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Recently Asked Questions

Residual Seasonality in Core PCE Inflation

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Is there residual seasonality in core PCE inflation? If so, what role is it playing in the near-term inflation forecast?

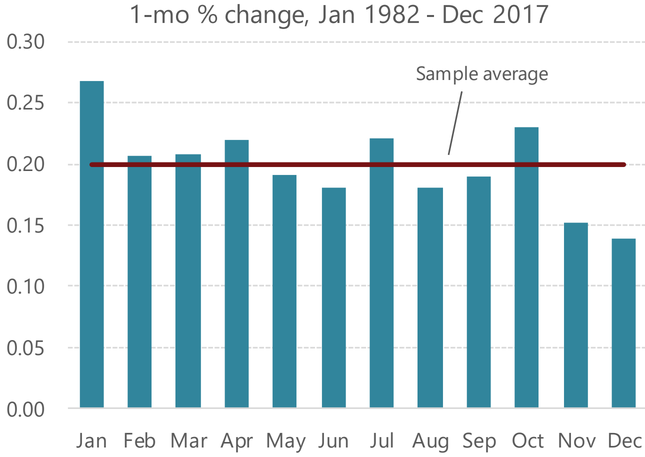
Yes, there is evidence of residual seasonality in core PCE inflation, and it tends to reduce core PCE inflation in November and December and boost it in January.

Over the last 36 years, the one-month percent change in the core PCE price index has averaged 0.20% per month. When calculated by calendar month, a striking pattern is revealed: growth in November and December has tended to be well below this average, while growth in January has tended to be well above this average (see the chart). This is striking because the core PCE price index is reported to be adjusted for normal seasonal variation.

If statistically significant, such a pattern is said to indicate residual seasonality; the tendency for a series that is reported to be seasonally adjusted to, nevertheless, exhibit a seasonal pattern. To determine whether the pattern shown in the chart is statistically significant, we entered calendar-month dummies into our monthly Phillips curve, which expresses the one-month percent change in the core PCE price index as a function of the unemployment gap, an expectations anchor (the difference between lagged core PCE inflation and forward-looking expected inflation), growth of relative nonpetroleum import prices, growth of relative oil prices, and lags of core PCE inflation.[1]

Core PCE Price Inflation by Month

1-mo % change, Jan 1982 - Dec 2017



Source: BEA

When estimated over roughly the sample shown in the chart, the November, December, and January calendar-month dummies were statistically significant. The point estimates suggest that the one-month percent change in the core PCE price index is reduced by three basis points in November and four basis points in December and boosted by seven basis points in January.[2] That is, after controlling for all of the factors that we typically think of as influencing core PCE inflation, a statistically significant seasonal pattern like the one seen in the chart appears in the data.

What could cause such a seasonal pattern? We think it's holiday discounting in November and December followed by a return to normal pricing in January.

At this point, the astute reader will note that such discounting behavior, if a recurring event, should be captured by normal seasonal adjustment procedures and removed from the data. This is correct, but the reason this logic does not apply to the core PCE price index is that seasonal adjustment is not done directly on the core PCE price index, but rather on the individual component prices that enter the core PCE price index. A seasonal pattern can be evident in the aggregate core

[1] The technical details of our monthly Phillips curve are out of scope for this RAQ, but we are happy to discuss these details with interested parties.

[2] These point estimates are from a regression that includes seasonal dummies for November, December, and January only, and which imposes the restriction that the sum of the coefficients on these monthly dummies equals zero; the null hypothesis that the sum of these coefficients equals zero cannot be rejected at any reasonable level of significance.

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PCE price index even if it is evident in none of it's individual price components. A simple stylized example will illustrate how this is possible.

Suppose a grocer discounts apples in December for three years, then discounts bananas in December for the next three years, and finally discounts pears in December for the final three years. None of these prices exhibits a seasonal pattern individually because none exhibits discounting on a regular basis; there is December discounting in only three of nine years in the sample. Therefore, none of these individual prices would trigger seasonal adjustment procedures. However, the price of a fruit basket comprising apples, bananas, and pears would exhibit a regular December discount — a seasonal pattern — because a portion of the fruit basket is discounted every December.

In this stylized example, the fruit basket stands in for the core PCE price index. If discounting regularly occurs in November and December, but generally not always in the same components, then the individual component prices in which discounting *irregularly* occurs will not exhibit regular seasonal patterns, but an aggregate index that combines these prices will. This is what we think is happening in the core PCE price index.

Residual seasonality in the core PCE prince index is distorting the near-term inflation outlook. For our latest base forecast issued early this month, we had actual monthly data on the core PCE price index through December and estimates for the months following. The quarter-on-quarter annualized growth rate for the core PCE price index was reported at 1.9% for the fourth quarter, and we had projected 1.8% growth in the first quarter. The latter was predicated on an assumed 0.15% increase in the core PCE price index in January followed by 0.16% increases in February and March. Following the January CPI report (issued after completion of our base forecast), we now estimate a 0.29% increase in the core PCE price index in January, which would put the first-quarter annualized increase at 2.4% (assuming 0.16% increases in February and March).

At first glance, the updated first-quarter figure is alarming; based on the one-quarter annualized increase, core PCE inflation is rising by five-tenths in the first quarter to four-tenths above the Fed's 2.0% objective. But when we adjust November, December, and January core PCE inflation for the estimated effects of residual seasonality, the picture is a little less alarming. Excluding the effects of residual seasonality, the one-quarter annualized increase in the core PCE price index was 2.0% in the fourth quarter and we would forecast 2.3% in the first quarter. This is still an acceleration and overshoot, but not as by as much (on both counts).

We still believe conditions will warrant four rate-hikes by the Fed in 2018. But in processing recent and prospective readings on the core PCE price index, and in gauging the recent acceleration in prices, it's important to keep in mind the regular tendency for core PCE inflation to run relatively soft in November and December and relatively strong in January.

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