\[ \Delta H = \frac{1}{n} \Delta NB \]

How does the Fed change the equilibrium money supply?

- very simple

- it changes the right hand side of the equation
  - change \( n \)
  - change \( \Delta NB \)
  - change currency
  - change reserves

- how does that work?

- go to the Fed's balance sheet
The Fed's Balance Sheet, December 1996

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>(billions of dollars)</td>
<td>(billions of dollars)</td>
</tr>
<tr>
<td>Gold and foreign exchange</td>
<td>21</td>
</tr>
<tr>
<td>U.S. government securities</td>
<td>460</td>
</tr>
<tr>
<td>Loans to banks</td>
<td>0</td>
</tr>
<tr>
<td>Total assets</td>
<td>481</td>
</tr>
<tr>
<td>Federal Reserve notes</td>
<td>427</td>
</tr>
<tr>
<td>Bank's deposits</td>
<td>25</td>
</tr>
<tr>
<td>Other liabilities (net)</td>
<td>29</td>
</tr>
<tr>
<td>Total liabilities (net)</td>
<td>481</td>
</tr>
</tbody>
</table>
Federal Reserve System

FOMC

Federal Open Market Committee

Three policy instruments:

1. A. "Discount rate of interest"

2. B. Required reserve ratio

3. C. Buying and selling of gov't securities in the open market.
<table>
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<th>Assets (billions of dollars)</th>
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<td>29</td>
</tr>
<tr>
<td>481</td>
<td>481</td>
</tr>
</tbody>
</table>

Policy action:

1. the Fed buys govt. securities from the public: ΔR > 0
2. the Fed lowers the discount rate; loans increase: ΔR > 0
3. the Fed issues more bank notes: ΔN > 0

Monetary Base

sell: ΔR < 0

"increase": ΔR < 0

"remit": ΔN < 0
The Federal Reserve System

• Discount Rate

  • The discount rate is the interest rate at which the Fed stands ready to lend reserves to commercial banks.
Controlling the Money Supply

How the Discount Rate Works

When the Fed decreases the discount rate:

- Banks pay a lower price for any reserves that they borrow from the Fed.
- Banks are willing to borrow more reserves and increase their lending.
- This increases the quantity of money.
The Federal Reserve System

• Required Reserve Ratios
  • The Fed determines a required reserve ratio for each type of deposit.
    • In 1997, banks were required to keep 3 percent of checking deposits up to $49 million and 10 percent of deposits in excess of $49 million.
    • Other deposits had no reserve requirement.
Balance Sheet

<table>
<thead>
<tr>
<th>Assets</th>
<th>Commercial Banks</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\Delta) Reserves +</td>
<td>(\Delta) Deposits = (\Delta M)</td>
<td>(\Delta) Net Worth</td>
</tr>
<tr>
<td>(\Delta) Cash</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(\Delta) Loans +</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(\Delta) Securities</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\[\begin{align*}
\text{\(\Delta M\)} &= \text{\(\Delta\) Deposits} \\
\text{\(\Delta\) Net Worth} &= \text{\(\Delta M\)} \\
\end{align*}\]

- The Fed decreases the reserve ratio
- This creates excess reserves
- Willing borrowers (public)
- Willing lenders (banks)
- More loans
- More deposits: \(\Delta M > 0\)
Controlling the Money Supply

How Required Reserve Ratios Work

When the Fed decreases the required reserve ratio:

• Banks may hold less reserves.
• As a result of the decrease in reserves, banks increase lending.
• The increase in lending increases the quantity of money.
The Federal Reserve System

- **Open Market Operations**
  
  Open market operations are the purchase or sale of government securities by the Federal Reserve System on the open market.
Open market operations

• the buying or selling of government securities by the Fed.

U.S. and internat.

• if the Fed is a net buyer $M_1$ will grow

• if the Fed is a net seller $M_1$ will decrease

• hence:

open market operations can be used to control the money supply [and the exchange rate]

? • how : creation or destruction of checkable deposits
Open Market Operations

Controlling the Money Supply

• The Fed Buys Securities
  • The Fed can buy securities from either:
    • A commercial bank
    • The public
      • U.S. Treasury
      • Other governments
      • International agencies
OMO

0. Fed buys 1 billion dollars from the public

0. The public receives cheques from the Fed. Res. Banks

0. The public deposits these cheques with the Gold Smith Bank

\[
\begin{array}{c|c|c}
\text{Assets} & \text{Commercial Bank} & \text{Liabilities} \\
\hline
\text{Required Reserves} + 0.10 & \text{Deposits} + 1.00 & \\
\text{Excess Reserves} + 0.90 & & \\
\end{array}
\]

0. Excess Reserves will be lent out!

0. First balance sheet

0. Next page
Summary

<table>
<thead>
<tr>
<th>ΔA</th>
<th>CBS</th>
<th>ΔL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loans</td>
<td>+9</td>
<td>Deposits</td>
</tr>
<tr>
<td>Reserves</td>
<td>+1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>+10</td>
<td></td>
</tr>
</tbody>
</table>

Δ Deposits = ΔM₁ = 10

Δ Reserves = ΔR = 1

Money-Reserve Multiplier

ΔM₁/ΔR = 10/1 = 10

ΔM₁/ΔR = \frac{1}{\text{r.r.}} = \frac{1}{10\%} = 10
Controlling the Money Supply

How an Open Market Operation Works

- When the Fed buys securities in an open market operation:

  - The monetary base increases;
  - Banks increase their lending;
  - The quantity of money increases.

Memorize!
Can Monetary Policy Avoid Recessions?

- **Timing is everything**

$$\Delta y = y (\Delta M, \Delta G, \Delta T, \text{shocks})$$

**Policy Problem**

$$\Delta M = M(\Delta y, \Delta G, \Delta T, \text{shocks})$$

↑  ↑  ↑

Target not not
controlled by Fed by Fed.

1 eqt., two many uncontrollable events.
Press Release

Release Date: March 18, 2003

For immediate release

The Federal Open Market Committee decided today to keep its target for the federal funds rate unchanged at 1-1/4 percent.

While incoming economic data since the January meeting have been mixed, recent labor market indicators have proven disappointing. However, the hesitancy of the economic expansion appears to owe importantly to oil price premiums and other aspects of geopolitical uncertainties. The Committee believes that as those uncertainties lift, as most analysts expect, the accommodative stance of monetary policy, coupled with ongoing growth in productivity, will provide support to economic activity sufficient to engender an improving economic climate over time.

In light of the unusually large uncertainties clouding the geopolitical situation in the short run and their apparent effects on economic decisionmaking, the Committee does not believe it can usefully characterize the current balance of risks with respect to the prospects for its long-run goals of price stability and sustainable economic growth. Rather, the Committee decided to refrain from making that determination until some of those uncertainties abate. In the current circumstances, heightened surveillance is particularly informative.

Voting for the FOMC monetary policy action were Alan Greenspan, Chairman; William J. McDonough, Vice Chairman; Ben S. Bernanke; Susan S. Bies; J. Alfred Broaddus, Jr.; Roger W. Ferguson, Jr.; Edward M. Gramlich; Jack Guynn; Donald L. Kohn; Michael H. Moskow; Mark W. Olson; and Robert T. Parry.

2003 Monetary policy