OUTLINE — November 18, 2019

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

PS4 due Tuesday November 26, 8 pm

Midterm 3 is Thurs Dec. 5, 7-8:30 pm

Comprehensive Essay prompt will be distributed here Nov 20

& due via bCourses 8 am Wed December 11

Financial Assets

"Money"

- Cash, coins, checking account balance
  - Cash & coins, $1.2 trillion; Checking & other transaction accounts, $10+ trillion
- Advantage: used to pay for things
- Disadvantage: doesn't earn (much) interest

Other financial assets

- Stocks, bonds, retirement funds
  - About 85% of all financial assets
- Advantage: Earn interest income
- Disadvantage: Can't be directly used to pay for things

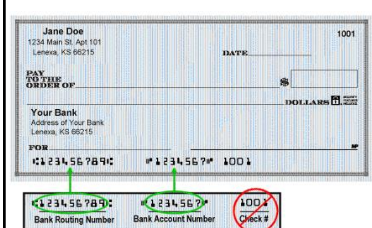
Banks and Money Creation

- 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 Barry Chelsea Dmitri etc., etc.	$15,000 $ 5,000 $24,000 $ 6,000
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"

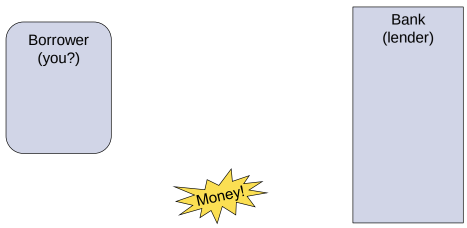
- Every bank has an account at Federal Reserve Bank
  - "Reserve Account"
- Bank reserves used to move funds between banks
- Required minimum balance = 10% of checking account balances
  - "Required reserves"
- Any balance beyond minimum requirement called "excess reserves"
  - Excess reserves = Total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

Old & New Fed Policy

- Most textbooks (and HS and AP classes) discuss the old way – the way the Fed used to conduct policy
  - Required reserve ratio
  - Discount rate
  - FOMO (federal open market operations)
- But since the textbook was written, the Fed has changed how they conduct policy
  - Article 23 is very helpful!
  - Headings on upcoming slides: Old and Now

Language re policy

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

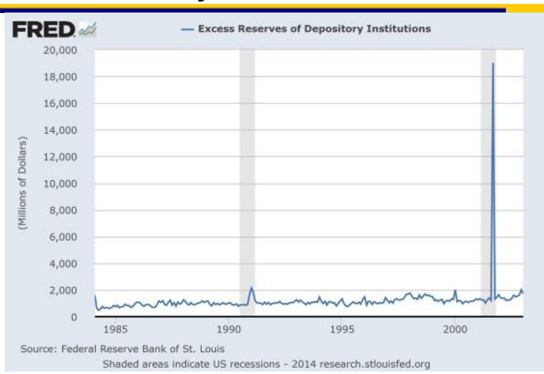
Old: How Fed changed int. rates

- Key rate: Federal Funds Rate (FFR)
  - FFR is interest rate banks pay for overnight loan of reserves
- Old reason to borrow: to cover reserve requirement
  - Borrowers = banks who need reserves to meet requirement
  - Lenders = banks with excess reserves
- FFR set in market for these overnight loans
  - Increase borrowing (increase borrower D for loans)?
    - Result: Higher interest rate (increase FFR)
  - Increase lending (increase lender S of loans)?
    - Result: Lower interest rate (decrease FFR)

Old: How Fed changes bank reserves

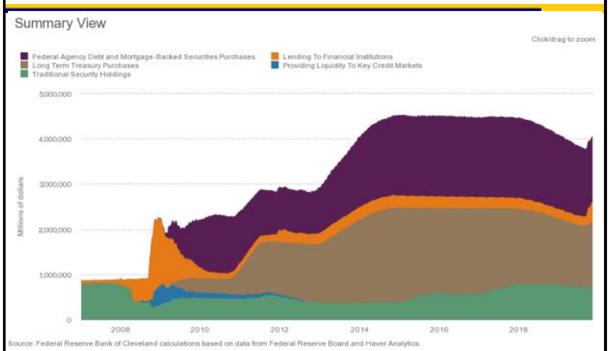
- Old: Fed changed reserves by conducting “FOMO”
  - FOMO = federal open market operations
  - To increase bank reserves, Fed would buy assets – traditionally Treasury bills (T-bills) – from banks
    - Fed pays banks for the T-bills by increasing banks’ reserves
    - More reserves → More lending & Less borrowing → FFR fell
  - To decrease bank reserves, Fed would sell T-bills to banks
    - Banks pay Fed for the T-bills by letting Fed decrease their reserves
    - Fewer reserves → More borrowing & less lending → FFR rose
- Fed could *influence* FFR by changing amount of reserves (“*influence”* . . . But Fed couldn’t *set* FFR)

How many unlent reserves?



Oh my, 2001 “blip” now barely registers

Assets owned by Federal Reserve



The Fed's Balance Sheet: https://www.clevelandfed.org/our-research/indicators-and-data/credit-easing.aspx

Now: Fed changed tactic

- New tactic as of 10/2008 (first used 12/2015): IOER
  - IOER = interest rate paid by Fed on excess reserves
  - Creates an obvious "opportunity cost" to lending
  - 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 (IOER)
  - Fed wants banks to increase their lending to public?
    - Fed decreases rate paid on excess reserves (IOER)

Source: *http://www.federalreserve.gov/monetarypolicy/reqresbalances.htm*

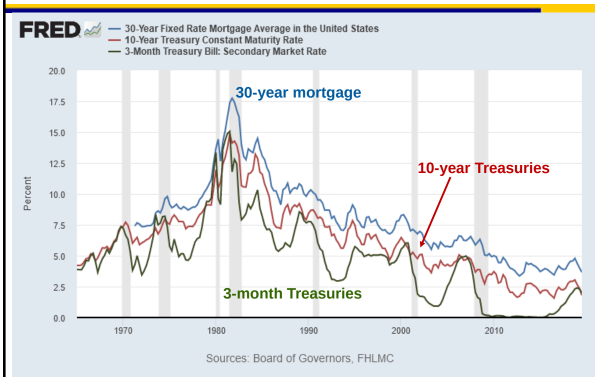
Now: And what else changed?

- Also, who were lenders in the Federal Funds market changed
  - Traditionally: just banks lending to other banks
  - Now: Also, "government sponsored enterprises" (GSEs, eg Fannie Mae, Freddie Mac) as lenders
- Gap between IOER and FFR matters
  - GSE lends to bank at an FFR of 0.40 percent
  - Bank thereby has excess reserves (ER)
  - Bank holds the ER and earns 0.50 percent IOER from Fed
  - When rates are low, bank prefers risk-free ER at IOER over risky loan to customer at market interest rate
- *Read Article #23!*

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

Interest Rates, 1965-2019



Long-term & Short-term Rates, 1

- Borrowing for investment spending is mostly *long*-term borrowing
  - 10-year, 20-year, 30-year loans
- Fed policy affects *short*-term interest rates
  - Fed can directly change
    - Rate paid on excess reserves (IOER)
  - Fed has influence (but not control) over
    - 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”

Long-term & Short-term rates, 3

- What determines “future expected ST rates”?
  - Our expectations about the future
- What is one thing affecting our expectations?
  - “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: IOER and target for the nominal 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

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  - 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