

## What's Down with Inflation?

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### Summary

- Despite continued improvements in the labor market, year-over-year core PCE inflation has remained stubbornly below the FOMC's 2 percent target since April 2012.
- For some time, Chair Yellen has cited transitory factors and certain categories as responsible for holding back inflationary pressures.
  - Sept. 24, 2015: *"...much of the recent shortfall of inflation from our 2 percent objective is attributable to special factors whose effects are likely to prove transitory."*<sup>1</sup>
  - June 21<sup>st</sup>, 2016: *"inflation [expected] to rise to 2 percent over the medium term ... as the transitory influences holding down inflation fade."*<sup>2</sup>
  - July 12<sup>th</sup>, 2017: *"recent lower readings on inflation are partly the result of unusual reductions in certain categories."*<sup>3</sup>
- Recently, policymakers and economists have focused on certain categories as factors keeping inflation low: pharmaceuticals, airlines, cellular services, and education services (PACE). We find that although PACE categories are partly responsible for the decline in core PCE inflation over the last year, it has not been a major factor for low inflation since the end of the recession.
- We show in this briefing that healthcare services has played a much larger role in keeping inflation low since the end of the recession. This is mainly due to continued legislated cuts to Medicare payment growth. Some of these growth cuts will be tapering off this upcoming fiscal year, but there is a risk that healthcare services inflation will remain low going forward.
- To better understand the broader dynamics of low inflation, we divide the subcategories of core PCE inflation into two groups: acyclical and pro-cyclical. Inflation within the acyclical group is more likely to be driven by supply-side factors, while inflation for the pro-cyclical group is more likely to be driven by demand-side factors and hence more sensitive to monetary policy.
- Since 2013, pro-cyclical inflation has risen back to its pre-recession level, however, acyclical inflation has continued to decline. We show that low acyclical inflation is being driven mainly by the decline in healthcare services inflation.
- Getting inflation back to or above 2 percent could plausibly be achieved through monetary policy by pushing pro-cyclical inflation even higher. However, it would need to be pushed to levels not seen since the early 1990s.

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<sup>1</sup> Yellen, Janet L. Speech at University of Massachusetts. September 24<sup>th</sup>, 2015.

<sup>2</sup> Yellen, Janet L. *Semiannual Monetary Policy Report to Congress*. June 21<sup>st</sup>, 2016.

<sup>3</sup> Yellen, Janet L. *Semiannual Monetary Policy Report to Congress*. July 12<sup>th</sup>, 2017.

## Transitory Influences Holding Down Inflation

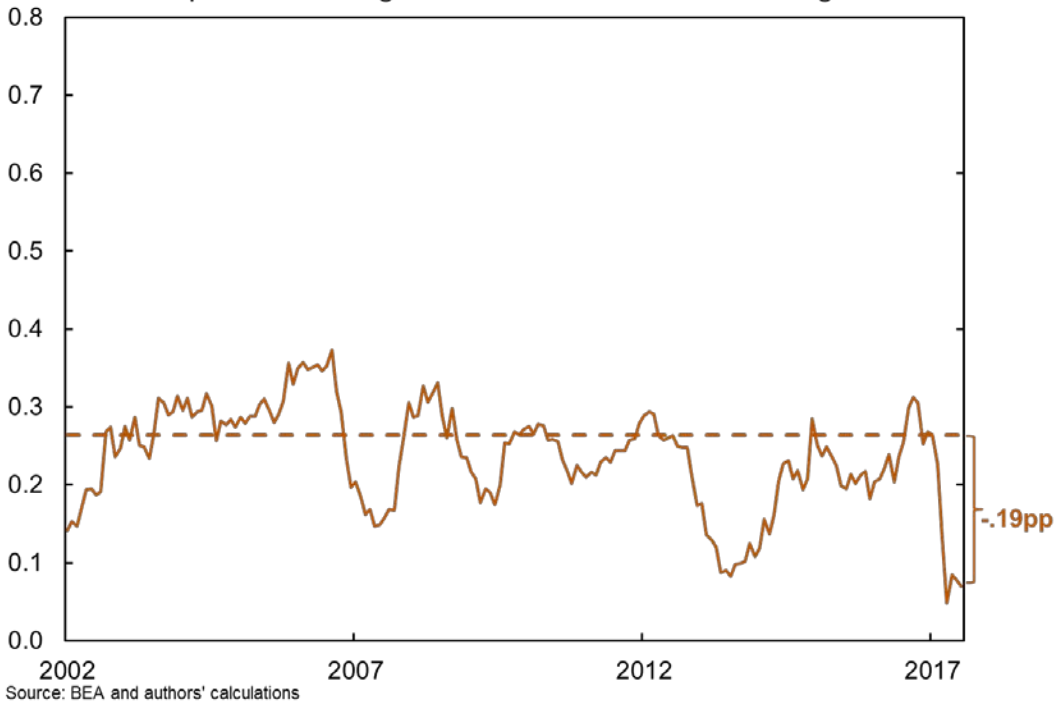
- Recently, economists and policymakers have focused on certain categories as reasons for current low core PCE inflation: pharmaceutical products (FOMC Minutes, 6/13-14/2017), air transportation (Williams 2017), cellular telephone services (Goldman Sachs (GS) 2/1/2017), and education services (GS 8/9/2017), what we refer to as PACE categories.
- These are categories where disinflationary pressures are thought to be transitory.<sup>4</sup>
  - New launches of generic drugs in 2016 slowed price inflation for pharmaceutical products over the last year. (GS 5/18/2017).
  - Declines in airline prices have been attributed to lower fuel costs and increased seat capacity per aircraft (*LA Times* 7/25/2017).
  - Recent deflation in cellular stemmed from an adoption of unlimited data packages by Verizon, and methodological changes to quality adjustments done by the BLS (GS 2/1/2017).
  - The pace of higher education prices in PCE has declined by half since 2014. (GS 8/9/2017).
- Figure 1 shows the contribution of the PACE categories to core PCE inflation since 2002. We also show its average contribution over the 2002-2007 period, which provides a useful benchmark.
  - The 2002-2007 period was chosen because it represents the last time core PCE inflation averaged close to 2 percent for consecutive years and because it excludes recessions.
- The figure shows that PACE inflation has hovered around its pre-recession level, and highlights the transitory nature of the shocks to these categories over the last 15 years.
- Notably, PACE inflation has plunged over the last year. If not for this recent dip, core PCE inflation would currently be 20 basis points higher (1.6 percent as opposed to 1.4 percent).

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<sup>4</sup> The inflation rates for these four categories are not cyclical as evidenced by their Phillips Curve slope coefficients. The model was estimated with an unemployment gap and monthly inflation data from 1985 to 2007.

### Figure 1: PACE Contribution to Core PCE Inflation

Dashed line represents average infaltion contribution 2002 through 2007



### Persistent Influences Holding Down Inflation: Healthcare Services

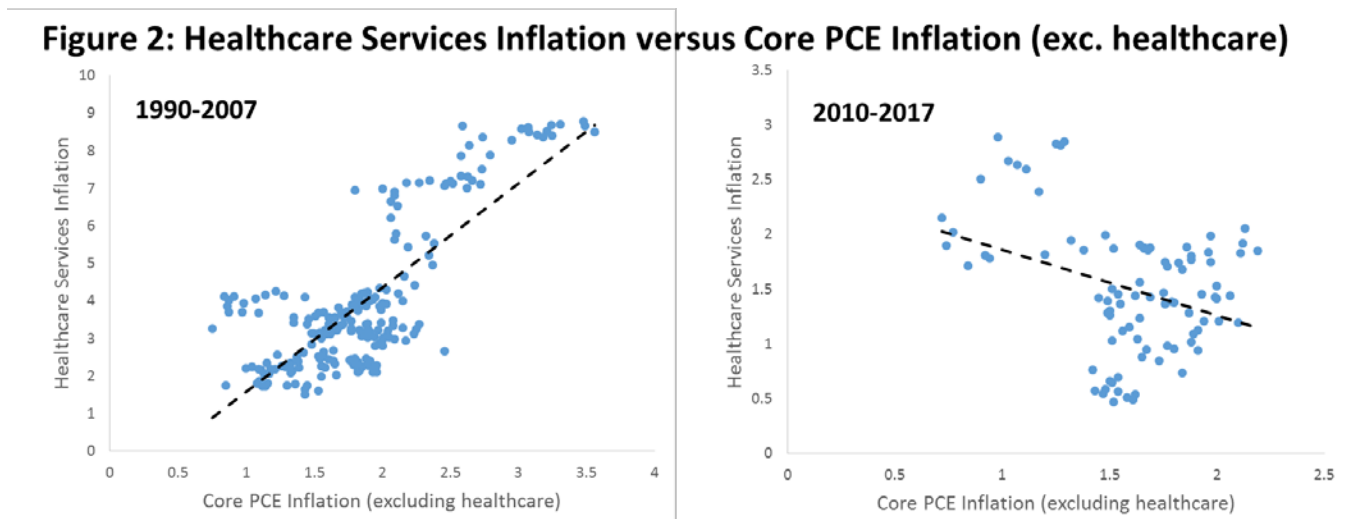
- While PACE categories can partly explain the recent decline in inflation over the past year, they do not explain much of why core PCE inflation has persistently remained below the 2 percent target since the end of the recession.
- As shown in a previous briefing (Shapiro, October 2015), both long-term and permanent cuts to the growth in public payments have kept healthcare services inflation low---averaging around 3.5 percent in the mid-2000s, but only 1.1 percent over the last five years (see Appendix Figure A1).
- The legislated changes to Medicare payment growth imply that there has been a persistent exogenous change in healthcare inflation in the post-recession period. Figure 2 shows some evidence that healthcare inflation is behaving differently now than in the past. Before the recession, healthcare inflation positively tracked core inflation (as measured by year-over-year core PCE inflation excluding healthcare).<sup>5</sup> However, since 2010 the two series are negatively correlated.
- The left panel in Figure 3 shows that the contribution of healthcare services inflation to core PCE inflation has steadily declined since the end of the recession. The figure highlights the substantial

<sup>5</sup> Results are the same with 1985-2007 as the pre-recession period.

size and persistence of the drag to core PCE inflation stemming from the healthcare services category. By contrast, the changes to core PCE attributable to the PACE categories (shown in the right panel) are smaller and appear to be more transitory.

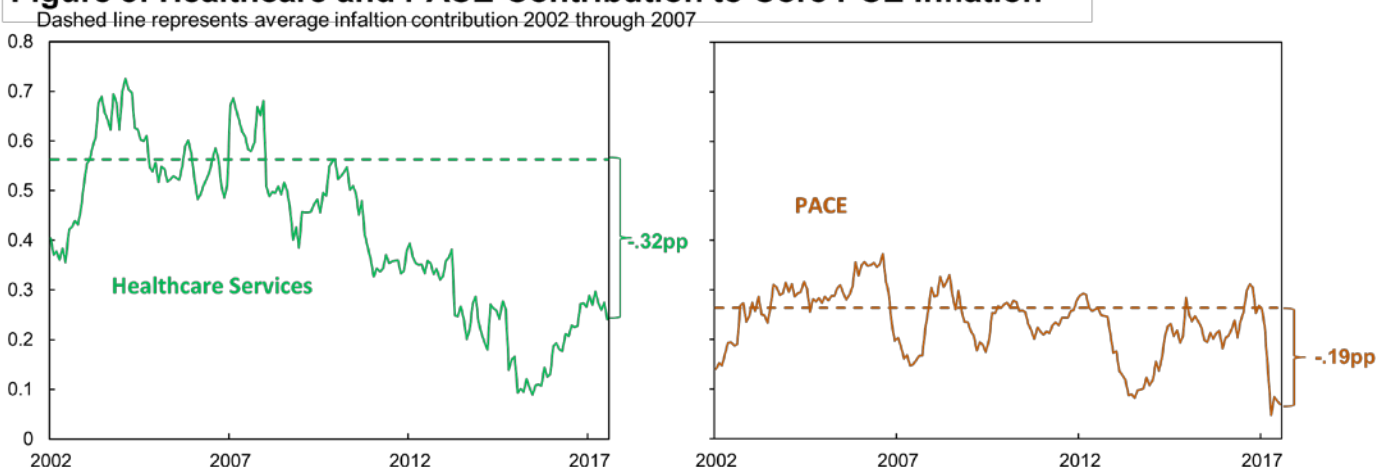
- The healthcare services category is currently contributing about 30 fewer basis points to core PCE than in the 2002-2007 period. That is, core PCE inflation would currently be 1.7 percent if healthcare services inflation was at its benchmark level.
- There is likely to be some upward pressure on healthcare services prices in the near-term as Medicare hospital payment growth cuts are set to expire at the end of this fiscal year.
  - The FY2018 hospital inpatient Medicare payments are set to grow at 2.0 percent. For comparison, the FY2016 and FY2017 rates were set to 0.9 percent and 0.6 percent, respectively.
  - An upper-bound estimate implies this Medicare payment increase translates into a 30 basis point increase in overall healthcare services inflation.<sup>6</sup>
- It seems unlikely for healthcare services inflation to reach its benchmark level given that many of the Medicare cuts are permanent or set to continue for an extended period of time (Clemens, Gottlieb, and Shapiro 2016).
  - Medicare physician payments are set to grow at only 0.5 percent growth until FY2019 and zero growth between FY2019 and FY2025.
  - The ACA mandates a permanent “multi-factor productivity” adjustment as well as a separate 0.75 percentage point cut to hospital payments through FY2019.

**Figure 2: Healthcare Services Inflation versus Core PCE Inflation (exc. healthcare)**



<sup>6</sup> Clemens, Gottlieb, and Shapiro (2014) found that a 1.9 percent Medicare payment cut (in 2013) translated into a 1.2 percent decline in healthcare services inflation (assuming pass-through to the private sector and Medicaid). Hospitals make up 46 percent of healthcare services. This means an increase from 0.9 to 2.0 would cause a  $1.1 \times (1.2/1.9) \times .46 = 0.32$  increase in health care services inflation and  $0.32 \times 0.17 = 0.05$  increase in core PCE inflation.

**Figure 3: Healthcare and PACE Contribution to Core PCE Inflation**



### A Broader Measure of Acyclical Influences on Core PCE Inflation

- The above analysis highlights only a small portion of the core PCE basket. To get a broader sense of whether acyclical shocks have been responsible for keeping inflation low, we decompose core PCE inflation into two mutually exclusive components: pro-cyclical and acyclical inflation.
- We do so by running a simple Phillips-Curve (PC) model using data from 1985 to 2007 on each of the major sectors in core PCE inflation, estimating a distinct slope coefficient,  $\beta$ , by sector:

$$\pi_{t,i} = \alpha_i + \beta_i(U_{t-1}^* - U_{t-1}) + \delta_i\pi_t^* + (1 - \delta_i)\pi_{t-1,i} + \varepsilon_t$$

Where

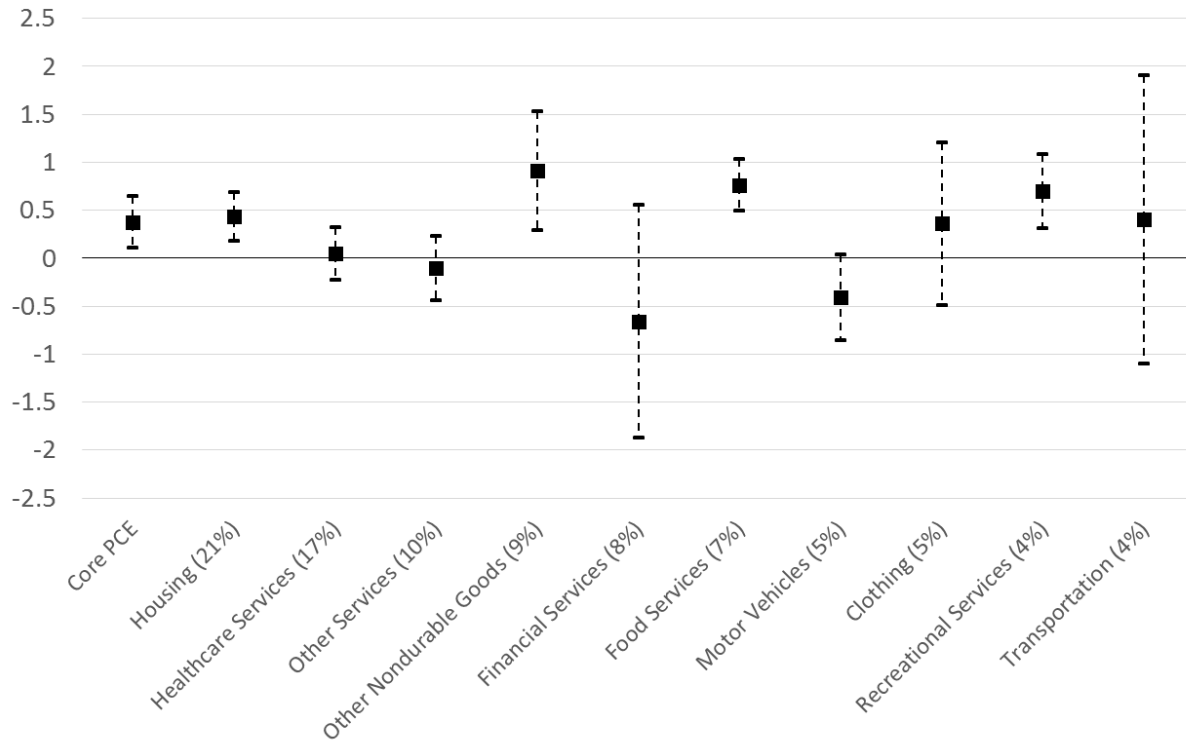
- $\pi_{t,i}$  is the monthly inflation rate of sector  $i$
  - $U_t$  is the unemployment rate
  - $U_t^*$  is NAIRU
  - $\pi_t^*$  measures the expected trend level of inflation (the perceived inflation target) measured using the FRB/US model variable “PTR.”
  - $\alpha$  is a constant
- Figure 4 shows the PC slope coefficients,  $\beta$ , along with 95 percent confidence bands.<sup>7</sup>

<sup>7</sup> Non-profit institutions serving households (1.9%) and other durable goods (2.8%) are not depicted in Figure 4.

- We classify a sector as being pro-cyclical if the slope coefficient is greater than zero and is statistically significant.
  - Pro-cyclical sectors include housing<sup>8</sup>, other non-durable goods, food services, recreational services, and non-profit institutions. (42 percent of core PCE)
  - Acyclical sectors include healthcare services, financial services, other services, motor vehicles, clothing, other durable goods, and transportation.<sup>9</sup> (58 percent of core PCE)
- We then create two inflation series (pro-cyclical core PCE inflation and acyclical core PCE inflation) by aggregating up the sectors within in each group.
- Figure 5 shows the two series since 1985. The two series diverged in the late 1990s (a period of low inflation) until converging in the mid-2000s (a period where inflation averaged close to 2 percent). Beginning in 2014, the two-series have diverged again as pro-cyclical inflation steadily increased while acyclical inflation declined.

### Figure 4: Betas by Sector, 1985-2007

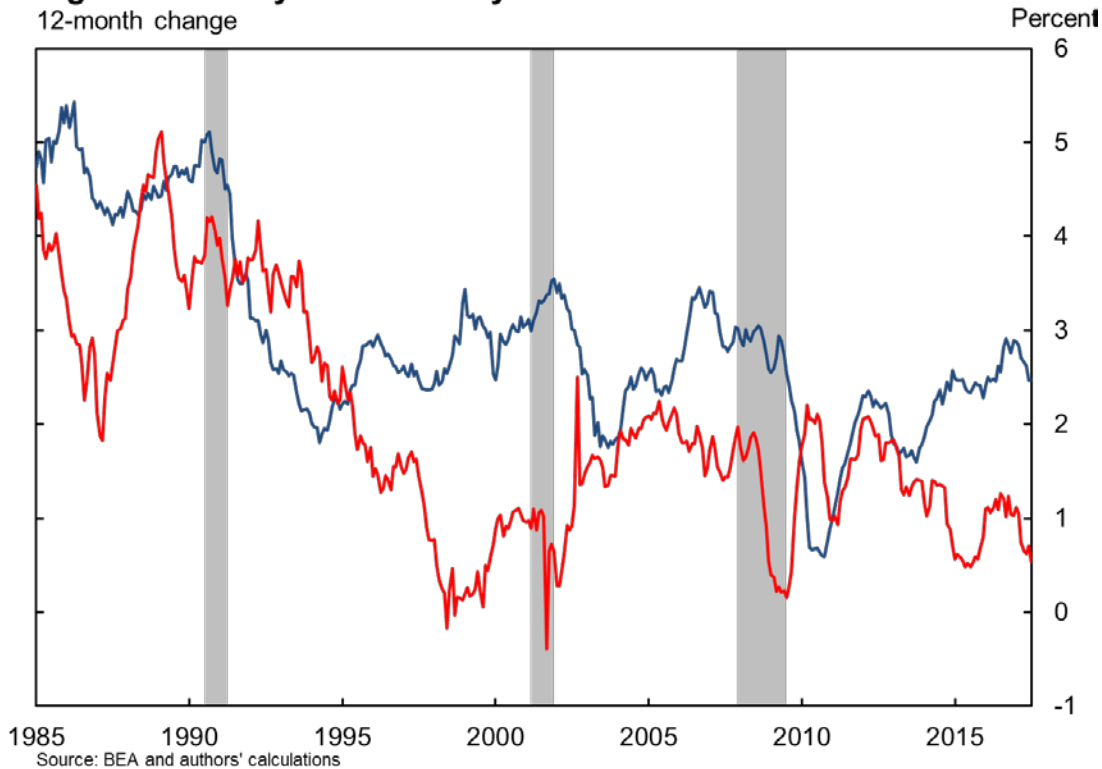
Sectors in order of share in Core PCE, shares in parentheses



<sup>8</sup> Our finding that housing inflation is pro-cyclical is consistent with evidence on housing inflation from cross-geographical Phillips Curve estimates as shown in Leduc and Wilson’s 2015 briefing as well as another briefing in the current binder.

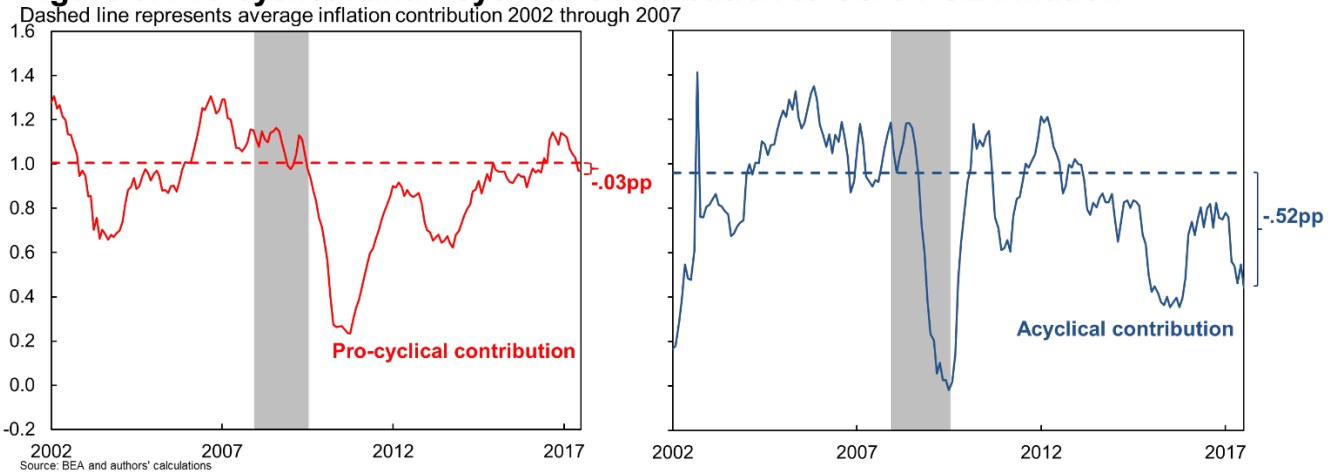
<sup>9</sup> This is in line with a 2016 briefing by Jorda and Lansing who show that removing healthcare services and durable goods from the PCE inflation measure provides a better fit with the Phillips Curve.

**Figure 5: Pro-Cyclical and Acyclical Core PCE Inflation**



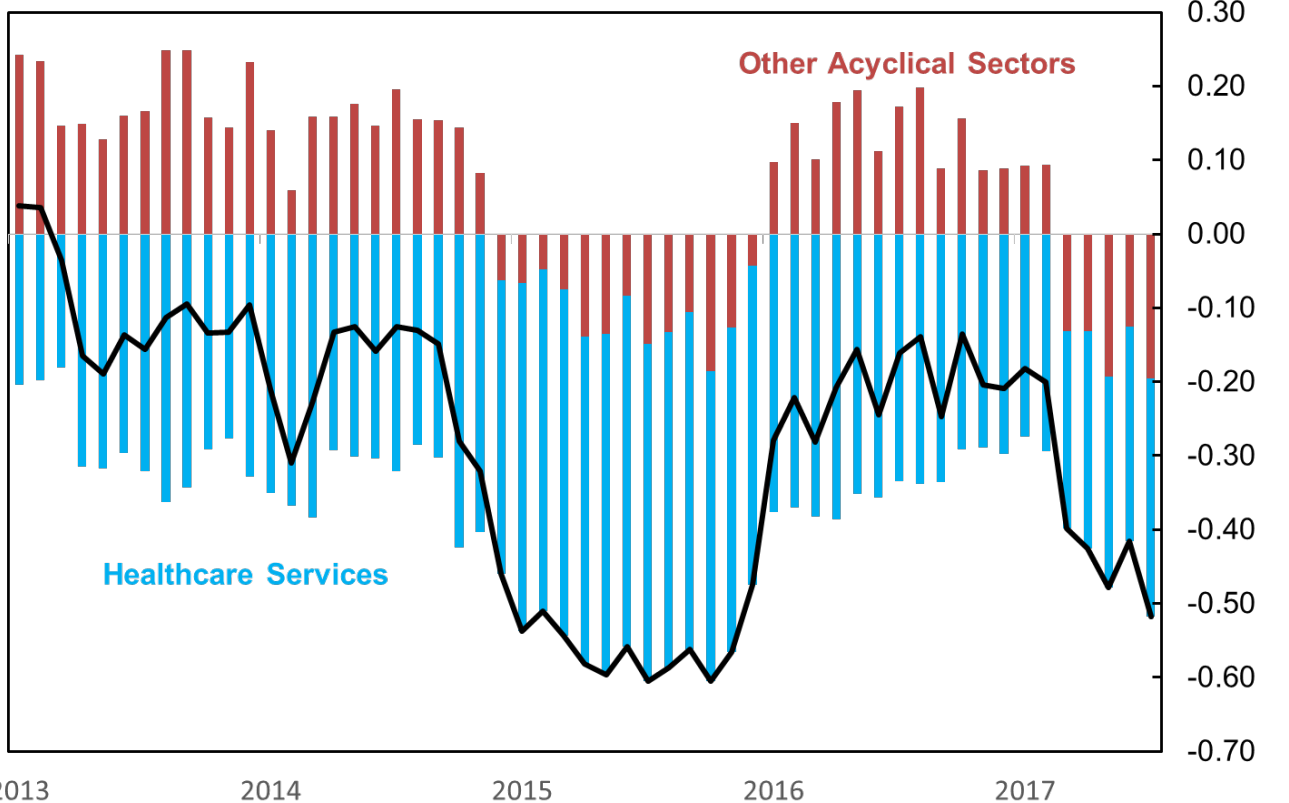
- Figure 6 reports the contributions of each series to year-over-year core PCE inflation. The dotted lines show the average contribution over the 2002 to 2007 period.
- Pro-cyclical inflation has returned to its pre-recession level, and is therefore contributing about the same to core PCE inflation as it did in the 2002-2007 period---in line with further improvements in economic conditions.
- Acyclical inflation, however, remains 52 basis points below its benchmark implying that acyclical influences are holding down core PCE inflation.
- In Figure 7, we measure the extent to which healthcare has caused the decline in the acyclical group's contribution to core PCE inflation (relative to the group's benchmark contribution).
- This decomposition shows the decline in the acyclical group's inflation contribution relative to benchmark since 2013 has been driven primarily by healthcare services inflation. The other acyclical sectors over this period either have added to the group's relative inflation contribution or been close to zero.
- Figure 7 also shows that the recent dip during 2017 in the acyclical group's inflation contribution---and hence core PCE inflation in general---can be traced to a relative decline in the contribution from the non-healthcare acyclical sectors.

**Figure 6: Pro-cyclical and Acyclical Contribution to Core PCE Inflation**



**Figure 7: Difference Between Acyclical Contribution and its 2002-2007 Avg.**

Contributions decomposed between healthcare and other acyclical sectors



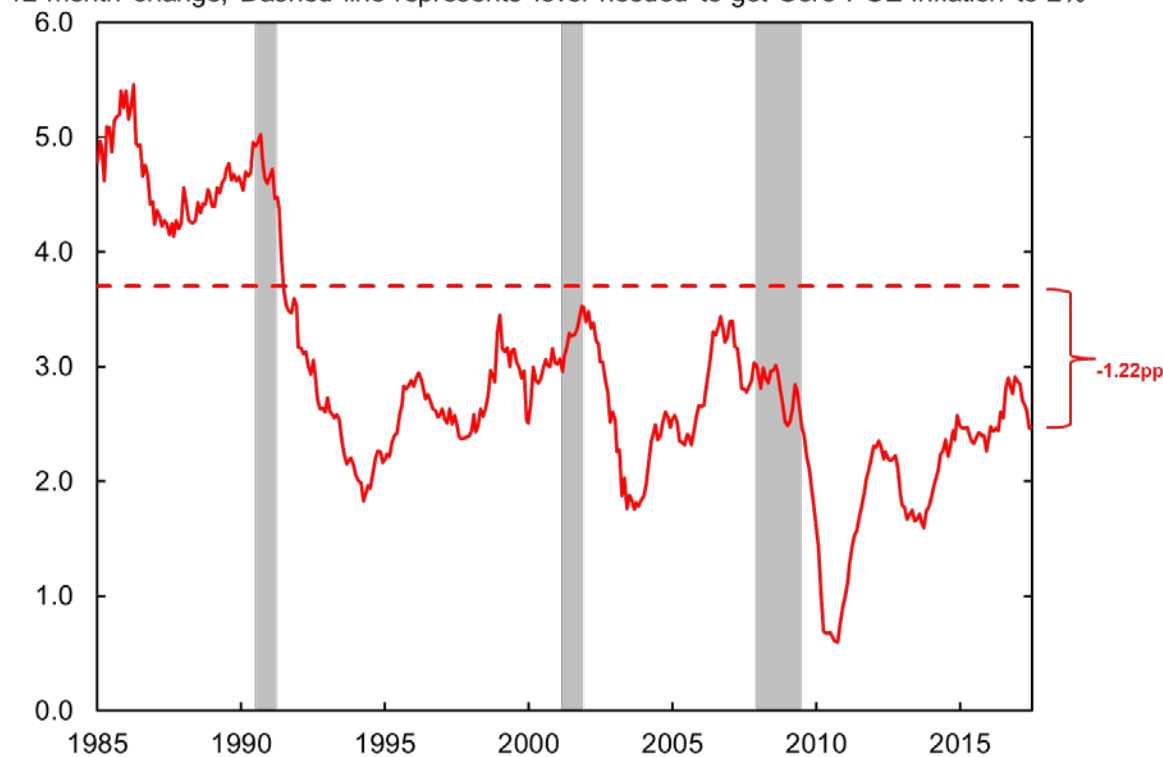


## How Can We Get Back to 2 Percent Inflation?

- Our analysis implies two broad scenarios by which inflation could reach or surpass the FOMC's 2 percent target:
  - The economy runs substantially hotter, further pushing up pro-cyclical inflation.
  - Acyclical inflation returns to (or surpasses) its benchmark level.
- Here, we consider each of these two scenarios in turn.
- First, further monetary stimulus could potentially push up inflation in pro-cyclical sectors. However, a historically high level of pro-cyclical inflation would be required to push core PCE inflation back up to 2 percent.
  - Specifically, pro-cyclical inflation would have to rise 122 basis points (to 3.7 percent) assuming noncyclical inflation stays constant. Figure 8 shows that pro-cyclical inflation has not been this high since the early 1990s (red dashed line).
  - Even if the PACE categories go back to their benchmark levels (adding 20 basis points to core PCE), pro-cyclical inflation would still need to rise 73 basis points (up to 3.2 percent) to get core PCE inflation back to 2 percent.

### Figure 8: Pro-cyclical Inflation

12-month change, Dashed line represents level needed to get Core PCE Inflation to 2%



Source: BEA and researcher calculations

- Second, acyclical inflation could return to its benchmark level if enough acyclical sectors are hit by positive inflation shocks. Healthcare inflation would have to return all the way to its benchmark level and enough of the other acyclical sectors would have to return to (or exceed) their benchmark levels.
  - Healthcare inflation will likely rise somewhat in the near-term, but there is a risk that it will stay below its pre-recession level for some time.
    - Current healthcare legislation does call for some of the Medicare payment cuts to reverse, which will alleviate some of this disinflationary pressure in the near term. However, many of the payment growth cuts are set to remain for many years or are permanent, implying low healthcare inflation may be here to stay.<sup>10</sup>
  - Inflationary shocks to other acyclical sectors are difficult to predict and would also need to be persistent to keep inflation at 2 percent.
    - Even if the PACE categories go back to benchmark levels, inflation would still be below target, so these inflationary shocks would likely need to stem from other sectors.
- Of course, a combination of these scenarios also could achieve a 2 percent or above inflation level. In our view, such a confluence of events is unlikely. What seems more likely is that:
  - Pro-cyclical inflation rises slightly above its current level as unemployment continues to decline (adding up to 5 basis points to core PCE inflation).<sup>11</sup>
  - The PACE shocks fade (adding 10 to 20 basis points to core PCE inflation).
  - Healthcare services inflation rises a bit as some of the Medicare payment growth rate cuts reverse (adding 5 to 10 basis points to core PCE).
- In this case, core PCE inflation would be brought back into the 1.6 to 1.8 percent range within the next 3 years.

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<sup>10</sup> Model-based estimates also provide evidence that healthcare services inflation is not likely to rise if the economy becomes even more heated. A rolling estimate of the healthcare Phillips Curve shows that both the slope and intercept declined even further beginning in the post-ACA period (see Appendix Figure A2).

<sup>11</sup> The PC slope coefficient for pro-cyclical inflation over the 1985-2017 period is 0.30 with 95 percent confidence interval [0.21, 0.39]. Therefore, an additional 0.4 decrease in the unemployment rate (as assumed in the FRBSF forecast) implies an 8 to 15 basis point increase in pro-cyclical inflation or a 3 to 6 basis point increase in core PCE inflation.

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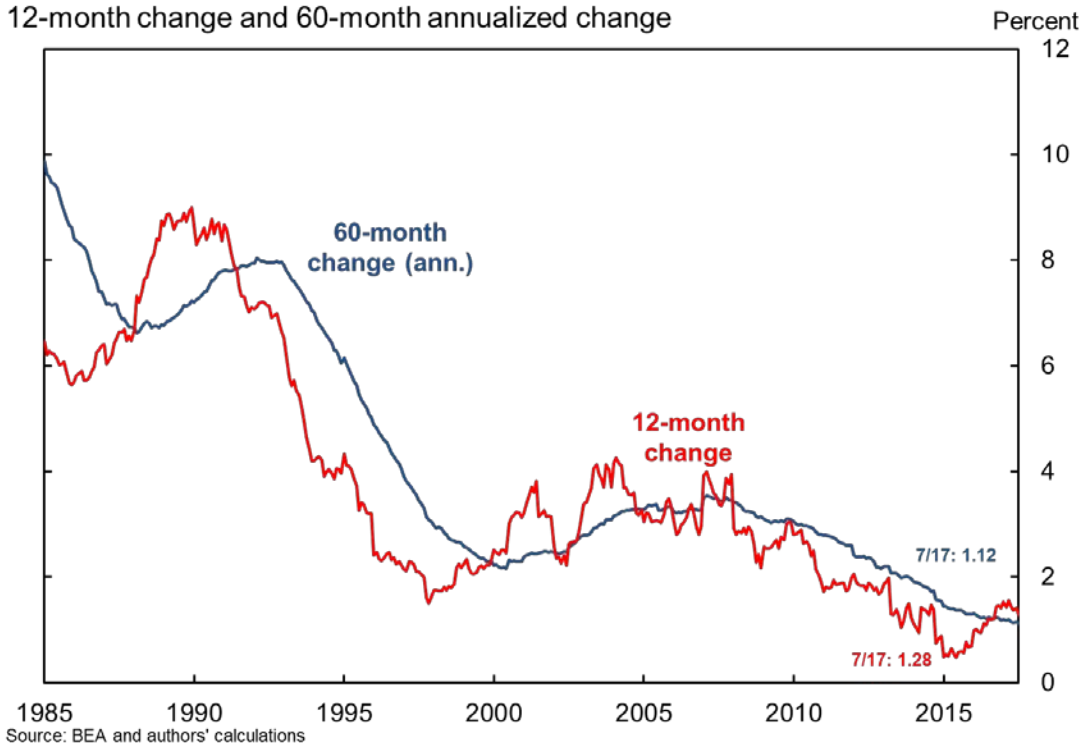
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Appendix

**Figure A1: Healthcare Inflation**

12-month change and 60-month annualized change



**Figure A2: Rolling Estimates (7-year) of Alpha and Beta from Healthcare Phillips Curve Regression**

