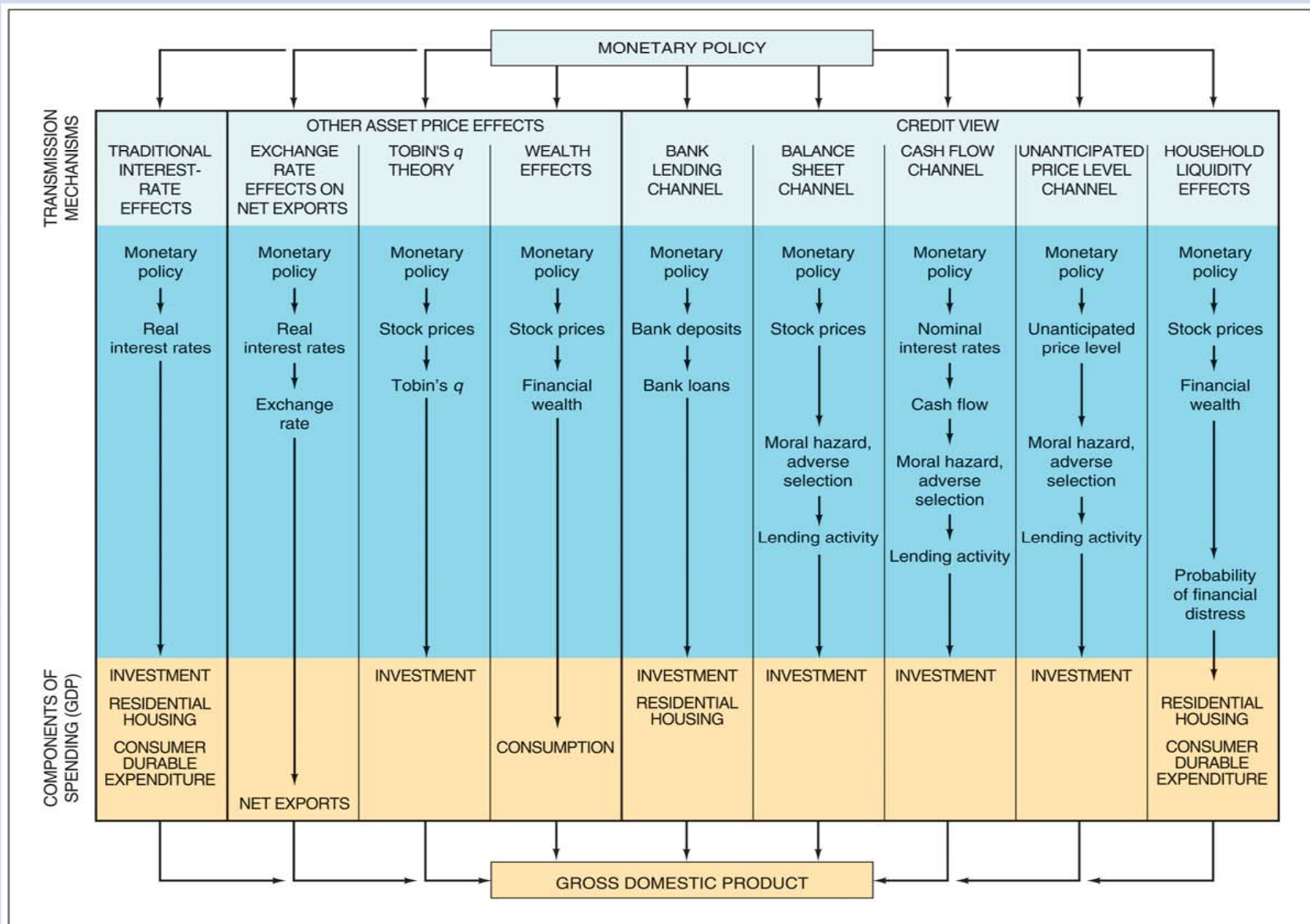


Economics 435  
The Financial System  
(11/13-18/2019)

Instructor: Prof. Menzie Chinn  
UW Madison  
Fall 2019



**FIGURE 3 The Link Between Monetary Policy and GDP: Monetary Transmission Mechanisms**

## CC-LM (Bernanke-Blinder)

Bank lending channel; imbeds a banking sector into an IS-LM model. (1) Loan mkt; (2) Money mkt; (3) IS curve.

$$(1) \quad L(\rho, i, y) = \lambda(\rho, i) D(1 - \tau).$$

$$(2) \quad D(\underset{+}{i}, \underset{+}{y}) = m(\underset{+}{i}) R.$$

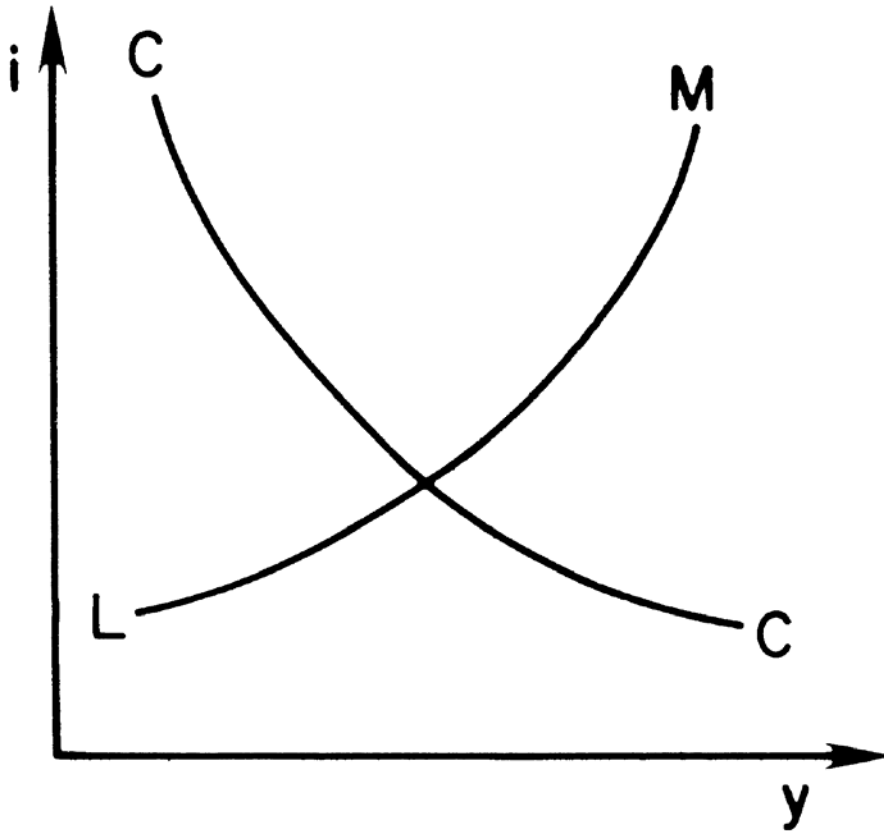
$$(3) \quad y = Y(\underset{-}{i}, \underset{-}{\rho}).$$

## CC-LM

Solved for rho using loan mkt, and LM to get (4).  
Substitute (4) into (3) to get (5), the CC curve,  
which is a combined commodities and credit  
curve.

$$(4) \quad \rho = \phi \left( \underset{+}{i}, \underset{+}{y}, \underline{R} \right).$$

$$(5) \quad y = Y \left( i, \phi \left( i, y, R \right) \right),$$



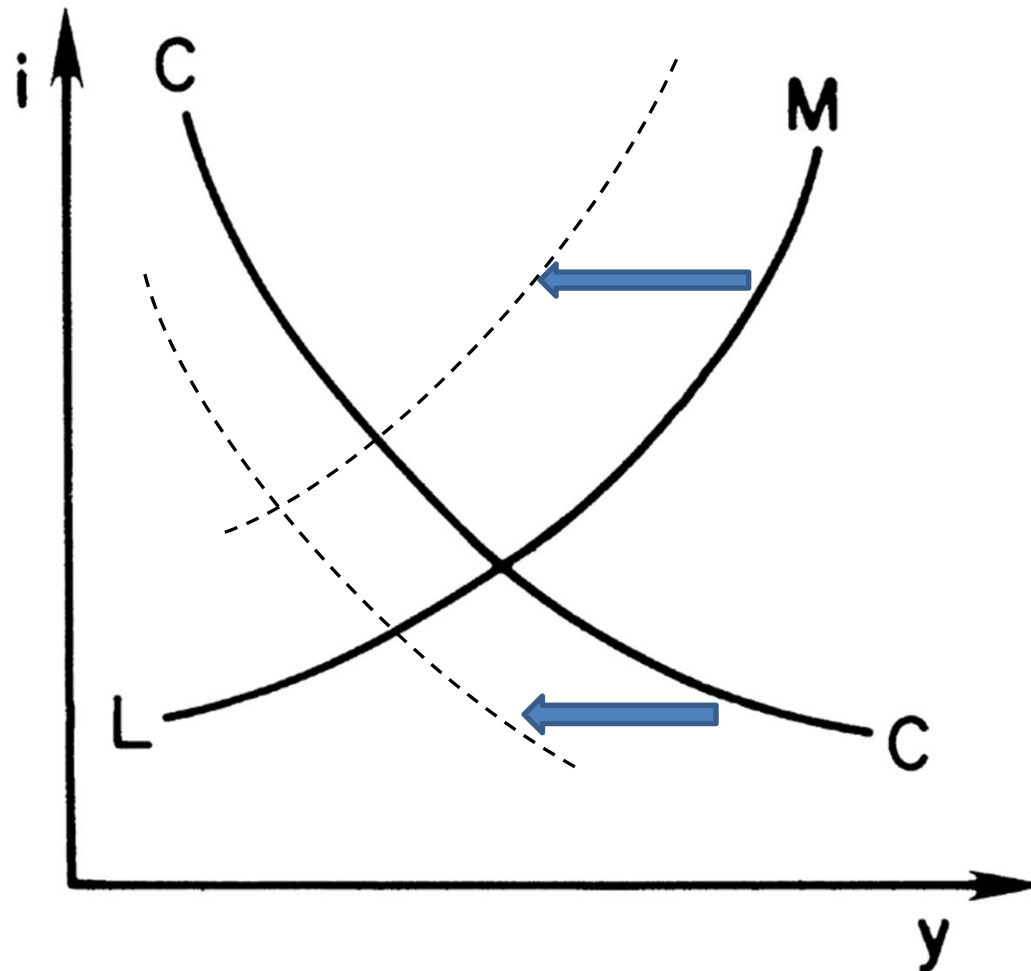
# CC-LM Comparative Statics

TABLE 1—EFFECTS OF SHOCKS ON  
OBSERVABLE VARIABLES

Rise in:	(1) Income	(2) Money	(3) Credit	(4) Interest Rate <sup>a</sup>
Bank Reserves	+	+	+	-
Money Demand	-	+	-	+
Credit Supply	+	+	+	+
Credit Demand	-	-	+	-
Commodity Demand	+	+	+	+

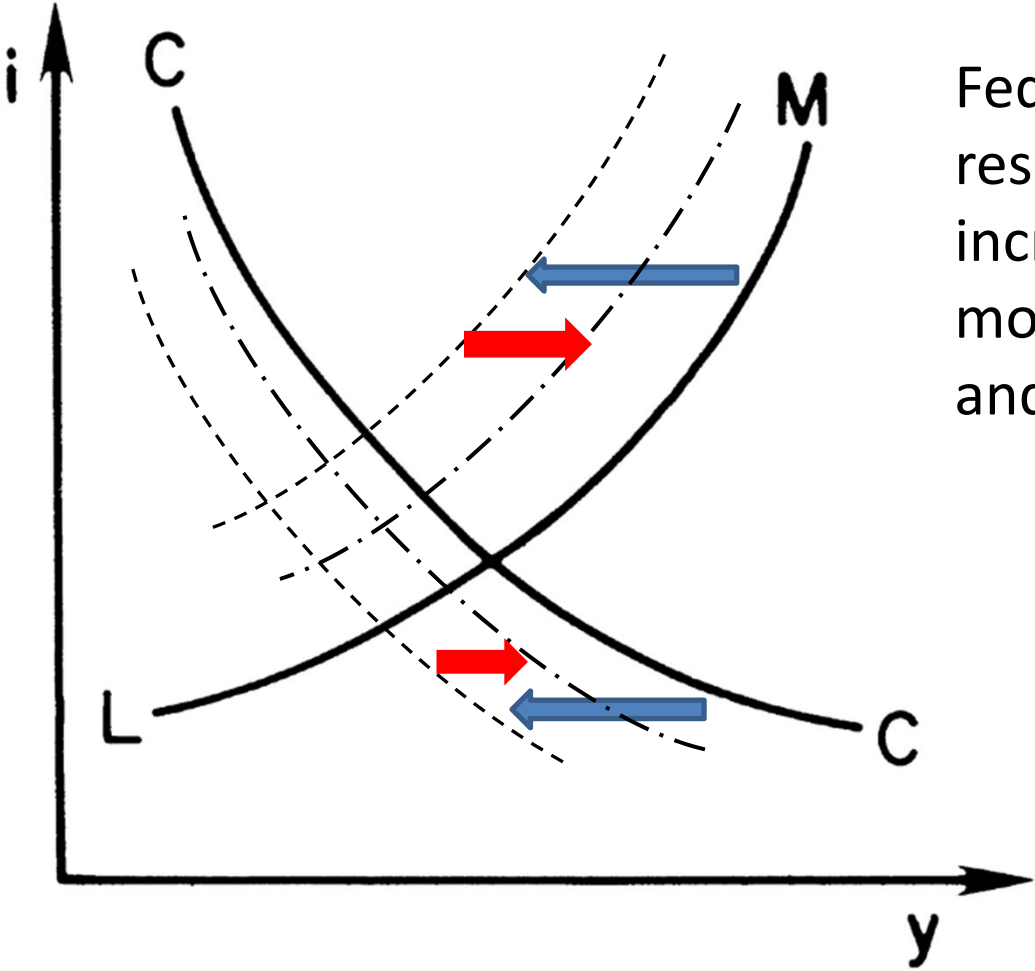
<sup>a</sup>On bonds.

# The Shock: Banking Sector



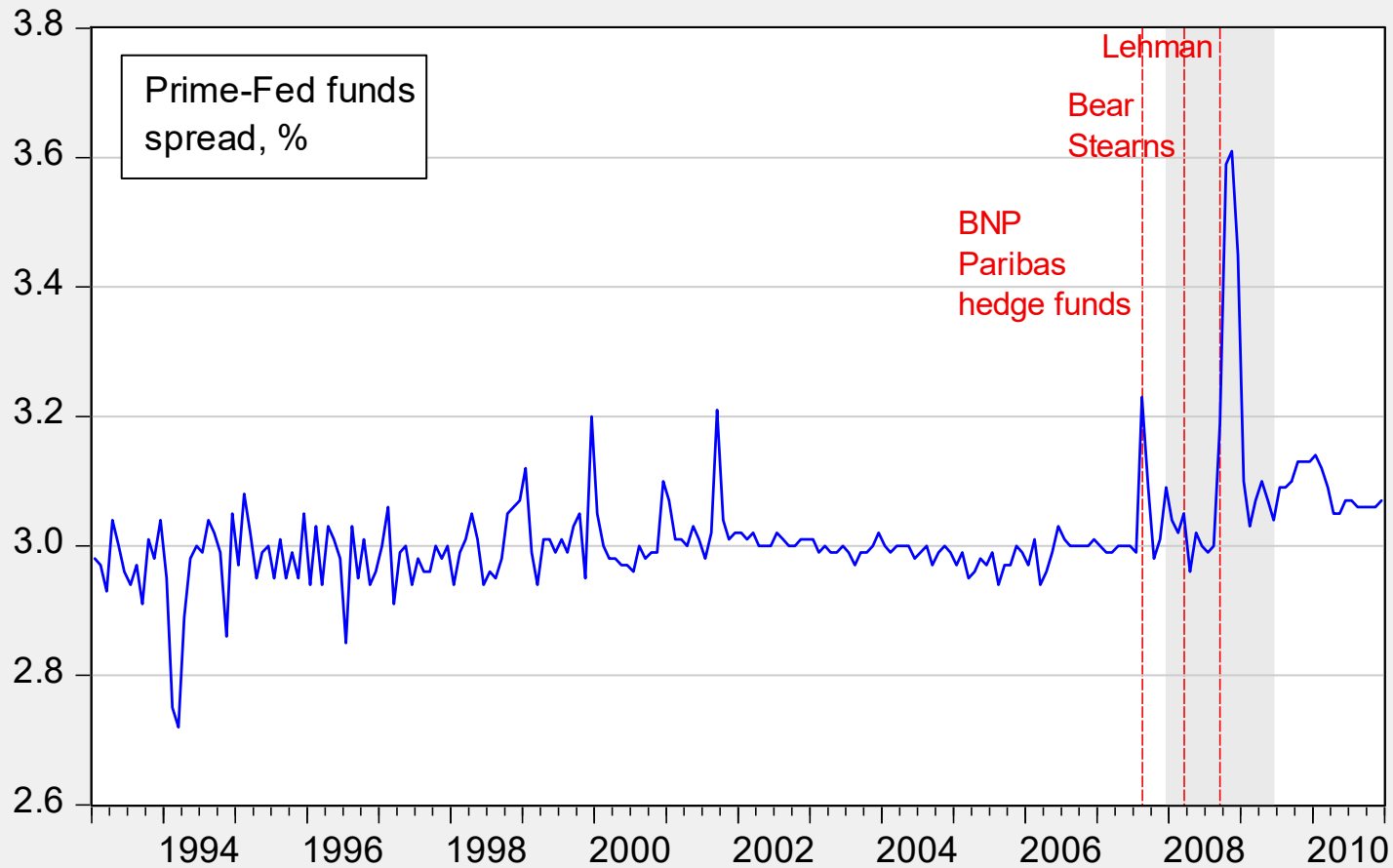
Higher risk causes decline in credit supply, causes reduction of loans, destruction of checking deposits and hence money supply

# The Shock: Fed Response



Fed increases reserves, cases increase in money base, and in loans

# Spreads on Bank Lending Rates





# Financial Accelerator

(Bernanke-Gertler-Gilchrist, 1996)

First, external finance is more expensive than internal finance, unless the external finance is fully collateralized. The higher cost of external finance reflects the agency cost of lending (the inevitable deadweight loss that arises because of asymmetric information).

Second, given the total amount of finance required, the premium on external finance varies inversely with the borrower's net worth, which we define as the sum of his internal funds (liquid assets) and the collateral value of his illiquid assets.

Finally, a fall in the borrower's net worth, by raising the premium on external finance and increasing the amount of external finance required, reduces the borrower's spending and production. This last result is the heart of the financial accelerator: To the extent that negative shocks to the economy reduce the net worth of borrowers (or positive shocks increase net worth), the spending and production effects of the initial shock will be amplified.

# Collateral Constraints: Recession induced decline in capital value

**Pre-Shock Firm Balance Sheet**

Assets	Liabilities
Capital (1 million machines × \$1000/machine = \$1 billion)	Debt (\$700 million)
	Equity (\$300 million)

Net worth = \$300 million

**Post-Shock Firm Balance Sheet**

Assets	Liabilities
Capital (1 million machines × \$800/machine = \$1 billion)	Debt (\$700 million)
	Equity (\$100 million)

Price of machines falls by 20%  
Net worth = \$100 million

# Financial Accelerator

- Two periods, 0, 1
- Two factors,  $K$  (fixed)  $x_1$  (variable)
- At end of period 1, can sell fixed factor at  $q_1$  ;  
 $x_1$  price = 1 and depreciates fully
- Begins period 0 w/ cash flow  $a_0 f(x_0)$  and debt obligation  $r_0 b_0$  ( $r_0$  is gross interest rate)
- Output in period 1 is  $a_1 f(x_1)$

# Financial Accelerator

New borrowing and variable inputs linked:

$$x_1 = a_0 f(x_0) + b_1 - r_0 b_0. \quad (1)$$

Suppose difficult to seize output (difficult to observe) but easy to seize fixed factor. Then fixed factor can serve as collateral:

$$b_1 \leq (q_1 / r_1) K. \quad (2)$$

# Financial Accelerator

- Unsecured lending is not feasible in this environment.
- Means there is a “collateral in advance” constraint.

$$x_1 \leq a_0 f(x_0) + (q_1/r_1)K - r_0 b_0. \quad (3)$$

Spending on the variable input cannot exceed the entrepreneur's net worth, equal to the sum of gross cash flow  $a_0 f(x_0)$  and net discounted assets,  $(q_1/r_1)K - r_0 b_0$ . If the entrepreneur's net worth is less than the unconstrained optimal value of  $x_1$ , which satisfies  $a_1 f'(x_1) = r_1$ , then the constraint (3) binds.

## Financial Accelerator

- When (3) binds,  $a_1 f'(x_1) > r_1$  (marginal value of dollar inside firm exceeds dollar outside firm)
- Fall in net worth raises agency premium  
 $a_1 f'(x_1) - r_1$ , also reduces borrower's spending.
- Net worth declines (and spending falls) if:
  - cash flow,  $a_0 f(x_0)$ , falls
  - asset price,  $q_1$ , falls
  - initial debt obligations,  $b_0$ , rises

# Financial Accelerator

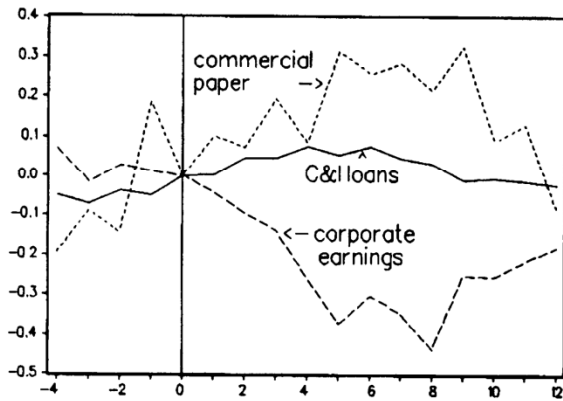
## V. Conclusion

The theory underlying the financial accelerator suggests that (1) borrowers facing relatively high agency costs in credit markets will bear the brunt of economic downturns (the flight to quality); and that (2) reduced spending, production, and investment by high-agency-cost borrowers will exacerbate the effects of recessionary shocks. As our paper has discussed, we now have fairly strong evidence—at least for the case of firms—that downturns differentially affect both the access to credit and the real economic activity of high-agency-cost borrowers. It would be useful to investigate these cross-sectional implications for other sectors, notably the household and banking sectors. Quantification of the importance of the financial accelerator in macroeconomic dynamics is an equally important topic for future research.

# Flight to Quality

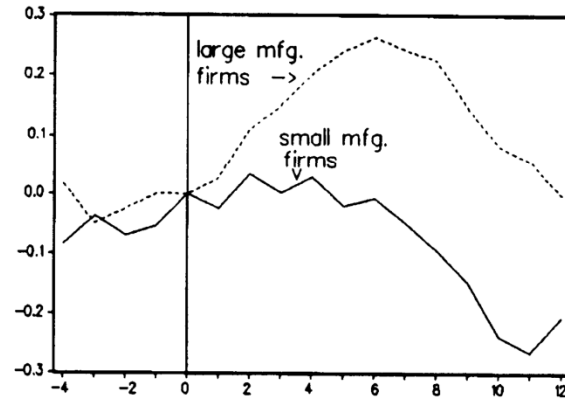
FIGURE 1.—BEHAVIOR OF SHORT-TERM DEBT AGGREGATES AND CORPORATE EARNINGS AROUND ROMER EPISODES OF TIGHT MONEY

Commercial Paper, C&I Loans,  
and Corporate Earnings

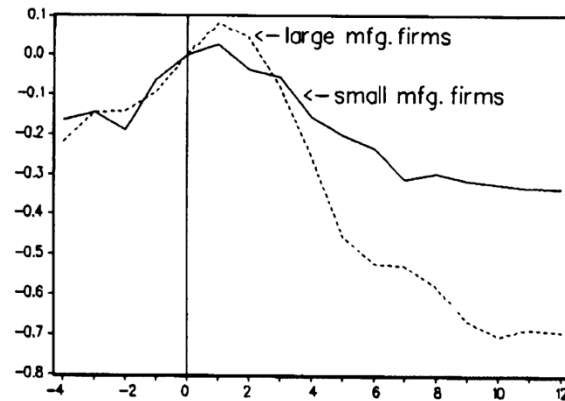
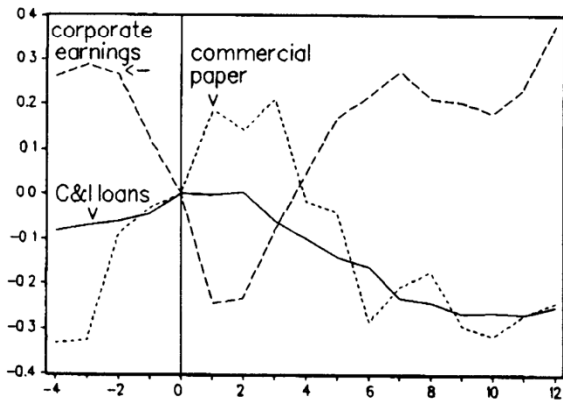


Short-Term Debt of Manufacturing  
Firms

1968:4

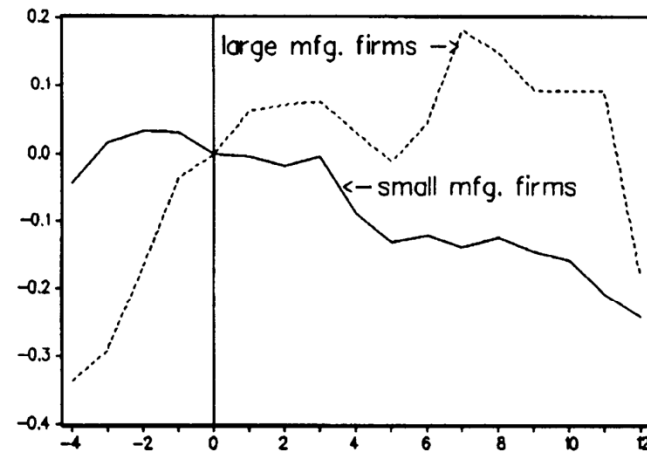
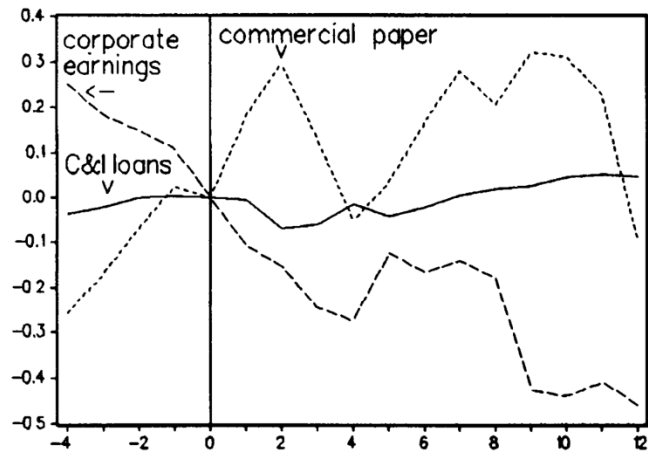


1974:2

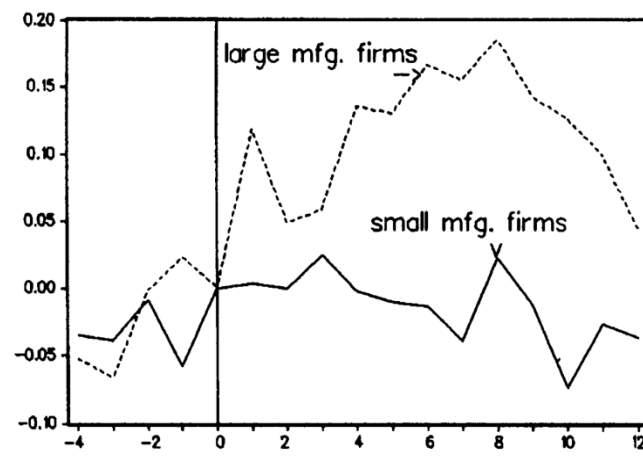
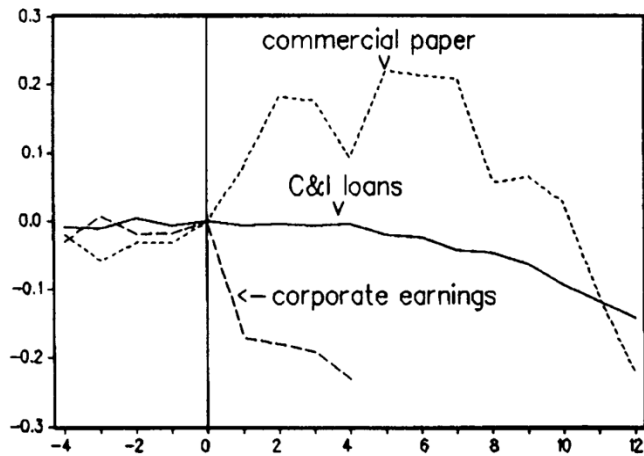




1979:4



1988:4



Source: Bernanke, Gertler and Gilchrist (*REStat*, 1996)