
Housing, the CPI, and the Deficit

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One of the hot issues in Washington these days is the question of possible upward bias in the consumer price index (CPI). Smaller increases in the CPI would translate into higher taxes, lower expenditures on social programs, and lower payments to government workers, reducing the deficit.

Many economic statistics are adjusted for inflation using CPI values. Many contracts have escalator clauses based on a CPI index. In addition, CPI measures of rents for metropolitan areas may be useful for evaluating local rental markets.

This article describes the CPI and the calculation of housing costs in the index, particularly the rent data. The recent criticisms of the CPI are then described. This is pretty dry, complicated stuff, but it may have profound implications.

What is the CPI?

The CPI measures prices for a fixed "market basket" of goods and services. The weights assigned to product categories are based on the spending patterns of urban consumers from 1982 to 1984. Although the market basket is updated infrequently, there are constant changes in the specific products and outlets from which prices are obtained, and there have been frequent changes in the methods used to convert individual prices into averages.

There are two sets of CPI values. The index for all urban consumers (CPI-U) reflects the spending patterns of all households in metropolitan and/or urban areas, representing about 80 percent of the population. The older index for urban wage earners and clerical workers (CPI-W) is based

on spending by hourly wage earners, accounting for about 32 percent for the population. Price data are collected in 85 urban areas, and the national values are weighted averages of the local areas. For the largest 5 areas, monthly data are published, and data for another 10 areas are published every other month. Semiannual data are available for 12 additional areas, and data for 2 more areas are available on an annual basis. Data for the remaining areas are not released, but are included in national and regional averages. When the CPI methodology is changed, no attempt is made to revise past data, except to update the base year (e.g., from 1967=100 to 1982-1984=100) or to revise the seasonal adjustment.

Nearly one-third of federal spending, mostly for social security and other retirement programs, is indexed to the CPI-W.¹ Income tax brackets are indexed to the CPI-U. If the CPI grew by only 0.5 percent less from 1996 to 2000, or if indexing formulas were altered to use CPI change minus 0.5 percent, the deficit in the year 2000 would be \$26 billion lower.² That's just for one year, not a total for five or seven years.

The Housing Components

The housing category accounts for 41.2 percent of the CPI-U and 38.8 percent of the CPI-W. Rents, including both the residential rent (RR) paid by renters and the owners' equivalent rent (OER) for home owners, account for more than one-fourth of the CPI. As Table 1 illustrates, the weights accorded rents and OER in the CPI are greater than the corresponding shares of personal consumption expendi-

tures (PCE) in the gross domestic product statistics, where home owners' consumption of shelter is also measured by implicit rents. There are several differences between the coverage of PCE and the definition of categories in the CPI, explaining part of the discrepancy. For example, RR includes utilities provided by landlords, while utility costs paid by landlords are counted separately in the PCE. Much of the difference, however, is due to measurement differences.

Tenants' Rents

The CPI surveys about 36,000 rental units on a rotating basis every six months. The rent is compared to the rent six months earlier, and the mean monthly changes in rents for units in that month's sample are used to update the rent index from the previous month.³

In collecting rents, interviewers also determine whether there has been a change in occupancy in the past six months. For vacant units that were occupied during the previous survey, rents are imputed, based on the experience in occupied units where turnover has taken place.

The CPI rent indexes primarily reflect the rents paid on units where no turnover has occurred. That factor, in addition to the six months between interviews, causes the RR index to respond sluggishly to changes in active rental markets.

In the rent measures, several types of adjustments are made for quality changes, with the objective of producing an index that measures price changes for an identical "product."

Sample units are a little older each time they are interviewed. Since 1988, each unit's rent has been adjusted

Table 1 Selected CPI-U Components

	CPI-U	Percent Share of		Avg. CPI
	Weights	Pers	Cons	Increase
	Dec 1994	1982	1992	89-94
All items	100.00	100.00	100.00	3.6%
Food and beverages	17.41	18.74	15.30	3.0%
Housing	41.19	29.86	27.74	3.3%
Shelter	28.04	15.11	14.49	3.9%
Renter's costs	7.96	4.29	4.27	4.1%
Rent, residential	5.77	3.72	3.72	3.0%
Other renter costs (incl. hotels)	2.19	0.56	0.56	6.9%
Home owners' costs	19.89	10.82	10.22	3.8%
Owners' equivalent rent	19.50	10.82	10.22	3.8%
Maintenance and repair services	0.20	0.00	0.00	2.1%
Fuels and other utilities	7.09	6.51	5.04	2.6%
Fuels	3.86	4.23	2.89	2.1%
Oil and other household fuel	0.36	0.70	0.33	1.7%
Gas (piped) and electricity	3.50	3.53	2.56	2.1%
Other utilities and public services	3.23	2.27	2.15	3.4%
Household furnishings and operation	6.05	8.24	8.22	1.7%
House furnishings	3.51	5.50	5.62	1.0%
Textile house furnishings	0.35	0.60	0.57	1.3%
Furniture and bedding	1.12	1.02	0.97	2.4%
Appliances	0.86	1.94	2.22	-1.6%
Other house furnishings	1.18	1.94	1.86	1.8%
Housekeeping supplies	1.09	1.67	1.64	2.7%
Housekeeping services	1.46	1.07	0.96	3.4%
Apparel and upkeep	5.66	7.10	6.82	2.4%
Transportation	17.14	12.79	11.19	3.3%
Medical care	7.27	13.25	17.02	7.2%
Entertainment	4.34	5.32	5.93	3.5%
Other goods and services	7.06	12.95	16.00	6.1%

Sources: U.S. Bureau of Labor Statistics; U.S. Bureau of Labor Analysis.
 Note: PCE data do not reflect November 1995 benchmark revision.

for aging.⁴ This adjustment has increased the national RR and OER indexes by about 0.3 percent a year. Previous studies had estimated housing depreciation rates of 0.3 percent to 0.9 percent per year, so the adjustments used in the CPI are at the low end of the range of estimates.⁵

Beginning in February 1989, special adjustment factors have been employed when rooms were added or removed. If there is a change in the utilities that are included in the rent for a unit, an estimate of the cost is used to adjust the rent. Other methods adjust for other types of quality changes.⁶

New units are regularly added to the sample, but they only affect the index to the extent that their rents change after they enter the sample.

Owners' Equivalent Rent

Since 1983, home owners' shelter cost in CPI-U has been measured in terms of what their homes would command in the rental market. Each of 26,000 owner-occupied units is matched with one or more⁷ of the 36,000 rental units in the CPI survey, based on similarity in location, and structural characteristics. The estimate of the change in equivalent rent for an owner

unit is based on changes in the rents for its matched units.

The procedure for calculating the change in the rent for an owner unit from the changes in rents for the matched rental units was revised in January 1995 to correct a flaw that inflated the rate of increase in OER by about 0.6 percent per year.⁸ That means the increase in the overall CPI was overstated by about 0.1 percent per year.

From 1953 to 1982, the cost of shelter for home owners was represented by a figure based on house prices, interest rates, property taxes, and other out-of-pocket costs borne by home owners. This approach was abandoned primarily because it confused the cost of shelter with the investment aspect of home ownership. In addition, the data used in the calculation had serious deficiencies.

The elimination of the asset-based measure of home ownership cost was also motivated by concerns that it overstated inflation. CPI-U would only have increased by about 65 percent (3.4 percent per year) during the 1967 to 1982 period, rather than 88 percent (4.3 percent per year), if the rental equivalence measure had been used.⁹ When the rental equivalence approach was adopted, the weights for insurance, maintenance, and appliances were drastically reduced, and real estate taxes were eliminated from the index. The lightly weighted prices of maintenance and appliances have not grown nearly as much as rents or most other CPI components. If their weights were more in line with their shares of home owners' budgets, the increase in the CPI since 1982 would have been less.

The change to OER in CPI-U occurred right after mortgage interest rates reached more than 16 percent. If the old procedures had

remained in place, home owners' costs would have fallen and CPI-U would have shown smaller increases since 1983. The CPI-W was not converted to the rental equivalence basis until 1985, to temporarily shield retirees and union workers from the effects of the change. The ironic result was smaller cost-of-living adjustments for 1983 and 1984 than if CPI-W had been converted to rental equivalence in 1983.

The Great Debate

Three recent reports have attempted to arrive at estimates of the CPI's total upward bias as a measure of inflation in the cost of living.¹⁰ The Bureau of Labor Statistics (BLS) has repeatedly said that the CPI is "not a measure of the change in the cost of living," but it, as well as the Congress and the rest of the government, then proceeds to use the index to adjust for changes in the cost of living.

Relying on many of the same studies of particular problems in the CPI, the reports by the Advisory Committee headed by Michael Boskin, by the Congressional Budget Office (CBO), and by members of the Federal Reserve staff identify basically the same sources of potential bias. The major issues they analyze include the failure to account for consumers' opportunities to substitute one product for another, failure to incorporate the positive impact of new low-price outlets, and failure to adequately account for quality improvements and new products. These are all biases related to a failure to adequately account for changes in the choices offered consumers. The other problem, noted in two of the three reports, concerns a bias inadvertently created by past BLS efforts to keep up with the changing array of choices.

Substitution Bias

An ideal measure of the cost of living would show changes in the cost of achieving a given level of satisfaction or "utility." If people buy the same fixed market basket as before, they presumably have maintained their standard of living, but if the relative prices of products change, consumers can change their mix of purchases and achieve an equal level of satisfaction at less cost.

The Boskin Commission interim report asserts that this substitution bias probably caused the CPI to overstate increases in the cost of living by 0.3 percent per year, while the CBO director said that there is "a strong consensus" that the figure is 0.2 percent.¹¹ The Fed staff analysis argues that the studies used by CBO did not use fine enough product categories to measure substitution, and comes up with a range of 0.4 percent to 0.6 percent.

Outlet Substitution Bias

Another source of potential overstatement is the failure to account for the cost savings created by the growth of discount stores with lower prices. Although new outlets enter the CPI sample, that only means that changes over time in the new outlets' prices will begin to influence the index. If the opening of new discount stores causes established outlets to lower their prices, the impact of the new outlets will show up in the index, but if the established stores fail to respond, the favorable impact on the cost of living will be missed by the CPI.

The Boskin Commission report indicates that outlet bias produces a likely overstatement of inflation of 0.2 percent per year. The CBO report does not distinguish this as a source of bias. The Fed study estimates a

range of 0.0 to 0.1 percent per year. The outlet substitution bias can be viewed as a special case of one of the other types of bias, such as substitution or new products.

Quality Change

The biggest piece of the alleged overstatement of inflation by the CPI is the failure to fully account for improvements in quality or for the contribution of new products toward consumer well-being. The CPI does use various techniques for adjusting prices to reflect changes in quality. The argument is over whether those adjustments are adequate.

The most common approach used in the CPI if a new model comes out with new features and a new price is to leave that item out of the calculation of price changes in the month that the new model is introduced, basing price change for that item's category on other items in the category. This is tantamount to assuming that, whatever the difference in price between the old model and the new model, the difference in price was exactly equal to the change in quality.

A second device for measuring the value of quality change is to find out how much it costs for the producer to make the change. Automobile producers say how much it cost them to add new features, and BLS subtracts that from the new price. A similar approach is taken when there is a change in the utilities provided to tenants in rental housing. In that case, BLS makes the cost estimate, not the owner or property manager.

The third method used by BLS is based on hedonic regressions. This statistical technique attempts to estimate the market value of various features. Hedonic regression estimates of depreciation and of additional rooms are used to adjust rents. Since 1991, hedonic regres-

sion estimates have been used to adjust apparel prices when new styles come out. This method is only feasible if there are a lot of competing products with different combinations of features.

Sample Rotation Bias

Although the CPI market basket categories remain fixed for a decade or more, the specific items and stores in the sample are changed to keep up with the brands consumers buy and the stores they buy them from. It was recently found by BLS that procedures used since 1978 had the effect of giving too much weight to items and stores whose prices were temporarily lower at the time they were rotated into the sample.¹²

BLS has already started to eliminate sample rotation bias, and the CBO director testified that only 0.1 percent annual bias remains. The Boskin Commission assumes it will be completely eliminated. This bias is not mentioned in the Fed study.¹³

Overall Bias

Table 2 summarizes the extent of the biases, as estimated in the three reports. Assuming that sample rotation bias is eliminated, the remaining upward bias estimates from the Boskin Commission report range from 0.7 to 2.0 percent per year. At the other extreme, the CBO report indicates the remaining bias is 0.0 percent to 0.5 percent.

Taking all the available evidence into account, it is fairly clear that the CPI has overstated inflation over the past 20 years or so. It is less clear whether the CPI will overstate inflation significantly in the future, but the use of fixed weights inherently means that it will fail to take into account opportunities for substitution.

Table 2 Estimates for Upward Bias for CPI

	Boskin Interim Rpt	CBO	Federal Reserve
Substitution bias	0.2% - 0.4%	0.1% - 0.3%	0.4% - 0.6%
Outlet bias	0.1% - 0.3%		0.0% - 0.1%
Rotation/formula bias	0.3% - 0.7%	0.2% - 0.3%	
Quality change	0.2% - 0.6%	-0.1% - 0.2%	0.0% - 0.3%
New products	0.2% - 0.7%		0.0% - 0.5%
Total	1.0% - 2.7%	0.2% - 0.8%	0.4% - 1.5%
Excluding rotation bias	0.7% - 2.0%	-0.0% - 0.5%	0.4% - 1.5%

It would be unfortunate if the problems discussed here led to political tinkering with the methods used to collect, analyze, and report economic data. On the other hand, it might be appropriate to have cost of living adjustments that don't move in direct proportion to CPI. For example, benefits might be raised by 0.5 percent less than the CPI increase. Or, to correct for past bias, there could be a temporary moratorium on cost of living adjustments.

¹"Who's Afraid of the Big Bad Deficit," *The Economist*, September 30, 1995, pp. 25-26.

²Statement of June E. O'Neill, Director, Congressional Budget Office, on the consumer price index, before the Committee on Finance, United States Senate, March 13, 1995.

³Until January 1995, rents were based on a weighted average of one month and six month rent changes. The one-month changes, based on a question in the current month's survey, missed many increases, creating an understatement of about 0.2 percent per year. See: Steven Henderson and Karin Smedley, *Improvements in Estimating the Shelter Indexes in the CPI*, CPI Detailed Report, October 1994, p. 5-6.

⁴Walter F. Lane, William C. Randolph, and Stephen A. Berenson, "Adjusting the CPI Shelter Index to Compensate for Effects of Depreciation," *Monthly Labor Review*, October 1988, p. 34-37.

⁵William C. Randolph, *Housing Depreciation and Aging Bias in the Consumer Price Index*, Bureau of Labor Statistics Working Paper 166, April 1987.

⁶Steven W. Henderson and Stephen A. Berenson, "Quality Adjustments for Structural Changes in the CPI Housing Sample," *Monthly Labor Review*, November 1990, p. 40-42.

⁷Beginning in 1996, two or more units. A typical owner unit has 12 rental units matched to it, but some are matched to 100 or more.

⁸Steve Henderson and Karin Smedley, *Improvements in Estimating the Shelter Indexes in the CPI*. CPI Detailed Report, October 1994, pp. 5-6. Until the calculation was corrected, if an owner unit was matched to two rental units, and the rent on one went up by 25 percent from \$100 to \$125, while the rent on the other went down by 20 percent from \$125 to \$100, then the average change was calculated as +2.5 percent.

⁹"The Effect of Rental Equivalence on the Consumer Price Index, 1967-82," *Monthly Labor Review*, February 1985, pp. 53-55. The article incorrectly states the cumulative increases as 165 percent and 188 percent.

¹⁰Michael Boskin, et al., *Toward a More Accurate Measure of the Cost of Living: Interim Report to the Senate Finance Committee from the Advisory Committee to Study the Consumer Price Index*, September 15, 1995. Congressional Budget Office, *Is the Growth of the CPI a Biased Measure of the Changes in the Cost of Living?*, October 1994. David E. Lebow, John M. Roberts, and David J. Stockton, *Monetary Policy and the Price Level*, Board of Governors of the Federal Reserve System, August 1994.

¹¹O'Neill, p.6.

¹²See: Marshall Reinsdorf, "The Effect of Outlet Price Differentials on the U.S. Consumer Price Index," in *Price Measurements and Their Uses*, M.F. Foss, M.E. Manser, and A.H. Young, eds. (Chicago: University of Chicago Press, 1993) p. 227-257; Brent R. Moulton, "Basic Components of the CPI: Estimation of Price Changes," *Monthly Labor Review*, December 1993, p. 13.

¹³This outlet rotation bias is comparable to the problem found in calculated OER from matched rental units. None of the three studies mentions the past bias in OER or other issues involving the large rent component.