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Financial-Sector Shocks in a Credit-View Model¹

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Abstract

A variation of the Bernanke-Blinder credit-view model reveals that holding constant the money supply following various financial-sector shocks, including an autonomous drop in the money multiplier, is insufficient to prevent aggregate demand from decreasing.

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

JEL Classifications: F41, E51

¹ Forthcoming in *Economics Letters*

1. Introduction.

The financial crisis and recession of 2008-2010 have witnessed the biggest reduction in money-supply multipliers in U.S. history and a major reduction in bank lending. The multiplier for MZM, for example, fell over 50 percent (from 10.0 to 4.7) between September, 2008, and May, 2010.² 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.³

Also in contrast to the Great Depression, in 2008-2010 the Fed successfully prevented a money-supply collapse by dramatically increasing the monetary base. Recent movements in the monetary base are shown in figure 1. 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 is sufficient to prevent a negative financial-sector shock to aggregate demand.

A modified version of the Bernanke-Blinder (1988) credit-view model reveals, however, that holding the money supply constant following two types of financial-sector shocks is insufficient to prevent a decrease in aggregate demand. These findings

² Source: Federal Reserve Bank of St. Louis Economic Data and author's calculations. MZM subtracts time deposits from M2 and arguably provides the best monetary aggregate comparable to historical data for M1.

³ Friedman and Schwartz (1963).

provide support for an extra-ordinary increase in the monetary base and the money supply to support aggregate demand when either of these two shocks occurs. Both of these shocks were likely occurring during the 2008-2010 recession. In November, 2010, Ben Bernanke, Chairman of the Federal Reserve Bank, proposed an additional thirty percent increase in the monetary base. The credit-view model provides a justification for such extraordinary measures.

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:

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

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

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

Where, (1) is the equation for the goods market, (2) is the equation for the money market and (3) the equation for the loan market. D is the demand for loans and S is the share of bank credit (bonds and loans) going to loans. In this specification the money supply in (2) consists of both deposits and currency in circulation. The money multiplier is a function of the traditional excess-reserve (e), currency (c) and required-reserve (r) ratios:

$$m = (1+c)/(r+e+c) \quad (4)$$

Following B-B, the money multiplier, m , is a function of the interest rate paid on bonds, i . An increase in i , for example, decreases the excess-reserve and currency ratios, increasing the money multiplier, other things equal.⁴ The expression $(m - 1) \times B$ represents total bank credit, bank assets held either in bonds or loans.⁵ The variables α and β are exogenous shift variables that increase m and S .

The above model differs from the B-B model by incorporating an explicit Brunner-Meltzer money-multiplier variable into bank credit and loan supply. In this specification, bank credit consists only of bonds and loans and not excess reserves as in B-B. This permits an explicit separation and identification of the money multiplier in the loan supply equation. This is useful for exploring comparative statics in the model holding the money supply constant following a change in the money multiplier.

3. Comparative Static Results and Conclusion.

Two types of financial shocks are now investigated with the model. Both shocks assume the Central Bank adjusts the monetary base to keep the money supply constant. The first shock is an increase in the perceived risk of bank loans. The second shock is an autonomous decrease in the money multiplier.

⁴ This assumes the rise in bond interest rates increases the interest rate paid on deposits and lowers the currency ratio.

⁵ 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). This specification differs slightly from B-B's specification. They include excess reserves in BC .

An increase in the perceived risk of bank loans produces an autonomous decrease in the share of bank credit going to loans ($-\beta$). Holding the money supply constant through an appropriate increase in the monetary base (i.e., $m \times dB + B \times dm = 0$) produces the following effects on endogenous variables: y decreases, r increases, and i decreases.⁶ The decrease in i induces a drop in the money multiplier and the central bank, by assumption, responds by increasing the monetary base in order to keep M constant. Notably, holding the money supply constant fails to prevent a drop in aggregate demand and output.

To investigate a second financial shock, assume the money multiplier shift variable, α , decreases and produces an autonomous decrease in the money multiplier. Again assume that the Central Bank holds the money supply constant and increases the monetary base. Such an autonomous shock to the multiplier could be caused by an increase in the required reserve ratio, an autonomous increase in the currency ratio or an autonomous increase in the excess reserve ratio. Comparative statics results are similar to those for an adverse shock to loan share: output falls, the interest rate on bonds decreases and the interest rate on loans increases. Table 1 summarized the comparative static findings for these two financial sector shocks.

Both of the above financial sector shocks, an autonomous decline in loan share of bank credit and an autonomous increase in the excess-reserve ratio causing an autonomous decline in the money multiplier, likely operated during the 2008-2010 recession. According to the credit-view model, the Federal Reserve's monetary policy actions to offset the huge decrease in money multipliers with a massive increase in the monetary base are insufficient to prevent the financial sectors from contributing to an

⁶ A mathematical appendix detailing the comparative static proofs is available from the author.

aggregate demand downturn. This provides support for the Federal Reserve's decision to further increase the monetary base and produce an extra-ordinary expansion of the money supply. However, the magnitude and appropriate timing of this expansion is less clear.

Table 1. Comparative-Static Findings Holding Money Supply Constant

Autonomous fall in:	(1) Income (Y)	(2) Interest rate (i) bonds	(3) Interest rate (r) loans
Money Multiplier (m) (decrease in α)	-	-	+
Loan Share (S) (decrease in β)	-	-	+

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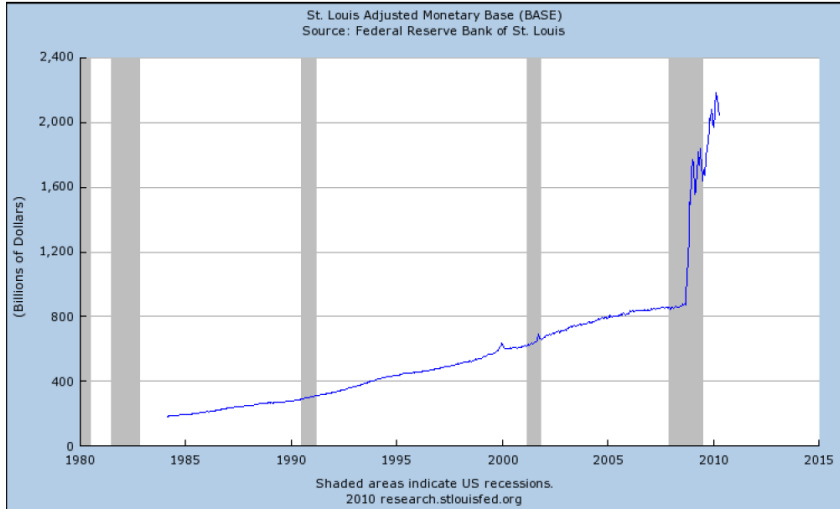


Figure 1. Monetary Base, 1984-2010