Global Macro Strategy

Theme #4: Anchors away! Are long-term inflation expectations disanchoring?

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Global

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Are US inflation expectations at risk of disanchoring?

With the Fed's 5-year forward breakeven inflation measure down 30bp in the past two months, and 60bp since mid-2015, it is reasonable to ask whether market-based measures of long-term inflation expectations are at risk of disanchoring. We test for this empirically, finding signs of disanchoring. Given the uncertainty around how best to measure this, we are cautious in interpreting our results, but at a minimum, they suggest increased risk of US inflation expectations disanchoring lower.

US yields to remain low

Given the link between expected and actual inflation, US back-end yields are likely to remain low under a variety of macro scenarios, with the degree of Fed response being key. If the Fed remains hawkish, 10-year yields should fall further, as long-term inflation expectations remain under pressure. If the Fed were to stop hiking, curves could steepen with US 10-year yields rising, but not well above 2% in our view.

An additional weight on inflation

We have argued previously that global core inflation is likely to remain low due to a still-negative global output gap, a relatively flat Phillips curve, and high inflation persistence ("Disinflation: felt locally, spread globally" 9 September 2015). A disanchoring or extended period of low inflation expectations could put additional pressure on global inflation.

Expectations matter for policy as well

The Fed's confidence that inflation will eventually converge to its 2% target has been predicated, at least in part, on stable inflation expectations, so any disanchoring could have policy implications. The recent past suggests that if the Fed continues on its current path, in the absence of positive growth surprises, market-based inflation expectations may remain low, dampening the prospects for an eventual recovery in actual inflation. This also has the effect of tightening financial conditions via higher real interest rates, suppressing growth expectations in the real economy as well.

A pyrrhic victory in the Euro area?

We performed the same exercise for the Euro area, where long-term inflation expectations also began to disanchor in 2014. In contrast to the US, Euro area inflation expectations started to re-anchor on our measure in early 2015. The ECB's sharp dovish shift at the time may have helped deter a further slide in inflation expectations. This re-anchoring, however, may have occurred at a new, lower level. If this is the case, and inflation expectations have re-set below the ECB's target rather than returning to pre-2014 levels, this would not be a good outcome.

Continue to favour a narrowing of the US-German 10-year yield spread

Our results are supportive of long US Treasuries versus short Bunds, a trade that we have been recommending as part of our 2016 top trades. The spread remains two standard deviations above its historical average, and with growth between the US and Euro area continuing to re-synchronize, we expect a significant narrowing. An increased risk of US inflation expectations disanchoring lower supports this trade, as well as our bullish EUR/USD view, as it provides additional evidence that dynamics in the Euro area and US are not as different as many think.

Inflation expectations

UBS Research THESIS MAP a guide to our thinking and what's where in this report

PIVOTAL QUESTIONS

Q: Are long-term inflation expectations becoming less well anchored in the US?

On our metric, yes, the decline in market-based US inflation expectations to a historical low has been accompanied by some disanchoring of expectations. We seek to quantify this by looking at the relationship between inflation surprises and long-term inflation expectations. If inflation expectations are well anchored, there should be no correlation between them. However, we find that during the past two years, inflation surprises have had a positive, statistically significant impact on US inflation expectations, suggesting some disanchoring. Given the short data sample and uncertainty regarding how best to quantify this, we are cautious in interpreting our results. But at a minimum, they tell us there is a significantly increased risk of US inflation expectations becoming disanchored. more →

Q: Can inflation expectations re-anchor?

Yes. Given how well anchored US inflation expectations have been during the past 20 years, what we are seeing now may be temporary, and reversible. Our results for the Euro area show that after disanchoring in 2014, inflation expectations started to re-anchor in early 2015, and now appear well anchored. This indicates that our US results are likely not just a function of declining oil prices, and also tells us that inflation expectations can re-anchor quickly. That said, we are cautious in extrapolating this result to the US. First, this re-anchoring required a sharp dovish shift from the ECB, and second, the re-anchoring may have taken place at a new, lower level. If inflation expectations have re-anchored below target, that is not a desirable outcome. more →

Q: What are the implications if US inflation expectations disanchor?

Given the link between expected and actual inflation, back-end yields in the US are likely to remain low under a variety of macro scenarios, and the degree to which the Fed responds will be key. If the Fed remains hawkish, 10-year yields should fall further. If the Fed were to stop hiking, yields could rise, though we see limited near-term upside. Our preferred expression of this view is to be long 10-year Treasuries against short 10-year Bunds. more →

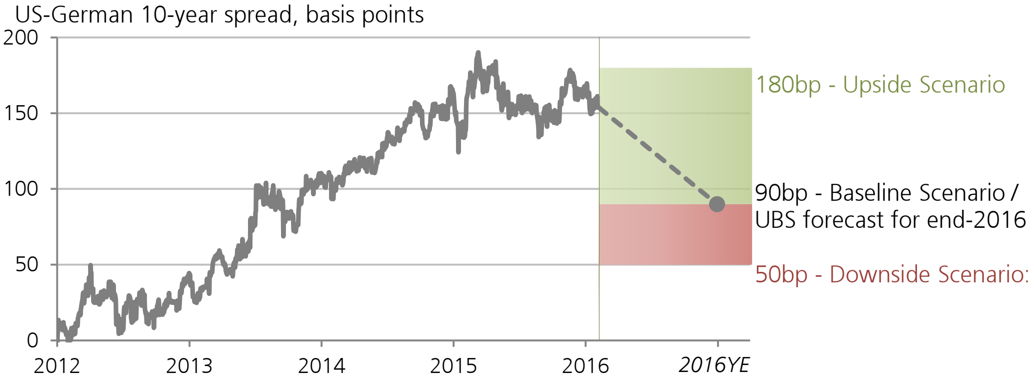
UBS VIEW

The decline in US inflation has impacted the anchoring of inflation expectations: Regardless of whether expectations have actually disanchored lower, persistently low inflation and a relatively hawkish Fed have increased this risk, and should keep back-end yields low.

EVIDENCE

We estimate a model of inflation expectation anchoring for the US, creating a time series of inflation surprises and comparing it to longer-term, market-implied inflation expectations. In the US, we find that after showing no relationship between 1999 and 2013, the relationship has become positive and statistically significant during the past two years.

UPSIDE / DOWNSIDE SPECTRUM



US/German 10-Year Spread Downside Risks	**US/German 10-Year Spread Upside Risks**
▪ US growth and inflation continue to fall, while Euro area credit growth continues to accelerate.	▪ Euro area growth decelerates. ▪ Political risk re-emerges in the Euro area.

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Are US inflation expectations disanchoring?

return ↑

Does the decline in inflation expectations indicate disanchoring?

With 5-year forward breakeven inflation in the US falling sharply to a historical low (Figure 1), it is reasonable to question whether long-term inflation expectations remain well anchored. This is important, as the relationship between actual and expected inflation has historically been positive, and the Fed continues to express confidence that inflation will eventually return to its 2% target. This confidence has, at least in part, been predicated on the stability of inflation expectations.

To answer this question empirically, we follow a methodology similar to that used by Davis (2012).[i] We create a time series of inflation surprises, and then compare it with long-term inflation expectations. The responsiveness of long-term inflation expectations to a shock to current inflation should be a good gauge of how well anchored expectations are. If long-term inflation expectations are well-anchored, the response should be minimal. If, however, surprises to current inflation have a positive and statistically significant impact on longer-term inflation expectations, they are not well anchored.

We test for this empirically by looking at the correlation between inflation surprises and long-term inflation expectations.

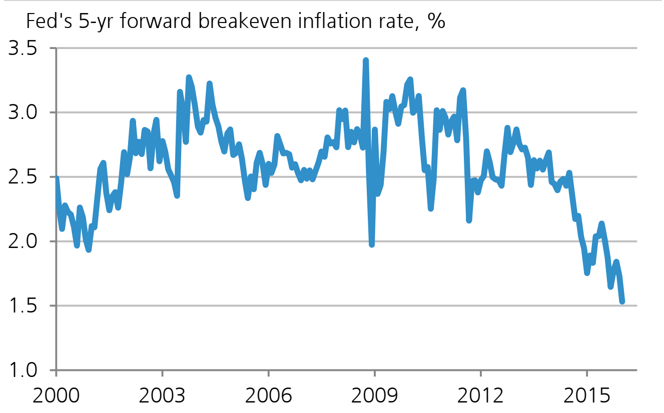
The Cleveland Fed produces a series of market-based inflation expectations extracted from bond yields, including expectations for one-year ahead inflation. We use this to calculate a monthly time series of inflation surprises by taking y/y headline CPI, and subtracting from it the 12-month lag of the Cleveland Fed's one-year ahead inflation expectation. These inflation surprises have been mean zero since 1999, with large positive deviations in 2007/08 during the run-up in oil, and then large negative deviations in 2009 post-financial crisis (Figure 2).[ii]

For a measure of long-term inflation expectations, we use the Fed's 5-year forward breakeven inflation rate. Although this is not a perfect measure, it is among the most widely known and utilized. We then estimate the following regression, lagging inflation surprises by one month to account for the fact that US CPI is released with a lag:

$$Inflation\ expectations = c + x * (sum\ of\ past\ 3\ months\ inflation\ surprises) + \varepsilon$$

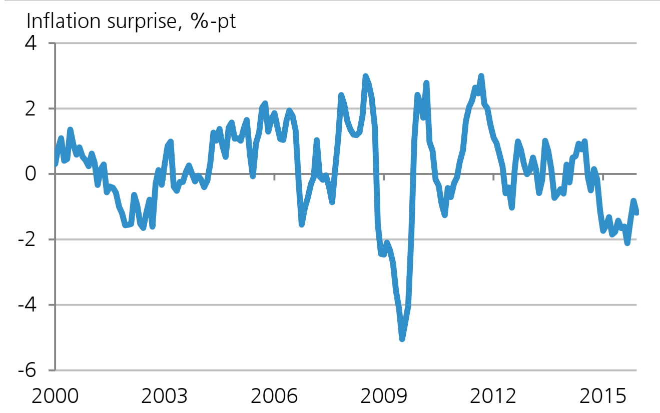
If long-term inflation expectations are well anchored, x, the coefficient on inflation surprises, should be small and statistically insignificant. If, however, it is positive and statistically significant, inflation surprises are causing changes in long-term inflation expectations, and expectations are not well anchored.

Figure 1: Market-based expectations falling sharply



Source: Bloomberg, UBS.

Figure 2: Inflation has surprised to the downside recently

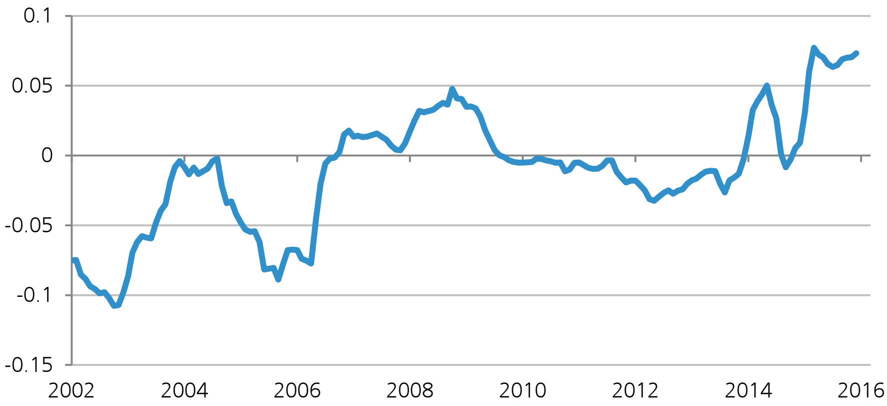


Source: Bloomberg, Cleveland Fed, UBS. Difference between realized y/y CPI and TIPS-based measure of 1-year ahead inflation 12-months prior.

Figure 3 shows the 24-month rolling regression coefficient on inflation surprises, currently at the highest of the past 15 years, and well above the 2008 peak. Figure 4 summarizes the regression results in more detail and over different sub-samples.

Figure 3: Impact of inflation surprises on inflation expectations is rising

Coefficient of inflation surprises (from regression on Fed's 5-yr fwd breakeven inflation)



Source: Bloomberg, Cleveland Fed, UBS calculations.

For the full sample (2000–15), the regression coefficient on lagged inflation surprises is zero and statistically insignificant. This is a good indication that, as one would expect, inflation expectations have been well anchored in the US.

This result holds for the 2000–05 and 2005–10 sub-samples, both of which show a slightly negative, but statistically insignificant coefficient. So, even during the financial crisis, long-term inflation expectations weren't moved by a large negative output gap and inflation undershoot.

Our results show signs that inflation expectations may be disanchoring lower.

However, for the 2010–15 sample, the coefficient rises to +0.06, and becomes statistically significant (t-stat = 4.9). Cutting this sub-sample in half, we see that the result is entirely due to 2013–15, when the coefficient rises to +0.10, with a t-statistic of 6.1.

Figure 4: Regressing inflation surprises on inflation expectations

	Full sample (2000-15)	2000-05	2005-10	2010-15	2010-12	2013-15
Coefficient on lagged inflation surprises	0.00	-0.03	-0.01	0.06	-0.01	0.10
t-statistic	0.8	-2.3	-1.4	4.9	-0.6	6.1
R-squared	0%	7%	3%	26%	1%	52%

Source: Bloomberg, Cleveland Fed, UBS calculations.

Disanchoring of inflation expectations: When and why?

It is important to be cautious in interpreting these results. Our data sample is short, and there is uncertainty regarding how best to measure the anchoring of inflation expectations. Declaring that inflation expectations in the US are no longer well-anchored is a very strong statement to make. Rather, what we are measuring here is the correlation between inflation surprises and inflation expectations. This is a reasonable way to think about and quantify anchoring, but it is only one such method for doing so, and not necessarily definitive.[iii]

We are cautious in interpreting our results, but at a minimum, we are comfortable saying that the risk of inflation expectations disanchoring has increased significantly.

As such, we think it makes sense to simply say that inflation expectations appear less strongly anchored than before, and that the risk of disanchoring has increased.

That said, the results are still striking, especially when one considers how well anchored inflation expectations remained from 2000–13, and 2008–09 in particular. Despite a large negative output gap and collapsing energy prices, there was very little increase in the impact of inflation surprises on longer-term expectations, and the impact was not statistically significant.

Yet, with a much smaller output gap currently, the relationship between inflation surprises and inflation expectations has turned positive and statistically significant. Inflation expectations are now changing alongside inflation surprises, a troubling development for the anchoring of such expectations.

In terms of when this started, it is difficult to pick an exact moment, but the rolling coefficients suggest sometime in late 2014 or early 2015. As for why this happened, one can only speculate, but it is worth noting that the disanchoring coincides with the period between the end of Fed asset purchases and the end of forward guidance. It is intuitively sensible that an increasingly less accommodative Fed against a backdrop in which core PCE has remained well below its 2% target, has led markets to question the Fed's commitment to its target. This may well be what our results are showing.

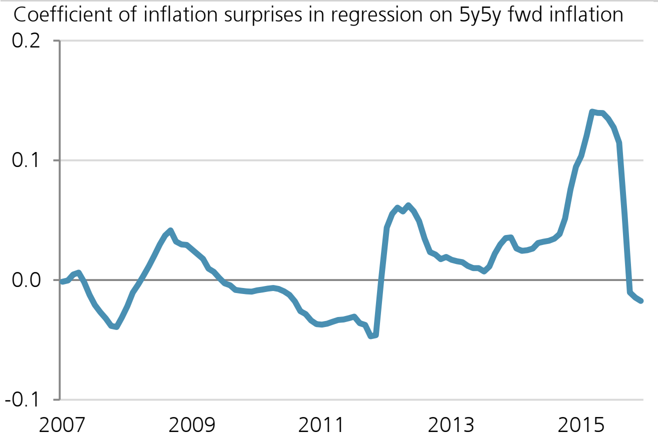
Can expectations re-anchor? A pyrrhic victory in Europe return↑

We run a similar exercise for the Euro area, with different results. Euro area inflation expectations appear to have re-anchored.

We ran the same empirical exercise for Euro area inflation expectations. Similar to the US, inflation expectations in the Euro area remained well anchored throughout the global financial crisis and aftermath. Also similar to the US, inflation expectations began to disanchor in 2014. This is consistent with the sharp decline in Euro area headline and core inflation that took place from 2013 to 2014, and similar to the current disanchoring of US inflation expectations, may have been a reflection of monetary policy that was too tight.

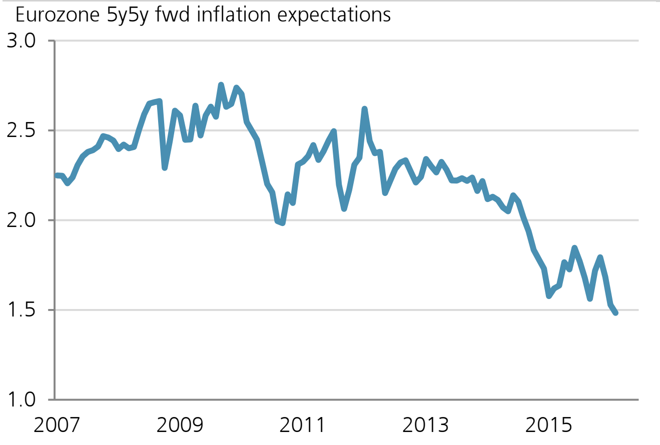
But notably, inflation expectations in Europe began to re-anchor on our metric in early 2015, and now appear well anchored – the regression coefficient is almost exactly zero during the past 24 months (Figure 5). Although correlation doesn't necessarily imply causation, it is notable that Euro area inflation expectations began to re-anchor when the ECB turned significantly more dovish in early 2015.

Figure 5: Inflation expectations re-anchoring in Europe



Source: Bloomberg, UBS calculations.

Figure 6: But are they re-anchoring at a lower level?



Source: Bloomberg, UBS calculations.

The fact that Euro area inflation expectations are re-anchoring precisely when US inflation expectations appear to be disanchoring, suggests that what is happening in the US is not just a result of oil or some globally common exogenous factor. It

may also imply that if the Fed continues on its current path, absent positive growth surprises, US inflation expectations are at risk of remaining disanchored, and may converge toward actual inflation, rather than vice versa.

Our Euro area results may provide some lessons for the US, though care needs to be taken when extrapolating from one to the other. First, Euro area inflation expectations only began to re-anchor after a sharp dovish shift from the ECB. Second, the decline in the correlation between Euro area inflation surprises and long-term inflation expectations, which is what our measure of anchoring reflects, has partly been driven by positive Euro area inflation surprises. Given how pessimistic short-term inflation expectations in Europe had become in 2014, the bar for inflation to surprise positively in 2015 on our metric was very low.

But the re-anchoring in the Euro area may have happened at a new, lower level, below the ECB's target. This would not be a good outcome.

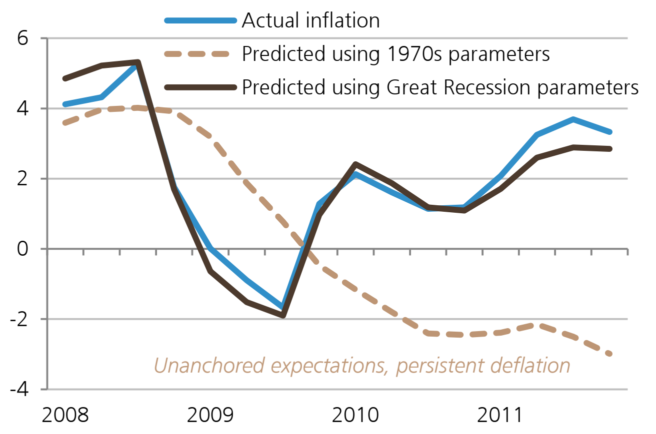
Third, and most important, this re-anchoring may have occurred at a lower level of inflation expectations (Figure 6, previous page). So, while it may be good that inflation expectations and inflation surprises are no longer correlated in the Euro area, if this happened because inflation expectations adjusted lower, and below the ECB's target, this is not necessarily a good outcome.

Market implications: focus on back-end yields

return↑

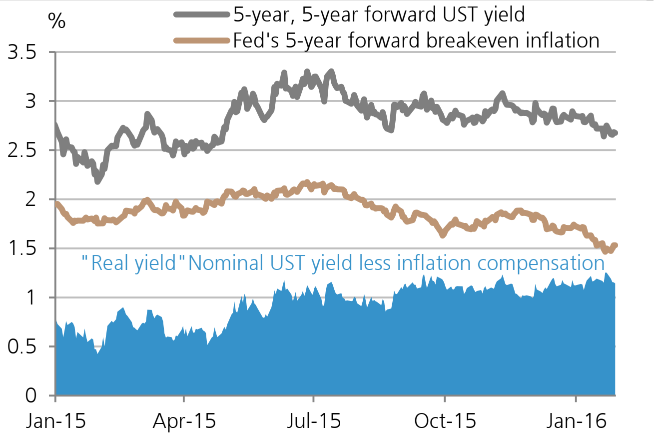
The empirical literature shows a significant role for inflation expectations in the inflation process. In our own Phillips curve estimations, the coefficient on expectations has a high degree of statistical significance, indicating inflation expectations play an important part in determining inflation outcomes.

Figure 7: The power of anchored inflation expectations



Source: IMF *World Economic Outlook*, Fall 2013, "The dog that didn't bark: has inflation been muzzled or was it just sleeping?"

Figure 8: Falling inflation expectations raising real rates



Source: Bloomberg, UBS.

The 2008–11 period demonstrates how powerful the anchoring effect can be, and is instructive in the current context. Despite a deeply negative output gap, the sharp decline in inflation in 2009 was short-lived. This is likely because inflation expectations served as a strong anchor for actual inflation. This has not always been the case. The IMF has shown that if US inflation expectations had not been well anchored in the 2000s, and instead were loosely anchored as they were in the 1970s, the result would have been a prolonged period of deflation (Figure 7).

Anchored inflation expectations are important, and helped the US avoid deflation after the global financial crisis.

Indeed, the Fed has long argued that well-anchored inflation expectations will lead actual inflation to eventually converge to target. But if expectations have become less well anchored, that confidence may be misplaced, making a return to target even more challenging. US inflation has not been at target in nearly 4 years, and

recent research reinforces this concern: in a cross-country study, a Bank of Canada economist found that when inflation runs below central banks' targets, inflation expectations are more prone to disanchoring.[iv]

Lower inflation expectations may tighten financial conditions…

Falling inflation expectations also tighten financial conditions by raising real rates. One year ago, yields on 5-year, 5-year forward nominal Treasuries were 50bp higher than equivalent inflation compensation. That gap now exceeds 100bp: Treasury yields are virtually unchanged, but inflation compensation is 50bp lower (Figure 8, previous page), translating to an increase in "real yields" and tightening of financial conditions.

Difficult for back-end yields to rise much in any scenario

…and put pressure on the Fed to respond.

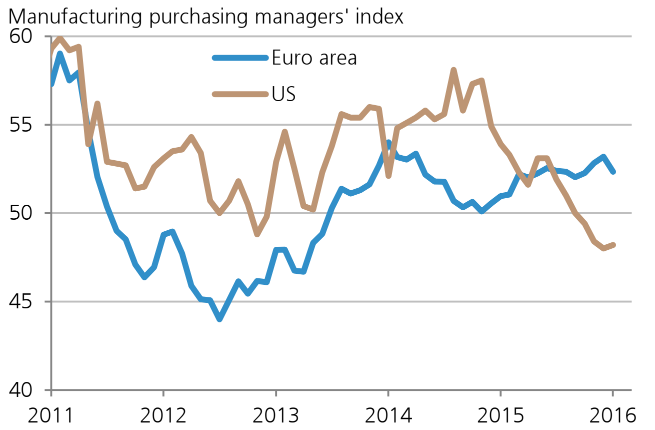
The clearest implication from the above is that back-end yields in the US have limited upside, given the large embedded inflation expectations component. We see three potential outcomes.

1. **The Fed follows its dots, and hikes four times this year.** Unless this is driven by an upside growth surprise, back-end yields should fall further in this scenario, as tighter policy weighs on both actual and expected inflation.

2. **The Fed becomes marginally more dovish, skipping a hike in March, and maybe June, but maintaining its view that rates will continue to rise.** This would be similar to last year's backdrop, in which the Fed delayed hiking, but retained the optionality to do so in the not too distant future. This resulted in elevated volatility and tighter-than-necessary financial conditions, a repeat of which would likely see yields remain volatile around current levels.

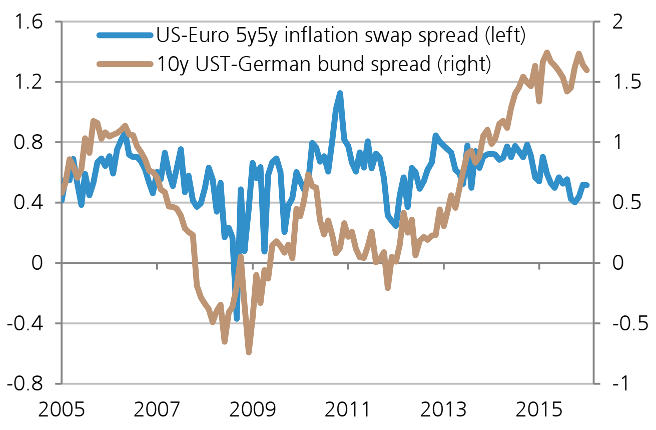
3. **The Fed stops hiking, and indicates that it will remain on hold for the foreseeable future.** This is the scenario in which back-end yields would have the most upside. As we showed in Big Macro 2, the further the Fed delays hikes, the higher the probability of inflation eventually reaching target. That said, long equities is probably the better market expression of this scenario, as inflation convergence from current levels will still take time, and a rally in equities would likely lead to a more hawkish Fed. The October - December 2015 period provides a good template for this, and indicates that inflation expectations may have trouble rising significantly in the near term.

Figure 9: Manufacturing gap has reversed



Source: Haver Analytics, UBS.

Figure 10: Narrowing inflation, wide UST-bund spread



Source: Bloomberg, UBS.

US-German 10-year spread to narrow further

Inflation expectations suggest that the divergence between the US and Euro area is not as large as many think.

Long 10-year US Treasuries versus short 10-year German Bunds is our favourite market expression of the above, and is a trade we have been recommending as one of our top trades for 2016. A heightened risk of US inflation expectations disanchoring supports the trade, not so much because the outcome for the Euro area is so much better than for the US, but because our results suggest that differentiation between the two regions is not nearly as great as many think.

We have been recommending the trade on the view that with the spread more than two standard deviations above its historical average, markets are pricing too much growth and inflation divergence between the two regions. Almost all of the growth headwinds perceived in Europe a few years ago have now turned into tailwinds, and in particular, the credit impulse, fiscal policy, level of the currency, and energy prices are all now supportive for Europe.

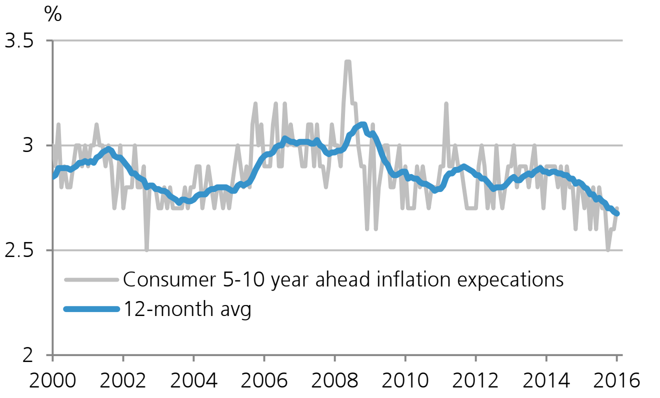
At the same time, an early Fed hiking cycle risks a static 10-year yield. This was the case during the last tightening cycle, when 10-year yields fell before ending the cycle unchanged. This time, we see downside risks as greater: terminal rates are lower than they were in previous cycles and credit markets appear more sensitive to rate increases than they were before.

Are we measuring inflation expectations correctly?

Market measures of inflation expectations may be imperfect…

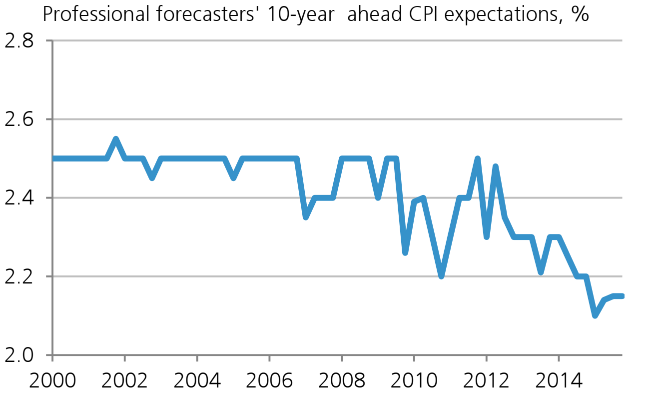
Our results need to be interpreted with caution, and we are conscious that there are a number of places in which we can be wrong. For example, some argue that market measures of inflation compensation do not accurately represent longer-run expectations. Because pricing is based on investor demand for inflation-indexed securities, they also reflect premia for liquidity (how easily they can be bought/sold) and inflation risk (the risk that an investor is wrong about realized inflation). By this logic, reduced inflation compensation may reflect a combination of less investor interest, which could be a function of more volatile energy prices, reduced liquidity in the securities, and/or reduced upside inflation risk (but not necessarily changing modal expectations). Others discount market-based inflation expectations because they are not particularly accurate in predicting future inflation.

Figure 11: Consumer inflation expectations declining…



Source: Bloomberg, UBS.

Figure 12: …and professional forecasters' as well



Source: Haver Analytics, UBS.

…but alternatives measures are declining, too.

There is validity to each of these critiques. However, we would note that while not as extreme as the decline in market-based measures, surveys of long-term inflation expectations are showing noticeable declines as well (Figures 11 and 12).

Is it all just about oil?

Many investors and commentators have noted the high correlation between oil prices and US inflation expectations, arguing that this makes the decline in inflation expectations less worrying, as a rise in oil prices will reverse the decline in inflation expectations. Although this is certainly possible, we would note that a similar decline in oil prices in 2008/09 was not accompanied by nearly as large an increase in the correlation between inflation surprises and inflation expectations. So, there is something different going on now that needs to be watched carefully.

Oil may distort the picture…

Bottom line

There is too much uncertainty to say for sure that US inflation expectations have become disanchored. That said, we do find evidence of disanchoring, and at a minimum, the risk has increased significantly. Well-anchored inflation expectations have been key for monetary policy over the past 20 years, and any disanchoring lower would make it more difficult for inflation to rise to target. To the extent that expectations are less well anchored than before, this should weigh on back-end US yields, and supports our long US Treasuries versus short German Bunds trade.

…but the risk of disanchoring is real, and important to monitor.

[i] J. Scott Davis, "Inflation expectations have become more anchored over time," Federal Reserve Bank of Dallas, *Economic Letter*, Vol. 7, No. 13, December 2012.

[ii] The measure of inflation surprises we use here is not the same as the UBS inflation surprise index published on Bloomberg. That index is based on data releases relative to economist expectations published on Bloomberg. Here we utilize a different measure of inflation surprises to be consistent with Davis (2012).

[iii] Some studies, for example, use a data-surprise framework, measuring anchoring by the sensitivity of long-term inflation expectations to data surprises.

[iv] Michael Ehrmann, "Targeting Inflation from Below: How Do Inflation Expectations Behave?" *International Journal of Central Banking*, Vol. 11, No. 4, September 2015.

Valuation Method and Risk Statement

Risks of multi-asset investing include but are not limited to market risk, credit risk, interest rate risk, and foreign exchange risk. Correlations of returns among different asset classes may deviate from historical patterns. Geopolitical events and policy shocks pose risks that can reduce asset returns. Valuations may be adversely affected during times of high market volatility, thin liquidity, and economic dislocation.

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