

Misconceptions about Consumer Price Indexes: the U.S. Experience

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April 22, 2009

Prepared for the Eleventh Meeting of the Ottawa Group in Neuchatel, Switzerland, May 29, 2009. All views expressed in this paper are those of the authors and do not necessarily reflect the views or policies of the U.S. Bureau of Labor Statistics.

Introduction

Within the past several years, commentary on the U.S. Consumer Price Index (CPI) has extended well beyond the circle of economists, statisticians, and public officials. Much of the strongest criticism of the CPI methodology used by the Bureau of Labor Statistics (BLS) has come from investment advisers, bloggers, magazine writers, and others in the popular press.

Some of these recent critics have accused the BLS not only of errors but also of willful misrepresentation of consumer price change. A prominent example is the article “Haute Con Job” in the October 2004 *PIMCO Investment Outlook*, in which fund manager William Gross said that the “faulty and near fraudulently calculated” CPI “may not be a conspiracy but it’s definitely a con job.”¹ Walter F. “John” Williams, who maintains the *Shadow Government Statistics* website, claims that the growth rate of the CPI “is understated by roughly 7% per year” largely because in recent decades it has “increasingly succumbed to pressures from miscreant politicians, who were and are intent upon stealing income from social security recipients.”² The widely-read blogger Barry Ritholtz wrote that “Changes have been made in how we measure and account for inflation. Not only do we understate inflation, but we do so in a systemic manner which has led to the current disconnect between government stats and reality.”³ As those accusations went unanswered, criticism grew increasingly more common and angrier.

In April 2008, these themes were picked up in two prominent magazine articles. One, “The Great Inflation Cover-Up” by Elizabeth Spiers in *Fortune*, asked “If the price of dinner is pinching us, why don’t the CPI numbers acknowledge it?”⁴ Meanwhile, Kevin Phillips wrote in “Numbers Racket” in *Harper’s* that “corruption has tainted the very measures that most shape public perception of the economy”—prominently including the CPI.⁵

Appearing as they did in national media and in the age of the Internet, these aggressive criticisms have probably been more widely quoted and circulated than most academic journal articles and panel reports on CPI issues.

While the BLS regularly discusses and debates measurement issues with its advisory committees and at professional meetings of economists and statisticians, it typically responds to criticism from outside the price measurement community only if a member of the public or a representative of the media contacts the Bureau directly. As a result, the BLS had difficulty recognizing both the prevalence of these misconceptions and the reality that the internet transmits ideas that confirm predispositions as easily as it transmits facts.

For similar reasons, the BLS found it difficult to find the proper venue for responding to critics. Previous attempts by the BLS to respond to critical comments through a letter to

¹ Gross (2004a). All web addresses cited in this paper were visited on or after April 20, 2009. No spelling corrections or other edits were made to quoted authors’ texts.

² Williams (2006).

³ Ritholtz (2008a).

⁴ Spiers (2008).

⁵ Phillips (2008a).

the editor had been unsatisfactory, and attempting to reply to a blog, where the rules of engagement are far fiercer, seemed pointless.

Ultimately, we decided on writing an article for the *Monthly Labor Review*, a BLS publication, and an associated “Questions and Answers” section for the BLS website.⁶ This allowed us to write explanations at both a brief, summary level as well as at a more detailed level while maintaining some control over the message. To increase the visibility of our response, business media and prominent economists with blogs were notified. After the article’s publication on September 4, 2008, criticisms based on conspiracy theories declined. However, Fannie Mae and Freddie Mac were placed in receivership on September 7 and Lehman Brothers filed for bankruptcy on September 15, so it is impossible to know how much of the decline in criticism was due to a diversion in the public’s focus away from the CPI and toward the financial crisis.

In this paper we describe the history of the criticism and the BLS response. We hope that the paper will be useful to other statistical agencies that have also faced criticism or distrust among the user community of the CPI or other published series. In addition, our experience serves as an example of how the internet allows a debate to spread rapidly, and the difficulty of correcting misconceptions in that setting.

Background

In this section we briefly review the context for criticisms of the CPI in the United States. Since 1978, the BLS has published CPI series that reflect the inflation experiences of two different population groups. The CPI for all urban consumers (CPI-U) and the CPI for urban wage earners and clerical workers (CPI-W) differ only in the populations from which their expenditure weights correspond.

The all-items, or overall, CPI-U is the CPI that is reported most widely in the media each month when the index is released. Both the CPI-U and CPI-W, however, have important uses in indexation. The CPI-W is the index used in the determination of the annual Social Security and Federal retirement cost-of-living adjustments. It also is used extensively for periodic wage adjustments in collective bargaining agreements. The CPI-U is used for indexation of tax brackets, personal exemption amounts, and many other parameters in the Federal tax system. In addition, the CPI-U is used by the Federal Government to calculate adjustments to the principal values of Treasury Inflation-Protected Securities, also known as TIPS, which have been issued by the U.S. Treasury Department since 1997 to provide a constant inflation-adjusted return to investors.

In 2002, the BLS began publishing a third monthly CPI: the chained Consumer Price Index for all urban consumers (C-CPI-U), created to more closely approximate a cost-of-living index by reflecting consumer substitution among item categories. The C-CPI-U applies to the same population group as the CPI-U, but employs a different formula to combine basic indexes. In part because C-CPI-U values are revised in each of the two calendar years following their initial publication, that index does not have any prominent uses in indexation. Consequently, those who criticize the CPI-U and CPI-W have paid relatively little attention to C-CPI-U methods, and accordingly the focus in the discussion that follows is almost exclusively on the CPI-U and CPI-W

⁶ Greenlees and McClelland (2008a, 2008b).

Like other national statistical agencies, BLS continuously reviews and enhances the data and methods used to generate the CPI. In terms of the present controversy, three methodological changes have been especially significant. The first came in late 1981, when the BLS announced that it would change the treatment of home-ownership from an asset-based approach to rental equivalence, or Owners' Equivalent Rent (OER), the name of the corresponding CPI series.⁷ A second major change took effect in January 1999, when the BLS adopted a geometric mean formula in the calculation of most CPI basic indexes. The express purpose was to reflect the demonstrated ability of consumers to shift away from products whose prices had increased relative to the prices of other products in the same basic CPI component—for example, away from apples whose prices had increased more, or decreased less, than the prices of other apples in Chicago. The third change took place over a period of years beginning in 1998, as the CPI program expanded the use of hedonic regression models for quality adjustment, previously confined to housing and apparel, to a number of additional series, primarily consumer durables such as computers, televisions, and refrigerators. It can be argued that each of these three methodological changes increased the complexity of the CPI and made it less readily understandable to users. In any event, each change has generated heated criticism from outside the BLS.

As is well-known, this is not the first instance of public controversy surrounding the U.S. CPI. The index has been the target of criticism at several points in its history, notably during the years surrounding the 1996 publication of the "Boskin Report."⁸ That report contained estimates of several upward biases in the CPI: upper- and lower-level substitution bias, new goods and quality change bias, and new outlets bias. Together, these problems were estimated to comprise a 0.8 percent to 1.6 percent per year upward bias relative to a cost-of-living index (COLI). Although the quantitative estimates of bias became the subject of much debate, there is a reasonable consensus among academic economists about the existence and potential significance of the associated CPI limitations.⁹ The criticisms discussed in this paper, however, are asserted to lead to biases that are much larger and in the opposite direction.

Statistical agencies outside the United States also have encountered a significant degree of controversy and skepticism. In Europe, public concerns about the accuracy of price indexes and other government statistics have been the topic of conferences and published papers. One factor in this was the 2002 Euro cash conversion; there is evidence that subsequent to that conversion there has been a divergence between published inflation measures and public perceptions of the inflation rate.¹⁰ The European Commission conducted a survey in 2007 about the public's knowledge of key economic indicators and attitudes toward them. According to that survey, almost as many citizens of EU member countries said they did not trust the statistics as said they did trust them (45 percent and 46 percent, respectively). The proportion distrusting the statistics exceeded 50 percent in

⁷ The change took effect for the CPI-U in January 1983. The same change was implemented in the CPI-W in January 1985.

⁸ U.S. Senate (1996). Reinsdorf and Triplett (forthcoming) provide a history of outside reviews of CPI methodology.

⁹ See, for example, Committee on National Statistics (2002) and Lebow and Rudd (2003) for further discussion.

¹⁰ See, for example, Aucremann *et al.* (2005) and Guedes (2005).

several large nations.¹¹ Another survey conducted by the UK Office of National Statistics in 2007 found that 57 percent of respondents disagreed with the statement that “Figures are produced without political interference,” although only 33 percent disagreed with the statement “Figures are generally accurate.”¹²

Who are the critics and what have they said?

For more than a decade the internet has been circulating the idea that improvements to the CPI are the result of political manipulation rather than careful economic analysis. In the last five years that idea has been given more credibility by a few widely-cited authors.

In 2008, those ideas became the source for the two magazine articles by Elizabeth Spiers and Kevin Phillips mentioned in the introduction. Phillips is a well-known political analyst and commentator who has written several best-selling books. His “Numbers Racket” article in Harper’s parallels the arguments he makes in one chapter of his latest book, *Bad Money*. Together, his article and book were important contributors to the spread of CPI criticisms. In this section we describe some of the major critics and summarize the arguments in their own words. We separately consider perceptions about quality adjustment, substitution effects, and owner’s equivalent rent. Because the articles by Spiers and Phillips rely heavily on the arguments of other critics, we do not discuss them specifically in what follows.

William Gross, founder and co-chief investment officer of PIMCO, the world’s largest bond investment house, has written three articles about the CPI. The first, “Haute Con Job,” was published in October 2004 and marks the start of the current criticism. The second, “Con Job Redux”, was written the same year in reaction to rebuttals from other commentators. The final article, “HmMMMM?”, was published in June 2008.¹³

John Williams first posted “Government Economic Reports: Things You’ve Suspected But Were Afraid To Ask: The Consumer Price Index” on September 22, 2004 (on Gillespiere.com). He later moved all of his writings to Shadowstats.com, where he publishes “alternate” versions of several government statistics, including the CPI. His “SGS Alternate CPI” exhibits an annual growth rate about 7 percent lower than that of the CPI in recent years. The differential is based on his belief that the BLS shift to Owner’s Equivalent Rent, the use of geometric means for lower level indexes, and the use of hedonic quality adjustment have led to a reduction of 7 percent per year in the reported annual inflation rate.

Barry Ritholtz writes a blog on investments (at bigpicture.typepad.com, now ritholtz.com) and until recently he was Chief Market Strategist for Maxim Group, a New York investment bank. He is now CEO and Director of Equity Research at Fusion IQ, an online quantitative research firm. His blog is one of the most widely-read economics websites in the world, with more than 2.2 million page views for the month of February

¹¹ European Commission (2008), p. 37.

¹² Lader (2008), pp. 6, 16.

¹³ Gross (2004, 2008a, 2008b).

2009.¹⁴ He is extremely critical of government statistics in general and the CPI in particular, and he frequently cites John Williams's CPI as a viable alternative.

Robert Hardaway has written one opinion article about Owner's Equivalent Rent (OER) in the recently closed *Rocky Mountain News*. Because it was published on the internet, it has become widely known as a source for information about the BLS move away from the asset approach to OER.

These authors attribute many current economic problems to policy actions based on a mistakenly optimistic view of the economy, a view which in turn resulted from the BLS's supposed understatement of inflation. Williams refers to this as a "Pollyanna Creep" that has cheated Social Security recipients out of their rightful payments.¹⁵ Gross believes that "today's acceptance of an artificially low CPI in the calculation of nominal bond yields in effect means that real yields – including TIPS – are 1% lower than believed."¹⁶

Barry Ritholtz and Robert Hardaway go much further. Ritholtz writes¹⁷ "There are obviously many many factors that are coming into play in today's credit crisis -- but I can draw a direct line from the Boskin Commission (who IMO, falsely claimed CPI overstated Inflation by 1.1%) to the Greenspan 1% FOMC rate, to the residential mortgage backed derivatives, to the Bear Stearns collapse." In a similar vein, Hardaway writes¹⁸ "The current subprime credit crisis can be directly traced back to the BLS decision to exclude the price of housing from the CPI."

In the remainder of this section, we will focus on some common themes to the misconceptions. We use the words of some of the above-mentioned authors to demonstrate the arguments made in support of those themes.

A. Quality adjustments for new items

In most cases, the critics' complaints about hedonic quality adjustment actually amount to an opposition to the use of any quality adjustment, not just to the use of hedonic regression analysis. Although never explicitly stated, there also appears to be a belief that prior to 1998 quality comparisons were never made in the CPI. In reality, of course, some form of quality adjustment is performed every month whenever an old item disappears and is replaced with a new one. Another idea implicit in the critics' arguments is that adjustments are only made for quality improvements, not when the old items are replaced by inferior ones. Finally, critics sometimes imply that adjustments for improved quality entirely eliminate any observed quality increase.

For example, in *Haute Con Job*, Gross writes¹⁹

Talk about a con job! The government says that if the quality of a product got better over the last 12 months that it didn't really go up in price and in fact it may have actually gone down!

¹⁴ <http://www.sitemeter.com/?a=stats&s=sm2ritholtz&r=33>. For comparison, for the six months ended July 1, 2007, average daily circulation at the *Washington Post* totaled 652,200 (Editor & Publisher [2007]).

¹⁵ Williams (2004).

¹⁶ Gross (2008).

¹⁷ Ritholtz (2008a).

¹⁸ Hardaway (2007).

¹⁹ Gross (2004a).

Barry Ritholtz, in “Is Inflation Really Understated? (No!)” also appears to assume that quality adjustments are inherently one-sided:²⁰

If hedonic quality improvement is anti-inflationary, what about corresponding drops in quality? The low, low price retailers sell cheap clothing, but subjectively speaking, the quality has been decreasing rapidly. Where's the Hedonic adjustment for that?

John Williams writes that hedonic quality adjustment “zeros out” price increases:²¹

... the average person also tends to sense higher inflation than is reported by the BLS, because of hedonics, as in hedonism. Hedonics adjusts the prices of goods for the increased pleasure the consumer derives from them. That new washing machine you bought did not cost you 20% more than it would have cost you last year, because you got an offsetting 20% increase in the pleasure you derive from pushing its new electronic control buttons instead of turning that old noisy dial, according to the BLS.

Another misconception is that in many cases consumers are being forced to purchase items with quality improvements that have little or no value to the consumer. Adjusting for quality improvements in that case is seen as unfair. Gross makes this argument concerning BLS quality adjustments for new features of a computer:²²

...because the machines' computer power and memory have improved, their hedonically adjusted prices have dropped by 25% a year since 1997... But did your new model computer come with a 25% discount from last year's price? Probably not. What is likely is that you paid about the same price for hedonically adjusted memory improvements you'll never use. [original emphases]

The most extreme view is that no adjustments for quality should be made. In, *Con Job Redux*, Gross writes about “an example that strikes to the heart of the hedonic debate”:²³

Say that only product that Americans purchase and consume are bags of gumdrops – 100 to a bag that cost \$1.00 per bag, with each citizen limited to 1 bag. Through the miracle of productivity, a way is found to fill each bag with 110 gumdrops that is now priced at \$1.10. The government's hedonic adjustments would now calculate that the bag really only costs \$1.00 and that the CPI has not gone up ... But here's the catch and the con. The price of a gumdrop hasn't gone up, but the cost of a bag of gumdrops has. Because Americans must buy 1 bag as opposed to individual candies, their cost of living has increased by 10%. [original emphasis]

Although he uses “hedonic” to mean any quality adjustment, he clearly takes the extreme position that food items should not be adjusted for changes in weight or volume. It is unclear whether he recognizes that failing to adjust for the number of

²⁰ Ritholtz (2008b).

²¹ Williams (2006).

²² Gross (2004a).

²³ Gross (2004b).

gumdrops would also mean that a reduction from 100 to 90 gumdrops without a price change would not count as inflation.

Barry Ritholtz expresses a similar distrust of quality adjustment in a post entitled “Your Personal Inflation Rate”:²⁴

Hedonics asks the question: "How much of product's price increase is a function of "inflation," and how much is a quality improvement?" Thus, the entire late 1990s concept of Hedonics is premised upon a flawed assumption: that Quality is static.

He explicitly equates hedonic quality adjustment with quality adjustment in general a few sentences later:

The theory of Quality Adjustments is flawed at best ... Hedonics are the bastard stepchild of flawed assumptions and abstract theory. To call it dishonest serves only to slander liars.

The distrust of government statistics expressed in the last sentence is unfortunately common, and it became more common throughout the spring of 2008.

B. Substitution

The use of a geometric mean formula to combine relative prices into an index is in some cases recognized as an attempt to adjust for substitution bias and in some cases treated as a separate exercise.

Gross objects to correcting for substitution by consumers in the Personal Consumption Expenditures deflator:²⁵

For those of you sophisticated economists who feel the substitution bias is more than justified, chew on this for a second. If you substitute a pound of chicken for a pound of beef because it's cheaper, then switch back to beef later on because it came back down in price, the overall round trip which resulted in no ultimate substitution and no relative price change winds up reducing the stated PCE. Oh man, what a con.

The PCE chain price index would combine chicken and beef with a Fisher formula that would be very unlikely to produce this type of downward chain drift. But in a later article, Gross clearly states the belief that the CPI-U accounts for substitution between items that are actually in separate indexes:²⁶

Product substitution and geometric weighting both presumed that more expensive goods and services would be used less and substituted with their less costly alternatives: more hamburger/less filet mignon when beef prices were rising, for example.

²⁴ Ritholtz (2007).

²⁵ Gross (2004a). The PCE index, part of the U.S. National Accounts, is produced by the U.S. Bureau of Economic Analysis, primarily using CPI series as inputs.

²⁶ Gross (2008).

Of greater importance is the expression, in the last clause above, of the idea that substitution consists of an income effect in which a lower-cost, lower-quality good is substituted for a higher-cost, higher-quality good when uniform price increases lower real incomes. The idea that contracting real incomes are assumed not to be inflation is more strongly stated by Williams:²⁷

The Boskin/Greenspan argument was that when steak got too expensive, the consumer would substitute hamburger for the steak, and that the inflation measure should reflect the costs tied to buying hamburger versus steak, instead of steak versus steak. Of course, replacing hamburger for steak in the calculations would reduce the inflation rate, but it represented the rate of inflation in terms of maintaining a declining standard of living. Cost of living was being replaced by the cost of survival. The old system told you how much you had to increase your income in order to keep buying steak. The new system promised you hamburger, and then dog food, perhaps, after that.

Barry Ritholtz in “Your Personal Inflation Rate” makes similar statements:²⁸

When someone buys Chicken instead of Steak because meat has gone up in price, that's evidence of inflation. The substitution process fraudulently rationalizes this to eliminate inflation from the BLS basket. Indeed, substitution is PROOF of inflation. When a product's price rises out of a consumers ability to afford purchasing it, its prima facie evidence of inflation. Only the starry eyed residents of ivory towers can say with a straight face that cheaper substitutes are non-inflationary.

When consumers engage in substitution, they are explicitly acknowledging inflation. Incidentally, the intellectually dishonest sleight of hand of substitution is courtesy of the Boskin Commission.

The effect on the CPI of switching to a geometric mean index was extremely high, according to Williams:²⁹

Once the system had been shifted fully to geometric weighting, the net effect was to reduce reported CPI on an annual, or year-over-year basis, by 2.7% from what it would have been based on the traditional weighting methodology. The results have been dramatic. The compounding effect since the early-1990s has reduced annual cost of living adjustments in social security by more than a third.

In light of their beliefs about the nature of substitution effects and their belief about the magnitude of the changes, the anger expressed by some writers becomes easier to understand.

C. Owner's equivalent rent

²⁷ Williams (2006).

²⁸ Ritholtz (2007)

²⁹ Williams (2006).

Perhaps surprisingly, much less has been written recently about the move to rental equivalence (OER). In general, what has been written is more of a critique of the rental equivalence approach than a support of the method used by the BLS to measure inflation in shelter costs prior to 1983. Similarly, most critics have not made clear the precise nature of the alternative methods they would prefer or the remedies they would suggest.

Two quotes are worth mentioning. First, Gross in “Hmmmmm” writes:

It was claimed that a measure based on what an owner might get for renting his house would more accurately reflect the real world – a dubious assumption belied by the experience of the past 10 years during which the average cost of homes has appreciated at 3x the annual pace of the substituted owners’ equivalent rent (OER), and which would have raised the total CPI by approximately 1% annually if the switch had not been made.

Second, Robert Hardaway writes that in 1983 the BLS was faced with the problem of publishing inflation rates of 15 percent, which would force nominal bond and money yields to 17 percent. In response, he writes, the BLS substituted Owner’s Equivalent Rent for “the cost of housing”³⁰.

The result of this statistical sleight of hand was immediate and gratifying, for the reported inflation index quickly dropped to 2 percent ... While the BLS was correct in assuming that this statistical ruse would fool the average citizen into believing that inflation was only 2 percent (and therefore be willing to accept a meager 4 percent return on his bank savings), what is remarkable is that the ruse also fooled the bond traders, and apparently continues to do so...

Determining how we should respond

As emphasized above, by the spring of 2008 the idea that the CPI was significantly understating inflation had spread widely across the internet, in interviews, online articles, newsletters, and blogs. Because the BLS has no formal program of monitoring online media commentary, however, much of that criticism went un-noticed at the Bureau. Our attention, and desire to respond, was stimulated by the articles in the popular print magazines *Harper’s* and *Fortune*, and by the publication of the book *Bad Money*.

An unfortunate aspect of this controversy was that the critics’ arguments were not addressed to the BLS directly, nor were they expressed at conferences or other venues that normally included BLS representatives. Often, the criticisms and accusations were simply repeated with no reference to opposing views. There were some exceptions, usually in the so-called “mainstream media.” For example, an article about John Williams in the *San Francisco Chronicle* newspaper quoted both former BLS Commissioner Katharine Abraham and FESAC member Valerie Ramey, an Economics Professor at the University of California in San Diego.³¹ Even so, the overall tendency in the media to present the criticisms of the CPI without counter-arguments and without apparent skepticism further convinced us of the urgent need to publish a BLS response.

³⁰ Hardaway (2007).

³¹ Zuckerman (2008).

A letter to the editor might be considered a natural and direct way of addressing errors in a magazine article. The BLS has learned from experience, however, that even when a publication allows for reader comments there are problems with that approach unless the article in question has made only simple factual errors. In the limited space of a letter, it can be very difficult to explain the methods used in a statistical series like the CPI and to demonstrate why those methods are appropriate. In addition, a magazine may choose not to print a letter from the BLS, it may edit out parts of the letter, or it may combine the letter with a rejoinder from the article's author, again without offering the BLS an opportunity to respond.

Another way in which the BLS addresses outside comments is through participation in conferences of economists and statisticians, or in meetings of the Federal Economic Statistics Advisory Committee (FESAC) panel. The critics mentioned here, however, did not present their arguments at conferences and did not bring the arguments to the BLS directly. In fact, academics and other experts in price measurement are more likely to follow the Boskin Commission in believing that the CPI *overstates* consumer inflation, the opposite of the view expressed by Phillips, Gross, Ritholtz, Williams, and the other recent critics.

For all these reasons it was decided that we would place an article in the BLS's own journal, the *Monthly Labor Review (MLR)*. The *MLR* is aimed at a broad readership and is followed by many economic analysts and reporters. Importantly, in the *MLR* the BLS can guarantee prompt publication of articles that it considers to be especially important or timely, and it has several ways in which it can highlight the release of such articles. Moreover, an article published in the *MLR* and written by two BLS staff members could be more complete than a letter to the editor and would be more authoritative than a posting to a blog site.

Along with these advantages, the use of the *MLR* imposed some constraints. In an official publication it is essential to maintain the BLS reputation for precision, restraint and non-partisanship. The decision was made that critics would not be quoted or mentioned by name in the article. While this constraint made describing some of the controversies more difficult, it confirmed the Bureau's traditional focus on explaining issues rather than on attempting to discredit individuals or groups.

The Monthly Labor Review article

The three key sections of our article corresponded to the three methodological changes on which the critics had focused: the CPI's use of the geometric mean formula to deal with consumer substitution behavior, its expansion of hedonic quality adjustment, and the measurement of homeownership cost by rental equivalence. In each case we explained the overall logic for the newer methods. We also provided evidence to counter the critics' arguments that our methods were eccentric or suspect by citing approval for those methods in the international CPI manual or by international agencies; recommendations for the methods by panels reviewing the CPI; and the use of the methods by other countries.

With respect to consumer substitution, as discussed earlier, the critics argued that the geometric mean formula essentially subtracts from the CPI a certain amount of inflation that consumers can "live with." For example, a critic might say that the CPI won't show

any inflation when the price of beef goes up, because BLS assumes that consumers can simply switch from steak to hamburger. We explained that, first, no substitution is assumed between hamburger and steak because they are in different index cells; second, even if they were in the same cell the CPI would only assume substitution to hamburger if steak prices went up *more* than hamburger prices; and third, if hamburger prices went up more than steak prices (and if they were in the same cell) the CPI assumes consumers would substitute *to* steak *from* hamburger. Our paper provided a mathematical example involving candy bars to show how the geometric mean formula works and to demonstrate that it does not build in a declining standard of living. We also noted that the geometric mean is one of the two formulas approved for use by the IMF³² and Eurostat³³ and that it is used in 20 of 30 HICP indexes.³⁴

In the section on quality adjustment we emphasized the distinction between adjusting for quality differences (which the CPI does hundreds or thousands of times each month by linking out non-comparable substitutions, using the class mean method, using automobile production cost adjustments, etc.) and *hedonic* quality adjustment, which the CPI employs only in certain item categories. We tried to make clear that the CPI would be meaningless if the BLS never found replacement products when a sample item disappears from the shelves or if it always assumed that old and replacement items had the same quality. We also explained that hedonic models don't estimate pleasure, they estimate market prices for product characteristics. We cited the international CPI manual's strong support of quality adjustment in general and hedonic methods in particular.³⁵

The question of how to measure the cost of shelter for homeowners has been controversial for several decades, and we didn't have space in our paper to go through all the technical arguments, some of which would have been too theoretical for many *MLR* readers in any case. We defended the rental equivalence approach primarily by noting that a homeowner's major investment is typically his or her home, and arguing that therefore inclusion of house prices in the CPI would introduce *investment* prices into an index that is intended to measure the cost of *consumption*. We also pointed out that the use of rental equivalence is supported by a broad spectrum of academic economists, the international CPI manual, and panels and agencies that have reviewed the CPI like the Government Accountability Office, the 1961 "Stigler Committee," the Boskin Commission, and a 2002 National Academy of Sciences panel.³⁶ Specifically, we noted that rental equivalence is the most widely used method among countries in the Organization for Economic Cooperation and Development (OECD).³⁷

The sections on substitution, quality adjustment, and shelter were followed by a brief attempt to expose some misunderstandings about the "core" CPI. For example, some Americans think that the official CPI-U has been modified to exclude food and energy, or

³² International Monetary Fund (2003).

³³ Eurostat (2001), p. 59.

³⁴ Eurostat (2008). The national HICP practices are available on the Eurostat website at http://epp.eurostat.ec.europa.eu/portal/page?_pageid=2714,1,2714_61582099&_dad=portal&_schema=PORTAL#SDDS.

³⁵ ILO (2004), pp. 1.253 and 1.255.

³⁶ Government Accountability Office (1981), Price Statistics Review Committee (1961), U.S. Senate (1996), p. 53, and Committee on National Statistics (2002), p. 72.

³⁷ Christensen *et al.* (2005), p. 9.

that the All Items less food and energy index is used to determine Social Security and federal retirement cost-of-living adjustments. Neither of these ideas is correct.

To propose some reasons why so many people seem to believe the critics' arguments, our article devoted one section to "The CPI and perceived inflation." We noted that an individual's cost of living change will differ from the CPI change because he or she consumes a unique mix of goods and services and shops at a specific set of stores. Also, inflation in early 2008 was concentrated in frequently-purchased items like food and, especially, motor fuel. Some people may feel that the CPI is understating inflation because the food and energy items that they buy every week are rising at a faster rate than the CPI index reported in the media.

Critics have sometimes made the argument that, as a result of the BLS methodological changes, measured inflation is lower in the United States than elsewhere. To contradict this idea, we presented evidence showing that between 1997 and 2007 the U.S. CPI rose faster than the CPIs of 16 of the other 29 OECD nations and faster than the CPIs of all the other G-7 nations.

Our last analysis in our article was designed to demonstrate that the SGS Alternative CPI series is not realistic. Changes in BLS methods over the years could not possibly have lowered the annual CPI growth rate by 7 percentage points or more, as claimed by Shadowstats. We referred to a BLS paper showing that first, the introduction of the geometric mean reduces annual CPI growth by only about 0.28 percentage point, and second, the hedonic models introduced into the CPI over the last decade have had only a very small impact on the overall index.³⁸ To get across to readers that the SGS Alternative estimates of inflation are extremely high, we compared that index to several CPI Average Price series for food, energy, and shelter. The BLS reports, for example, that the average U.S. price of two liters of diet cola was \$1.06 in April 1998 and \$1.33 ten years later. If the price had risen as fast as the SGS Alternative CPI, diet cola would have cost \$2.72 for two liters in April 2008, more than twice as much as its actual average price. We also demonstrated that if consumer prices had climbed as far over the prior ten years as the SGS index says they did, inflation-adjusted incomes must have fallen further than they did during the Great Depression of the 1930s. Few of us would believe that real incomes in mid-2008 were 40 percent lower than they were in 1998.

The paper's release and its aftermath

When the *MLR* was released on September 4, the BLS featured our article prominently. It issued a Media Advisory about the article's release, and placed a headline announcement on the main BLS web page linked to a set of questions and answers summarizing our analyses. We also notified some prominent bloggers as soon as the article was made public, and some of them cited it. By that first evening, there were already numerous mentions of the article around the blogosphere, along with comments posted by readers. As you might suspect, some people were glad we had responded, and many others refused to accept our arguments.

³⁸ Johnson *et al.* (2006).

James Hamilton, an economics professor at the University of California, San Diego, on his widely-read *Econbrowser* blog posted a summary entitled “Shadowstats Debunked” and said:³⁹

I've yet to find someone who has been able to reproduce the claims made by Shadow Government Statistics about the extent to which government agencies are grossly misreporting the U.S. inflation rate. Apparently, neither has the Bureau of Labor Statistics ... Why do people continue to give credibility to an operation like Shadowstats? Now that's something that I'd like to hear explained.

The Economist magazine's blog site, under “Today's recommended economics writing,” noted:⁴⁰

A group of crank conspiracy theorists called Shadowstats has alleged that the American Bureau of Labor Statistics systematically miscalculates inflation numbers ... Awesomely, the Bureau finally had enough, and economists John Greenlees and Robert McClelland wrote a detailed debunking of the allegations in *Monthly Labor Review*.

It was interesting to view the reader comments about our article on these and other sites. Some examples:

CPI has been significantly altered over the past twenty years through "pollyanna creep" and we all know it despite any hair-splitting rationales.

I've read enough of the Greenlees McClelland report to see that it is articulate, logical, and clear. The primary fuel for the shadow movement and its adherents is economic illiteracy. It's that simple.

Sorry, BLS, you use suspect assumptions on housing and employment and 'hang out' with suspect folks (The Fed). That is why we do not accept your pronouncements at face value.

BLS went upside those fools' domes.

Does the BLS recruit exclusively from graduates of the CMI (Con Men's Institute)

A few days after the article's release, John Williams posted a response on the Shadowstats site.⁴¹ Although he stood by his previously expressed positions and published numbers, he also said that in a later Primer Report on the CPI he would further explore and discuss the issues we raised. In addition, he stated that he would make available to the public in the not-too-distant future the detailed series and calculations of the SGS Alternate CPI. On this latter point, James Hamilton reported in *Econbrowser*⁴² that Williams admitted the SGS series is derived using add factors, not detailed simulations of past CPI methodologies.

³⁹ Hamilton (2008a).

⁴⁰ Free Exchange (2008). Interestingly, that writer pointed out that he or she used to work for the BLS.

⁴¹ <http://www.shadowstats.com/article/special-comment>

⁴² Hamilton (2008b).

Since the middle of September, discussion of CPI distortions has all but disappeared from the blogosphere and the media. Undoubtedly, the ongoing financial and economic crises have contributed greatly to that disappearance by diverting economists' and media attention. We know we can't take the recent relative silence about the CPI as evidence that the skeptics have all changed their minds.

Conclusion

Our experience in dealing with the recent CPI critics has yielded several lessons for the future. The first is that the BLS should carefully monitor the Internet, as well as major newspapers and broadcast media, for misinterpretations of their statistics. Responding to such misinterpretations is consistent with IMF guidelines,⁴³ and the importance of online media and the blogosphere has recently been emphasized by Statistics Denmark.⁴⁴

A second lesson is that a statistical agency should respond to misunderstandings and flawed criticisms as rapidly as possible. As we noted in the previous section, the criticisms stopped abruptly after the publication of our article. By that time, however, the idea that the CPI was seriously biased had become ingrained in certain parts of the investment community and the broader public.

A final lesson re-emphasized by this experience is that a statistical agency should, to the extent possible, make available easy-to-understand explanations and justifications of its methods.⁴⁵ This is particularly important in the case of methods that have a significant quantitative impact on the corresponding statistics, and when those methods may not make obvious sense to the non-specialist. Thus, in addition to any success that our article and its question-and-answer summary had in convincing skeptics, they also have two additional, ongoing benefits: they serve as a detailed reference when BLS staff members respond to questions from the public, and they provide a readily-available summary of the BLS view when reporters or analysts address issues of CPI accuracy.

⁴³ IMF (2003).

⁴⁴ Stafansson (2008).

⁴⁵ CPI methods are explained in detail on the BLS website in the BLS Handbook of Methods, CPI fact sheets, and many other documents. Justifications for specific controversial methods and approaches have been prepared less frequently.

References

- Aucremanne, L., M. Collin, and E. Dhyne (2005): “Is there a discrepancy between measured and perceived inflation in the euro area countries since the euro cash changeover?” presented at the seminar *Inflation Measures: Too High—Too Low—Internationally Comparable?* Paris, June 21-22.
- Christensen, Ane-Kathrine, Julien Dupont and Paul Schreyer (2005): “International Comparability of the Consumer Price Index: Owner-occupied housing,” Paper prepared for the OECD Seminar “Inflation measures: too high – too low – internationally comparable?” Paris, 21-22, at <http://www.oecd.org/dataoecd/14/18/34987270.pdf>.
- Committee on National Statistics of the National Research Council (2002): *At What Price? Conceptualizing and Measuring Cost-of-Living and Price Indexes*, Charles L. Schultze and Christopher Mackie, eds. Washington D.C.: National Academy Press.
- Editor & Publisher (2007): “2Q Earnings Fall at Washington Post Co. -- As Flagship Slides”, at http://www.editorandpublisher.com/eandp/news/article_display.jsp?vnu_content_id=1003621129.
- Eurostat (2001): *Compendium of HICP reference documents (2/2001/B/5)*, 2001, at http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-AO-01-005/EN/KS-AO-01-005-EN.PDF.
- European Commission (2008): *Europeans’ Knowledge of Economic Indicators*, Special Eurobarometer, Wave 67.2, April.
- Free Exchange (2008): “Link Exchange,” at http://www.economist.com/blogs/freeexchange/2008/09/link_exchange_41.cfm.
- Government Accountability Office (1981): “Measurement of Homeownership Costs in the Consumer Price Index Should Be Changed,” General Accounting Office PAD-81-12, 1981, at <http://archive.gao.gov/f0202/114922.pdf>.
- Greenlees, John S., and Robert B. McClelland (2008a): “Addressing misconceptions about the Consumer Price Index,” *Monthly Labor Review*, Vol. 131, August, pp. 3-19, at <http://www.bls.gov/opub/mlr/2008/08/art1full.pdf>.
- Greenlees, John S., and Robert B. McClelland (2008b): “Common Misconceptions about the Consumer Price Index: Questions and Answers,” at <http://www.bls.gov/cpi/cpiqa.htm>.
- Gross, William H. (2004a): “Haute Con Job,” *PIMCO Investment Outlook*, October 2004, at http://www.pimco.com/LeftNav/Featured+Market+Commentary/IO/2004/IO_Oct_2004.htm.
- Gross, William H. (2004b): “Con Job Redux,” *PIMCO Investment Outlook*, October 2004, at <http://www.pimco.com/LeftNav/Featured+Market+Commentary/IO/2004/IO+Con+job+redux+04.htm>.

- Gross, William H. (2008): “Hmmmmm?” *PIMCO Investment Outlook*, June 2008, at <http://www.pimco.com/LeftNav/Featured+Market+Commentary/IO/2008/IO+June+2008.htm>.
- Guedes, Dominique (2005): “Dispute around inflation since Euro changeover in France” presented at the seminar *Inflation Measures: Too High—Too Low—Internationally Comparable?* Paris, June 21-22.
- Hamilton, James (2008a): “Shadowstats Debunked,” September 4, at http://www.econbrowser.com/archives/2008/09/shadowstats_deb.html.
- Hamilton, James (2008b): “Shadowstats Responds,” October 12, at http://www.econbrowser.com/archives/2008/10/shadowstats_res.html.
- Hardaway, Robert (2007): “Price index sleight of hand haunts in credit crisis,” *Rocky Mountain News*, September 22, at <http://www.rockymountainnews.com/news/2007/sep/22/price-index-sleight-of-hand-haunts-in-credit/>.
- International Labour Office (2004): *Consumer Price Index Manual: Theory and Practice*. Geneva: International Labour Office, at <http://www.ilo.org/public/english/bureau/stat/guides/cpi/index.htm>.
- International Monetary Fund, Statistics Department (2003): *Data Quality Assessment Framework (DQAF) for the Consumer Price Index*, at http://dsbb.imf.org/vgn/images/pdfs/dqrs_cpi.pdf.
- Johnson, David S., Stephen B. Reed, and Kenneth J. Stewart (2006): “Price measurement in the United States: a decade after the Boskin Report” *Monthly Labor Review*, Vol. 129, May, pp. 10-19, at <http://www.bls.gov/opub/mlr/2006/05/art2full.pdf>.
- Lader, Deborah (2008): *Public Confidence in Official Statistics, 2007*, Office of National Statistics Omnibus Survey Report No. 35. Crown Copyright.
- Lebow, David E., and Jeremy B. Rudd (2003): “Measurement Error in the Consumer Price Index: Where Do We Stand?” *Journal of Economic Literature*, March, pp. 159-201.
- Phillips, Kevin (2008a): “Numbers Racket: Why the economy is worse than we know,” *Harper’s*, May, pp. 43-47.
- Phillips, Kevin (2008b): *Bad Money: Reckless Finance, Failed Politics, and the Global Crisis of American Capitalism*, New York: Penguin, 2008, pp. 80-89.
- Price Statistics Review Committee (1961): *The Price Statistics of the Federal Government*, National Bureau of Economic Research, 1961.
- Reinsdorf, Marshall, and Jack Triplett (forthcoming): “A Review of Reviews - Ninety Years of Professional Thinking About the Consumer Price Index” in *Price Index Concepts and Measurement*, Erwin Diewert, John Greenlees and Charles Hulten, eds. University of Chicago Press.
- Ritholtz, Barry (2007): “Your personal inflation rate,” January 23, at http://bigpicture.typepad.com/comments/2007/01/your_personal_i.html

- Ritholtz, Barry (2008a): "CPI: 2008 vs 1980," March 15, at <http://bigpicture.typepad.com/comments/2008/03/cpi-2008-vs-198.html>
- Ritholtz, Barry (2008b): "Is Inflation Really Understated? (*No!*)" May 8, at <http://bigpicture.typepad.com/comments/2008/05/inflation-infla.html>.
- Spiers, Elizabeth (2008): "The Great Inflation Cover-Up," *Fortune*, April 14, at http://money.cnn.com/2008/03/31/magazines/fortune/spiers_cpi.fortune/.
- Stefansson, Rune (2008): "Monitoring and Reacting in the Blogosphere and Other Online Media," presented at the UNECE Work Session on Statistical Dissemination and Communication in Geneva, Switzerland, May 13-15.
- U.S. Senate, Committee on Finance (1996): *Final Report of the Advisory Commission to Study the Consumer Price Index*. Print 104-72, 104 Cong., 2 sess. Washington, D.C.: Government Printing Office.
- Williams, Walter J. (2004): "Government Economic Reports: Things You've Suspected But Were Afraid To Ask!" Part Five, "Gross Domestic Product," October 6, at http://www.shadowstats.com/article/gross_domestic_product.
- Williams, Walter J. (2006): "Government Economic Reports: Things You've Suspected But Were Afraid To Ask!" Part Four, "The Consumer Price Index," October 1 update, at <http://www.shadowstats.com/article/56>.
- Williams, Walter J. (2008): "Special Comment," September 10, at <http://www.shadowstats.com/article/special-comment>.
- Zuckerman, Sam (2008): "Economist Challenges Government Data," San Francisco Chronicle, May 25, at <http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2008/05/25/BU6K10JTEF.DTL> .