



# Econ 201: Introduction to Economic Analysis

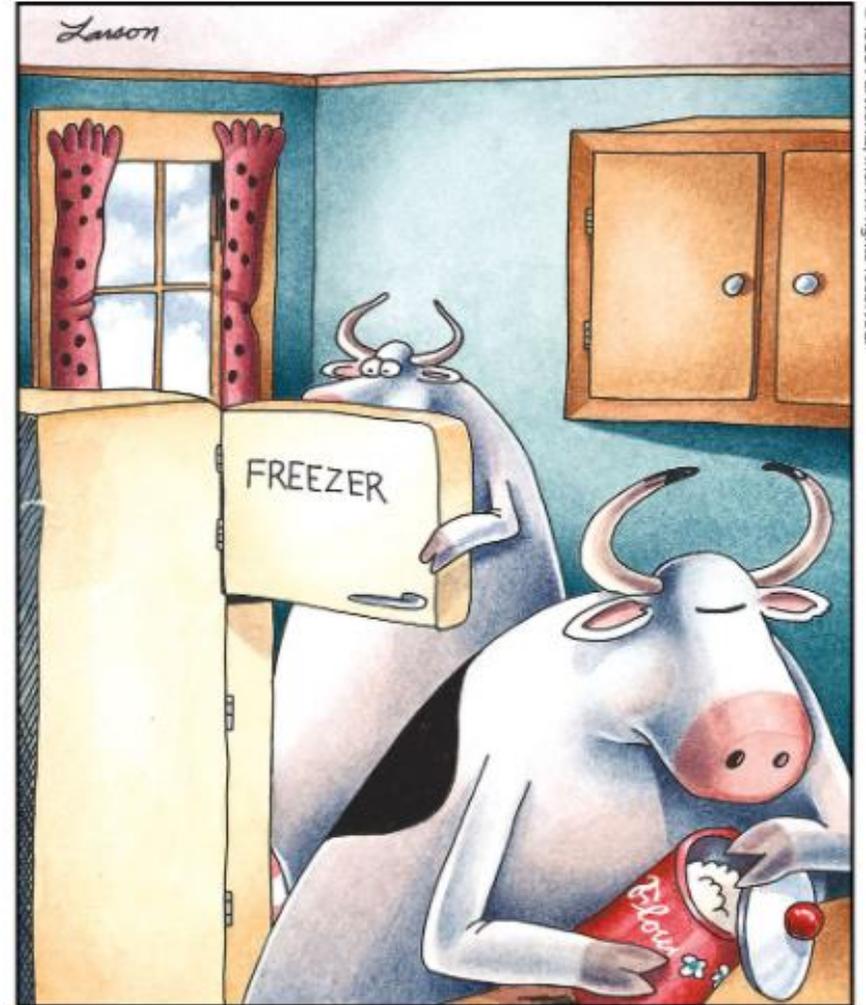
**November 18 Lecture: Money, Banking and  
the Monetary System**



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# Daily dose of The Far Side

[www.thefarside.com](http://www.thefarside.com)



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While Farmer Brown was away, the cows got into the kitchen and were having the time of their lives—until Betsy's unwitting discovery.

# Preview of this class session

- Definitions of money: medium of exchange
- Federal Reserve System and the organization of the banking system
- Monetary policy, federal-funds market, and open-market operations
- Money and prices in the long run
- Social costs of inflation





# Money



# What is money?

- Not just currency, and not what you hear in common speech
- Misleading usages
  - “She makes a lot of money” (income)
  - “She has a lot of money” (wealth)
  - “The money market” (short-term credit market)
- **Money** is the **medium of exchange**: Asset used to pay for goods and services in markets
- **Functions** of money
  - Means of payment or medium of exchange
  - Unit of account
  - Store of value



# How do societies decide what to use?

- Social convention
  - Everyone using same money eliminates **double coincidence of wants**
  - Historically, societies decide what asset should serve this function
- Governments often play a role by defining **legal tender**
  - Federal Reserve System is charged with managing the U.S. dollar
- If inflation is very high, societies might refuse to use government money
  - Ecuador abandoned the sucre and adopted the U.S. dollar
  - Zimbabwe uses U.S. dollars as *de facto* currency



# Kinds of money

- **Commodity money** has intrinsic value comparable to money value
  - Gold coins
  - Stone disks on Yap?
- **Convertible money** (fiduciary money)
  - Exchangeable for something valuable
  - Dollars were originally backed by gold
- **Fiat money**
  - Not backed by anything except your trust that someone else will accept it in exchange



# Statistical definitions of money

- **M1** = Currency in circulation (outside banks) + demand deposits
  - “Narrow money”
  - These assets are typically usable as means of payment
- **M2** = M1 + savings accounts, money-market deposits, small time deposits
  - These assets are trivially convertible into M1, so people may use them interchangeably
  - Other broader aggregates include slightly less liquid assets that are substitutes for M2
- Why not credit cards?
  - They are not an asset, just a “line of credit” on which you can draw
  - But more use of credit cards would reduce the need for money



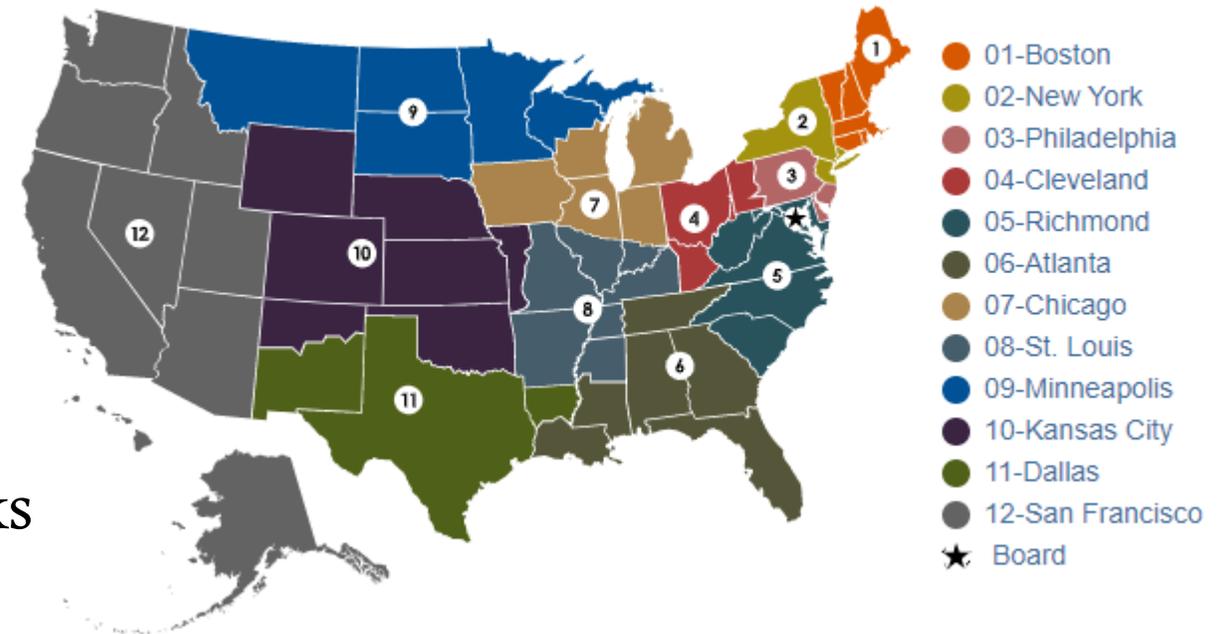
# Banks and the Federal Reserve System



# Federal Reserve System

- Founded in 1913
- Board of Governors
  - 7 members with 14-year terms
  - Regulates banking system
- Regional Fed banks (12)
  - Private, owned by member banks
  - Serve member banks by clearing checks
- Federal Open-Market Committee (FOMC)
  - Board members + 5 of regional presidents
  - Meets regularly to decide on monetary policy

Federal Reserve Banks



<https://www.federalreserve.gov/aboutthefed/structure-federal-reserve-banks.htm>



# A bank's balance sheet

- **Assets**

- Loans to public
- Securities owned
- Reserves
  - Vault cash
  - Deposits at Fed
- Physical assets

- **Liabilities**

- Deposits of public
- Borrowing from Fed

- **Net Worth**

- Assets minus liabilities
- Bank “capital”

- **Regulations**

- **Reserve requirements:** Reserves / Deposits  $>$  minimum
- **Capital requirements:** Bank capital / Assets  $>$  minimum (8%)



# Fractional-reserve banking

- **Monetary base** is financial liabilities of the Fed
  - Deposits at Fed + Currency issued
  - Equals bank reserves + Public's holding of currency
- Banks hold only part of depositors' money as reserves
  - The rest is lent out or used to purchase securities
- Until 2008, reserves did not earn interest
  - Holding reserves was not as profitable as lending
  - Banks would hold only required reserves (no excess reserves)
- If short of reserve requirement, they could
  - Borrow from Fed (unpopular!)
  - Borrow from each other on federal-funds market



# Money multiplier and the Fed

- Increase in monetary base by Fed →
  - Increase in reserves of banks OR
  - Increase in currency held by public
- If banks hold 10% reserves against deposits, each additional dollar of reserves (monetary base) supports \$10 of deposits
- Banks end up with \$1 more reserves, \$10 more deposits, and \$9 more in loans
- Monetary base goes up \$1; money supply (deposits) goes up \$10
  - This ratio is **money-supply multiplier**
- More complicated if households and firms hold some of increase in currency rather than putting into banks/reserves



# Monetary Policy



# Open-market operations

- Monetary policy is enacted mainly through **open-market operations**
  - Any time that the Fed purchases anything, it pays with new monetary base, so the base increases
  - If the Fed sells, the base goes down.
- In normal times, the Fed buys and sells Treasury bills
  - Since 2008, it also has bought longer-term Treasuries and private assets
- If the money-supply multiplier is stable, increasing the monetary base raises the money supply
  - Banks acquire more reserves and expand lending so that deposits go up by more than the base
- Recently, banks have largely absorbed excess reserves, so money supply has not exploded with the base



# Targeting the federal-funds rate



- Central banks can set its monetary-policy target in terms of **growth in the money supply** or an **interest rate**
- Most central banks (including Fed) now pursue interest-rate target
  - Fed sets target level of federal-funds rate
  - Funds rate reflects the tightness of bank reserves
  - Lowering rate involves supplying more reserves through open-market operations
  - Additional reserves lower the federal funds rate on loans between banks

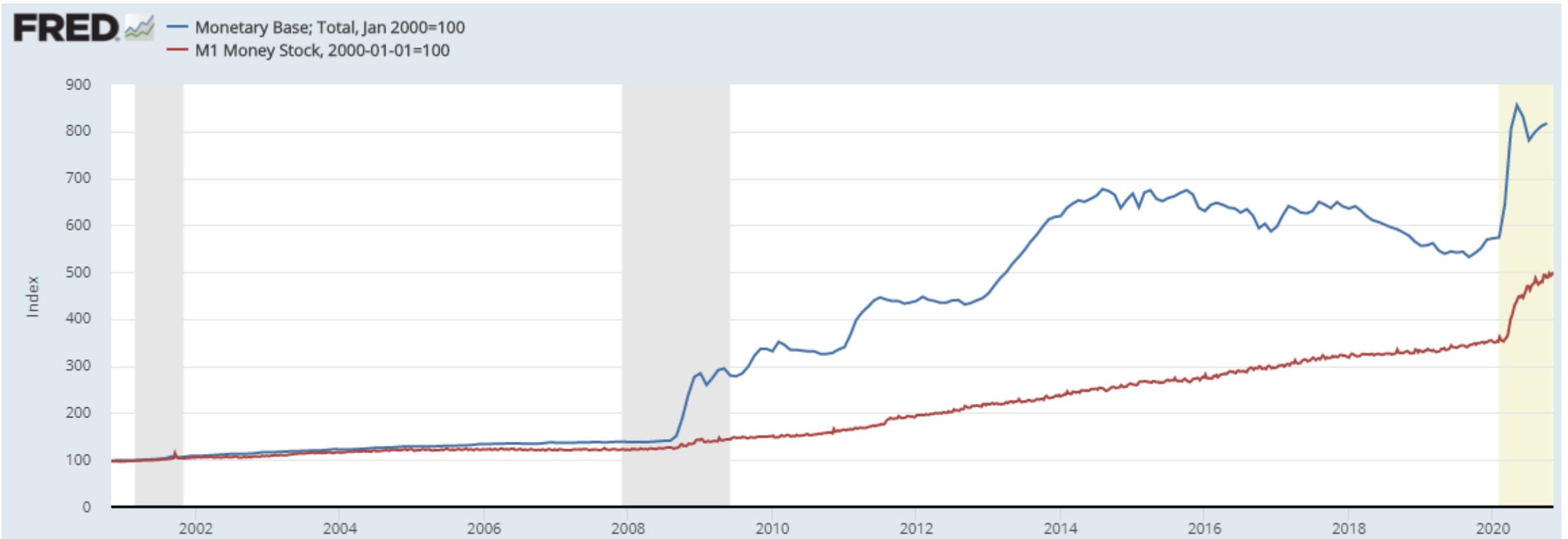


# Other possible instruments of monetary policy

- Could change **reserve requirements** to alter the multiplier
- **Discount rate**: Rate at which the Fed lends to banks
  - Fed is banks' **lender of last resort**
  - Now adjusted to follow target of federal-funds rate
- Interest rate paid on banks' deposits
  - Was zero until 2008, now follows federal-funds rate target
- Targeted market intervention to stabilize financial system
  - Used extensively in 2008 and 2020 to prevent market meltdown
- What happens when nominal funds rate approaches zero?
  - **Zero lower bound** in 2008 led to **quantitative easing**



# Quantitative easing



- Massive base expansion following 2008 was mostly held as reserves
  - Money supply did not grow explosively → no inflationary pressure
- More expansion in money/deposits in 2020 intervention



# Money and Inflation



# Money and prices in the long run

- “Too much money chasing too few goods”
- **Classical quantity theory of money:  $MV = PY$**
- If  $Y$  is constant and  $V$  is stable:

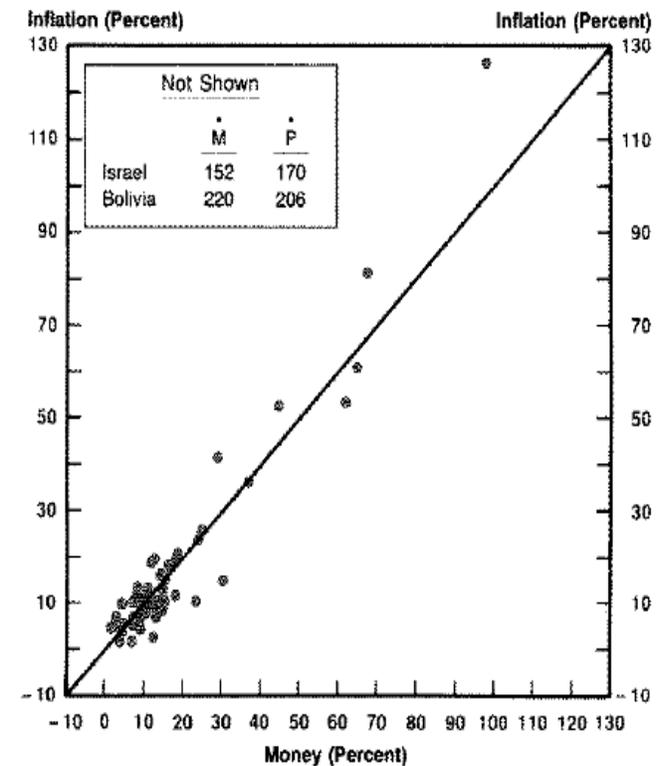
$$\frac{\Delta P}{P} = \frac{\Delta M}{M}$$

- If output is growing, then

$$\frac{\Delta P}{P} \approx \frac{\Delta M}{M} - \frac{\Delta Y}{Y}$$

- Old data in diagram, but evidence is consistent:  
**inflation reflects money growth** in long run

Chart 3  
Inflation Rate and Growth in  
Money: 1979 to 1984





# Costs of inflation

## Anticipated inflation

- People reduce money holdings
- Menu costs
- Variations in relative prices
- Tax and legal distortions
- Confusion and inconvenience

## Unanticipated inflation

- Transfers from lenders to borrowers
  - $\pi > \pi^e$  so for given  $i$ ,  $r < r^e$
- Borrowers are repaying in devalued dollars
  - If they had known about inflation, they would have required higher nominal rate
- Similar transfers in long-term nominal contracts



# Review

- Money is an asset used as a medium of exchange
  - Currency and some forms of bank deposits
- U.S. monetary system is regulated by Federal Reserve System
- Banks hold fractional reserves, so expansion in supply of reserves leads to a multiplied effect on deposits and money
- Fed undertakes monetary policy by targeting federal-funds rate
  - This effectively controls the supply of reserves
- Quantitative easing has been used when interest-rate target gets to zero
- Rapid monetary expansion leads to inflation in long run



# Daily diversion

Another bad economist joke:

A physician, an engineer, and an economist were arguing about whose profession was oldest. “Healing is as old as humanity,” said the physician. “That makes *mine* the oldest profession.”

“Not so,” said the engineer. “God had to use engineering to create the world out of chaos and confusion.”

The economist asked, “And who do you think created chaos and confusion?”

Caroline Postelle Clotfelter, *On the Third Hand*

# What comes next?

- On Friday, we will study the theory of aggregate demand and supply, which is a basic theoretical framework that we often use to explain macroeconomics
- Friday's case study asks you to consider how the economic effects of the pandemic can be broken into supply effects and demand effects
- Problem Set #8 will be due on Wednesday, December 2 (after Thanksgiving break)

