Order Code RS22705
August 15, 2007

CRS Report for Congress

Inflation: Core vs. Headline

Marc Labonte
Specialist in Macroeconomic Policy
Government and Finance Division

Summary

Inflation measures the rate of change in all prices. Maintaining low and stable inflation is one of the primary goals of macroeconomic policy. But how should inflation be measured? Policymakers, particularly at the Federal Reserve, often refer to *core* inflation in their policy decisions. Core inflation is commonly defined as a measure of inflation that omits changes in food and energy prices. Some policymakers prefer to use core inflation to predict future overall inflation because food and energy price volatility makes it difficult to discern trends from the overall inflation rate. A drawback of an over-reliance on core inflation, however, is that an extended period of rapidly rising energy prices could cause all other prices to accelerate. A focus on core may cause policymakers to fail to react to such a rise in inflation until it is too late. This scenario may have occurred recently. Furthermore, several studies have failed to find core inflation to be a good forecaster of future inflation, casting doubt on the very rationale for relying on it. This report will not be updated.

Inflation, the general rise in the prices of goods and services, is important to policymakers for several reasons.[1] First, rising inflation is unpopular with the public, in part because some households are more adversely affected by inflation than others. Second, high or rising inflation can reduce productivity by distorting price signals, so that it is hard for businesses to tell if prices are changing in relative terms, and by individuals wasting resources in order to maintain the purchasing power of their wealth. Finally, inflation plays a key role in macroeonomic stabilization policy. Changes in inflation often indicate changes in the business cycle — rising inflation is often a sign that the economy is overheating and falling inflation is a sign that the economy is sluggish. The Federal Reserve (Fed) is mandated to keep inflation low and stable, and alters interest rates in order to do so.[2]

---

[1] For more information, see CRS Report RL30344, *Inflation: Causes, Costs, and Current Status*, by Marc Labonte and Gail Makinen.

[2] For more information, see CRS Report RL30354, *Monetary Policy and the Federal Reserve*, by Marc Labonte and Gail Makinen.

In recent years, the Fed has focused attention on the *core* rate of inflation, a measure of inflation that excludes food and energy prices, in explanations of its policy decisions. For example, in July 2007, the third sentence of the 10-sentence Federal Open Market Committee statement summarizing the committee's policy decision read, "Readings on core inflation have improved modestly in recent months." In Fed Chairman Ben Bernanke's July 2007 testimony to Congress, he stated that "Food and energy prices tend to be quite volatile, so that, looking forward, core inflation...may be a better gauge than overall inflation of underlying inflation trends." When core inflation approached 3% in 2006, Chairman Bernanke said that it had "reached a level that, if sustained, would be at or above the upper end of the range that many economists, including myself, would consider consistent with price stability...."[3] This report defines core inflation, reviews recent trends, and analyzes the advantages and drawbacks of using core inflation.

Definition

No official measure of "inflation" exists. Inflation is measured as the percent change in a price index. Several indices track price changes, with each data series measuring something different. The most commonly cited measure of inflation is the percent change in the consumer price index (CPI).[4] This index measures the price of a basket of consumer goods and services that is representative of overall consumer purchases in urban areas. When food and energy prices are omitted from the CPI, the remaining basket is commonly referred to as the *core CPI*. The overall measure of CPI, which includes food and energy, is often referred to as the *headline CPI*. Another common measure of inflation is the percent change in the *GDP (gross domestic product) price deflator*, which is used to transform nominal GDP into real GDP. Since the GDP deflator is based on the prices of all goods and services in the economy, it is a broader measure of inflation than the CPI. A subset of the GDP deflator that is conceptually similar to the CPI, but includes more items and areas, is the *personal consumption expenditures (PCE) price deflator*; for technical reasons, the Fed sometimes prefers this measure to the CPI in their analyses. Core measures of the GDP and PCE deflators are also available.

Conceptually, core inflation could be any measure of inflation that attempts to strip out price volatility, but the most common definition of core strips out only two particularly volatile categories of goods, food and energy. The four most volatile items in the CPI are all food or energy products.[5] The standard deviation of energy prices is estimated to be 12 times higher than overall inflation.[6] Omitting food and energy prices

---

[3] Chairman Ben S. Bernanke, "Panel Discussion: Comments on the Outlook for the U.S. Economy and Monetary Policy," at the International Monetary Conference, Washington, DC, June 5, 2006.

[4] For more information, see CRS Report RL30074, *The Consumer Price Index: A Brief Overview*, by Brian W. Cashell.

[5] Todd Clark, "Comparing Measures of Core Inflation," Federal Reserve Bank of Kansas City, *Economic Review*, 2002:2, p. 5. The four most volatile items are fuel oil, motor fuel, meats and dairy products, and fruits and vegetables.

[6] Seamus Smyth, "Why Care About Core?," Goldman Sachs, *U.S. Daily Financial Market* (continued...)

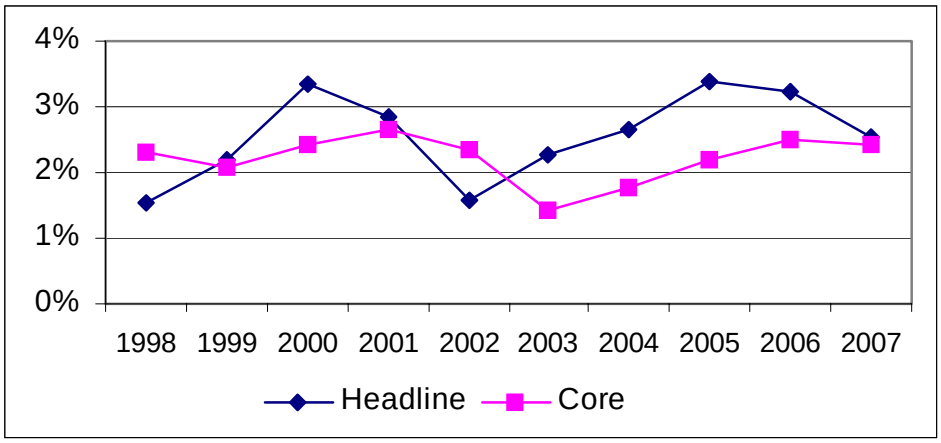
from the CPI is not a trivial modification — food and beverages accounted for 15% of the headline CPI basket, and energy accounted for an additional 9% in 2006.

While excluding food from core inflation has become conventional, it may no longer be warranted. The volatility of food has decreased significantly since the 1970s.[7] Clearly, the recent divergence between headline and core inflation has been driven by energy prices. If food prices are no longer volatile, then policymakers may be losing useful information by omitting them.

Recent Inflation Trends

In recent years, headline inflation has typically outpaced core inflation, as seen in **Figure 1**, because of the rapid rise in energy prices. The difference between the two has not always been trivial — from 2003 to 2006, core inflation was 0.9 percentage points lower than headline. Considering that the Fed judges 2% inflation to be on the low side and 3% inflation on the high side, the definition used in these years would have arguably strongly colored their policy stance. The difference between core and headline inflation over this period was overwhelmingly the result of energy prices, which rose by an average of 12.8% a year as measured by the CPI.

Figure 1. Inflation Rate, 1998-2007



Source: Bureau of Labor Statistics
Note: Data for 2007 is calculated as the percent change from the first half of 2006 to the first half of 2007.

[6] (...continued)
Comment, September 7, 2006.

[7] William Gavin and Rachel Mandal, "Predicting Inflation: Food for Thought," Federal Reserve Bank of St. Louis, *Regional Economist*, January 2002.

When Should Headline Inflation Be Used?

When comparing purchasing power over two time periods, headline inflation is the relevant measure. Comparisons over time of wages, wealth, rates of return, government transfers such as Social Security payments, and so on should all use a headline measure of inflation, because all of these concepts depend on a broad measure of inflation. For example, adjusting household income by core inflation would not be useful since food and energy consumption account for about one-quarter of average household expenditures. Similarly, government programs and parts of the tax code that are adjusted for inflation are based on headline inflation. Economic growth is also calculated by first adjusting GDP by headline inflation.

When Should Core Inflation Be Used?

Core inflation is used by policymakers for the reason offered by Chairman Bernanke in the introduction — policymakers are most concerned about the future path of inflation, and current core inflation data may give better information than current headline data about future headline inflation. Headline inflation often does not have good predictive power over short-time periods because food and energy prices are so volatile. For example, the monthly headline inflation rate varied between -6.3% and 7.5% in 2006 at annualized rates, whereas the core rate varied between 1.2% and 3.6%.[8] Policymakers are concerned with future inflation because of lags between a change in policy and its effect on the economy. In essence, it is already too late for policy to influence current inflation, a policy change today can only affect future inflation.

Theoretically, short-term changes in inflation can be caused by the supply-side or demand-side of the economy. When rising inflation is demand-driven, it means that spending is growing too quickly in the overall economy, and production cannot keep pace. This phenomenon is captured in the famous saying "too much money chasing too few goods." The Fed's task is to counteract this by raising interest rates in order to reduce the growth rate of interest-sensitive spending. Likewise, if spending is rising too slowly, inflation will fall, which the Fed can counteract by reducing interest rates.

In the short run, the overall inflation rate can also be affected by sharp price changes of individual goods caused by supply shocks. For example, bad weather can drive up food prices or a reduction in the oil supply can drive up energy prices. Since these supply shocks are temporary, they should not have any lasting effect on inflation (holding aggregate spending constant), in which case they can be ignored by policymakers. In the long run, price shocks on the supply side should cancel each other out (since, across all goods, there will be an equal number of positive and negative surprises), and average inflation should be completely demand driven.

---

[8] Of course, volatility is lower over longer time horizons, so policymakers also judge inflationary pressures by looking at, say, the 12-month change in inflation rather than the one-month change. In 2006, the 12-month change in headline inflation varied between 1.3% to 4.3%, and 12-month core inflation varied between 2.1% and 2.9%.

Ideally, policymakers would like to be able to identify whether any change in inflation was demand-driven or supply-driven. Unfortunately, there is no straightforward way to do this, so they have commonly used core inflation as a proxy for demand-driven inflation, reasoning that food and energy are two sectors of the economy that are most susceptible to supply shocks. Furthermore, policymakers are particularly concerned with inflationary expectations, and a rising core rate may be a better sign than rising headline that inflationary expectations have risen.

Relying on core inflation for policymaking has its drawbacks, however. There is no inherent reason that changes in food and energy prices cannot be caused by changes in aggregate demand. For example, rapid spending growth could push up energy prices if supply does not rise in response. In fact, an argument has been made that a change in aggregate demand would first show up in price changes of goods that have flexible pricing, such as commodities that are traded on financial markets where prices change continually to clear the market.[9] Both energy and basic foodstuffs are traded on financial markets, although the CPI measures final food and energy products, not basic commodities.

Furthermore, a rise in the price of any one good need not lead to a change in inflation if the prices of other goods fall to offset it. Technically, if a rise in one price leads to a rise in overall inflation, it must be because of some accommodation on the Fed's part (because it did not raise interest rates enough to induce other prices to fall). Most economists believe that some accommodation to relative price changes is desirable because it reduces the volatility of economic growth, whereas zero accommodation could lead to needless disruptions in economic activity. But if the Fed accommodates a rise in the price of one good too much, then the price of all goods could start rising. In other words, a rise in headline inflation could feed through to higher core inflation. This scenario occurred in the 1970s where rising energy prices resulted in a rise in total inflation.

In scenarios like this one, a focus on core inflation could forestall a needed policy change until it is too late. Indeed, a case can be made today that more of a focus on headline inflation would have avoided the persistent upward trend in core inflation that has occurred from 2003 to 2007 and brought core inflation above the Fed's self-defined "comfort zone." The weakness with the focus on core inflation is that when energy prices rise continually for a period of several years, they no longer represent random price fluctuations that offer no useful information about future inflation. As a result, too much monetary policy accommodation may have taken place recently, causing the economy to overheat. Future events will reveal if this is the case, or if the rise in core inflation can be painlessly reversed without a recession.

In the end, the question of what measure of inflation is best for policymaking is an empirical one. One study found that "no core measure does an outstanding job forecasting [headline] CPI inflation...we find no strong evidence to suggest that a selected core measure will be able to retain its usefulness as a tool to forecast inflation for any given

---

[9] Brian Motley, "Should Monetary Policy Focus on Core Inflation?," Federal Reserve Bank of San Francisco, *Economic Letter*, no. 97-11, April 1997.

period..."[10] Another study did not find a statistically significant relationship between core inflation and future headline inflation, although the relationship becomes significant when limited to a more recent time period.[11] Two other studies found that headline inflation is a better predictor of future headline inflation than core inflation.[12] An explanation for this finding is that during the past 10 years, changes in core inflation have tended to lag behind changes in headline inflation as illustrated in **Figure 1**. One study found that a core measure that excludes only energy was a better predictor of future inflation from 1983 to 2001 than a measure excluding food and energy. In fact, that study found food prices to be a better predictor of future inflation than any other measure, including core inflation.[13] Some studies suggest that there may be more sophisticated measurements that are better gauges of underlying inflationary pressures than the standard definition of core inflation.[14] Core inflation has the advantage from a policy perspective, however, of being transparent, whereas the more sophisticated measurements could be hard for the public to understand and open to accusations of data mining or manipulation. While this advantage may make core inflation a useful tool for communicating Fed policy to the public, the empirical evidence suggests it to be, by itself, an inadequate tool for policymaking.

---

[10] Robert Rich and Charles Steindel, "A Review of Core Inflation and an Evaluation of Its Measures," Federal Reserve Bank of New York, staff report no. 236, December 2005. The study examines the forecasting power of inflation less food and energy, as well as alternative definitions of core inflation that have been proposed by others.

[11] Todd Clark, "Comparing Measures of Core Inflation," Federal Reserve Bank of Kansas City, *Economic Review*, 2002:2, p. 5.

[12] Michael Bryan and Stephen Cecchetti, "Measuring Core Inflation," in N. Gregory Mankiw, ed., *Monetary Policy* (Chicago: University of Chicago Press, 1994), p. 195; and Julie Smith, "Weighted Median Inflation: Is This Core Inflation?," *Journal of Money, Credit, and Banking*, April 2004, vol. 36, no. 2, p. 253. Both studies compared the forecasting ability of many measures of inflation, and concluded that a weighted median measure of inflation performed best.

[13] William Gavin and Rachel Mandal, "Predicting Inflation: Food for Thought," Federal Reserve Bank of St. Louis, *Regional Economist*, January 2002.

[14] Economists have tried to find the best measure of core inflation according to different criteria. See Timothy Cogley, "A Simple Adaptive Measure of Core Inflation," *Journal of Money, Credit and Banking*, vol. 34, no. 1, February 2002, pp. 94-113; Danny Quah; Shaun P. Vahey, "Measuring Core Inflation," *The Economic Journal*, vol. 105, no. 432, September 1995, pp. 1130-1144; Michael Bryan and Stephen Cecchetti, "Measuring Core Inflation," in N. Gregory Mankiw, ed., *Monetary Policy*, (Chicago: University of Chicago Press, 1994), p. 195; Todd Clark, "Comparing Measures of Core Inflation," Federal Reserve Bank of Kansas City, *Economic Review*, 2002:2, p. 5.