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MONEY-MULTIPLIER SHOCKS IN A CREDIT-VIEW MODEL

Burton A. Abrams

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By

**Burton A. Abrams
Department of Economics
University of Delaware
Newark, DE 19716
Email: abramsb@lerner.udel.edu**

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Abstract

The financial crisis and recession of 2008-2010 have witnessed the biggest reduction in money-supply multipliers in U.S. history. In contrast to what occurred during the Great Depression, the Fed has avoided decreases in monetary aggregates by dramatically increasing the monetary base. A variation of the Bernanke-Blinder credit-view model is shown to reveal that holding the money supply constant following an autonomous fall in the money multiplier is insufficient to prevent aggregate demand from falling. This helps to explain the severity of the 2008-2010 recession despite growing monetary aggregates and expansionary fiscal policy.

Key words: credit-view model, monetary policy, money-supply model

JEL Classifications: F41, E51

1. Introduction.

The financial crisis and recession of 2008-2010 have witnessed the biggest reduction in money-supply multipliers in U.S. history. The multiplier for MZM, for example, fell over 50 percent (from 10.0 to 4.7) between September, 2008, and May, 2010.¹ Similar declines in multipliers using other monetary aggregates also occurred. In contrast, during the Great Depression, it took nearly four years for the M1-multiplier to decline by approximately 35 percent.²

Also in contrast to the Great Depression, in 2008-2010 the Fed successfully prevented a money-supply collapse by dramatically increasing the monetary base. Figures 1 and 2 show recent movement in the monetary base and MZM. Importantly, from September, 2008, to May, 2010, the monetary base broke trend and increased from \$0.88 trillion to \$2.0 trillion. During this time period, MZM grew at a modest annual rate of approximately 4 percent increasing from \$8.76 trillion to \$9.36 trillion.

In terms of the traditional IS-LM model, the specific values for the money multiplier and the monetary base are irrelevant for aggregate demand, only the aggregate money supply matters. So an increase in the monetary base that offsets a decrease in the money multiplier should be sufficient to stabilize any money supply shocks on aggregate expenditures.

An expanded version of the Bernanke-Blinder (1988) credit-view model reveals, however, that holding the money supply constant when an autonomous decrease in the

¹ Source: MZM subtracts time deposits from M2 and arguably provides the best monetary aggregate comparable to historical data for M1. Federal Reserve Bank of St. Louis Economic Data and author's calculations.

² Friedman and Schwartz (1963).

money multiplier occurs is insufficient to prevent a decrease in aggregate demand. This finding suggests an additional explanation for the severity of the 2008-2010 recession.

2. The Credit-View Model.

The original Bernanke-Blinder (hereafter, B-B) credit-view closed-economy model adds to the traditional IS-LM model another financial asset, bank loans. These loans are imperfect substitutes for bonds and, unlike the traditional model, carry an interest rate distinct from bonds. The model consists of three endogenous variables, the real interest rate on bonds (i), the real interest rate on bank loans (r) and real output (y).

The three equations for the model are:

$$E(y, i, r) = y \quad (1)$$

$$L(y, i) = m \times B \quad (2)$$

$$D(y, i, r) = S(i, r) \times (m-1) \times B \quad (3)$$

Where, (1) is the equation for the goods market, (2) is the equation for the money market and (3) for the loan market. Following B-B's functional forms, D is the demand for loans and S is the share of bank credit going to loans. The variables $(m - 1) \times B$ represent total bank credit.³ The above model expands upon the B-B model by incorporating an explicit Brunner-Meltzer money-multiplier variable and a correspondingly revised specification for bank credit. For simplicity, it is assumed that the money multiplier is

³ Bank credit is derived from the aggregate bank balance sheet. Bank assets are reserves (R) plus bank credit (BC) while liabilities are D . D equals M less C (currency in circulation). $R + BC = M - C$. Since $B = R + C$, $BC = M - B$. Since $M = m \times B$, $BC = (m - 1) \times B$. See, Burger (1969).

exogenous and depends on the usual currency, excess-reserve and required-reserve ratios.⁴

Rewriting (3) we obtain:

$$D(y, i, r) = S(i, r) \times (m \times B) - S(i, r) \times B \quad (4)$$

3. Comparative Static Result.

Assume the system is shocked by an exogenous decrease in the money multiplier (e.g., an autonomous rise in the excess-reserve ratio) and that the Central Bank responds by increasing the monetary base to keep the money supply, $m \times B$, constant. By inspection, at the original values for y , i , and r , equations (1) and (2) remain in equilibrium, but equation (4) experiences excess demand for loans. The supply of loans falls by $-S(i, r)$ times the change in B . If B increases by \$100 billion, for example, and the share of bank credit going to loans is 50 percent, then the supply of bank loans falls \$50 billion, *ceteris paribus*. The decrease in loan supply necessitates a rise in the loan interest rate, r , in (4) and a reduction in expenditures in equation (1). Compared to original values, the model returns to equilibrium at a higher r , lower y and lower i . Thus, an autonomous decrease in the money multiplier will reduce aggregate demand and output even if the Central Bank keeps the money supply constant. This result contrasts to the IS-LM model that would predict no change in aggregate demand.

In terms of the equation of exchange, the drop in m (holding M constant) produces a drop in the velocity of money. The velocity of money, $(P \times y)/M$, must be lower as P is fixed (by assumption), M is unchanged, while y has decreased.

⁴ Clearly, the excess-reserve and currency ratios entering the money multiplier are functions of i and r . Endogenizing the money multiplier will change the magnitude of the model's predictions, but not its basic conclusions.

4. Concluding Remarks.

The credit-view model presented here predicts that an autonomous decrease in the money multiplier, when holding the money supply constant, produces an autonomous decrease in loan supply and drop in aggregate demand. The magnitude of the reduction in loan supply depends crucially on the magnitude of the increase in the monetary base needed to keep the money supply constant. As noted earlier, the massive fall in the money multiplier during 2008-2010 required more than a trillion dollar increase in the monetary base to keep the money supply from falling. This enormous rise in the monetary base suggests a potentially large negative shock to loan supply, but the exact impact of this on aggregate demand cannot be determined without a detailed empirical analysis. The model also suggests that the spread between bonds and loan interest rates would widen following an autonomous decrease in the money multiplier. This seems generally consistent with observed data especially if we compare yields on government bonds to non-mortgage loans.

The credit-view model has implications for the aggregate-demand impact of Fed policy as it deals with the current unusual money-supply situation. It is expected that banks will eventually reduce their substantial holdings of excess reserves and in the absence of some defensive monetary-policy action the money supply will surge. Currently the Fed is considering two general strategies for offsetting the expected increase in the money supply. One strategy is to lower the base as the money multiplier increases. This could be done by the Fed selling large amounts of its holdings of financial assets or by arranging for the Treasury to sell new bonds and place the proceeds

at the Fed. Alternatively, the Fed could prevent the money multiplier from falling by using its new tool that allows it to pay interest on bank reserves. By raising the interest rates it pays on bank reserves the Fed could keep the excess-reserve ratio from falling and prevent the money multiplier from increasing. The credit-view model suggests that the monetary-base-reduction policy would produce an aggregate demand stimulus while the interest-rate-on-reserves approach would be neutral on aggregate demand.

In conclusion, we know that a substantial fall in velocity took place during the 2008-2010 recession. The money supply grew, real output fell while the price level remained largely unchanged. Velocity fell despite what was thought to be a highly expansionary fiscal policy that, according to many models, should have given a boost to velocity. Clearly, wealth losses and loss of confidence worked to reduce consumption and investment spending and consequently reduce velocity. The credit-view model and its money-multiplier channel provide yet another reason why velocity might have fallen during 2008-2010. It will take empirical work beyond the scope of this letter to determine the empirical significance of this channel.

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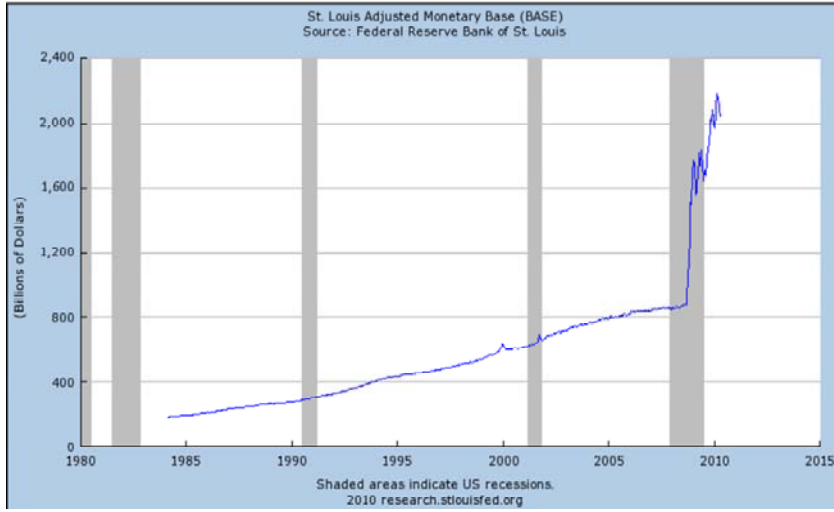


Figure 1. Monetary Base, 1984-2010

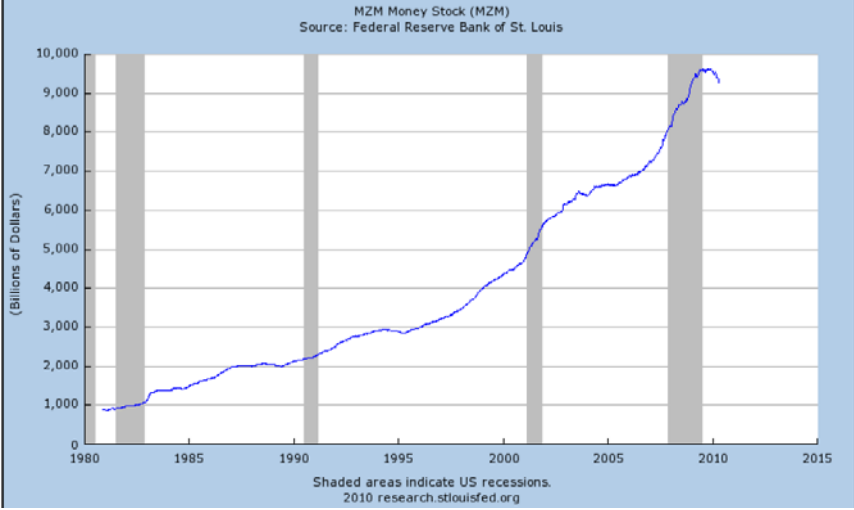


Figure 2. MZM, 1981-2010.