The Identification of Monetary Policy Disturbances. Explaining the Liquidity Puzzle

by

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Overview

When monetary aggregates are used to measure exogenous policy disturbances, three problems consistently arise:

1. Innovations in standard monetary aggregates are associated with rising rather than falling interest rates. This is fairly consistently observed in the literature.

2. Monetary aggregates do not Granger-cause output when interest rates are included.

3. Innovations in money explain a small proportion of output variance in VARs relative to interest rate innovations.
Related conceptual problems:

1. If there is a liquidity puzzle, How can innovations in interest rates be attributed to monetary policy?
2. Inferences about policy shocks are susceptible to misspecification errors that lead to endogeneity, e.g. rising prices after a contractionary money shock.
What explains these problems?

- A significant proportion of the variance in reserves is due to accommodation of demand innovations rather than policy-induced supply innovations.

Key identifying assumptions:

- The level of total reserves is determined by the Fed’s accommodation of reserve demand shocks.
- Policy innovations are reflected in the mix of borrowed and nonborrowed reserves.
Summary of findings:

• Interest rates fall in response to expansionary monetary policy disturbances.

• Monetary policy disturbances account for a higher percentage of the variance of interest rates and output.

• The marginal explanatory power of interest rates relative to the new measure is negligible in Granger-causality tests.

• Accommodative policy leads to permanent and significant increases in prices.

• Output responses to policy innovations are insensitive to different VAR orderings.
Identifying Policy – The market for reserves

Fed Funds Rate
Discount Rate

r
Reserves

D
S’
S
Key assumptions

1. Innovations in the total level of reserves are largely the result of the Fed’s accommodation of demand innovations.

2. The Fed exerts its influence by altering the mix of borrowed to nonborrowed reserves it supplies to meet current demand.
Model

\[ u_{nbr} = \nu_s + \phi \nu_d \]
\[ u_{br} = - \nu_s + (1 - \phi) \nu_d \]
\[ u_{tr} = 0 + \nu_d \]
\[ u_{ff} = \lambda \nu_s + \pi \nu_s + \nu_ff \]

\( \nu_s, \nu_d \) are reserve supply and demand shocks
\( \phi \) is the split determined by operating procedure

\( \lambda \) is the liquidity effect, \( \pi \) is the elasticity of interest rates to reserve demand.
Institutional Rigidities

- In the short-run, there is little banks can do to affect their demand for reserves.

- Borrowed and non-borrowed reserves satisfy reserve requirements equally well, however, banks are reluctant to borrow.

- Banks hold reserves for two purposes: (1) to satisfy requirements; and (2) to clear balances. Hence, banks also want to avoid finishing the day in overdraft and tend to hold excess reserves.
Institutional History

• 1959 – 1966: Free reserves targeting (fed funds market does not exist)

• 1966 – 1972: Free reserves targeting

• 1972 – 1979: Fed funds targeting

• 1979 – 1982: Nonborrowed reserves targeting

• 1982 – present: borrowed reserves/fed funds targeting
Empirical Implementation

Goal: to identify supply innovations in narrow money aggregates to be able to trace the response of interest rates and verify the liquidity effect.

Key point 1: From the “model,” the identification strategy consists on realizing that the orthogonal component of nonborrowed reserves to total reserves will contain the supply shocks – this consists in ordering total reserves ahead of nonborrowed reserves in a Choleski identification of the VAR.
Key point 2: To preserve the structure of the model into the empirics and the identification assumptions implied, normalize the data by the previous period’s total reserves.
VAR Specifications

3-variable VAR: TR, NBRX, FF

5-variable VAR: IP, CPI, TR, NBRX, FF

Lag-length: 6-lags for subsamples; 12-lags for full sample

Sample: January 1959 – February 1992

Responses to TR shocks (reserve demand)
Responses to NBRX shocks (supply shocks) – The Liquidity Effect
Conclusions

• First paper to deliver a significant and persistent liquidity effect after a vast litany of failure.

• **Key insight:** the institutional framework matters – it is easy to confound supply and demand innovations if proper identification is not implemented.

• **At a more general level:** proper identification is difficult to verify. Improper identification assumptions may lead to measuring endogenous rather than exogenous responses.