

# General Discussion

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I'll use my discussion time to make a simple argument that in a low inflation environment further improvements in reducing the variances of inflation and employment will require increased attention to informal, or anecdotal information. Before developing that argument, I offer the usual Fed disclaimer that the views I express here are mine and do not necessarily reflect official positions of the Federal Reserve System. I thank my colleagues at the Federal Reserve Bank of St. Louis for their comments, especially Robert Rasche, but I retain full responsibility for errors.

Central bankers around the world are currently faced with a challenge not experienced in over 40 years: maintaining low and stable inflation now that it has been achieved for more than a passing quarter or two. In the aftermath of the Great Inflation, the primary objective of monetary policy was clear and distinctly one-sided: Bring inflation down to achieve a low and stable long-term rate of inflation. In the early 1990s, inflation subsided to levels that are widely regarded as roughly consistent with price stability, and the short-run volatility of inflation became substantially smaller. This observation applies to countries that adopted formal inflation targets and to countries such as the United States where monetary policy inflation objectives are asserted only qualitatively.

Today central banks are concerned with two-sided risk with respect to their inflation objective. On the one hand, no one wants to see an upward drift of inflation,

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either sudden or gradual, and on the other hand no central bank wants a systemic deflationary environment. In the United States it is likely that the inflation rate bottomed out in 2003, around the time that the FOMC expressed concern that " the probability of an unwelcome substantial fall in inflation, though minor, exceeds that of a pickup in inflation from its already low level."<sup>1)</sup>

Now, approximately three years later, after a period of strong economic growth in many parts of the world and demand driven increases in energy prices, the perceived risk has shifted in the other direction. The current assessment of the FOMC is summarized in its statement following its meeting in May 2006:

As yet, the run-up in the prices of energy and other commodities appears to have had only a modest effect on core inflation, ongoing productivity gains have helped to hold the growth of unit labor costs in check, and inflation expectations remain contained. Still, possible increases in resource utilization, in combination with the elevated prices of energy and other commodities, have the potential to add to inflation pressures.<sup>2)</sup>

Meeting the challenge of sustaining a low-inflation environment may require new approaches to policy analysis. Policymakers understand that their actions do not generate immediate responses in the economy, which is why they must look out into the future. Perfect foresight may be a useful construct for theoretical analyses, but policymakers in practice must make their decisions with full knowledge of the normal range of forecast errors. Economic forecasts are rooted in statistical models estimated from historical data and the model forecasts are then modified, often substantially, through the application of expert judgment. Experience indicates that forecasting inflation is hardly precise and that forecasting models are not robust.

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1) FOMC Press Release, May 6, 2003.

2) FOMC Press Release, May 10, 2006.

Stock and Watson summarize their experiments with numerous forecasting models for inflation across seven industrial economies:

These forecasting successes, however, are isolated and sporadic. For example, the seasonal no-change forecast works well in the United States in the second period but poorly in the first, a similar pattern as in Canada (but the opposite pattern as in the United Kingdom).<sup>3)</sup>

The only set of predictors that usually improves upon the AR [autoregressive] forecasts is the measures of economic activity. For example, the IP [Industrial Production] and unemployment gaps both improve on the AR (or are little worse than the AR) for both periods for Canada, Germany, and the United States. Even for these predictors, however, the improvement is neither universal nor always stable.<sup>4)</sup>

Economists have long understood that control theory implies that the more successful a central bank is in achieving and maintaining a low inflation environment, the smaller are the correlations between the control objective here, the inflation rate and the instruments that a policymaker has available to affect the economy. Years ago Solow and Kareken provided a straightforward illustration of this proposition:

Suppose that by heroic (and perhaps even cyclical) variation in the money supply and its rate of change, the Federal Reserve manages deftly to counter all disturbing impulses and to stabilize the level of economic activity absolutely. Then an observer following the Friedman method would see peaks and troughs of monetary change accompanied by a steady level of aggregate activity. He would presumably conclude that monetary policy has no effects at all, which would be precisely the

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3) J.H. Stock and M.W. Watson, "Forecasting Output and Inflation: The Role of Asset Prices," *Journal of Economic Literature*, September, 2003, 41, p. 805.

4) J.H. Stock and M.W. Watson, "Forecasting Output and Inflation: The Role of Asset Prices," *Journal of Economic Literature*, September, 2003, 41, p. 808.

opposite of the truth.<sup>5)</sup>

The observation that correlations are changing or disappearing does not mean that the economy has fundamentally changed. In particular, it is likely that the correlation between the growth of monetary aggregates and the inflation rate (or even nominal income growth) will be small in low inflation environments. Yet central bankers who fail to monitor the growth rates of monetary aggregates do so at their own peril. History illustrates that rapid and accelerating monetary growth, positive or negative, is a recipe for the demise of the low inflation regime into inflation or deflation. Just because a low inflation environment has been established, central bankers cannot print money without restraint. Large correlations, then, provide evidence that the central bank has failed to exploit relevant information; as policy becomes more effective, correlations tend toward zero.

In a low inflation environment, the stability of expectations of long-run inflation is certainly one, and perhaps the single most important, element in the continued success of the low inflation policy. Of first importance is that such expectations remain "well contained" or "well anchored." In rational expectations models of the macroeconomy, monetary policy rules specified with a nominal interest rate instrument require a constant expected long-term (or equilibrium) expected rate of inflation to assure the existence of an equilibrium rate of inflation. The familiar "Taylor Rule" contains a  $\pi^*$  term, the desired rate of inflation of the monetary authorities. Note that in the Taylor Rule the term is  $\pi^*$  not  $\pi_t^*$ .<sup>6)</sup> In such models,  $\pi^*$

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5) R. M. Solow and J. Kareken, "Lags in Monetary Policy", in A. Ando, E.C. Brown, R.M. Solow and J. Kareken, "Lags in Fiscal and Monetary Policy," in Commission on Money and Credit, *Stabilization Policies*, Englewood Cliffs NJ: Prentice-Hall, 1963, p. 16.

6) There is an ongoing debate in the monetary policy literature over "instrument rules" versus "targeting rules." See for example, B.T. McCallum and E. Nelson, "Targeting versus Instrument Rules for Monetary Policy," *Federal Reserve Bank of St. Louis Review*, September/October 2005, 87(5), pp.597-612 and L.E.O. Svensson, "Targeting versus Instrument Rules for Monetary Policy: What is Wrong with McCallum and Nelson?" *Federal Reserve Bank of St. Louis Review*, September/October 2005, 87(5), pp.613-626. In both approaches it is important that the policy rules specify  $\pi^*$ , not  $\pi_t^*$ .

is the "anchor" on which the long-term expected inflation rate of private agents is based. If the inflation objective is time-varying, or is perceived by private agents as time-varying, then long-term inflation expectations become unglued and the inflation rate will not remain low and stable; indeed depending on how the desired inflation rate of the policymakers is perceived inflation can become a self-fulfilling explosive process.

Such models provide insight into how to conduct monetary policy that will successfully sustain a low and stable inflation environment: the monetary authorities must clearly communicate their inflation policy objectives. The communication must be symmetric: private agents must understand what rates of inflation are unacceptably high and what are unacceptably low to the central bank. Central banks that announce explicit numeric inflation objectives go a long way towards satisfying this communication objective. However announcements must be confirmed by deeds. Central banks must demonstrate that they are prepared to act decisively against sustained deviations from their announced objective. Further to preserve the credibility of the announced inflation objective, changes in the announced objective must be undertaken sparingly and infrequently, and certainly not in directions away from low rates of inflation. If the central bank loses credibility with respect to the announced inflation target, then long-term inflation expectations of private agents will become disconnected from the target and the economy will begin to drag its nominal anchor.

Central bankers may be reluctant to take decisive policy actions as actual inflation approaches a perceived boundary of price stability because of their imprecise forecasts of inflation and economic activity. Faced with an uncertain view of the future, the natural tendency of policymakers is to wait for further information on the state of the economy. In the absence of decisive policy actions, central bankers may be able to stabilize long-term inflation expectations by clarifying their vision of price stability. The text in the Minutes of the May 2003 FOMC meeting is an example of such a clarification:

Given the pressure of a considerable amount of unused resources, any adverse developments that held down economic expansion would increase the probability of further disinflation. Members commented that substantial additional disinflation would be unwelcome because of the likely negative effects on economic activity and the functioning of financial institutions and markets, and the increased difficulty of conducting an effective monetary policy, at least potentially in the event the economy was subjected to adverse shocks.<sup>7)</sup>

Note that these minutes provide symmetry to the concerns of FOMC participants about inflation: they reveal that the implicit inflation objective of the Committee evaluated downside as well as upside risk.

A difficult question facing central bankers is how to judge when inflation expectations remain anchored. One way to approach this question is to ask what critical data might be expected to show different characteristics when inflation expectations are "well anchored" compared to when they are coming unglued. Most such data will require direct or indirect measures of inflation expectations. Survey data on inflation expectations provide some evidence, but typically have limitations such as small sample size, nonscientific sample design and a restricted population from which survey respondents are drawn. The introduction, over the past decade in a number of countries, of inflation-indexed long-term government debt instruments and the emergence of liquid secondary markets in such securities offers additional information.

In an economy with well-anchored inflation expectations, it can be expected that those expectations would not be highly responsive to changes in the observed rate of inflation. A limitation of survey data in this respect is that historically they have been characterized by strong persistence. For example, in the 34 quarterly Surveys of Professional Forecasters conducted by the Federal Reserve Bank of Philadelphia since the second quarter of 1998, the average 10 year-ahead forecast of CPI inflation

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7) *Minutes*, FOMC Meeting of May 6, 2003, [www.federalreserve.gov/fomc/minutes/20030506.htm](http://www.federalreserve.gov/fomc/minutes/20030506.htm).

has differed from 2.5 percent on only five occasions. On those five occasions, the range of the average forecast was from 2.3 percent to 2.6 percent.

In contrast, with highly liquid markets for both nominal and indexed government debt of comparable maturity, it is possible to observe both real interest rates and inflation compensation. If inflation expectations are well-anchored, the correlation between changes in yields on nominal securities and indexed securities should be quite high. At the opposite end of the spectrum, if inflation expectations become unanchored, then the correlation between changes in these yields should be much lower. In the extreme of highly unstable inflation expectations, changes in nominal yields will be dominated by changes in inflation expectations and the correlation of changes in nominal and real yields will approach zero.

In the absence of precise statistical forecasting models, another potentially useful source of information to assess the stability of inflation expectations and the likely course of the real economy is real-time anecdotal information. The drawback of anecdotal information is that there is no scientific basis for the sample. Yet the accumulation of forward-looking anecdotal information at critical times can be informative. An example can be drawn from the recently released transcripts of the FOMC meetings of October, November and December, 2000. At that time, the best inference from statistical forecasting models was that economic growth in the U.S. would gradually slow from the very high rate of the first half of the year to rates that were regarded as more sustainable. Yet, also at that time more and more FOMC participants were reporting stories indicating sharply slowing conditions from an ever increasing number of respondents. We now measure real growth in the second half of 2000 as less than 1 percent (annual rate), with negative growth in the third quarter. In this instance the anecdotes gave a better early warning signal of the turn in activity than did the forecasting models.

A similar situation may prevail today. Statistical studies to detect pass-through from recent energy price increases have failed to show significant effects in U.S. price data but stories about widespread pass-through are becoming increasingly

common. We may and I emphasize "may" because my purpose is to make a general point and not to conduct a full analysis of the current situation face more inflation pressure than currently shows up in formal data. The general point is that the more successful are policymakers in exploiting regularities in formal data, the more they will have to rely on anecdotal information to make further progress in stabilizing inflation. Refining collection and analysis of anecdotal information promises earlier policy responses to changing economic conditions. The Federal Reserve already devotes substantial resources to making judgmental adjustments to its formal forecasting model but my hunch is that there will be significant improvements in policy analysis from strengthening our sources of anecdotal information.