Money and Banking

What is Money? Money Supply and Demand

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We need to talk

Meaning of Money

- Economists' use of the word money differs from conventional usage.
- When most people talk about money, they're talking about **currency or wealth**.
- Money, income, and wealth are three words familiar to everyone. People often use them interchangeably. But to economists these three words have very different meanings.
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  - **MONEY** discussed in this class refers to anything that is generally accepted as *payment* for goods and *services* or in the *repayment of debts* and is distinct from **income** or **wealth**.

Functions of Money

- Medium of exchange. "double coincidence of wants" $\Rightarrow$ transcation motive
- Unit of Account. A standard numerical unit of measurement of market value for goods, services, and other transactions.

Example

Housing prices in Japan can be compared using the yen as a unit of account.

- Storage of Value. $\Rightarrow$ portfolio motive

Example

An ounce of gold could buy a toga in Roman times, yet it can still buy a nice suit today.

Evolution Of the Payments System

Commodity Money $\longrightarrow$ Fiat Money $\longrightarrow$ Checks $\longrightarrow$ Electrronic Payment $\longrightarrow$ E-Money $\longrightarrow$?

"Tech-savvy people are not likely to stop looking for alternatives, until they find or invent one."

Application: Bitcoin

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Will bitcoin end the dollar's reign?

- Reading material 1: https://www.ft.com/content/ea33b688-12e0-459c-80c5-2efba58e6f1a
- Reading material 2: https://www.ft.com/content/b4023a49-2819-4a01-94f6-2a8f6dc77c18
- launch in 2019
- When you hold, you are becoming richer, but you are not transacting.
- Gresham's law "bad money drives out good".

Will Bitcoin Become the Money of the Future?

Money Supply and Demand

Roadmap

1. Bank and fractional - reserve bank
2. Model of money supply
3. Quantity theory of money
4. Money demand
5. Baumol-Tobin model

Fractional Reserve Banking

Definition

Money Supply (M) = Currency (C) + Demand Deposits (D)

- *How do banks make money?⇒ Primarily by lending money*
- *By laws, banks need to hold reserves (fraction of deposit)*

Example

Suppose the reserve-deposit ratio (rr) is 20% and I make a deposit of \$1000 (initial deposit). Further assume that the bank lends to its limit. step 1. deposit increases by \$1000 and loan increases by \$800. step 2. deposit increases by \$800 and loan increases by \$640.....step ∞. (keep increasing)

- Total money supply = \$1,000 + \$800 + \$640 + . . . = \$5,000
- \$1,000x$(1/rr)$! $1/rr$ is money multiplier.
- Why do deposits keep increasing? Because banks make loans!

Model of Money Supply

Definition

Money Base (B) = Currency (C) + Reserve(R)

- *Monetary base is also called high-powered money.*
- M/B gives

$$\frac{M}{B} = \frac{C+D}{C+R} = \frac{C/D+1}{C/D+R/D} = \frac{cr+1}{cr+rr} = m \quad (1)$$

$$M = mB \quad (2)$$

Example

B=\$800 billion, rr = 0.1, cr =0.8. What is m, and M?

- m= 2

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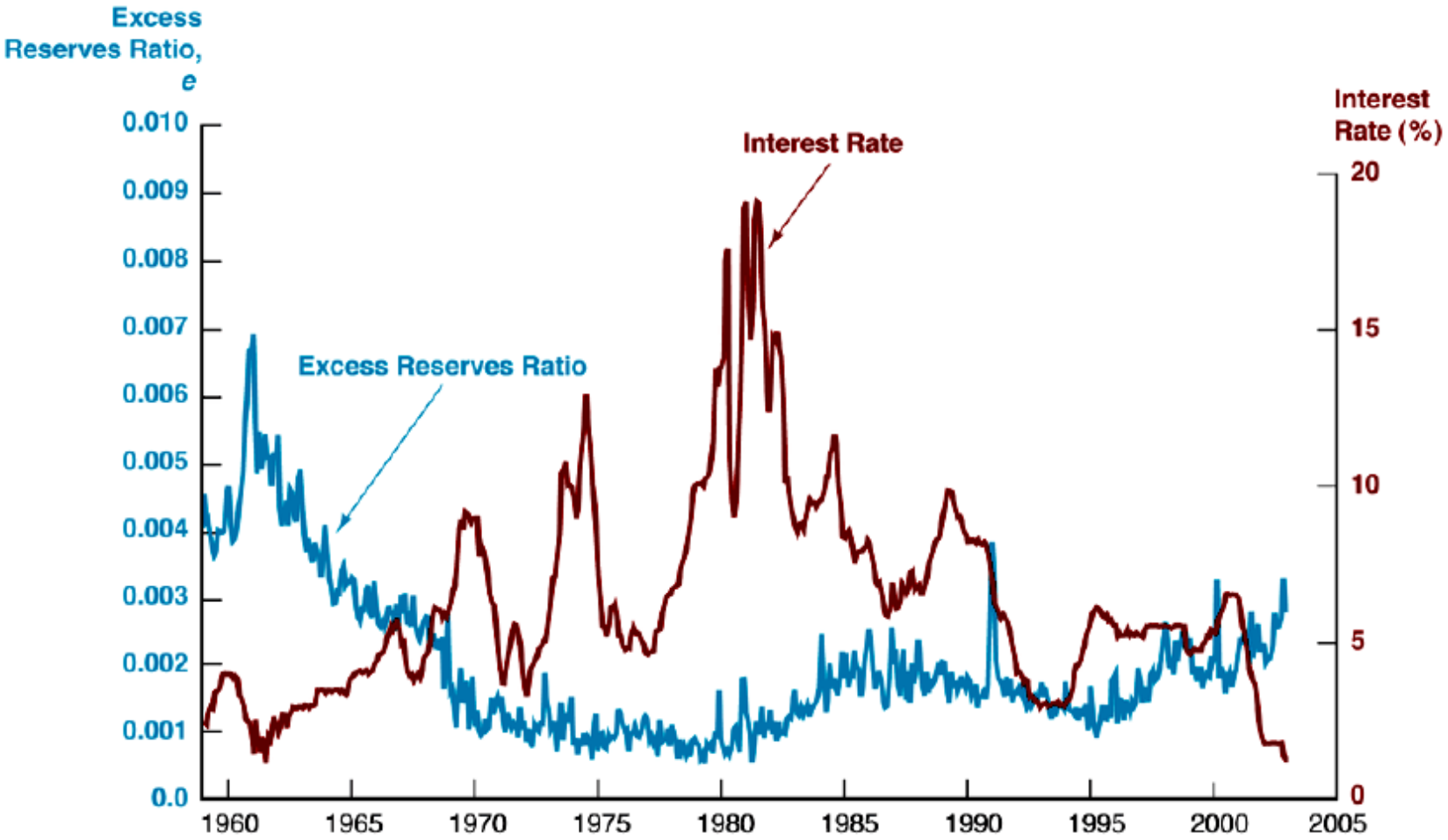
- m= 2
- M= $1,600 billion

Model of Money Supply

- Reserves. All banks have an account at the Fed in which they hold deposits. Reserves consist of deposits at the Fed plus currency that is physically held by banks (vault cash). Reserves are assets for the banks but liabilities for the Fed, because the banks can demand payment on them at any time and the Fed is required to satisfy its obligation by paying Federal Reserve notes.
- Increase in reserves $\uparrow \Rightarrow$increase in the level of deposits $\uparrow \Rightarrow$Money supply$\uparrow$
- Normally, $R =$reserves that Fed requires banks to hold + any additional reserves the banks choose to hold
- In short, $R =$ required reserve + excess reserve
  - market interest rate $\downarrow$, expected deposit outflows $\uparrow \Rightarrow$excess reserve $\uparrow$

Model of Money Supply



Model of Money Supply

- Reserve-deposit ratio (rr) is determined by the Fed and banks: $rr \downarrow \Rightarrow m \uparrow \Rightarrow M \uparrow$
- Currency-deposit ratio (cr) is determined by households: $cr \downarrow \Rightarrow m \uparrow \Rightarrow M \uparrow$
- B is determined by the Fed and banks: $B \uparrow \Rightarrow M \uparrow$
  - B can be split into two components: discount loans (DL) and nonborrowed monetary base (B_n)

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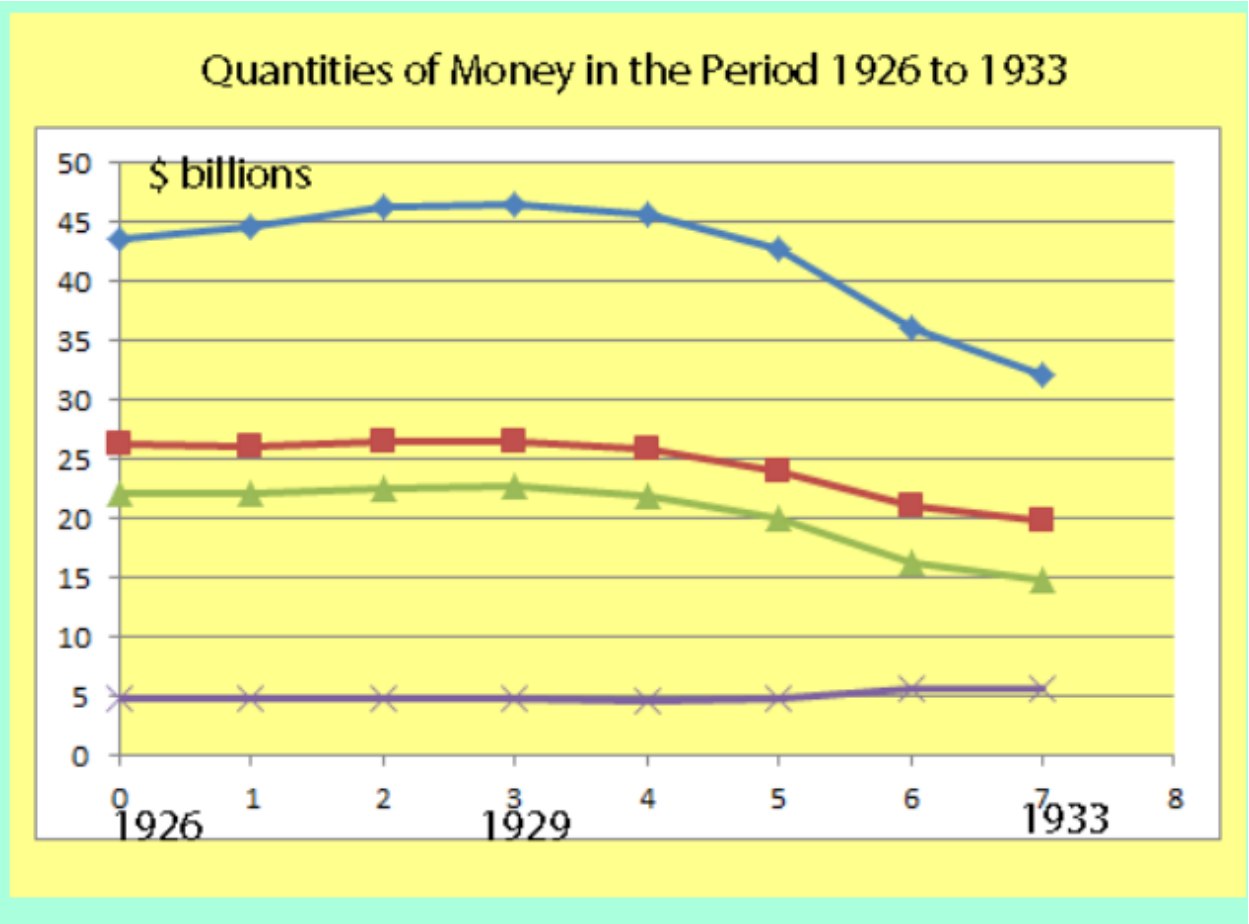
  - B_n is under the Fed's control: the Fed's open market purchase: $B_n \uparrow \Rightarrow B \uparrow$

Money Supply in 1930s and the Fed

The longest and deepest downturn in the history of the United States and the modern industrial economy lasted more than a decade, beginning in 1929 and ending during World War II in 1941.



Money Supply in 1930s and the Fed

- Between August 1929 and March 1933, money supply fell by 28%.
- More than 9,000 banks suspended in the early 1930s.
  - confidence in banking system $\downarrow \Rightarrow cr \uparrow \Longrightarrow m \downarrow \Rightarrow M \downarrow$
- Was the Fed responsible for $M \downarrow$?
- The Fed could have done better by acting as a *lender of last resort.* (increase B $\uparrow$).

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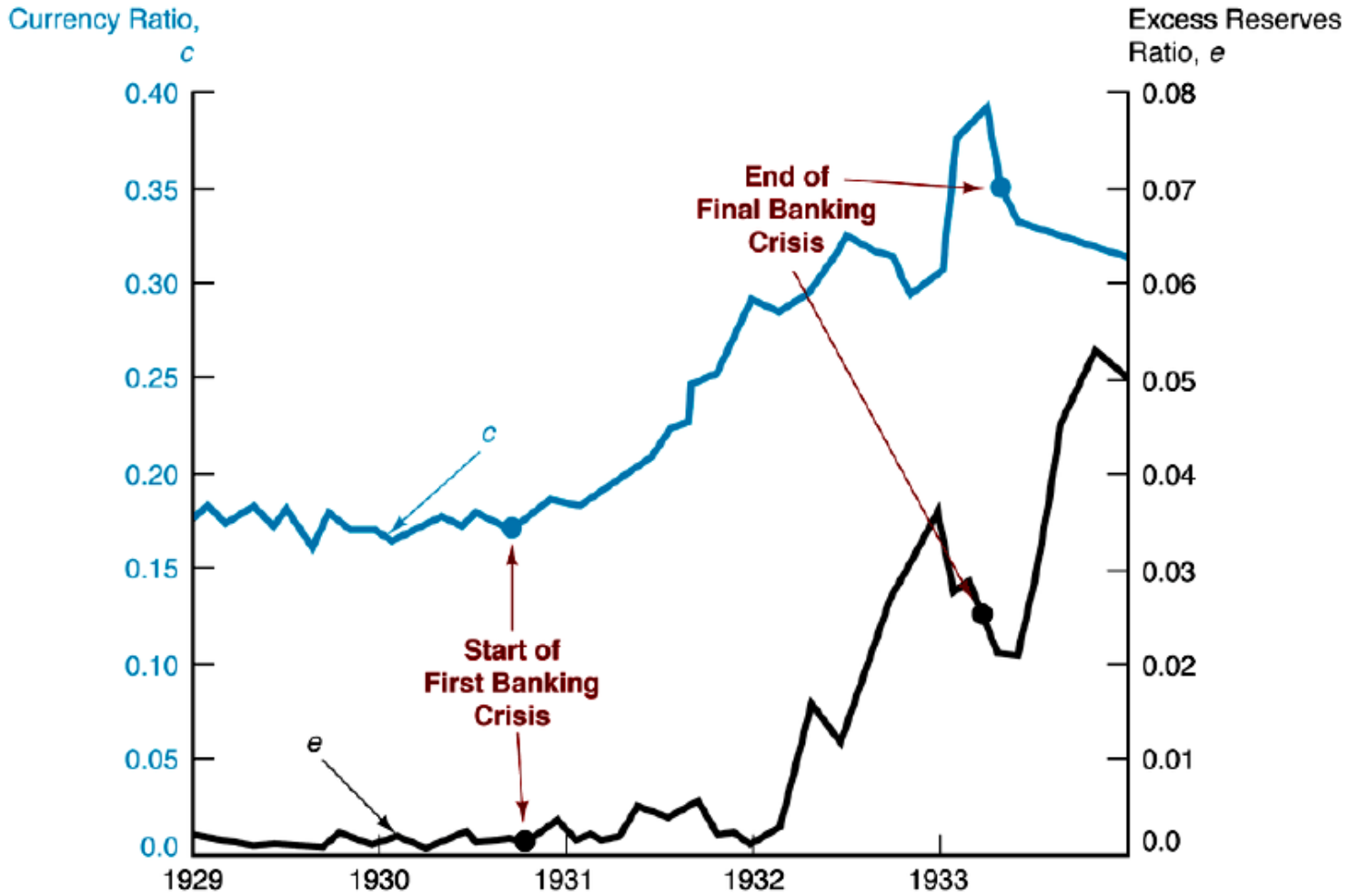
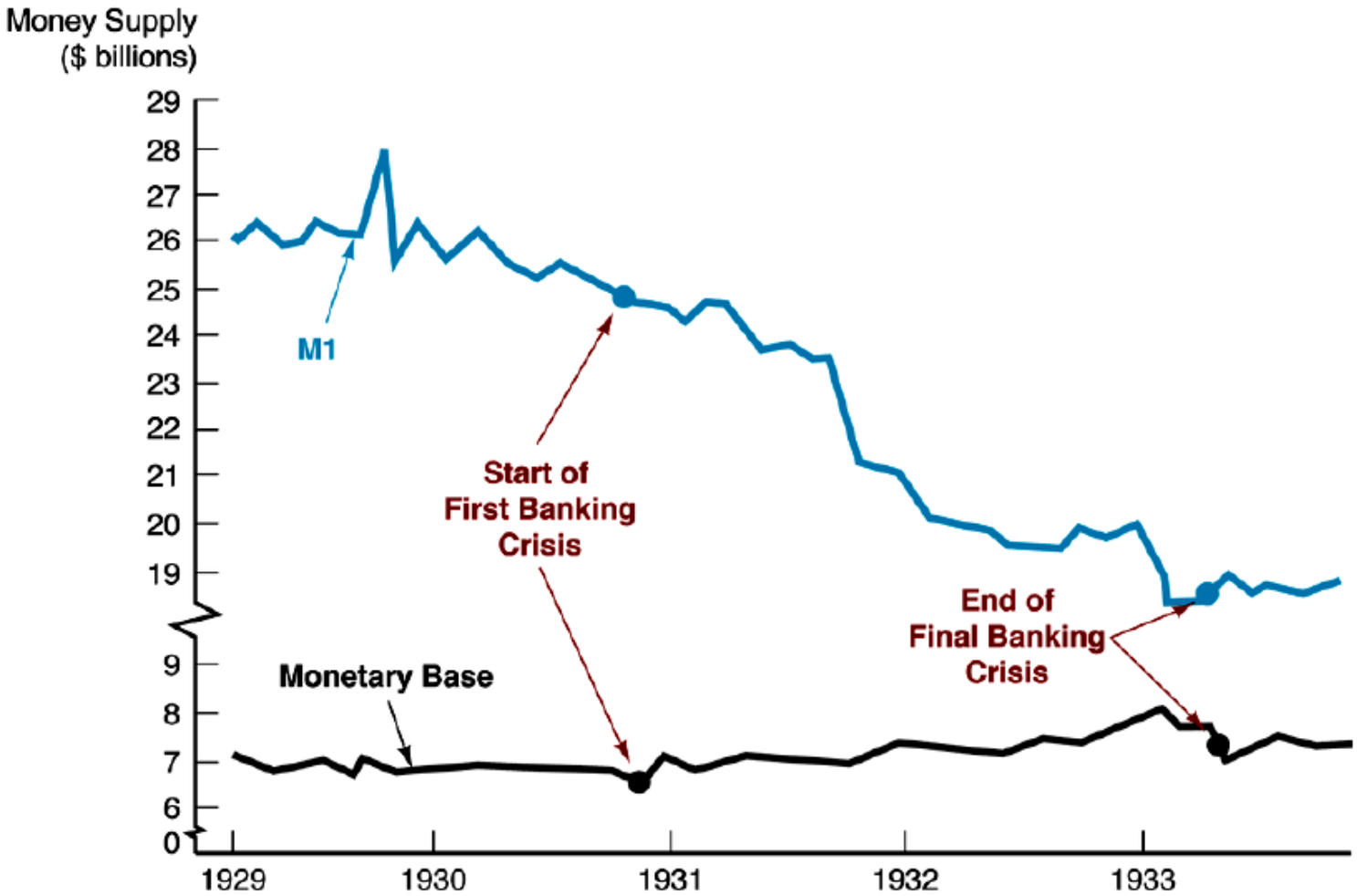
- More than 9,000 banks suspended in the early 1930s.
  - confidence in banking system $\downarrow \Rightarrow cr \uparrow \Longrightarrow m \downarrow \Rightarrow M \downarrow$
  - banks got more cautious $\Longrightarrow rr \uparrow \Rightarrow m \downarrow \Rightarrow M \downarrow$
- Was the Fed responsible for $M \downarrow$?
- The Fed could have done better by acting as a *lender of last resort.* (increase B $\uparrow$).

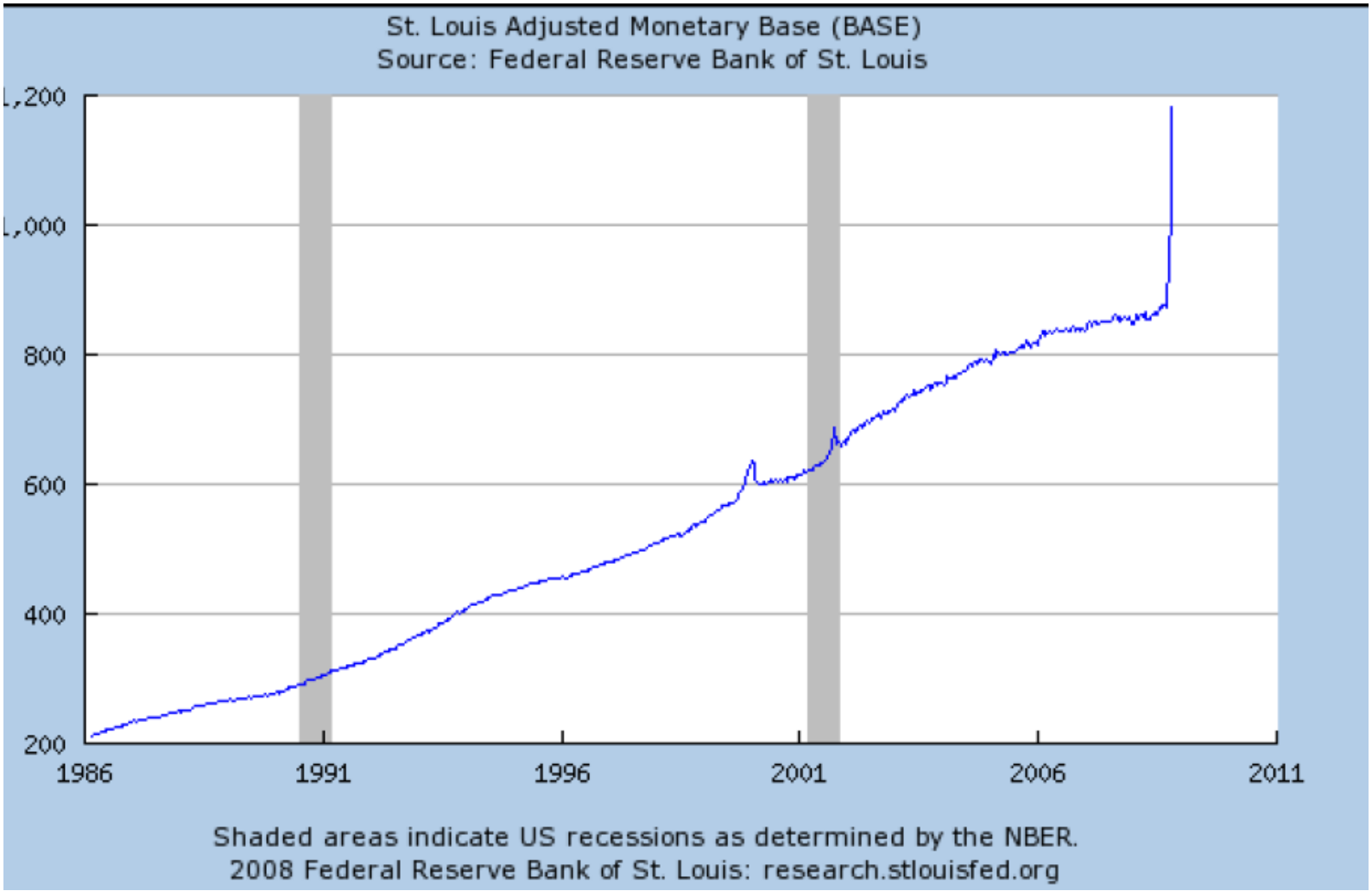
Currency Ratio and Excess Reserve Ratio



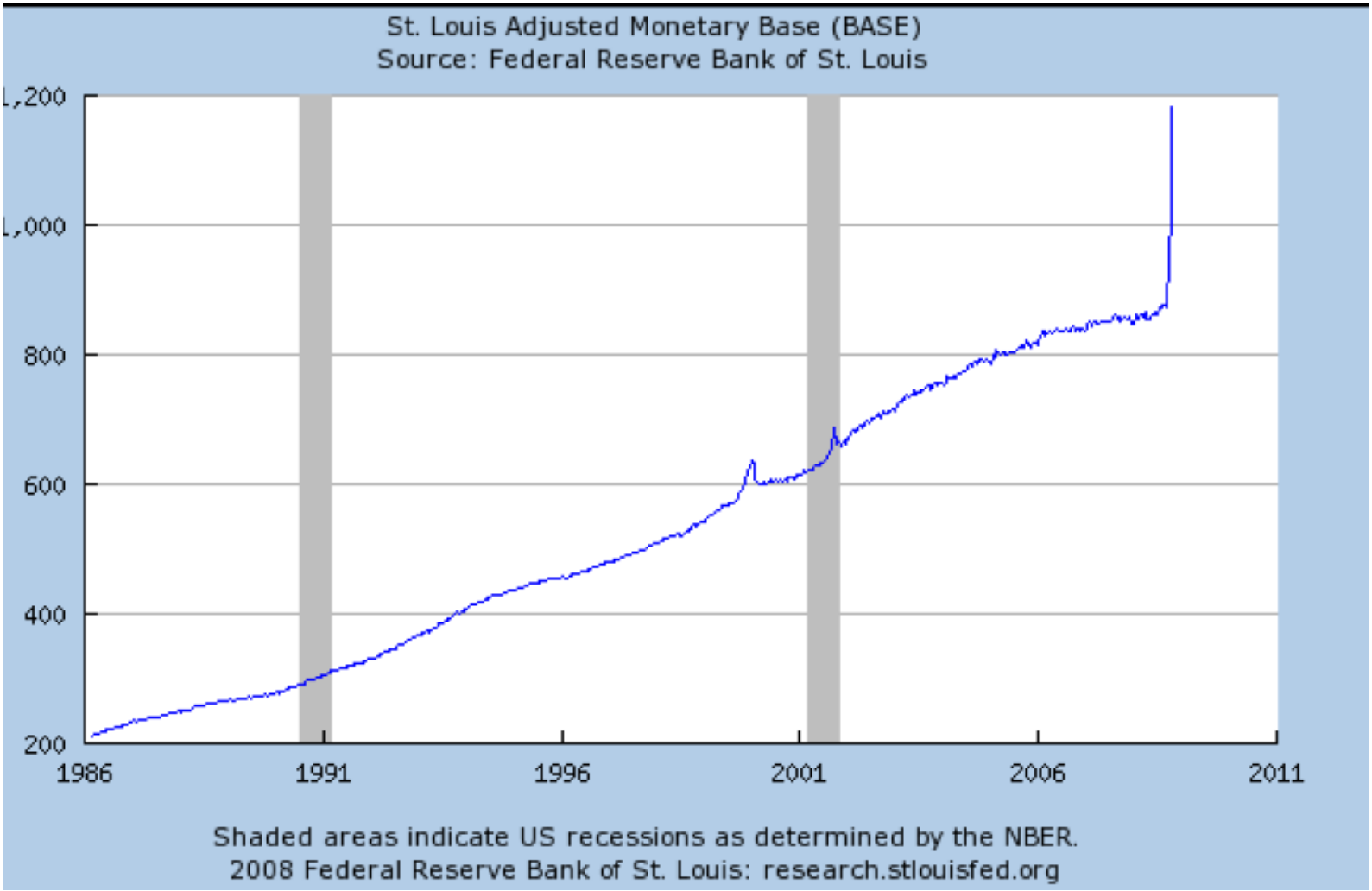
M1 and Monetary Base



What about 2008?



Why did the banks' excess reserves rise?



Quantity Theory of Money

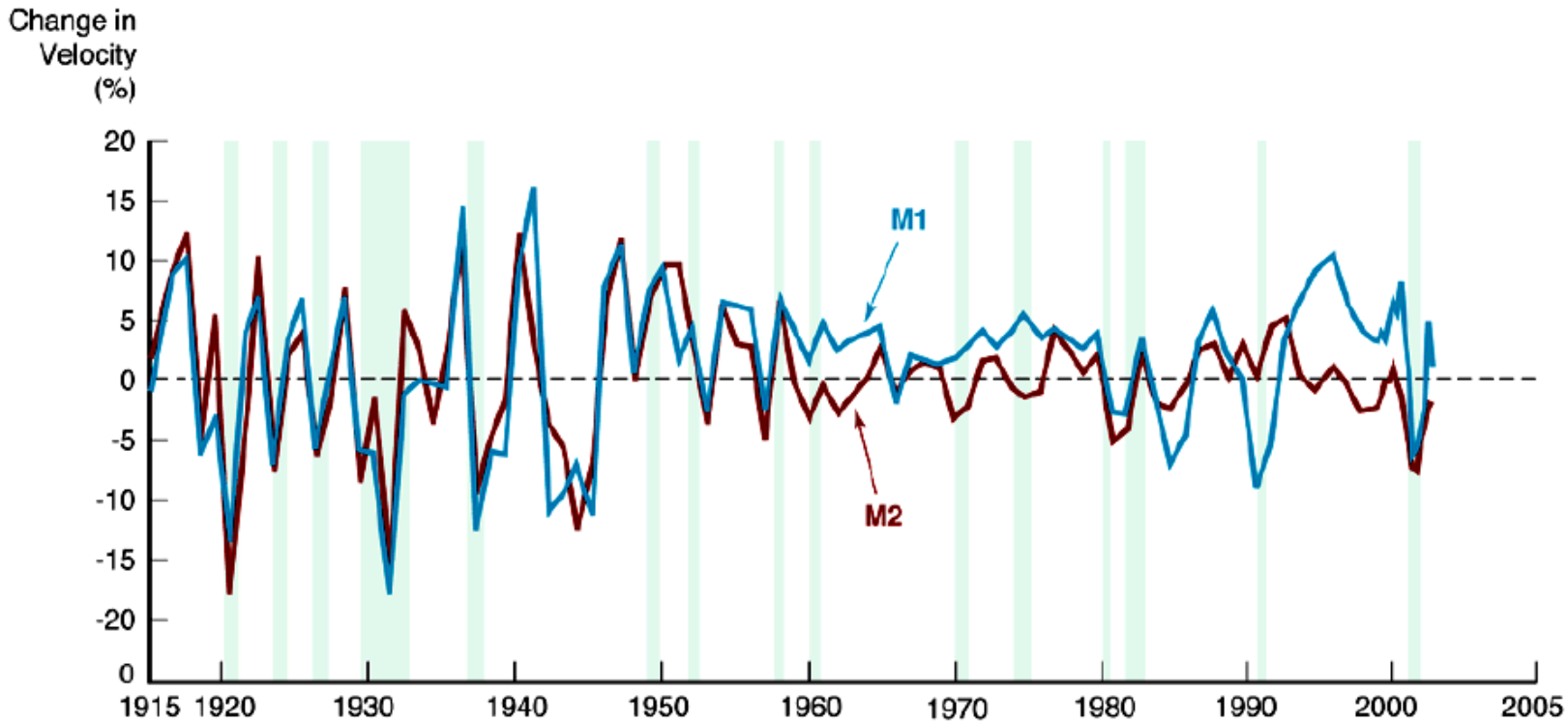
- Quantity equation $MV = PY$ can be used as money demand function or a theory on money growth and inflation.
- The equation of exchange thus states that the quantity of money multiplied by the number of times this money is spent in a given year must equal nominal income.
- If V is stable over time and Y is at the full employment level,

$$\tilde{M} + \tilde{V} = \tilde{P} + \tilde{Y} \Rightarrow \tilde{M} = \tilde{P} \tag{3}$$

- Milton Friedman: "Inflation is always and everywhere a monetary phenomenon."
- Inflation comes from "too much money chasing too few goods."
- This is not a literally correct statement because Y an V changes. However, a long-run correlation between M and P is 0.95!
- Money growth is the primary determinant of the inflation rate.

Is Velocity of Money Stable?

$$V = \frac{PY}{M} \tag{4}$$



Money Demand

- Functions of money $\Rightarrow$ portfolio motive and transaction motive $\Rightarrow$ the demand for holding money
- Quantity equation can be a simple money demand function:

$$\frac{M^d}{P} = kY \tag{5}$$

$$k = \frac{1}{V} \tag{6}$$

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  - It's better to interpret Y as Y^p ("permanent income")

Money Demand

Baumol-Tobin Model

- Holding money
  - benefit: convenience

- A person plans to spend Y gradually over time: how much money to hold? (how often to visit the bank?)
- Let N be the number of visit and F fixed cost of going to the bank.
- Question: what would be the optimal number of visiting the bank?
- $N \uparrow$ money holding $\downarrow \Rightarrow$ forgone interest $\downarrow$, but the cost of visiting the bank $(NF) \uparrow$

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  - benefit: convenience
  - cost: forgone interest + trip to bank (ATM) + fees
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Baumol-Tobin Model

- With Y and N times of visiting, average money holding is $\frac{Y}{2N}$
- Efficient money management requires that the individual minimizes this cost:

$$\min_N \frac{Y}{2N} i + NF \tag{7}$$

- The solution is

$$N^* = \sqrt{\frac{iY}{2N}} \tag{8}$$

- thus $M^* = \sqrt{\frac{YF}{2i}}$

Quizzes In Class Requirements

- 10 minutes
- Send to: rsun2@gradcenter.cuny.edu
- Email title: *Name_ECON215_Quizzes#1*
- Comments and scores will come back to you later via email