The Central Bank and Monetary Policy Tools

Week 05

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0. Tradition isn't what it used to be

Central banks are independent & accountable

- In 1989, there was only TWO central banks formally independent from the government (the Fed and the Bundesbank)
- Today, in advanced economies, all central banks are independent
- They make decisions based on collegial decision-making processes
- Minutes of the meetings are immediately made public
- Central banks are independent and accountable:
  - We know who they are and what they do
  - No element in the Board has a huge political power




Central banks board meetings

The Fed board meeting (also know an the FOMC - Federal Open Market Committee)



Central banks board meetings

The European Central Bank (ECB) board meeting



Three tremendously important dates

- Unill 1989: central banks controlled ***Money*** + there was a ***Money Multiplier***
- 1989-2008: central banks controlled ***Interest rates*** + there were ***limited Reserves***
- After 2008: central banks control ***Interest rates*** + there are ***ample Reserves***

> "*The Federal Reserve sets two overnight interest rates: the interest rate paid on banks' reserve balances and the rate on our reverse repurchase agreements. We use these two administered rates to keep a market–determined rate, the federal funds rate, within a target range set by the FOMC.*" —Jerome Powell, Chair of the Federal Reserve, (2019) here

1. The Central Bank Balance Sheet

Can the Central Bank Set i By Law?

- Last week, we saw the central bank will change the real interest rate (r) as a response to changes in inflation (π) or in the natural real interest rate $(\bar{r})$:

$$r = \bar{r} + \lambda\pi$$

- And the Fisher equation says that the Fed must implement a change in the Fed Funds rate (i) such that r will change, given that π is constant in the short-term:

$$i = r + \pi$$

Can the Central Bank Set i By Law?

- Can the central bank "set" **by law** the level of market short term interest rate (i)?
- **NO**!
- Does the central bank have some power to **force** the short-term interest rate (i) to move to some target range/value?
- **YES**!
- To understand the logic behind this apparent contradiction we need to understand two issues:
  - The balance sheet of the central bank.
  - The main monetary policy tools available by law to the central bank.

The Fed's Balance Sheet (2007)

Federal Reserve Balance Sheet: 31 December 2007

Assets	**%**	**Liabilities & Equity**	**%**
Foreign Reserves	6.5	Currency	88.6
Securities	89.1	Reserves (Commercial Banks)	1.2
Loans	2.8	Government Account	0.6
Other Assets	1.6	Other Liabilities	5.5
–	–	Equity	4.1
Total	**100.0**	**Total**	**100.0**

- Foreign exchange reserves: foreign currency + gold
- Securities: financial assets with a fixed return
- Currency: amount of money in circulation outside the banking system
- Reserves: amount of money held by commercial banks
- Loans: money lent to banks /// *Equity*: shareholders' stake in the bank

The Fed's Balance Sheet (2025)

Federal Reserve Balance Sheet: 31 March 2025

Assets	**%**	**Liabilities & Equity**	**%**
Foreign Reserves	0.3	Currency	34.5
Securities	95.4	Reserves (Commercial Banks)	51.2
Loans	0.1	Government Account	4.7
Other Assets	4.2	Repos	9.3
–	–	Equity	0.3

Assets	**%**	**Liabilities & Equity**	**%**
Total	**100.0**	**Total**	**100.0**

2. Changes in the Central Bank Balance Sheet

Fed Buys US Treasury Bonds

The Federal Reserve Bank of New York purchases $1 billion in U.S. Treasury bonds from a commercial bank (page 459)

. . .

Assets	$ Billions	Liabilities	$ Billions
Securities	+1	Reserves	+1
Total assets	+1	Total liabilities	+1

Assets	$ Billions	Liabilities	$ Billions
Reserves	+1		
Securities	−1		
Total assets	0	Total liabilities	0

- Liabilities change +1 billion
- Monetary Base changes +1 billion

Fed Buys Bonds Denominated in Euros

The U.S. Treasury instructs the Federal Reserve to buy $1 billion worth of bonds denominated in euros (page 459)

. . .

Assets	$ Billions	Liabilities	$ Billions
Foreign Exchange Reserves	+1	Reserves	+1
Total assets	+1	Total liabilities	+1

Assets	$ Billions	Liabilities	$ Billions
Reserves	+1		
Foreign Exchange Reserves	−1		
Total assets	0	Total liabilities	0

- Liabilities change +1 billion
- Monetary Base changes +1 billion

Discount Loans to Commercial Banks

Commercial banks borrow 100 million dollars from the Fed, through the "discount window", providing collateral.[1] (page 461)

. . .

Assets	$ Millions	Liabilities	$ Millions
Discount loans	+100	Reserves	+100
Total assets	+100	Total liabilities	+100

Assets	$ Millions	Liabilities	$ Millions
Reserves	+100	Discount loans	+100
Total assets	+100	Total liabilities	+100

- Liabilities change +100 millions
- Monetary Base changes +100 millions

Jane Takes Cash Out of Her Bank Account

Jane withdraws $100 from her checking account (page 462)

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[1] Specific assets pledged by a borrower that a lender can seize in the event of nonpayment.

Assets	$ Millions	Liabilities	$ Millions
Currency	+100		
Deposits	−100		
Total assets	0	Total liabilities	0

- Jane changes money she had in Deposits into Currency
- What changes will appear in the Fed's balance sheet?
- What changes will appear in the Banking System's balance sheet?

Jane's Impact on the Banking System

Recall that Jane changed money in her deposit account (Deposits) into money in her pockets (Currency)

. . .

Assets	$ Millions	Liabilities	$ Millions
		Currency	+100
		Reserves	−100
Total assets	0	Total liabilities	0

Assets	$ Millions	Liabilities	$ Millions
Reserves	−100	Deposits	−100
Total assets	−100	Total liabilities	−100

- Liabilities change 0 dollars
- Monetary Base changes 0 dollars

3. Monetary Policy Tools

Acronyms

Term	Acronym
Federal Funds Rate	FFR
Federal Open Market Committee	FOMC

Term	Acronym
Interest on Excess Reserves	IOER
Interest on Reserve Balances	IORB
Overnight Reverse Repurchase Agreement	ON RRP

Monetary policy tools with Ample-Reserves

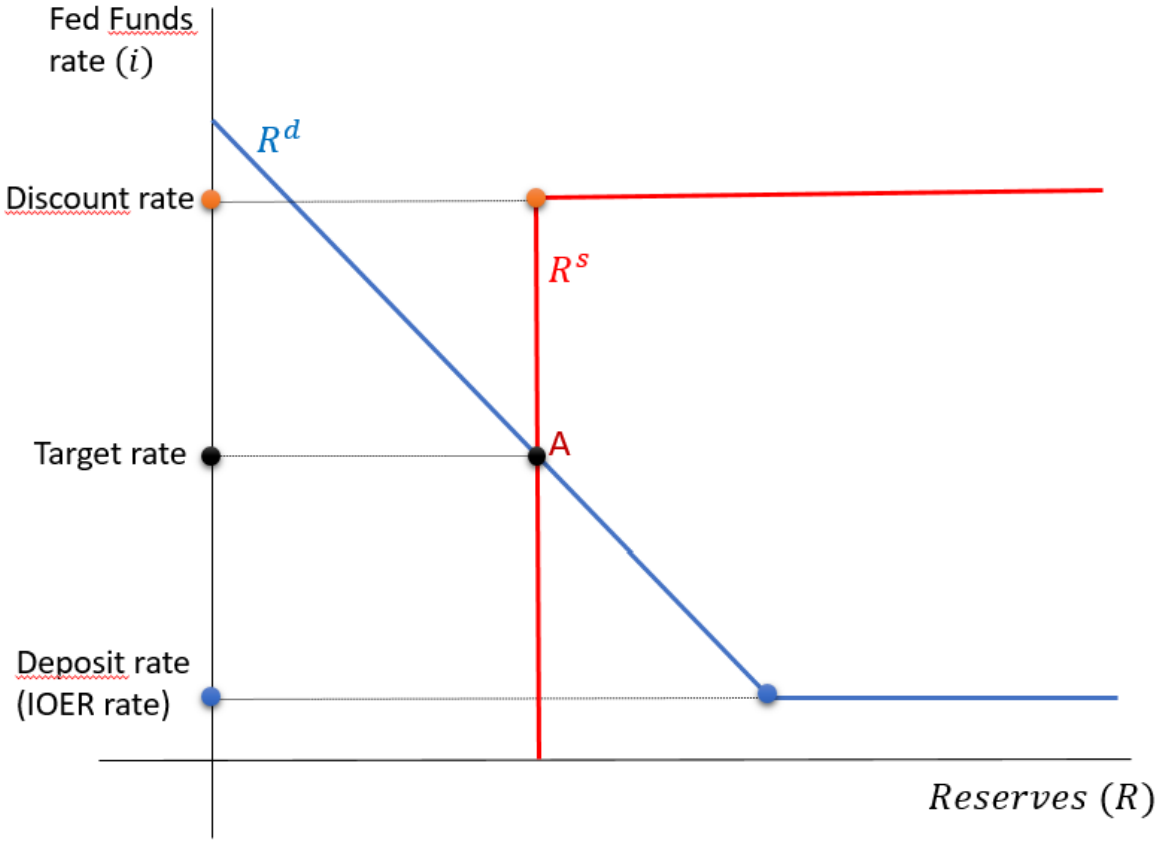
- IORB
  - Interest paid on reserve balances that banks hold in their accounts at a Federal Reserve Bank.
- ON RRP
  - An overnight transaction in which the Federal Reserve sells a security to an eligible counterparty and simultaneously agrees to buy the security back the next day.
- Open market operations
  - The buying and selling of government securities by the Federal Reserve.
- Discount rate
  - The interest rate charged by the Federal Reserve to banks for loans obtained through the Fed's discount window.
- Reserve requirements
  - Funds that banks must hold in cash, either in their vaults or on deposit at a Federal Reserve Bank.

Monetary Policy Tools: Summary

Tool	Definition	In Practice
IORB	Interest paid on reserve balances that banks hold in their accounts at a Federal Reserve Bank.	The IORB rate is an administered rate set by the Fed. Banks are unlikely to lend their reserves in the federal funds market for less than they get paid by the Fed. As such, IORB is an effective tool for guiding the FFR. In fact, interest on reserves is the principal tool for moving the FFR within the target range.
ON RRP	An overnight transaction in which the Federal Reserve sells a security to an eligible counterparty and simultaneously agrees to buy the security back the next day.	The ON RRP rate is an administered rate set by the Fed. More types of financial institutions can participate in the ON RRP facility than can earn IORB. Because these institutions are unlikely to lend funds for lower than the ON RRP rate, and institutions can arbitrage the difference between short-term rates, the FFR is unlikely to fall below the ON RRP rate. As such, the ON RRP rate is a supplementary tool that acts like a floor for the FFR. NOTE: The ON RRP facility is a form of open market operations.
Open market operations	The buying and selling of government securities by the Federal Reserve.	While daily purchases and sales are no longer used to adjust the supply of reserves and influence the FFR, open market operations are an important tool for ensuring that reserves remain ample.
Discount rate	The interest rate charged by the Federal Reserve to banks for loans obtained through the Fed's discount window.	The discount rate is an administered rate set by the Fed. It is set above the FFR target range with the intention of it serving as a ceiling for FFR transactions because banks are unlikely to borrow at a higher rate than they can borrow from the Fed at the discount window. The perceived stigma of borrowing from the Fed, however, generally dampens the rate's effectiveness as a ceiling. The spread between the discount rate and the FFR target tends to be constant: The Fed typically adjusts the discount rate at the same time the FOMC moves the FFR target range.
Reserve requirements	Funds that banks must hold in cash, either in their vaults or on deposit at a Federal Reserve Bank.	With reserves ample, and many banks holding excess reserves, reserve requirements remain a stated tool but are not a factor in policy implementation. In fact, as of March 26, 2020, reserve requirements have been set to zero.

Tools combined with "Limited Reserves"

The Fed sets the quantity of reserves supplied (R^s)

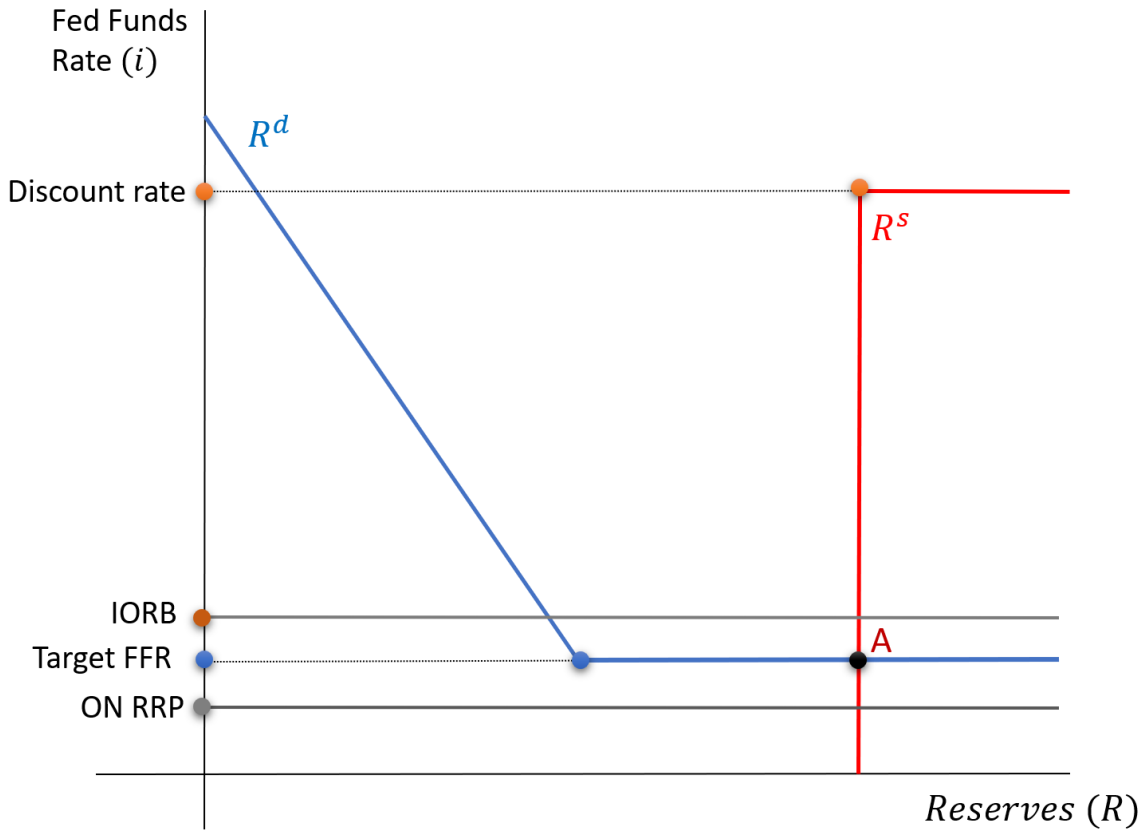


- For a given level of the demand for reserves $\left(R^d\right)$
- The equilibrium $R^d = R^s$ is forced to occur between the two rates set by the Fed

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Tools combined with "Ample Reserves"

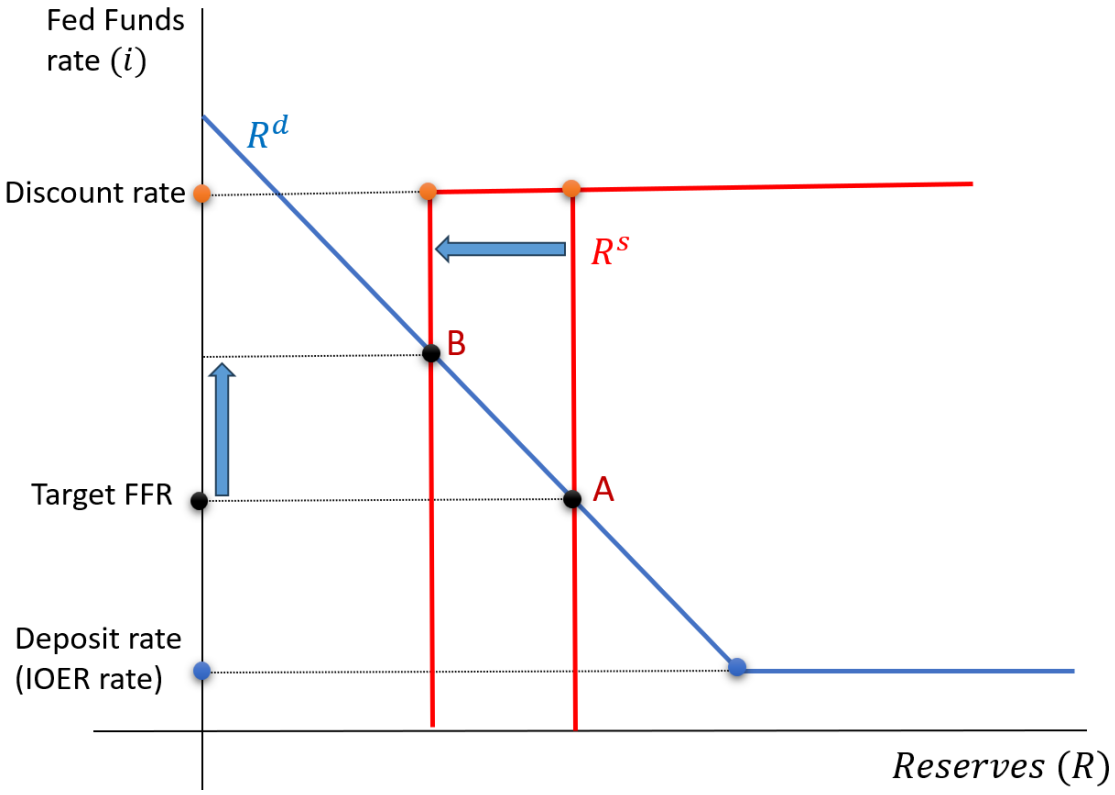
The Fed sets the two critical rates: IORB and ON RRP



- The FFR is forced to remain inside the interval between those two rates
- The Fed will have to adapt R^s to the R^d that comes out of that FFR.

Contractionary policy with "Limited Reserves"

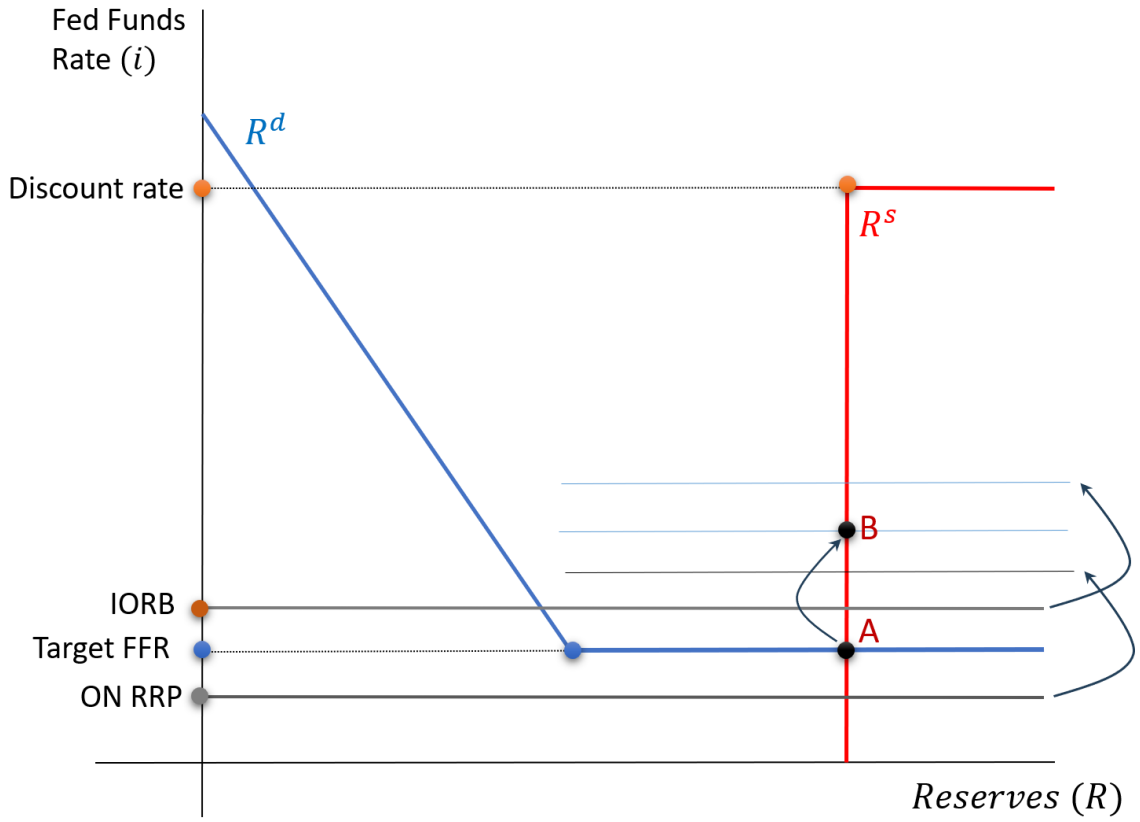
The Fed reduces the supply of Reserves.



- R^s goes down, FFR increases
- No need to change IOER and Discount rate, but usually they also are changed (increased in this case).

Contractionary policy with "Ample Reserves"

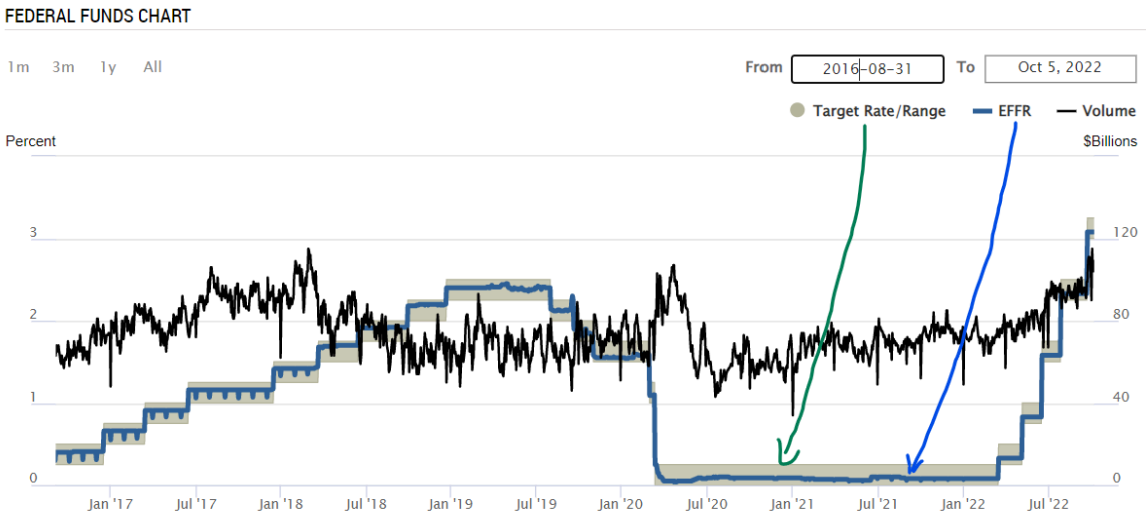
The Fed increases both rates: IORB and ON RRP.



- R^s remains constant and the FFR goes up.
- Obviously, for that FFR, the Fed has to adapt R^s to match any change in R^d.

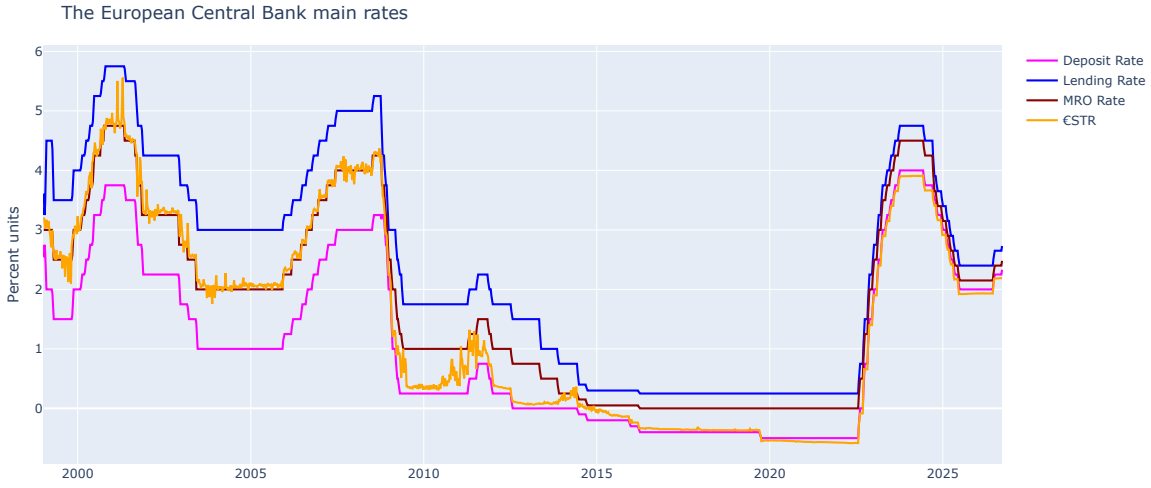
Fed's Perfect Control of the Fed Funds Rate

The Fed navigates with the tools close to perfection.



Monetary Policy in the ECB

The ECB has a similar monetary policy structure. The names change a little bit, but the essence is the same.



4. Unconventional Policy Tools

— Not covered in this course —

Fed's Unconventional Tools

When the Fed Funds Rate comes down to zero, and the economy still needs some support from monetary policy, the Fed has two options:

- Force short-term interest rates (Fed Funds Rate) to go below zero, as many European central banks did from 2010 to 2021.
- Keep rates at zero and use some "unconventional policy tools".

. . .

The unconventional monetary policy tools are basically three:

- Quantitative easing
- Forward guidance
- Targeted asset purchases (TAP)

Quantitative Easing (QE)

QE consists basically of one decision by the central bank: buying vast quantities of bonds and expanding its balance sheet by a magnitude of 3 or 4 in a few years.

Why is it different from "conventional" monetary policy?

Because the bonds bought under QE are:

- Long term maturity bonds (in opposition to short term maturity)
- They have considerable risk attached to them (in opposition to risk free)
- They belong to classes of bonds that were not eligible to be used by conventional policy.

Forward Guidance

- Forward guidance is usually used by central banks when they **communicate with private agents**. If the central bank thinks that is convenient to signal a particular point to the private sector, they will do that.
- But if short term interest rates are at zero (call this as the Zero Lower Bound), this guidance becomes vital.
- At the ZLB there is a danger of deflation, and it is crucial if the private sector gets a clear commitment from the central bank that "we will do whatever it takes" to avoid the trap of a long deflationary period.
- The central bank has to clarify that it will not increase interest rates if inflation surpasses the 2% target value by a significant amount: it will allow inflation to "overshoot" the 2% main goal for a significant time.

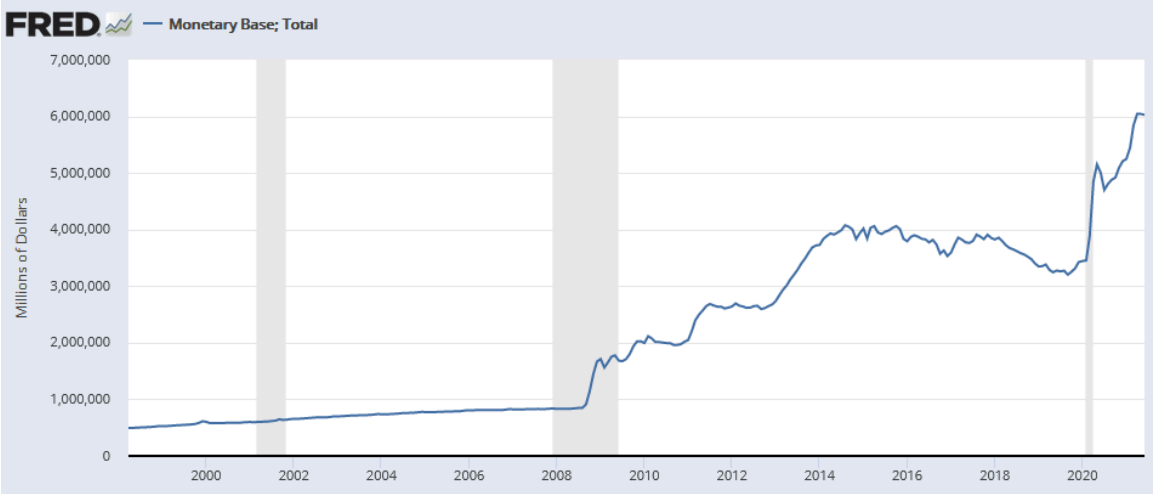
Targeted Asset Purchases

- In contrast to QE, which increases the size of the central banks balance sheet by all sorts of bonds, targeted asset purchases (TAP) shift the composition of the balance sheet toward selected assets in order to boost their relative price, reducing their yields, and stimulate economic activity.
- A recent example of this type of tool has become known as the "Operation Twist". The Fed bought longer-term Treasuries and Mortgage-Backed Securities. It simultaneously sold some of

the short-term assets it already held to ease the economy by bringing down long-term interest rates.

How Far Unconventional Can I Go?

In 2008: MB=0.8 trillion dollars; in 2021: MB = 6 trillion US dollars



5. Readings

Readings 1

- For a general overview of the evolution of the Fed's monetary policy read the Fed's blog:
  - How the Federal Reserve's Monetary Policy Implementation Framework Has Evolved
- For the balance sheet of the central bank read:
  - Stephen G. Cecchetti and Kermit L. Schoenholtz (2017). Money, Banking, and Financial Markets, Fifth Edition, McGraw-Hill. Chapter 17: "The Central Banks Balance Sheet" (pages 453-457). The subsection "The Importance of Disclosure" not required reading.
- For the changes in the Fed's balance sheet read:
  - Stephen G. Cecchetti and Kermit L. Schoenholtz (2017). *Money, Banking, and Financial Markets*, Fifth Edition, McGraw-Hill. Chapter 17: "Changing the Size and Composition of the Balance Sheet" (pages 457-463).

More on Readings

- For the monetary policy tools read:
  - Jane E. Ihrig and Scott A. Wolla, "The Fed's New Monetary Policy Tools," Federal Reserve Bank of St. Louis Page One Economics, Aug. 3, 2020. here
- "Unconventional Policy Tools". ***Not covered in this course***

Bibliography