

Brainteaser

Problem:

- If I flip a fair coin five times in a row, what is the probability of getting at least 3 heads in a row?

Brainteaser

Answer:

- **There is a $\frac{1}{4}$ or 25% chance of getting at least 3 heads in a row**
- There are a total of $2^5 = 32$ possible permutations
- Of those, there are exactly:
 - 1 case of 5 heads in a row
 - 2 cases of 4 heads in a row
 - 5 cases of 3 heads in a row
- For a total of 8 different valid permutations. $8/32 = 1/4$

Market Update

10/31/17 to 11/07/17

- Couple events related to Saudi Arabia:
 - Allegedly, Yemen fired a missile which Saudi Arabia shot down
 - A variety of princes and officials were arrested in a “corruption crackdown”
- Trump’s Asia Tour
- Republican Tax Plan

Fed-Specific Market Update

10/31/17 to 11/07/17

- Last week's FOMC Meeting
 - No hike but on track for December
 - Removal of balance sheet language from statement
- Announcement of Jerome Powell as next FOMC Chair
- Announcement of retirement of Bill Dudley

Central Banks

A lesson in printing money (legally)

Central Bank Basics

Core Functions

- Government Bank
 - Monopoly issuer of currency
 - Monopoly issuer of reserves
 - Conventional policy tool: interest rates
 - Intermediate goal: control money and credit
- Bankers' Bank
 - Bank reserve accounts
 - Lender of last resort
 - Manage payments system
- Ultimate Goal: Stability
 - Stability as a public good

Stability

Modern objective of central banks

- Objectives
 - Low and stable inflation
 - High and stable economic growth
 - Stable financial markets and institutions
 - Stable interest rates
 - Stable currency

Not all central banks adopt all these objectives

Effectiveness

Need a few qualities to be effective

- Independent
 - Instrument independence vs. goal dependence
- Transparent
- Explicit goals and frameworks
- Committee decisions

Monetary Policy Strategy

The Fed vs. the Market

- Controlling expectations is key
 - Expectations drive investor and consumer behavior
- Rule-like behavior reduces uncertainty
- Confidence in policy behavior key to stability
- Stable inflation *expectations* key to real interest rates
 - $r = i - \pi^e$
- *Time consistency* and *constrained discretion*
 - Time consistency - incentive to renege in the future weakens credibility
 - Constrained discretion - rule-like policies to reduce time consistency issues

Monetary Policy vs. Fiscal Policy

The Fed vs. the Government

- Government funding needs can clash with monetary policy
- Fiscal dominance: fiscal authority determines monetary policy
 - Often leads to runaway inflation
 - Inflation as a low-cost means of default
- Big Takeaway: fiscal policy and monetary policy often collide

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A Central Bank Balance Sheet

Central banks have assets....and liabilities?

Assets	Liabilities
Securities	Currency
FX Reserves	Government Deposits
Loans	Commercial bank deposits

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A Central Bank Balance Sheet

How does the balance sheet work?

When a central bank purchases a \$1 million bond, it does not just give the owner of the bond \$1 million.

Instead, the central bank just adds \$1 million to the owner's bank account.

In doing so, the central bank adds \$1 million to the reserve account of the commercial bank who then adds \$1 million the owner's account.

A Central Bank Balance Sheet

How can the central bank alter its balance sheet?

- Open market operation
 - Buying and selling a security
- FX Intervention
 - Buy or sell FX reserves
- Extend a discount loan
 - Initiated by commercial banks
- Individual withdraws cash from the bank
 - Initiated by us plebeians

Multiple Deposit Creation

Aka printing money

- Central bank controls monetary base (= deposits + currency)
- Deposit expansion multiplier is the increase in commercial bank deposits following a one-dollar open market purchase

Basic arithmetic follows from required reserves, deposits, level of reserves

Not the most perfect arithmetic - excess reserves, holding cash, etc.

- Can derive a money multiplier from quantity of money and monetary base
- Important to recognize that central banks do not make money but rather monetary base

Federal Reserve Mandate

From Federal Reserve Reform Act of 1977

“To foster the growth of money and credit so as to effectively promote the goals of maximum employment, stable prices, and moderate long-term interest rate”

Federal Open Market Committee (FOMC)

What we actually mean when we say Fed

- Voting Members
 - Seven governors + NY Fed President + four other district bank presidents
 - Chair generally possesses a great deal of influence
- Duties
 - Set interest rates to control money and credit; determine scale and mix of assets
 - Key instruments: federal funds rate and interest rate of excess reserves
 - Scheduled meetings eight times annually
- Statement ([WSJ](#))

Federal Open Market Committee (FOMC)

What we actually mean when we say Fed

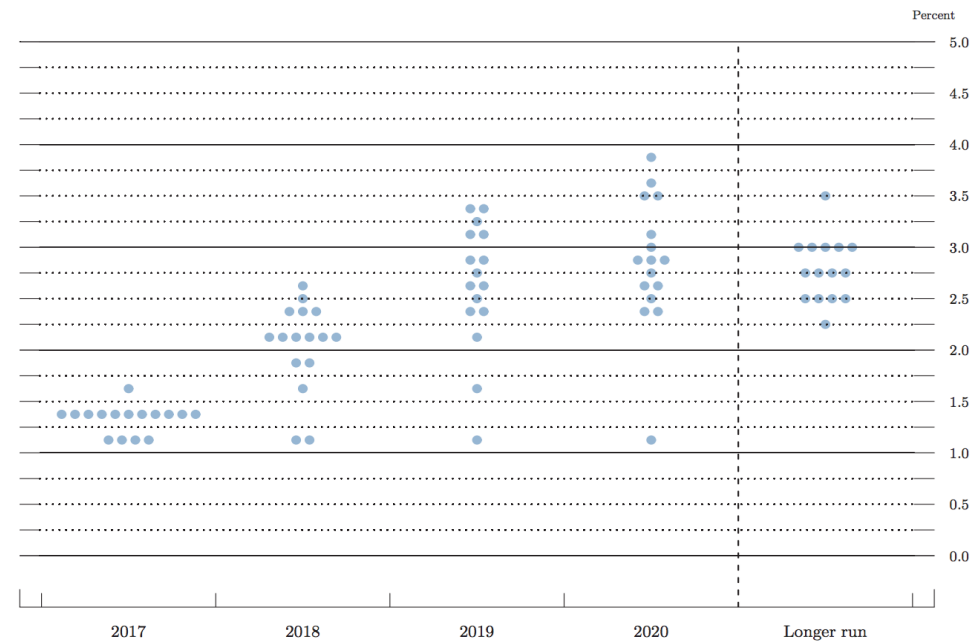
Governor	Entered office	Term expires
Janet Yellen (Chair)	February 3, 2014 (as Chair) October 4, 2010 (as Governor)	February 3, 2018 (as Chair) January 31, 2024 (as Governor)
<i>Vacant</i> (Vice Chair)		N/A (as Vice Chair) January 31, 2020* (as Governor)
Randal Quarles (Vice Chair for Supervision)	October 13, 2017 (as Vice Chair for Supervision) October 13, 2017	October 13, 2021 (as Vice Chair for Supervision) January 31, 2018 (as Governor)
Jerome Powell	May 25, 2012 June 16, 2014 (new term)	January 31, 2028
Lael Brainard	June 16, 2014	January 31, 2026
<i>Vacant</i>		January 31, 2022*
<i>Vacant</i>		January 31, 2030*

Federal Open Market Committee (FOMC)

What we actually mean when we say Fed

For release at 2:00 p.m., EDT, September 20, 2017

Figure 2. FOMC participants' assessments of appropriate monetary policy: Midpoint of target range or target level for the federal funds rate



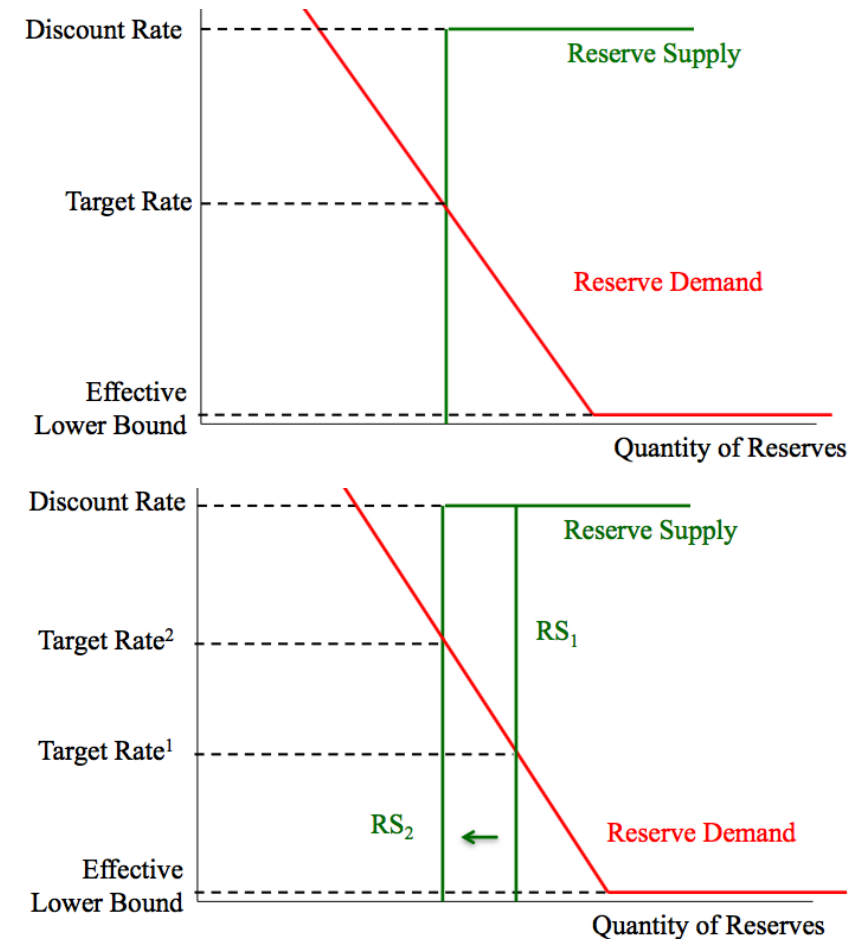
Fed Policy Tools

How the Fed actually sets policy

Conventional Fed Tools

How the Fed (used to) sets interest rates...

- Target federal funds rate
 - Contributes to the market FFR
- Discount rate
 - Served as the ceiling for market FFR
- Open Market Operations
 - Determine reserve supply



Unconventional Fed Tools

When the Fed pulls out all the stops

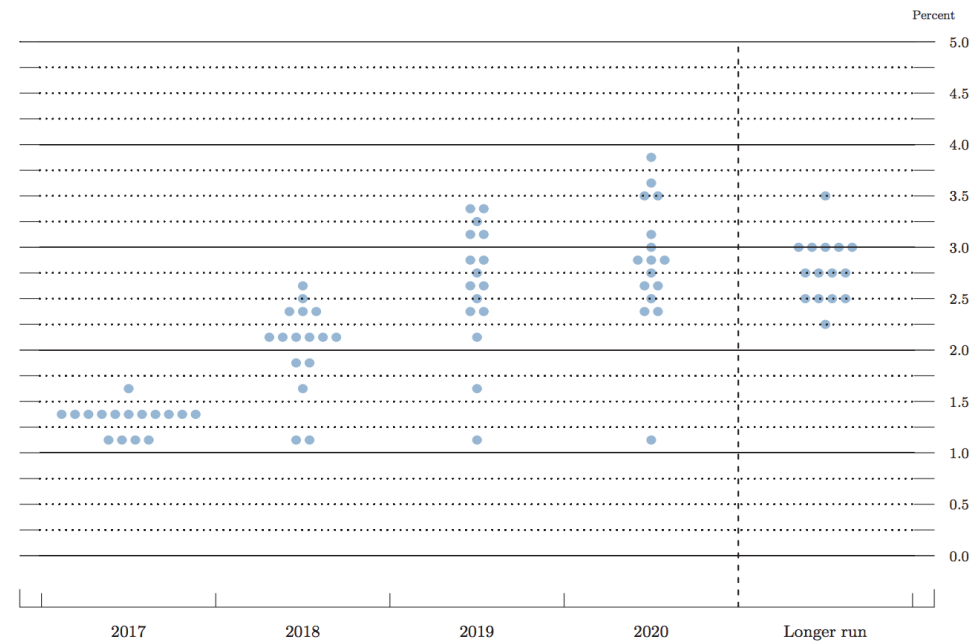
- Forward Guidance
- Quantitative Easing (QE)
- Targeted Asset Purchases (TAP)
- Capping or Pegging Long-Term Bond Yields
- “Helicopter money”
- Capping the Exchange Rate

Unconventional Fed Tools

The ominous dotplot

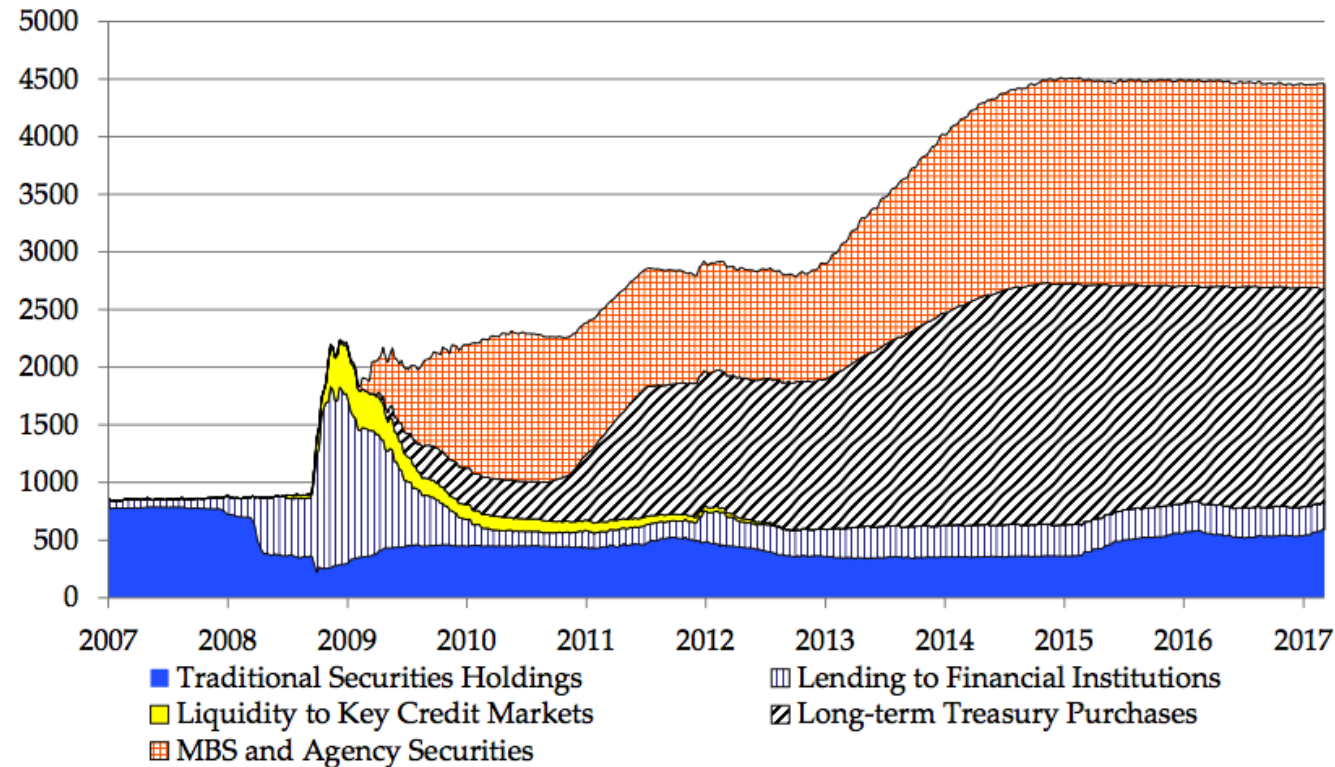
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Unconventional Fed Tools

Quantitative Easing and Targeted Asset Purchases



Unconventional Fed Tools

Any issues?

We have no idea if any of this actually helps...

Even if it does, we have no idea if/when central banks can stop...

If they do stop, what happens next?

Unconventional Fed Tools

Setting interest rates in today's world

Except interest rates are no longer so simple

Four tools today:

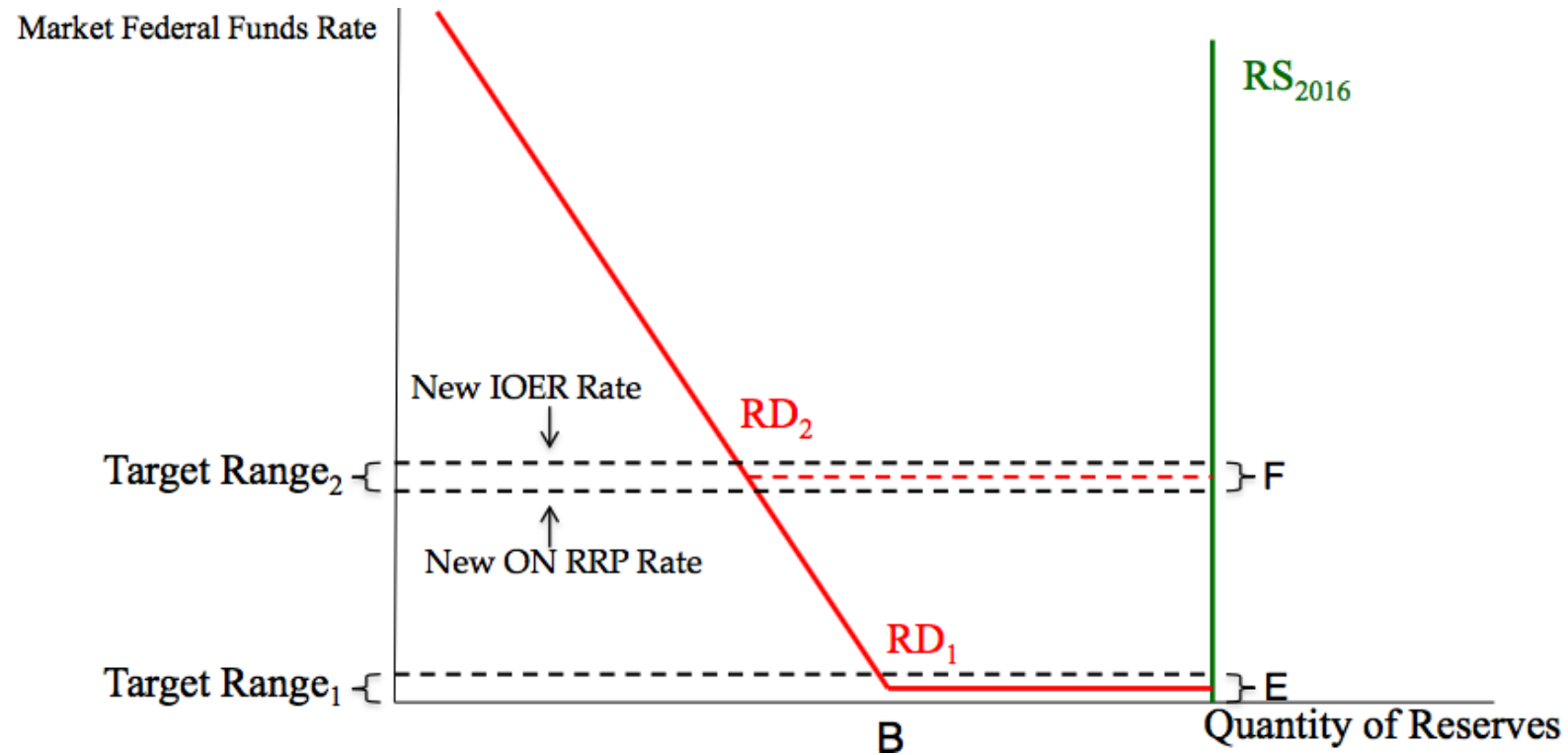
- Target FFR range
- Interest rate on excess reserves (IOER)
- Discount rate
- Reserve requirement

Supplementary tools:

- Overnight reverse repo rate
- Term reverse repo rate
- Term deposit rate

Unconventional Fed Tools

Setting interest rates in today's world



The Taylor Rule

An alternative to policy-making