OUTLINE — December 3, 2018

- The Fed & Monetary Policy
  - Taylor rule
- 2007-2009 Great Recession
  - Subprime Mortgages, Credit Default Swaps, and AIG
- Challenges Facing the Fed
- What's Next?

Essay due via bCourses Wed Dec. 5, 1:00 pm

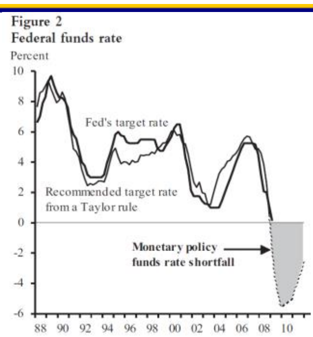
Olney review here, Wednesday, usual time

"Taylor Rule"

- Taylor Rule
  - An equation for FFR target that seems to (usually) fit the data reasonably well is the "Taylor Rule" equation
    - Estimated separately for different central banks
  - The equation says: The central bank (in U.S., the Fed) sets its interest rate target in reaction to inflation and unemployment (or growth rate of GDP)

$$
\begin{aligned}
&FFR\ Target \\
&= neutral\ FFR \\
&\quad + A * (actual - Fed's\ goal\ for\ inflation\ rate) \\
&\quad + B * (actual - Fed's\ goal\ for\ \%\ \Delta GDP) \\
&= neutral\ FFR \\
&\quad + A * (actual - Fed's\ goal\ for\ inflation\ rate) \\
&\quad - \beta * (actual - Fed's\ goal\ for\ unemployment\ rate)
\end{aligned}
$$

Taylor Rule & Actual FFR, pre-2008



Source: http://www.frbsf.org/economic-research/publications/economic-letter/2009/may/fed-monetary-policy-crisis/

Inflation Hawks And Doves

- Taylor Rule
  - Fed reacts to inflation and unemployment

$$
\begin{aligned}
&FFR\ Target \\
&= neutral\ FFR \\
&\quad + A * (actual - Fed's\ goal\ for\ inflation\ rate) \\
&\quad - \beta * (actual - Fed's\ goal\ for\ unemployment\ rate)
\end{aligned}
$$

- Inflation hawk

- Inflation dove

Hawks & Doves

Using the Taylor Rule

Question: Suppose the Taylor Rule is estimated as

FFR target = 4 + 1.5*(actual inflation – inflation goal)
– 1*(actual unemployment – unempl't goal)

And suppose further

inflation goal = 2 percent (use 2, not 0.02)
unemployment goal = 4 percent (use 4, not 0.04)
actual inflation = 1 percent
actual unemployment = 6 percent

2007-09 downturn

- Most post-WWII downturns triggered by Fed raising interest rates . . . *But not 2007-2009!*
- 2007-09 characterized by a global financial crisis (GFC)
  - What is the crisis?
    - At its most essential: unwillingness to lend
  - What caused the crisis?
    - Asymmetric information, greed, dumb decisions, and more . . .
- What happened to AD in 2007-2009?
  - Consumption decline was key feature
  - And investment spending plummeted too
    - Commonality: effects of the financial crisis
    - Brought on by changes in mortgage lending

Home Mortgages

- Mortgage = loan to buy house
- Technological development: FICO score, 1989
  - Allows risk-based pricing
- Home Loans, three levels of risk
  - Prime Alt-A Sub-prime
  - Sub-prime mortgage: borrower has bad credit (low FICO) or low down payment (< 20 percent)
- Adjustable rate (rather than "fixed rate") mortgage
  - Interest rate & monthly payment change
- New products in early 2000s: 2/28, 3/27, teaser rate
  - And no-doc (no documents) "stated income" loans

Housing prices soar with easy credit

Subprime Lending

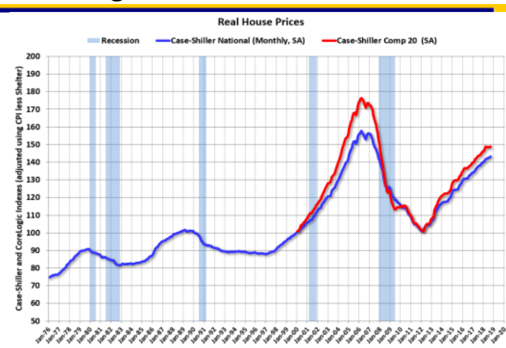
- Crazy loan offers in the subprime market
- "2/28 at teaser rate"
  - Borrow $400,000 for 30 years, $0 down, interest only for 2 years, at 4% teaser rate
  - Reset after 2 years to market rate of 8%
    - Monthly payment rises from $1,333 to $2,987
- What does a borrower do when payment rises?
  - If house price has risen 25%, refinance at lower rate: Win!!
  - If house price didn't rise fast enough, can't refinance: Must pay the new higher monthly amount.

Housing "Bubble"

- Bubble: Rapid & temporary rise of prices
- Speculation?
  - Flip this house

- Buy for $400,000
  - Appreciate 12% per year
  - In 2 years, worth $502,000
    - Speculators sell
    - Others refinance
- Unsustainable rate of increase . . . Market forces

Housing Prices Peaked 2006-07



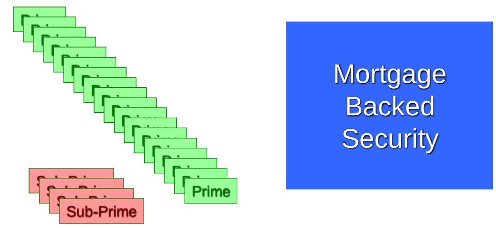
Source: http://www.calculatedriskblog.com (accessed 12/2/2018)

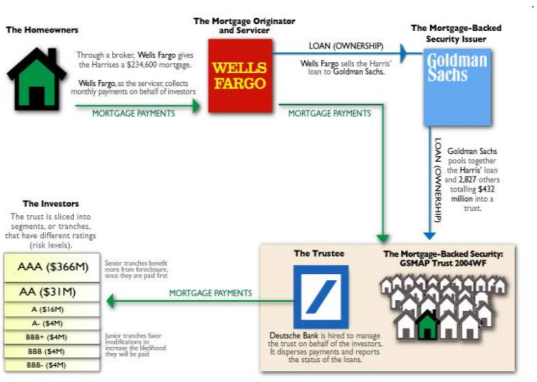
But Then Prices Stopped Rising

- Prices stopped rising, started falling
  - Supply of houses up due to foreclosures
  - Supply up due to need to sell to avoid default
  - Demand down because less credit available
- Unable to refinance?
  - Into default. Possible foreclosure.
- Then Alt-A and Prime mortgages went bad too

Problem: Mortgage Backed Securities

- Bundle together mortgages; sell shares





Who Bought MBS?

- Everyone . . . In every country
  - Banks
  - Central Banks
  - Hedge Funds
  - Any Financial institution you can name
  - Insurance Companies
  - Pension funds

Banks & Insurance

- Banks insure themselves against losses
  - Bank buys insurance policy
  - Insurance company bears risk of default
  - If borrower defaults, bank is paid by insurance company
- Insurance is called “credit default swap”
- Largest insurance company: AIG
  - American International Group
  - Issued trillions of dollars in credit default swaps

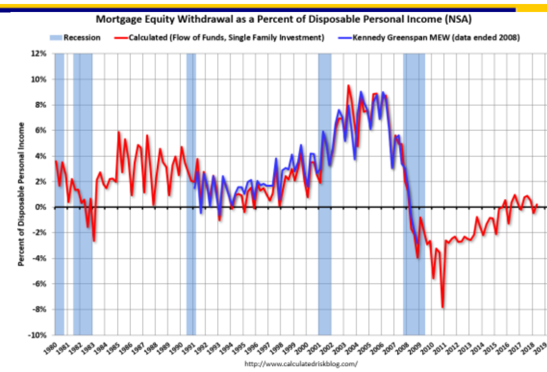
Credit Default Swap (CDS)

- Insurance against <u>someone else</u> defaulting
  - You buy a CDS on Joe’s home mortgage
    - If Joe defaults on his debt, you get $100
    - You pay $2 / year for this CDS (price reflects perceived default risk)
    - You are betting that Joe will default
    - Insurance company is betting that Joe won’t default
- Key problem: <u>anyone</u> could buy a credit default swap
- What if **<u>lots</u>** of borrowers default at once?
  - Insurer may be <u>un</u>able to pay
  - Debt-holders who bought CDS have big losses
  - Debt-holders may themselves go bankrupt
  - **Result: Big reduction in credit availability**

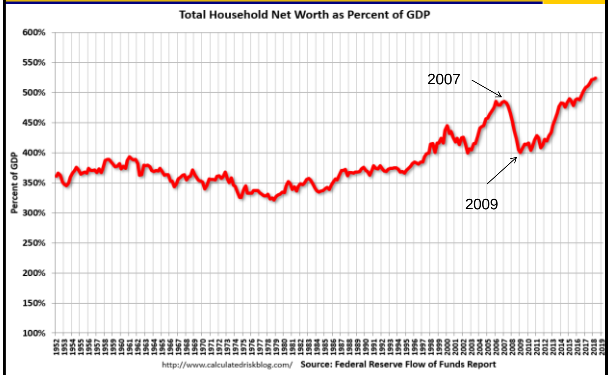
AIG (American International Group)

- AIG suddenly had to cover hundreds of billions of dollars worth of CDS
  - . . . And it couldn’t
- US federal government bailed out AIG
- So why not let AIG fail?
  - AIG insured all major financial institutions
  - Without insurance, no lending

C is no longer funded by home equity



Household Wealth Fell



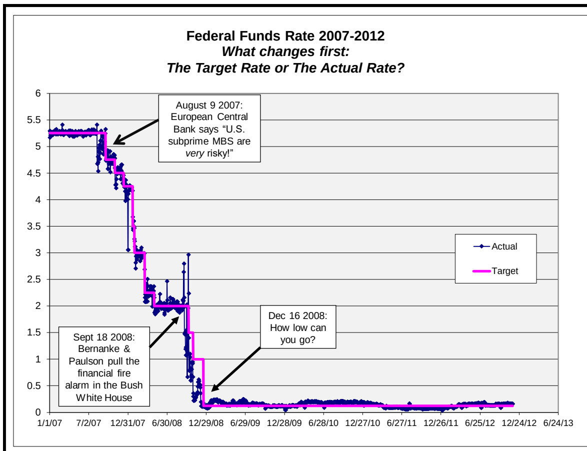
What has made monetary policy challenging?

During the 2007-09 crisis, multiple challenges

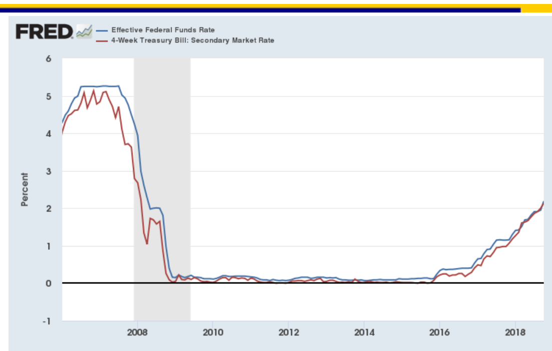
1. At least initially, Fed's target & actual FFR differed
2. FFR & short-term government rate were at the Zero Lower Bound by December 2008
3. Long-term interest rates didn't fall as far as short-term rates

    And so Fed undertook Quantitative Easing to lower long-term rates

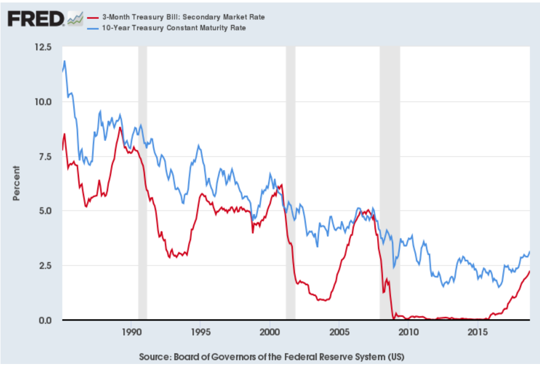
4. Lenders were not lending



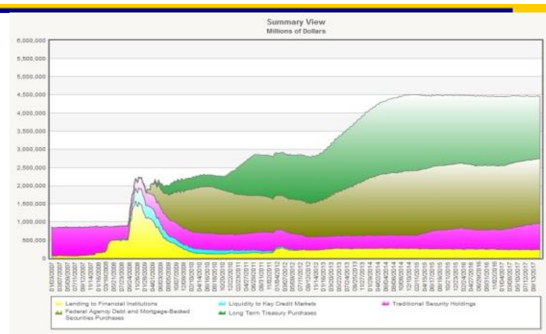
FFR & Short-Term Government Rate



Short-Term & Long-Term Rates

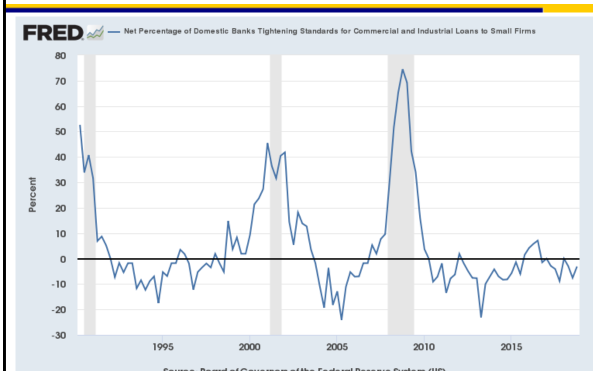


Fed Balance Sheet 2007-2017



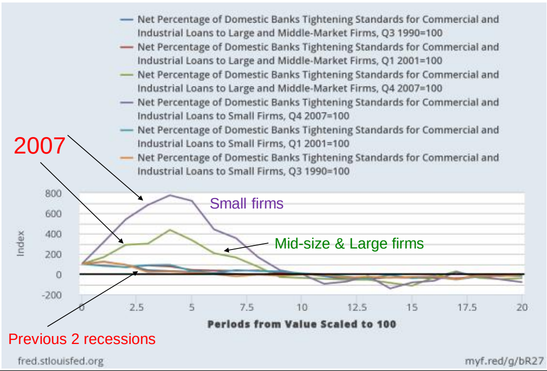
The Fed's Balance Sheet (saw this Nov. 14):
https://www.clevelandfed.org/our-research/indicators-and-data/credit-easing.aspx

Banks Tightened Lending Standards

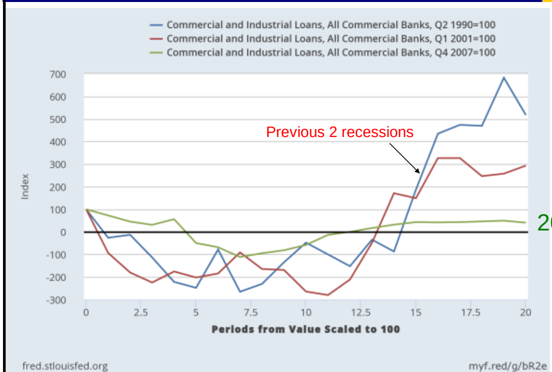


For Midsize & Large Firms, too

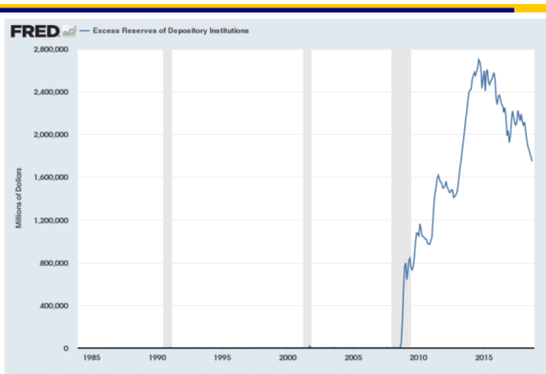
And this recession was unusual



By 2012, still very little lending



Banks no longer "lend all excess reserves"



What is Fed doing now?

- Fed engaged in "normalization" (returning FFR to its neutral rate, ~4 percent)
  - Or is neutral rate only 3 percent? Chairman Powell's speech on Wednesday 11/28: Fed's benchmark interest rate (FFR, target currently 2.25%) is "just below" neutral rate.
- And also "unwinding its [balance sheet] position" (returning to a balance sheet with few long-term assets and mostly short-term Treasuries)

Challenges today

- Source: Former Fed Chair Janet Yellen speech, Oct. 2016
  https://www.federalreserve.gov/newsevents/speech/yellen20161014a.htm

1. Should we disaggregate "C" (or "I")?
   Does a tax cut for high Y have same effect as one for low Y households? Are there systematic differences between firms?
2. What's role of finance in determining AD?
   What's unique to 2009-2018 due to 2007-09 financial crisis?

What determines inflation?

3. What determines inflation?
   Do wages really respond to labor market conditions? Do firms really pass labor costs (or savings) on to customers? Which inflationary expectations (near term, far term) matter? And whose inflationary expectations matter (consumers, businesses, wealth-holders)? And how are those expectations formed anyway?

4. How are different economies connected?
   What's effect of Fed policy on other countries? Is effect on advanced and emerging countries the same? Does QE have same effect as traditional FOMO? What's effect of monetary policy in other countries on US economy?

So what's next?

- Indicators: economy looks strong
  - Unemployment at 3.7 percent
  - Core Inflation (inflation less food & energy) at 2.1 percent
  - Fed raising FFR to neutral rate since Dec 2015, now 2.25%
- But what's on the horizon?
  - Ongoing concern re labor force participation rate
  - Benefits of Dec 2016 tax cut dissipating
  - Investment growth 2018:III was all inventory accumulation
  - Trade war/talks/uncertainty
    - Agriculture feeling pain
    - Recent General Motors announcement re factory closures