

## MONETARY POLICY INSIGHTS POLICY FOCUS



### MONEY AND MONETARY POLICY

*The ECB held a conference last week on the role of money in monetary policy that included remarks by Fed Chairman Ben Bernanke and ECB President Jean Claude Trichet.<sup>1</sup> A review of the discussion at this conference provides an opportunity to answer a question we are often asked: What is the role of money in U.S. monetary policy? As a Federal Reserve governor, I suggested that there was virtually no role for the monetary aggregates in the current approach to monetary policy at the Fed. Bernanke's comments at this conference, while softer, confirm this conclusion. This commentary reviews the reasons why money growth is not taken into consideration in U.S. policy decisions and then turns to the question of why the ECB places greater value on the monetary aggregates.*

#### CLASSICAL THEORY, MONETARISM, AND THE ROLE OF MONEY

The late Milton Friedman has taught us that inflation is always and everywhere a monetary phenomenon, and it would be hard to find a central banker today who disagrees with that assessment. Yet central banks almost universally set policy directly in terms of a short-term interest rate, and the role of money in monetary policy has clearly diminished at most central banks. The remaining role of money in the setting of the policy rate clearly varies significantly across central banks today, and the Fed and the ECB are perhaps the polar ends of that spectrum: money has virtually no role at the Fed but has a continuing and very explicit role at the ECB. The difference in rhetoric and perhaps in practice as well made the participation of Bernanke at the ECB conference particularly interesting.

The underpinning of a role of money in monetary policy is standard macroeconomic theory, beginning with virtually the earliest writing about macroeconomics. Classical macroeconomics focused on long-run properties of the economy, and core elements of classical theory were "neutrality" and the "quantity theory of money." The "neutrality" theorem held that money is neutral in the long run, meaning that changes in the money supply do not affect the equilibrium values of real variables such as the level of output and employment. The quantity theory of money held that the price level was pinned down by the money supply, with the aggregate price level changing in proportion to the change in the money supply.

<sup>1</sup> The conference was the 4<sup>th</sup> ECB central banking conference on "The role of money: money and monetary policy in the 21<sup>st</sup> century," held on November 10, 2006. Bernanke's paper was entitled, "Monetary Aggregates and Monetary Policy at the Federal Reserve: A Historical Perspective." See also introductory remarks by Jurgen Stark, speeches by Jean Claude Trichet and Lucas Papademos, and the ECB staff paper by Bjorn Fischer, Michele Lenza, Huw Pill and Lucrezia Reichlin.

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A simple way of establishing the relationship between money and prices is the well known equation of exchange,

$$M V = P Q$$

where M is the money supply, V is the velocity of money (the ratio of nominal income to money), P is the aggregate price level, and Q is level of aggregate output. The right-hand side (P times Q) is also nominal income. If V is stable, then movements in the money supply should have a predictable and stable effect on nominal income.<sup>2</sup> In turn, since the level of output is determined by real forces (growth in the labor supply and long-term productivity trends) in the long run that are unrelated to the money supply (neutrality), there should also be a stable long-run relation between the money supply and the price level and hence between money growth and inflation (the quantity theory of money).

Of course, this equation is nothing more than a definition of velocity, and hence it only has content if velocity is predictable. Velocity reflects how much money people want to hold in relation to their income—it is basically a reflection of the forces that determine the demand for money. Whereas earlier models may have assumed that velocity is constant, more modern models try to determine a stable demand function for money. (For example, velocity can be affected by evolving financial practices and regulations, as well as by short-run factors such as the level of interest rates and other asset returns.) As long as the demand for money is a stable relationship with a small number of variables, neutrality and the quantity theory of money will generally hold in the long run.

The focus on the link between money growth and inflation tended to fall out of fashion as the Great Depression and Keynes' General Theory put more emphasis on the business cycle and stabilization policy. But as inflation began to increase in the mid 1960s and especially in the 1970s, and as Milton Friedman and his monetarist colleagues, including those at the St. Louis Fed, renewed emphasis on the theoretical linkage between money and inflation and provided new evidence on the empirical linkage, there was a renewed appreciation of the role of money growth as an ultimate source of inflation and an increase in the attention given to money growth in the implementation of monetary policy. The Fed started identifying monitoring ranges for the monetary aggregates as early as 1966, the Congress mandated that the Fed set explicit monitoring ranges for the monetary aggregates in 1977, and the FOMC briefly set an explicit operating role for the monetary aggregates in the implementation of its policy between 1979 and 1982 as part of the effort under Volcker to lower inflation.<sup>3</sup> But the influence of money in monetary policy at the Fed

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<sup>2</sup> The demand for money and hence velocity is generally viewed as depending on interest rates. But as long as the relation between velocity (the demand for money) and interest rates itself is stable, we can continue to glean important information about the future course of nominal income and inflation from the monetary aggregates. So it is the break-down of the stability of the demand for money—the relation of money, interest rates and income—that has more fundamentally undermined the usefulness of the monetary aggregates in monetary policy decision making.

<sup>3</sup> However, many observers recognize that the shift to monetary aggregates by Volcker from 1979 to 1982 was at least partly to provide political cover for raising the federal funds rate aggressively, rather than a serious belief that the aggregates were the appropriate policy instrument.

steadily diminished thereafter, and today the word money is rarely uttered at discussions of monetary policy strategy inside the Fed.

### WHO TOOK THE MONEY OUT OF MONETARY POLICY?

Two inter-related developments reduced the role of money in the implementation of monetary policy at the Fed. First, as the pace of deregulation and financial innovation accelerated in the 1970s, 1980s, and thereafter, velocity and the demand for money became more unstable and, as a result, the stability of the relation between the monetary aggregates and nominal income and prices was significantly undermined.<sup>4</sup> The instability in velocity was especially evident over shorter horizons, reducing the usefulness of monetary aggregates as an instrument or even as an intermediate target for monetary policy.

Second, and in part related to the evidence of instability of velocity and the demand for money, central banks turned to some short-term interest rate as the effective instrument of monetary policy. This is the case for central banks around the world today. Indeed, it was Bill Poole who wrote a classic paper in 1970 on the choice between some interest rate and the money supply as the effective instrument of monetary policy, arguing that the appropriate choice depends on the relative stability of the money demand equation and the linkages from interest rates to aggregate demand.<sup>5</sup>

Today, modern macro models often do not even include an equation for the demand for money or any monetary aggregates.<sup>6</sup> Instead, these models now include a policy rule that directly links the policy instrument—some short-term interest rate—to economic developments, specifically to the movement in output and inflation relative to the central bank's objectives.

The Taylor Rule

We continue to include a money demand equation and the money supply in our macro model. But this is really a historic relic in the model. The money demand equation is buried in a “post-simultaneous” block of the model. That means that money growth is determined only after income, prices, and interest rates are already determined in the other parts of the model, and there is no feedback from the money supply back to the economy. It remains true in modern macro models that, if the demand for money were stable, there would be a stable long-run relationship between money growth and inflation. But the focus is on the policy rule as a description of the conduct of monetary policy. Inflation is pinned down in these models not by some assumed steady rate of money growth, but by

<sup>4</sup> Initially, the financial innovations seemed centered on the introduction of new types of monetary aggregates that were substitutes for narrowly defined money, M1, leading to a slower than predicted increases in the narrow measure of the money supply. This led the Fed to abandon formal growth targets for M1 in 1987 and to increased interest in broader measures of the money supply, such as M2. However, over the years, the stability of relationships between M2 and nominal income and inflation have come into question, leading the FOMC to discontinue setting target ranges for M2 and other monetary aggregates after the statutory requirement for reported such ranges lapsed in 2000.

<sup>5</sup> William Poole, "Optimal Choice of Monetary Policy Instruments in a Simple Stochastic Macro Model," *Quarterly Journal of Economics*, 84 (May 1970), pp. 197-216.

<sup>6</sup> See, for example, Richard Clarida, Jordi Gali and Mark Gertler, "The Science of Monetary Policy: A New Keynesian View," *Journal of Economic Literature*, December 1999. The standard three equation modern macro model includes a dynamic IS curve, a Phillips curve with forward looking expectations, and a policy rule.

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an explicit inflation objective in the policy rule that ensures that the policy rate will be adjusted over time to ensure that inflation converges to its objective.<sup>7</sup>

Nevertheless, many central banks, including the Fed, continue to see a potential role for the monetary aggregates at the extremes—that is, in times of either very high or very low inflation. For example, as noted above, when inflation was very high in the U.S. in the late 1970s and into the early 1980s, the Fed altered its operating strategy to give an explicit role for the monetary aggregates in the setting of monetary policy.<sup>8</sup> And when inflation was very low in Japan during the recent deflationary period and the nominal policy rate there was pushed to its lower bound of zero, there was an experiment with “quantitative easing,” targeting a faster rate of growth in the monetary aggregates, in an effort to provide further stimulus to the economy. There was also discussion in the U.S. about the possible role for quantitative easing as part of non-conventional policies in the case that the federal funds rate was pushed to its lower bound.

### MONEY AND MONETARY POLICY AT THE FED

Back when I was a Federal Reserve governor, I summarized the role of money in macro models and monetary policy at the Fed as follows: “Money plays no role in today’s consensus macro model and virtually no role in monetary policy, at least in the United States.”<sup>9</sup> Bernanke’s remarks at the conference provided a historical tour of the evolution of the role of money at the Fed<sup>10</sup> and reached the conclusion that “heavy reliance of the monetary aggregates as a guide to policy would seem to be unwise in the U.S.” as a result of the breakdown in the relationship between money and inflation due to the continuing pace of financial innovation. Admittedly, Bernanke’s description is a bit less blunt than my assertion five years earlier, but the message is similar—the monetary aggregates have a very limited role in the conduct of U.S. monetary policy.

<sup>7</sup> I was tempted to say that John Taylor took the money out of monetary policy. Indeed, I argued in my 2001 paper that a macro model with a Taylor rule has all the properties of long-run classical macro as long as we define neutrality in terms of the absence of effects inflation on the equilibrium values of real variables and substitute monetary policy for the money supply as pinning down inflation in the long run. I called the resulting model monetarism without money, but the fact is that by the time Taylor unveiled his rule, money was already playing a much diminished role in monetary policy.

<sup>8</sup> Even if the motivation was to give the Fed freedom to raise the funds rate enough to choke off inflation (while claiming that the higher rates were market driven), the choice of a monetary target still highlighted the Fed’s commitment the Fed had to lowering inflation over time.

<sup>9</sup> Laurence H. Meyer (2001), “Does Money Matter?” The 2001 Homer Jones Memorial Lecture, Washington University, St. Louis, Missouri, March 28. The paper can be found at the following link: <http://www.federalreserve.gov/boarddocs/speeches/2001/20010328/default.htm>

<sup>10</sup> Bernanke begins the historical tour of the role of the monetary aggregates at the Fed with the role established in the Federal Reserve Act and then discusses the increased attention to the monetary aggregates inside and outside the Fed as a result of the interaction of the work by Milton Friedman and others about a stable relationship between money growth and inflation and the experience of higher inflation in the 1960s and especially the 1970s. This increased attention led to the establishment of explicit monitoring ranges for the monetary aggregates in the mid-1970s and culminated the explicit role of the monetary aggregates as part of the operating strategy of the FOMC for a few years under Volcker. Even after the FOMC abandoned a direct role for the monetary aggregates as part of its operating strategy, it continued to publish monitoring ranges for the monetary aggregates in some form from the mid 1970s until 2000. But since the operating strategy returned to a focus on setting a federal funds rate target, the attention given to the monetary aggregates has diminished, though the staff continues to estimate money demand functions and to monitor the monetary aggregates.

Bernanke notes that the Federal Reserve staff continues to devote considerable effort to modeling and forecasting velocity and the demand for money. But it remains the case that the empirical relationship between money growth and nominal income and inflation is unstable at times and, as a result, monetary aggregates get very little attention in the staff assessment of macroeconomic conditions and the outlook.

By the time I got to the Board in mid-1996 and was serving on the FOMC, the word “money” was mentioned at FOMC meetings virtually only during the discussion of monitoring ranges for monetary and credit aggregates at the two two-day meetings that preceded the Chairman’s Humphrey Hawkins testimony. At that time the Committee fulfilled its congressionally mandated obligation to set the monitoring ranges. The major question during these discussions was whether or not the monitoring ranges were a charade. I occasionally argued for altering the ranges to make them line up more effectively with the Committee’s implicit inflation objective. But the overwhelming view was that it would be a mistake to make any change because doing so would suggest that the Committee was paying more attention to the ranges than in fact was the case. The ranges were in fact already dead, and the Committee relished the opportunity to bury them when the obligation lapsed in 2000.

Nevertheless, I continued to look for information in the monetary aggregates while on the FOMC. I made it a practice of meeting with the staff members who focused on the monetary aggregates each FOMC cycle. Their mandate was to identify for me any movements in the monetary aggregates that they believed might be providing an important signal about future macro developments that was different from the signals in other macro data and different from the direction of the staff forecast. This process seemed to me similar to the notion of “cross checking” as practiced by the ECB, a topic I will return to below. But in 5½ years, there was never an occasion when the staff believed that the monetary aggregates were providing such a useful signal. Indeed, the staff clearly felt that their main task was explaining away the occasional unusual movements in the monetary aggregates with reasons that were unrelated to the future course of nominal income and inflation. This continues to be the case today.

### **MONEY AND MONETARY POLICY AT THE ECB**

The ECB clearly gives more emphasis rhetorically to the role of money in the conduct of monetary policy—indeed assigning it a role as a second “pillar” in its strategy—and, in addition, argues that its reliance on the monetary aggregates has served it well in practice. Trichet made a point of identifying three recent episodes when reliance on the monetary pillar helped the ECB make “good and timely” policy decisions.

The ECB sets a reference value for a single monetary aggregate, the M3 definition that is essentially the same as the M2 definition for the U.S. The reference value for M3 is the rate of growth consistent with achieving its inflation objective over an intermediate term, based on estimates of the trend growth in potential output and velocity. This was initially identified as the first pillar. The second pillar, referred to as the “economic analysis” pillar, considers the appropriate setting for policy in terms of the “economic shocks driving the business cycle and embodies a thorough assessment of the cyclical dynamics of inflation.”<sup>11</sup>

<sup>11</sup> See the Fischer, Lenza, Pill, and Reichlin (2006) paper from the conference.

This pillar conforms to the eclectic forecast-oriented approach to policy setting at the FOMC, though it seems more focused on projections of inflation than in the case of the forecast process at the Fed.

Over time, the ECB has broadened its approach to money in monetary policy, downweighting the direct reliance on money demand equations due to some evidence of instability, and complementing the analysis of money demand with simple reduced form equations linking inflation with past inflation and money growth, an approach that was very characteristic of monetarists in the U.S.. The ECB staff has also followed the route that was initially followed in the U.S., trying to rehabilitate money demand equations with various judgmental adjustments and even deriving an adjusted measure of money growth as an alternative for comparing with the reference value.

The rationale for the reference value for money growth and emphasis on reduced-form regressions of inflation on money growth is that the money demand equation remains reasonably stable, in which case there would be a reasonably stable long-run relationship between money growth and inflation (as discussed above). The ECB recognizes that there is considerable instability in shorter-term movements in M3 and nominal income, but believes that keeping an eye on M3 relative to its reference value provides a useful second check on the consistency of its policies and its medium-term inflation objective. Persistent deviations from the reference value should at least raise questions and call for a reassessment of whether prevailing monetary policy is consistent with the medium-term inflation objective. The ECB uses the term reference value instead of target to make clear that deviations from the reference value will not necessarily result in policy adjustments aimed to return money growth to the reference value.

The ECB's approach to setting a reference value for M3 seems much more disciplined than the approach the Fed took toward setting monitoring ranges for the monetary aggregates when Congress required it to do so. The difference, of course, is that the ECB actually believes in the value of setting a reference value for money growth, whereas the Fed did not.

At the conference, Papademos referred to the relation between money growth and inflation as "theoretically robust," but agreed that over short and medium horizons the effects of money growth on inflation was an empirical issue that could not be settled on theoretical grounds. He also admitted that "the evidence on the role of money, as captured by macroeconomic models currently employed by central banks, including the ECB, is not encouraging." Nevertheless, econometric models focused on the medium or longer links between money and inflation have been able to capture statistically significant empirical relationships that can help us predict long-term inflation and assess the risks to price stability emanating from monetary developments."

Still, the role of money in monetary policy seems to be evolving at the ECB. While the conference highlighted the greater role for money in monetary policy at the ECB relative to the Fed, remarks at the conference by Lucas Papademos were interpreted by some as signaling an interest of some on the governing council to merge the monetary pillar and the ECB's more general and eclectic economic analysis pillar into a single "fat pillar," a

direction that might in turn signal a somewhat further diminished role for money supply in the setting and communication of monetary policy at the ECB.

### **DIFFERENT WAYS TO CROSS CHECK MONETARY POLICY DECISIONS**

Still, the differences between the Fed and ECB on the role of money in monetary policy are considerable. What accounts for the difference? It could simply be that financial innovations have resulted in greater instability in the demand for money in the U.S. than in the Euro area, but frankly there was not a lot of good news in the discussion of money demand in the Euro area presented by ECB staff at the conference. So, the difference instead seems to be one driven more by analytical approach—and specifically, by the Federal Reserve's view that there are much better “cross checks” than monetary growth rates.

As discussed above, the ECB emphasized the use of the monetary pillar as a cross check on the policy rate decisions that follow from the economic analysis. So, perhaps a good point of departure is to understand why there might be value in such a cross checking exercise. Assigning a role for money in monetary policy addresses a prominent feature of the monetarist critique of monetary policy, specifically that setting policy in terms of a target for a policy rate can result in monetary policy in effect reinforcing the effect of an unanticipated aggregate demand shock. Holding to a steady rate of money growth (assuming a stable money demand function) will yield steady inflation in the long run. But holding the nominal interest rate constant, for example, in the face of an unanticipated positive demand shock could result in the Fed increasing money growth to prevent the funds rate from rising and result in higher inflation. Monitoring money growth under these circumstances could at least provide a useful check and help avoid such destabilizing policy responses.

But there are several other cross checks that the central bank could consider. For example, many central banks, including the Fed, use the prescriptions from monetary policy rules as a “reference” to provide such a check and avoid destabilizing policy responses. A policy rule is not in this case a rule that is rigidly or mechanically followed. Indeed, it is not even the main source of rate decisions. But it does at least provide a check to make sure that the policy rate adjusts to ongoing economic developments (in terms of output gaps and inflation) and thereby provides some insurance that policy is set in a manner consistent with the medium term objectives of policy.<sup>12</sup> Another useful cross check is survey and market based measures of long-term inflation expectations. If long-term inflation expectations become un-anchored at a given funds rate, it is a very powerful signal that the public and/or markets believe that the policy rate setting is no longer consistent with the FOMC's medium term inflation objectives, and is a very effective vehicle for motivating a reassessment of that policy.

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<sup>12</sup> One reason that these rules work well in this context is that, as long as they follow certain principles, these rules tend to stabilize the economy around the inflation objective across a range of models. Moreover, the rules roughly proxy how the Federal Reserve has acted over the past 20 years, a period in which it managed to deliver favorable economic outcomes.

So the key difference may be that the ECB prefers the reference value for the money supply as a cross check and the Fed prefers to use reference policy rules as one of the checks. Why the difference?

There may be several reasons why the ECB favors using the reference value for money growth: because it carries the link back to the Bundesbank; because, as a result, a reference value of money growth may be seen as an effective way of communicating to the public about the ECB's commitment to price stability; and because the ECB mandate is more hierarchical, specifically focused principally on inflation (and long-run trends in money are viewed more as a vehicle for pinning down long-run trends in inflation than as an instrument of stabilization policy).

As a new central bank, the ECB clearly wanted to inherit some of the credibility for a commitment to price stability that the Bundesbank had earned over its history. The Bundesbank was equally well known for its commitment to price stability and its emphasis on controlling the growth of the money supply as a means of achieving that objective. As a result, the ECB adopted a strategy that gave at least the appearance of a linkage back to the Bundesbank.<sup>13</sup>

But it also seems clear that the ECB also firmly believed that there was an important role for money in the conduct of monetary policy. It clearly believed that focusing on the money supply was an important element in communication strategy, an effective way of constantly reminding the markets about the ECB's commitment to price stability. Trichet said at the inference that "The monetary pillar of our monetary policy strategy constitutes a visible commitment to take the long-run link of monetary developments and inflation into account in monetary policy decisions. From my experience I can tell you that this has played an important role in our success in anchoring inflation expectations in the Euro area."

The ECB's mandate is also more single-mindedly focused on inflation, so it does not have to worry about communicating to the markets about policy trade-offs between higher inflation and higher unemployment rates. Thus, it is perhaps more appropriate to choose a cross check that, in the long run at least, is only linked to inflation.

The reference policy rule works better for the Fed, on the other hand, because it is more consistent with its dual mandate (balancing full employment and price stability objectives) and because the Fed has been able to build its reputation for a commitment to price stability over a longer period of performance.

The reference policy rule allows the Committee to feel comfortable that it is effectively balancing its commitments to full employment and price stability in the short run. Moreover, this does not diminish its usefulness as a cross check. The prescriptions from a policy rule avoid persistent destabilizing policy responses to unanticipated demand shocks

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<sup>13</sup> At the conference, Issing noted the difference between central banks that were at the same time moving toward inflation targeting regimes. These moves followed poor outcomes with respect to inflation and the intention was to show a new direction relative to past policy. The ECB intention was just the opposite, to show continuity with the commitment to price stability and disciplined policy at the Bundesbank.

because the rule calls for higher rates in response to lower unemployment rates and higher inflation.<sup>14</sup>

Moreover, the FOMC does not feel the need to mimic any other institution to enhance its credibility. The combination of a remarkably explicit implicit inflation objective in the form of the so-called comfort zone (1% - 2% range for the core PCE) and the success in monetary policy in reducing and then maintaining inflation near its implicit objective have allowed the FOMC to effectively anchor inflation expectations. The way for the Fed to maintain its credibility is to act in the same way that it has in the past, which is captured by the reference rule.

### THE BOTTOM LINE

We spend very, very little time monitoring money growth and comparing it with an assumed reference value as we assess how the FOMC is likely to adjust monetary policy to changing economic conditions. In effect, monetary policy decisions can be made very effectively without ever looking at money.

We generally return to the subject of money growth only on the rare occasions when a client calls and asks what the Fed may be thinking about some unusual pattern in one of the aggregates. We invariably answer (often after calls to the staff that monitors money growth at the Board) that there are special factors that seem to be raising or lowering money growth relative to a rate that might seem more consistent with the medium-term objectives of the Fed and that the Board staff, and the Committee are not troubled by or likely to adjust policy in light of the observed pattern in money growth.

In contrast, as we have often emphasized, FOMC members routinely receive prescriptions from a set of policy rules in advance of FOMC meetings and these rules provide some guidance to policymakers, at least a check on the policy recommendation that may be on the table at that time. As a result, we are always closely monitoring policy rules for guidance about the appropriate setting of the funds rate target and its likely path, based on MA's forecast. If policy was deviating significantly from the prescription of these rules, we would want to fully understand why and to seriously think about the consequences for the economic outlook.

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<sup>14</sup> Money growth has sometimes been features as a possible “information variable” – that is faster money growth might provide quicker information about an unanticipated increase in aggregate demand, in advance of the data on employment and GDP growth, but the instability of money demand over such short periods has pretty well wiped out this role.