

OUTSIDE MONEY BEHAVIOR IN THE GREENSPAN ERA

Michael Cosgrove, College of Business, University of Dallas, Irving, TX, USA

Daniel Marsh, College of Business, University of Dallas, Irving, TX, USA

ABSTRACT

Federal Reserve System officials appear to have an on-going discussion concerning the appropriate target of monetary policy. In particular, should it be an interest rate, price level or quantity of money measure. We argue that some measure of the money supply should be used as a policy target in place of the federal funds rate. But which measure? Monetary theory suggests the most appropriate measure will be the one corresponding most closely to "outside money." Outside money, in contrast to inside money, generates a real balance effect. An increase in outside money generates an increase in society's net wealth, whereas an increase in inside money is an increase in both assets and liabilities, and hence does not create an increase in society's net wealth. Commodity monies like gold or silver are outside money; likewise for fiat money such as the monetary base. An increase in the monetary base is an increase in net wealth, and should generate a large real balance effect. In contrast, most of the M2 money supply measure is interest-bearing debt, so an equivalent increase in M2 should generate very little increase in net wealth, and a small real balance effect.

We demonstrate that there appeared to be a sizeable real balance effect on aggregate spending from outside money, as the theory suggested, during the Greenspan era. In particular, when there was a slowdown in growth of the monetary base to nearly the same level as the growth of real output, the adverse real balance effect created economic and/or financial market dislocations either within or outside the U.S. Other measures of money such as M1 and M2, inside money, were inconsistent in their effects on aggregate spending as suggested by the theory.

Keywords: *Outside Money, Net Wealth, Real Balance Effects, Inside Money, Yield Curve, Greenspan*

1. INTRODUCTION

An ongoing debate among Federal Reserve officials and outside economists concerns what is the most appropriate target or instrument of monetary policy. Romer and Romer (2004) recently argued that endogeneity of policy, along with the anticipatory nature of counter-cyclical policy mean that most conventional definitions of policy instruments may be misleading.

Behavior of the quantity of money doesn't seem to be very important to some at the Federal Reserve. For instance Gavin (2004) states: "Since 1982, however, measures of the quantity of money have provided little useful information about the near-term outlook for spending or inflation. Money growth has remained highly variable even as inflation has become less variable." Gavin in discussing the quantity of money refers to M1 and M2.

Gavin (2004) also states: "This disconnect between the variability of inflation and money growth is partly due to the success of policy in reducing inflation and causing expectations of future inflation to become more stable. In this environment, the Federal Reserve has been able to keep its federal funds target rate fixed for months at a time. When the funds rate is fixed, the short-run money supply is perfectly elastic with respect to the interest rate and all changes in money demand are perfectly accommodated."

Others at the Federal Reserve take a very different position. Altig (2004) states: "In the world in which we live, inflation is ultimately about the pace of money creation, and the level of the federal funds rate is about how fast money gets created. Not adjusting the federal funds target when other market-driven interest rates rise will, in most cases, lead to more rapid money growth and, in many cases, a de facto change in the effective stance of monetary policy."

Gavin (2004) to emphasize his position states: "We do not have to pay attention to the quantity of money today because policymakers are paying attention to its price, by focusing on inflation and inflation expectations."

Bernanke and Reinhart (2004) seemed to also focus on interest rates as they stated that: "The pricing of long-lived assets, such as long-term bonds and equities, depends on the entire expected future path of short-term interest rates as well as on the current short-term rate. Prices and yields of long-lived assets are important determinants of economic behavior because they affect incentives to spend, save, and invest. Thus, a central bank may hope to affect financial markets and economic activity by influencing financial market participants' expectations of future short-term rates."

A review of testimony by former Chairman Greenspan only uncovered one reference to the importance of the quantity of money. In response to a question during Senate testimony, Chairman Greenspan stated: "We did raise interest rates in 1999, and the reason we did is real, long-term interest rates were beginning to rise because the economy was beginning to accelerate. Had we not raised the federal funds rates during that particular period, we could have held it in check only by expanding the money supply at an inordinately rapid rate." Mr. Greenspan by that answer seemed to refer to the quantity of reserves or the monetary base. Implicit in his answer is that former Chairman Greenspan appeared to acknowledge that excessive monetary base growth may lead to excessive increases in the price level.

In addition to targeting a federal funds rate, Mr. Greenspan, at least in 1999, appeared to also have been concerned about growth of the monetary base. But Mr. Greenspan, as chairman, could not simultaneously hit two targets with the one variable. As a result the FOMC gave up control over the monetary base. We show that changes in the monetary base relative to changes in money demand generate sizeable real balance effects and that Mr. Greenspan was right when he seemed to express concern about monetary base growth.

2. THEORY

How do changes in the money supply influence real output, prices, and interest rates? We start with Irving Fisher's (1922) equation of exchange using the income definition of velocity, so that

$$MV = PQ, \tag{1}$$

Where M is the nominal money stock, V is the income velocity of money, P is the average level of prices, and Q is real output.

If we differentiate with respect to time, and simplify by ignoring the cross-product terms, we get as an approximation

$$\frac{dM}{dt} + \frac{dV}{dt} = \frac{dP}{dt} + \frac{dQ}{dt} \tag{2}$$

Making the standard Fisherian assumption that velocity is stable in the long run, or $dV/dt = 0$, then

$$\frac{dM}{dt} = \frac{dP}{dt} + \frac{dQ}{dt} \tag{3}$$

In other words, changes in the money stock M, cause proportionate changes in the price level P and/or changes in real output Q.

The microfoundation rationale for assuming velocity is stable can be seen by reforming equation (1) into the Marshallian demand for money function. Define $k=1/V$ and define $PQ=Y$ = nominal income. Then equation (1) becomes

$$M^d = k Y \quad (4)$$

Marshall's assertion that nominal money demand is strictly proportional to nominal income implies k is constant, or equivalently, that V is constant.

The consequence for monetary policy is the existence of a wealth effect, or as Patinkin (1956) called it, a real balance effect. If the money supply is increased beyond the level of money demand, agents spend their excess real balances. If the money supply is reduced below the level of money demand, agents reduce spending in order to restore their desired level of real balances.

Why should the printing of unbacked paper money by the government make society as a whole wealthier, and hence lead to an increase in aggregate spending? Gurley and Shaw (1960), and Pesek and Saving (1967) argued that money creation raises society's net wealth only when new money is in the form of "outside" money, or money which is not a liability or debt of an economic agent within society. Outside money is distinct from "inside" money -- a debt, or promise to pay, by someone within the economy.

An increase in outside money is an increase in society's wealth, whereas an increase in inside money is an increase in both assets and liabilities, and hence is not an increase in society's net wealth. Pesek and Saving argued that commodity monies like gold or silver are outside money and likewise so is fiat money. Because fiat money, or currency, pays no interest and is not exchangeable for anything else, it is an asset but not a liability, and hence is a part of society's net wealth. In contrast, both government bonds and corporate bonds are not a part of net wealth, because they are liabilities as well as assets. Hence an increase in interest-bearing bank liabilities, such as savings account deposits, creates no new net wealth for society as a whole, and thus should generate no real balance effect.

This microfoundation argument, if true, has consequences for monetary policy. If the Federal Reserve System chooses a target growth rate for the money supply, which measure of money should it use? According to the outside money-inside money distinction, the monetary base is pure outside money. Any increase in the monetary base is an increase in net wealth, and should generate a large real balance effect. In contrast, most of the M2 measure of the money supply is interest-bearing debt, so an equivalent increase should generate very little increase in net wealth, and a small real balance effect. The M1 measure of the money supply should be intermediate between the two.

If the Fed uses interest rate targeting, the reverse should be the case. Because most of M2 is interest-bearing debt, it is a closer substitute for bonds than the monetary base. An increase in M2 should have a larger effect on interest rates than an equivalent change in the monetary base. But the Federal Reserve seemed to downplay the importance of M2 starting in the late 1980s. Changes in M1 should again be intermediate between the two.

3. MONEY AND OUTPUT ASSESSMENT

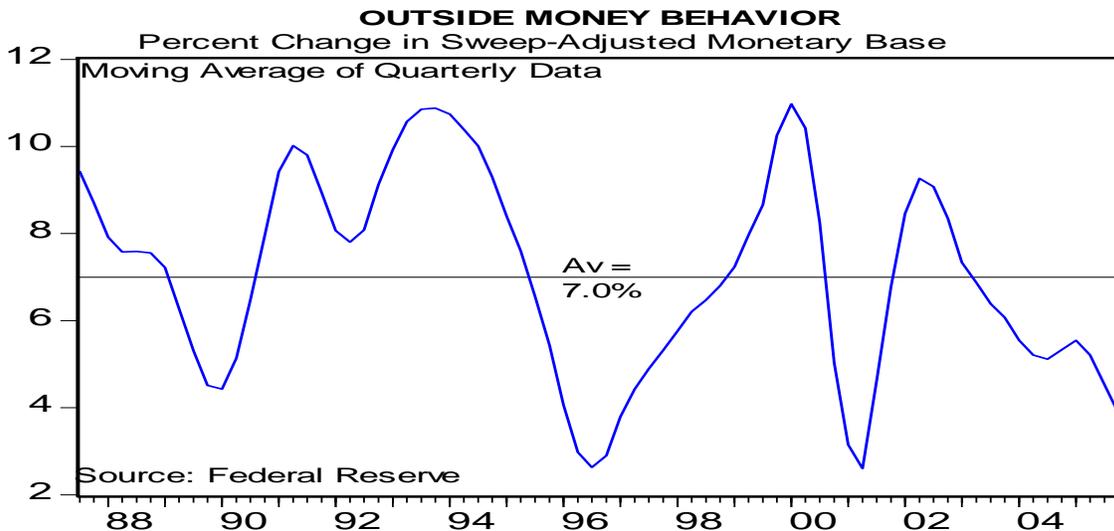
The quantity of money is important because as Altig states, "The FOMC can, however, exert nearly complete control on the price of federal funds because it controls the total quantity of reserves available for borrowing and lending." In this study we use the sweep-adjusted monetary base as the definition of outside money. It contains both the total quantity of reserves as well as currency. The point being that the FOMC controls the growth of the monetary base. So changes in the monetary base are changes in net wealth and would be expected to generate sizeable real balance effects. We examine the data for evidence of a real balance effect resulting from changes in the monetary base from the time that Mr. Greenspan became Chairman of the Federal Reserve in August 1987 to the end of 2005.

If the money supply -- monetary base -- increases faster than real output growth, agents eventually spend their excess real balances. Or if money supply increases slower than real output growth, agents reduce

spending in an attempt to restore their desired level of real balances. Excess or inadequate real balances in turn influence aggregate spending.

Real output growth varies considerably over different periods. Theory suggests that rapid output growth is accompanied by high demand for money growth. In turn, implied inflation will be lower. A measure of money supply growth in excess of that justified by output growth can be obtained by subtracting real output growth from growth in the monetary base. This measure of excess outside money is also a measure of the potential real balance effect.

The following illustrates the change in the monetary base over the relevant time period.



Next, an adjustment to changes in the monetary base is made for growth in output. This measure of excess outside money illustrates the potential real balance effect that the central bank exerts on the economy. A sizeable positive number suggests the Federal Reserve is allowing for the potential of positive real balance or wealth effects on aggregate spending. A number approaching zero, in comparison, suggests the Federal Reserve may be willing to tolerate adverse real balance or wealth effects on aggregate spending.

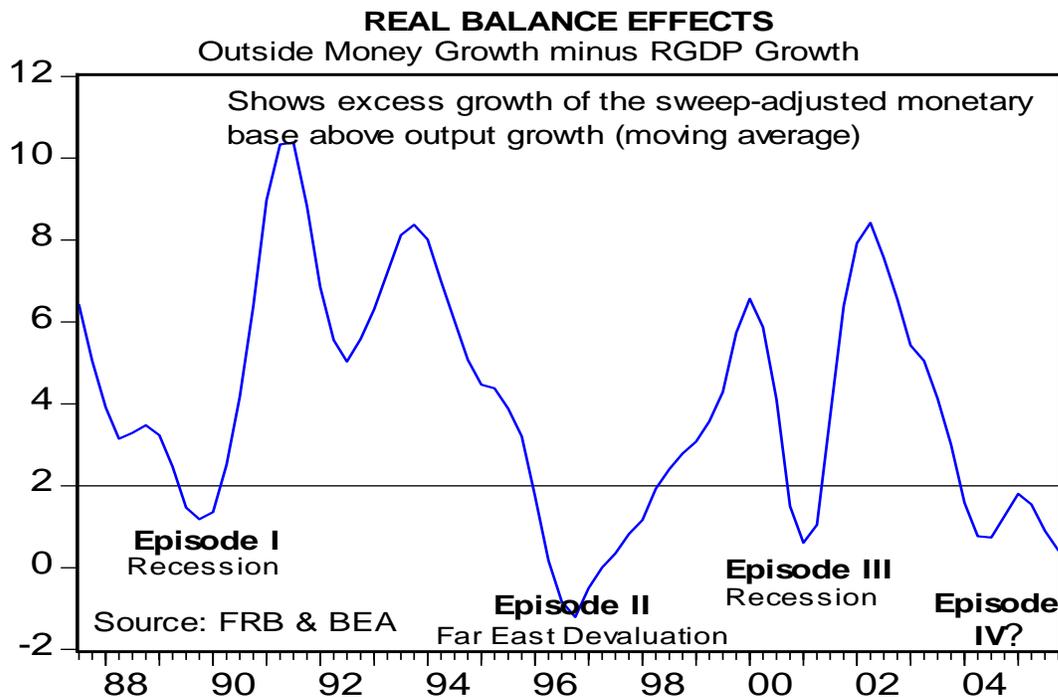
There were three episodes during the Greenspan era in which growth of the sweep-adjusted monetary base or outside money was near real output growth with resulting substantial effects on real and/or financial conditions. Sizeable real balance effects occurred in three of the episodes as the theory suggests. Implication -- outside money may be useful as a target in achieving the dual goals of full employment and price level stability. Episode IV spilled over into the Bernanke era.

4. EPISODES

Two of the first three episodes in which there was a slowing in the growth of outside money until it was nearly equal to output growth resulted in U.S. real output downturns. And one episode resulted in a stronger dollar which contributed to the economic disruption in Far East economies.

4.1 Episode I

The slowdown in growth of high-powered money compared to real GDP growth reached a low of 1.2 in 1989:4. The U.S. recession started in July 1990 – six months later. As growth of the money supply started to approach growth of real GDP, agents, as the theory suggests, reduced their spending enough to induce a recession. Implication: the Federal Reserve was willing to tolerate adverse real balance or wealth effects on aggregate spending to the extent that a recession was created.



4.2 Episode II

In 1996:4 differential growth between the monetary base and real GDP reached a low of negative 1.6. In this episode there wasn't much of an adverse real balance impact on the U.S. economy. However an increase in the price-adjusted broad dollar index of 24.8 percent occurred in the period from July 1995 to August 1998. The sharp increase in the dollar index helped create an environment in which the Asian economies of Thailand, Indonesia and South Korea broke their dollar pegs and floated their currencies in the latter part of 1997. In August 1998 the Russian government defaulted on its debt commitments. An adverse real balance effect appears to have occurred outside the U.S. from the sustained slowdown in growth of outside money relative to U.S. aggregate spending. But the slowdown in the monetary base relative to output suggests the Federal Reserve may have been willing to accept adverse real balance or wealth effects on U.S. aggregate spending.

4.3 Episode III

In the post-y2k period there was a sharp slowdown in growth of the monetary base until the differential growth between the base and real GDP was approximately 0.6 in the first quarter of 2001. An adverse real balance effect occurred -- the recession start date was March 2001. Again the theory suggests the Federal Reserve was willing to bear adverse real balance or wealth effects on U.S. aggregate spending and/or financial markets.

4.4 Episode IV

The differential between growth of the sweep-adjusted monetary base and real gross domestic product was approximately 0.4 in 2005:4. In two of the past three episodes there was an adverse real balance effect on the U.S. economy as recessions followed. In the other episode, the mid-1990s, an environment of economic and financial dislocation occurred outside the U.S.

History and theory suggest an economic and/or financial dislocation may occur in late 2006 or in 2007 either inside the U.S. or outside the U.S., as the Federal Reserve again appears willing to accept a negative real balance effect as agents, in late 2006 or in 2007, may well attempt to regain their desired

level of real balances. It could be a repeat of 1996 where the economic dislocation occurs in other parts of the global economy.

4.5 Implication

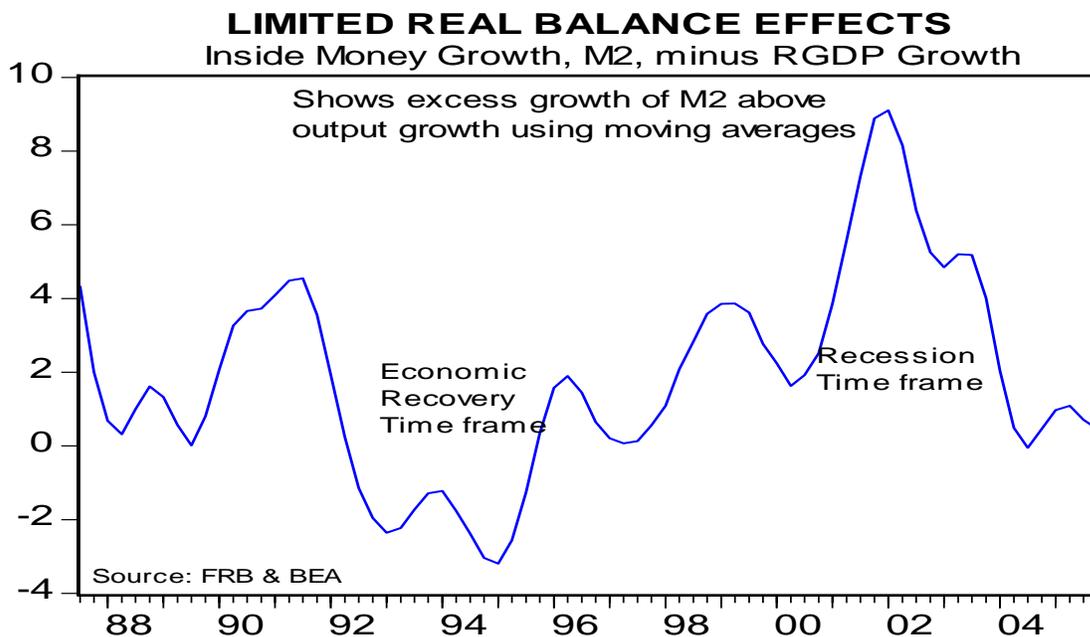
The FOMC targets the federal funds rate by varying the quantity of reserves in the federal funds market. The importance of the growth of quantity of money is downplayed by many at the Federal Reserve while some such as Altig suggest that the speed of money creation controls the price level. Mr. Greenspan didn't appear to focus on the quantity of money at least in most of his public comments. However his one answer suggested he may have been concerned about the rate of growth of the monetary base. Since the FOMC controls the monetary base, it may be that the FOMC was willing to accept both the positive and negative real balance effects resulting from the dramatic changes in growth of the monetary base relative to real output growth in order to achieve their desired federal funds rate target during the Greenspan era. Plus Chairman Greenspan and other Fed members could have had an interest in the growth of the monetary base since FOMC members did discuss wealth effects and real balance effects.

We demonstrated that there appeared to be a sizeable real balance effect on aggregate spending as the theory suggests. In particular when there is a slowdown in growth of outside money or monetary base relative to real output growth, the adverse real balance effect creates economic and/or financial market dislocation either in or outside the U.S. This sequence of events ending in economic and/or financial market dislocation is suggested by the theory. Other measures of money such as M1 and M2, inside money, were inconsistent in their effects on aggregate spending as would be suggested by the theory.

Cosgrove and Marsh (2004) suggested that the Federal Reserve and other central banks may need to be cautious with changes in quantity of money growth in order to account for the impact of disinflation due to gains of trade among developed and developing countries in the post-1980 period.

5. INSIDE MONEY BEHAVIOR

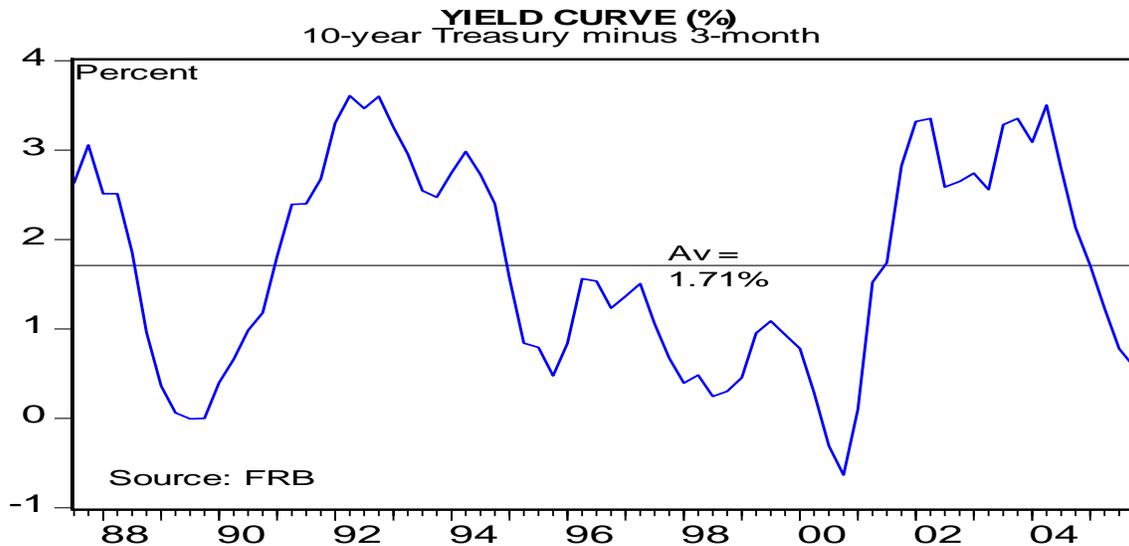
M2 is used as a measure of inside money for this study to determine its impact on aggregate spending. M2 grew more slowly than aggregate spending during the economic recovery in the early 1990s and grew much faster than output early this decade during the 2001 recession. Implication: M2 real balance effects have little influence on real output, which is what the theory suggests.



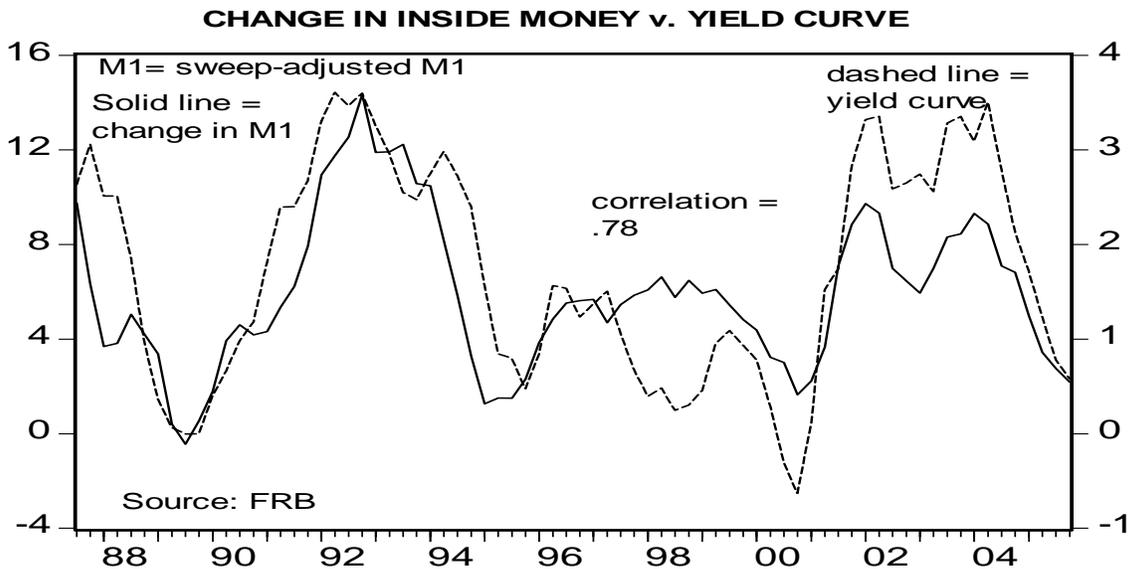
6. MONEY AND INTEREST RATE ASSESSMENT

The FOMC targets interest rates so that one would expect the inside definitions of money to have a closer association with the movement of interest rates than outside money. M1 and M2 are used as measures of inside money for this study.

The yield curve is used as a proxy for comparison to the alternative measures of inside money as well as the measure of outside money – the monetary base. The average difference between the 10-year and 3-month Treasuries during the Greenspan era was 1.71%. Before the two recessions that occurred on Greenspan's watch, the yield curve was slightly inverted. In the fourth quarter of 2005 the difference was only 0.5.

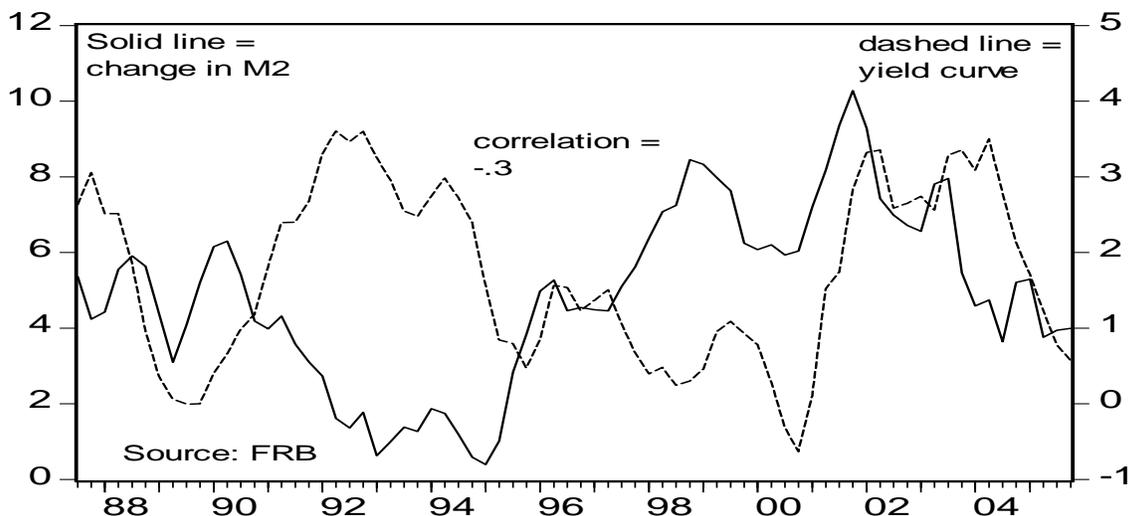


The relationship between M1 (inside money) and behavior of the yield curve was quite close during the Greenspan era. The correlation of near .8 is an indicator of that association. But Mr. Greenspan and other FOMC members did not seem to give much emphasis to any measure of money growth whether it fits either the inside or outside concept.



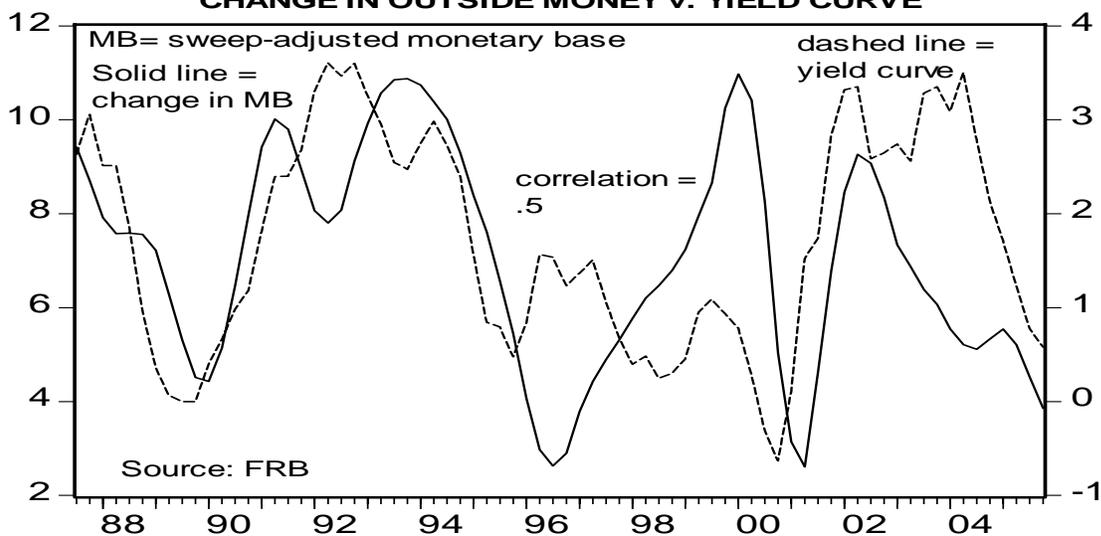
The other measure of inside money, M2, doesn't have a close relationship with the yield curve. Theory suggests that of the two measures of inside money used in this study, M2 might have the closer relationship since M2 is a closer substitute for bonds than M1.

CHANGE IN M2 v. YIELD CURVE



The outside measure of money – sweep-adjusted monetary base -- doesn't have as close a relationship to interest rates as the M1 measure of money. But that was expected from the theory as outside money was expected to generate the real balance effect.

CHANGE IN OUTSIDE MONEY v. YIELD CURVE



6.1 Implication

Targeting of the federal funds rate implies that the inside measures of money are closer substitutes for bonds and therefore would likely have a closer relationship with interest rate behavior than would outside money. We found that M1, an inside measure, has a closer relationship with behavior of interest rates than does M2. Theory would suggest that M2 would have the closer relationship. Perhaps further analysis will show this to be the case. But as the theory suggests, M1 does have a closer tie with interest rates than does the outside measure of money.

7. SUMMARY

We demonstrated that there appears to be a sizeable real balance effect on aggregate spending, as modern monetary theory suggests. In particular, when there is a slowdown in growth of the monetary base -- outside money -- so that its growth is nearly equal to real output growth, an adverse real balance effect creates economic and/or financial market dislocations either in or outside the U.S. Other measures of money such as M1 and M2, inside money, were inconsistent in their effects on aggregate spending as suggested by the theory.

We also found that M1 -- an inside money measure -- has a closer relationship with behavior of interest rates than does M2. Theory suggests that M2 would have the closer relationship. Perhaps further analysis will show this to be the case. But M1 does have a closer tie with interest rates as the theory suggests than does the outside measure of money.

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Author Profiles

Dr. Michael H. Cosgrove earned his Ph.D. at Ohio State University. Currently he is a professor in the College of Business, University of Dallas.

Daniel Marsh, ABD, Southern Methodist University. Currently he is adjunct professor in the College of Business, University of Dallas.