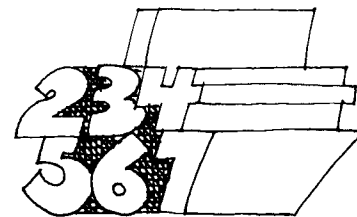


The Anatomy of Price Change



Reconciling the CPI and the PCE Deflator: 4th quarter 1981

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The September 1981 issue of the *Monthly Labor Review*¹ presented a reconciliation of the Federal Government's two major inflation measures—the Consumer Price Index (CPI), 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. By comparing alternative versions of the indexes published by the Bureau of Labor Statistics and the Bureau of Economic Analysis, the difference between the CPI and PCE measures can be decomposed into three factors: owner-occupied housing, different index weights, and “all other” factors. The technical basis for the analysis is contained in the September 1981 article.²

This second quarterly update of the reconciliation, which extends the data through the end of calendar year 1981, shows a general narrowing of the difference between the two measures.

Reconciling period-to-period changes

Table 1 shows the reconciliation of percent changes in the Consumer Price Index for All Urban Consumers (CPI-U) and “PCE: Chain-Weight” index for the most recent years and quarters. These two indexes present alternative measures of period-to-period price change.³

The difference between CPI and PCE price measures, which widened with the upsurge of inflation in 1979, seems to be diminishing as inflation winds down. At 1.4 percentage points, the 1981 difference between the annual CPI and the PCE was half its value for 1980, and lower as well than the comparable number for 1979. The quarterly figures show a generally declining trend, although there is considerable variability. The difference for the fourth quarter of 1981 (0.3 percentage points) is the smallest quarterly difference in these alternative price measures in several years.

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As demonstrated in the September article, the treatment of owner-occupied housing has historically been the largest source of PCE-CPI differences. The effect of alternative measures of owner-occupied housing can be estimated by comparing two BLS price indexes (CPI-U and CPI-X1) that are published monthly and measure housing in different ways.

In recent quarters, the “housing effect” has been smaller than it was in the first half of 1980. The negative entry for the fourth quarter of 1981 (–0.5 percentage points) occurred because the CPI-U, which follows the traditional BLS treatment of housing, advanced less than the CPI-X1 index, which approximates a “rental equivalence” measure of housing. (The BLS has announced plans to change the treatment of housing in the CPI-U index to incorporate a rental equivalence treatment, beginning in January 1983.)⁴

Weighting differences are a second source of PCE-CPI differences. The CPI-U weights are drawn from an expenditure survey taken in 1972-73; weights for the PCE: Chain-Weight index are always taken from the period just preceding the date of publication (for example, weights for the 1981-IV index come from 1981-III), and so are more nearly current than are the CPI weights.

Table 1. 'Reconciliation' of annual, 1979-81, and quarterly, 1980-81, percent changes in the CPI-U and the Personal Consumption Expenditure price measures

Difference	1979	1980	1981	1980 ^{1 2}				1981 ²			
				I	II	III	IV	I	II	III	IV
CPI-U ³	11.3	13.5	10.4	16.5	13.5	7.7	12.8	11.0	7.8	11.8	7.7
PCE: Chain-Weight ⁴	9.3	10.6	9.0	12.5	9.7	9.5	10.1	10.3	6.5	8.7	7.4
Total difference ⁵ (CPI-U minus PCE:											
Chain-Weight)	2.0	2.9	1.4	4.0	3.8	-1.8	2.7	.7	1.3	3.1	.3
Housing treatment ⁶	1.7	2.3	.9	3.6	3.4	-1.9	1.9	.4	.5	2.7	-.5
Weighting effect ⁷	.3	.4	.1	.7	.2	.0	.0	.6	.0	-.5	-.2
"All other" effect ⁸	.0	.2	.4	-.3	.2	.1	.8	-.3	.8	.9	1.0

¹ Owing to changes in seasonal adjustment factors, the quarterly figures may differ slightly from those which appeared in *Monthly Labor Review* Table 3, p. 9, September 1981 and Table 1, p. 43, January 1982.

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 source in 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 percent change from 1972 to the date shown

Difference	1979	1980	1981	1980 ¹				1981			
				I	II	III	IV	I	II	III	IV
CPI-U (1972=100) ²	173.6	197.0	217.4	189.1	195.2	198.9	204.9	210.3	214.3	220.4	224.6
PCE Deflator (1972=100) ³ (Current-Weight)	166.6	178.9	193.8	172.9	177.0	180.7	184.9	188.5	191.5	195.7	199.4
Total difference ⁴ (CPI-U minus PCE Deflator)	11.6	18.1	23.6	16.2	18.2	18.2	20.0	21.8	22.8	24.7	25.2
Housing treatment ⁵	7.0	11.7	14.5	10.5	12.2	11.6	12.7	13.3	13.7	15.4	15.5
Weighting effect ⁶	3.7	5.4	7.2	4.9	5.1	5.6	5.9	7.3	7.4	7.2	7.0
"All other" effect ⁷	.6	1.0	1.9	.8	.9	1.0	1.4	1.2	1.7	2.1	2.7

¹ Owing to changes in seasonal adjustment factors, quarterly figures may differ slightly from those which appeared in *Monthly Labor Review* Table 4, p. 10, September 1981 and Table 2, p. 44, January 1982.

² Annual data for the CPI-U were computed by the Office of Research and Evaluation from unadjusted monthly data provided by the Office of Prices and Living Conditions, Bureau of Labor Statistics. The quarterly data for 1980 and 1981 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, U.S. Department of Commerce. The data incorporate revisions released in April 1981.

sions released in April 1981.

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

⁵ CPI-U minus CPI-XI. See September 1981 *Monthly Labor Review*, p. 5, for fuller explanation. Data source for the CPI-XI 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-XI minus "PCE: 1972-Weight". See September 1981 *Monthly Labor Review*, p. 6, for fuller explanation.

As pointed out in the September 1981 article, the effect of utilizing different weights on disparities between the measures is far smaller than has often been supposed. Since mid-1980, weighting effects have essentially been zero, although there was more impact from this source in 1979 and early 1980. Negative values for weighting effects in the two most recent quarters reflect the fact that the index with the most recent weights (the PCE: Chain-Weight) has been rising somewhat *more* rapidly than an index based on the same price data but using 1972 weights.⁵ It is usually expected that use of more recent weights will result in an index that rises *less* rapidly; as table 1 shows, this expectation is not always borne out.

The "all other" effect measures the influence of computational and compilation factors on the difference between the CPI and PCE measures (everything other than the period for which the weights were drawn, and the treatment of owner-occupied housing). The precise sources of the "all other" effect have not been quantified, but seasonal adjustment methods undoubtedly are important. PCE seasonal adjustment factors for 1981 and 1980 have not yet been re-estimated, while the CPI seasonals are revised annually; this has probably contributed to the increased magnitude of the "all other" effect in the quarterly numbers, an explanation that is consistent with the annual figure for 1981 (0.4) being so much lower than the quarterly figures.

Reconciling cumulative changes

For technical reasons, two reconciliations are necessary.⁶ The first reconciliation, covered in the previous section, addresses the question: "What are the reasons the CPI and PCE price measures show different rates of change from one period to the next?" The reconciliation of the differences between the measures in this section

answers the question: "What accounts for the cumulative divergence in the CPI and PCE since 1972?"

Table 2 reconciles the CPI-U and the Implicit Price Deflator for Personal Consumption Expenditures (PCE: Current-Weight) with 1972 as the base year. By the fourth quarter of 1981, the PCE: Current-Weight index indicated that consumption prices had almost doubled since 1972 (a 99-percent increase); by the CPI-U measure, the increase was nearly 125 percent. Of the approximately 25-percentage-point difference between the two, housing treatment accounted for three-fifths (15.5 percentage points). The table also shows that choosing current period weights instead of 1972 weights creates a difference of 7 percentage points, over a period when prices have doubled, by either alternative measure. The weighting effect has declined slightly in the most recent two quarters from its high reached early last year.

BOTH RECONCILIATIONS SUGGEST that the inflation rates recorded by CPI and PCE price measures may be converging. Quarterly and annual percentage increases in the two price measures differ less in 1981 than in the previous 2 years, and the cumulative reconciliation shows a similar picture. □

FOOTNOTES

¹ Jack E. Triplett, "Reconciling the CPI and PCE Deflator," *Monthly Labor Review*, September 1981, pp. 3-15.

² *Ibid.*

³ As discussed in Triplett, pp. 7, 13-14, the Implicit PCE Deflator, a Paasche-formula index, cannot be used for this reconciliation because Paasche-formulas lend themselves to statistical interpretation only when referring back to the base year (in this case, 1972).

⁴ See "Labor Month in Review: CPI changes," *Monthly Labor Review*, November 1981, p. 2.

⁵ See footnote 7 to table 1 and the September 1981 MLR article for information on the computation of the weighting effect.

⁶ See Triplett, pp. 7, 13-14.