Today

Federal Reserve System
aka FRS, Fed

M+B 16

Tools of M Control

M+B 17
The Federal Reserve System (FRS)

12 Federal Reserve Banks

A: 1. Boston
B: 2. New York
C: 3. Philadelphia
D: 4. Cleveland
E: 5. Richmond
F: 6. Atlanta
G: 7. Chicago
H: 8. St. Louis
I: 9. Minneapolis
J: 10. Kansas City
K: 11. Dallas
L: 12. San Francisco

Board of Governors (FRB)

Washington, D.C.
The Federal Reserve System

12 F.R. Banks, Districts

Cleveland District

Legend

■ Federal Reserve Bank city

■ Board of Governors of the Federal Reserve System, Washington, D.C.

Figure 2

This map is totally irrelevant for the conduct of monetary policy. However, no Money and Banking textbook would seem complete without it.

Source: F.R. Bulletin, Nov 54
Each FR Note is issued by 1 of the 12 FR Banks.

E = S = Richmond, Va.

D = 4 = Cleveland
FRB Banks have little power.

FRB, FOMC more important.

- FRB = FR Board
- Board of Governors = BOG
- FOMC = Federal Open Market Committee
Board of Governors (B0G)
aka FR Board (FRB)

- 7 Members, 14 yr terms,
  expire 1/00, 1/02, etc.

- President appoints, Senate confirms.

- Governors may not be appointed to
  more than 1 full term

⇒ max term = 27.9 yrs.
  (e.g. Alan Greenspan 18.5 yrs)

- FRB sets FR within limits set by
  Congress

\[ k = \frac{c+1}{c+fr+fx} \]

- FRB comprises 7 of 12 members
  of FOMC
Table 1

Board of Governors of the Federal Reserve System

In order by end of term

March 2011

<table>
<thead>
<tr>
<th>Name</th>
<th>Year Appointed</th>
<th>Term Ends Jan. 31</th>
<th>Theoretical Appointing Admin.</th>
<th>Actual Appointing Admin.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elizabeth A. Duke</td>
<td>2008</td>
<td>2012</td>
<td>Clinton II</td>
<td>GW Bush II</td>
</tr>
<tr>
<td>Vacant since 8/08*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sarah Bloom Raskin</td>
<td>2010</td>
<td>2016</td>
<td>GW Bush I</td>
<td>Obama I</td>
</tr>
<tr>
<td>Vacant after 3/11**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ben S. Bernanke</td>
<td>2006</td>
<td>2020</td>
<td>GW Bush II</td>
<td>GW Bush II</td>
</tr>
<tr>
<td>(Chairman)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daniel K. Tarullo</td>
<td>2009</td>
<td>2022</td>
<td>GW Bush II</td>
<td>Obama I</td>
</tr>
<tr>
<td>Janet L. Yellen</td>
<td>2010</td>
<td>2024</td>
<td>Obama I</td>
<td>Obama I</td>
</tr>
<tr>
<td>(Vice Chair)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


Note that only 5 of the 7 seats are actually filled, and of these 5, only 2 were filled on the theoretical 14 year cycle. Although President Obama was only guaranteed one position by the date of this table, he in fact had already filled three, and could still fill two more.

* Peter Diamond (subsequently winner of the 2010 Nobel Prize in Economics) was nominated by President Obama for the seat expiring in 2014, but the Senate returned his nomination without action. He has been renominated, but no action has been taken as of 3/23/11.

** Kevin Warsh, who was appointed George W. Bush II in 2006 to the seat expiring in 2018, has announced his intent to resign from the Board at the end of March 2011.
Chairman of FRB Board

- 4 yr term
- from confirmation date
- Pres appoints, Senate confirma
- Is 1 of the 7 FRB members.

### Table 2
Selected Federal Reserve Board Chairmen
Oct. 2010

<table>
<thead>
<tr>
<th>Name</th>
<th>Term as Chairman</th>
<th>Appointing President(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wm. McC. Martin, Jr.</td>
<td>4/2/51 – 1/31/70</td>
<td>Truman, Eisenhower, Kennedy, Johnson</td>
</tr>
<tr>
<td>Arthur F. Burns</td>
<td>2/1/70 – 1/31/78</td>
<td>Nixon</td>
</tr>
<tr>
<td>Paul A. Volcker</td>
<td>8/6/79 – 8/11/87</td>
<td>Carter, Reagan</td>
</tr>
<tr>
<td>Alan Greenspan</td>
<td>8/11/87 – 1/31/06</td>
<td>Reagan, Bush43, Clinton, Bush43</td>
</tr>
<tr>
<td>Ben S. Bernanke</td>
<td>2/1/06 – 1/31/14*</td>
<td>Bush43, Obama</td>
</tr>
</tbody>
</table>


Note that Miller, Volcker and Greenspan's terms as Chairman fell out of sync with the expiration of a seat on the Board, but that Bernanke's term is back in sync.

Many are bipartisan appointed.
\[ B = C + R = C_F + C_T + D_R \]

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities + Net Worth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Securities of US Treasury</td>
<td>790.5</td>
</tr>
<tr>
<td>(held outright)</td>
<td></td>
</tr>
<tr>
<td>Loans:</td>
<td>27.4</td>
</tr>
<tr>
<td>to dealers as Repos</td>
<td>27.2</td>
</tr>
<tr>
<td>to banks through Discount</td>
<td>0.2</td>
</tr>
<tr>
<td>Window</td>
<td></td>
</tr>
<tr>
<td>International Reserves:</td>
<td>51.5</td>
</tr>
<tr>
<td>Gold Certificates</td>
<td>11.0</td>
</tr>
<tr>
<td>Foreign Currency</td>
<td>38.3</td>
</tr>
<tr>
<td>SDR Certificates</td>
<td>2.2</td>
</tr>
<tr>
<td>Misc. Assets</td>
<td>9.6</td>
</tr>
<tr>
<td>Total Assets</td>
<td>880.4</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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<tr>
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<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Adapted from Federal Reserve Bulletin Statistical Release H4.1.

\[ M_0 = \text{Treasury Currency } C_T \text{ (coin) } = 535.8 B. \]

\[ 7/07: \]

\[ B = S + L + I + C_T \]

\[ - D_R - NW \]

\[ = (790.5) + (27.4) + (51.5) + (38.5) \]

\[ - (36.9) - (34.1) \]

\[ = 836.9 B \]

\[ \Delta \text{ endl } = 829.2 B \]
Traditional Base Equation \( M = K \cdot B \) (pre-2008)

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities, NW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Securities</td>
<td>CF, NR Currency</td>
</tr>
<tr>
<td>Lcno</td>
<td>DR, Reserve Dep.</td>
</tr>
<tr>
<td>Int'l Res.</td>
<td>D0, Other Dep.</td>
</tr>
<tr>
<td>NW</td>
<td></td>
</tr>
</tbody>
</table>

Balance Sheet Identity \( A = L + NW \)

\[
\Rightarrow S + L + I = (CF + DR) + D0 + NW
\]

\[
CF + DR = S + L + I - D0 - NW
\]

In fact,

\[
B = C + R = CF + GT + DR
\]

where \( GT = \text{Treasury Currency = Coin} \)

\[
\Rightarrow B = S + L + I + GT - D0 - NW
\]

Sources of \( B \)

Drains on \( B \)

\[
\Delta B = AS + AL + AI + \Delta GT - \Delta D0 - \Delta NW
\]
Open Market Operations (OMOs)

Purchases and Sales of Treasury securities by Fed

= AS

Executed by NY Fed for system.

"Open Market Desk"

Decision made by FOMC
Federal Open Market Committee (FOMC) = FRB + 5 FR Bank Presidents, incl. Pres of NY Fed

⇒ 7 + 5 = 12 Voting members

Commercial Bankers that have "Member" status with Fed have say in Pres. of their FR Bank, but FRB is majority.

Other 4 Voting members rotate among other 11 FR Bankers

- Cleveland, Chicago alternate
- Other 9 on 3-yr cycle.

FOMC decides on Open Market Operations (OMOs)

Most important trad. power of Fed.

Determine B thru "S" or Fed Funds rate thru "L"

Meets 8 times/yr
Fed's OMO's. \hspace{0.5cm} (05)

\[ S \uparrow, \ B \uparrow \]
\[ \Rightarrow \text{Bond Prices} \uparrow, \ Yield \downarrow \]

\[ S \downarrow, \ B \downarrow \]
\[ \Rightarrow \text{Bond Prices} \downarrow, \ Yield \uparrow \]

* Fed could set \( B \) via \( S \), let market set bond prices, yield. (i)

or

* Fed could set \( i \) via bond prices, let market set \( S, B \)

But not both.
Dynamic vs Defensive OMO's

Dynamic - intended to cause DB
Defensive - intended to offset DB caused by SL, DI, etc.

\[ E9 \]

\[ \Delta I = + $7B \]
\[ \Delta D_0 = + $1B \]
\[ \Delta NW = + $2B \]

\[ \rightarrow \Delta B = (+7) - (+4) - (12) = + $4B \]

if \( \Delta S = 0 \)

\[ \Rightarrow \Delta B = 0 \] if \( \Delta S = - (+4B) = -4B \)
Δ L: Net Loans
Mostly thin Repos. (Traditionally)

Repurchase Agreements (Repos)

In effect:

• Loan collateralized by a Treasury security

Operationally:

• Lender buys security from borrower.
• Borrower agrees to repurchase next day (if overnight) for sale price plus 1 day's interest @ repo rate.
• Collateral changes ownership twice.

Bank ➔ Nonbank
Close substitute for Fed Funds transactions
F>F Rate ➔ Repo Rate.
Non bank ➔ Nonbank
No effect on M, B.
Fed ➔ Nonbanks (Dealers)
Changes "L", "B"
Coupon Passes

Periodic big OMO (a5), offset by opposite ΔL

Hold L in range +10 - +50B.

⇒ Day-to-day ΔB mostly ΔL

Year-to-year ΔB mostly ΔS

(in Traditional, pre-2008 Fed)
Discount Window

- Loans by Fed directly to Banks, Thrifts
- Fed charges banks Discount Rate
- Ordinarily very small portion of "L"

→ Since 1/2003
  Discount rate set 0.5% above FF target.
  ⇒ only failing banks borrow perceptible amount.

→ 1930's - 2003
  Access severely limited except for
  failing banks.
  ⇒ borrowings negligible except during crisis

→ WWI, 1920's

Very important

→ 2009
  Discount up to $35.9 B
Net Worth "NW"

Who owns Fed?

Member banks own "stock" (NW), get dividends

But -

Have little control.

Dividends restricted to 6% of par value.

(trivial)

Fed very profitable. (pre-2008)

Most profits -> Treasury.

=> Effectively a Public Agency
Seigniorage under Fed

Treasury runs deficit, sells bonds

Fed buys bonds a/m new Base M

- Receives $t from Trans.
- Returns $t to Treasury.
- Trans gets perpetual interest-free loan

Treasury may as well have printed M zeros.

(as with Civil War Greenbacks)

But spending decision separated from M decision

- (Pre-2008)

\[ \text{Pre-2008 } R = R_t + R_x \text{ pays is } 0 \]

\[ \Rightarrow S = \frac{\Delta B}{P} = \frac{1}{k} \frac{\Delta M}{P} = \frac{1}{k} \mu \cdot M \]

Since 10/08, R * pays competitively:

\[ \Rightarrow S = \frac{\Delta B \text{ net}}{P} \]

\[ B \text{ net } = C + R_t \text{ only. } \]

\[ R_x \text{ just represents Financial Intermediation by Fed. } \]

The Fed exposed to credit risk, i-risk on supported portfolio.
Between August 2008 and August 2009, the US Monetary base increased from $843.0 billion to $1705.4 billion, a 102% increase in just one year. Will this lead to inflation as the banks find borrowers for these funds?
Table 3B
Consolidated Federal Reserve Balance Sheet
(Bernanke)

July 2, 2009
(billions of dollars)

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities + Net Worth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Securities of US Treasury (held outright)</td>
<td>Federal Reserve Notes 871.3</td>
</tr>
<tr>
<td>Loans:</td>
<td></td>
</tr>
<tr>
<td>to dealers as Repos 0.0</td>
<td></td>
</tr>
<tr>
<td>to banks 318.7</td>
<td></td>
</tr>
<tr>
<td>Discount Window 35.9</td>
<td></td>
</tr>
<tr>
<td>Term Auction Cred. 282.8</td>
<td></td>
</tr>
<tr>
<td>International Reserves:</td>
<td>Deposits</td>
</tr>
<tr>
<td>Gold &amp; SDR Certificates 13.2</td>
<td>Reserve 726.3</td>
</tr>
<tr>
<td>Foreign Currency 73.9</td>
<td>Other 334.8</td>
</tr>
<tr>
<td>Cent. Bank Liq. Swaps 115.3</td>
<td>US Treasury 271.9</td>
</tr>
<tr>
<td></td>
<td>Foreign 72.9</td>
</tr>
<tr>
<td></td>
<td>(incl. Reverse Repos)</td>
</tr>
<tr>
<td>Junk:</td>
<td>Misc. Liabilities 26.4</td>
</tr>
<tr>
<td>Fannie Mae &amp; Freddie Mac 559.3</td>
<td></td>
</tr>
<tr>
<td>Mc. Mort. Backed Secs 462.5</td>
<td></td>
</tr>
<tr>
<td>Debt 96.8</td>
<td></td>
</tr>
<tr>
<td>Bear Stears (Maiden Ln. I) 25.9</td>
<td></td>
</tr>
<tr>
<td>AIG 78.9</td>
<td></td>
</tr>
<tr>
<td>Direct Credit 42.8</td>
<td></td>
</tr>
<tr>
<td>Maiden Lane II &amp; III 36.1</td>
<td></td>
</tr>
<tr>
<td>Comm.Paper Funding Fac 119.7</td>
<td></td>
</tr>
<tr>
<td>MMMF CP Funding Fac 14.9</td>
<td></td>
</tr>
<tr>
<td>Term Asset-Backed Securities Lending Facility 25.1</td>
<td></td>
</tr>
<tr>
<td>Misc. Assets 5.5</td>
<td>Capital Accounts (NW) 48.6</td>
</tr>
<tr>
<td>Total Assets 2,007.4</td>
<td>Liabilities + NW 2,007.4</td>
</tr>
</tbody>
</table>

Adapted from Federal Reserve Bulletin Statistical Release H4.1.

Memo: \( C_T = 642.4 \) B

Bernanke: \( B = S + L + I + J + C_T - D_0 - NW \)
Junk Assets J

- Risky stuff no one else will buy
  - at price Fed pays
- Mostly Subprime Mortgage-Related
- Now Primary Source of B - $824 B

Fannie & Freddie $559.3 B

Debt $97 B
Mort. Backed Securities $462 B

Bear Stearns $26 B
  "Maiden Lane II LLC"

AIG $79 B
  Direct advance + "Maiden Lane II+III"

CP Funding Facility $120 B

MMMF CP Funding Fac. $15 B

Term Asset-Backed SEC Lending Fac $25 B
Traditional vs Bernanke Fed

Traditional (pre-2008)

Congress decides
- How much to spend, on what,
- Who to spend on,
- How much to borrow.

Fed decides
- How much Treasury Debt to monetize.

Bernanke (since 2008)

Fed decides
- How much to spend, on what
- Who to spend on:
  - F+I, AIG, Bear, Lehman.
- Invokes Emergency Powers
- No specific Act of Congress required.
Liabilities Side

Reserve Deposits

- 2007 $16.7B
  Paid 0 int.
  Mostly Required Reserve

- 2009 $7.26B
  Mostly Excess Reserve
  Paid Interest since 10/08.

⇒ Fed now acts as a Financial Intermediary as well as a traditional Central Bank, Is exposed to credit risk, interest rate risk on corresponding assets.
6 sick control

Other (non-Rosyne) Deposits Do
Drain (-) on Base
* US Treasury

2007 - $46.1B

2009 - $271.9B

* Mostly unspent TARP $?

* Offset ~ $260B of Assets (SorJ)

for now.

* Will a Base if spent.
Since 12/07

Term Auction Credit Facility

- 28- or 84-day loans to banks
- Auctioned to highest bidders
- $282.8B 7/09
- Makes L major source of base
Functions of FR

1. **Tax on D**
   
   \[ FR \uparrow \Rightarrow KB \Rightarrow s = \frac{1}{k} \mu \uparrow \]

2. **Makes K less sensitive to c.**
   
   \[ \Rightarrow M: kB \text{ easier to control w/B.} \]

3. **Provides bank liquidity**
   
   only if \( R_{e} \) may be used for withdrawals.

   * If not, banks need \( R_{x} \) for withdrawals.
   
   - 1930s - \( R_{x} \) high even after \( FR \uparrow \) in 1937.
   - Late 18th cent -
     
     \[ \text{Nat'l Bank suspended if } F \neq F. \]
     
     \[ \Rightarrow \text{frequent suspensions.} \]

   Ban on lending when \( F \neq F \) makes \( R_{e} \) avail. for withdrawals.