St. Louis Fed

What Do Components of Key Inflation Measures Say about Future Inflation?

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By Michael McCracken , Trần Khánh Ngân

If you follow speeches by members of the Federal Open Market Committee (FOMC), you will hear references to both "headline" and "core" household inflation. The former refers to a measure of inflation that is based on a weighted basket of goods and services from all household spending categories. The latter typically refers to a measure of inflation that is based on the same representative basket except for food and energy.

To many consumers, core inflation may seem like a ridiculous concept, since food and energy (e.g., gasoline) are two of the most common categories of items they purchase. Why, then, would central bankers even consider such a measure of inflation?

The primary argument for following a core measure of inflation is that it provides a clearer picture of the direction in which inflation is headed. The premise is that food and energy prices are volatile, which makes the headline measure a poor indicator of future inflation; therefore, monitoring core inflation is a better idea.

A 2011 *Economic Synopses* essay (PDF), authored by Michael McCracken, highlighted two weaknesses in this logic. One consideration is that over time, the volatility of food or energy prices may change. A second is that if prediction is the goal, there is a trade-off between the volatility of a given component and its signal of future inflation.

Lower Signal-to-Noise Ratio Implies Lower Efficacy in Predicting Inflation

To evaluate these two points tied to headline inflation, the 2011 essay examined rolling 10-year samples of the signal-to-noise ratio (SNR) for select components of consumer price index (CPI) inflation between December 1968 and May 2010. A lower SNR means a lower predictive content relative to variance, implying less usefulness for predicting future inflation, and vice versa.

McCracken found that the SNR of energy prices declined drastically following the oil crisis of the mid-1970s, indicating that energy became less useful for predicting future headline inflation. On the other hand, the SNR of food prices started climbing in the mid-1980s, fluctuated between the late 1990s and late 2000s, and then stabilized in the early 2010s. The conclusion was that while energy prices were too volatile to be used as a predictor, food prices had some efficacy—though the food component was not among the most important by this metric.

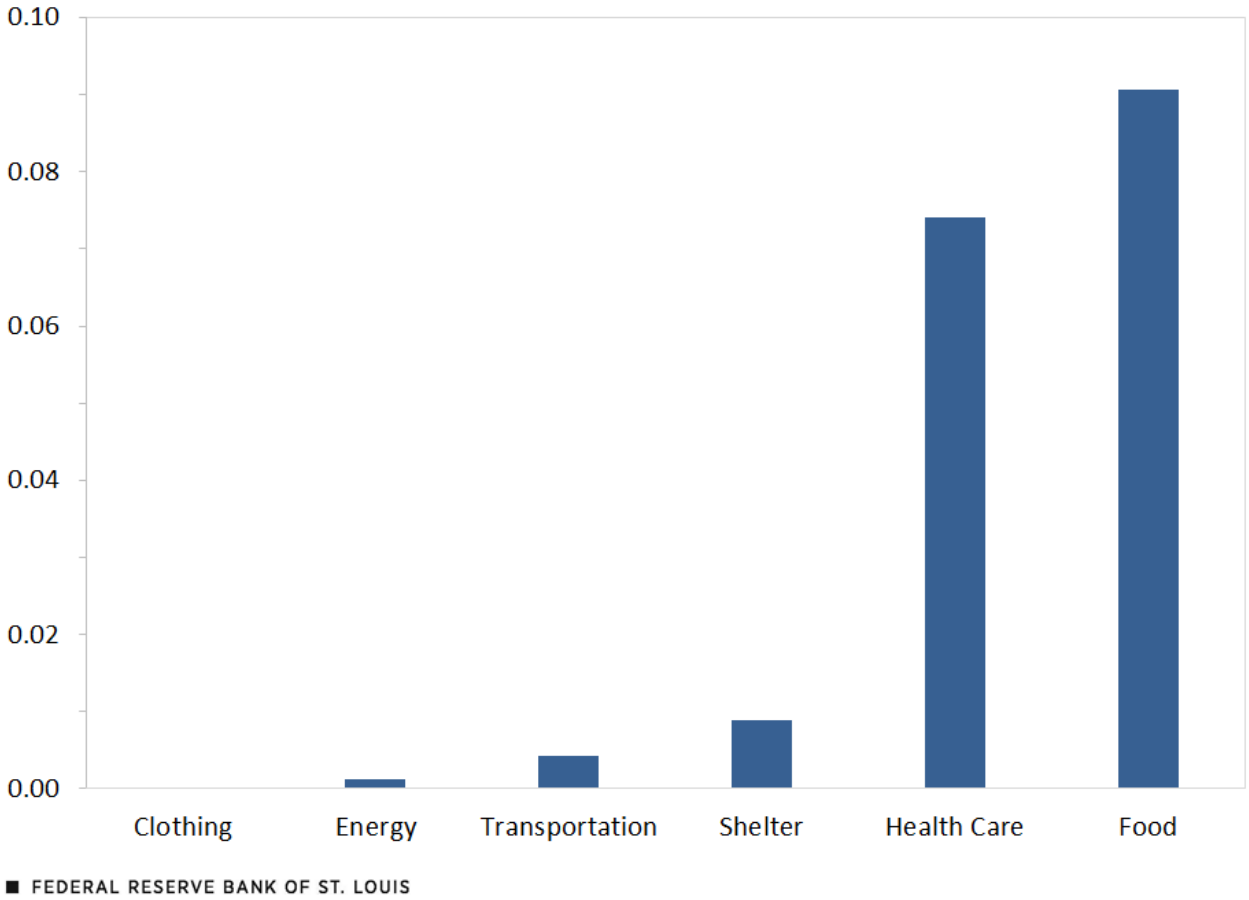
In this blog post, we revisit the SNRs for the same components of CPI inflation with over 10 more years of subsequent data. We also extend our analysis to personal consumption expenditures (PCE) inflation and its major components. Our estimates are based on data from January 2011 to March 2023. As before, the ratio for a given component is calculated by *dividing* the correlation between year-over-year headline

inflation and the 12-month-lagged component's inflation rate *by* the lagged component's sample standard deviation, and then taking the square of the result. The two figures below plot, from lowest to highest, the SNRs for components of CPI and PCE inflation, respectively.

Food Now Has the Highest Predictive Value for Headline CPI

In the first figure, we see that the energy SNR is the second lowest among the six CPI components, continuing its trend since the mid-1970s. In 2011, the SNR of food prices was higher than that of energy, transportation and clothing but lower than that of health care and shelter. This is no longer the case: Food now tops the chart with the highest SNR (0.09), followed closely by health care (0.07). This means that food has the highest predictive content relative to noise among all the components. At least in the case of CPI, the SNRs suggest that food is a useful predictor of future headline inflation and should not be excluded vis-à-vis core inflation. Moreover, since 2011, health care has become a more important player.

Signal-to-Noise Ratios: Select CPI Inflation Components

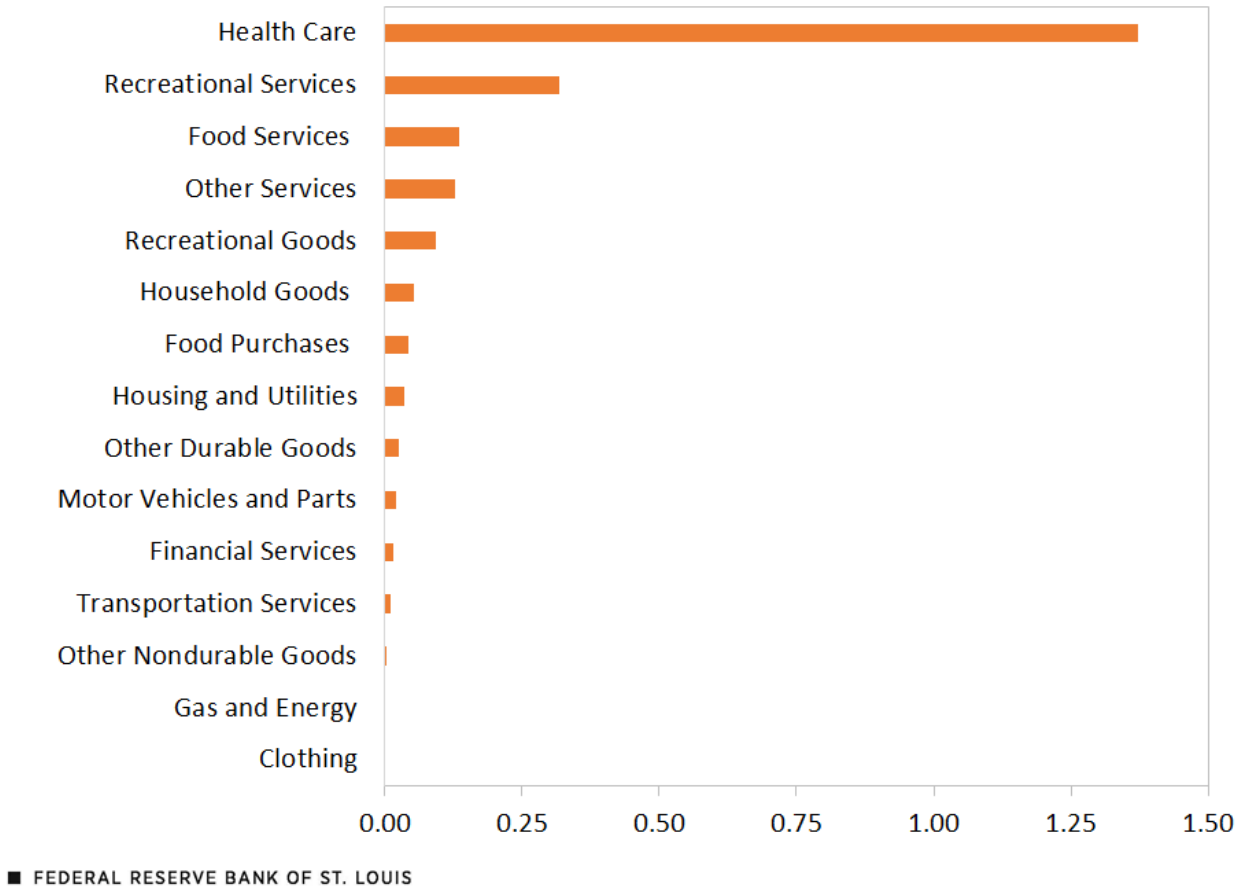


SOURCE: Bureau of Labor Statistics and authors' calculations.

Food Services Has the Highest Predictive Value among PCE Components

The second figure displays the SNRs for PCE inflation components. Here, however, the food category is broken into two components: food purchases and food services. Both SNRs are above the median, but the ratio of food services is about three times that of purchases. Looking at the PCE components adds an interesting layer to the story of food as told by their CPI counterpart: It seems that food *services* specifically is important for forecasting future headline inflation.

Signal-to-Noise Ratios: PCE Inflation Components



SOURCE: Bureau of Economic Analysis and authors' calculations.

While the SNRs of food and health care were comparable in the CPI case, the SNR of health care easily surpasses that of all other components of the PCE. At 1.37, it is over four times the second highest SNR, that of recreational services. PCE results corroborate the recent rise in predictive significance of health care vis-à-vis future headline inflation first observed with CPI.

Conversely, the SNR of clothing, as well as that of gas and energy prices, remains at the bottom of the chart, mirroring the case with the CPI. Also consistent with the CPI components, the SNR for transportation services is slightly higher than those of clothing and energy, but the ratio is still very low, indicating little predictive significance for future headline inflation. Also near the bottom are financial services and other nondurable goods.

About the Authors

Michael McCracken
Michael W. McCracken is an economist and assistant vice president at the Federal Reserve Bank of St. Louis. His research focuses on econometrics and macroeconomic forecasting. He joined the St. Louis Fed in 2008. Read more about the author and his research.

Trần Khánh Ngân
Trần Khánh Ngân is a research associate at the Federal Reserve Bank of St. Louis.