“Core” CPI and Permanent Price Changes

The Consumer Price Index (CPI) is the nation’s primary measure of inflation. Ensuring its stability, important for our economic well-being, is one of the primary objectives of the Federal Reserve. Historically, however, economists have recognized that two components of the CPI—food and energy prices—fluctuate more wildly than other components. These vacillations make adjustments more difficult. As a result, policy-makers have developed the “core” CPI measure which excludes the food and energy prices.

The crudeness of this solution could do more harm than good, however. While this solution accounts for the volatility of the price changes, the key desire is to exclude temporary price changes. It could be the case that though food and energy prices change drastically and quickly, they still represent permanent shocks, while the “core” CPI contains numerous prices undergoing temporary shocks.

In PERC Working Paper #1206, PERC’s Jordan Professor of Economics, Dennis Jansen, with Michael Bradley and Tara Sinclair of George Washington University decompose the alternate CPI measures into their permanent and transitory components to determine how precise the “core” CPI measures persistent inflation. They then use their model to predict how price shocks will affect both the CPI and the “core” CPI. They find that the “core” CPI seems more stable because shocks to the permanent component and shocks to the transitory component cancel each other out. Additionally, excluding food and energy prices omits important permanent changes in these prices. Finally, though in the short term, price shocks do have smaller effects on “core” CPI, in the medium term, “core” CPI retains more of the shock than overall CPI.

To make economic decisions about the future, people need to know what prices to expect. The CPI helps these people—be they consumers, firms, or policy-makers—predict the future evolution of prices. A superior index, however, would include only the permanent components of CPI, the price changes that will persist; temporary price changes will eventually diminish.

The authors use a multivariate version of a correlated unobserved components model to separate the permanent and transitory elements of each CPI measure. This approach requires the fewest assumptions about the CPI measures and therefore offers a very general solution. For example, it does not assume, as other models do, that the permanent and temporary components of the CPI are uncorrelated. Additionally, it allows them to analyze the “core” CPI, food CPI, and energy CPI separately but simultaneously so that they can determine any correlations between them.

The estimation of the model shows that all three CPI measures contain both permanent and temporary price movements. In addition, temporary movements in the “core” CPI consistently negate permanent movements. In other words, the “core” CPI itself is the product of volatile movements in both its permanent and temporary elements, but because they cancel each other out, “core” CPI seems to be smooth. Furthermore, these shocks to the permanent component are actually more volatile than the shocks to the headline CPI.

The authors also find that though the energy CPI does exhibit fairly large levels of volatility, especially in its transitory component, reinforcing the decision to exclude it from “core” CPI, the food CPI is comparable to the “core” CPI in both its permanent and transitory components. This similarity may suggest that excluding the food CPI does not enhance the value of the “core” CPI. Moreover, the permanent component is the main contributor in all three series and
therefore dividing them neglects important information in permanent price changes. In fact, the permanent component may be least important for the “core” CPI.

As discussed earlier, the permanent and temporary components of the “core” CPI are negatively correlated; this relationship holds for the energy CPI as well. The authors suggest a mechanism for this: in the face of a permanent change in prices for some goods, the market responds with an immediate, but temporary counter-movement in order to smooth the price transition. This relationship doesn’t hold for the food CPI, which shows a small, positive correlation—permanent price movements in food are reinforced by temporary price movements.

Using the estimates, Jansen, et al, created their own “permanent” CPI that included only the permanent components of the three CPIs. They then compared their CPI to both the headline and “core” CPI measures. They found that in terms of smoothness “core” CPI prevailed while their “permanent” CPI performed worst. They attribute this to “core” and headline CPI containing the offsetting temporary price movements, in other words, the market smooths the CPI. They also find that the “core” rate consistently under-

estimated long term inflation while the headline rate had a more varied relationship with the permanent rate.

Finally, the authors use impulse response functions to explore how shocks to the permanent components of the CPIs affect both the headline and “core” CPIs. As one would expect, they find that a permanent shock manifests more quickly and more strongly in the headline CPI than in the “core” CPI. More importantly, they find that core inflation understates the price shock’s effect on headline inflation in the first year after the shock but overstates it in the second year. So policymakers obtain a smooth “core” CPI by sacrificing the information on the true inflation rate.

Inflation is one of the most watched metrics of the U.S. economy and prices are clearly an extremely important factor when consumers (and firms) make decisions. If measurement of the inflation rate is biased, it could have detrimental effects on the country; if the Federal Reserve is basing its decisions if the Federal Reserve is basing its decisions on the headline inflation the result would be a smoother economy in the wrong direction. This paper suggests that CPI measures are biased and that policy-makers must understand those shortcomings.

Location Choice and Efficiency

Economist have long been interested in how the ownership structure affects the management of firms. In most circumstances, economists agree that for-profit enterprises will operate much more efficiently (minimizing costs for a given set of outputs) than those run by the government. In some industries, however, market idiosyncrasies may supersede those economic fundamentals. Many economists have argued that hospitals are one such industry.

In PERC Working Paper 1208, PERC Research Fellow Li Gan and Ph.D. Candidate Jeremy Nighohossian revisit the evidence on the subject and propose a reason that the evidence up to this point has been mixed. Namely, they suggest that one reason for-profit firms seem to have superior results is because the for-profit firms are choosing to operate in areas best suited to maximize profits, and when this location choice is taken into effect, the results are less obvious.

The economic theory on ownership posits that the main objective of the for-profit firms is to maximize the difference between their revenues and their costs. Because they are answerable to shareholders, they feel constant pressure to do so. Alternatively, government-run enterprise managers are compelled only by their own benevolence (and that of the board) to perform. Consequently, they feel less pressure to minimize costs. However, in hospitals, the nature of the relationship between provider and patient—the
asymmetry of information and the distrust of motives—makes the for-profit firm less desirable and could give the government-run firm an advantage.

Studies of this issue have had mixed results. These studies neglect the inherent selection issue involved, however. They ignore the fact that, in the hospital industry, unlike for-profit firms, government-run firms do not have the latitude in choosing where to serve customers. Generally, government hospitals operate in less dense communities not served by hospitals; they are built to ensure that these less populous areas have access to medical care. Because it is likely that for-profit firms are choosing areas that will best boost their bottom line, studies of efficiency will be biased.

To address that issue, the authors use an instrumental variable approach. In the first step, hospital location choice is estimated using a multinomial logit model. These estimates are then used to generate predicted locations for each hospital, and those predictions are used as instrumental variables in the second stage regression. The latter regression utilizes the stochastic frontier approach to determine the factors that affect hospital efficiency. The instrumental variable approach, of course, overcomes the endogeneity.

More specifically, the authors take a national sample of hospitals and split them into separate markets (counties, in this case). They then divide the markets into three groups based on the population density. Highly populous markets are deemed large. Then, they use a multinomial logit model to regress the market type on hospital characteristics, and they use those estimates to obtain a predicted market type.

In the second stage, they estimate a cost function for each hospital. The error term serves as an estimate of the hospital’s efficiency (the larger the error, the farther it operates from the cost frontier). With stochastic frontier analysis, they can decompose that error and determine how a set of variables changes it. In this way, they can estimate how certain factors affect efficiency. It is this stage that contains the predicted market types (as dummy variables).

The data used for this study come from Centers for Medicare and Medicaid Science Hospital Cost Reports. These are documents that each Medicare certified hospital must submit annually. The county data come from the Area Resource File provided by the US Department of Health and Human Services. It contains county-level demographic and health data.

The authors estimated the cost function and efficiency contributors using both the actual market types for each hospital and the predicted market type from the multinomial logit estimates. They found that the cost function coefficients were very similar for both. The one case where they differed (whether the hospital was categorized as a teaching hospital), can be explained by the fact that teaching hospitals also locate in large markets, so it would be subject to the same bias.

Their main finding, however, was that when they corrected for location selection, the relative rankings became mixed. Using the actual locations, for-profit firms are more efficient in all market types. However, when the endogeneity is removed, the picture becomes more mixed. In the small markets, for-profit clearly outperform public firms, but in the large markets, public firms slightly outperform the for-profits. The authors suggest that in the small markets, the investor pressure pushes for-profits to excel and there is no comparable pressure for the public firms, while in the large markets, competition amongst several hospitals ensures that even public hospitals perform.

In this paper, Gan and Nighohossian point out how differences in the ability for firms to choose their locations can skew their analysis. They find that, though public firms may be expected to outperform for-profits in the hospital sector, it is only in highly populated areas that this expectation holds. Because ownership plays a role in economic efficiency in many sectors—hospitals, education, banking—determining which environments are most conducive to which type may help policy-makers improve our economic well-being.