

Tools of Monetary Policy

This lecture examines how the conventional and unconventional tools of monetary policy are used in practice.

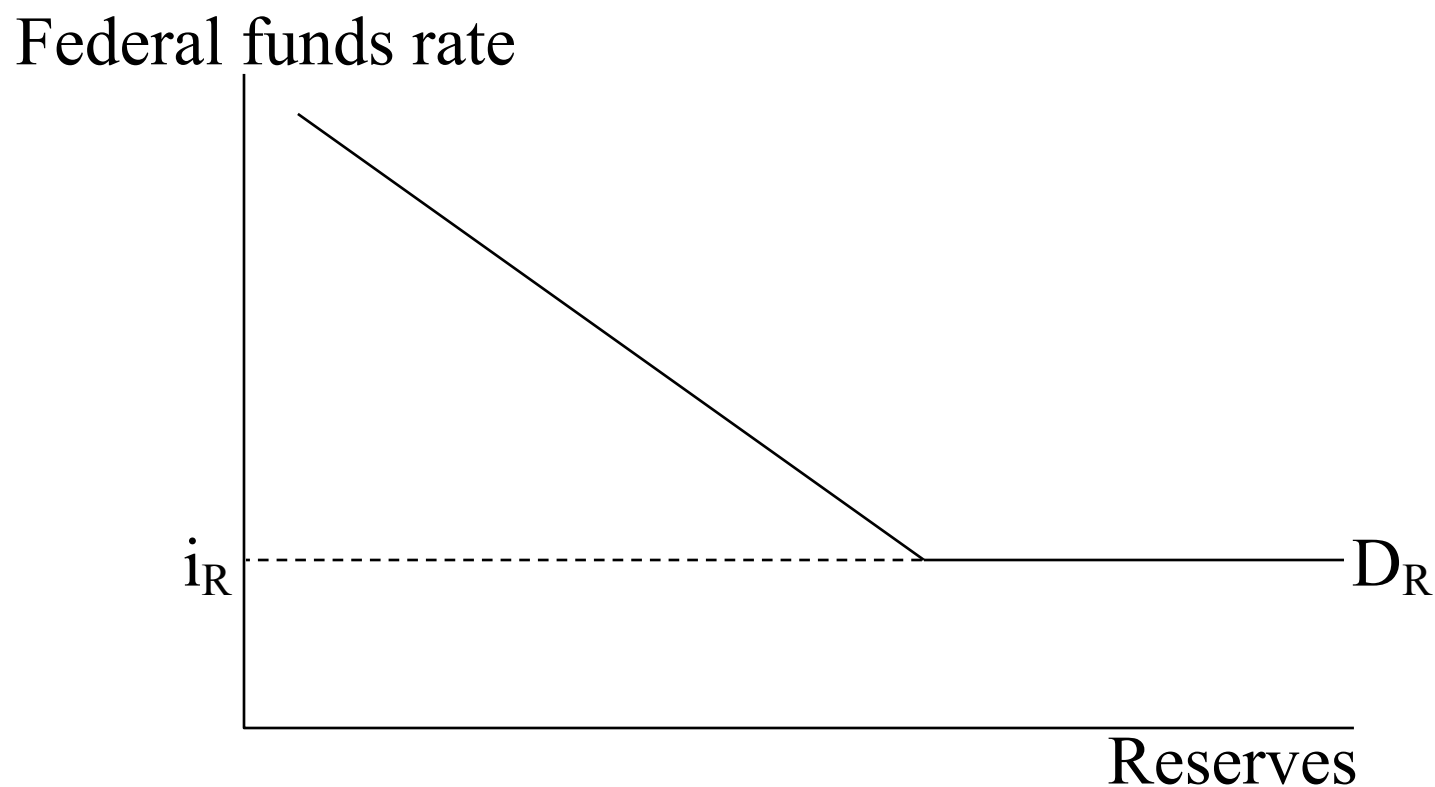
The Market for Reserves and the Federal Funds Rate

A. Demand and Supply in the Market for Reserves

1. The demand curve for reserves

- a. Banks' demand for reserves is the sum of their required reserves plus excess reserves.
- b. While banks must hold required reserves, their demand for excess reserves depends negatively on its opportunity cost.

- c. The opportunity cost of holding excess reserves is the federal funds rate (i_{ff}) minus the interest rate that the Fed pays on reserves (i_R). As the opportunity cost ($i_{ff} - i_R$) rises, banks' demand for reserves decreases.
- d. Hence, the demand for reserves rises as $(i_{ff} - i_R) > 0$ falls. When $(i_{ff} - i_R) \leq 0$, the demand for reserves is unlimited.

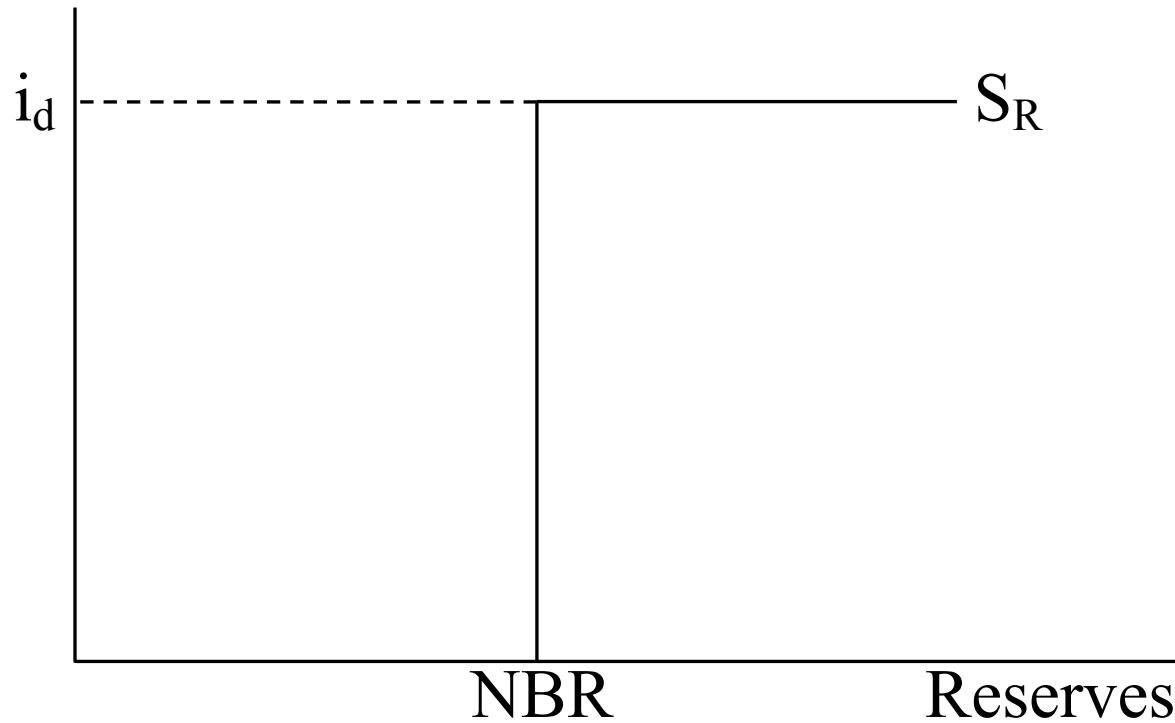


2. The supply curve for reserves

- a. The supply of reserves is the sum of nonborrowed reserves (NBR) plus borrowed reserves.
- b. The Fed inelastically supplies nonborrowed reserves.
- c. Borrowed reserves are the amount of reserves banks borrow directly from the Fed's discount window.
- d. If the discount rate (i_d) is above the federal funds rate (i_{ff}), then banks will borrow reserves from other banks and not the Fed.

- e. When $i_{ff} \geq i_d$, the Fed supplies an unlimited amount of reserves at i_d .

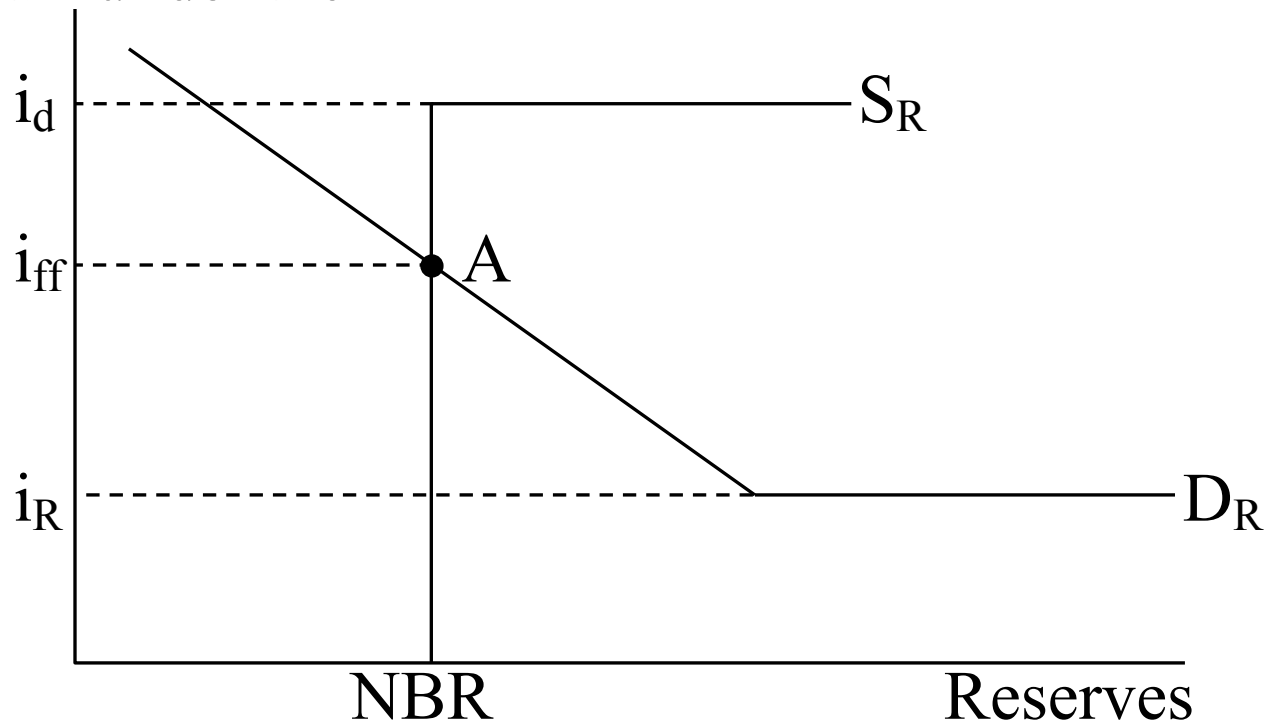
Federal funds rate



3. Market equilibrium for reserves

- a. The federal funds rate (i_{ff}) clears the market for reserves.

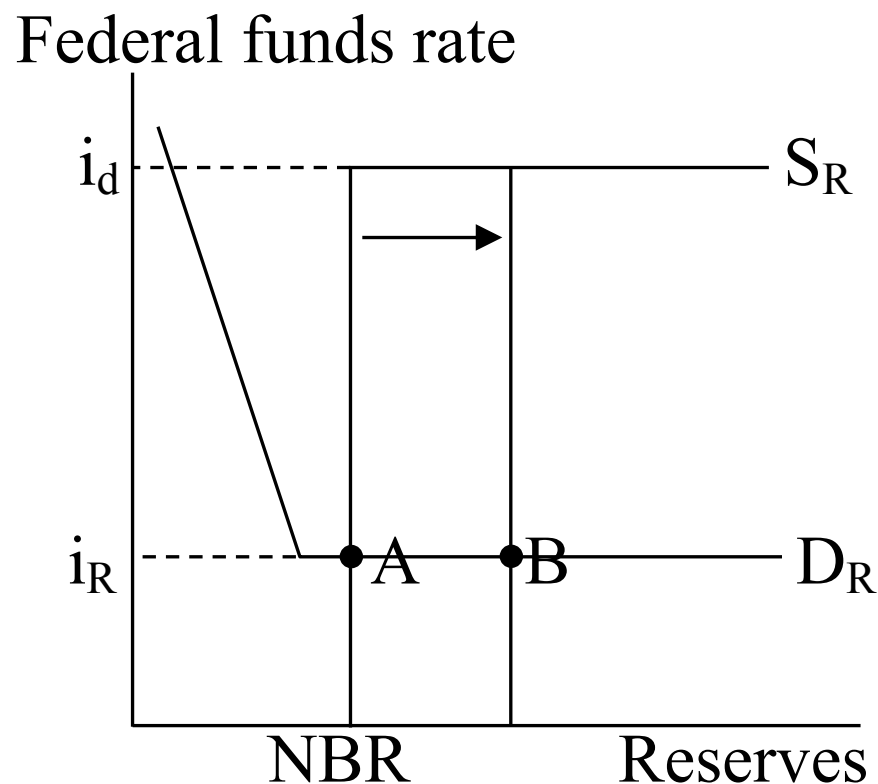
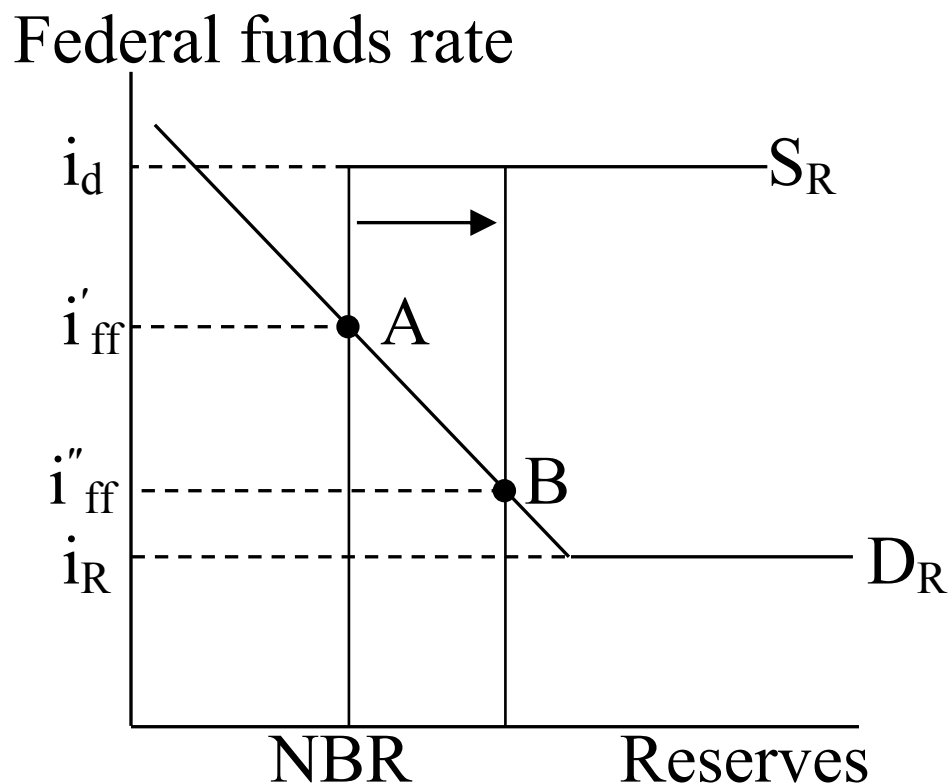
Federal funds rate



B. The Tools of Monetary Policy and the Federal Funds Rate

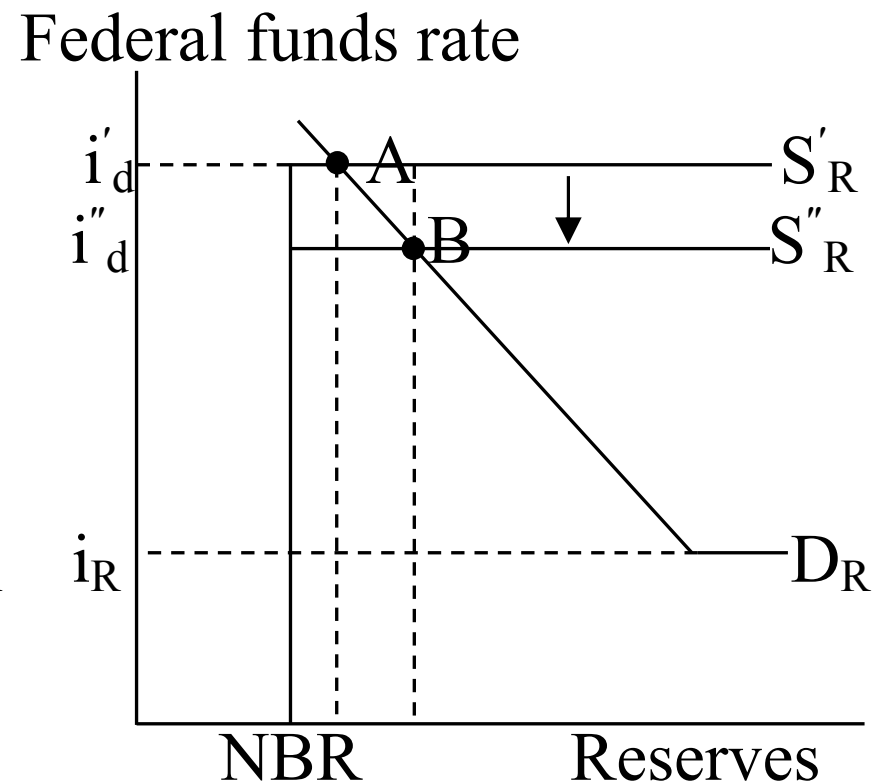
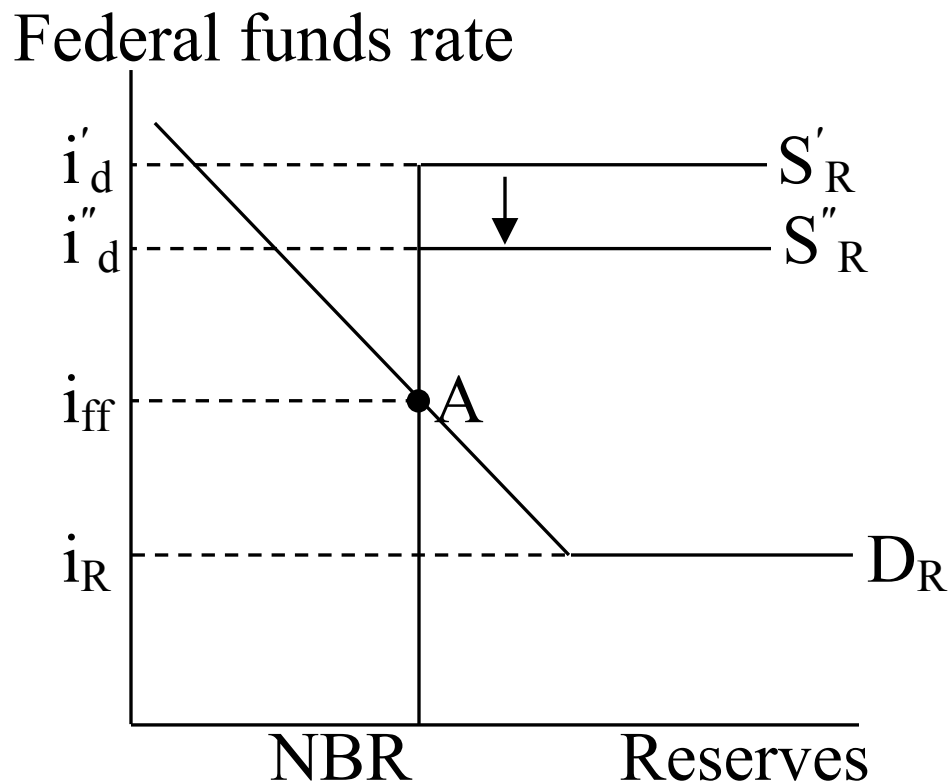
1. Open market operations

- a. When $i_{ff} > i_R$, an open market purchase (sale) lowers (raises) the federal funds rate [left graph].
- b. When $i_{ff} = i_R$, an open market purchase has no effect on the federal funds rate [right graph].



2. Discount lending

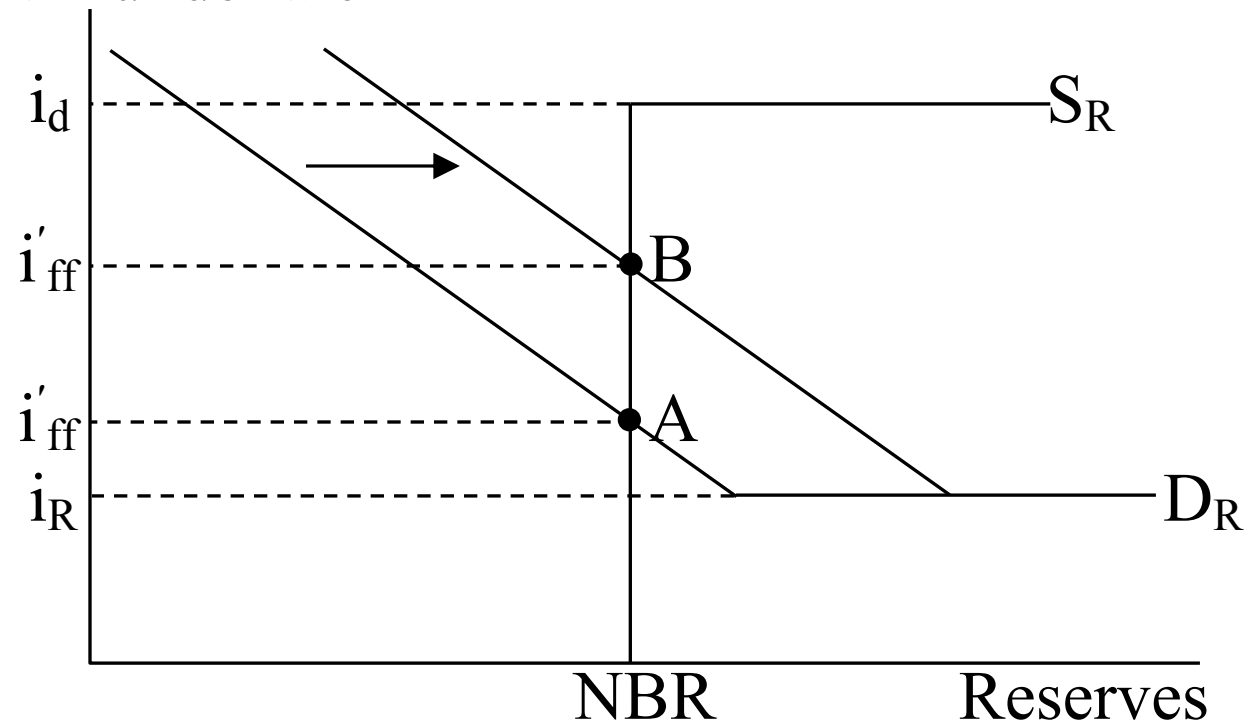
- When $i''_d \geq i_{ff}$, a discount rate cut has no effect on the federal funds rate or the quantity of reserves traded [left graph].
- When $i_d = i_{ff}$, a discount rate cut (rise) increases (decrease) the quantity of reserves traded [right graph].



3. Reserve requirements

- a. When the Fed raises (lowers) the required reserves ratio, the federal funds rate increases (decreases).

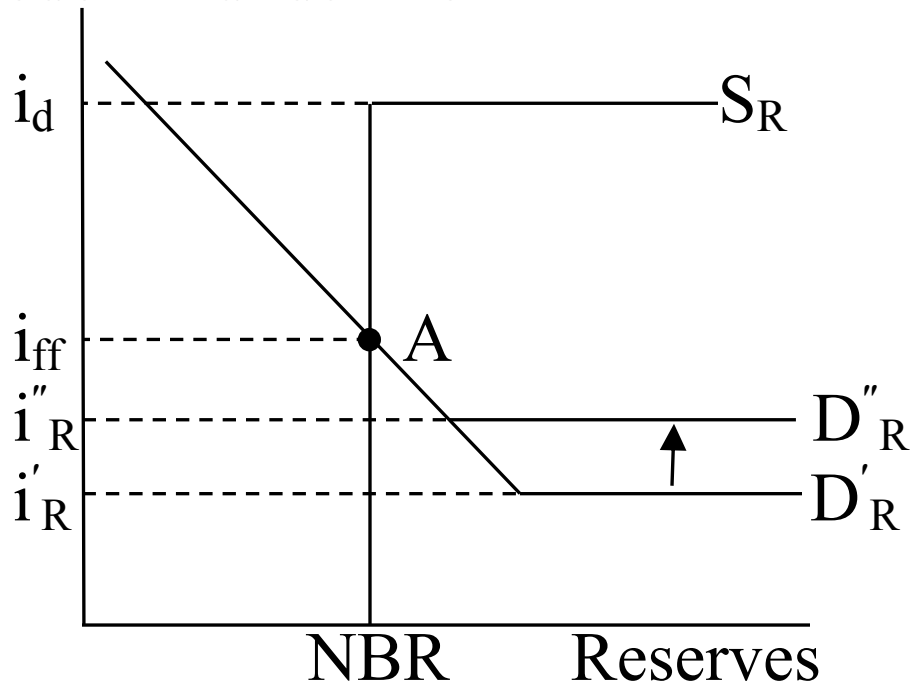
Federal funds rate



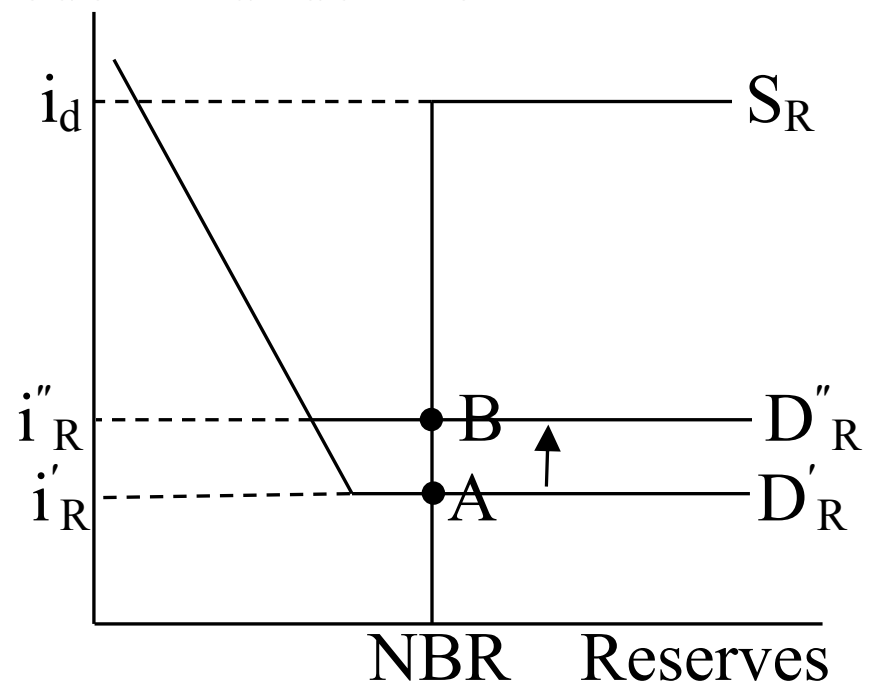
4. Interest rate on reserves

- a. When $i_{ff} \geq i''_R$, an increase in the interest rate on reserves has no effect on the federal funds rate or the quantity of reserves traded [left graph].
- b. When $i_d = i_{ff}$, an increase (decrease) in the interest rate on reserves raises (lowers) the federal funds rate, but has no effect on the quantity of reserves [right graph].

Federal funds rate



Federal funds rate



Conventional Tools of Monetary Policy

A. Open Market Operations

1. The Fed usually conducts most conventional open market operations with U.S. Treasury securities because they are the most liquid and have the largest trading volume.
2. Two types of open market operations.
 - a. Dynamic open market operations are intended to change the level of reserves and the monetary base.
 - i. Outright purchase occurs when the Fed purchases securities that it does not intend to sell back in the near future.
 - ii. Outright sale occurs when the Fed sells securities that it does not intend to buy back in the near future.

- b. Defensive open market operations are intended to offset other factors, such as a change in currency holdings, which impact reserves and/or the monetary base.
 - i. Repurchase agreement (repo) exists when the Fed purchases securities with the agreement the seller will repurchase them on a specified date (usually within one to 15 days).
 - ii. Matched sale-purchase agreement (reverse repo) exists when the Fed sells securities and agrees to purchase them back on a specified date.
- 3. The New York Fed conducts the open market operations.
- 4. Each business day, the New York Fed informs the primary dealers (securities dealers at banks) via a computer of the type and maturity of the operation being arranged. The primary dealers then immediately submit bids, and the New York Fed selects the most attractively priced ones.

B. Discount Window and the Lender of Last Resort

1. The discount window has three distinct types of discount loans to banks.
 - a. Primary credit is loans made to healthy banks at very short maturities (usually overnight). The discount rate is the interest rate on those loans.
 - b. Secondary credit is loans made to banks suffering severe liquidity problems. The interest rate on those loans is the discount rate plus 50 basis points.
 - c. Seasonal credit is loans to small banks in vacation and agricultural areas that have a seasonal pattern of deposits. The interest rate charge on those loans is the average of the federal funds rate and CD rates.

2. Lender of last resort

- a. An important role of the Fed is to provide reserves via the discount window to banks when the private market will not in order to prevent bank and financial panics.
- b. Even though the FDIC provides deposit insurance, the lender of last resort role of the Fed is still necessary.
 - i. Since the FDIC insurance fund equals only 1% of all covered deposits, the FDIC cannot respond to a systematic failure of a large number of banks.
 - ii. FDIC insurance does not cover deposits over \$250,000, so a loss of confidence in a bank could still cause a bank panic.
- c. The Fed can also provide lender of last resort funding to the entire financial system as it did after the 1987 stock market crash and the 2001 terrorist attacks.

C. Reserve Requirements

1. An increase in the required reserves ratio reduces the money supply and raises the demand for reserves, which pushes up the federal funds rate.
2. This tool is a very powerful way to change the money supply and, as a result, is rarely used today.
3. All depository institutions are subject to the same reserve requirements on checkable deposits.
 - a. The first \$13.3 million of checkable deposits are not subject to any reserve requirements.
 - b. The required reserves ratio is 3% on all checkable deposits between \$13.3 million and \$89 million.
 - c. All checkable deposits above \$89 million are subject to a 10% reserves requirement.

D. Interest Rate on Reserves

1. The TARP Act of 2008 gave the Fed authority to pay interest on reserves.
2. Interest on reserves essentially keeps the federal funds rate from falling below the interest rate on reserves.
3. Since 2008, banks have acquired substantial numbers of excess reserves.
4. Without interest on reserves, the Fed would need to conduct a huge amount of open market sales (to reduce excess reserves) in order to raise the federal funds rate.
5. With interest on reserves, the Fed avoids needing to make a large amount of open market sales by simultaneously raising its interest on reserves as it increases the federal funds rate.

E. The Relative Advantage of Open Market Operations

1. The Fed has complete control over the volume of open market operations.
2. Open market operations are flexible and precise.
3. Open market operations can easily be reversed.
4. There are no administrative delays in implementing open market operations.

F. The Relative Advantage of the Other Policy Tools

1. When excess reserves are high, the interest rate on reserves can be raised simultaneously with the federal funds rate to prevent the need for a large amount of open market sales.
2. The Fed can perform its lender of last resort role via the discount window to respond to a liquidity crisis in the financial system.

Unconventional Monetary Policy Tools and Quantitative Easing

A. Reasons Why Conventional Monetary Policy Might Not Work

1. The financial system might seize up causing sizable declines in investment and output by preventing the efficient allocation of capital to the most productive investment opportunities.
2. Traditional open market operations will become ineffective if a negative shock to the economy pushes short-term interest rates to zero.

B. Unconventional Monetary Policy Tools

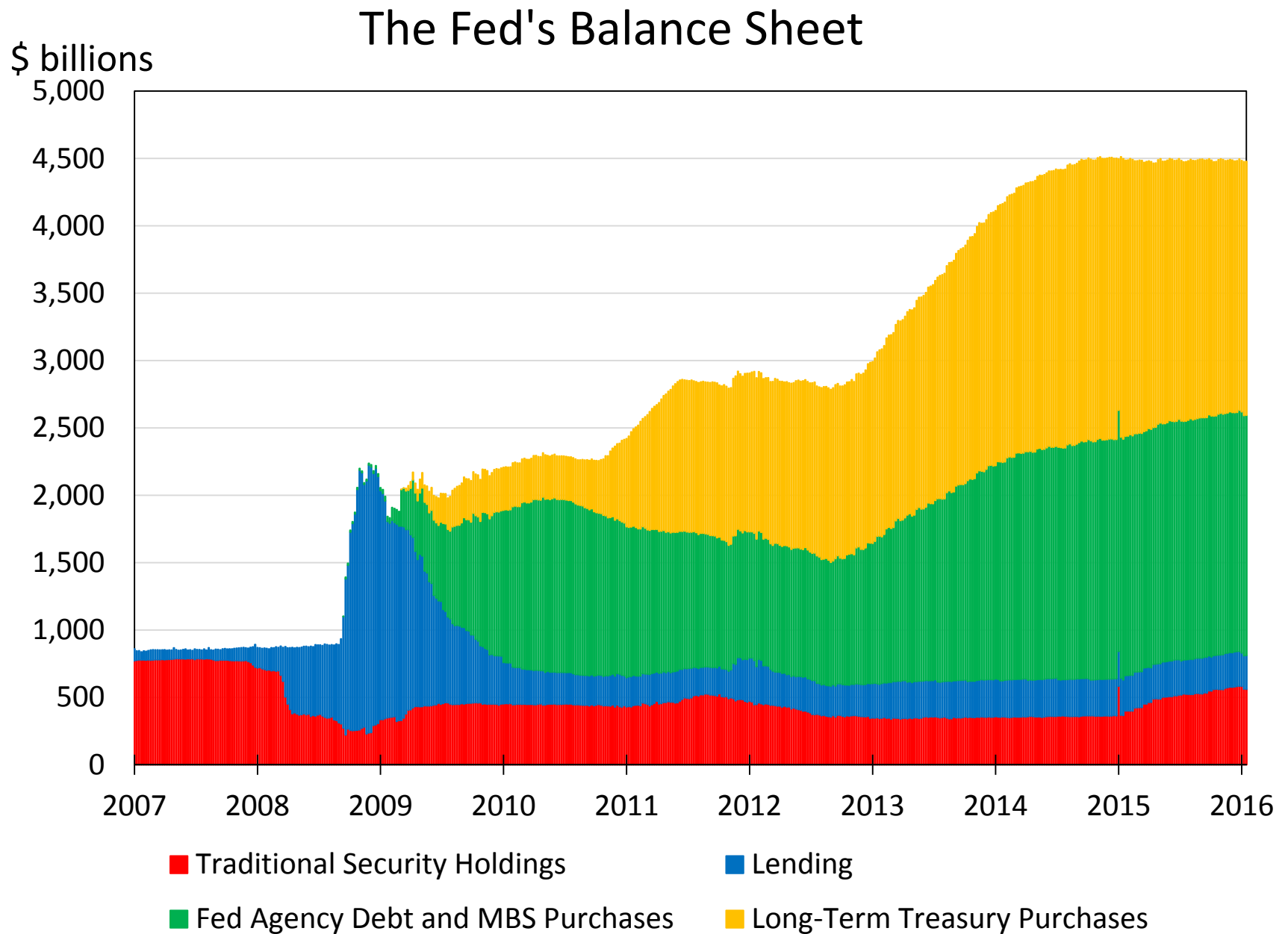
1. Programs to provide liquidity to the financial market
 - a. The Fed can promote discount window expansion by lowering the discount rate to the federal funds rate.

- b. The Fed can use a Term Auction Facility to provide banks additional lending through competitive auctions, where the resulting interest rate is lower than the discount rate.
- c. The Fed can also provide liquidity through New Lending Programs, like the Commercial Paper Funding Facility, to nonbank institutions in the financial market.

2. Large-Scale Asset Purchases

- a. These programs purchase long-term assets by issuing additional reserves in order to help lower long-term interest rates.
- b. The Fed has purchased assets such as long-term U.S. Treasury securities and mortgage-backed securities.
- c. One key effect of an asset purchase program is that it can increase the size of the Fed's balance sheet.

d. The Fed's balance sheet since 2007



3. Forward Guidance and the Commitment to Future Policy
 - a. Forward guidance is when the Fed commits to specific future policy actions.
 - b. If the Fed has credibility, a promise to keep the future federal funds rate lower than it otherwise would will push down the expected future federal funds rate.
 - c. According to the expectations theory of the term structure, a lower expected future federal funds rate will push down long-term interest rates, which will help stimulate output.

- d. Two types of forward guidance
 - i. Conditional forward guidance says a particular policy will be in place as long as certain economic conditions persist.
 - ii. Unconditional forward guidance states a certain policy will remain in place regardless of economic conditions.
- e. Unconditional forward guidance should provide a larger stimulative effect than conditional because the Fed is pledging not to abandon its future policy.
- f. If economic conditions dramatically change, however, unconditional forward guidance may force the Fed to follow through on a commitment that is no longer optimal.

C. Quantitative Easing Versus Credit Easing

1. The Fed's balance sheet rose from about \$800 billion in 2008 to about \$4.5 trillion in 2014. That expansion in the balance sheet is referred to as quantitative easing.
2. Quantitative easing led to a large increase in the monetary base but not in the money supply.
3. There are a couple reasons the money supply did not explode.
 - a. Instead of increasing lending, banks simply increased excess reserves (which were paying interest).
 - b. The expansion of the monetary base also could not lower the federal funds rate (and stimulate the economy) because it was already effectively at zero.

4. The quantitative easing policy, however, did change the composition of the Fed's balance sheet (credit easing), which helped improve the functioning of particular segments of the credit market.
 - a. The additional liquidity to certain markets helped unfreeze them, so capital could be allocated to its most efficient uses.
 - b. When the Fed purchases a particular security, it increases the demand for that security, which drives up its price and lowers its interest rate.
5. During the period from 2008 to 2014, the Fed purchased both MBSs and long-term government securities in order to help lower mortgage rates and long-term interest rates to stimulate housing and business investment.

Monetary Policy Tools of the European Central Bank (ECB)

- A. The ECB uses open market operations to target the overnight cash rate (the ECB's equivalent of the federal funds rate).
- B. Unlike the Fed, each country's National Central Bank conducts open market operations for the ECB.
- C. The ECB operates the marginal lending facility, which lends reserves to banking institutions (it's the ECB's equivalent of the discount window). The marginal lending rate is the interest rate banks pay on those loans.
- D. The ECB also requires all banks to hold 2% of their checking deposits and other short-term deposits in reserve accounts at the National Central Banks.