Appendix: CPI Overstates the Rate of Increase in Food Prices, Especially for Fresh Fruits and Vegetables

The CPI may not definitively answer how food prices trended over the past several decades. The CPI overstates the rate of price inflation as compared with what a true cost-of-living index would have reported.[10] In the mid-1990s, the Boskin Commission, an advisory commission, was appointed by the Senate Finance Committee to study the role of the CPI in government benefit programs and recommend needed changes to the CPI. The Commission's December 1996 report estimated the CPI overstated the annual rate of inflation by 1.1 percent. Moreover, not all food groups appear to have been equally affected.

Economic research points to several reasons why the CPI was biased over this time period.[11] One source of CPI bias was the formula used by the BLS to calculate the rate of price change for commodities.[12] Following an example in the Boskin Commission Report (Boskin et al., 1996), suppose that the price of beef was $1.00 in January, but increased to $1.60 in February. We would have observed a 60-percent price increase for February. If the price fell back to $1.00 in March, we would observe only a 37.5-percent price decline. By the formula it previously used, BLS would have determined the average rate of price change from February to March to have been 11.25 percent (i.e., 60 percent minus 37.5 percent divided by 2 months), even though prices were the same at the beginning and end of the period. This particular problem was resolved when BLS changed its formula in January 1999.

Though the rate of price change formula has since been corrected, Reinsdorf and Moulton (1997) show that problems with the formula previously used by BLS did not affect all food indices equally. They re-estimated rates of inflation using two different formulas. The first formula reflected BLS methodology at the time. The second corrected for oscillating prices, as well as for other types of bias associated with the first formula. Reinsdorf and Moulton (1997) found that formula bias impacted the index for fresh fruits and vegetables more than price indices for other types of food. They believed that prices for fresh fruits and vegetables tend to be more volatile than those for other foods.

A more controversial question is whether quality changes have also contributed to the upward bias in the CPI. The Boskin Commission argued that quality and new product bias accounted for about half of the overall bias in the CPI (Boskin et al., 1996; Gordon and Griliches, 1997; Gordon, 2006).[13]

Moulton and Moses (1997) argued that the Boskin Commission's estimate of the rate of quality bias was too high. Consider that BLS prices tens of thousands of products. The goods and services comprising its sample are not constant. BLS rotates products in and out of the sample according to a pre-planned schedule. Also, items being priced may be unexpectedly discon-

[10]The objective of the CPI is to approximate a cost-of-living index. For example, if we compare the cost of living this year against that of a past year, the CPI should measure how much more (or less) households need to spend in order to achieve the same level of utility (well-being) as they did in the previous year (e.g., Bureau of Labor Statistics, 2007).

[11]The BLS defines bias as differences between the CPI and what a true cost-of-living index would report (Bureau of Labor Statistics, 2007).

[12]This occurred at the lower level of index construction, meaning that BLS would later aggregate these price changes to calculate changes in the overall CPI.

[13]The CPI was estimated to have overstated the rate of inflation by 0.60 percent due to quality and new product bias alone.

tinued or become permanently unavailable and need to be replaced. Rotating and replacing products is problematic if the products entering the sample are different in quality from the goods they replace. For example, imagine that a bag of ready-to-eat baby carrots replaces a bag of traditional, unpeeled and uncut carrots. The former is typically more expensive per pound. Moulton and Moses (1997) argued that BLS would take appropriate steps to separate out how much of the price increase is due to quality change rather than actual price inflation. The BLS could assume the difference in price between the two goods to be explained by a difference in quality. If the price of baby carrots in a prior month were available, for example, it might then compare the price of baby carrots in the current month against the historical price, not against the price of traditional, unpeeled, uncut carrots.

Despite the best efforts of BLS analysts, however, when an older product is replaced by an entirely new product, the potential for bias remains. Gordon and Griliches (1997) argued that the CPI will be biased if the new product is superior in quality to the older product by more than the differential in price between the two. Applying this same logic to our carrot example, we would expect the benefit provided to households by ready-to-eat baby carrots to exceed the cost differential between them and the traditional product. If this were not true, it would be hard to explain why the more expensive, value-added product has grown in popularity.[14] When entirely new products are introduced and gain market share, households typically enjoy large increases in welfare above the higher prices they pay for those new products (Hausman, 2003). Hausman argued BLS needs to incorporate these large welfare changes into its calculations for the CPI to more closely approximate a true cost-of-living index.[15]

New product and quality bias might also have affected the CPI for fresh fruits and vegetables more than indices for other foods. The Boskin Commission Report and Gordon and Griliches (1997) put the annual rate of new product and quality bias for fruits and vegetables at twice that for other foods.

Since the late 1990s, the BLS has worked to improve the CPI (Stewart and Reed, 1999; U.S. Department of Labor, Bureau of Labor Statistics, 2007). Aside from the ongoing debate over quality change, the CPI may provide a better estimate of future relative price changes. Our focus, however, is retrospective. We want to examine how relative prices have changed since 1980.

[14]Otherwise, there would be no increase in consumer surplus and households would be indifferent between buying traditional carrots and the newer ready-to-eat product.

[15]If households are obtaining greater utility from newer goods than BLS analysts assume, the CPI could be measuring how a household's expenditures need to change for that household to buy baskets of goods and services providing greater-and-greater utility. The CPI would not then approximate a cost-of-living index.