

EXHIBIT – E

Why is the Consumer Price Index Controversial?

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The Bureau of Labor Statistics (BLS) produces the Consumer Price Index (CPI). It is the most widely watched and used measure of the U.S. inflation rate. It is also used to determine the real gross domestic product (GDP). From an investor's perspective, the CPI, as a proxy for inflation, is a critical measure that can be used to estimate the total return, on a nominal basis, required for an investor to meet his or her financial goals.

For several years, there has been controversy about whether the CPI overstates or understates inflation, how it is measured, and whether it is an appropriate proxy for inflation. One of the primary reasons for this contention is that economists differ on how they feel inflation should be measured.

The Controversy

Originally, the CPI was determined by comparing the price of a fixed basket of goods and services spanning two different periods. In this case, the CPI was a cost of goods index (COGI). However, over time, the U.S. Congress embraced the view that the CPI should reflect changes in the cost to maintain a constant standard of living.¹ Consequently, the CPI has evolved into a cost of living index (COLI).

Over the years, the methodology used to calculate the CPI has undergone numerous revisions. According to the BLS, the changes removed biases that caused the CPI to overstate the inflation rate. The new methodology takes into account changes in the quality of goods and substitution. Substitution, the change in purchases by consumers in response to price changes, changes the relative weighting of the goods in the basket.²

The overall result tends to be a lower CPI. However, critics view the methodological changes and the switch from a COGI to a COLI as a purposeful manipulation that allows the U.S. government to report a lower CPI.

John Williams, a U.S. economist, and analyst of government reporting prefers a CPI, or inflation measure, calculated using the original methodology based on a basket of goods having quantities and qualities fixed.³

David Ranson, another U.S. economist, also questions the official CPI's viability as an indicator of inflation. Unlike Williams, Ranson does not espouse the viewpoint that the CPI is manipulated. Instead, Ranson's view is that the CPI is a lagging indicator of inflation and is not a good indicator of current inflation. According to Ranson, increases in the price of commodities are a better indicator of current inflation because inflation initially affects commodity prices, and it may take several years for this commodity inflation to work its way through an economy and to be reflected in the CPI. Ranson bases his inflation measure on a commodity basket of precious metals.⁴

What is immediately apparent is that there are three different definitions of the CPI. Since these definitions are not operationally equivalent, each method of measuring inflation leads to different results.

Different CPI or Inflation Levels

The different methods of measuring inflation produce disparate indications of inflation for the same period. For example, the November 2006 Consumer Price Index Summary, which is published by the BLS, stated that "During the first 11 months of 2006, the CPI-U rose at a 2.2% seasonally adjusted annual rate (SAAR)."⁵ Williams' estimate of CPI for the same period was 5.3%, while Ranson's reported an 8.2% estimate.

The differences between the BLS CPI and the figures attained by Williams and Ranson would be of sufficient magnitude whereby if the CPI is manipulated downward, the outcome of an investment plan could be less than effective. Therefore, a prudent investor may wish to obtain more insight and a better understanding of these disparate views of CPI and inflation measures and the effects they may have on their investment decisions.

Inflation and Profit Calculations

The rate of inflation also impacts the results investors and analysts calculate as they determine the returns on a portfolio. Investors must calculate their total required rate of return (RRR) on a nominal basis taking into account the effect of inflation. As the inflation rate increases, higher nominal returns must be earned to obtain a desired real rate of return. The nominal annual required total return is approximated as the real required return plus the rate of inflation. For short investment horizons, the approximate method works well.

However, for longer investment horizons (such as 20 years or more), a slightly different method should be used because the approximate method will introduce additional inaccuracy, which will compound as the investment horizon increases. A more accurate estimate of the nominal annual required total return is calculated as the product of one plus the annual inflation rate and one plus the required annual real rate of return.

The following table measures the three respective methods of inflation figures with a 3% desired rate of real return. The results in the table show that as the difference between the inflation rate and the real rate of return increases, the difference between the approximated and the accurately determined total required returns increases.

Inflation Estimated By	BLS	Williams	Ranson
Inflation Rate (i)	2.2	5.3	8.2
Real Rate of Return Required (r)	3.0	3.0	3.0
i + r (approximate nominal rate)	5.2	8.3	11.2
$1 - [(1+i)(1+r)]$ ("accurate" nominal rate)	5.3	8.5	11.5

The effect of these differences is magnified as the investment horizon increases. The next table shows the effect on the value of \$1 compounded for 10, 20, and 30 years at the various nominal total required returns determined for each inflation estimate. The first-rate of return in each pair is the approximated return, and the second rate is more accurately determined.

Implications for the GDP

The GDP is one of many economic indicators investors can use to gauge the growth rate and strength of an economy. The CPI plays a vital role in the determination of the real GDP. Therefore, manipulation of the CPI could imply manipulation of the GDP because the CPI is used to deflate some of the nominal GDP components for the effects of inflation. CPI and GDP have an inverse relationship, so a lower CPI—and its inverse effect on GDP—could suggest to investors that the economy is stronger than it really is.

CPI and Government Spending

Governments also use CPI to set future expenditures. Many government expenses are based on the CPI and, therefore, any lowering of the CPI would have a significant effect on future government expenditures.

A lower CPI provides at least two major benefits to the government:

1. Many government payments, such as Social Security and the returns from TIPS, are linked to the level of the CPI. Therefore, a lower CPI translates into lower payments—and lower government expenditures.⁶
2. The CPI deflates some components used to calculate the real GDP—a lower inflation rate is reflective of a healthier economy. In other words, if the true rate of inflation is higher than the CPI as the government calculates it, then an investor's real rate of return will be less than originally expected as the unplanned amount of inflation eats away at gains.

Factors Adding to the Controversy

Many of the factors contributing to the CPI controversy are shrouded in complexities related to statistical methodology. Other major contributors to the controversy hinge on the definition of inflation and the fact that inflation must be measured by proxy.

The BLS describes the CPI as a measure of the average change in the price of goods and services purchased by households over time on an average day-to-day basis.⁷ The BLS uses a cost of living framework to guide its decisions regarding the statistical procedures used to determine the CPI. This framework means that the inflation rate indicated by the CPI reflects the changes in the cost of living or the cost of maintaining a fixed standard of living or quality of life. In other words, it is a cost-of-living index.⁸

The procedures used by the BLS to calculate the CPI are presented in detail in the *BLS Handbook of Methods*, Chapter 17, titled "The Consumer Price Index".⁹

CPI and Consumer Behavior

To illustrate a simplified example of the effect of the CPI on consumer behavior and its different calculation methodologies, assume the following scenario where substitution happens at the item level within a category in keeping with the BLS methodology.

Suppose that the only consumer good is beef. There are only two different cuts available - filet mignon (FM) and t-bone steak (TS). In the prior period, when prices and consumption were last measured, only FM was purchased, and the price of TS was 10% less than the price of FM. When next measured, prices had increased by 10%. A set of prices have been constructed to reflect this scenario and are presented in the table below.

Product	Price Per Pound Before Increase	Price Per Pound After Increase	Price Increase
Filet Mignon	\$12.00	\$13.20	10%
T-Bone Steak	\$10.00	\$11.00	10%

The CPI, or inflation, for this contrived scenario, is calculated as the increase in the cost of a constant quantity and quality of beef, or a fixed basket of goods. The inflation rate is 10%. This is essentially the way the CPI was originally calculated by the BLS, and it is the methodology used by Williams. This method is unaffected by whether consumers change their buying habits in response to a price increase.

The current BLS methodology of calculating CPI takes into account changes in consumer purchasing preferences. In the simplified example presented, if there is no change in consumer behavior, then the calculated CPI would be 10%. This result is identical to that obtained with the fixed basket method used by Williams. However, if consumers change their purchasing behavior and fully substitute TS for FM, the CPI will be 0%. If consumers reduce their purchases of FM by 50% and purchase TS instead, the BLS calculated CPI will be 5%.

The previous calculations showed that the CPI methodology used by the BLS, given the scenario and consumer behaviors described above, result in a CPI that depends on consumer behavior. Furthermore,

an inflation level that is lower than an observed price increase can be measured. Although this example is contrived, similar effects in the real world are definitely within the realm of possibility.

What Should Investors Do?

Investors could use the official CPI numbers, accepting the government reported figures at face value. Alternatively, investors are faced with choosing either Williams' or Ranson's measure of inflation, implicitly accepting the argument that the officially reported figures are unreliable. Therefore, it is up to investors to become informed on the topic and take their own stance on the issue.

Different CPI levels for a single price increase, depending upon consumer behavior, can be calculated using the BLS methodology, and it is not implausible that, depending upon consumption patterns, different rates of inflation may be experienced by a consumer. Therefore, the answer may be investor-specific.