



**The Northern Trust Company**  
**Economic Research Department**  
**Positive Economic Commentary**

*"The economics of what is, rather than what you might like it to be."*

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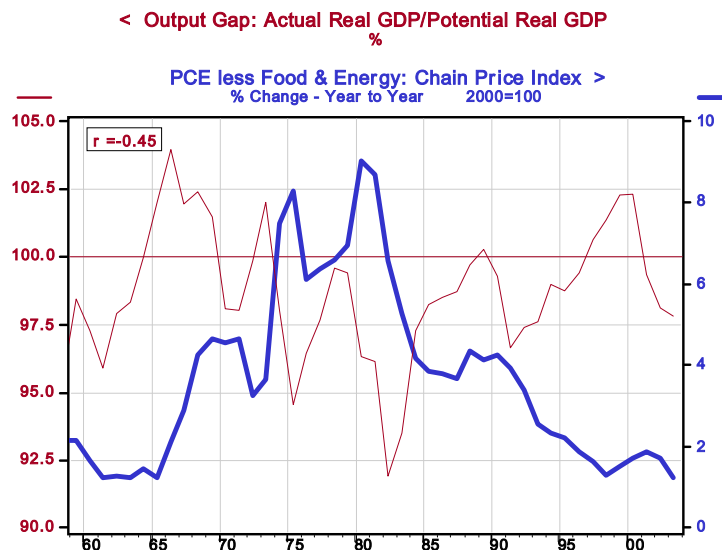
## **The Well-Known Relationship Between The Output Gap And Inflation**

One of the arguments advanced in favor of continued low and/or declining inflation is the wide output gap that exists today. The output gap refers to the difference between actual real GDP and some estimate of the economy's *potential* real GDP. Potential GDP is thought to be a function of expected productivity and the expected labor force. It is well known that the wider the output gap today, the higher will be inflation tomorrow. To quote Professor Peter H. Lindert, who, in turn, was quoted in Thursday's New York Times on a different economics matter, **"Well known – but unsupported by statistics and history."**

The logic behind the output gap hypothesis is straightforward. If actual real GDP persists in exceeding potential real GDP, then upward pressure will be put on production costs, especially labor costs, which will lead to higher prices of goods and services. In other words, if aggregate demand persistently exceeds aggregate supply, then the aggregate of the prices of goods and services will rise. To examine this well-known relationship, I have calculated the output gap as the level of real GDP as a percent of the Congressional Budget Office's estimate of the level of potential real GDP. Again, the hypothesis is that the higher this percentage, the higher will be inflation.

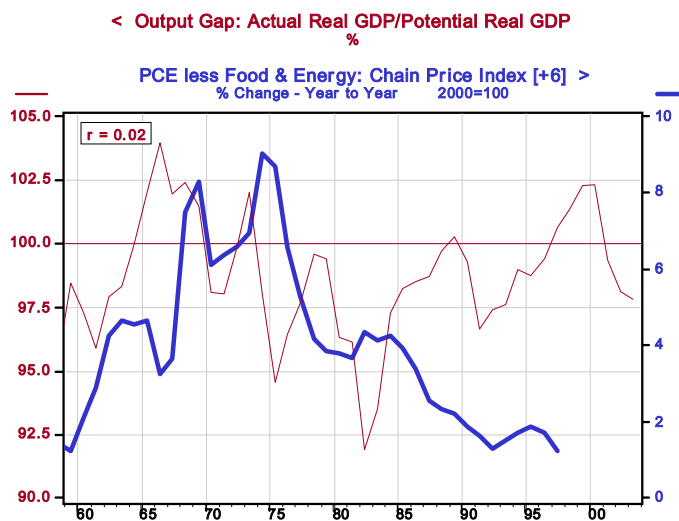
Output-gap data and inflation data – the Fed's favorite measure, the year-over-year percent change in the core Personal Consumption Expenditures chain price index -- are shown in Chart 1 along with their correlation coefficient. The absolute value of the correlation coefficient is 0.45 out of a possible 1.00. I've seen worse. The problem is that the *sign* in front of the correlation-coefficient value is a *minus*. The hypothesis is that the output gap and inflation are *positively* correlated, not negatively correlated, as it turns out.

Chart 1



Not to worry, right? Perhaps the output gap *leads* inflation. So, if we lag inflation relative to the output gap, we will find a positive correlation between the two. Sure enough, that is the case, as shown in Chart 2. When the output gap leads inflation by *six years*, a positive correlation coefficient *finally* emerges. But the absolute value of that coefficient correlation is only *0.02*, which is close enough to zero for government-policy work. The highest positive correlation, between the output gap and inflation, 0.45, occurs when the output gap leads inflation by a whopping *12 years*. Somehow I do not see the Federal Reserve explaining to the American people that it is raising or lowering the fed funds rate today in order to affect inflation 12 years from today.

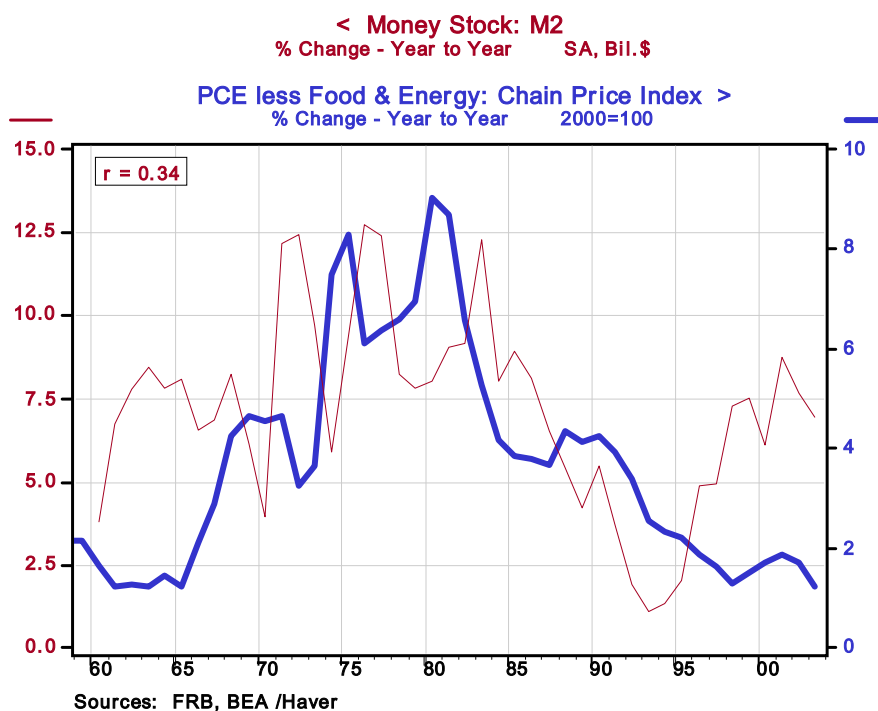
Chart 2



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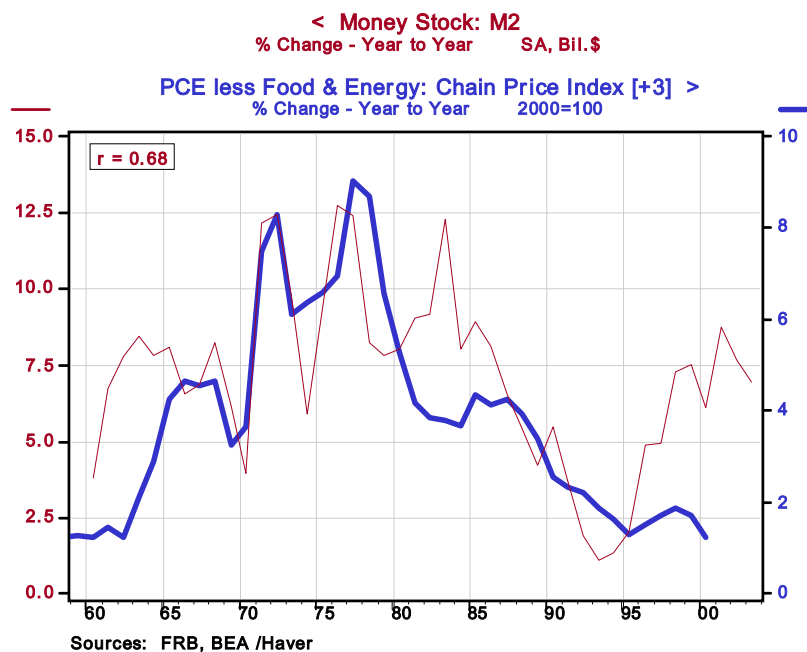
Inflation used to be defined as an increase in the money supply. Increases in the prices of goods and services were thought to be the *result* of inflation, i.e., an increase in the money supply. It is curious, then, that so few analysts today, including those at the Fed, look for a relationship between the money supply and various price indices. So, let's be old-fashioned and look for such a relationship. Chart 3 shows that the correlation coefficient between year-over-year percent changes in the nominal M2 money supply and core PCE inflation is *positive* 0.34 on a contemporaneous basis. Well, the sign is right even if the absolute value of the coefficient is not all that high.

**Chart 3**



Now let's see by how many years M2 growth has to lead inflation to get the highest positive correlation coefficient. Will it take 12 years, as was the case with the output gap? Hardly. Chart 4 shows that the highest positive correlation between M2 growth and inflation, 0.68, occurs at only *three* years.

Chart 4



Now, I would have a difficult time picturing a highly-discretionary Fed, such as the current one, buying into a three-year policy horizon. But a more humble Fed, one that believed that its printing money created higher prices of goods and services rather than real wealth, might be willing to move the funds rate today in order to affect the speed at which prices change three years from now. No, let me rephrase that. This more humble Fed might change the *money supply* today in order to affect inflation three years from now. This more humble Fed would probably do away with interest-rate targeting altogether. But humble or arrogant, the data show that a Fed that is basing its monetary policy on an output-gap indicator is misguided.

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