

Research Department
Federal Reserve
Bank of
San Francisco

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Index Problems

The problem of fighting inflation can be aggravated by the difficulty of knowing just how bad the problem is. Statisticians try to deal with this difficulty by devising a number of different yardsticks to measure changes in price levels. Yet most discussion still centers around the consumer-price index (CPI) and its variants, simply because public and private policymakers use that index far more than any other yardstick in their policy decisions. (Through indexing provisions, wages and other payments of nearly 80 million people are dependent on CPI fluctuations.) Statisticians continually try to improve various inflation measures, but recognize that no index measure can be perfect. The methods used in constructing indexes depend greatly on the uses for which they are intended.

Any "cost of living" index, such as the consumer-price index, is based upon a comparison of household "utility" (or perceived well-being) in two different periods. Index makers assume that utility is constant in each time period, and that a change in the cost of living is the ratio of income or expenditures that will leave an individual or household on the same "utility map"—or equally well off—as before. In the words of Lawrence Klein and Harry Rubín, "The true cost of living is defined as the ratio of two incomes. The denominator of this ratio is the actual base-period income. The numerator is the smallest income required in order to buy, at current prices, that complex of goods which would leave one on the same level of utility as was experienced in the base period."

Weighting crucial

The key decision facing statisticians is how best to weight the various prices in the two time periods being compared. One approach (Laspeyres) is to weight prices of individual goods and services at the quantities existing in some base period. (This index was developed by the 19th-century French-German economist, Etienne Laspeyres.) An alternative

approach (Paasche) is to weight prices at current-period quantities. (This index was developed by Laspeyres' German contemporary, Hermann Paasche.) The CPI is a Laspeyres index, while the personal-consumption expenditures (PCE) "deflator" is a variant of a Paasche index—and that distinction makes for some important differences in results, as we shall see below.

The Bureau of Labor Statistics (BLS) determined the base-year weights in the present consumer-price index by a survey of consumer expenditures involving about 20,000 family units in the 1972-73 period, either through quarterly interviews or through diaries of actual expenditures maintained over a two-week period. On that basis, BLS developed a statistical market basket involving almost 400 separate categories of goods and services.

CPI and alternatives

The BLS collects prices for individual goods and services from a number of sources each month. The sample includes about 24,000 retail establishments, such as supermarkets, cleaning establishments, repair shops, and doctors and lawyers' offices.

The Commerce Department's Bureau of Economic Analysis (BEA) follows a different procedure in developing its price indexes—"implicit price deflators"—for GNP and its components. (The deflator for personal consumption expenditures is the most important of these yardsticks, being the closest alternative to the CPI.) In developing its price deflators, BEA draws upon a variety of other price series to deflate segments of current-dollar GNP to a constant-dollar basis.

It should be emphasized that the two series differ in construction partly because they are designed for different purposes. The CPI is designed expressly to measure the escalation of prices. The PCE deflator is essentially a

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byproduct of the process involved in reducing current-dollar GNP to a constant-dollar volume.

BEA does not deflate by individual commodities, because this would create massive operational problems for anything as complex as GNP. Instead, it deflates expenditures for a variety of commodities with fixed-weight price indexes, with the indexes combining price relatives for individual types of commodities included in the expenditures component. (A price relative is the ratio of current price to base-period price.) Thus, the implicit deflator involves current-period weighting among sub-indexes—the Paasche approach—and fixed weighting within the components.

Actually, BEA depends heavily on BLS data in compiling its deflators; more than three-quarters of the PCE deflator is directly comparable with the coverage in the CPI. The other one-fourth includes items that are treated differently for conceptual reasons, such as net purchases of used cars, expenditures for nonprofit institutions, and (especially) the rental value of owner-occupied housing.

Comparing indexes

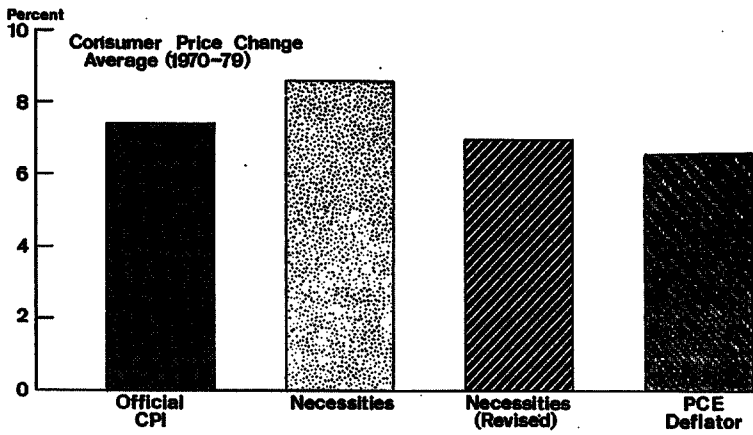
The CPI, a Laspeyres index, may overstate price increases—mainly because as prices change, consumers will alter their consumption patterns to include smaller amounts of products with large price increases and larger amounts of products with small price increases. (If consumers can do this without reducing their total satisfaction, the use of base-period commodity selections will tend to overstate declines in living standards.) The PCE deflator, a modified Paasche index, conversely may understate price increases—

mainly because it already reflects some of the change in consumption patterns with which consumers respond to price increases.

Consequently, we might expect the “real” cost-of-living rate to fall somewhere between the CPI on the high side and the PCE deflator on the low side. This relationship hasn’t held consistently over the past generation, at least during the relatively stable period of the 1960’s, but it has held during most of the recent period of accelerating inflation. The mean annual increase in consumer prices over the 1968-79 period was 6.7 percent for the CPI and 6.0 percent for the PCE deflator, compared with annual increases of roughly 1.8 percent for both indexes in the 1961-67 period. In a period of relatively stable prices, the price elasticities between goods that are close substitutes generally aren’t great enough to respond to relatively modest price differentials between the goods. But when prices are rising, the fixed-weighted market basket becomes distorted by changes in tastes—and especially by substitution of less expensive for more expensive goods.

Comparing necessities

Considerations such as these help us evaluate the many controversies over the CPI’s value as an inflation indicator. For example, there is the criticism, made by the National Center for Economic Alternatives, that the CPI understates the rise in prices of the necessities purchased by the poor. In this view, the inflation of the past decade has been most prevalent in the prices of basic needs—food, housing, energy and medical care. Thus, inflation has fallen most harshly upon the poor and middle-income families who must perforce devote most of their income to such necessities. To test this argument, the Center for Economic Alternatives devised a “necessities price index” on the basis of the CPI series for food, shelter, energy and medical care. This series increased at an 8.6-percent annual rate for the decade of the 1970’s, compared with a 7.4-percent annual rate of increase in the official CPI (see chart).



This relatively crude index may overstate the actual inflation rate for the poor, however, as has been suggested by the Brookings' economist Joseph Minarik. The latter devised an "improved necessities index" by adding apparel (an obvious necessity), deleting the restaurant-food component (a relative luxury), and substituting the residential-rent component for the home-ownership component (because low-income families normally rent rather than buy.) Minarik's necessities index increased at a 7.0-percent annual rate over the decade—considerably less than either the official CPI or the crude necessities' index. But the PCE deflator increased at an even slower pace, at a 6.6-percent annual rate over the decade, partly reflecting its derivation as a Paasche-based index, as opposed to the Laspeyres' basis of the other indexes. This difference was widest in 1979, when the PCE deflator increase (10.2 percent) ranked two percentage points below the rise in the Minarik necessities index, three percentage points below the official CPI increase, and seven percentage points below the rise in the crude necessities index.

Comparing housing costs

Part of the difference in this regard, and part of the basic criticism of the CPI, centers around the CPI's treatment of housing costs. Houses and other durable goods yield a stream of consumer services—such as shelter and transportation—which are consumed during the period covered by the index. Critics thus argue that such goods should not enter the index as a single purchase but as some measure of current user cost or consumption.

The official CPI includes five components in the base weight for home ownership—property taxes, property insurance, home maintenance and repair, total price paid for the home, and total contracted interest payments over half the mortgage term. The weights for the last two items are based on about six percent of the total—the percentage who purchased homes during the base

period—and not on the entire housing stock, as is sometimes erroneously believed. (Still, that weighted figure overstates reality in periods of low housing activity such as the present.) In response to the demand for a better theoretical measure of housing costs and its own desire to improve the existing series, BLS now publishes five experimental measures of home-ownership costs.

These alternative measures yield quite diverse results in comparison with the official home-ownership component, which rose 23.8 percent between June 1979 and June 1980. However, BLS estimated much smaller weights for these alternative measures than for the official home-ownership component, which accounts for 22.8 percent of the total index. Thus, substitution of any but one of the five low-weighted alternatives would help dampen the sharp rise in the overall CPI caused by soaring home-ownership costs.

What can policymakers learn from all these statistical considerations? Perhaps the strongest conclusion is that the CPI tends to overstate "actual" inflation at the present time, because of the index's general weighting procedures and its overweighting of home-ownership costs. This suggests that 80 million workers, pensioners and others may be getting more than their due, to the extent that their incomes adjust directly to increases in the CPI. In devising a solution, policymakers would do well to apply more sophisticated measures, such as CPI variants or the PCE deflator, in future indexing agreements—and in future discussions of the inflation problem—all the while recognizing that the various yardsticks will differ greatly in construction because they are basically designed to do different things.

Herbert Runyon

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BANKING DATA—TWELFTH FEDERAL RESERVE DISTRICT

(Dollar amounts in millions)

Selected Assets and Liabilities	Amount Outstanding	Change from	Change from			
			11/26/80	11/19/80	Dollar	Percent
Large Commercial Banks						
Loans (gross, adjusted) and investments*	145,030	1,610	9,736	7.2		
Loans (gross, adjusted) — total#	122,833	1,485	10,641	9.5		
Commercial and industrial	36,723	943	4,782	15.0		
Real estate	49,861	384	7,092	16.6		
Loans to individuals	23,936	268	73	0.3		
Securities loans	1,206	62	180	13.0		
U.S. Treasury securities*	6,735	94	679	9.2		
Other securities*	15,462	31	226	1.4		
Demand deposits — total#	45,911	658	2,299	5.3		
Demand deposits — adjusted	32,238	112	1,173	3.8		
Savings deposits — total	29,142	197	440	1.5		
Time deposits — total#	69,482	1,596	11,019	18.8		
Individuals, part. & corp.	60,339	1,466	10,451	20.9		
(Large negotiable CD's)	27,274	812	5,521	25.4		
Weekly Averages of Daily Figures	Week ended 11/26/80	Week ended 11/19/80	Comparable year-ago period			
Member Bank Reserve Position						
Excess Reserves (+)/Deficiency (-)	n.a.	n.a.	—	24		
Borrowings	299	245		107		
Net free reserves (+)/Net borrowed(-)	n.a.	n.a.	—	83		

* Excludes trading account securities.

Includes items not shown separately.

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