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# Tracking Inflation with Relative Price Changes

**Andreas Hornstein, Francisco Ruge-Murcia, and Alexander L. Wolman.** “The Relationship Between Inflation and the Distribution of Relative Price Changes.” *Federal Reserve Bank of Richmond Working Paper No. 24-15*, December 2024.

**T**he Federal Reserve has operated under an inflation-targeting framework since the mid-1990s (at first implicitly and then explicitly) with successful results in maintaining price stability. Yet even when inflation is generally stable around its target rate, it still fluctuates from month to month. One source of those fluctuations is large shocks to supply and demand for particular goods or services. For example, a disruption in the oil market can cause a spike in gasoline prices and lift the overall inflation rate, even if prices in most other categories remain stable. Conversely, a shock that causes a sharp decline in gas prices can pull inflation down, even if other prices are unchanged. In both scenarios, the overall inflation rate moves significantly because of a single category that experiences a large relative price change. Can studying the relationship between inflation and the distribution of relative price changes provide insights into the stability of overall inflation?

In a recent working paper, Andreas Hornstein and Alexander Wolman of the Richmond Fed and Francisco Ruge-Murcia of McGill University focus on a statistic of the distribution of relative price changes in the consumption categories that make up U.S. monthly personal consumption expenditure (PCE). Using PCE data, the authors defined the share of relative price increases (SRPI) as the expenditure-weighted share of consumption categories with price changes exceeding the overall inflation rate. The authors found that SRPI can explain much of the variation in monthly

inflation from 1995 through 2019.

Referring to the previous example, if gasoline prices surge and other prices are unchanged, then SRPI will be low and inflation will be high. If gasoline prices plummet and other prices are unchanged, then SRPI will be high and inflation will be low. This relationship is not specific to gasoline prices. When inflation is generally stable, there may

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be an inverse relationship between monthly inflation and SRPI. Under the hypothesis that monetary policy has stabilized inflation, the authors postulated that any remaining fluctuations in inflation are driven by large relative price changes for particular consumption categories. SRPI captures those large relative price changes in a single statistic.

To empirically examine the relationship between SRPI and inflation, the authors used PCE data from January 1995 to February 2020. They chose this period because it represents a historically stable inflation regime: Inflation volatility was low compared to prior decades, and the Federal Reserve formally adopted a 2 percent inflation target in 2012. The authors noted that outside a stable regime, they would not expect inflation to be well explained by SRPI. The data indicate that SRPI and monthly inflation exhibited a strong negative correlation coefficient of -0.83. When SRPI was low, inflation was typically high, and vice versa. The authors show that this single statistic can explain a substantial share of

monthly inflation volatility during that period. More generally, the authors show that large relative price changes are important for understanding the behavior of inflation: Categories with the largest relative price changes — accounting for just 2 percent of expenditures — explained roughly two-thirds of the variance in inflation.

The researchers then used this framework to evaluate inflation during and after the COVID-19 pandemic. Throughout 2020, monthly inflation remained largely consistent with the pre-pandemic SRPI-inflation relationship. But beginning in March 2021, inflation began to consistently exceed what SRPI alone would have predicted. This divergence suggests that broader macroeconomic forces were at play — presumably a combination of monetary policy shocks and other shocks to aggregate demand or supply.

The authors then estimated the SRPI-inflation relationship over rolling 10-year windows to interpret inflation over a longer time period. This approach defines underlying inflation as the level of inflation that would prevail if SRPI were fixed at its 10-year average. This new measure effectively filters out the influence of unusually large relative price movements, revealing the underlying inflation trend in the economy.

Under stable inflation regimes, Hornstein, Ruge-Murcia, and Wolman demonstrated that monthly inflation can be well explained by SRPI. This statistic can then be used to infer departures from inflation stability — such as during the COVID-19 pandemic — and to measure underlying inflation in the economy. The authors aim to extend their work by exploring whether similar patterns exist in other countries with long periods of stable inflation. If so, the share of relative price increases could be a useful tool for central banks to determine departures from stability. **EF**