Alternative Measures of Inflation

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During periods of rapidly changing prices, it's important to measure inflation in order to monitor price changes and to separate changes in the real value of economic activity from the effect of inflation.

Prices paid by consumers are reported each month by the Department of Labor's Bureau of Labor Statistics (BLS) and by the Department of Commerce's Bureau of Economic Analysis in the form of the Consumer Price Index (CPI) and the personal consumption expenditure (PCE) deflator, respectively.

People generally interpret changes in these measures as changes in the cost of living. Numerous wage contracts, Social Security payments, and some retirement plans peg "cost-of-living" adjustments to changes in the CPI. However, no index can accurately measure the changes in the cost of living. Thus, we settle for price indexes like the CPI and the PCE deflator. Price indexes are an indication of what a given bundle of goods cost at two points in time.

In the following sections, the construction and components of these two widely recognized price indexes are described and some of their major differences are discussed.

The Differences

During 1979, the CPI for all items rose 11.3 percent while the PCE deflator increased 8.9 percent. The CPI has indicated a larger price rise in 8 of the last 10 years. The striking differences in the two series have generated a great deal of debate over which one more accurately reflects price level changes.

Much of the difference is accounted for by coverage, conceptual, and weighting differences in the two indexes. Coverage differences arise because the PCE deflator and CPI do not measure exactly the same things. Less than three-fourths of the items are common to both indexes.

The major conceptual difference between the two series is the treatment of housing. Home purchases (10.6 percent of total CPI) and contracted mortgage interest costs (7.3 percent of the total CPI) are the important elements of the homeownership cost component of the CPI. In periods of rising house prices and rapidly rising interest rates—as in recent years—the impact of the homeownership components on overall CPI price increases can be substantial. The PCE deflator is derived from an estimate of the value of housing to the occupant, a concept that is similar to the way the CPI treats the rental component of its housing series. In fact, the rental series of the CPI is used to deflate the PCE housing component.

Another major difference in the two series is weighting. There are two types of weighting problems—those associated with differences in the relative importance of items in the consumer's market basket and those related to shifting versus fixed weights. It is necessary to weight items in an index by their relative importance because consumers do not purchase equal quantities of all items. A 10-percent increase in the price of lettuce obviously has a different impact on the overall cost of food than an equivalent rise in meat prices. Thus, different weights must be applied to goods in order to accurately measure the effect of a price change on the total market basket. When the CPI and the PCE deflator are compared, the relative importance of items differs even among those items common to each index. Food at home, for instance, accounted for about 12.6 percent of the items in the CPI in 1979 but 13.3 percent of personal consumption expenditures. The CPI weights are based on a nationwide consumer expenditure survey conducted in 1972-74 and reflect purchasing patterns existing at that time. The PCE deflator weights differ from period to period and are determined by the mix of constant dollar expenditures for that period. Thus, the PCE deflator reflects changes in prices and changes in the composition of expenditures. The PCE deflator is most useful for comparing the cost of the basket of goods purchased today with its cost in the base period (1972). However, since the basket is changing, month-to-month or year-to-year changes in the PCE deflator are not strictly comparable.

Constructing the CPI

It is useful to trace through the mechanics of constructing the two indexes in order to better understand their similarities and differences. A market basket is determined by the consumer expenditure survey conducted in 1972-74. Once the items are chosen, appropriate weights are applied so that each item's relative importance is consistent with consumer purchasing patterns. Every month each of the items are priced to determine how the cost of the market basket has changed over time. The CPI is a base-period weight (Laspeyeres) index. That is, it measures the cost today of the original bundle of goods selected in the base period.

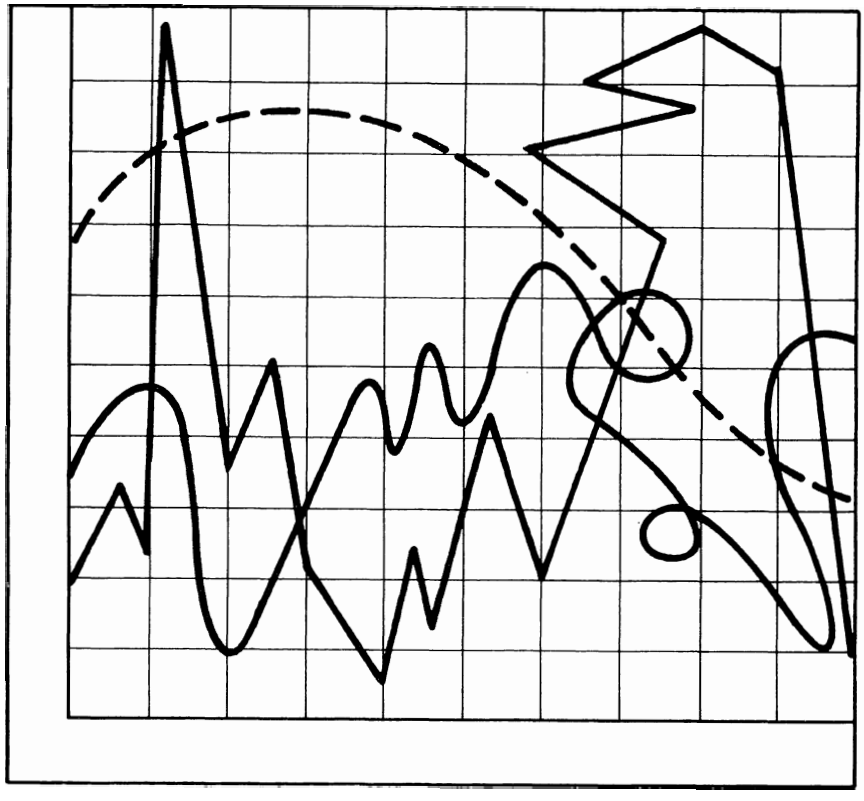
Some indexes compare the price of a basket of goods purchased today with its price in the base period. Generally speaking, yesterday's basket of goods priced at today's prices will cost more than today's basket of goods priced at today's prices. This is because it is rational to select lower priced substitutes when prices rise, thus today's bundle of goods will contain more lower cost substitutes.

Constructing the PCE Deflator

The Bureau of Economic Analysis (BEA) is charged with the responsibility of constructing measures of aggregate economic activity. In order to make valid comparisons over time, the BEA needs some means of deflating the estimated money aggregates. The PCE deflator is simply the amount obtained from dividing nominal personal consumption expenditures by personal consumption expenditures in constant dollars. Of course, this begs the question of how personal consumption expenditures in constant dollars are estimated in the first place.

The BEA breaks personal consumption expenditures into component parts and deflates each of those components by the most appropriate price index available. Generally, the price index is a component of the CPI. Once deflated, the components are added up to get personal consumption expenditures in constant dollars. But, since each of the PCE subcomponents carries a different weight and because some components of the PCE series are not common to the CPI market basket, the resulting PCE deflator derived from the nominal and deflated series may not (and likely will not) be equal to the CPI.

The PCE deflator differs slightly from a current-period weight (Paasche) index because the individual items in the index are deflated with conventional base-period weight price indexes. The implicit deflator



thus involves current-period weighting among the component price indexes, but base-period weighting within the various components.

Statistical Discrepancies

Most of the divergence between the PCE deflator and the CPI that is not accounted for by coverage, conceptual, and weighting differences is probably due to statistical discrepancies.

These discrepancies result from different computational processes, human value judgements, and the different purposes for which the two measures of price change are constructed. The PCE deflator and the CPI for a product like eggs, where there are no coverage, conceptual, or weighting problems, should be identical, but they are not. We know, for instance, that the BLS and the BEA use slightly different computer procedures to seasonally adjust the CPI data—which no doubt accounts for some of the differences. The statistical procedure used has a number of subvariations the use of which is a choice of the analyst. Also, data are often messy and incomplete. Often there are contradictions in the data and an analyst must use judgement to reconcile them. Two analysts, making informed and well-meaning subjective judgements in forcing the consistency of data and in other manipulations of raw data, will often reach different conclusions, and this is likely the case with PCE and CPI data.

What About Food Prices?

In 6 of the past 10 years, the CPI has indicated a larger rise in food prices than has the PCE deflator—1978 was the only year that the two measures gave equal estimates of food price inflation. The average relative difference in the two measures of food price increases and the increases in all prices were about the same. The PCE series includes several minor conceptual differences. The value of food produced and consumed on the farm, for instance, is a component for which there is no corresponding CPI element. This leads to problems of selecting appropriate prices for the items, since prices are not determined in a market setting.

Coverage is also a bit different. The PCE series covers individuals and nonprofit organizations, whereas the CPI measures prices paid by urban consumers.

Weighting differences between items included in each index probably account for much of the difference. In 1979, for instance, food at home accounted for 70 percent of food expenditures in the CPI and 75 percent of the PCE food expenditures. There also are differences in weighting the subcomponents of the food basket.

Finally, the statistical discrepancies mentioned above—seasonal adjustments, imperfect data, forcing of numbers, etc.—contribute to the discrepancies between the two series. ■

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