

Calculating the Price of Everything: The CPI

Daniel Mitchell

The author proposes a range of alternative CPIs. One estimate cannot satisfy all needs.

A cynic, Oscar Wilde observed a long time ago, "knows the price of everything and the value of nothing." More recently, many economists have become cynics about our official index of the price of (virtually) everything, the Consumer Price Index (CPI). The Boskin Commission in 1996 summarized most of the complaints about the CPI.¹ The commission argued that the CPI, as the Bureau of Labor Statistics (BLS) produces it, is beset by inflation overstatement. It identified two faults in the CPI: insufficient adjustment for product quality and lack of recognition of consumer substitution. The Boskin Commission also criticized the BLS for other technical deficiencies in the index. In the background of this debate loomed the fact that, by law, increases in the CPI cause social security payments and other government benefits to rise. And, because of indexation of income tax brackets, federal revenues increase with any rise in the index.

By no means do all economists agree with the criticisms of the CPI.² Nor are most familiar with the details of its construction. However, all economists and policy-makers should understand that continued debate about the index undermines public con-

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confidence in official economic data. At various points, both Republicans and Democrats in Congress have threatened the BLS with extinction if it did not change its methodology. Republican Speaker of the House Newt Gingrich once proposed to "zero . . . out" the BLS if the agency did not alter the CPI to his liking. And so-called Blue Dog Democrats, led by Representative Charles W. Stenholm of Texas, once proposed mandating methodological changes.³ If the Bureau of Labor Statistics makes changes in the CPI that move in the direction suggested by the Boskin Commission, the agency might be

My menu approach is based on the view that there are many plausible and reasonable versions of the CPI. A variety of alternatives should be offered to meet the preferences of CPI users.

accused of kowtowing to political pressure. On the other hand, if the BLS does not make changes, the old complaints will continue and the agency will be seen as unresponsive.

I am proposing a resolution to the CPI controversy that is not related to the technical issues entailed in measuring quality or accounting for substitution, one that is also applicable to other official data series. I am suggesting that the CPI "problem" has been framed by an approach to official data that can only lead to continued conflict: the assumption that there is but one theoretically correct CPI. Even if perfection cannot be fully achieved in practice, proponents of this erroneous approach believe that statistical policy should at least aim at approximating a particular idealized index. My menu approach, in contrast, is based on the view that there are many plausible and reasonable versions of the CPI. I argue that a variety of alternatives should be offered to meet the preferences of CPI users.

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Taylorism or Choice?

In the late nineteenth century, management guru Frederick W. Taylor argued that there was "one right way" for factory production tasks to be accomplished. By using "scientific" methods, that one right way could be both determined and imposed on factory workers. Nowadays, of course, the rigidity of Taylorism has fallen from grace in management circles. What is peculiar is that Taylorism should continue to be applied by knowledgeable economists to the quest for a single, perfect price index.

Economics, after all, is often defined as the science of *choice*. And Taylorism implies that there is no choice. Suppose that, for example, I were to argue that the public would be best served by having government and academic experts design an ideal automobile for consumers. Suppose that I further proposed thereafter that only one ideal model should be available. Most economists would recoil in horror at such a proposition. They would point to the varied preferences of automobile consumers. Some consumers prefer full-size cars; others want compacts. Some like sporty convertibles; others prefer utilitarian sedans. Why should a group of experts, however well-meaning or technically proficient, impose their will on others?

Taylorism and Official Data

If the one-right-way approach is not particularly appealing for automobiles, then consider the way major economic data series, including the CPI, are typically produced. Essentially, government experts—sometimes advised or critiqued by official task forces (such as the Boskin Commission)—design a methodology of data collection, assembly, and presentation. The end product is then presented to the public as the "official" Consumer Price Index (or Producer Price Index or gross domestic product [GDP] or other series). This approach to official statistics is sim-

ply "data-Taylorism." Why is Taylorism still the underlying methodology of official data?

There are several justifications for the current system of CPI production that might be cited. First, government has been perceived as a "neutral" source of data. A price index produced by, say, the American Association of Retired Persons might be suspect; perhaps such an index would be deliberately designed to exaggerate inflation and pump up social security benefits. Second, the government has the authority to compel or induce cooperation by data respondents. Absent such authority, failure to obtain cooperation could produce undesirable biases in data collection. Third, official statistics are public goods. Particularly for general indexes such as the CPI, it is not clear that there would be a sufficient private market to make collection and sale profitable. Even if the CPI were sold commercially, it would be difficult to prevent knowledge of it from being disseminated without payment.

Note, however, that these arguments basically support having the government as the primary collector and disseminator of major economic data such as the CPI. They do not speak to the issue of whether a *choice* of price indexes (or any other major series) should be provided by government statistical agencies. They do not support data-Taylorism.

Criteria for the CPI

Let me propose four criteria for the CPI that seem to characterize the needs of its varied users. The first three criteria are transparency, accordance with economic theory, and consistency, all objectives on which different users place differing weights. The fourth and final criterion is accuracy, a purported goal of all users. As will be seen, these criteria do not lead to a single CPI. Indeed, they can easily conflict with one another.

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The basic concept of the CPI should be transparent, that is, easy for those who are not economists, and who are affected by the CPI, to understand. For example, some union contracts have escalator clauses that gear wage adjustments to the CPI. And, as noted above, the CPI is used to index social security benefits as well other government benefits and to adjust income tax brackets.

The current CPI methodology, a Laspeyres index with weights based on the budget patterns of a "typical" consumer in some base period, is certainly transparent. It tells us what that consumer's buying habits in the base period would cost today. If the CPI has risen by, say, 10 percent since the base period, it means that the basket of goods consumed back then costs 10 percent more now. What could be clearer? On the other hand, as many critics of the CPI have noted, this clarity comes at the cost of a departure from the economic theory of the consumer.

Accordance with Economic Theory

This criterion appears to have been the goal of the Boskin Commission, which argued that the CPI should approximate as closely as possible a true "cost of living" index. What model or theory did the Commission have in mind for its true cost of living index? Not surprisingly, the Commission was thinking of the textbook microeconomic model of a rational consumer making choices among products to maximize utility.

Most economists would acknowledge that the question of how much happiness money can buy is unanswerable in absolute terms. But they often believe (and teach) that it is possible to answer a less challenging question: How much money would I have to give you today to make you as happy as you were in some previous period? It is really that question that has guided

criticisms of the CPI. The fixed-basket Laspeyres approach of the BLS does not provide the answer, critics note, because it denies the possibility of product substitution as relative prices shift. If the price of apples rises relative to the price of bananas, consumers can buy more bananas and fewer apples. They won't stick to the base-period basket and so can be made whole for inflation by an amount less than a fixed-basket index suggests. The make-whole amount, economists such as those on the Boskin Commission argue, should be the basis of the CPI.

A rise in the price of beer makes beer-drinkers worse off but has no effect on teetotalers. The average consumer is a cross between drinkers and teetotalers.

Unfortunately, standard economic theory offers less guidance to construction of a CPI than is often understood. Assume for the moment that the theory is an accurate representation of a single consumer at a moment in time. Assume that we have an index, which perfectly accords with theory. Even so, the index surely cannot simultaneously represent *all* consumers with their diverse incomes and tastes. A rise in the price of beer makes beer-drinkers worse off but has no effect on teetotalers. The average consumer is a cross between drinkers and teetotalers. If indexed social security benefits rose in response to beer prices, beer drinkers would be shortchanged. And teetotalers would receive a windfall. There is no theoretically correct way of adding up the conflicting welfare changes of these two groups in response to the adjustment. Consumer theory cannot even represent the *changing* tastes of a single consumer over time. It is premised on an unchanging utility function.

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In short, a CPI based on the standard economic model is not a self-evident choice for all data users. Yet—imperfect though it actually is—such a theory-based CPI is certainly of interest for various purposes. Some users—certainly the members of the Boskin Commission—would like to see inflation measured that way. And if there is one fundamental axiom of economic theory, it is that there is no accounting for anyone's tastes.

Consistency

Macroeconomists and monetary policy-makers are often concerned with the relationship between inflation and the level of real economic activity. Generally, such users want to examine past relationships between inflation and activity, whether through econometric techniques or otherwise. These relationships are then used to predict the implications of current economic activity and policy. But if the measurement of inflation is constantly being changed, an acceleration or deceleration of inflation can be obscured. It becomes difficult to know if an observed acceleration or deceleration is a reflection of the actual trend in inflation or is merely a statistical artifact. Appropriate policy-making is made more difficult if measurement is based on a rubber yardstick. A consistently produced CPI facilitates the making of judgments about inflation trends.

Is the actual CPI produced using a constant methodology? In fact, it is not. During the 1990s, the BLS incorporated the following changes (among others) into the index, in part in response to the ongoing criticisms by economists of the CPI:

1991: Hedonic pricing introduced for apparel⁴

1991: Greater recognition of discount air fares

1992: Improved imputation methods for new product models

1994: Quality improvement recognized for reformulated gasoline

1995: Generic pricing recognized when drugs lose patent protection

1995: "Seasoning" procedures introduced for food to eliminate upward bias

- 1996: "Seasoning" extended to other products
- 1997: New procedures for pricing hospital services
- 1998: Hedonic pricing of home computers

These and other changes tended to produce lower rates of recorded inflation. And each change has a reasonable rationale behind it. As new procedures were being phased in, economists marveled about how much less inflation-prone the 1990s appeared, relative to earlier decades. Were they right? Or did the decisions of experts at the BLS and the criticisms of outside academics simply make it seem so? If consistency over time were a high priority of the data producers, we would not have to ask.

Accuracy

Finally, it is hard to quarrel with the virtue of data "accuracy." If accuracy is taken simply to mean the collection of precise data at the most detailed level, there is little controversy. When CPI data collectors record the price of bananas, we want them to ascertain the right price (although even defining the right price is more complicated than it sounds). Once we go beyond this level of detail, however, the concept of accuracy can be fuzzy. The myriad product and service prices that are gathered must be averaged together. Different weighting schemes will produce different results. Determining whether those schemes should be linear, geometric, fixed, chained, base-period, or end-period is at the heart of much of the CPI debate.

The product quality issue is often considered to be one of accuracy. Is the CPI accurately reflecting changes in the value of products that are the result of new product attributes? A newly purchased personal computer has more speed, memory, and other desirable features than one bought a decade ago. Surely it would be inaccurate simply to track the price of a

CPI: new cars

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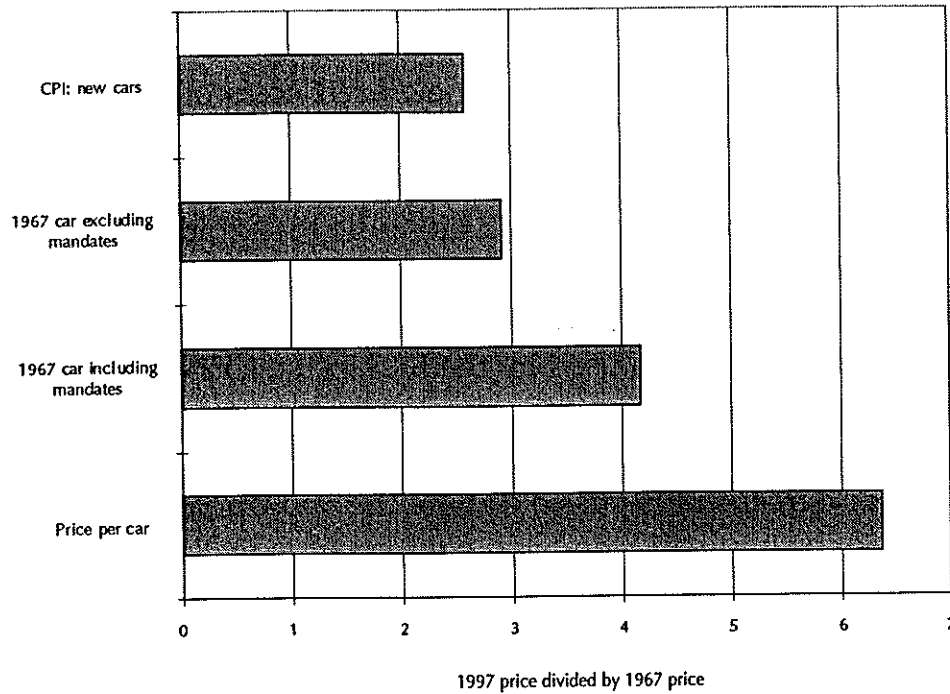


Figure 1. Alternative Measures of New Car Price Change: 1967–1997

Source: American Automobile Manufacturers Association.

personal computer over time without adjusting the selling price for quality change. But making that obvious point does not automatically suggest a precise methodology for adjusting the price.

Price adjustments for quality are inevitably subjective, even when performed with the elegance of regression analysis and hedonic pricing. As anyone who has ever run a regression knows, alternative—but reasonable—specifications produce alternative results. Ultimately, the price adjustment for quality change is a judgment call over which CPI users can disagree.

Consider Figure 1, which shows the change in the price of new cars from 1967 to 1997 as measured by four alternative indexes. The average nominal price of a new car has increased more than sixfold during that three-decade period. However, consumers have shifted to more expensive models during this

period, exaggerating the seeming price increase. If we hold car quality constant, but recognize the added costs of mandated equipment (for safety and air pollution), the price increase would be a little over fourfold. If we assume that consumers value these mandates at cost, the increase is a bit under threefold. And if we assume that mandates and other quality changes are all valued by consumers at cost, the increase factor is about 2.6. It is this last assumption that is used by the BLS in the CPI component for new cars.

Surely, the range between 2.6 and 6+ is a wide one within which disagreement is possible about the appropriate methodology. For example, if mandated equipment is really valued at cost by consumers, why was it necessary to apply the mandate? Under this assumption producers would have offered the equipment and consumers would have bought it. In short, the measurement of quality is tricky.

A Menu Approach

Different users have different tastes with regard to transparency, accordance with theory, and consistency in the CPI. And while all users want the index to be accurate, there will inevitably be disagreement on what accuracy entails. The solution, therefore, is to respond as the private market does when there are different preferences for goods. In such a case, the private market typically offers a choice. Indexes should be offered to meet the preferences of different groups of users. The idea of a single, official CPI should be downplayed. Instead, users—even Congress, when it decides to index benefits or taxes—should be offered alternative CPIs. Users should make the choice of which index they will employ, not the Bureau of Labor Statistics.

What would this menu approach mean in practice? At present

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		Quality Control		
		Pre-1990s BLS methodology	1998 BLS methodology	Elaborate hedonic pricing
Substitution control	Fixed-weight Laspeyres index with infrequent basket changes (current methodology)			
	Geometric weighting with more frequent basket updates			
	Chained Fisher ideal index (annual basket updates)			

Figure 2. Hypothetical Menu of Consumer Price Index Inflation Rates

there are two CPIs offered, one weighted for “all urban consumers” (CPI-U) and the other for “urban wage earners and clerical workers” (CPI-W). In fact, however, there is only a slight weighting difference between the two, and they seldom give readings of inflation that diverge significantly. Under the menu proposal, CPI inflation would be presented in a matrix, something like that shown in Figure 2.

The hypothetical menu provides users with a choice of methodology, along both the substitution and quality control dimensions. On the vertical axis, users have a choice between a fixed-weight Laspeyres index—the current methodology, which has the advantage of transparency. The in-between option is a geometrically weighted index, along the lines that BLS has been publishing on an experimental basis. Such a weighting scheme arguably comes closer to the economic model of consumer choice. Finally, for those who want an even

more elaborate index, a chained Fisher ideal of the type now used for the GDP deflator is offered.⁵ This type of index most closely approximates the theoretical preferences of the Boskin Commission, but it is the least transparent. Try explaining to your grandmother that her social security adjustments are based on the chained geometric mean of a Laspeyres and Paasche index!

The market-basket updates that accompany the three options are also varied. They range from the current practice of updating the basket about every ten years to updating annually. Cases can be made for frequent and infrequent adjustments. Again, user preference is paramount.

Quality control—the horizontal axis of Figure 2—would also vary from modest to aggressive. The least aggressive approach would be that used before hedonic pricing began to make its way into the CPI. The in-between approach would be the current approach, as introduced in 1998. And the most aggressive would involve hedonic approaches to a broad range of products. Presumably, the members of the Boskin Commission would be most happy with the lower right corner of the matrix in Figure 2. Other users might pick another location. And all users, by studying the range of figures reported in the nine boxes, would have an indication of the sensitivity of the measured inflation rate to alternative approaches.

Of course, the menu of indexes offered could be different from Figure 2 along the two dimensions shown. There could be more or different options available. And there might be choices along other dimensions. For example, there has long been demand for a CPI based on the consumption habits of the elderly for purposes of social security indexation. While the BLS could not produce every possible variant, it could do more than it now does to meet user preferences. But doing so means abandoning data-Taylorism.

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Political Advantages of a Menu Approach

When an index such as the CPI is used for resource allocation, it is inevitably subject to politicization. I have already noted the past threats against the BLS that have arisen in Congress to force changes in CPI methodology. That problem is built into the current Taylorist approach. If there is only one right official CPI, and if that one right index is used for budgetary indexation, politicians will inevitably want to influence the index's movements. (The current controversy over whether the year 2000 Census of Population should be based on a strict head count or employ sampling is another example of this tendency.) But if a menu of indexes is offered, including those that meet the criteria politicians say they want, then they are free to choose that version.

Of course, with a menu of indexes, there could be no hiding behind the BLS in making such choices. A politician who wanted to limit increases in social security benefits or to raise taxes could pick a version of the CPI expected to rise more slowly than others. He or she could cite the Boskin Commission and hope voters would buy the explanation. But the choice would be political and voters could then decide whether the selection made was what they wanted. Meanwhile, policy-makers concerned with inflation, professional economists, and wage-setters negotiating union contracts, could make their own choices of the CPI, unfettered by political vagaries.

Follow the Precedent

Is there any precedent for the menu approach for the CPI? To a limited extent, there is. The various underlying subcomponents of the CPI are offered—for example, food prices—along with the overall index. And certain subindexes are routinely published, such as the “core” CPI that excludes volatile energy and food prices. But

all of these series are based on the same underlying methodology.

A better precedent for the menu approach is found in the unemployment rate data produced by the BLS, where variants are presented that deviate from the standard definition. For example, one variant includes an allowance for part-timers who are seeking full-time jobs. Another incorporates "discouraged" workers. This menu of unemployment rates was developed because over time the BLS found that it was the best way to meet complaints of arbitrariness in the official definition. Providing alternatives allowed critics to pick their preferred unemployment rate. My proposal is to extend the menu approach to the CPI and to other official data series.

Notes

1. Advisory Commission to Study the Consumer Price Index, "Towards a More Accurate Measure of the Cost of Living," *Daily Labor Report*, December 5, 1996, special report, pp. S10-S53.

2. For a detailed critique of the Boskin report, see Dean Baker, ed., *Getting Prices Right: The Debate Over the Consumer Price Index* (Armonk, NY: M.E. Sharpe, 1998).

3. "BLS Commissioner Says CPI Will Not Become Politicized," *Daily Labor Report*, February 23, 1995, pp. A1-A2; "Blue Dogs to Press for Downward CPI Change in 105th Congress, Stenholm says," *Daily Labor Report*, December 6, 1996, pp. A13-A14.

4. Hedonic pricing uses regression analysis to break a product down into attributes and applies implicit prices to each attribute. For example, attributes of a house could include lot size, number of bedrooms, neighborhood, age of the structure, and so on.

5. A chained Fisher ideal index requires end-period weights. Thus, it could not be offered monthly but could be offered annually once each year's consumption pattern was surveyed. This approach is used for the price deflators, which are part of the GDP accounts. Quarterly GDP deflator figures are fixed-weighted until the annual data are published.

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