

# Economic Watch

United States

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Economic Analysis

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## Should Low Inflation be a Concern? A Comprehensive Explanation for the Current Lack of Inflationary Pressures

### Executive Summary

#### Low Inflation is Not Impeding Economic Growth

- Low inflation in the U.S. is not always associated with slow growth – since 1980, GDP growth hit 2.0% or higher nearly 80% of the time when core inflation dropped below 2.0%, and all of these instances occurred in 2003 or later.
- Our deflation vulnerability index has dropped significantly in 1Q14, suggesting that the risk of deflation in the U.S. is very low.

#### Disinflation Trends Only Temporary in the Short Term

- Despite the fact that various price indicators note below-trend inflation, the current slowing inflation rate is fairly transitory.
- Persistently low inflation reflects excess slack in the labor market and downward pressures on imported goods.
- Short-term CPI forecasts suggest moderate inflationary pressures in 2014 will stem from medical care, shelter, and energy, while food prices are expected to remain subdued.

#### Long-Term Structural Changes Will Contain Inflation at New Historical Lows

- Stabilization of the inflation rate at new historic lows is due to long-term economic structural changes, such as lower costs of production and labor-to-capital ratios driven by globalization and infiltration of technology.
- Core services have been and will remain the principal contributor to the core inflation rate.
- The contribution of durable goods to the core inflation rate has been consistently negative since the end of 1995. Considering the rapid growth of information technology, the deflationary trend for durable goods is unlikely to be reversed and will stabilize in the future.

#### Uncharted Waters for Monetary Policy

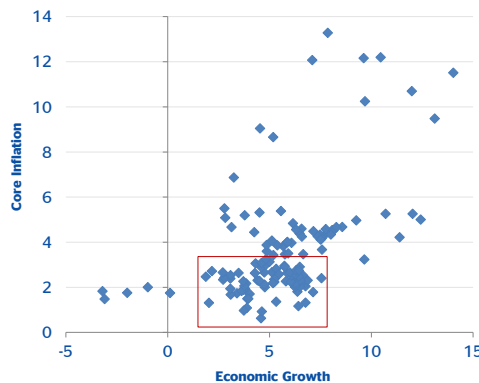
- The FOMC remains concerned with the fact that short- and medium-term inflation expectations might not be as contained as long-term expectations. However, our analysis shows that PCEPI and CPI inflation expectations will remain well anchored.
- Sizable deviations in the inflation rate, GDP growth, or the unemployment rate from the FOMC's projections could prompt a change in the trajectory of tapering and policy firming.
- A hypothetical scenario illustrates that slow growth and a disinflationary environment would yield a less desirable outcome for the Fed, pushing them further into uncharted territories with the zero lower bound.

## Inflation and Economic Growth

Economic growth and highly accommodative monetary policy have historically been known to put upward pressure on the inflation rate. Supported by stronger growth expectations for 2014 and the ongoing monetary stimulus, we had been expecting inflation to trend up towards its long-term mean. However, current inflation concerns are near the low end of the spectrum, with prices holding well-below the Federal Reserve’s target rate throughout the past year. Nevertheless, deflation is not an immediate threat to the U.S. economy.

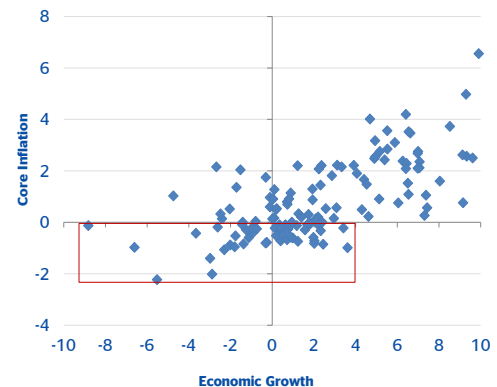
Historically, inflation and economic growth have had a volatile relationship despite the fact that the two should logically move hand in hand. Typically, a strong economic environment creates upward price pressures as supply struggles to keep up with growing demand. Conversely, slow economic growth implies tempered demand and reduced willingness to consume, therefore putting downward pressure on overall prices. While these correlated tendencies do produce a positive relationship between very strong growth and high inflation, we have found in the U.S. that low inflation is not always associated with slow growth. In fact, when core inflation dropped below 2.0% throughout the past four decades, the U.S. economy was only in recession for four quarters – in all other instances during this period, GDP growth actually hit 2.0% or higher (Chart 1). Unlike Japan, where slow growth and low inflation are more prevalent, the U.S. has not experienced negative core inflation in recent history (Chart 2).

Chart 1  
U.S. Economic Growth & Core CPI Inflation  
(YoY % Change)



Source: BBVA Research & BEA

Chart 2  
Japan Economic Growth & Core CPI Inflation  
(YoY % Change)

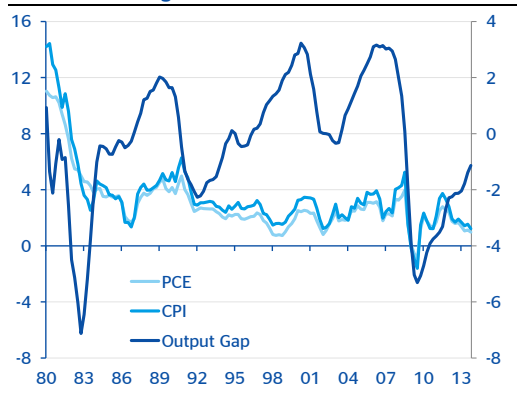


Source BBVA Research & Haver Analytics

Nevertheless, the inconsistency between strengthening economic growth and the subdued inflation rate has led to a lack of clarity and understanding of why prices are holding so low. Real GDP growth in 2014 is set to reach an encouraging pace for the recovery at 2.5%, showing significant improvement over the 1.9% rate seen in 2013. At the same time, the output gap in the U.S. is gradually shrinking as the economy moves back towards full capacity (Chart 3). Despite these calls for rising inflation, prices remain extremely subdued.

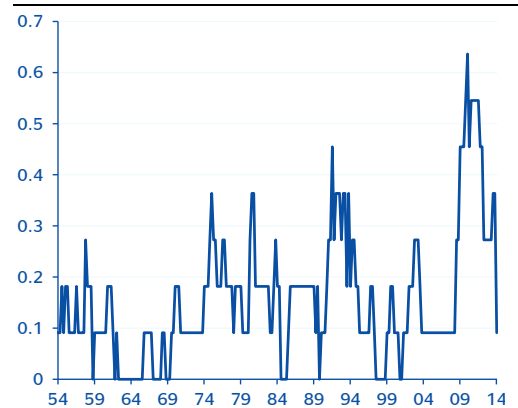
Although inflation remains lower than expected, our analysis suggests that the risk of deflation in the U.S. is very low. In order to better capture this risk, we constructed a deflation vulnerability index based on a recent IMF approach that looks at current levels of inflation, cyclical trends in the economy, monetary indicators, and imported inflation via real effective exchange rates (Chart 4). Our deflation vulnerability index has dropped significantly throughout the first quarter of 2014, suggesting that the current slowing inflation rate is considered fairly transitory.

Chart 3  
Output Gap & Core Inflation  
(%, YoY % Change)



Source: BBVA Research, BLS, & BEA

Chart 4  
Deflation Vulnerability Index  
(%)



Source BBVA Research

While labor market conditions appear to be on the right track, low inflation has become a growing concern among Federal Reserve policymakers who are in the driver's seat when it comes to setting the tone for continued strength in the economic recovery. The Fed has summed up their views on inflation in recent FOMC meetings and speeches, committing to the idea that the latest trends are due to some transitory factors. Some members within the FOMC have noted that recent declines in inflation might suggest that the economic recovery is not as strong as we like to think, particularly as it has been overshadowed with bouts of monetary stimulus in recent years. Still, the FOMC's economic projections suggest that inflation is expected to rise to a level at or slightly below the 2% target by 2016, which is slightly less optimistic than our view.

With this in mind, burning questions are directed at the underlying drivers of recent inflation trends (or rather, disinflation) and why this is such an important factor to monitor. When it comes to the ongoing recovery in the U.S., risks of disinflation appear to be more pronounced. As the output gap has recovered only partially from the crisis, sluggish price growth can signal a vulnerable economy and slower recovery towards full potential. Disinflation also exposes economies to negative shocks which can easily tip over a vulnerable economy into a deflationary spiral. Another issue is that deflation, or even low inflation, increases the value of outstanding debt, which can be considered a risk for the U.S. given that public debt as a percent of GDP have jumped significantly since the crisis. Maintaining low interest rates is the Fed's way of controlling for this risk, hoping to spur higher inflation via an added boost to business and consumer demand.

Indeed, risks to both ends of the inflation spectrum can be equally concerning. Thus, it is important to control inflation expectations by targeting monetary policy at moderate and stable price growth. Meanwhile, the fact that Federal Reserve's highly accommodative policies do not seem to be achieving the desired consequences of price growth is part of the problem.

Given the current economic situation in the U.S., it is necessary to take an in-depth look at the lack of inflationary pressures and assess if these trends are purely transitory or not. Although the latest inflation indicators have failed to show a pick-up in prices, major deflationary concerns are contained for the short-term. Demand conditions are stable, though slow on the global stage, and cost pressures are limited due to excess resource slack in the labor market. Taking a deeper look at ongoing inflation trends, we expect that prices should start picking up as the latest downward pressures fade away, ultimately stabilizing at new historic lows. Outside of the usual volatile contributors, such as commodity and food prices, our analysis points more toward a permanent shift in inflation trends for the long-term, particularly related to goods-producing sectors where technological advancements have improved productivity and cost efficiency.

### Box 1. CPI vs PCE Inflation - How Do the Two Indicators Measure Up?

Price indices are widespread in economic research, measuring input and output costs impacting both producers and consumers. When it comes to economic activity, consumer prices tend to be followed more closely, although strides have been made to improve producer price measures as well (see [PPI Inflation Flash](#)). The consumer price index (CPI) and the personal consumption expenditure chain price index (PCEPI) are the two primary measures of consumer inflation, differing only slightly in methodology and trend. The CPI is estimated by the Bureau of Labor Statistics (BLS) based on a sample of retail reports and measures average price changes paid by urban consumers for a set basket of goods and services. Various samples are used to compile the index, including a Consumer Expenditure Survey of over 30,000 families, a Point-of-Purchase survey of nearly 16,800 families, and a selection of housing units eligible for the shelter component based on 1990 Census of Population data. The PCEPI, the price index for the personal consumption expenditures component of GDP, is released by the Bureau of Economic Analysis (BEA) and is closely related to the GDP deflator as a whole. The BEA sites four specific differences between the two indices: formula, weight, scope, and other (i.e. seasonal adjustments and residual differences). Ultimately, the trends between the two indices are almost identical, except for the fact that the CPI on average tends to run roughly 0.5 percentage points higher than the PCEPI.

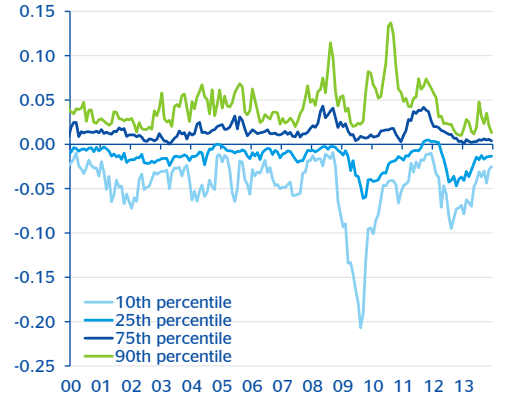
As it turns out, the CPI is followed more closely by financial markets while the Federal Reserve has elected the PCEPI as its preferred inflation indicator. While there is no exact understanding of which index provides a more accurate view of actual consumer inflation, it is clear that the CPI is more widely followed. Much of this is due to the fact that the CPI is used to make many adjustments to cash flows, such as social security, Medicare, and cost of living changes, among others, that ultimately impact investors in some way. Furthermore, the CPI calculation is consistent with that in other developed economies, so it tends to serve as a better gauge for inflation worldwide. Also, the CPI is released earlier than the PCEPI each month and therefore provides the initial gauge on short-term inflationary trends. The Fed closely monitored CPI prior to 2000 but changed to the PCEPI instead because the latter is more comprehensive and has flexible weights that can change as consumers shift from some goods and services to others.

Recently, Chicago Federal Reserve President Charles Evans touched on this distinction between price indices, reemphasizing the Fed's focus on the PCEPI rather than the CPI. He particularly noted the risk in confusing the two inflation indicators given that the target for CPI would be closer to 2.5% rather than the 2.0% target for PCEPI. As such, he reiterated the Fed's need to appropriately communicate monetary policy strategy in order to avoid market confusion or disruption.

## Disinflation Trends Only Temporary in Short Term

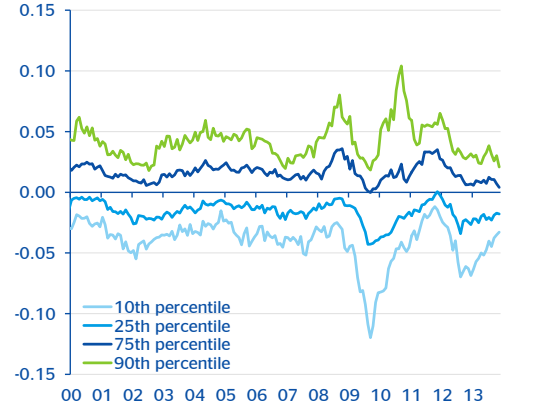
Looking at both the CPI and PCEPI, annual inflation remains near the lowest levels of the recovery period. Considering the vulnerability of the ongoing recovery, fragile business and consumer confidence could be a major factor in holding down prices. However, a deeper look at the details reveals a more complicated picture than just subdued economic confidence. Various price indicators are noting below-trend inflation throughout the past year, with persistently low inflation reflecting elevated slack in the labor market and downward price pressures on imported goods. In fact, the import price index has held mostly flat throughout the past few years and has dropped into negative YoY growth territory, mostly dragged down by capital goods and autos throughout the past nine months. When assessing the price distribution of both headline CPI and PCEPI indices, we are seeing a converging central tendency that hints at low yet stable inflation that is more broad-based across different components and sectors (Charts 5 & 6).

Chart 5  
12-Month YoY Relative CPI Price Distribution  
(YoY % Change Less Year-Ago YoY % Change)



Source: BBVA Research & BLS

Chart 6  
12-Month YoY Relative PCEPI Price Distribution  
(YoY % Change Less Year-Ago YoY % Change)

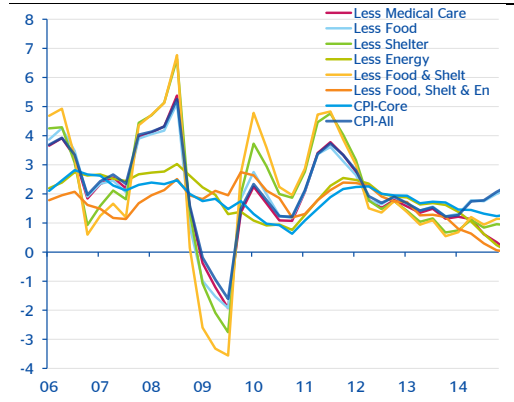


Source BBVA Research & BLS

Our short-term forecasts of the CPI components imply that main inflationary pressures in 2014 are expected to arise from medical care, shelter, and energy (Chart 7). At the same time, food prices are expected to remain subdued.

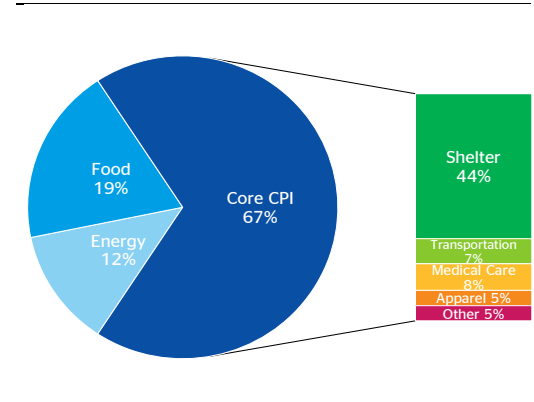
At the headline level, energy prices are sticking to the usual volatile pattern but have held abnormally low, mostly due to downward pressure from energy commodities. On the contrary, prices for energy services have accelerated to rates not seen since the start of the recession, hitting 4.85% YoY in February 2014, in large part a consequence of increased demand for electricity. It is also interesting to note that unlike other components of the CPI, the energy services index is calculated using a Laspeyres estimator<sup>1</sup> that tends to overstate inflation, so the pressures seen here may not be completely reflective of true price trends for the index. Food prices are the other major non-core inflation component, accounting for about 19% of the CPI (Chart 8), and have been steadily decelerating even during the time when we expected an uptick resulting from the Midwest drought a few years back.

Chart 7  
Relative Importance of CPI Components  
(YoY % Change)



Source: BBVA Research & BLS

Chart 8  
Short-Term Forecasts of CPI Components  
(YoY % Change)



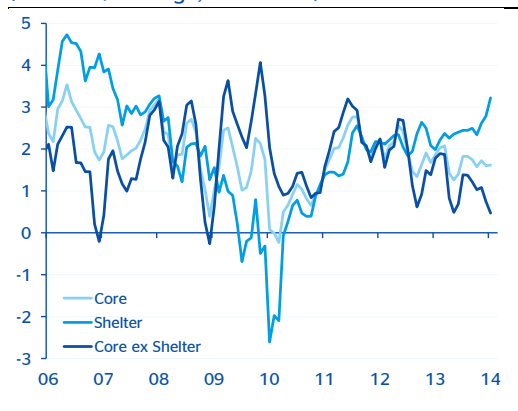
Source BBVA Research & BLS

When it comes to core inflation, medical care and shelter prices continue to be the primary and consistent drivers. On a YoY basis, costs for medical care services have dropped near historical lows, though much of this can be attributed to recent changes to the U.S. healthcare system and the end of some important drug patents, as well as technological advancements in the field and fiscal policy adjustments via sequestration. Shelter prices, particularly owners' equivalent rent, comprise a much larger share of the CPI and have been accelerating steadily since the end of the recession, rising from negative territory in 2010 to above 2.5% YoY in February

2014 (Chart 9). However, it is becoming clearer that we have almost hit the peak of this trend, and over the course of the next few years we do expect to see a significant stabilization in the growth of housing prices. Still, this brings up the question of why inflation is running so low when a major component is holding above historical average growth rates.

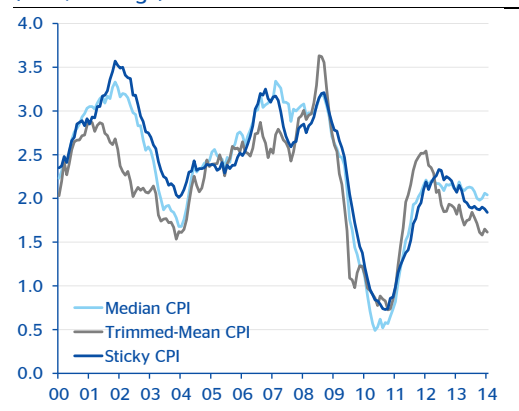
One way of intensifying this look at core inflation is to further eliminate the more volatile monthly changes among the various components, known as the trimmed-mean index<sup>2</sup>. There are also methods of adjusting the given weights in the CPI to achieve a more accurate measure of underlying inflation trends (the weighted median CPI).<sup>3</sup> Furthermore, flexible and sticky price indices separate the components of the CPI where price changes do or do not occur relatively frequently. Consistent with the overall trends mentioned above, these alternative measures of CPI continue to show decelerating price growth (Chart 10), confirming our assessment of a more permanent shift in inflation tendencies for the long-term.

Chart 9  
Core CPI & Shelter Inflation  
(3-Month % Change, Annualized)



Source: BBVA Research & BLS

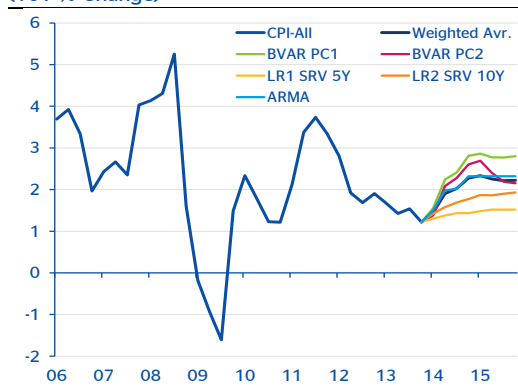
Chart 10  
Alternative Measures of CPI Inflation  
(YoY % Change)



Source BBVA Research & FRB

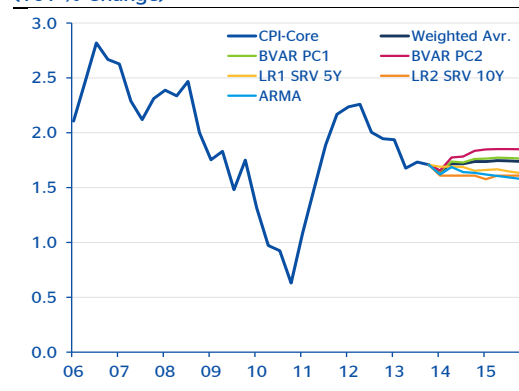
Charts 11-14 illustrate several methodologies to forecast the CPI and PCEPI inflation indicators as well as the weighted averages for the forecasts over the medium term. The models employed reflect studies on obtaining accurate and reliable U.S. inflation rate forecasts with assorted choices of variables, such as surveys, output gap, and financial variables.<sup>4</sup> Our headline CPI and PCEPI inflation rate forecasts stabilize near 2.4% and 1.8%, respectively in the medium term. The long-run forecasts of both headline and core CPI and PCEPI are in line with our baseline projections, as the disinflationary period is expected to reverse after 1Q14 and inflation indicators will trend up gradually toward their long-term means.

Chart 11  
Headline CPI Forecasts  
(YoY % Change)



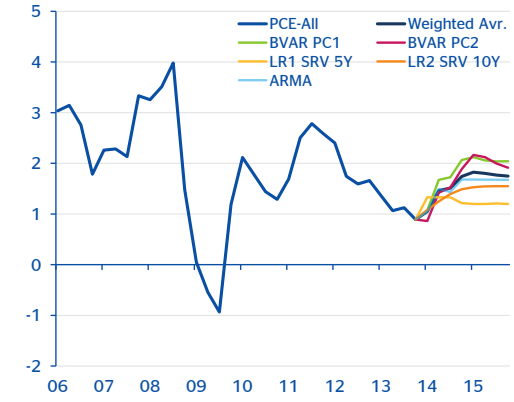
Source: BBVA Research & BLS

Chart 12  
Core CPI Forecasts  
(YoY % Change)



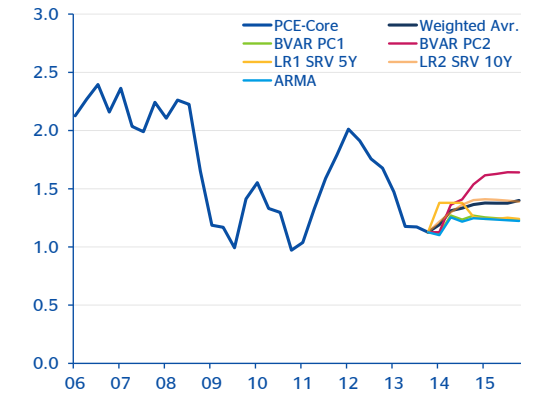
Source BBVA Research & BLS

Chart 13  
Headline PCE Forecasts  
(YoY % Change)



Source: BBVA Research & BEA

Chart 14  
Core PCE Forecasts  
(YoY % Change)

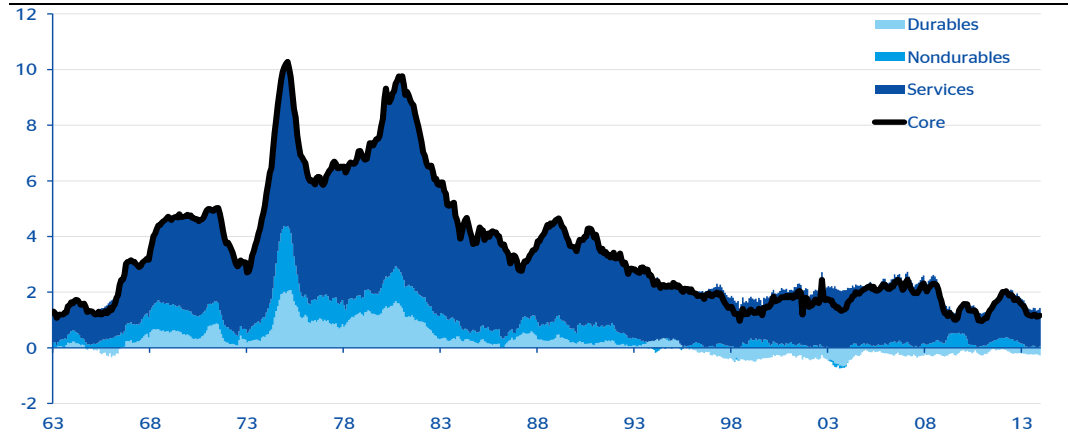


Source BBVA Research & BEA

## Long-Term Structural Changes Will Contain Inflation at New Historical Lows

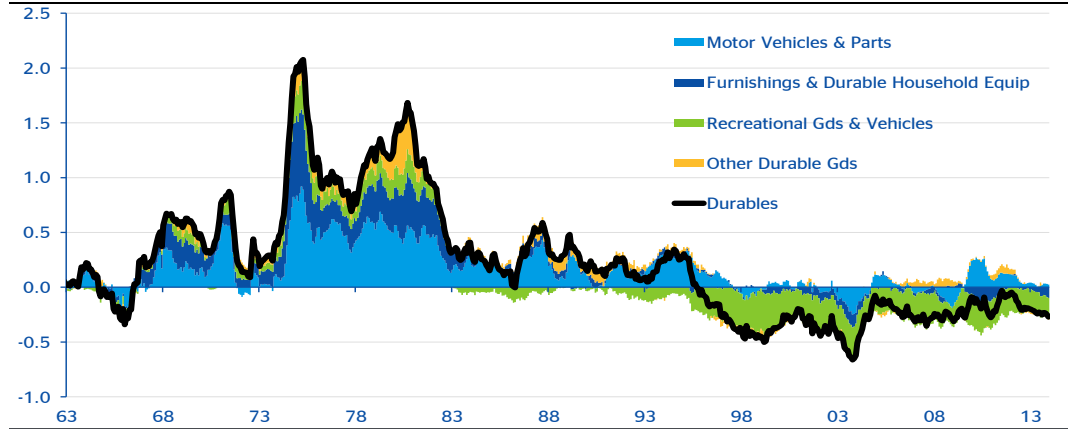
The moderate U.S. inflation rate that we see today is not a new phenomenon. Annual headline and core PCE inflation rates from 1995-present have averaged 1.9% and 1.7%, respectively. Decomposition of the core inflation rate into its components confirms that the stabilization of the inflation rate at new historic lows is due to long term economic structural changes, such as lower costs of production and labor-to-capital ratios driven by infiltration of technology. While core services are the principal contributor to the overall core inflation rate, disinflationary pressures arise from the negative contribution of core goods, driven downward by substantial idiosyncratic relative price changes of a few information technology related components.

Chart 15  
PCE Inflation Contributions  
(%)



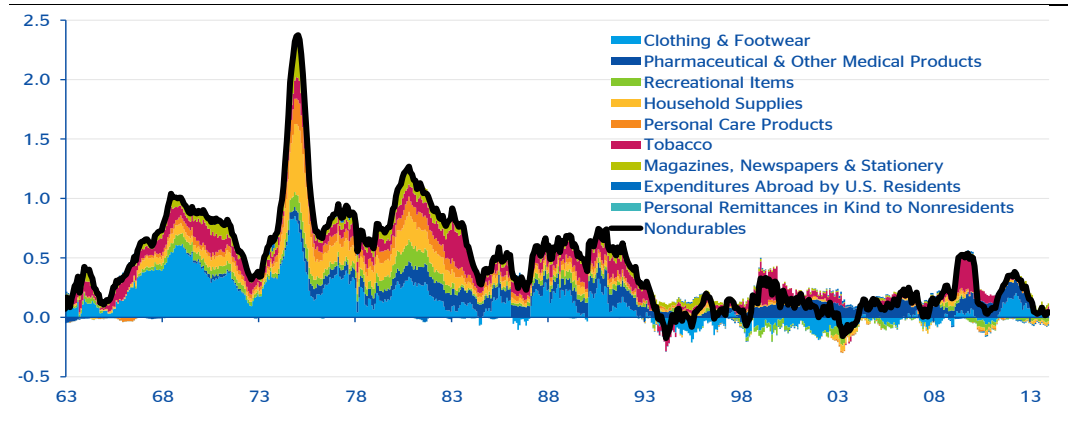
Source: BBVA Research & BEA

Chart 16  
PCE Inflation Durable Goods Contributions  
(%)



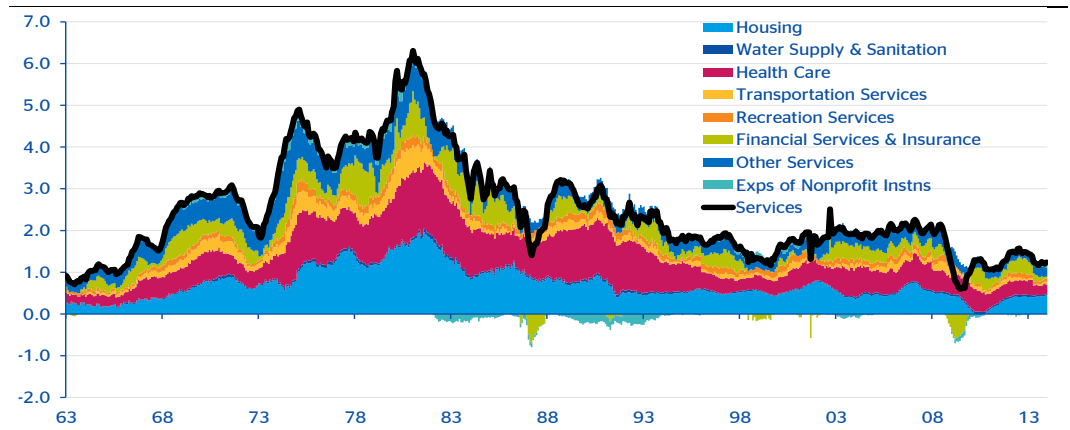
Source: BBVA Research & BEA

Chart 17  
PCE Inflation Nondurable Goods Contributions  
(%)



Source: BBVA Research & BEA

Chart 18  
PCE Inflation Services Contributions  
(%)



Source: BBVA Research & BEA

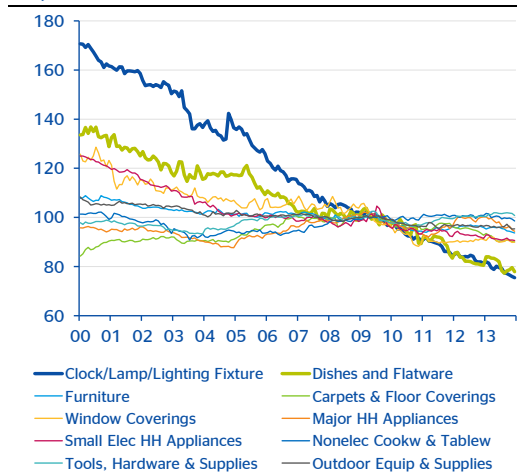


Charts 15-18 illustrate the components of aggregate core inflation - services, durable and nondurable goods - calculated as the percentage contribution of each component to the aggregate inflation rate. The methodology employed reveals both broad-based changes in the PCE inflation rate as well as relative price movements of components, as it reflects each component's change in weight and rate of price increase relative to the core aggregate of goods and services.<sup>5</sup>

The core services sector remains the prime contributor to core inflation and has moderated since the late 1990s. The main contributors to core services inflation, housing/rent and health care, have evenly declined proportional to the change in services overall contribution. In general, technological progress will continue to put downward pressure on prices in the sector, while the exact price effect is not always realized. For example, technological advancements like the switch to broadband internet are found to create large values of unaccounted consumer surplus equivalent to around 1.9% annual decline in the internet access prices.<sup>6</sup>

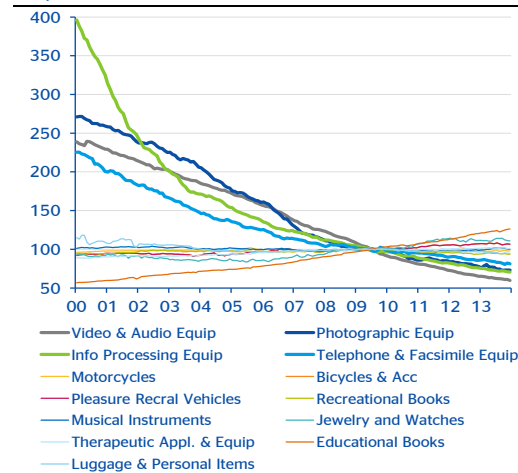
The contribution of durable goods to the core inflation rate has been consistently negative since the end of 1995, where on average 88% of the negative contribution has been due to the recreational goods and vehicles subcategory while the remaining 12% derives from the furnishings and durable household equipment subcategory (Charts 19 and 20). A further look into those two subgroups reveals that the negative contributions can be attributed to strong deflation in video and audio equipment, photographic equipment, information processing equipment, telephone and facsimile equipment, and clock, lamp, lighting fixtures. Throughout the past 10 years, the annual deflation rate averaged -6.8%, -6.5%, -5.9%, -4.4%, -4.6% for these five components, respectively.

Chart 19  
Durables: Furnishing Goods Price Indices  
(SA, 2009=100)



Source: BBVA Research & BEA

Chart 20  
Durables: Recreational Goods Price Indices  
(SA, 2009=100)



Source: BBVA Research & BEA

Evidently, continuous innovation and growth in the information technology sector resulted in lower prices along with a simultaneous increase in the quality of high-tech products. Most of the benefits of technological change were passed on to the consumer, while firms were able to collect only a small portion of the returns from innovative activity.<sup>7</sup> These facts are hard to bypass; for example, the price of a mobile phone declined by 95% from \$4K in 1982. Similarly, there has been, on average, a 70% price decline for digital camcorders, while the pixel counts rose from 580,000 to 3.8 million.

Conversely, nondurable goods have contributed positively to the core PCE inflation rate, but we have seen a dramatic fivefold decline since the late 1990s. The decline in the core nondurable goods inflation contribution is led by broad based changes in the clothing and footwear subcategory. The price index for this sector remained relatively stable with slight upward pressure for the last two decades. However, due to globalization and a growing number of U.S. free trade agreements, the sector's contribution to the inflation rate has dropped significantly over time. The clothing and footwear sector accounted for 48% of the nondurables inflation

rate between 1964 and 1974, but then gradually declined to 19% between 1984 and 1994 and 5% in 2004-2014. This is in line with the 83% drop in the industrial production of apparel between 1995 and 2014, in part due to production moving abroad. Similarly to the durable goods inflation rate, the nondurable goods rate also faces deflationary price pressures from recreational items, where the average deflation rate over the last 10 years for games, toys and hobbies stood at -4.2%.

Ultimately, long-term structural shifts will keep the inflation rate contained at new historical lows. In this new era centered on rapid growth of information technology, along with simultaneous price decreases and quality increases of high-tech goods, the deflationary trend for durable goods is unlikely to be reversed but will stabilize over the long-run.<sup>8</sup> Likewise, globalization and free trade have influenced lower inflation rates for nondurable goods. Core services will remain the principal contributor to the core inflation rate, while infiltration of technology will keep downward pressure on the prices in the services sectors as well.

## Uncharted Waters for Monetary Policy

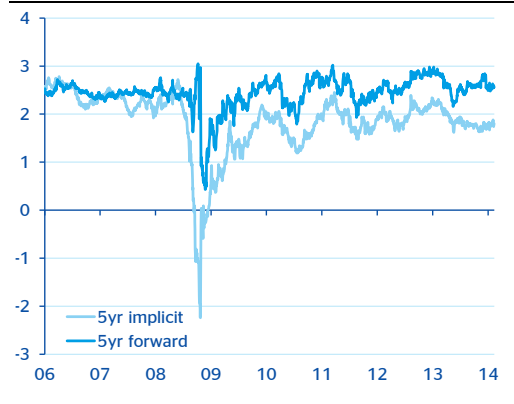
In setting the current and future course of monetary policy and the federal funds rate, the Federal Reserve has outlined the desirable levels of progress towards full employment and stable inflation with the 2.0% target PCEPI inflation rate. The low inflation rate, specifically the decline in the PCEPI below the Fed's 0.5% comfort band (minimum of 1.5% inflation rate), has been an essential part of recent FOMC deliberations. Accordingly, the December 2013 decision to reduce the monthly pace of large scale asset purchases was largely based on improvement in the labor market outlook and the nearing of the unemployment rate to the 6.5% threshold, which the FOMC has relied on until the recent decision to abandon it (see [latest Fed Watch](#)). Still, the decision to begin tapering came with an additional qualitative statement tying the future path of the federal funds rate to inflation:

*"The Committee continues to anticipate, based on its assessment of these factors, that it likely will be appropriate to maintain the current target range for the federal funds rate for a considerable time after the asset purchase program ends, especially if projected inflation continues to run below the Committee's 2 percent longer-run goal, and provided that longer-term inflation expectations remain well anchored."*

Moving forward, we expect the Federal Reserve to continue discussing alternative forward guidance modifications with the goal of narrowing the gap between the timing of policy firming and the unemployment and inflation rate thresholds. While long-term inflation expectations are well anchored due to the success of the FOMC in communicating the decoupling of the actual inflation rate from long-term inflation expectations, the FOMC remains concerned with the fact that short- and medium-term inflation expectations might not be as well anchored as long-term expectations. The Committee members continue to voice worries over low inflation rates, stating that "inflation persistently below the Committee's objective would pose risks to economic performance," and pledging to monitor inflation developments carefully. With Japan's experience in mind, these worries reflect the risk that low inflation could drive down inflation expectations and in turn generate a self-fulfilling deflationary environment, which could be difficult to reverse once in place.

Sizable deviations in the inflation rate, GDP growth, or the unemployment rate from the FOMC's Summary of Economic Projections could prompt a change in the trajectory of the tapering of asset purchases and the pace of policy firming. With this in mind, we examine three scenarios of the Fed's path towards long-run policy stabilization contingent on different economic scenarios of growth, unemployment, and inflation. The scenarios result in significant differences in the Fed's projected timings for normalization and the ultimate impact on the yield curve.

Chart 21  
Inflation Expectations (%)



Source: BBVA Research & FRB

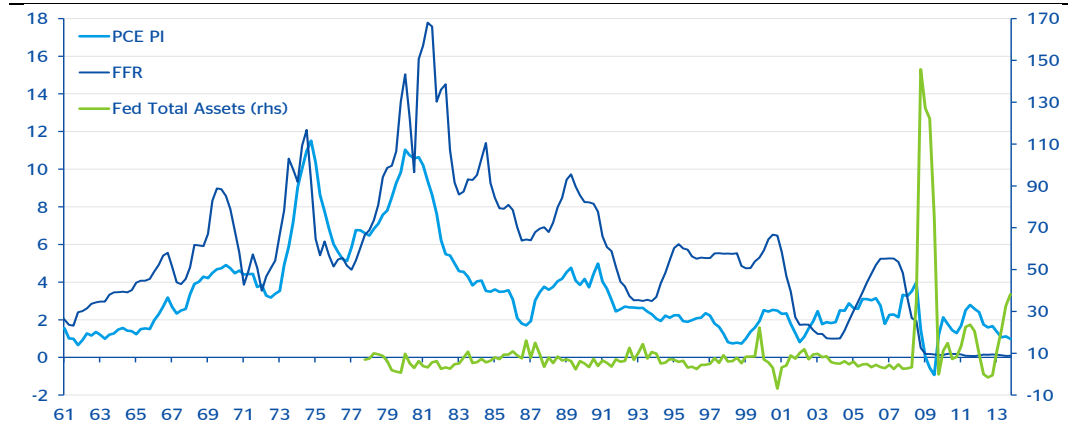
Chart 22  
Ten-Year Ahead Mean Inflation Expectations (YoY % Change)



Source BBVA Research & FRB Philadelphia SPF

Nevertheless, a distinctively different question to answer is whether the Fed should defer policy firming and further extend large scale asset purchases solely governed by disinflationary concerns. Chart 23 below illustrates that the Fed’s growing balance sheet under the quantitative easing programs appears to have had limited to no impact on price levels and revives the 2008-2009 discussions on the limitations of the Zero Lower Bound (ZLB). A recent study from the Federal Reserve Bank of St. Louis concludes that a positive aggregate shock (i.e., a technology shock) will have “unconventional effects” at the ZLB where “a tension exists at the ZLB between the supply-side effects of technology and the demand-side effects of the real interest rate.” The study shows that a positive technology shock in the New Keynesian model “can generate lower consumption, labor, and output—what we call unconventional dynamics—when the ZLB binds,” and thus firms respond with further reduction of their prices and a decrease in their labor demand.<sup>9</sup>

Chart 23  
Federal Funds Rate, Balance Sheet, and PCE Inflation (% YoY % Change)

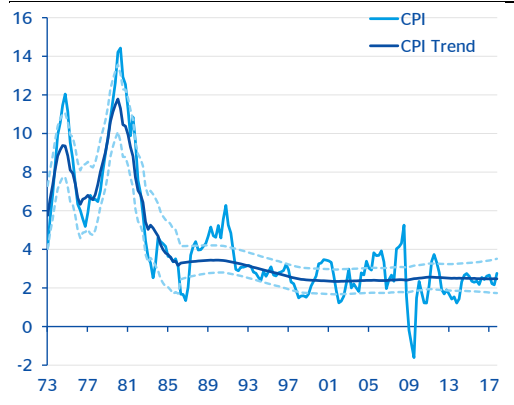


Source: BBVA Research, FRB, & BEA

An equally important argument against deferring monetary policy normalization due to disinflationary pressures is the existence of different channels of policy transmission that were in place for QE3, which were aimed at wealth creation and revitalization of the housing market. While asset prices increase, measures of the inflation rate do not take into account asset price changes. The NBER study shows that leaving out asset prices – equities, bonds, and houses – from the aggregate price statistics introduces a downward bias in the CPI of around ¼

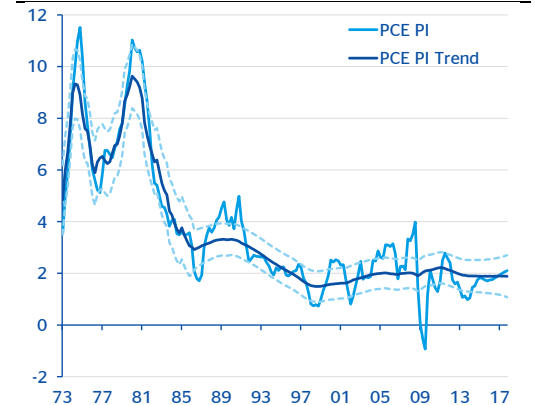
percentage point annually. Most importantly, the research finds that the largest potential measurement error results from the failure to include housing prices.<sup>10</sup>

Chart 24  
CPI Philips Curve Inflation Trend  
(YoY % Change)



Source: BBVA Research & BLS

Chart 25  
PCE Philips Curve Inflation Trend  
(YoY % Change)



Source BBVA Research & BEA

Despite short-term risks of disinflation, the FOMC expects that the inflation rate will return to the 2.0% target by the end of 2015. Our analysis shows that PCEPI and CPI inflation expectations, which account for both backward and forward-looking behavior, will remain well-anchored near historic averages. The CPI and PCEPI inflation trends are measured at 2.5% and 1.9%, respectively, and remain stable. The latent factor model employed also confirms that the Philips curve slope, measured using PCEPI inflation rate expectations, changed little, with a 0.30 output gap coefficient before the recession and 0.25 encompassing the forecasted time period (Charts 24 and 25).<sup>11</sup> Furthermore, academic literature finds that the measure of inflation expectations, extracted from the model as the inflation-trend with means of trend-cycle decomposing, presents a more accurate picture of core inflation compared to the trimmed or the BLS and BEA core inflation indicators.<sup>12</sup>

**Box 2. Three Paths of Federal Reserve Policy**

Three Paths of Federal Reserve Policy

	Late Exit	BBVA Baseline	Early Exit
RGDP Growth	Low	Moderate	High
Unemployment	Slow ↓	Moderate ↓	Fast ↓
2Q Inflation (YoY)	Below 0.5%	No Change	Above 3%
QE3 End	2Q15	4Q14	2Q14
FFR 1 <sup>st</sup> ↑	None	3Q15	4Q14
Balance Sheet Normalization	Further Growth/Delayed Normalization	Hold to Maturity	Reverse Maturity/early sale of Treasuries
<b>By 4Q17</b>			
FFR ↑ (bp)	0	225	575
10Y ↑ (bp)	-48	118	405

Source: BBVA Research

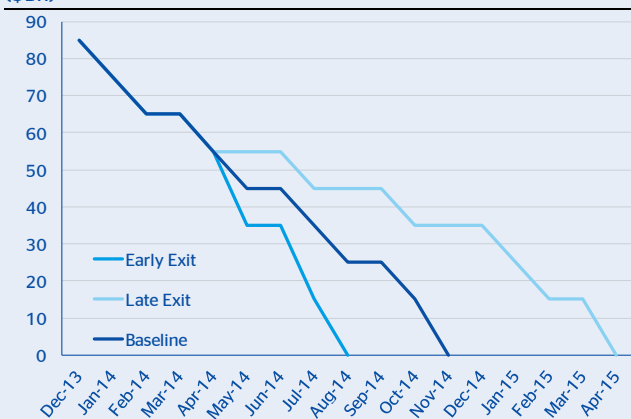
The BBVA Research Baseline scenario reflects our forecast for continued moderate economic growth coupled with inflationary expectations that are well anchored near the Fed's 2.0% target rate. Under our scenario, the economy will attain its potential output level in 2Q16. This baseline scenario implies a wind down of LSAP in "measured steps" that will bring QE3 to an end in 4Q14. The first federal funds rate increase is projected for 3Q15 while the Federal Reserve is expected to hold the stock of long-term Treasuries and MBS to maturity.

The 'Late Exit' scenario assumes a positive but low real GDP growth rate as well as near term declines

in the inflation rate, emphasizing continued deflationary pressure on the economy. Under those circumstances, the 'Late Exit' scenario projects prolonged LSAP purchases by the Federal Reserve and no policy rate change on the horizon. The Fed balance sheet will continue to grow, pushing the policy normalization process further into the future.

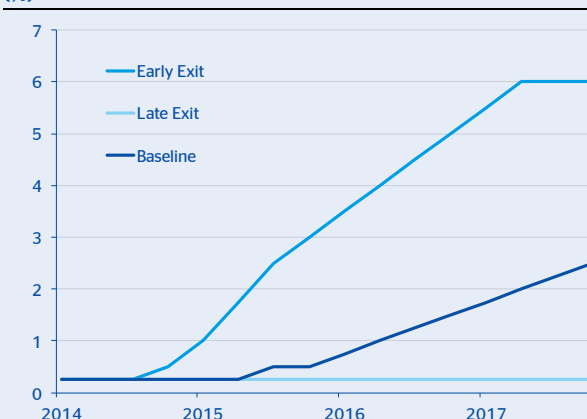
On the contrary, the 'Early Exit' scenario assumes higher real GDP growth compared to the baseline and, consequently, a faster decline of the unemployment rate and inflationary pressure on the economy. It would prompt the Federal Reserve to end QE3 sooner and to lift the zero bound policy rate earlier.

Chart 26  
**LSAP Tapering (\$Bn)**



Source: BBVA Research

Chart 27  
**Federal Funds Rate Forecasts (%)**

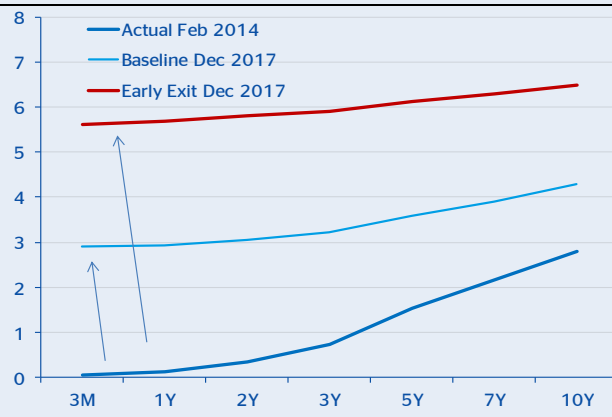


Source BBVA Research

While the short term rates closely follow the policy rate path, the path of long term interest rates is a composite reflection of the expected path of short term rates, inflation expectations, expectation of economic growth, and the risk premium. To capture the effect of each of the three outlined scenarios on long-run interest rates and the yield

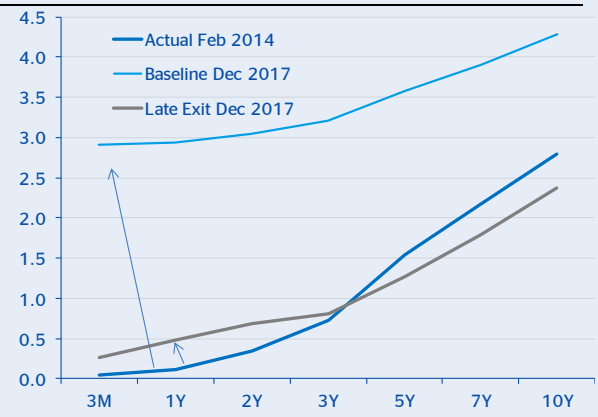
curve dynamics, we employ a latent factor model. The model incorporates macro variables of real economic activity measured by real GDP, YoY CPI inflation rate and federal funds rate to incorporate the bi-directional linkages between yields and the macro factors.<sup>13</sup>

Chart 28  
Yield Curve Changes from 2014 to 2017  
(%)



Source: BBVA Research & FRB

Chart 29  
Yield Curve Changes from 2014 to 2017  
(%)



Source: BBVA Research & FRB

The charts above compare the change in the U.S. Treasury Zero-Coupon Yield curves for the three scenarios discussed. The stronger growth and pickup in the inflation rate, together with the Federal Reserve's earlier than expected tightening, results in a yield curve that is pushed further up and flattened in the 'Early Exit' scenario compared to the baseline. On the other hand, weak growth, disinflation, and the prolonged highly accommodative monetary policy keep the 'Late Exit' scenario yield curve below the baseline forecast, resulting in a change in the slope of the yield curve with no shift.

In conclusion, while the probabilities of both the 'Early Exit' and 'Late Exit' scenarios are low and imply undesirable inflation environments, we believe that the 'Early Exit' scenario would yield a more

desirable outcome for the Fed compared to the 'Late Exit.' The rising inflation rate under the 'Early Exit' scenario would be a well-matured risk scenario for the Fed, with a prewritten manual of action where the FOMC would be expected to more easily handle a faster pace of tapering and earlier than expected policy tightening. Contrary to the belief that early tightening might suppress economic growth, an earlier-than-expected lift of the near-zero rate might come with additional perks of quicker policy normalization, ultimately signaling a healthier economic environment. Conversely, the 'Late Exit' would result in further growth of the Fed's balance sheet and indefinitely delay policy normalization, pushing the Fed further into uncharted territories of unconventional tools and economic effects with the ZLB.

## Bottom Line: U.S. Economy Not at Risk of Deflation

Inflation has become a hot topic throughout the past year, particularly as it gains relative importance to the Fed's monetary policy exit strategy. Meanwhile, low inflation by itself should not divert the FOMC from the current policy timeline on tapering and the projected path of the federal funds rate, especially given that our analyses confirm that inflation expectations remain well-anchored. It is also important to highlight that moderate inflation is by no means an abnormal trend in the U.S. and has only rarely been associated with recessionary periods.

While current inflation remains subdued, we expect prices to moderately pick up through the coming year as transitory factors fade away. Upward pressures arising from medical care, shelter, and energy should lift prices in the short-term. Even still, we expect that inflation will not increase back to the average rate seen throughout the past three decades. In fact, we project that inflation will stabilize at new historic lows as a result of long-term economic structural changes, such as lower costs of production and labor-to-capital ratios driven by globalization and infiltration of technology. Looking forward, the question is whether financial markets and policymakers are ready for another round of low inflation which can potentially lead to lower-than-expected interest rates and profit margins.

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- <sup>1</sup> The Laspeyres estimator does not take into account that the consumer will usually buy less of a good or service as prices increase, reducing the overall sales volume. In this manner, the estimator tends to overstate inflation.
  - <sup>2</sup> For more information on the Cleveland Fed's trimmed-mean CPI, see Meyer, Brent H., Venkatu, Guhan, and Zaman, Saeed (2013)
  - <sup>3</sup> For more information on the Cleveland Fed's weighted median CPI, see Meyer, Brent H., Venkatu, Guhan, and Zaman, Saeed (2013)
  - <sup>4</sup> Ang Bekaert, and Wei (2005), Meyer and Pasaogullari (2010), Stock and Watson (1999)
  - <sup>5</sup> Bauer, Haltom, and Peterman (2004)
  - <sup>6</sup> Greenstein and McDevitt (2009)
  - <sup>7</sup> Nordhaus (2004)
  - <sup>8</sup> Gowrisankaran and Rysman (2012), Gordon (2003)
  - <sup>9</sup> Gavin, Keen, Richter and Throckmorton (2014)
  - <sup>10</sup> Bryan, Cecchetti, and O'Sullivan (2002)
  - <sup>11</sup> Doménech and Gómez (2006)
  - <sup>12</sup> Nason and Smith (2014), Cogley (2002)
  - <sup>13</sup> Diebold, Rudebusch, and Aruoba (2006), Diebold and Rudebusch (2013)

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