International Money and Banking: 8. How Central Banks Set Interest Rates

Karl Whelan

School of Economics, UCD

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Monetary Policy Strategies: The Fed and ECB

- Most textbook discussions of macroeconomics assume that central banks set monetary policy by controlling the money supply (shifting the LM curve left and right).
- We have seen, however, that targeting the money supply is not an effective way to produce good macroeconomic outcomes.
- Most modern central banks do not practice monetary targeting. Instead, they focus on controlling short-term interest rates.
- Here, we will take a close look at how the Federal Reserve and the ECB implement policies to control interest rates.

Part I

The Fed and the Market for Reserves

Reserves and Interbank Markets

- Banks are legally required to maintain a minimum amount of their assets in the form of reserve accounts at the Central Bank.
- Because reserve accounts are used by banks to make payments to each other, banks also need to keep a certain amount of reserves to process payments.
- So how much reserves should a bank keep? One strategy would be to behave in a "precautionary" manner, always keeping more reserves on hand than they probably need.
- But there is a downside to this. Central banks usually pay interest on reserves but traditionally this is a low interest rate. So holding large amounts of reserves is not very profitable.
- An alternative is to use what are known as **inter-bank money markets** in which banks borrow and loan reserves from each other. Banks can use these markets to make up any temporary shortfall in reserves.
- In the US, the interbank market for short-term funds is known as the Federal Funds market (despite its name, it is a private market) and the average rate in this market is known as the **Federal Funds Rate**.

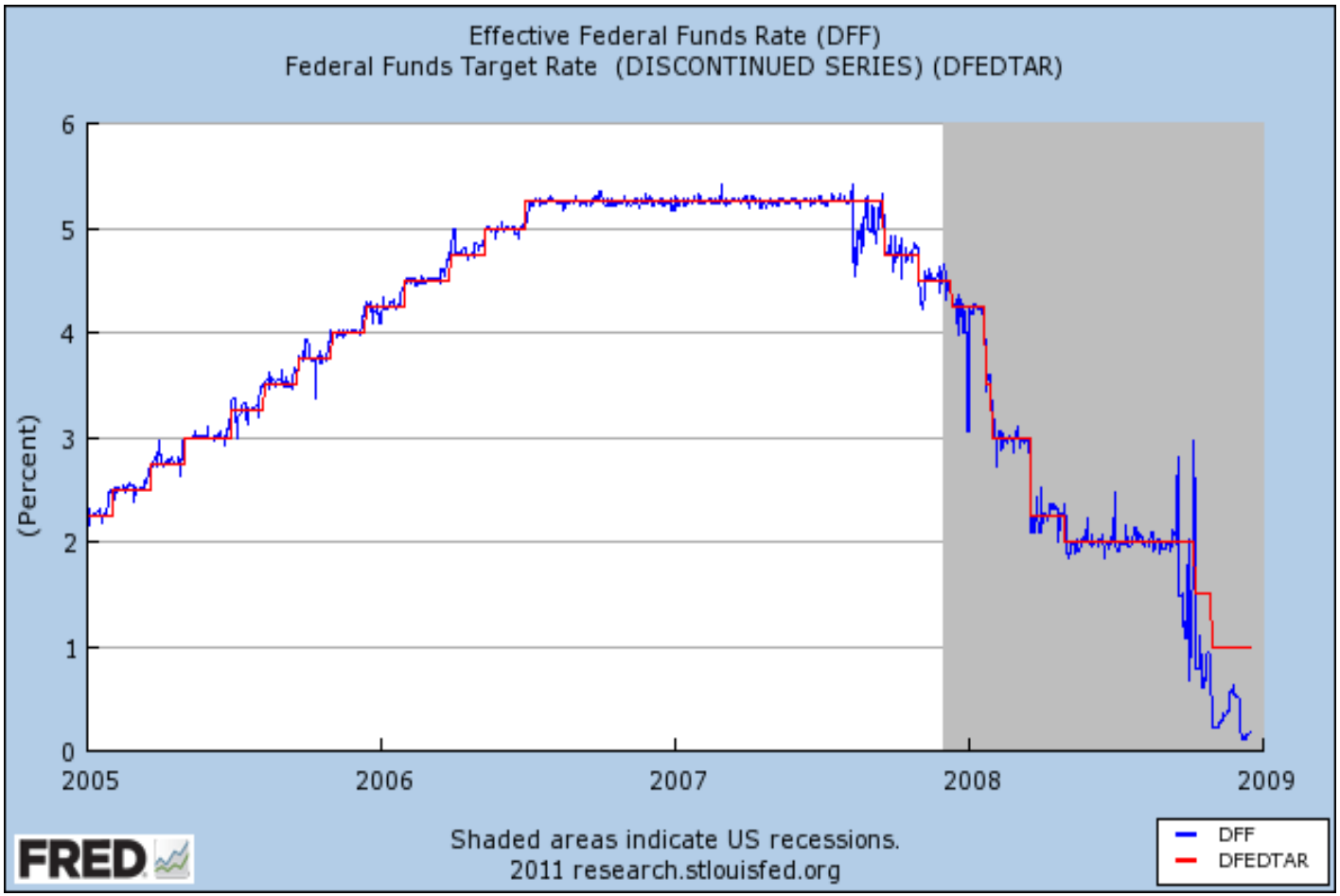
Supply and Demand in the Reserves Market

- Like all markets, the price set in the Federal Funds market—in this case the interest rate that banks charge to lend reserves—depends on both supply and demand.
- The Fed is uniquely positioned to control this price (i.e. the interest rate) because it can control both supply and demand in this market.
  - **Demand**: The Fed sets reserve requirements so they can increase or reduce demand for reserves via adjusting this requirement.
  - **Supply**: The Fed can determine the total supply of reserves to the system via open market operations.
- In practice, the Fed focuses on the latter element (controlling the supply of reserves) and does not focus on adjusting reserve requirements as part of its monetary policy strategy.
- When the Fed creates lots of reserves, there is little demand for borrowing reserves and so the federal funds rate is low. When the Fed keeps the supply of reserves low, there is more demand for borrowing and the federal funds rate is high.

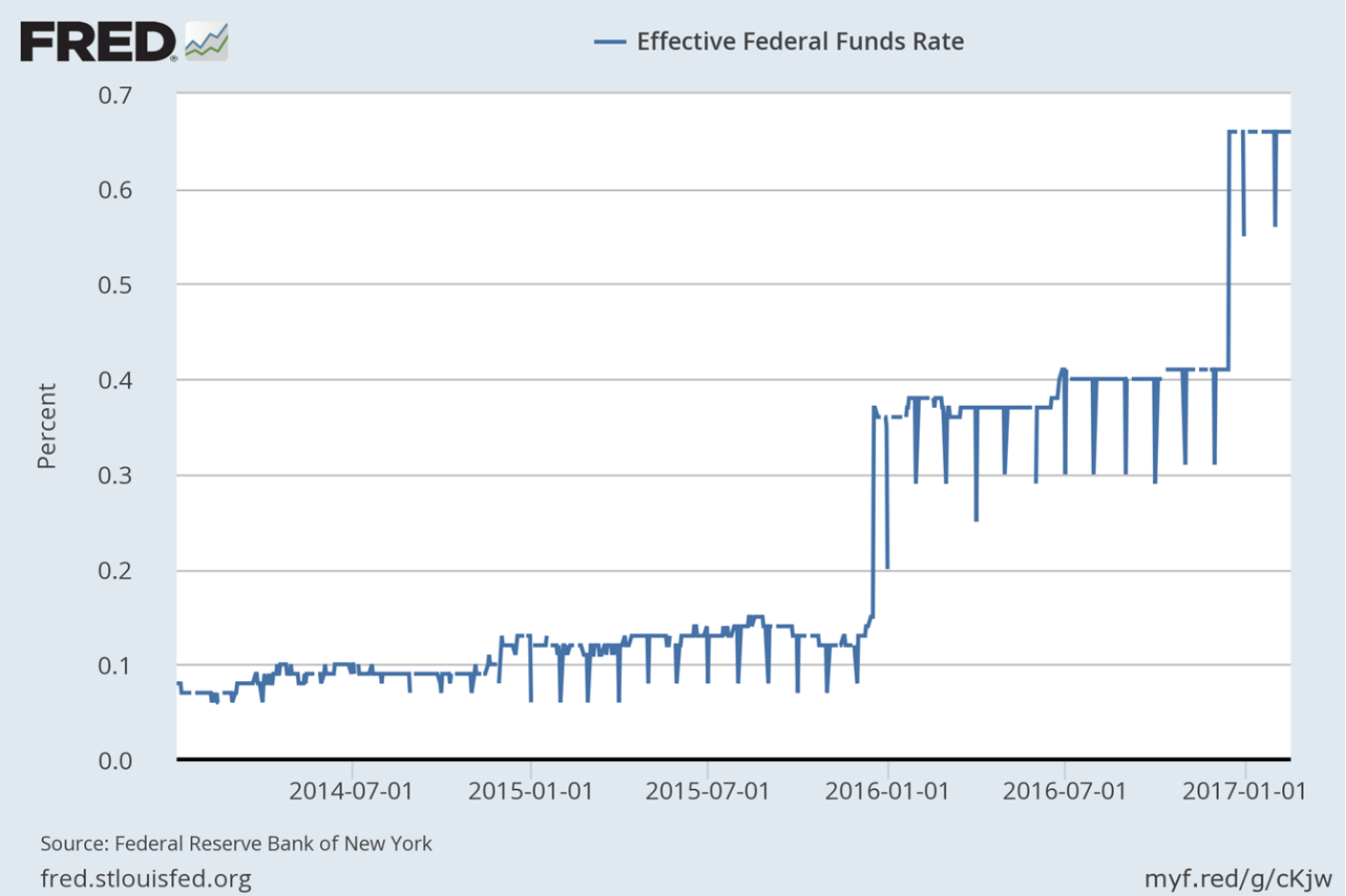
The Federal Reserve's Operational Strategy

- The Federal Reserve intervenes in the Fed funds market—via its Open Market Desk at the New York Fed—on a daily basis to keep interest rates as close as possible to its target rate. See the webpage for a speech on this by Ben Bernanke ("Implementing Monetary Policy")
- Its main way to adjust the supply of reserves is to vary the amount of short-term loans (1 to 14 days) that it provides to banks via credits to their reserve accounts.
- The loans are collateralized by Treasury bonds or mortgage-backed securities and usually take the form of "repurchase agreements" (known as repos). Under these agreements, the Fed takes temporary ownership of a security and then returns it to the borrowing bank when the term of the loan is over.
- Every day, the Open Market Desk consults with the largest banks attempts to figure out how much liquidity is needed and plans its operation accordingly. Most days, the Fed succeeds in keeping the funds rate close to target.
- After many years of targeting a federal funds rate below 0.25%, the FOMC has twice raised its target since December 2015. They are now targeting a funds rate between 0.5% and 0.75%.

The Fed Usually Keeps the Funds Rate Close to Target



Current Target Funds Rate Is Between 0.5% and 0.75%



The Federal Reserve's Standing Facilities

In addition to its daily interventions in the federal funds market, the Fed also has two programmes, known as "'standing facilities", that can also be used to influence interest rates.

1. **The Discount Window**: Banks can request a direct loan from the Fed via this facility. The discount window interest rate is traditionally a half percentage point above the target fed funds rate. Currently, the Fed's principal discount facility has an interest rate of 1.25 percent. The ability to access loans from the discount rate should set an upper bound for the federal funds rate because it is an alternative way to borrow money.
2. **Interest on Reserves**: In October 2008, the Federal Reserve began paying interest on reserves. They noted: "Paying interest on excess balances should help to establish a lower bound on the federal funds rate." This is because it can provide an alternative option to loaning out reserves to another bank. Currently, the Fed pays a 0.75 percent interest rate on reserves.

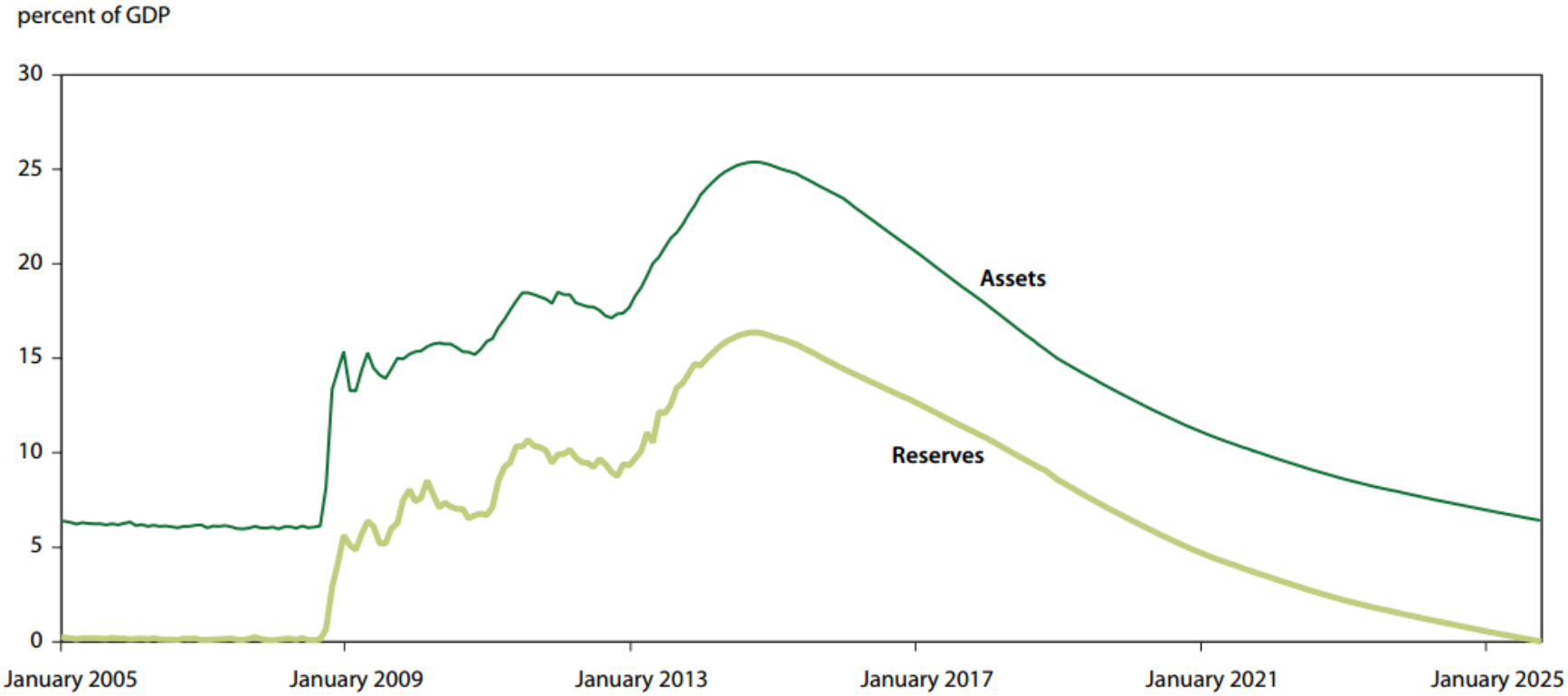
Monetary Policy When Reserves Are Plentiful

- The Fed's QE programme has created an enormous amount of reserves, over $2 trillion.
- The Fed can reduce the supply of reserves by reducing its portfolio of assets and thus retiring the money that was created when the assets were purchased.
- However, the Fed's plans are to reduce their asset portfolio very gradually over the next decade, so the supply of reserves will remain plentiful. See the chart projecting future reserves (from a paper by Joseph Gagnon and Brian Sack.)
- This means the Fed needs to use new tools if it wants to raise interest rates over the next decade. The key tools will be.
  1. **Interest on Reserves**: The interest rate that banks obtain on reserves will act as a baseline rate. Rates on bank loans or other risky investments will need to be higher than this interest rate which is risk free for banks.
  2. **Interest to Non-Banks**: The Fed now has a programme of taking in money from a wide range of non-bank financial institutions and paying interest. The technical name for this programme is the "Overnight Reverse Repurchase Agreement Facility" (ON RRP) which sounds complicated but it's ultimately just a way of paying an interest rate to institutions that are not banks.

Reserve Balances of US Banks

Projected Fed Assets and Reserves

Figure 1 Past and projected Federal Reserve assets and bank reserves, 2005–25



Paul Volcker and Monetarism: 1979-1982

- A final mention for monetarism.
- For most of its history, the Federal Reserve has set an implicit or explicit target for the Federal Funds rate and supplied the amount of reserves on a daily basis that kept this rate close to its target.
- During the period from October 1979 to October 1982, under the chairmanship of Paul Volcker, the Fed switched from targeting the federal funds rate to targeting reserves with the intention of hitting target levels for the growth rate of the money supply.
- The background to this decision was (a) a large rise of inflation (12% in October 1979) and the appointment of Volcker (a well-known "inflation hawk") to the position of Fed Chair by President Jimmy Carter (b) the increasing influence of Milton Friedman's monetarist ideas.
- The Federal Reserve makes available transcripts of the meetings of its monetary policy decision-making body, the Federal Open Market Committee (FOMC) years after the meetings have happened. The October 1979 transcript suggests Volcker was probably not a hardline monetarist but rather was looking for something to break "inflationary psychology."

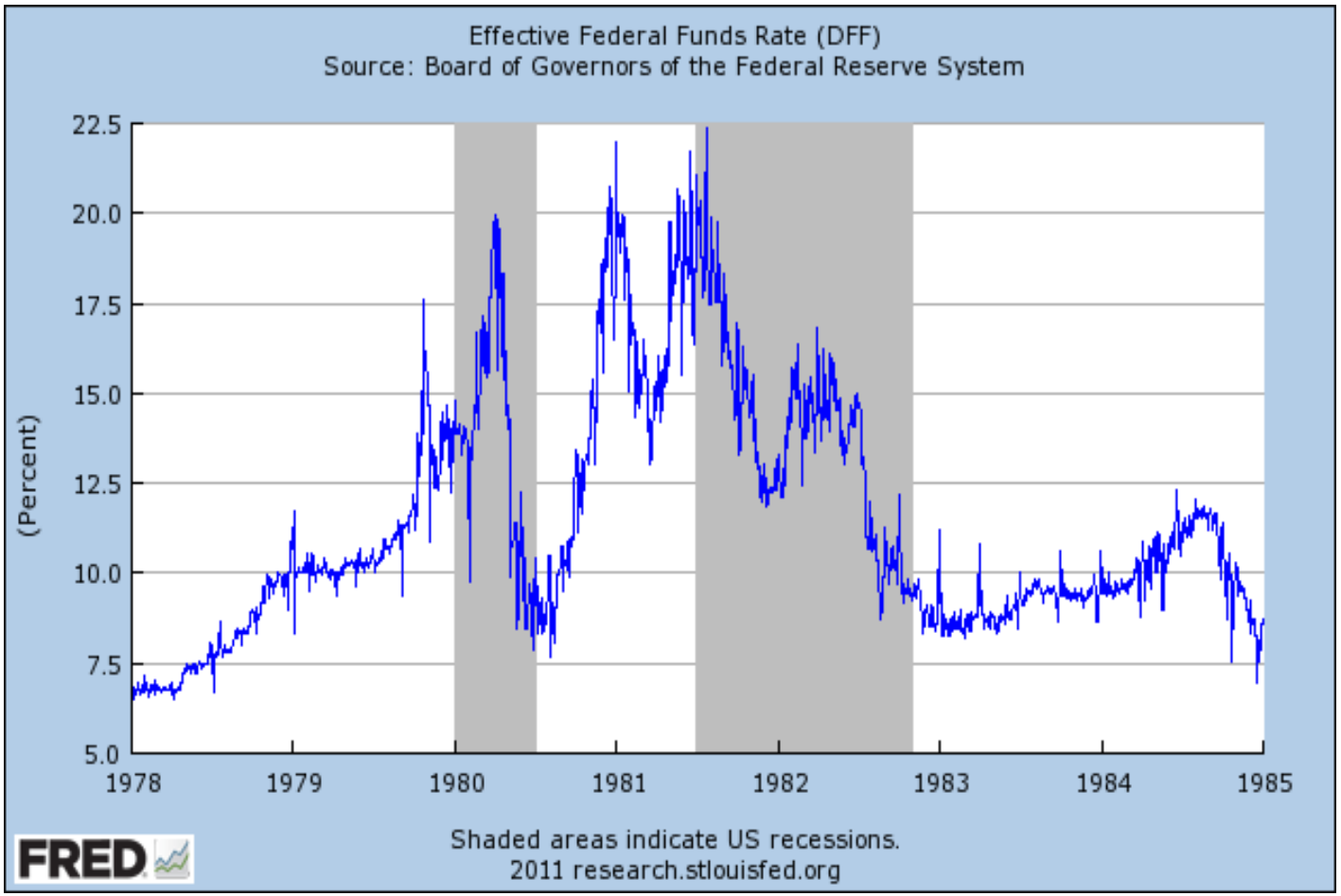
Paul Volcker and Monetarism: 1979-1982

- It should be stressed that the daily and weekly demand for reserves tends to be very volatile, as the large amounts of transactions moving around systems like on Fedwire or TARGET2 can create unpredictable shortages and excesses of reserves at individual banks.
- If central banks follow a monetarist policy and thus supply a fixed level of reserves, this can cause interest rates in money markets to move around a lot from day to day as some days lots of banks are seeking loans, forcing the interest rate up, while other days few banks are seeking loans and interest rates are low.
- During the period when monetarist policies were pursued in the US, the Federal Funds rate was highly volatile, moving around on a daily and monthly basis in a way that was not seen before or since. Similar volatility was seen in the UK during this period, as their government also adopted monetary policies.

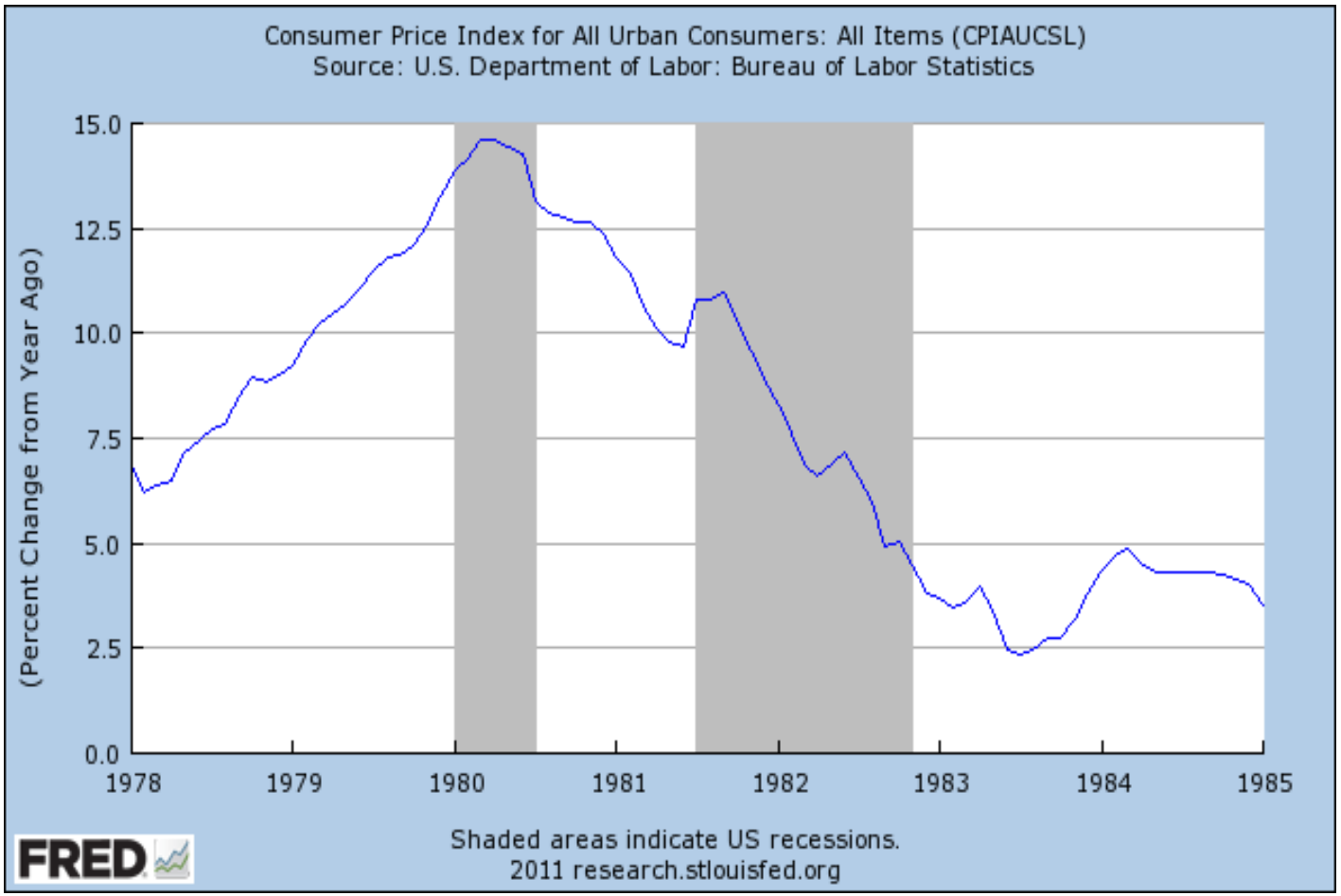
October 1982: Abandoning Monetarism

- In one sense, Volcker's monetarist strategy was a success: US inflation fell rapidly after the implementation of monetary targeting.
- However, if one looks at the pattern for interest rates, this wasn't too surprising. The Federal Funds rate reached about 20% on three different occasions between 1980 and 1982 and the US economy suffered a severe double-dip recession.
- By late 1982, with inflation conquered and interest rates high and volatile, Volcker became dissatisfied with the restrictions placed on him by monetary targeting, particularly because the link between the monetary base and M1 was proving to be so imprecise.
- Today, many believe that Volcker's apparent embrace of monetarism was a tactical decision to avoid having to take direct responsibility for the high interest rates required to bring down inflation.

The Federal Funds Rate: 1978-1984



US CPI Inflation: 1978-1984



Part II

The ECB's Monetary Policy

European Interbank Markets and the ECB's Policy Tools

- The European interbank market known as the Euribor market. Its average overnight rate is known as the **EONIA** (Euro Overnight Index Average). The EONIA rate is usually considered the interest rate that the ECB is targeting with its policies.
- Unlike the Fed, the Eurosystem does not intervene in money markets on a daily basis by tweaking the stock of reserves. Instead, the ECB focus on controlling interest rates via a weekly lending operation to banks as well the use of two standing facilities.
- The Eurosystem has always conducted a large lending operation, known as the "main refinancing operation" (MRO) every week, with the funds due back a week later.
- The loans take the form of repurchase agreements (repos): The central bank takes a security from a financial institution, provides it with a short-term loan by boosting its reserve account and sells the security back later at an agreed higher price.
- Because all banks in the Eurosystem can borrow from the ECB as an alternative to interbank money markets, the terms of the ECB's lending programmes have a key influence on interbank loan rates.

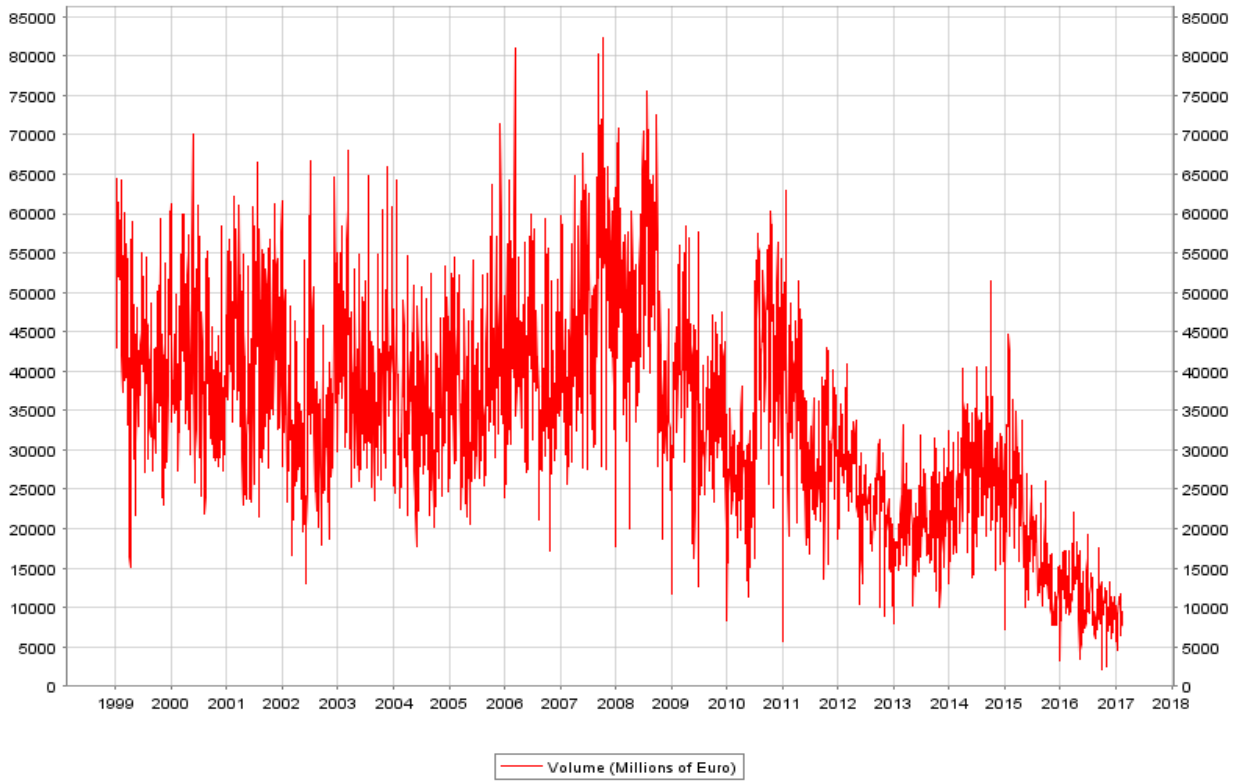
The ECB's Pre-2008 Operational Strategy

- Prior to 2008 the main refinancing operation worked as follows:
  - The ECB decided how much money it would loan out and then conducted an auction for these funds.
  - It announced the minimum interest rate that banks will have to pay for the loans and then rationed the loans by giving them out to those who are willing to pay the highest rate.
  - This "minimum bid rate on the main refinancing operation" was the "headline" interest rate for most of the ECB's existence.
  - The ECB maintained a list of high-quality assets that it was willing to accept in the refinancing operation as well as a list of "haircuts" it would apply to these assets (so, for example, an asset worth €100 million might be used to obtain a loan of €95 million).
- These operations are all carried out by the national central banks, not the ECB. The bank loans are counted as assets of the NCBs and the reserve credits created are counted as liabilities of these NCBs. The ECB then published a consolidated Eurosystem balance sheet every week.

Changes to ECB Strategy Since 2008

- These are not normal times in Europe. Many European banks have lost deposit and non-deposit funding because of fears they may fail or that their country may leave the Euro. Volume in markets like Euribor are down.
- This has meant that the Eurosystem has had to step in to become a major source of funds for the euro area banking system.
- There have been a number of major changes to ECB operations:
  - Since October 2008, the MRO has been conducted on a fixed-rate basis and all bidders have been allocated their requested amount of funds. Of course, they still need to have the eligible collateral to obtan a loan.
  - The weekly MRO has ceased to be the major source of funding provided by the ECB. Instead, most loans from the ECB now take the form of longer-term refinancing operations (LTROs) which are loans with a term of months or years.
  - The list of eligible collateral for all ECB operations has been widened. In particular, starting in early 2012, the ECB widened the amount of "credit claims" (i.e. bank loans) that it will accept as collateral.

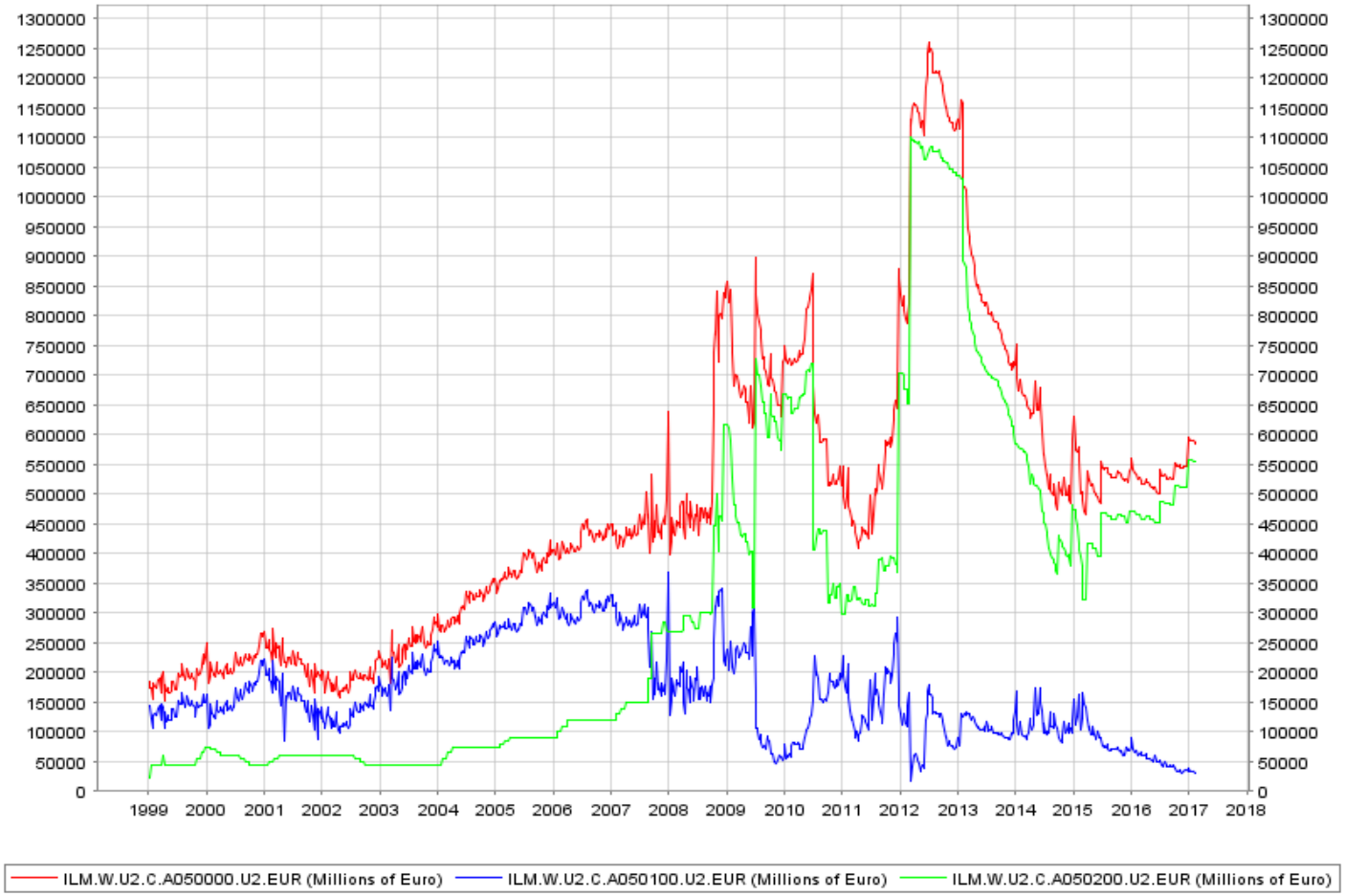
Volume in the Overnight Euribor Market (Millions of Euros)



The LTRO Operations

- The chart on the next page shows the size of ECB refinancing operations, broken into the main (short-term) operation and longer-term operations.
- As financial tensions increased from 2008 on, the ECB moved to three month, six month and one year operations.
- By late 2011, the Euro crisis was entering an intense phase and banks in Spain, Italy and other European countries were having severe trouble obtaining non-deposit funds (e.g. from the bond market).
- The ECB thus introduced a new long-term refinancing operation (LTRO) which saw banks borrowing large amounts of money for three years. Banks now owe about €1 trillion to ECB as non-deposit funding markets for banks have broken down.
- This LTRO had an influence on the sovereign debt crisis. Many banks used the funds they borrowed from the ECB to buy sovereign bonds.
- The amount of LTRO borrowings declined from early 2013 to early 2015 but it remains the case the longer-term borrowings are now much higher than shorter-term borrowings from the the Eurosystem.

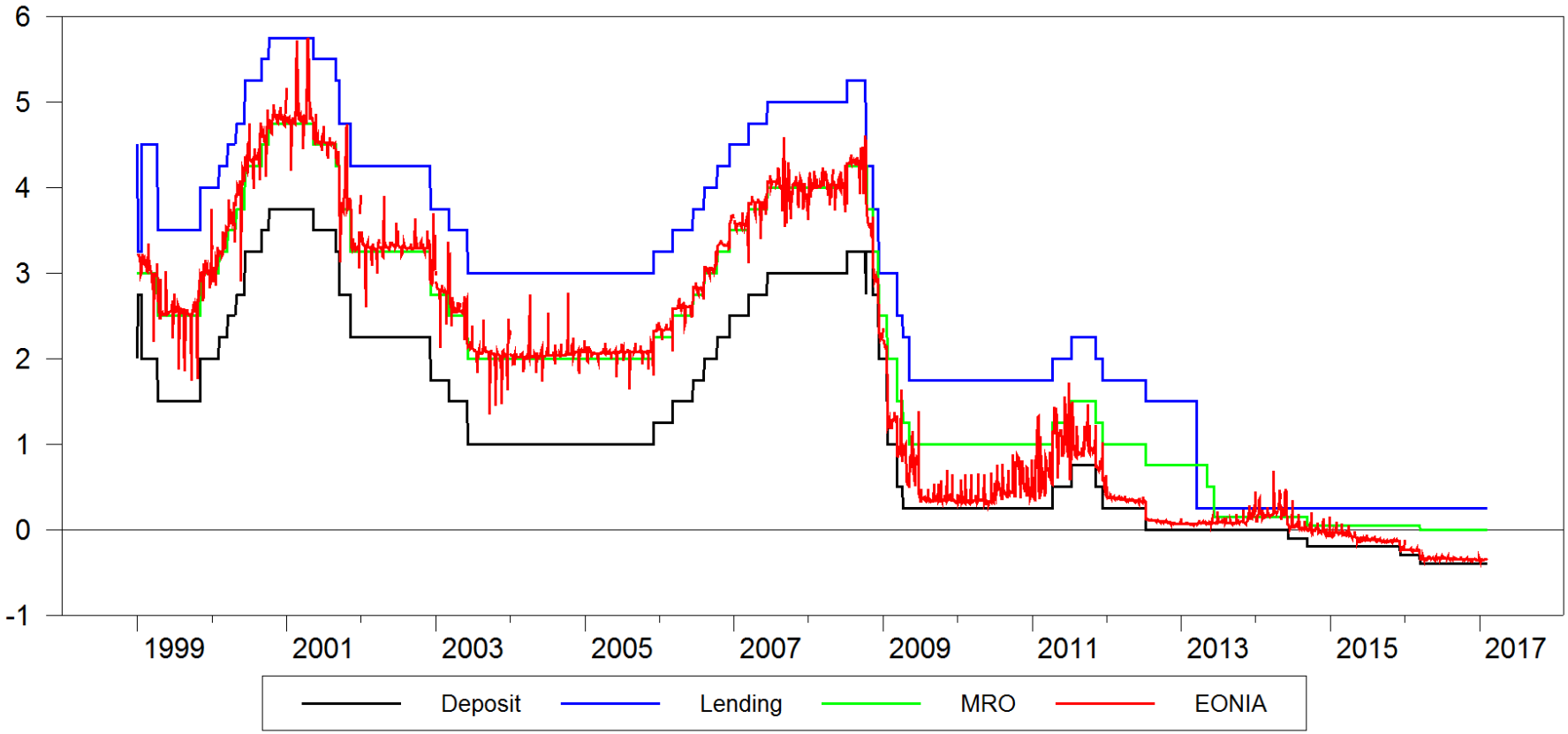
Size of the ECB's Refinancing Operations (Red=Total, Green=Long-Term, Blue=Main)



Standing Facilities

- In addition to its regular weekly and occasional non-weekly refinancing operations, the ECB also has "standing facilities" that are always available.
  - A lending facility ("marginal lending facility") usually set 1% above the rate on main refinancing operation.
  - A deposit facility which usually pays an interest rate 1% below the rate on main refinancing operation. Since September 2014, this rate is negative so banks need to pay ECB to have money in their deposit account.
- The interest rate in the main refinancing operation is the key policy rate, i.e. EONIA is supposed to stay close to this rate most of the time. The standing facilities are intended to set an interest rate "corridor" for money market rates.
  - Since banks can borrow from the lending facility, they do not need to pay a higher interest rate than this in the money market.
  - Similarly, banks don't need to lend at a rate lower than they can get from the deposit facility.
- These tools usually do a good job of controlling Euro area money market interest rates. EONIA bumps up and down but has usually stayed close to the MRO rate and never gone outside the "corridor".

How the ECB Controls Money Market Interest Rates



Changes Over Time in EONIA-MRO Relationship

- Since 2009, the relationship between the MRO rate and the EONIA has changed.
- Previously, the EONIA rate tended to be close to but slightly higher on average than the MRO rate, reflecting the fact that banks could substitute between borrowing from ECB and borrowing in interbank markets.
- However, from 2009 onwards, many lower-quality banks were unable to borrow in the interbank markets. The EONIA rate became lower than the MRO rate because it reflected only loans made to the highest quality banks.
- The EONIA rate during this period has tended to move in line with the interest rate on the ECB's deposit facility reflecting the alternative option the lending institutions have.
- Since September 2014, the ECB is charging banks for the money they have in their deposit accounts. The EONIA rate has moved downwards since this announcement and is now generally also negative.
- Why would interest rates ever go negative? Why would make a loan that you lose money on? We will come back to this!

The Eurosystem's Risk Control Framework

- The Eurosystem has various systems in place to see that it banks either repay the loans the ECB provides them or, alternatively, that the ECB obtains an asset equivalent in value to the loan.
- Banks that don't repay lose the asset pledged as collateral.
- The ECB loans feature *haircuts*, meaning the collateral is supposed to be higher in value than the loan provided to the bank.
- The haircuts get bigger (i.e. the value of the loans get smaller) as the central bank's assessment of the quality of the asset declines. So, for example, if a bond gets downgraded by a ratings agency, then a bank pledging this bond will only be eligible for a smaller loan.
- The Eurosystem also has a "risk control framework" that allows the ECB to deny credit to any bank or reject any assets as collateral should it see fit "on the grounds of prudence".
- See my blog post on "Draghi's Secret Tool" for a description of the how the Eurosystem's risk control framework has been used by the ECB at a number of key junctures in the euro crisis, including Ireland's decision to seek a bailout from the EU and the IMF.

Risk-Sharing

- What happens, however, if there is a default and the value of the collateral turns out to be less than the value of the loans? In this case, the central bank that made the loan writes down the value of its assets (without writing fown the value of its liabilities, i.e. the money it has created). This reduces the capital of that central bank.
- However, Article 32.4 of the ECB statute states that losses on monetary policy operations can be shared. In practice, this has meant that any losses incurred on standard monetary policy operations are shared among the various central banks in the Eurosystem.
- The shares of losses taken are determined by each country's ECB capital key. This is the share of the money that each national central bank provided to give the ECB its initial amount of capital.
- Could losses on monetary policy operations mean some NCBs lose all their capital? The Eurosystem as a whole can take losses of almost €500 billion before liabilities would exceed assets so this is unlikely, though possible. Not clear it matters though.
- Note that losses (or profits) on QE purchases by NCBs will not be shared. See my "ECB QEsplainer."

Emergency Liquidity Assistance

- In some cases, banks run out of Eurosystem collateral but still need to borrow from the central bank to pay off the liabilities that are flowing out of the bank.
- Eurosystem central banks generally have a lender of last resort power that pre-dates the euro. This allows them to make loans to banks even if these banks don't have eligible collateral.
- These loans are called **Emergency Liquidity Assistance** (ELA) and the central banks of the Eurosystem do not share risks with the central bank that makes these loans.
- Article 14.4 of the ECB statute implies that the ECB Governing Council can decide by a two thirds majority to prevent any programmes (including ELA) that "interfere with the objectives and tasks" of the ECB. So while the risk stays with the central bank (and ultimately government) granting the loan, the ECB Governing Council still needs to approve these loans.
- ELA featured heavily in the Irish banking crisis (almost all the money Anglo/IBRC owed was ELA), in Cyprus (where the Cypriot banks were granted large amounts of ELA prior to 2013's crisis) and in the current situation in Greece. See my paper "The ECB's Collateral Policy and Its Future As Lender of Last Resort."

Recap: Key Points from Part 8

Things you need to understand from these notes:

1. Why interbank "money markets" exist.
2. Why central banks are able to influence money market interest rates.
3. How the Fed intervenes in money markets.
4. The Fed's other policy tools: Interest on reserves and ON RRP.
5. Why Paul Volcker adopted (and abondoned) monetary targeting.
6. The ECB's refinancing operations and how they have changed in recent years.
7. The ECB's standing facilities and Euribor interest rates.
8. The relationship between EONIA and the ECB's policy rates.
9. Risk control and risk sharing in the Eurosystem.
10. Emergency Liquidity Assistance in the Eurosystem.