OUTLINE — November 15, 2017

- The Fed & Monetary Policy, cont.
  - Money, Reserves, and Bank Lending
  - Federal Funds Rate
  - Yield Curve
  - Zero Lower Bound

PS4 due Mon/Tues Nov. 20/21
Other announcements sent by e-mail

Comprehensive Essay prompt will be distributed in class Nov 20
& due via bCourses 8 am Tues December 5

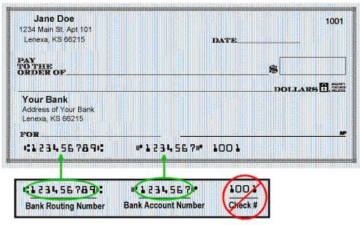
Banks and Money Creation

- A bank is an institution that
  - accepts deposits
  - makes loans
  - earns profit
  - and holds reserves – a fraction of deposits – to cover withdrawals
- Banks create money (checking account balances) by making loans with their "excess reserves"
  - The printing press is irrelevant

Bank (Checking) Accounts

You!

Bank



Movement of funds between accounts
- Electronic
- On demand
- Through "clearinghouse"
  Fed is the clearinghouse for U.S. banks

How checks (debits) clear

Bank A's Ledger

Account owner	Balance
Alejandra	$15,000
Barry	$ 5,000
Chelsea	$24,000
Dmitri	$ 6,000
etc., etc.	
Total deposits	$1,000,000

How checks (debits) clear

Bank A's Ledger	
Account owner	Checking Account Balance
Alejandra Barry Chelsea Dmitri etc., etc.	$15,000 $ 5,000 $24,000 $ 6,000
Total deposits	$1,000,000

Clearinghouse Ledger	
Bank name	Reserve Account Balance
Bank A Bank B etc., etc.	$200,000 $250,000
Total reserves	$150,000,000

How checks (debits) clear

Bank A's Ledger	
Account owner	Checking Account Balance
Alejandra etc., etc.	$15,000

Bank B's Ledger	
Account owner	Checking Account Balance
You! etc., etc.	$ 3,000

Federal Reserve Bank Ledger	
Bank name	Reserve Account Balance
Bank A Bank B etc., etc.	$200,000 $250,000
Total reserves	$150,000,000

Alejandra writes you a check for (or, electronically sends you) $1,000
You deposit the check into (or, see the increase in) your account at Bank B

Bank "Reserves"

- Every bank has an account at Federal Reserve Bank
  - "Reserve Account"
- Bank reserves used to move funds between banks
- Required minimum balance = 10% of checking account balances
  - "Required reserves"
- Any balance beyond minimum requirement called "excess reserves"
  - Excess reserves = Total reserves – Required reserves

Banks make loans

- Banks earn profit by making loans

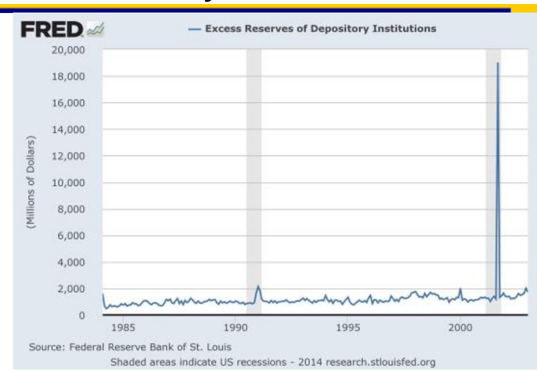
AND!

- Banks create money by making loans

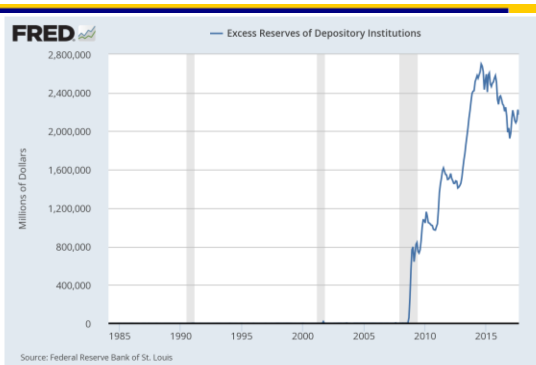
Changing the Money Supply

- Banks create money by making loans with their "excess reserves"
- Fed wants more money in economy?
  - Fed increases excess reserves held by banks
  - Banks lend more, creating more money (checking account balances)
- Fed wants less money in economy?
  - Fed decreases excess reserves held by banks
  - Banks lend less, creating less money (checking account balances)
- Or, at least, that's how it used to work . . .

How many unlent reserves?



Oh my, 2001 "blip" now barely registers

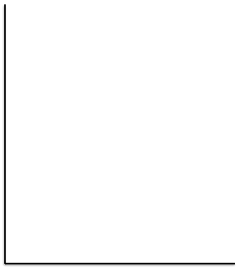


How Fed changes bank reserves

- To increase bank reserves, Fed buys assets – traditionally Treasury bills – from banks
  - Fed pays bank by increasing bank's reserves
- To decrease bank reserves, Fed sells assets to banks
- The Fed's Balance Sheet: https://www.clevelandfed.org/our-research/indicators-and-data/credit-easing.aspx

Federal Funds Rate

- Fed requires bank reserves ≥ 10% of deposits
  - Not enough reserves? Borrow from another bank
- FFR (federal funds rate): interest rate charged by banks on overnight loans to other banks
- Demand for federal funds
- Supply of federal funds
- Equilibrium



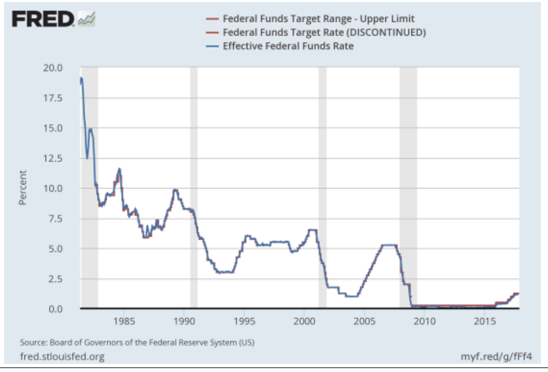
Language re policy

- See text, pg 221
  - *Goal*: stable prices
  - *Objective*: inflation rate = 2%
  - *Strategy*: increase federal funds rate to 3 %
  - *Tactic*:
    - Traditionally: Fed sells financial assets (FOMO)
    - New tactic: Fed will change interest rate paid on excess reserves (IOER)

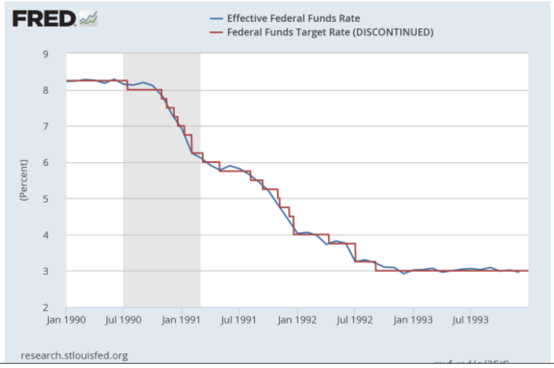
Fed influences FFR by changing reserves of banks

- If Fed increases reserves in banking system
- If Fed decreases reserves in banking system
- *Tactic called FOMO: Federal open market operations*
- **Disadvantage**: Fed can't control FFR
  - Fed sets target for the federal funds rate
  - Takes action to influence that rate
  - But market – supply & demand – determines rate

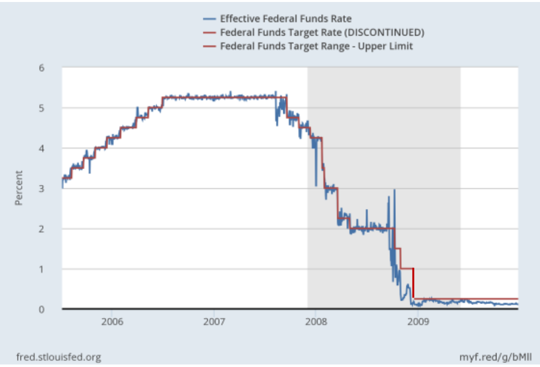
Usually FFR tracks target



Even as Fed lowers FFR Target



But not in 2007 – 2009!!



Fed changed tactic

- New tactic as of 2008: IOER
  - IOER = interest rate paid by Fed on excess reserves
  - Replaced FOMO as primary tactic of monetary policy
- **Advantage:** Fed *can* control interest rate paid on reserves
- **Strategy**
  - Fed wants banks to decrease their lending to public?
    - Fed increases rate paid on excess reserves
  - Fed wants banks to increase their lending to public?
    - Fed decreases rate paid on excess reserves
- Source: *http://www.federalreserve.gov/monetarypolicy/reqresbalances.htm*

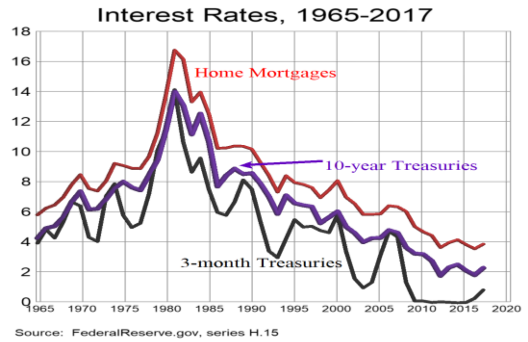
And what else changed?

- And also, who were lenders in the Federal Funds market changed
  - Traditionally: banks lending to other banks
  - Now (read #24!): Also, “government sponsored entities” (GSEs) as lenders
- Because of market imperfections. . .
  - GSE lends to bank at, say, 0.40 percent
  - Bank thereby has excess reserves (ER)
  - Bank holds the ER and earns 0.50 percent IOER from Fed
  - Bank prefers risk-free ER at IOER over risky loan to customer

FFR & Other Interest Rates

- Different types of loans are substitutes for each other
  - What are choices for bank that wants to make loans?
- Federal funds rate influences other interest rates
  - Prime rate (for best commercial customers)
  - Home mortgage rates
  - Home equity loan rates
  - And many other interest rates

Historical pattern of interest rates



Long-term & Short-term Rates, 1

- Borrowing for investment spending is mostly *long*-term borrowing
  - 10-year, 20-year, 30-year loans
- Fed policy directly affects *short*-term interest rates
  - Rate paid on excess reserves (IOER)
  - Overnight rate (federal funds rate, FFR)
  - Treasury-bill rate (30-day, 90-day, 1-year)

Long-term & Short-term rates, 2

- What is connection between short-term (ST) and long-term (LT) interest rates?
  - LT rate = average of current & future expected ST rates + “term premium” + “risk premium”
- What determines “future expected ST rates”?
- “Forward guidance”
  - Fed policy starting 2004 to clearly state “this is what we’re going to do in the future to interest rates”
  - Sometimes expressed as a conditional: “If X happens, then we will do <this> to interest rates”
  - Eliminates interest rate uncertainty (aside from uncertainty about when X will happen)

Yield Curve

- Yield curve shows – *on any one day* – relationship between that day's ST rates and LT rates

- Animated Yield Curve: http://stockcharts.com/charts/YieldCurve.html

Zero Lower Bound (ZLB)

- Traditional belief: Target FFR can't go below 0
  - Fed's 2008-2015 target for Federal Funds Rate was "in the range of 0 – 0.25 percent"
  - Fed was at **zero lower bound**
- So Fed tried other strategies
  - "Quantitative Easing" (2009-2014)
  - Operation Twist (late 2011, 2012)
- All had same goal: increasing lending & spending

Zero Lower Bound (ZLB)

- Traditional belief: Target FFR can't go below 0
  - Fed's 2008-2015 target for Federal Funds Rate was "in the range of 0 – 0.25 percent"
  - Fed was at **zero lower bound**
- *Why do I say "Traditional belief"?* Because other countries have broken ZLB and Fed officials ponder whether Fed will eventually do so, too
  - Why is zero no longer "a lower bound"?
    - That's a question addressed in a section exercise