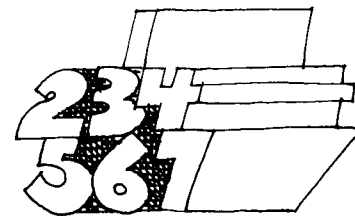


The Anatomy of Price Change



Reconciling the CPI-U and the PCE Deflator: 3rd quarter

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This article, sixth in a series, reconciles two of the Federal Government's major inflation measures—the Consumer Price Index (CPI-U), published by the Bureau of Labor Statistics, and the Implicit Price Deflator for Personal Consumption Expenditures (PCE Deflator), produced by the Bureau of Economic Analysis.¹ The purpose of these articles is to help clarify discussion of issues concerning the sources of divergence between the two measures—“weighting” and “treatment of homeownership costs” issues, and, to a lesser degree, the issue of computational and compilation differences. This is accomplished by measuring the empirical significance of each of these factors.

As in earlier articles, two reconciliations are presented, one dealing with period-to-period changes (annual and quarterly) in the price measures, and the other with total movement of the two indexes over the decade from 1972 to date. In both reconciliations, the effect of one factor or group of factors, holding all other factors constant, can be extracted from the overall divergence by taking the difference between alternative versions of the measures which differ only in one or a small number of respects.

Reconciling period-to-period changes. In the third quarter of 1982, the CPI-U continued to rise more rapidly than the “PCE: Chain-Weight” index.² (See table 1). The percentage-point difference (0.9) was the same as for the second quarter. The composition of that difference did, however, shift quite dramatically.

The third-quarter housing treatment effect of 0.6 percentage points is the third negative housing effect of the past year. This negative effect is the result of rental

charges increasing at a faster rate than homeownership costs. For each of the 3 months, rents rose faster than CPI-U homeownership costs. (In July, rents increased 1.0 percent and homeownership costs, 0.4 percent, and in August, 0.5 and 0.4 percent; in September, rents increased 0.4 percent, and homeownership costs decreased 0.7 percent.) Although it has generally been true in the recent past that CPI-U homeownership costs have risen more rapidly than rental costs, this effect can change direction as economic conditions affect house prices, interest rates, other components of homeownership costs, and rental charges.

The weighting effect measures the impact on the price measure of using weights for recent periods, compared with the decade-old weighting structure of the CPI-U. The weighting effect turned positive in the third quarter after 4 negative quarters, but continued to be quite small relative to the overall quarterly increase (only 0.2 percentage points relative to a quarterly change of approximately 7 percent).

The “all other” effect, measured as the difference between CPI-X1, a rental equivalency measure, and the PCE: 1972-Weight index, increased substantially in the third quarter. This effect measures the influence of all differences between the CPI and PCE: Chain-Weight index other than those which result from choice of weights and housing treatment. Although a full explanation of this source of price measure difference remains unclear, depending as it does on a very large number of separate factors, the influence of seasonal adjustment procedures more than likely plays an important role. The fact that over a period of several years quarterly effects for any one year have shown a pattern of being low at the outset of the year and then rising in the latter quarters lends support to this view.

Reconciling cumulative changes. Table 2 updates the cumulative reconciliation of the CPI and PCE Deflator. The general results, consistent with those of previous reconciliations, can be summarized as follows: (1) different approaches to the measurement of housing costs have accounted for approximately two-thirds of the cumulative difference between the two measures over the 1972–

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Table 1. Reconciliation of annual and quarterly percent changes in the CPI-U and the Personal Consumption Expenditure price measures, 1980 to 1982-III

Difference	1980 ¹	1981 ¹	1981 ^{1,2}				1982 ²		
			I	II	III	IV	I	II	III
CPI-U ³	13.5	10.4	11.0	7.8	11.8	7.7	3.2	4.6	7.6
PCE: Chain-Weight ⁴	10.7	9.1	10.3	7.4	8.0	7.2	5.2	3.7	6.7
Total difference ⁵ (CPI-U minus PCE: Chain-Weight)	2.8	1.3	0.7	0.4	3.8	0.5	-2.0	0.9	0.9
Housing treatment ⁶	2.3	0.9	0.4	0.5	2.7	-0.5	-1.3	1.6	-0.6
Weighting effect ⁷	0.5	0.2	0.6	0.3	-0.4	-0.1	-0.4	-0.4	0.2
"All other" effect ⁸	0.0	0.2	-0.3	-0.4	1.5	1.1	-0.3	-0.3	1.3

¹ Owing to the July 1982 revision of data produced by the Bureau of Economic Analysis, U.S. Department of Commerce, the annual and quarterly figures may differ slightly from those which appeared in earlier articles in this series.

² Seasonally adjusted annual rates.

³ Annual and quarterly changes in the CPI-U are taken from tables provided by the Office of Prices and Living Conditions, Bureau of Labor Statistics. The changes are compiled from 1967-based indexes.

⁴ Data for the "PCE: Chain-Weight" were obtained from the Bureau of Economic Analysis, U.S. Department of Commerce.

⁵ CPI-U minus "PCE: Chain-Weight" equals the sum of "housing treatment," "weighting" and "all other" effects.

⁶ Change in CPI-U minus change in CPI-X1. See September 1981 *Monthly Labor Review*, p. 21, for fuller explanation. Source of CPI-X1 data is same as footnote 3.

⁷ Change in "PCE: 1972-Weight" minus change in "PCE: Chain-Weight." See September 1981 *Monthly Labor Review*, pp. 8-9, for fuller explanation. Data source for "PCE: 1972-Weight" changes is same as for footnote 4.

⁸ Change in CPI-X1 minus change in "PCE: 1972-Weight." See September 1981 *Monthly Labor Review*, p.6, for fuller explanation.

Table 2. Reconciliation of the CPI-U and the Personal Consumption Expenditure price measures cumulative change from 1972 to the date shown

Difference	1980	1981	1981 ¹				1982		
			I	II	III	IV	I	II	III
CPI-U (1972=100) ²	197.0	217.4	210.3	214.3	220.4	224.6	226.3	228.9	234.2
PCE Deflator (1972=100) ³ (Current-Weight)	179.2	194.5	189.2	192.6	196.4	199.8	202.2	204.0	207.5
Total difference ⁴ (CPI-U minus PCE Deflator)	17.8	22.9	21.1	21.7	24.0	24.8	24.1	24.9	26.7
Housing treatment ⁵	11.7	14.5	13.3	13.7	15.4	15.5	15.3	16.0	17.0
Weighting effect ⁶	5.6	7.6	7.4	7.6	7.5	7.7	7.7	7.7	7.7
"All other" effect ⁷	0.5	0.8	0.4	0.4	1.1	1.6	1.1	1.2	2.0

¹ Owing to changes in seasonal adjustment factors and to the July 1982 revision of data produced by the Bureau of Economic Analysis, U.S. Department of Commerce, annual and quarterly figures may differ slightly from those which appeared in earlier articles in this series.

² Annual data for the CPI-U are annual averages, 1972=100. The quarterly data for 1981 and 1982 were computed by the Office of Research and Evaluation, employing seasonally adjusted monthly data provided by the Office of Prices and Living Conditions.

³ Data for the Implicit PCE Deflator, or "PCE: Current-Weight" index, were provided by the Bureau of Economic Analysis. The data incorporate revisions released in August 1982.

⁴ CPI-U minus PCE Deflator equals the sum of "housing treatment", "weighting" and "all other" effects.

⁵ CPI-U minus CPI-X1. See September 1981 *Monthly Labor Review*, p. 5, for fuller explanation. Data source for the CPI-X1 is the same as footnote 2.

⁶ "PCE: 1972-Weight" minus "PCE: Current-Weight." See September 1981 *Monthly Labor Review*, p. 6, for fuller explanation. Data source for the "PCE: 1972-Weight" is same as footnote 3.

⁷ CPI-X1 minus "PCE: 1972-Weight." See September 1981 *Monthly Labor Review*, p. 6, for fuller explanation.

1982 period; (2) as expected, the impact of choosing weights from different periods has increased as intervals lengthen, yet the total effect of weighting differences over a 10-year period is only 7.7 index points over an interval during which the price level doubled; and (3) despite significant differences between procedures for compiling and computing the two measures, all other factors have made only a very small contribution to the overall divergence.

Result (1) stands out as having particular significance at this time. Last month, the Bureau of Labor Statistics changed the procedures used to compile the homeownership component of the CPI. The new approach—rental equivalency (a derivation of CPI-X1)—is in concept akin to that followed by the Bureau of

Economic Analysis in its compilation of the PCE Deflator. Hence, future reconciliations beginning with the first quarter should show less disparity in movements of the two measures. □

—FOOTNOTES—

¹ The initial reconciliation and technical basis for the analysis are contained in Jack E. Triplett, "Reconciling the CPI and PCE Deflator," *Monthly Labor Review*, September 1981, pp. 3-15. Subsequent reconciliations appeared in the January, May, July and October 1982 issues of the *Monthly Labor Review*.

² As discussed in Triplett, pp.7, 13-14, the PCE Deflator, a Paasche-formula index, cannot be used for this reconciliation because Paasche formulas lend themselves to statistical interpretation only when referring to the base year (in this case, 1972).