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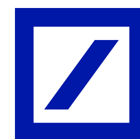

Global

Strategy
Asset Allocation

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Strategy Update

Six Myths About Inflation

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Arguably the most consequential surprise across markets this year has been the slowdown in inflation. The slowdown began in March even as growth strengthened and the labor market tightened. Lower inflation and the subsequent pricing out of Fed hikes saw bond yields become range bound, the dollar fall to the bottom of its 2½ year range, oil prices rebound, Value significantly underperform Growth within equities and the normally strong positive bond yield-equity correlation plummet. These large cross asset impacts have understandably led to an acute market focus on inflation, its drivers and debate as to its prospects. But it has also led to the perpetuation of a large number of myths about inflation, several of them variously emphasized by different members of the FOMC. We discuss 6 of them.

- **Myth:** Inflation is low. **Fact:** It is well within its narrow 20-year range
- **Myth:** Low inflation reflects structural changes. **Fact:** Statistically that's impossible with inflation around 1 standard deviation (40bps) from its average
- **Myth:** The recent decline in inflation is telling us something about current or future slack or growth. **Fact:** Inflation is a (very) lagging indicator. The recent slowdown, if anything, is telling us about the (long) past slowdown in growth
- **Myth:** Inflation is running stubbornly below target. **Fact:** The Fed effectively raised its target when it adopted the PCE as its preferred measure of inflation since it systematically runs lower than CPI inflation; though the Fed has on average hit its target of 2% vis-a-vis CPI inflation, vis-à-vis the PCE it has only done so once in 20 years; it is hard to effectuate changes in inflation targets
- **Myth:** The decline in inflation expectations reflects deep deflationary forces. **Fact:** It is easily explained by the US dollar and oil shocks of 2014
- **Myth:** The Phillips curve is broken. **Fact:** It is not. But unemployment is not the only driver of inflation and certainly not the most important

When myths abound, the same facts can lead to very different conclusions. The many myths currently prevailing about inflation leave the bond market, in our view, vulnerable to two distinct sources of risks. The first is the obvious one that reality simply overcomes the myths and inflation moves back up, prompting a

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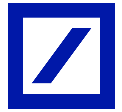
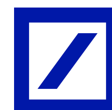


gradual repricing of rates. This is our baseline and house view. The second though is that even if inflation does not move up, the same facts are open to very different, even opposite, interpretations, if and when members of the FOMC, particularly the leadership change. Indeed, if inflation is judged by historical standards to be completely normal, then a Fed behaving in line with its average past behavior would have policy rates at 350bps this morning not 113bps.



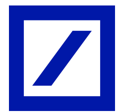
Six Myths About Inflation

Arguably the most consequential surprise across markets this year has been the slowdown in inflation. The slowdown began in March even as growth strengthened and the labor market tightened. Lower inflation and the subsequent pricing out of Fed hikes saw bond yields become range bound, the dollar fall to the bottom of its 2½ year range, oil prices rebound, Value significantly underperform Growth within equities and the normally strong positive bond yield-equity correlation plummet. These large cross asset impacts have understandably led to an acute market focus on inflation, its drivers and debate as to its prospects. But it has also led to the perpetuation of a large number of myths about inflation, several of them variously emphasized by different members of the FOMC. We discuss 6 of them.

Myth: **Inflation is low**

Fact: **It is well within its narrow 20-year range**

- **Arguably the most basic and pervasive myth of this cycle has been that inflation is low.** One could be forgiven from a reading of all the headlines and policy maker hand wringing for thinking that inflation must have fallen off the charts. It is in fact very much on the chart. Measured by the Fed's preferred PCE index, core inflation has remained well within the relatively narrow 1%-2.3% range it has been in for the last 20 years.
- **Don't compare with the Great Inflation cycle of 1968-1995.** While casual comparisons of inflation often go further back than the last 20 years, it is important to note the Great Inflation cycle of 1968-1995, one of the longest and largest peace time inflation cycles. It is widely agreed that this was not a desirable outcome for inflation and therefore not what one wants to compare current inflation against. In our view it is therefore appropriate to restrict comparisons of current inflation to the last 20 years, i.e., the period since 1996. Prior to the Great Inflation cycle, during the early part of the 1960s, core PCE inflation fluctuated in a range of 1.1%-2.1%, about the same as it has done for the last 20 years. Notwithstanding the change in monetary policy maker rhetoric during this cycle, the range for core PCE inflation in this economic recovery has been no different than it was during the last two economic recovery cycles.
- **False precision of discussing small movements in inflation.** We share the view that the recent acute focus on small movements in inflation forgets the normal volatility of economic time series. Over the last 20 years, core PCE inflation has averaged 1.7% with a standard deviation of 40bps. One standard deviation around the average encompasses inflation outcomes of 1.4%-2.1% and suggests not reading too much into small movements in inflation.



Myth: **Low inflation reflects structural change**

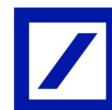
Fact: **Statistically that's impossible with inflation around 1 standard deviation (40bps) from its average over the last 20 years**

- **Long list of potential sources of structural change in inflation.** The list of potential drivers of structural changes in the inflation process is long. The list includes globalization, the impact of outsourcing in meeting constraints on capacity and in hiring, the impacts of technological disruption that have lowered prices in various market segments, increased competitive price pressures, secular changes in sector inflation such as lower Health Care inflation since 2007 and cycles in rents which comprise a significant proportion of consumption baskets.
- **But impossible that any change in the aggregate has been statistically significant.** With inflation well within its historical distribution and currently around 1 standard deviation from its mean of the last 20 years, it is impossible that there has been a statistically significant structural break in inflation in the aggregate. It is not that these changes have not occurred or that they are not having the expected impact, it is that they have not had a sizable or discernible enough impact in the aggregate, at least no more than they have at any time over the last 20 years.
- **Inflation rotations.** From a macro perspective, a decline in the rate of inflation in one sector implies more income available to spend elsewhere and should all else equal see a rotation of inflation to other sectors, not necessarily a decline in aggregate inflation.

Myth: **The recent decline in inflation is telling us something about current or future slack or growth**

Fact: **Inflation is a (very) lagging indicator. The recent slowdown, if anything, is telling us about the (long) past slowdown in growth**

- **Inflation responds with long lags.** It is well known that inflation is slow moving and responds with long lags to changes in growth, to changes in unemployment, to the dollar and to commodity prices. For example, while the correlation between core CPI inflation and GDP growth over the last 20 years is only around 5%, when GDP growth is lagged by 6 quarters, the correlation jumps to a strong 80%. This strong correlation implies almost 2/3 of the variation in core inflation can be explained simply by lagged growth.
- **Lagged growth is pointing to inflation turning up.** GDP growth, having rebounded since the impacts of the dollar and oil shocks have dissipated, is pointing to a turn up in inflation.



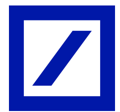
Myth: **Inflation is running stubbornly below target**

Fact: **The Fed effectively raised its target when it adopted the PCE as its preferred measure of inflation since it systematically runs lower than CPI inflation; though the Fed has on average hit its target of 2% vis-a-vis CPI inflation, vis-à-vis the PCE it has only done so once in 20 years; it is hard to effectuate changes in inflation targets**

- **The Fed effectively increased its inflation target by 40 bps with the adoption of the PCE as its preferred measure of inflation.** The FOMC moved to adopt the PCE as its preferred measure of inflation over the CPI at its Feb 2000 meeting. In doing so, the FOMC explicitly noted at the time that the "... PCE chain-type index is constructed from a formula that reflects the changing composition of spending and thereby avoids some of the upward bias associated with the fixed-weight nature of the CPI." That is to say, PCE inflation runs below CPI inflation. Over the last 20 years, core PCE has almost always run lower than the CPI, on average 40bps lower. A move from targeting CPI inflation to PCE inflation with an unchanged target thus implies an effective increase in the inflation target by the average differential. To put it another way, with an unchanged inflationary process a CPI inflation target of 2% translates to a 1.6% inflation target for the PCE since it tends to run 40 bps lower. Or to achieve a 2% inflation target for the PCE would require a 2.4% target for the CPI. Of course the Fed did not adopt an explicit official target of 2% until 2012, but arguably this has been implicit for a long time.

- **Though core CPI has averaged 2% over the last 20 years, core PCE inflation has sustained at or above 2% only "once" in the last 20 years, during the last dollar down cycle.** It is notable that almost all of the observations of core PCE at or above 2% over the last 20 years occurred during a single consecutive period which ran from Oct 2004 through Sep 2008. As we have pointed out previously, this singular period of core PCE inflation sustaining at or above 2% over the last 20 years coincided with the last US dollar down cycle (Core Inflation Below Target Just Reflects The Dollar, Sep 2016). Other episodes of core PCE inflation reaching or rising above 2% represented brief spikes that look to have reflected the effects of temporary shocks, including both large gyrations in the dollar and idiosyncratic shocks to particular components of core PCE.

- **It is hard to effectuate changes in inflation targets.** The recent experience of Japan in trying to raise inflation expectations and inflation from mild deflation to 2% as part of Abenomics is testament to the difficulty of changing inflation expectations despite draconian, coordinated, and internationally sanctioned measures to do so. In the case of the US, the Volker disinflation by contrast of the early 1980s was very successful in lowering inflation expectations dramatically. But arguably this required not only a big recession, but also a very large rise in the dollar and a narrative of supply-side reform. In our view, in short, other factors also helped. In the case of the US, the recent difficulty of increasing inflation expectations to achieve a 2% PCE inflation target also points to the inherent dangers of success in that once inflation expectations do start to rise, does monetary policy have the tools to stop them from continuing to do so without engineering a massive recession?



Myth: **The decline in inflation expectations reflects deep deflationary forces**

Fact: **It is easily explained by the US dollar and oil shocks of 2014**

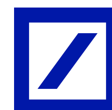
- **Inflation expectations are the most important driver and anchor for inflation over time.** This is the case both analytically and empirically. Analytically, in that inflation is impacted by variations in the output or labor market gap over the course of a business cycle, once an economic recovery is sufficiently advanced and these gaps have diminished, inflation expectations are the main driver and anchor of inflation. Empirically, it follows that changes in inflation expectations over time have a 1-for-1 impact on actual inflation. So a 1 percentage point increase in inflation expectations should be expected to lead to a 1 percentage point increase in inflation over time and the empirical evidence is that they do. By contrast, empirical estimates suggest that very large declines in the unemployment rate, ranging between 3-7 percentage points, would be required to raise inflation by 1 percentage point.

- **So the falloff in inflation expectations beginning in mid-2014 is potentially concerning, but it looks to simply reflect the US dollar and oil shocks which have dissipated.** Following the ECB's adoption of negative rates in June 2014 and subsequent BOJ actions, the US dollar rose at its fastest 9-month pace since it floated in the early 1970s and oil prices collapsed. One and 5-10 year ahead inflation expectations began to decline soon after in H2 2014, indicating the dollar and oil shocks were the driver of the declines. Inflation expectations look to have stopped falling but have fluctuated around lower levels since. Supporting the read that the driver of the decline in inflation expectations was the dollar and that this should be temporary, is that inflation expectations have been relatively robustly correlated (-40%) with changes in the dollar though arguably with long and variable lags. With the impacts of the dollar shock having dissipated on US growth and earnings, we expect it will also pass through inflation and inflation expectations.

Myth: **The Phillips curve is broken**

Fact: **It is not. But unemployment is not the only driver of inflation and certainly not the most important**

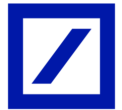
- **Many observers argue the Phillips curve has flattened or broken.** There has been much discussion about whether the traditional Phillips curve relating inflation to the output or unemployment gap has "flattened" or "broken" in recent years, i.e., inflation has become less- or un-responsive to the demand-supply gap as measured by the unemployment rate. Arguably, this has made the Fed bolder in keeping rates lower for longer even as unemployment has fallen to or below its estimates of the natural rate. Over the last 20 years, the correlation between core PCE inflation and the unemployment gap has been reasonable (-37%), though this implies that only a relatively small proportion (14%) of the variation in core PCE inflation can be attributed to the unemployment rate over the last 20 years. The "flattening" or "breaking" of the Phillips curve in this



cycle describes the fact that after being relatively closely correlated in the previous cycle (-77%), core PCE inflation has been much less correlated (-21%) in this cycle.

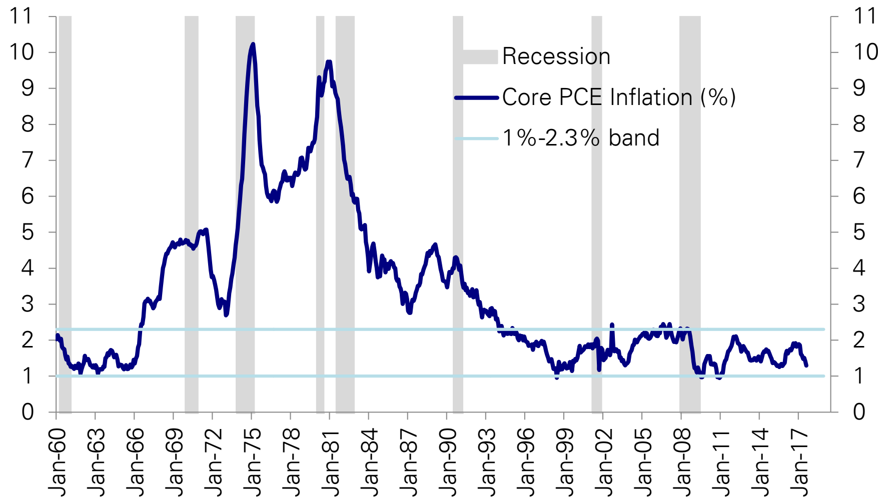
- **But inflation does not depend only on unemployment. Other drivers, especially in our view the dollar, have mattered.** As we noted above, the singular instance of core PCE sustaining at or above 2%, during the last economic recovery, coincided with the last multi-year dollar down cycle. Indeed core PCE inflation has been robustly and strongly negatively correlated with the dollar (-44%), starting with contemporaneous changes in the dollar and going out to lagged changes in the dollar up to at least 2 years. The strongest correlation of core PCE inflation has been with the 3-month lagged change in the dollar (-44%). But those with 6 month, 12 month, 18 month and 24 month lagged changes in the dollar are also relatively strong (ranging from -30% to -40%). The dollar impacts headline inflation through its impact on oil and commodity prices. But why does it impact core inflation which excludes Energy and Food? Because the dollar (i) impacts import prices directly and imports are part of the consumption basket; (ii) indirectly impacts domestic prices through import-competing effects, with for example a rise in the dollar making foreign goods in the US cheaper, pressuring domestic producers to cut prices or to restrain price increases; (iii) impacts oil and commodity prices which are used to produce all goods, including those in core. The nature of these effects also suggests that many of these impacts from changes in the value of the dollar will be felt on the core PCE only over time, i.e., with lags. How quantitatively important have these effects been? Almost a third (31%) of the variation in the core PCE over the last 20 years can be explained by changes in the value of the dollar alone. The US dollar has of course exhibited large (spanning 40%) and long (6-7 year) up and down cycles since the early 1970s when it floated (Unusually Delicate Balance For The Dollar: Norm of Feast or Famine To Resume, Apr 2006). On occasion the cycles in the dollar have been relatively synchronized with the US business cycle and added to inflation as the unemployment gap shrank. This was the case during the last business cycle during 2003-2007. But there have also been US business cycles such as in the 1990s and the current cycle when the dollar cycle detracted from inflation pressures.
- **The Phillips curve—augmented with the dollar—has not flattened or broken.** Including the dollar along with the unemployment gap to explain core PCE inflation dramatically improves the fit (61%) and the responsiveness of inflation to unemployment which we see as in line with various other historical estimates (11bps rise in core PCE for a 1% decline in unemployment). Actual inflation has on occasion deviated from fitted or fair value core inflation, but there is no sign that the relationship—the augmented Phillips curve—has broken.

When myths abound, the same facts can lead to very different conclusions. The many myths currently prevailing about inflation leave the bond market in our view vulnerable to two distinct sources of risks. The first is the obvious one that reality simply overcomes the myths and inflation moves back up, prompting a gradual repricing of rates. This is our baseline and house view. The second though is that even if inflation does not move up, the same facts are open to very different, even opposite, interpretations, if and when members of the FOMC, particularly the leadership change. Indeed, if inflation is judged by historical standards to be



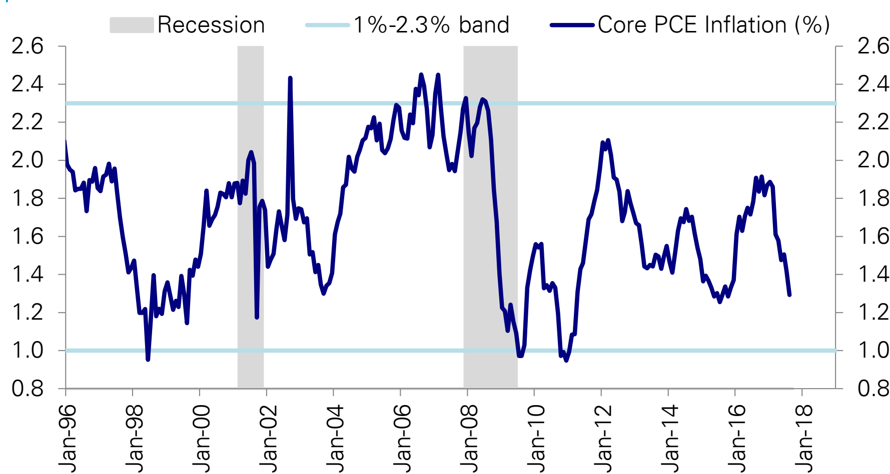
completely normal, then a Fed behaving in line with its average past behavior would have policy rates at 350bps this morning not 113bps.

Figure 1: Outside the Great Inflation cycle of 1968-1995, inflation has been in a narrow 1%-2.3% range



Source: BEA, Haver, Deutsche Bank

Figure 2: Despite policy maker rhetoric, the range of core PCE inflation during this recovery has been no different than in the last two economic recoveries



Source: BEA, Haver, Deutsche Bank

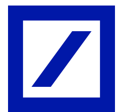
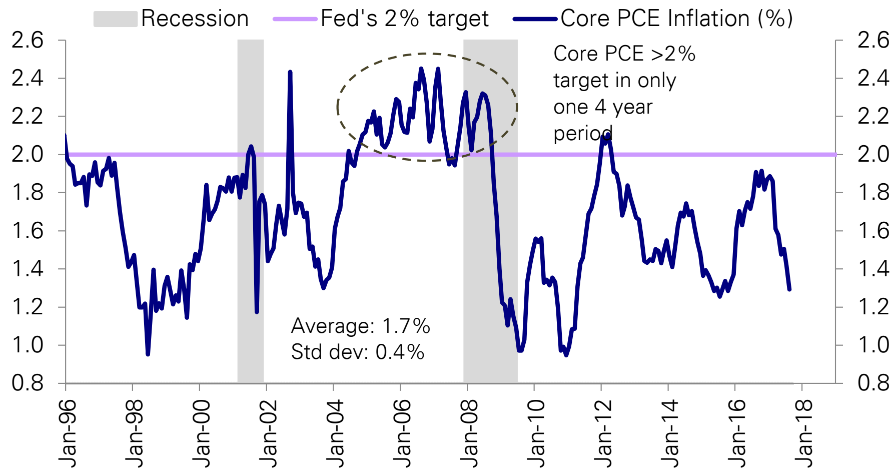
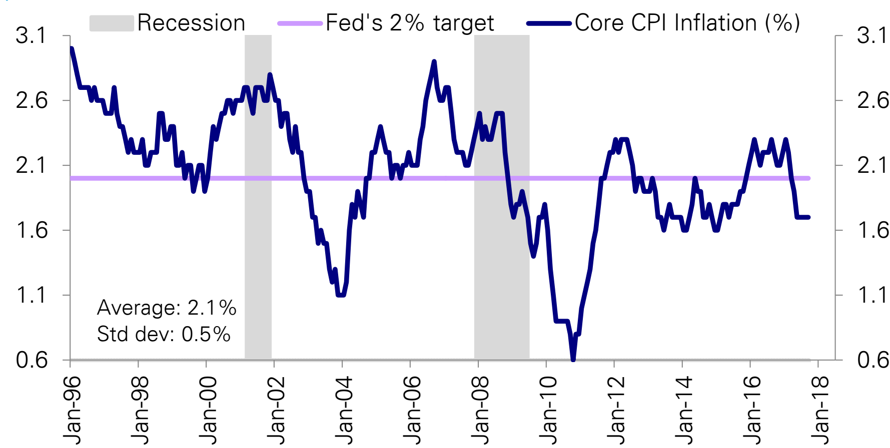


Figure 3: Core PCE inflation sustained at or above 2% only once in the last 20 years



Source: BEA, Haver, Deutsche Bank

Figure 4: Core CPI inflation by contrast has fluctuated around 2% in this and the last two economic recoveries



Source: BLS, Haver, Deutsche Bank

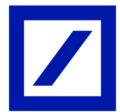
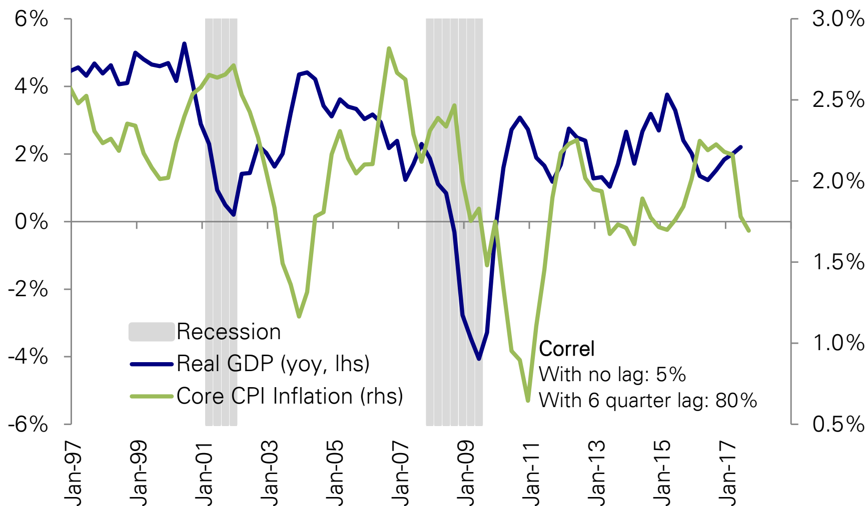
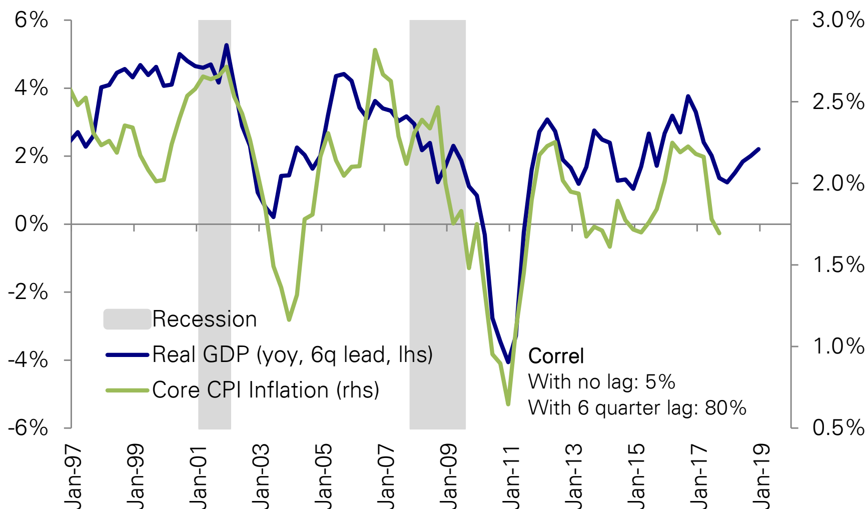


Figure 5: While the correlation between core inflation and current GDP growth over the last 20 years is only around 5%...



Source: BEA, BLS, Haver, Deutsche Bank

Figure 6: … when GDP growth is lagged by 6 quarters, the correlation jumps to a strong 80%



Source: BEA, BLS, Haver, Deutsche Bank

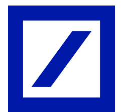
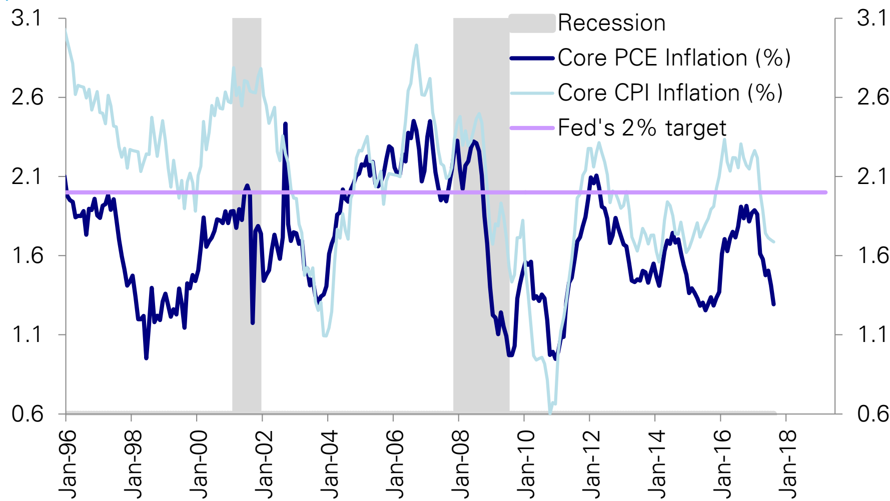
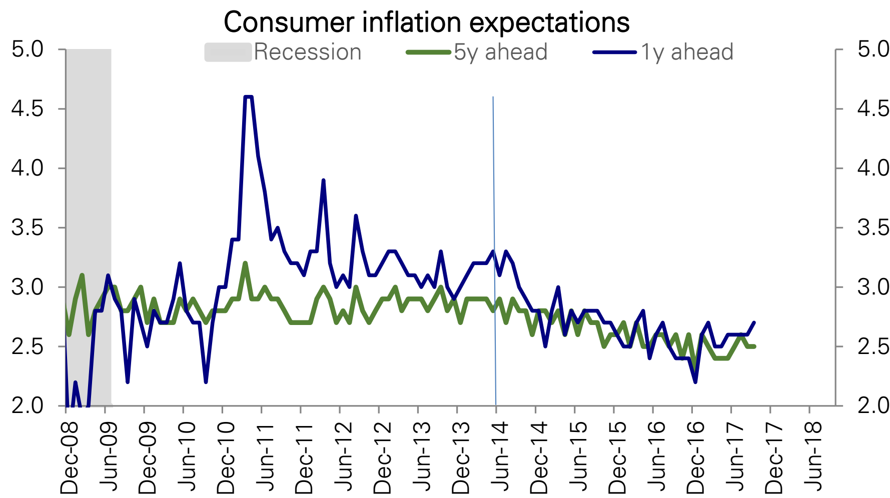


Figure 7: Core PCE inflation has run systematically lower than CPI inflation, on average by -40bps



Source: BEA, BLS, Haver, Deutsche Bank

Figure 8: Inflation expectations declined in H2 2014 following the ECB's adoption of negative rates and the subsequent US dollar and oil shocks ...



Source: University of Michigan, Haver, Deutsche Bank

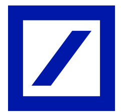
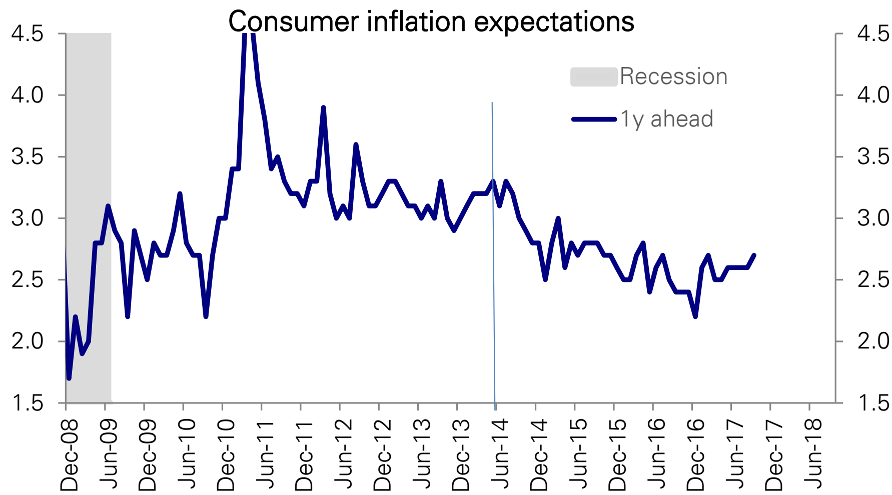
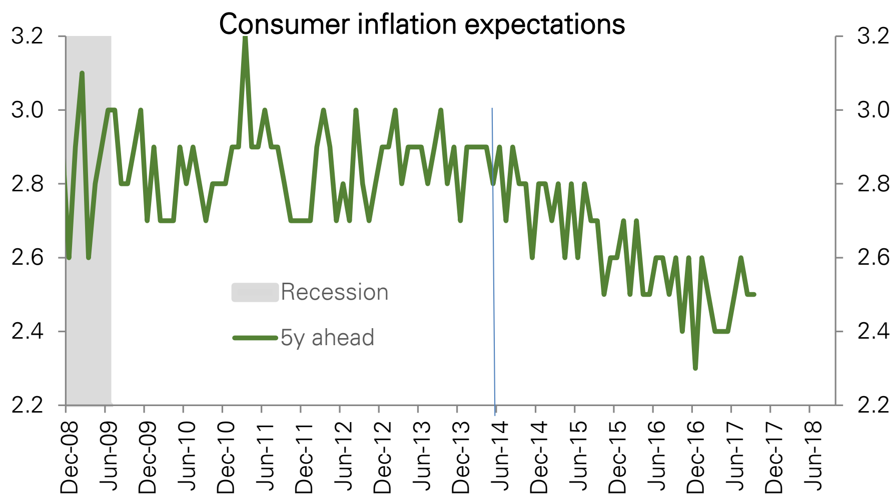


Figure 9: … both 1-year ahead …



Source: University of Michigan, Haver, Deutsche Bank

Figure 10: … and 5 years ahead



Source: University of Michigan, Haver, Deutsche Bank

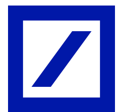
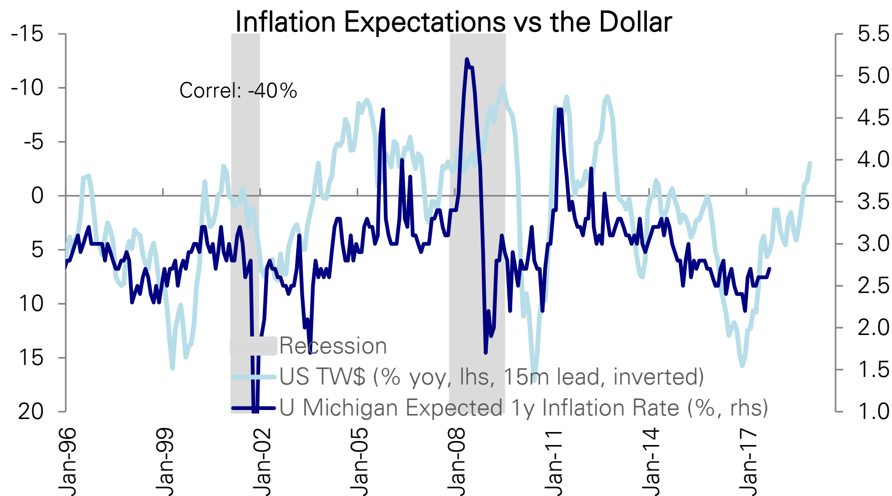
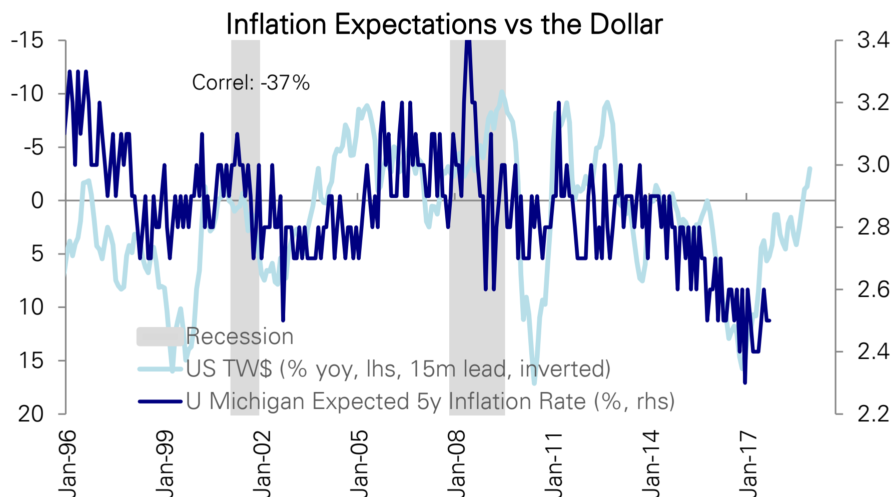


Figure 11: Inflation expectations have been ...



Source: University of Michigan, FRB, Haver, Deutsche Bank

Figure 12: ... well correlated with changes in the value of the dollar though with long and variable lags



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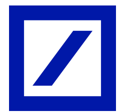
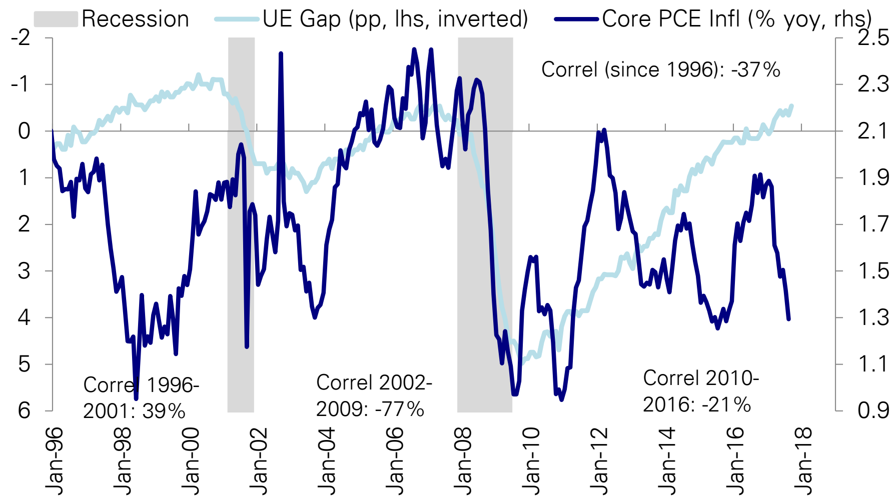
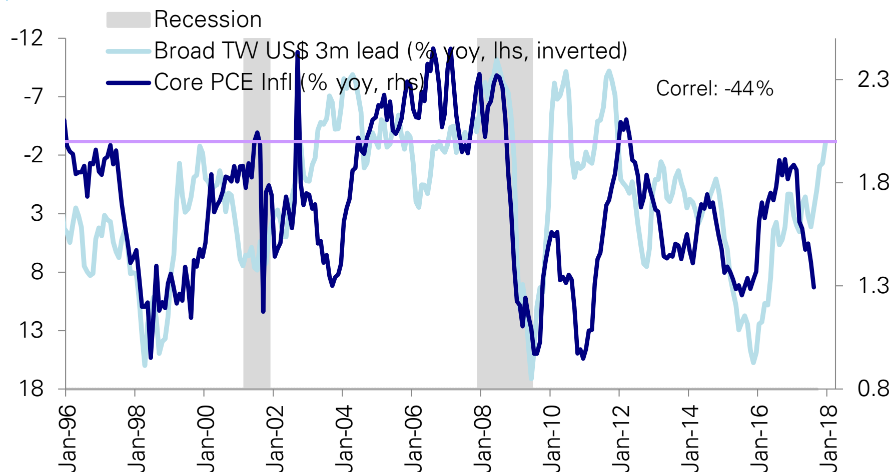


Figure 13: Many observers argue that the Phillips curve has flattened or broken as the correlation between inflation and unemployment has declined in this cycle



Source: BEA, BLS, CBO, Haver, Deutsche Bank

Figure 14: But unemployment is not the only driver of inflation. Core inflation is strongly correlated with the US dollar with lags out to 2 years



Source: BEA, FRB, Haver, Deutsche Bank

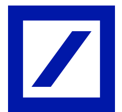
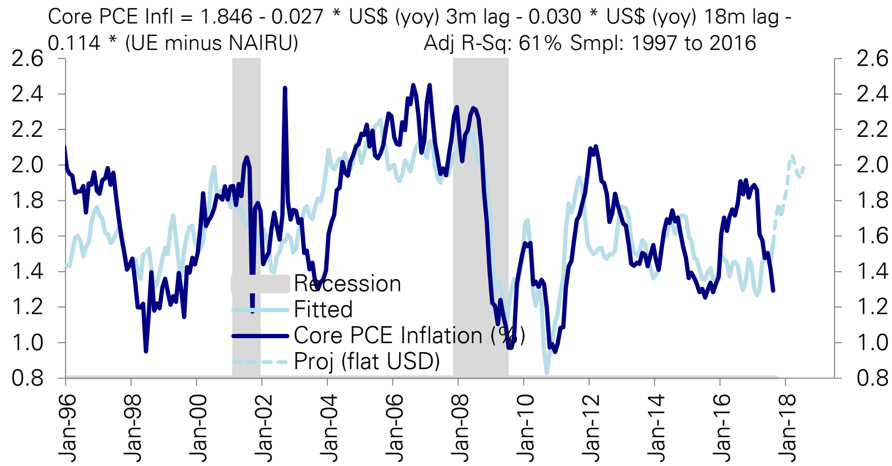


Figure 15: There is no indication that the Phillips curve—augmented by the US dollar—is broken



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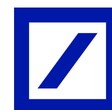

Appendix 1

Important Disclosures

*Other information available upon request

*Prices are current as of the end of the previous trading session unless otherwise indicated and are sourced from local exchanges via Reuters, Bloomberg, and other vendors. Other information is sourced from Deutsche Bank, subject companies, and other sources. For disclosures pertaining to recommendations or estimates made on securities other than the primary subject of this research, please see the most recently published company report or visit our global disclosure look-up page on our website at http://gm.db.com/ger/disclosure/DisclosureDirectory.eqsr. Aside from within this report, important conflict disclosures can also be found at https://gm/db.com/equities under the "Disclosures Lookup" and "Legal" tabs. Investors are strongly encouraged to review this information before investing.

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Sell: Based on a current 12-month view of total share-holder return, we recommend that investors sell the stock.
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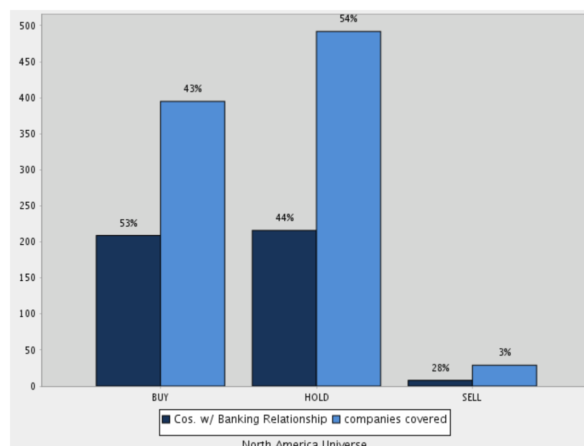
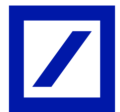
Equity rating dispersion and banking relationships





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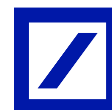

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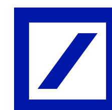

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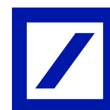

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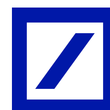

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