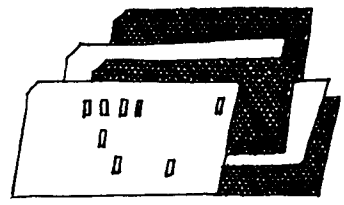
Research Summaries



Reconciling the CPI and the PCE Deflator: an update

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In an article in the September 1981 issue of the *Monthly Labor Review*,[1] a technique was developed for determining the effect of differences in index number construction on the measurement of inflation. The technique permits a straightforward 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. This update advances the reconciliation to the third quarter of 1981.

Differences between movements in the CPI and PCE inflation measures can be attributed to three factors: owner-occupied housing, different index weights, and "all other" factors. By comparing alternative versions of the indexes published by the Bureau of Labor Statistics and the Bureau of Economic Analysis (the Federal Government currently publishes ten aggregate consumption expenditure price measures), the difference between the CPI and PCE measures can be decomposed into these three categories.

For technical reasons, two reconciliations are necessary.[2] The first reconciliation 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 second answers the question: "What accounts for the cumulative divergence in the CPI and PCE measures since 1972?"

Reconciling period-to-period changes

Table 1 shows the reconciliation of period to period percent changes in the Consumer Price Index for All Urban Consumers (CPI-U) and "PCE: Chain-Weight" index. 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).[3]

In most recent quarters, the CPI-U has recorded a greater price change than the "PCE: Chain-Weight" index. The difference between the two seems to be diminishing from the historically high values of 1979–80. The exception to this statement occurs in the third quarter of 1981, in which the difference between the two surged to 3.3 percentage points.

In nearly every case, the treatment of owner-occupied housing accounts for most of the difference between the CPI and PCE price measures. For example, alternative treatments of housing accounted for 3.1 percentage points of the total 3.3 point differential in 1981's third

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

Difference	1979	1980	1980[1, 2]				1981[2]		
			I	II	III	IV	I	II	III
CPI-U[3]	11.3	13.5	16.5	13.1	7.7	12.9	10.8	7.5	12.0
PCE: Chain-Weight[4]	9.3	10.6	12.5	9.7	9.5	10.1	10.3	6.5	8.7
Total difference[5] (CPI-U minus PCE: Chain-Weight)	2.0	2.9	4.0	3.4	1.8	2.8	0.5	1.0	3.3
Housing treatment[6]	1.7	2.3	3.2	3.2	1.9	2.2	0.0	0.2	3.1
Weighting effect[7]	0.3	0.4	0.7	0.2	0.0	0.0	0.6	0.0	0.5
"All other" effect[8]	0.0	0.2	0.1	0.0	0.1	0.6	0.1	0.8	0.7

[1] Owing to changes in seasonal adjustment factors, the 1980 quarterly figures may differ slightly from those which appeared in table 3, p. 9, in the September 1981 *Monthly Labor Review*.

[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 (BLS). The changes are compiled from 1967 based indexes.

[4] Data for the "PCE: Chain-Weight" were obtained from the Bureau of Economic Analysis (BEA), U.S. Department of Commerce. The data incorporate revisions released by BEA in April 1981.

[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.

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quarter, and in quarters in which the total difference between the two price measures was low (1980–III, 1981–I, 1981–II), so was the housing effect.

Note we estimated the housing treatment effect by comparing the two BLS indexes which are published monthly and which have different treatments of housing. In October, the BLS announced plans to change the treatment of housing to more nearly approximate a rental equivalence treatment in the CPI-U index, beginning in January 1983.[4]

Weighting effects have behaved erratically and unpredictably over recent quarters. Generally, one expects that the longer the interval between weights, the greater the weighting effect in the price index. This expectation has been true of most CPI-PCE comparisons in the past.[5] However, the size of the weighting effect became noticeably smaller in the last half of 1980, and except for the first quarter of 1981, has contributed very little to CPI-PCE differences for over a year. In 1981 III, the index with 1981 weights (actually 1981 II weights) showed higher inflation than did the index with 1972 weights, so the weighting effect was negative (minus 0.5 percentage points), a surprising result.

"All other" factors are the sum total of computational and compilation differences in which the CPI and PCE indexes differ (that is, everything other than the period for which the weights were drawn, and the treatment of owner-occupied housing). The "all other" effect has typically been small in the past.[6] The precise source of the "all other" effect has not been identified, but seasonal adjustment methods undoubtedly are important.

Table 2. "Reconciliation" of the CPI-U and the Personal Consumption Expenditure price measures: cumulative percent change from 1972 to the date shown (1979–81)

Difference	1979	1980	1980[1]				1981		
			I	II	III	IV	I	II	III
CPI-U (1972=100)[2]	173.6	197.0	189.3	195.3	199.0	205.1	210.4	214.3	220.4
PCE Deflator (1972=100)[3] (Current-Weight)	162.3	178.9	172.9	177.0	180.7	184.9	188.5	191.5	195.7
Total difference[4] (CPI-U minus PCE Deflator)	11.3	18.1	16.4	18.3	18.3	20.2	21.9	22.8	24.7
Housing treatment[5]	7.0	11.7	10.6	12.3	11.8	13.1	13.3	13.7	15.5
Weighting effect[6]	3.7	5.4	4.9	5.1	5.6	5.9	7.3	7.4	7.1
"All other" effect[7]	0.6	1.0	0.9	0.9	0.9	1.2	1.3	1.7	2.1

[1] Owing to changes in seasonal adjustment factors, the 1980 quarterly figures may differ slightly from those which appeared in table 4, p. 10, in the September 1981 *Monthly Labor Review*.

[2] Annual data for the CPI-U were computed by the Office of Research and Evaluation (BLS) from unadjusted monthly data provided by the Office of Prices and Living Conditions (BLS). 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 BEA. The data incorporate revisions 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-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.

Table 3. Relative distribution of CPI-PCE reconciliation factors, 1979–81[1]

Factor	1979		1980		1981[2]	
	Index points	Percent	Index points	Percent	Index points	Percent
Total difference	11.3	100	18.1	100	23.1	100
Housing treatment	7.0	62	11.7	65	14.2	61
Weighting effect	3.7	33	5.4	30	7.3	32
"All other" effect	0.6	5	1.0	6	1.7	7

[1] Data based on table 2.
[2] Average of first three quarters.

Reconciling cumulative changes

Table 2 shows the reconciliation of the CPI-U and the Implicit Price Deflator (PCE: Current-Weight) index levels, with 1972=100. The cumulative effect created by differences in owner-occupied housing treatment from 1972 to 1981 third quarter amounted to 15.5 index points, which is roughly 13 percent of the inflation over this interval, as measured by the CPI-U. As expected, the cumulative effect of updating weights in the price measures increases in index points as the periods providing the comparisons grow further apart. The 7.1 index number difference for the third quarter of 1981, however, accounts for only roughly 7 percent of the measured inflation from 1972 to that quarter (as recorded by the PCE measures). When computed as a percentage of the inflation that has occurred since 1972, both the housing treatment and weighting effects have grown somewhat larger in recent quarters.

As a percent of the total difference between the CPI-U and PCE Deflator in any particular period, however, all three categories have maintained roughly their same proportions to the total difference. These proportions are shown in table 3.

In summary, housing treatment continues to account for most of the difference between the CPI and PCE inflation measures. The effects of updating weights and "all other" factors play a much less significant role. □

FOOTNOTES

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

[2] See *ibid.*, pp. 7, 13–14.

[3] *Ibid.*

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

[5] Triplett, *op. cit.*, pp. 6–7, 9.

[6] *Ibid.*, pp. 6 and 8.