

# Intermediate Macroeconomic Theory

Costas Azariadis

Lecture 10: Monetary Policy

# Monetary Policy

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Theory

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## 1. BALANCES

### Typical Commercial Bank Balance Sheets

Assets		Liabilities & Net Worth	
Reserves	10	Deposits	45
Loans	40	Owner's Equity	5
Total	50		50
Federal Reserve Balance Sheet			
Assets			
Securities	900	Currency in public hands	700
Gold	100	Vault Cash of Commercial Banks	100
		Reserves	200
Total	1000		1000

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U.S. Money Supply (rounded, \$ bn 2009)

Currency +	853
Bank Reserves =	<u>813</u>
Monet. Base	1670
+	
–Res + Deposits =	<u>7,495</u>
<b>Money supply (M1)</b>	<b>8,348</b>

$$\frac{Res}{Dep} = .108 \quad \text{Currency} + Deposits = .114$$

$$\frac{M1}{Base} = 5.00 = \text{Money multiplier}$$

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Note:

$$\begin{aligned} multiplier &= \frac{M1}{Base} = \frac{1 + \frac{CU}{DEP}}{\frac{CU}{DEP} + \frac{RES}{DEP}} = \frac{CU + DEP}{CU + RES} \\ &= \text{decreasing function of } \left( \frac{CU}{DEP}, \frac{RES}{DEP} \right) \end{aligned}$$

∴ money multiplier ↑ if

→  $\frac{CU}{DEP}$  decreases (public puts more money in banks)

→  $\frac{RES}{DEP}$  decreases (banks lend more)

} both increased  
1930-1933

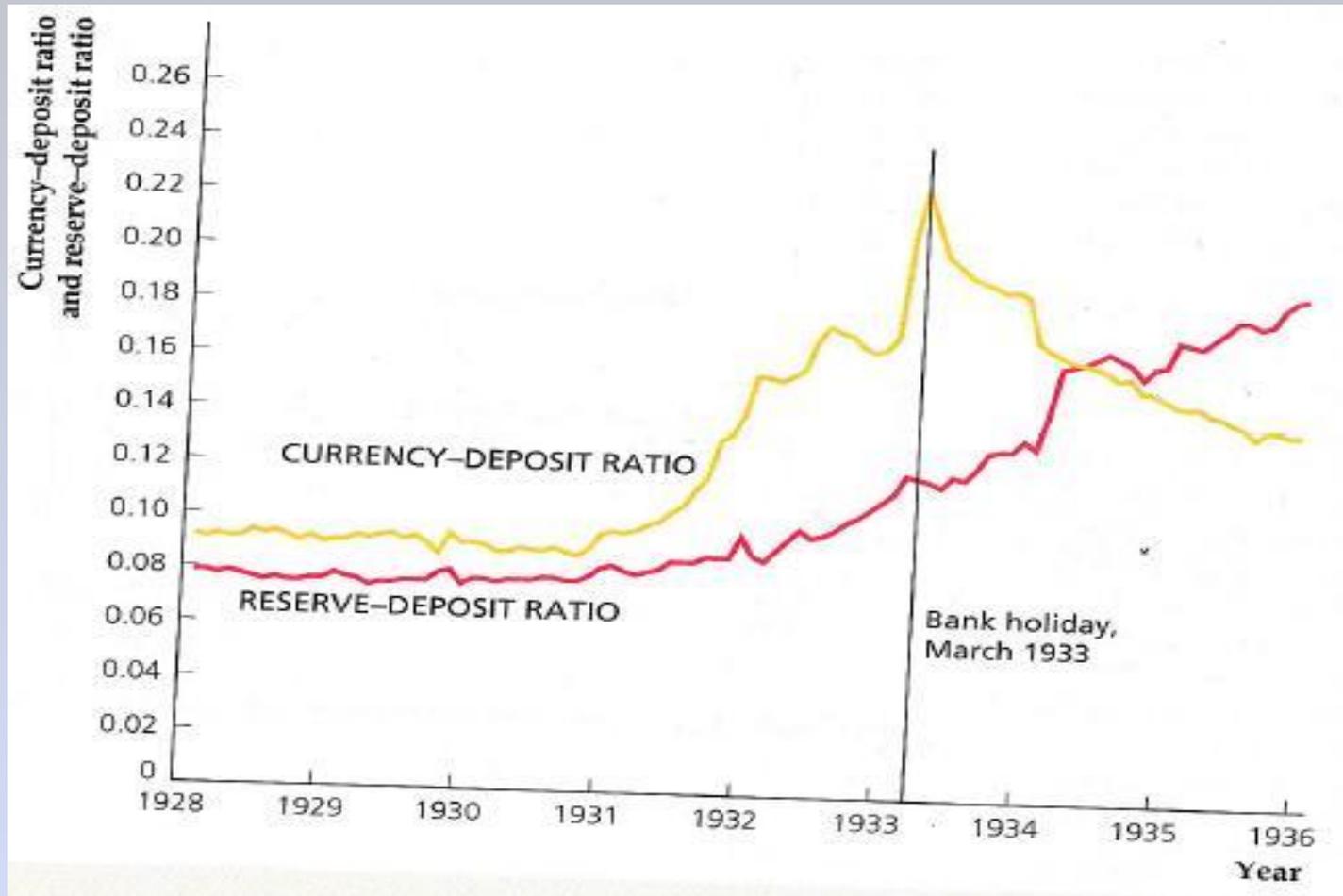
## 2. THE GREAT DEPRESSION

$\left( \frac{CU}{DEP}, \frac{RES}{DEP} \right)$  both up 1930-1933,  $\frac{RES}{DEP}$  up 1930-1936

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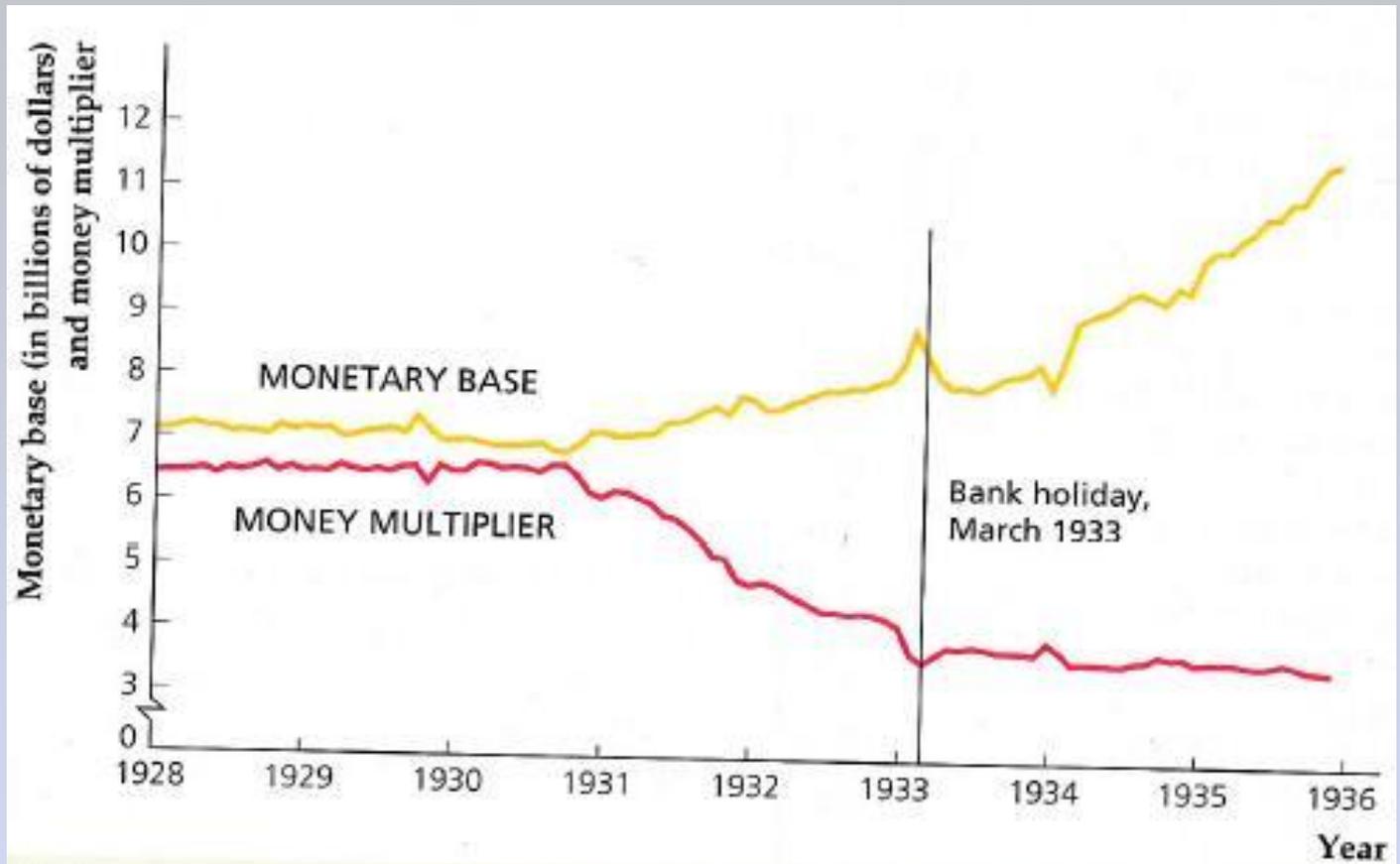
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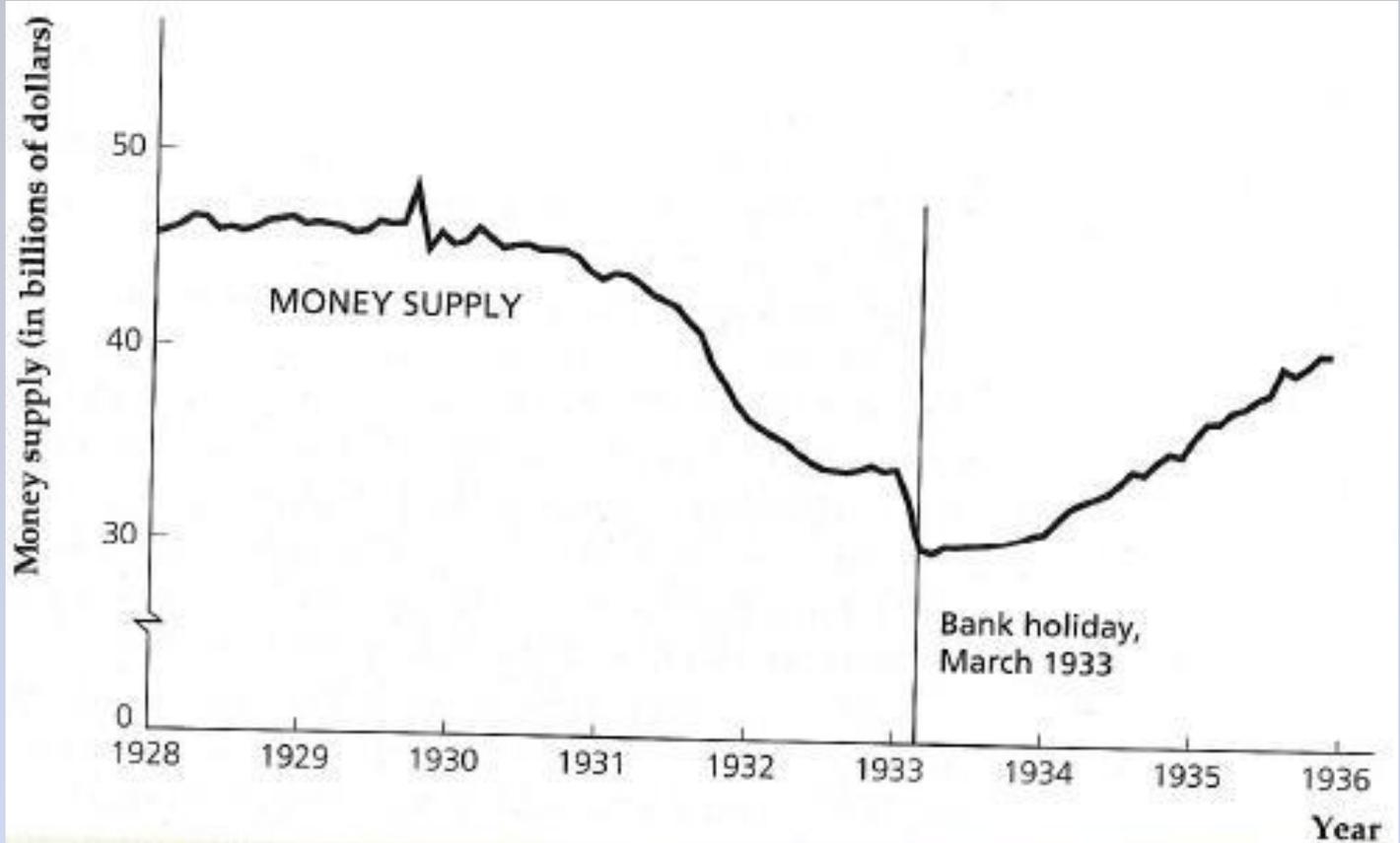


(a) The monetary base and the money multiplier in the Great Depression

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(b) The money supply in the Great Depression : done by 1/3 or 15% of peak GDP

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## 3. THE FEDERAL RESERVE SYSTEM

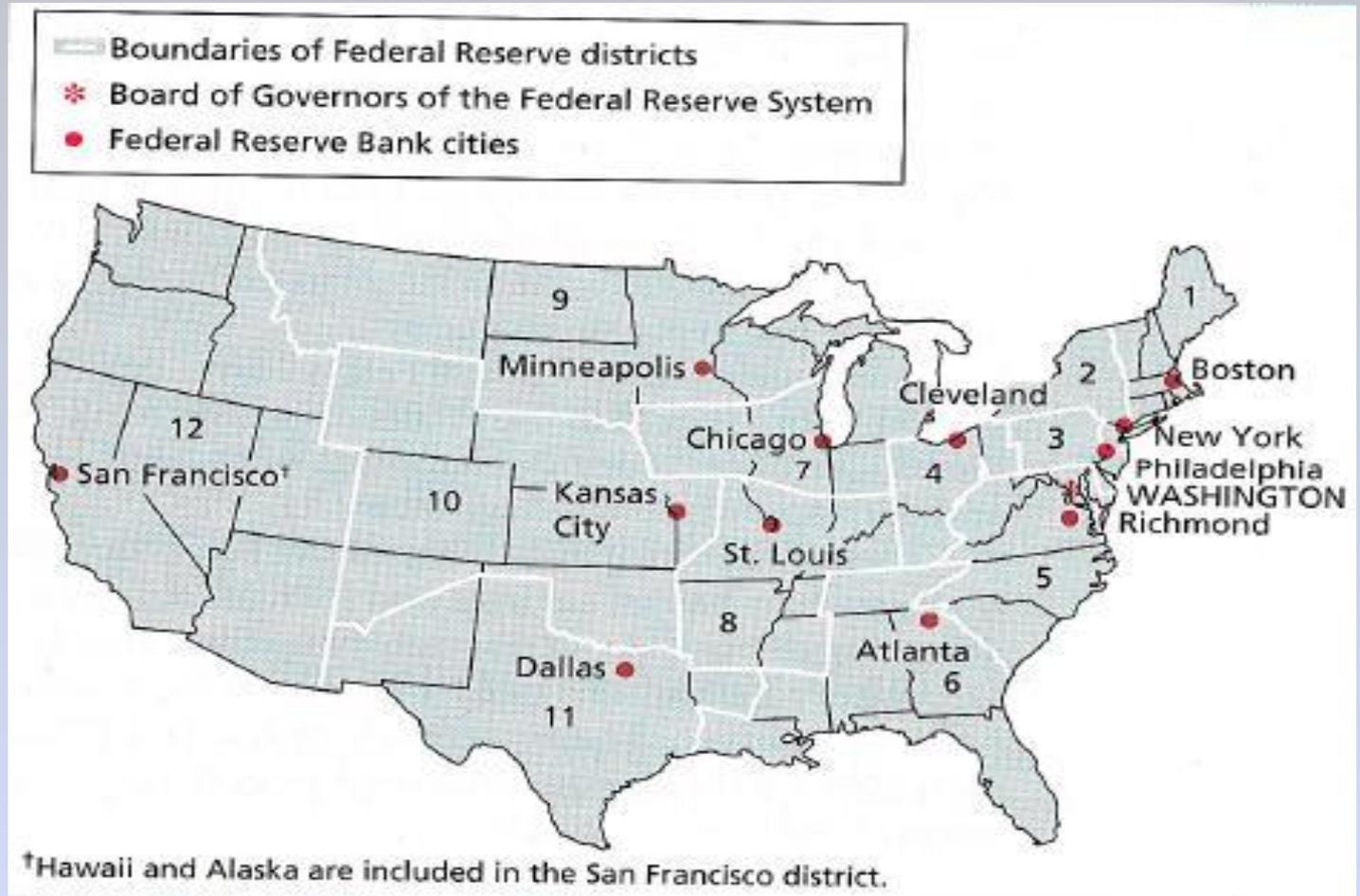
- a) Figure 14.5: 12 districts (St. Louis is #8) plus DC
- b) Balance Sheet (Aug. 2009)

Assets		Liabilities & Net Worth	
Gold	11	Currency	910
Loans to		–vault cash (banks)	49
Banks	31	–non-bank public	861
U.S. Treasuries	740	Deposits from Banks (reserves)	833
Mortgage-Backed Securities	624		
Other	584	Other	362
Total	2105	Total	2105

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## c) Fed Lending

- to depository institutions @ discount rate
- banks to each other (excess reserve trading)  
@ fed funds rate

## d) Fed Policy

- B of gov's (7 people)
- FOMC = 7 gov's + 4 regional Fed Presidents

# Monetary Policy

## → Policy Instruments

- open mkt operations
- reserve requirements
  - reserves = 3% of deposits from 8 to 48 mil
  - 10% of dep. over 48 mil;
  - no res. for up to 8 mil
- discount rate (charged on loans to banks)

# Monetary Policy

e) Fed policy & the real economy

Q: Do monetary policy instruments affect real output, C, I, etc?

- channel 1: policy affects **real** interest rates
- channel 2: policy affects **real** exchange rate & net exports
- channel 3: policy affects **credit conditions**,  
i.e., supply and/or demand for credit /loans, etc.

# Monetary Policy

## 4. THE MECHANICS OF MONETARY POLICY

a) lags & delays: policy changes hit

-short-term rates almost immediately

-output **with a long & variable lag**

∴ Monetary policy not a precise instrument

For this reason, Milton Friedman and other economists argued:

- do not use monetary policy to stabilize economy;
- you do not know how long it will take for policy to make an impact;
- by the time policy bites, economy may have recovered on its own.

# Monetary Policy

## b) Channels

-int. rate

-exch. rate

-credit conditions (see earlier)

c) The credit channel In normal times (confidence is high)

-tight monetary policy leads to reduced lending

-slack monetary policy leads to increased lending

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## Examples of tight money leading to tight credit

- i. higher interest rates lead to lower stock prices and home prices  
→ less collateral → less lending
- ii. reductions in commercial bank reserves (open market sales)  
→ fewer deposits → fewer loans
- iii. higher cost of capital  
→ weaker demand for loans by firms

# Monetary Policy

## 5. RULES OR DISCRETION?

### a) The case for discretion

- Employment act of 1946:

Fed charged with maintaining price stability **and** high employment.

- With few exceptions, both goals achieved 1964-70, 1984-2007
- Fed policy looked at many things from 1964 to 2007, including:
  - unemployment rate
  - wars
  - financial conditions (tech bubble 2001) etc.
- Can the Fed achieve price stability and high employment without help from fiscal policy?
- High public debt in 1945 vs. high public debt now.

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## b) The Case for Rules

-Monetarist: Fed likely to overreact to bad news, esp. if it takes long time to fix real economy.

Follow simple rule: Make your target zero inflation no matter what.  
(actual target: 2% inflation)

-Taylor: Empirical Rule that fits fed behavior

$$i_{t+1} - \hat{i} = 1.5(\pi_t - \hat{\pi}) + .5 \left( \frac{y_t - y_t^*}{y_t^*} \right)$$

$\hat{i}$  = interest rate target

$\hat{\pi}$  = inflation target

$\pi_t$  = actual inflation rate

$$\frac{y_t - y_t^*}{y_t^*} = \% \text{ actual output deviation from trend}$$

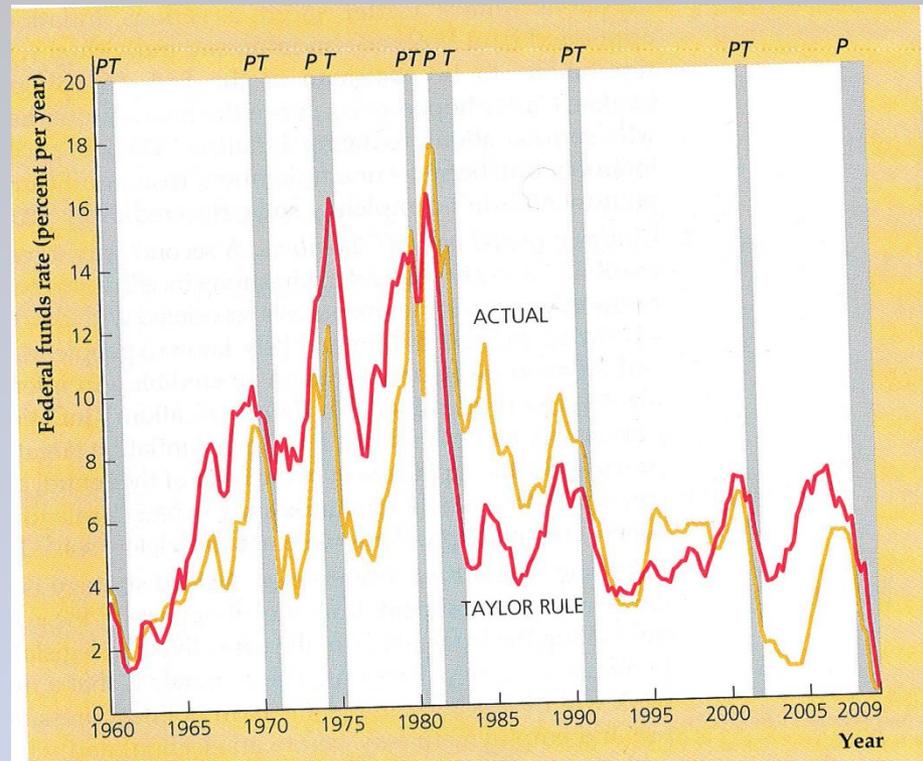
$y_t$  = actual output

$y_t^*$  = trend output

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## c) Rules & Credibility

**New argument:** Effectiveness of monetary policy depends on public confidence that the bank will follow through on its announced policies.

Confidence is built up by a record of commitment to a **specific rule**

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d) Establishing Credibility: A game for Central Bank vs. the private sector.

-Moves

First: Firms

Next: The Fed

-Strategies

$$\text{FS} \rightarrow \frac{\Delta P}{P} = .10, 0$$

Firms set prices: up 10% or same

$$\text{FED} \rightarrow \frac{\Delta M}{M} = .10, 0$$

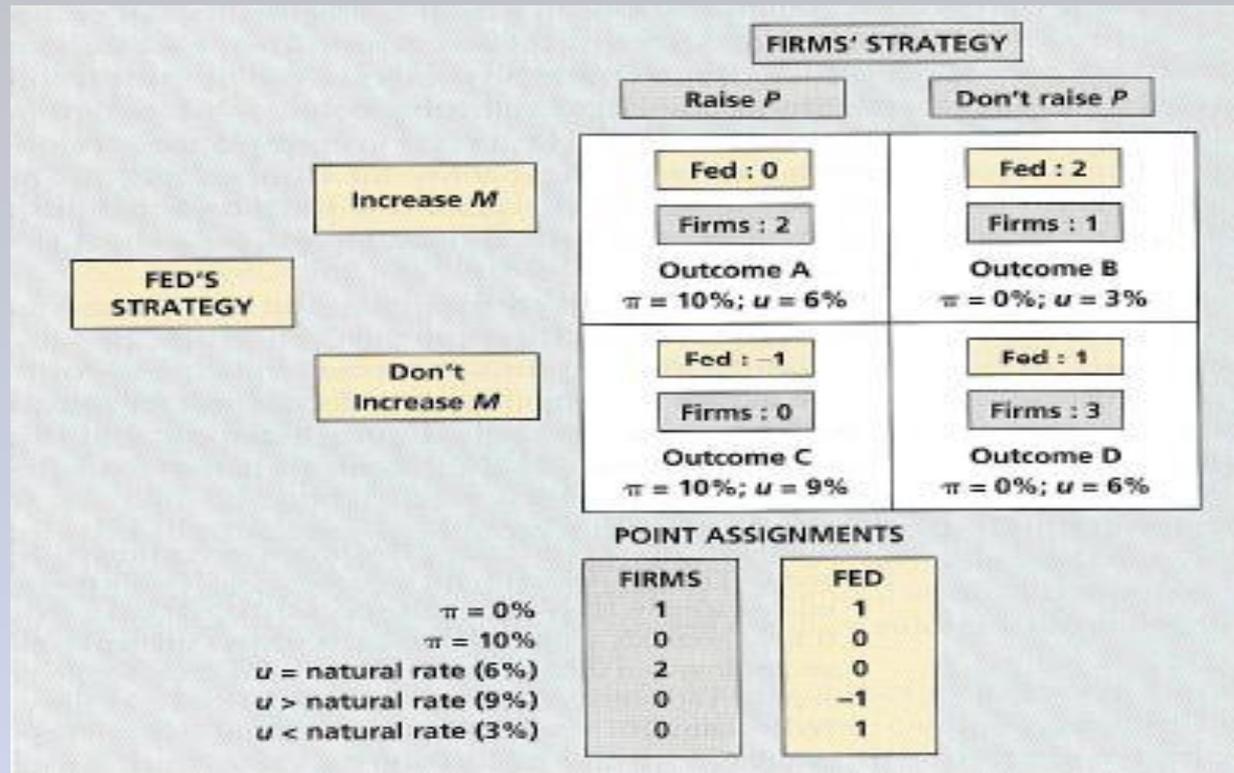
Fed sets money supply: up 10% or same

-Outcomes

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$\frac{M}{P}$  down (up) less credit (more)

$\frac{M}{P} = L(y, r); L \downarrow, y \downarrow \text{ and or } r \uparrow$

Recession  $\rightarrow u \uparrow$

$\frac{M}{P}$  up  $\rightarrow$  expansion

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$$\pi = 0, .10$$

$$u = .03 \text{ (low)}, .06 \text{ (normal unemployment rate)}, .09 \text{ (high)}$$

-Payoffs or scores

$V_F(\pi, u)$  = Fed value if inflation rate =  $\pi$ , unemployment rate =  $u$

$V_P(\pi, u)$  = Private sector pay-off

$$V_F(0, .03) = 2$$

$V_F(.1, .09) = -1$  Fed hates both unemployment and inflation

$V_P(0, .03) = 1$  Firms hate inflation but prefer “normal” to “low” or “high” unemployment

$$V_P(0, .06) = 3$$

High unemployment means less revenue for firms;

Low unemployment means hiring becomes expensive for firms.

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## e) Equilibrium of the Fed Game

-If firm sets  $\frac{\Delta P}{P} = .1$  raising prices

Fed will raise  $\frac{\Delta M}{M} = .1$  to avoid recession

(looser credit condition)

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-If firms keep  $P$  constant, Fed will raise  $M$  to drive  $u$  down to .03

∴ Fed desire to keep inflation low not credible.

Fed sets  $\frac{\Delta M}{M} = .1$  no matter what firms do.  $\frac{\Delta M}{M} = .1$  is Fed's dominant strategy.

Equilibrium: Firms raise  $\frac{\Delta P}{P} = .10$  knowing Fed will play  $\frac{\Delta M}{M} = .10$

if Fed cannot credibly commit to keeping  $M$  constant  $\rightarrow$  (bad outcome)

If Fed could commit credibly to  $\Delta M = 0$ , then firm would choose  $\Delta P = 0$

$\rightarrow (\pi, u) = (0, .06) \rightarrow$  best outcome for society

$\rightarrow$  largest combined payoff for Fed + Firms

∴ Fed credibility matters

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## f) Rules, discretion & credibility

Path to credibility

-strong record as an inflation hawk (Volcker)

-targeting money supply (Fed, 1980's)

Difficult goal

-Fed controls Monetary Base

-M1 influenced by commercial banks (easy or tight lending )

or by shifts in money demand

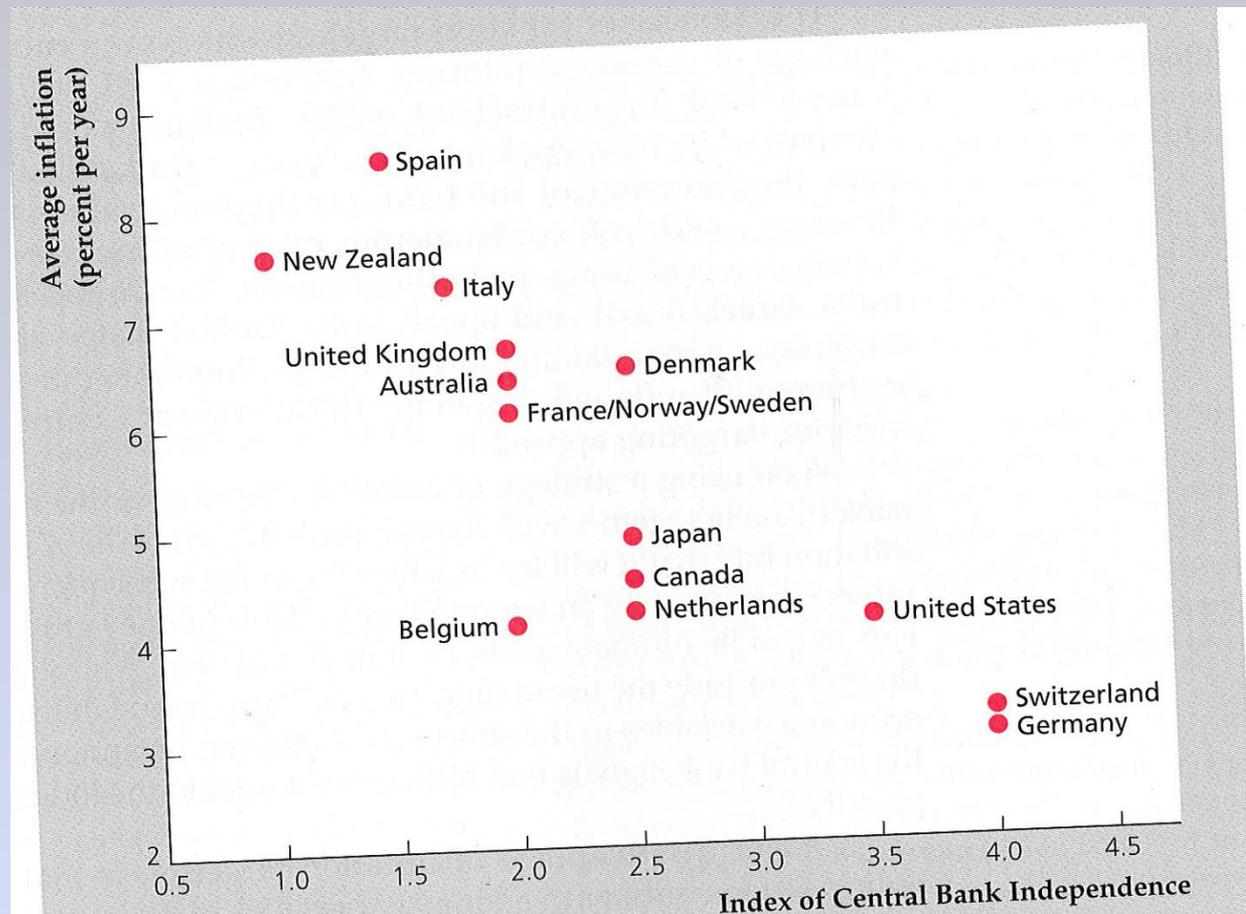
## g) Credibility and CB Independence

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## g) Credibility and CB Independence : 1955 – 1988



# Monetary Policy

## h) Inflation Targeting

- Reserve Bank of New Zealand instructed to keep infl. rate within specified band.
- If persistent failure, gov' of R.B. to be fired
- Success followed by imitation. Infl. targeting popular in Australia, Canada, E.U., Israel, etc.
- Main problem: inflation responds to policy with **long & variable lag.**

Can't always see if policy is working → potential loss of credibility

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- Other problem: negative supply shock (high energy prices) boost inflation, hurt output  
Inflation targeting hurts output even more.

## -increasing independence of the central bank

- Separating bank from Treasury
- Emerging economies use Central Bank as an ATM
- Role of Central Bank Independence