

# New Monetarist Economics: Understanding Unconventional Monetary Policy

Steve Williamson  
Washington University in St. Louis  
Federal Reserve Bank of Richmond  
Federal Reserve Bank of St. Louis

July 2011

# What I Learned From the Financial Crisis

- My view of economics pre-crisis: A group of scientists - knowledgeable, well-trained and talented people in seminars, at conferences, and in the top journals, hashing over ideas.
- How economics looks to me now: Two groups:
  - ① The above-mentioned scientists.
  - ② Rabble-rousers: An angry mob with vague notions of what group 1 is up to, but bent on destruction anyway.
- What's going on here?
  - Are the rabble-rousers confused, self-absorbed, or is it just that their goals are political and not scientific?
  - Do the rabble-rousers have a point?
  - Are the scientists good at science but bad at explaining themselves?

# Some Successful Economists Have Also Been Rousing Some Rabble

Caballero (mild rabble-rousing):

*On the methodology front, macroeconomic research has been in 'fine-tuning' mode within the local-maximum of the dynamic stochastic general equilibrium world, when we should be in 'broad exploration' mode.*

Krugman (not-so-mild):

*So here's what I think economists have to do. First, they have to face up to the inconvenient reality that financial markets fall far short of perfection...*

- This is what I mean by “confused.” There is plenty of broad exploration and facing up, and you don't have to look hard to find it.

# New Monetarism

- Are we at a loss when it comes to understanding recent events and current policy issues?
- No, we have been working on limited commitment, private information, and monetary exchange, for the last 40 years or more, including work by 6 Nobel prize-winners in economics.
  - Kareken-Wallace (1980), “Models of Monetary Economies”
  - Private Information: 1970s adverse selection, principal-agent, costly state verification
  - Intermediation Theory: Diamond, Diamond-Dybvig, Boyd-Prescott, B. Smith, Williamson, Bernanke-Gertler, Townsend
  - Mechanism design: Hurwicz, Maskin, Myerson
  - Dynamic contracts: Green, Abreu-Pierce-Stachetti, Atkeson-Lucas
  - Limited commitment: Kehoe-Levine, Kocherlakota
  - Monetary Search: Kiyotaki-Wright, Lagos-Wright
- Some surveys: Williamson and Wright (*Handbook of Monetary Economics, St. Louis Fed Review*) and Nosal and Rocheteau (MIT Press, 2010).

# Key New Monetarist Ideas

- 1 To understand how financial factors are important for aggregate economic activity, we need to delve into the particulars of private information and limited commitment frictions.
  - 2 To analyze monetary policy requires that we construct models that explain how and why central bank liabilities and other assets are used in exchange, and to think carefully about how the central bank functions as a financial intermediary.
  - 3 Attempting to classify some subset of assets as “money” is a futile and useless exercise. We are interested in liquidity - broadly, some notion of how assets are used in exchange (retail exchange, wholesale exchange, exchange among financial institutions).
- These three ideas set us apart, from Old Keynesians, Old Monetarists, and New Keynesians, though the New Keynesians show some signs of wanting to catch up.

# Plan for the Talk

- Review some recent monetary policy interventions in the United States.
- Use a model fleshed out in Williamson (2011) - “Liquidity, Monetary Policy, and the Financial Crisis: A New Monetarist Approach”
- Show how the model can be used to make sense of some features of the financial crisis, and of the conventional and unconventional policy responses to it.

# Balance Sheet of the Federal Reserve System

## Liabilities (\$billions)

	January 2008	July 2011
Currency	829	1024
Reserves	13	1617
Treasury Accounts	9	113

## Assets (\$billions)

	January 2008	July 2011
T-bills	228	18
T-bonds	508	1514
Mortgage-backed securities	0	912
Agency securities	0	118

- Balance sheet size: tripled, from \$944 billion to \$2903 billion

# Two Interventions of Particular Interest

- Typically referred to as “quantitative easing,” a misnomer.
- QE1:
  - \$1128 billion in purchases of mortgage-backed securities, Feb. 2009 to July 2010
  - \$169 billion in purchases of agency securities, Sept. 2008 to April 2010
- QE2: \$600 billion in purchases of T-bonds, Nov. 2010 to June 2011

Reserve Balances with Federal Reserve Banks (WRESBAL)  
Source: Board of Governors of the Federal Reserve System



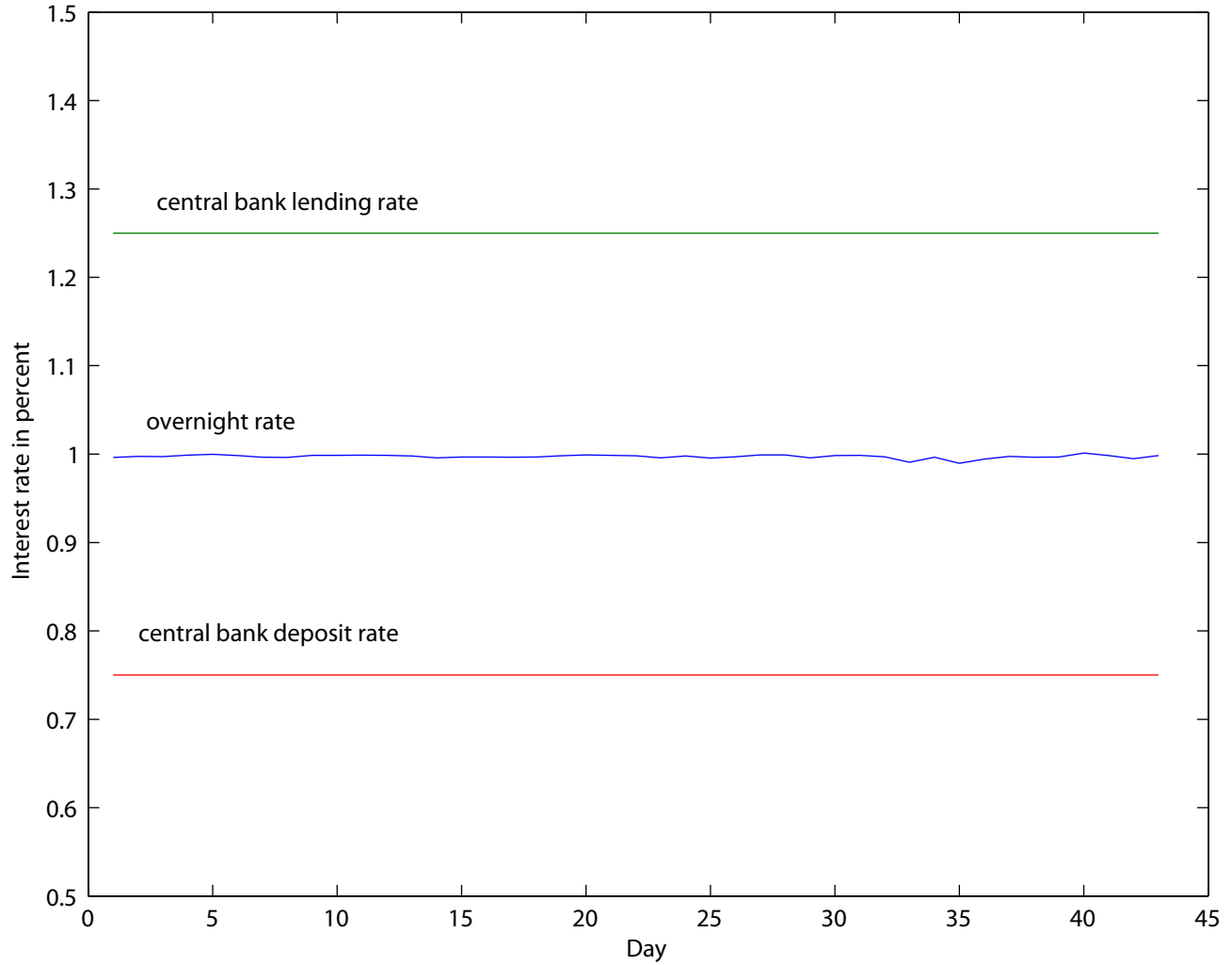
Shaded areas indicate US recessions.  
2011 research.stlouisfed.org

Effective Federal Funds Rate (DFF)  
Source: Board of Governors of the Federal Reserve System



Shaded areas indicate US recessions.  
2011 research.stlouisfed.org

Bank of Canada channel and overnight rate



# Key Questions

- How does monetary policy work when there is a positive quantity of excess reserves in the system for an extended period of time?
- How do the effects of open market operations in private assets or in long-maturity government securities differ from conventional open market operations in short-term government securities?

- Basic structure looks like Rocheteau-Wright (2005)
- $t = 0, 1, 2, 3, \dots$
- Two subperiods: decentralized trading (DM) followed by centralized trading (CM)
- Population: Continuum of *buyers*, continuum of *sellers*, each with unit mass.

- Buyers:

$$E_0 \sum_{t=0}^{\infty} \beta^t [u(x_t) - H_t]$$

- Sellers:

$$E_0 \sum_{t=0}^{\infty} \beta^t [-h_t + X_t]$$

- $x, X$  denote consumption;  $h, H$  denote production.

- Costly State Verification Credit: Overlapping generations of entrepreneurs, constant mass  $\alpha$ .
  - each entrepreneur lives from one CM to next CM
  - each has an indivisible investment project with payoff  $w$ , distribution  $F(w)$ .
  - $w$  is private information - verification cost is  $\gamma$
  - heterogeneity across entrepreneurs: distribution of verification costs  $G(\gamma)$ .
- DM: Random bilateral matching (buyers matched with sellers)
- CM: Everyone together in one location
- Key friction: imperfect information. Market participants in CM can only observe prices; buyers/sellers in DM don't know histories.

- Loans to entrepreneurs
  - costly state verification implies optimal debt contracts and delegated-monitoring intermediary structure.
  - gross loan rate  $R(\gamma)$ , each loan has gross expected return  $r$ .
  - total loans are  $L(r)$ ,  $L' < 0$ .
- Currency:
  - $M_t$  units in period  $t$ , trades at price  $\phi_t$  (price of money in terms of goods).
  - produced only by the government (no counterfeiting).
- Nominal one-period government bonds:
  - $B_t$  in period  $t$ , sells at price 1 (units of money) and pays off  $q$  units of money.
  - account balances with the fiscal authority.

# Exchange in the DM

- Fraction  $\rho$  of meetings: information technology is not available to trade loans, government bonds, or the liabilities of intermediaries holding these objects as assets. Cash is the only alternative.
- Fraction  $1 - \rho$  of meetings: can trade claims on entrepreneurs, bonds, currency, or claims to a portfolio of these assets.
- Personal IOUs never accepted, as no access to histories.

- Government policy:  $(\delta, \mu)$ , where

$$M_t = \delta(M_t + B_t)$$

$$M_{t+1} + B_{t+1} = \mu(M_t + B_t), \quad t = 0, 1, 2, \dots$$

- Policy determines the mix of public liabilities and the rate of growth in the total.

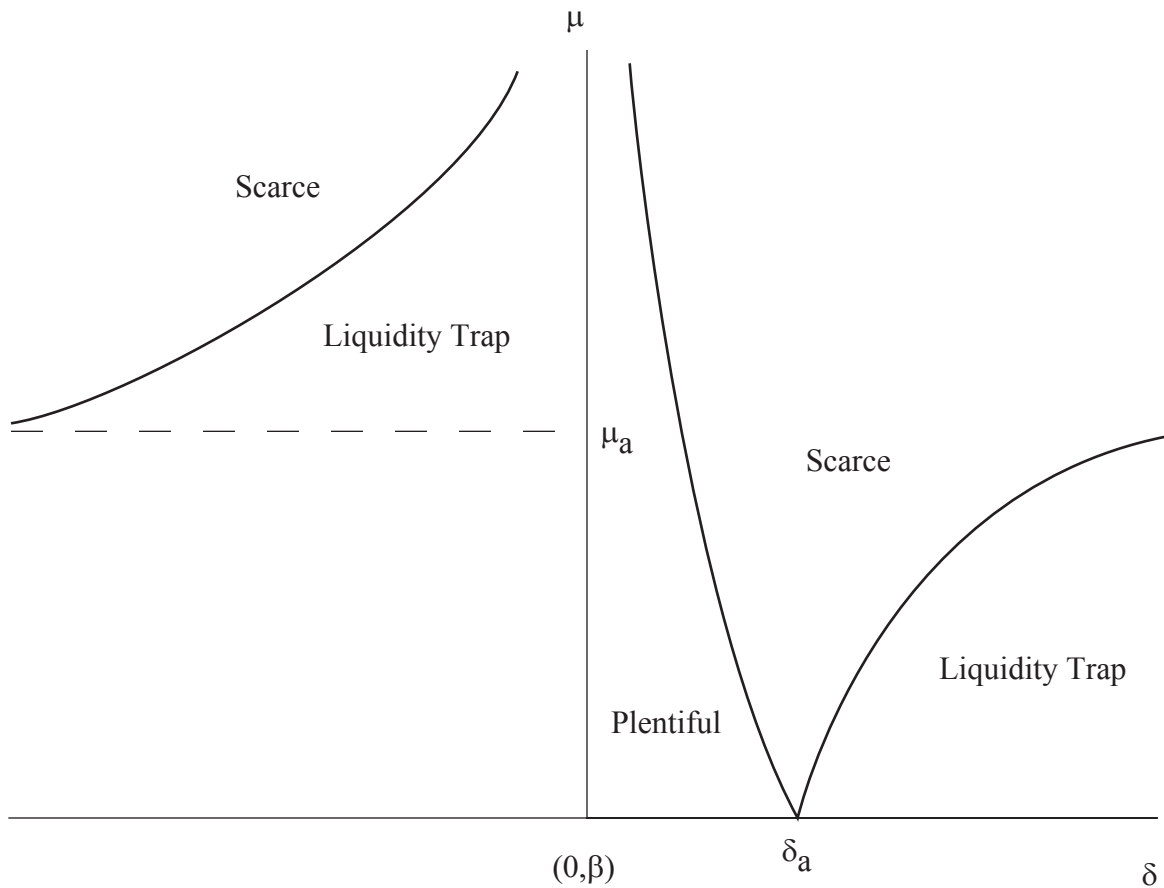
- CM: Buyers work and acquire deposits in banks.
- Banks acquire a portfolio of currency, government bonds, and loans to entrepreneurs.
- Buyers each learn the type of meeting for the next DM.
- Buyers requiring currency withdraw it from the ATM.
- Buyers who don't need currency use their debit card to transfer bank liabilities to a seller in the DM.
- Buyers trade in the DM.
- In the next CM, banks dissolve and pay off their promises from the previous CM.

# Key Features

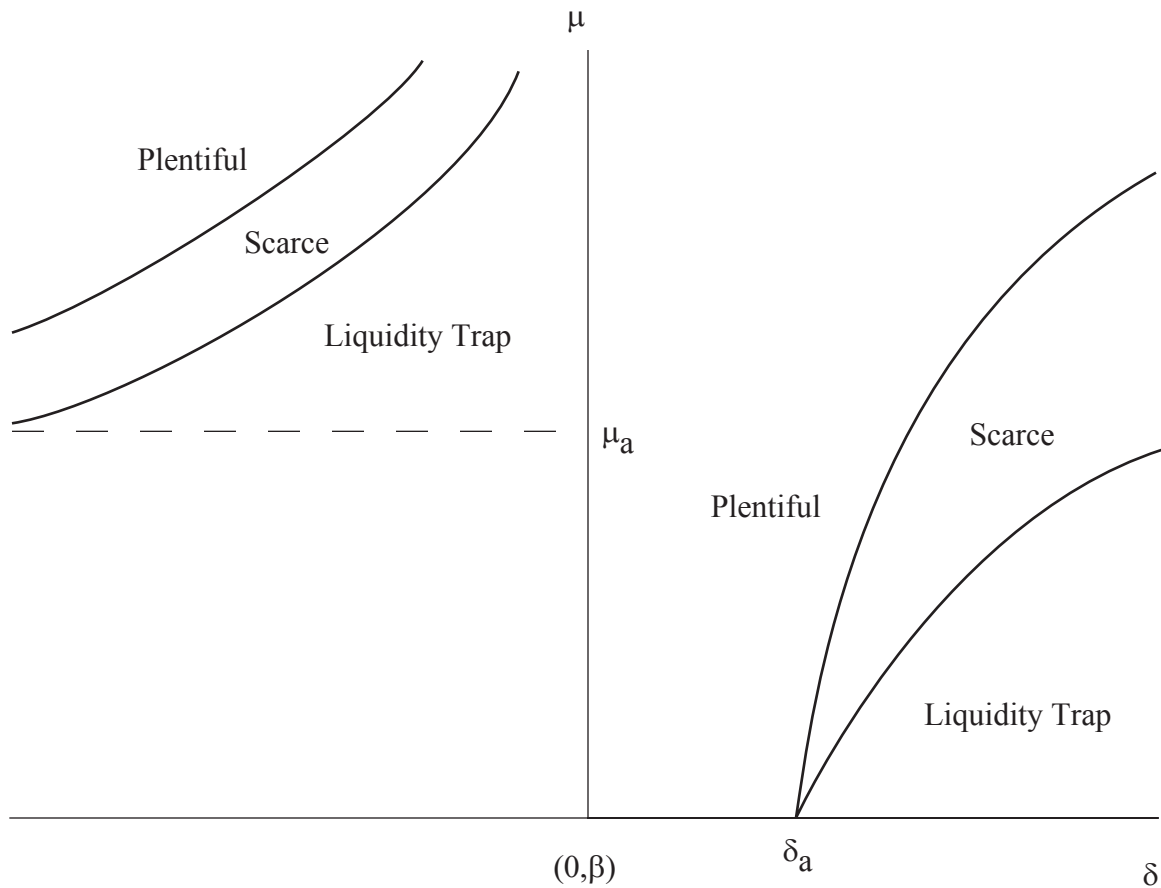
- Two roles for banks: delegated monitoring and Diamond-Dybvig.
- As in D-D, there is an insurance role for banks - banks act to allocate liquidity efficiently.
- Better for one type of transactor to have currency, and the other type of transactor to have bank liabilities backed by loans (private liquidity), and government bonds (public liquidity).
- In contrast to D-D, bank liabilities are traded, and rates of return on assets are endogenous.

- Stationary equilibria where policy  $(\delta, \mu)$  determines  $(r, m, a)$  : gross real interest rate, real stock of currency, real stock of government bonds plus loans (interest-bearing assets).
- Four types of equilibria:
  - Liquidity trap:  $\frac{1}{\mu} = r < \frac{1}{\beta}$  : currency is not scarce relative to other assets, but all assets are scarce.
  - Plentiful interest-bearing assets:  $\frac{1}{\mu} < r = \frac{1}{\beta}$  : currency is relatively scarce, other assets are not scarce.
  - Scarce interest-bearing assets:  $\frac{1}{\mu} < r < \frac{1}{\beta}$  : currency is relatively scarce, other assets are scarce.
  - Friedman rule:  $\frac{1}{\mu} = r = \frac{1}{\beta}$  : no scarcity.
- Scarcity reflected in efficiency of trades in DM exchange.
  - Surplus in DM exchange =  $u(x) - x$ , maximized when  $x = x^*$  with  $u'(x^*) = 1$ .
  - Scarcity implies  $x < x^*$ .

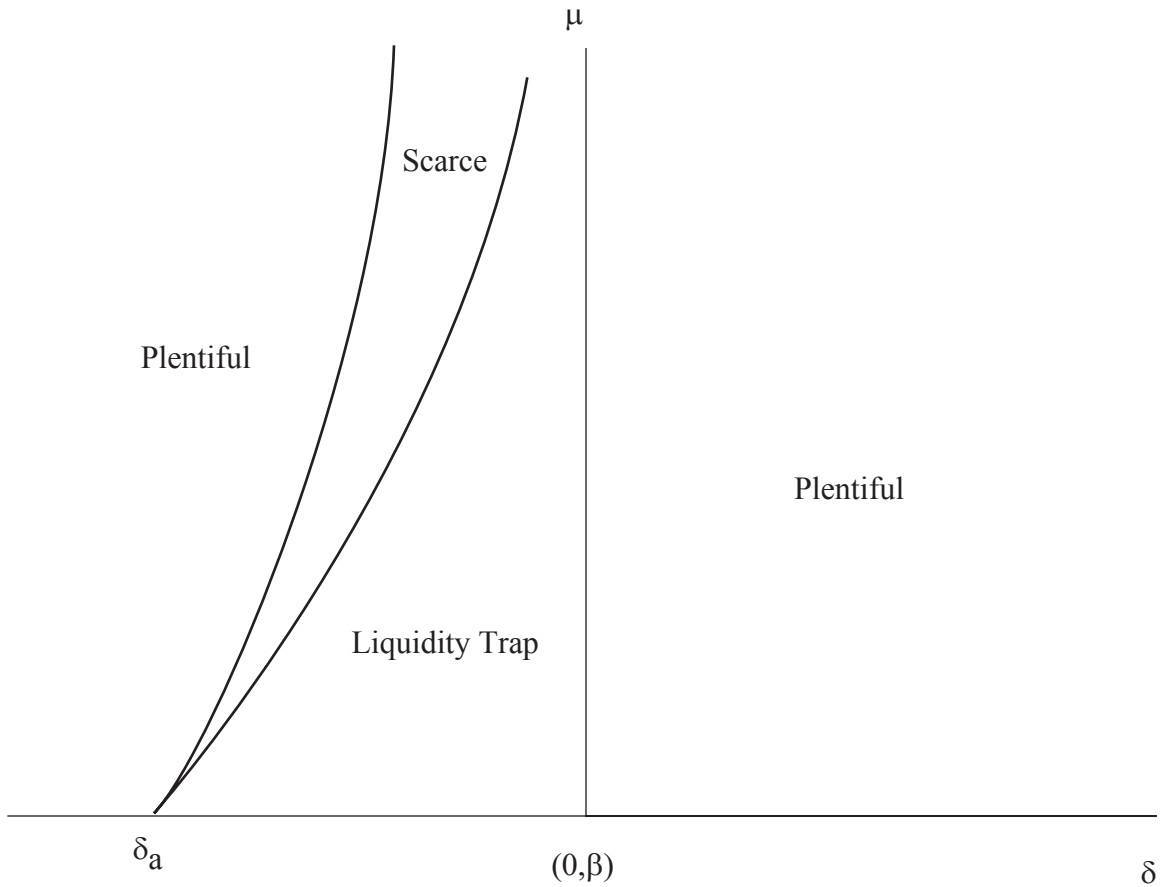
**Figure 3: Equilibria with Private Assets:  $L(1/\beta) < (1-\rho)x^*$**



**Figure 4: Equilibria with Private Assets:  $(1-\rho)x^* < L(1/\beta) < x^*$**

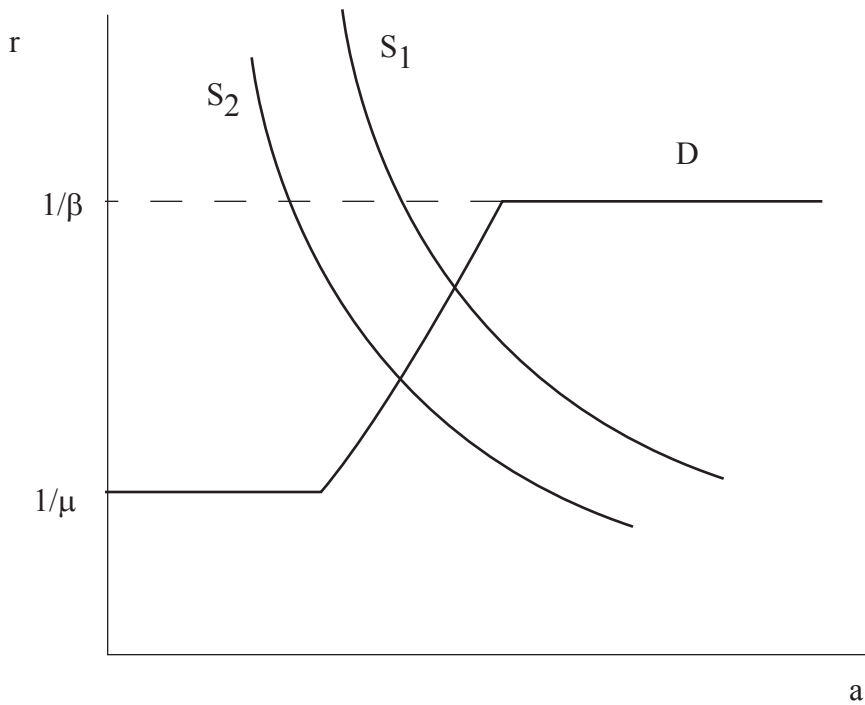


**Figure 5: Equilibria with Private Assets:  $x^* < L(1/\beta)$**



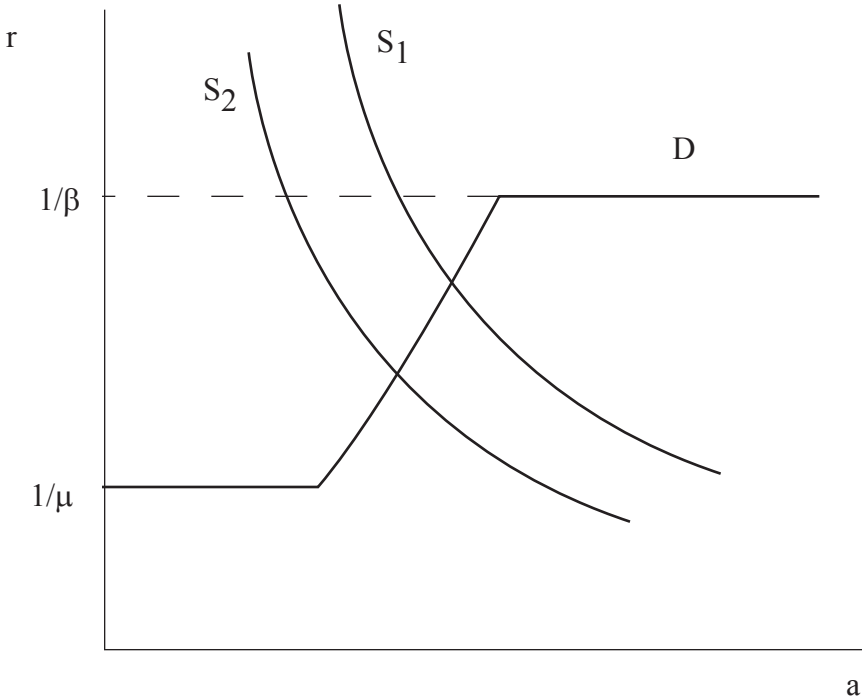
- Can obtain the liquidity trap equilibrium away from the Friedman rule. For any  $\mu \geq \beta$  there exists a  $\delta$  such that the only equilibrium is a liquidity trap equilibrium.
- When interest-bearing assets are scarce, an open market purchase is always non-neutral. There is an *illiquidity effect*. The real rate falls and lending expands.

**Figure 6: Illiquidity Effect with Private Assets**



- Think about financial crisis as affecting  $F(w)$  and  $G(\gamma)$ 
  - first-order stochastic dominance shift
  - increase in risk (Christiano risk shock - see Williamson 1987)
  - increase in verification costs
- Makes interest-bearing assets more scarce. What to do? Open market sales.
- Note difference from currency shortages of National Banking era and Great Depression in US (see Friedman-Schwartz).

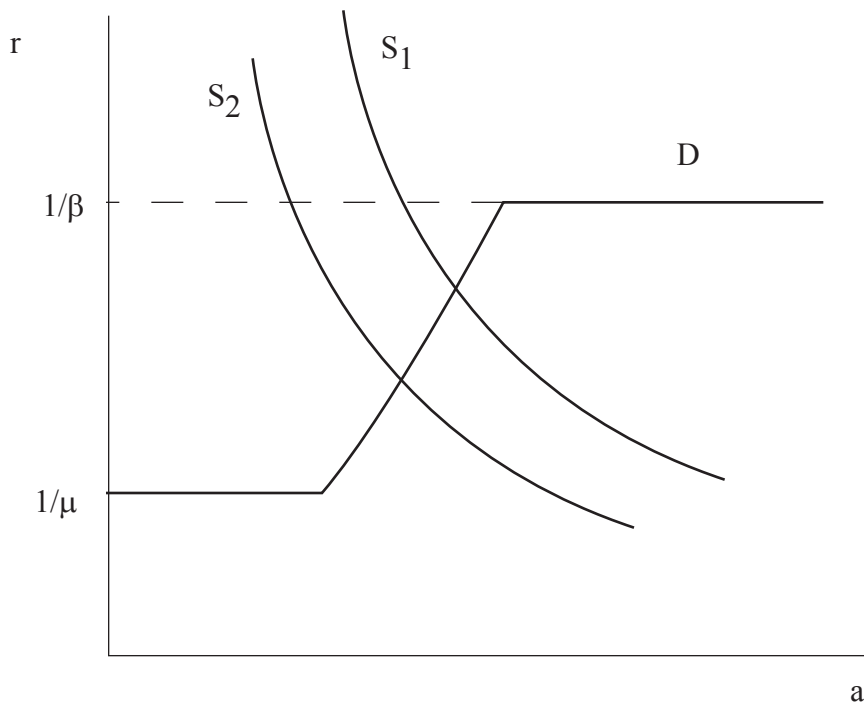
# Financial Crisis



# Monetary Policy with a Positive Quantity of Reserves, and Interest on Reserves

- Works effectively in exactly the same way.
- Central bank determines the total quantity of outside money = currency + reserves, and the gross interest rate on reserves,  $r$ .
- Banks and consumers determine how outside money is split between currency and reserves.
- Open market operations irrelevant (like liquidity trap), but changing  $r$  matters.

**Figure 6: Illiquidity Effect with Private Assets**



# QE1: Purchases of Private Assets

- Suppose the central bank is as good at banking as private sector agents.
- Purchases of private assets on the same terms as the private sector is offering (same loan contracts) implies
  - stock of outside money increases
  - central bank retires the money with payoffs on its portfolio
  - irrelevant for quantities and prices.
- Purchases of private assets on better terms than the private sector is offering implies
  - lending expands
  - the central bank makes losses on its portfolio
  - credit is reallocated, wealth is redistributed.

## QE2: Purchases of Long-Maturity Government Securities in Exchange for Reserves

- Here, argue outside the model, but I think one can do the extension.
- Why does central banking matter? Central bank has some advantage over the private sector in financial intermediation. Modigliani-Miller idea.
- What are a central bank's advantages?
  - ① Monopoly in the issue of currency.
  - ② Monopoly in some payments arrangements - e.g. Fedwire in the US.
- Under the circumstances in which QE2 played out, neither (1) nor (2) come into play.
- Conclusion: QE2 was irrelevant.
- Under QE2, the Fed rolls over overnight assets - reserves - to finance a portfolio of long Treasuries.
- Bank of America can construct a special purpose vehicle (SPV) that purchases long Treasuries, financed by rolling over overnight repos.
- Private sector undoes QE2, i.e. Modigliani-Miller theorem for QE2.

# Monetary Policy Future for the Fed

- In one sense, the size of the Fed's balance sheet matters little. It has all the monetary control it needs through setting the interest rate on reserves.
- In another sense, monetary policy is operationally different. Inflationary effect of monetary policy is passive, and maybe this matters.
- Quantitative easing is not another monetary policy tool. Neither are reverse repos or term deposits, which the Fed advertises as “reserve-draining” tools.
- Private asset purchases are a dangerous tool for a central bank that cares about its independence.