Lesson 11 - Monetary Policy

Acknowledgement: Ed Sexton and Kerry Webb were the primary authors of the material contained in this lesson.

Section 1: The Federal Reserve System

The Federal Reserve

The **Federal Reserve System** (sometimes called the **Fed**) was established by the **Federal Reserve Act of 1913**. The Fed is the central banking authority (**central bank**) of the United States. The governing authority of the Federal Reserve System is called the **Board of Governors**. There are seven members of the Board of Governors, each is appointed by the president and confirmed by the Senate for 14-year terms. They may serve for 14 years plus the unexpired term of the person they replace. One of the governors is designated to serve as the **Chairman of the Fed**, and his/her term as chairman lasts for four years, after which he/she needs to be nominated again by the President and confirmed by the Senate in order to continue serving as chairman. The current chairman is **Ben Bernanke**.

The primary policy making body of the Federal Reserve is called the **Federal Open Market Committee**, or **FOMC**. The FOMC is comprised of the Board of Governors plus five of the 12 **Presidents of the Federal Reserve District Banks**. One of the five regional presidents is always the President of the New York Fed, and the other four rotate among the other 11 presidents. The FOMC sets policy on the purchase and sale of government bonds in the open market. As will be seen later, this is the most important control over the money supply.

The Federal Reserve has four main functions:
1. **Implement monetary policy** to ensure stable macroeconomic conditions, with particular emphasis on maintaining low unemployment, low inflation, and stable interest rates;
2. **Supervise and regulate banking institutions** to ensure the safety and soundness of the nation's banking and financial system, and to protect the credit rights of consumers;
3. **Contain systemic risk** that may arise in financial markets by serving as the lender of last resort when needed, in order to maintain the stability of the financial system;
4. **Provide financial services** to depository institutions, the U.S. government, and foreign official institutions, including playing a major role in operating the nation's payments system.

The Twelve Federal Reserve Banks

One unusual feature of the Federal Reserve System in the United States is that we really have 12 central banks. Most countries have only one central bank. Our system is divided into 12 district or regional banks, approximately representing equal divisions of the population in 1913, but today do not all make as much sense. There are 12 regional banks because many western and southern states did not trust the "eastern establishment" represented by such tycoons as J.P. Morgan and John D. Rockefeller, Jr. In order to gain support for the Federal Reserve Act, it was necessary to disperse the power of the Federal Reserve System throughout the country and to give control of the system to a board that was appointed and confirmed by the government. The districts are show in the map below.

The Twelve Federal Reserve Districts

This maps show the twelve Federal Reserve districts.

The Fed is sometimes called a **quasi-public bank**. It really is quite a unique business model. The regional banks are privately owned but publicly controlled. The banks are privately owned by the private banks within their regions. All nationally chartered private banks and many state chartered banks own stock in the Federal Reserve bank in their region. The model is unique because the owners of the bank do not control the bank or its policies. They do not even receive all of the profits from the operation of the bank. Member banks receive a dividend that is equal to 6% of their stock, and the remainder of the profits of the Federal Reserve banks goes to the US Treasury. In 2010, the member banks received 1.583 billion dollars, and the US Treasury received 79.268 billion dollars.

The Federal Reserve Banks are also called bankers' banks. Individual United States citizens cannot have an account at the Fed. Member banks do have an account and can make deposits and withdrawals, can borrow money from the Fed, and receive their Federal Reserve Notes from their regional bank. You can look at a one dollar bill and see which Federal Reserve Bank issued that bill. At the center left of the bill, you will see a letter of the alphabet that corresponds to the regional bank that issued the bill. A is for 1, the Boston bank. B is for 2, the New York bank. C is for 3, the Philadelphia bank, etc. Many of the bills in the Western United States have an L for the 12th bank in San Francisco. Another interesting feature of our system is that the Federal Reserve System issues our money, but the money is actually created by the US Treasury. The Bureau of the Mint creates our coinage and the Bureau of Printing and Engraving creates our paper money. The Fed then purchases the coinage at face value and the paper money at approximately six cents per bill, regardless of the denomination of the bill, and issues the money to the various regional banks.

Section 2: Banking and Money Creation

Banks

You have heard of many types of financial firms and institutions, including insurance companies, mutual funds, stock brokerages, and pension funds. However, **banks**, **credit unions** and **thrift institutions**—collectively known as **depository financial institutions**, DFI's—are a particularly different kind of financial firm. For ease of understand-

ing, we will simply refer to all DFI's as banks, and a bank has **three main goals:**

1. Accept deposits from its customers
2. Issue loans to its borrowers
3. Earn profits for its shareholders

How does a bank accomplish all three of these goals at the same time? The answer is found the oldest business phrase known: "Buy Low and Sell High." Banks simply buy money at low rates of interest and sell it at higher rates of interest. For example, when you deposit your paycheck into your checking account at the bank, you typically receive no interest for doing so. Thus the bank has just purchased your money at a zero rate of interest. When your parents go to the bank to borrow money to pay your tuition, the bank charges them a certain interest rate for the use of the funds. Thus the bank has just sold your money to your parents for, say, five percent. A bank makes its profits by creating a positive spread between the interest rate it receives when it sells money (Sell High) and the interest rate it pays when it buys money (Buy Low). In doing so, banks function as an intermediary between lenders and borrowers.

Bankers provide services and attempt to make a profit for their owners. The balance sheet of a commercial bank looks much like the balance sheet of any other business. **Assets** are items the bank owns and **liabilities** are items the bank owes. Assets minus liabilities equal the **net worth** of the bank. It may seem counter intuitive, but the liabilities of the banks are its deposits, and the assets of the bank are the loans that it has issued. Remember that a liability is something that the bank owes; when you deposit money into your account, the bank owes you that money. An asset is something that the bank owns; when the bank lends you money, it owns that loan, and you owe the bank the amount of the loan. Banks like to make loans, because it is one of the primary ways that they make money. Charging interest on the loan is one of the most profitable activities for any commercial bank.

Reserves are balances that a bank keeps on hand from its deposits to manage its normal cash inflows and outflows. Reserves can held by a bank in two different ways: 1) as cash in the bank's vault, the tellers' cages, or its ATM system, all of which is collectively known as **vault cash**; or 2) as a **deposit at a Federal Reserve Bank**. These reserves are bank assets, and the bank's goal is to earn profits on its assets. Thus the bank has a financial incentive to own assets that yield a relatively high rate of return. But note that the bank earns a zero return on its vault cash, and the Fed only pays a very small rate of interest on the reserve balances a bank holds there. Consequently, a bank is incentivized to keep reserve balances as low as possible, and invest its assets in other higher yielding alternatives.

Another important reason that banks keep money in reserve is that they are legally required to do so. The percentage of the deposits that must be kept in reserve is called the **reserve ratio**.

You might think that a bank should hold reserves equal to its total deposits, but that is not necessary. A bank only needs to hold enough reserves to cover the expected withdrawals on any given day. Because not everyone will withdraw all of their money on the same day, the bank can hold reserves equal to just a fraction of its total deposits and still cover all withdrawals. Economists call a banking system in which reserves are less than deposits a fractional reserve system.

Fractional Reserve Banking

Our modern banking system is known as **fractional reserve banking system**. "**Fractional reserve**" refers to the fact that, at any given point in time, the bank has in reserve only a fraction of its total deposits. This system was developed as early as the Middle Ages to allow banks to invest money (or make loans) for a profit. If banks were forced to keep all of their deposits in reserve in the vault, then the bank would be no more than a storage unit for customers' money. Not only could they not make any money, but they would not be able to pay interest to their depositors. In fact, in order to operate, they would have to charge customers a fee for accepting their deposits.

You may have seen the classic movie *It's a Wonderful Life*, and remember the bank-run scene. All of the bank's customers wanted to withdraw their money at the same time, but as George Bailey said, "The money's not here. Well, your money's in Joe's house…and in the Kennedy house, and Mrs. Maitlin's house, and a hundred others." This scene depicts the essence of the fractional reserve banking system.

Federal Reserve regulations require most banks to hold 10 percent of their eligible deposits as reserves. This 10 percent is called the **reserve requirement**. These balances are known as **required reserves**, and the percentage is

known as the **required reserve ratio**. The required reserve ratio has been fixed at 10 percent since 1980. Thus, if a bank had total eligible deposits of $500 million it would be required to maintain $50 million of reserves.

What can the bank do with the other $450 million? These balances are known as **excess reserves**. Note that if the bank simply maintains these balances as vault cash or on deposit at the Fed, it will not maximize its profit goal. Consequently, banks will use their excess reserves for lending and investing purposes, where banks lend to individuals (i.e., car loans, home loans, and student loans), to businesses (i.e., commercial loans, farm loans, construction loans), to governments (i.e., Treasury bonds, and state and local bonds) and to other banks (i.e., Federal funds). If a bank converts all of its excess reserves to one type of loan or another, then its excess reserves will be zero. During normal economic times, most banks will manage their excess reserve balances at or close to zero. During recessionary times, banks will typically hold not only their required reserves, but also some degree of excess reserves in order to handle any emergency situations.

How Banks Create Money

Now with an understanding of the fractional reserve system, you are prepared to see how **banks create money**. Let's suppose you decide to deposit $100 into your checking account at First National Bank, and let's assume that the required reserve ratio is 10 percent. Let's further assume that the bank lends out all of its excess reserves, which is equal to $90. The borrower will spend that money, and whoever receives it will then deposit the $90 in his/her bank, say the Second National Bank. Second National will then hold $9 as required reserves, and will then lend out the remaining amount of its excess reserves, or $81. This process of depositing, lending, and spending continues through the banking system. As a result, your initial $100 deposit creates substantially more money than the $100, as the expansion process continues through the economy. The **maximum of money** that can be created or the **total potential money expansion** is given by the following equation:

$$\mathbf{D = e \times m}$$

where
D = maximum amount of money that can be created by the deposit process,
e = increase in excess reserves, and
m = simple money multiplier

The **simple money multiplier** is given by the following equation:

$$\mathbf{m = \frac{1}{r}}$$

where **r** = required reserve ratio

Thus if the required reserve ratio is 10 percent, then

$$\mathbf{m = \frac{1}{0.10} = 10}$$

This **model assumes** that all of the banks that take in the various deposits also lend out all of their excess reserves. It further assumes that all of the loan proceeds are spent, and that the receiver will deposit all of the money received back into the banking system (i.e., there will be no cash holdings from this process). Continuing the example from above, the total amount of additional money created from this process will be $90 x $(\frac{1}{0.10})$ = $900. The figure below illustrates the process of money creation from the deposit of $100.

Note that if banks, for safety reasons, decide to hold more reserves than the legal requirement, or if the public chooses to not re-deposit all of the loan proceeds back into the bank system (i.e., the public chooses to hold the loan proceeds as cash), then the effect of the money multiplier will be reduced, and money supply will not grow to the same levels as dictated by the simple money multiplier.

Banks Creating Money

This table how a deposit can create new money when banks lend out excess reserves.

	Deposits	Required Reserves	Excess Reserves which can be lent and which create new money
Bank 1	$100	$10	$90
Bank 2	$90	$9	$81
Bank 3	$81	$8.10	$72.90
Bank 4	$72.90	$7.29	$65.61
Bank 5	$65.61	$6.56	$59.05
All Other Banks	$590.49	$59.05	$531.44
Sum of All Rounds	$1,000	$100	$900
	Total money in the banking system	Required reserves in the banking system	New money in the banking system

Another Example Using A Balance Sheet

In this example, we are going to consider the actions of a fictional bank called The Last National Bank (LNB) which has a legal reserve requirement of 10 percent. This bank's initial balance sheet is shown below:

The Last National Bank: Balance Sheet 1

Assets	Liabilities
Reserves: $1,000	Deposits: $1,000

Notice that this bank has liabilities of $1,000, the total of its deposits. At times there will be other liabilities such as stock shares on the balance sheet. These are not able to be lent out. When we are determining how much money is created we are focused primarily on deposits.

If the bank initially takes $1,000 deposit and puts it in the vault, then it also has assets of $1,000 in the form of cash reserves. If the reserve requirement is 10 percent then the LNB is only legally required to keep $100 in reserve. What should the bank do with the other $900? Well, don't forget that this bank has to make a profit just like any other business, so it needs to do something with the $900 that will bring in more money than what it is paying to the depositor in interest. The bank could invest the $900, or lend it and charge more interest than what it is paying to the depositor. In either of these two scenarios the result will be the same, but we will look at the case where the bank lends out the money. After the loan is made and the loaned money is withdraw from the bank, the balance sheet of the LNB looks like the following:

The Last National Bank: Balance Sheet 2

Assets	Liabilities
Reserves: $100	Deposits: $1,000

Loans: $900

Let's say that the person who borrows the $900 buys an item from someone, who then deposits the $900 in his bank, The Second to the Last National Bank (SLNB). The balance sheet for the SLNB is illustrated below. Notice that deposit is a liability to the bank and, at least initially, we are showing the entire deposit as being held in reserve as cash vault, which is an asset to the bank.

The Second Last National Bank: Balance Sheet 1

Assets	Liabilities
Reserves: $900	Deposits: $900

The SLNB does not have to keep $900 in reserves, however. Because the legal reserve ratio is 10 percent, SLNB can lend out $810. If the SLNB has $900 in deposits and $900 in "actual" reserves with a 10 percent reserve ratio, they have what is call "excess" reserves of $810. The "required" reserves would be $90, and they can lend out all of their excess reserves. After making such a loan and the loaned money is withdraw from the bank, the new balance sheet for the SLND would look like the following:

The Second to the Last National Bank: Balance Sheet 2

Assets	Liabilities
Reserves: $90	Deposits: $900
Loans: $810	

Notice what has happened to the money supply as a result of this fractional reserve banking system. Remember that the money supply includes cash in the hands of the non-bank public plus demand deposits at commercial banks. When the original deposit is made at the LNB, the money supply is $1,000. When the LNB lends $900 the, money supply immediately goes up to $1,900. Even if the person who borrowed the $900 just kept the money in his pocket this would be true. The money supply expands, however, when the $900 is deposited into the SLNB and they make an $810 loan off that deposit. Now the money supply is $1,000 + $900 + $810 = $2,710. When the $810 is deposited into another bank and they lend out 90 percent of that deposit the money supply continues to grow. The commercial banking system is essentially "creating" money. In our example r = 0.10 so $\frac{1}{0.10}$ = 10. Since the initial excess reserves of the LNB were equal to $900, the total potential money expansion would be equal to $900 x 10 = $9,000.

Summary

1. Banks can create money because of the fractional reserve banking system.
2. The Federal Reserve controls the ability of banks to expand the money supply by setting the reserve ratio.
3. Commercial banks hold reserves as cash and do one of two things with their excess reserves: Lend them out or invest them in government securities.
4. In both cases, the excess reserves of one bank become the deposits of another bank.
5. The total potential expansion of the money supply will be equal to excess reserves times $\frac{1}{r}$.
6. The Fed uses the reserve ratio as one of the tools of Monetary Policy.

Section 3: Monetary Policy

Monetary Policy

Federal Reserve decisions that affect the economy through changes in the money supply, available credit, and interest rates are labeled as **monetary policy**. Unlike fiscal policy, monetary policy does not require the sanction of

Congress or the President. As a result, the Fed has a significant amount of independence when making policy, which in turn affects interest rates, exchange rates, inflation, unemployment and real GDP levels.

In order to make and implement monetary policy, the Fed uses the **Federal Open Market Committee (FOMC)**, which is composed of all seven governors and five of the twelve Federal Reserve Bank presidents. The FOMC is the monetary policy-making body of the Fed, and it meets about every six weeks. As noted above, the Fed is primarily concerned with the state of the economy. And so, if the economy is in a recessionary mode, the Fed will implement policy in order to increase lending and spending throughout the economy, by lowering interest rates. If the economy is experiencing inflation, it will implement policy designed to reduce lending and spending, by raising interest rates. When interest rates are higher, people have less incentive to borrow, and if they don't borrow, they won't spend either. Note all of these measures are consistent with Keynesian philosophies.

The traditional tools for monetary policy are listed below. Since the financial crisis of 2008, the Federal Reserve utilized other tools outside these three traditional tools. The **three traditional monetary policy tools** are Open Market Operations, adjusting the reserve requirement ratio, and adjusting the discount rate. These three traditional monetary policy tools will be discussed in the next three sections. After that discussion, there will be a brief discussion about the non-traditional policies the Federal Reserve has undertaken during and after the Great Recession.

Open Market Operations

This tool allows the Fed to directly inject money into the economy or pull money out of the economy through adjusting the Federal Funds rate. The **Federal Funds rate** is the rate paid by banks when they borrow money from other banks. Typically these loans are over-night or short-term loans. Open Market Operations is totally under the control of the Federal Open Market Committee (FOMC), in that the Fed alone can determine when and how much it wants to either increase or decrease the money supply. The Fed does this by buying from banks or selling to banks government bonds or **Treasury securities** for the purpose of altering bank reserves. These transactions occur between the Fed and a select group of banks known as **Primary Dealers**. Because the Fed has complete control over open market operations, it is the most often used and strongest tool of monetary policy in controlling the money supply.

When the FOMC decides to buy government bonds or treasury securities they take bonds out of the hands of the public and put cash into the hands of the public. If the Fed were to buy a bond from you, you would give the Fed the bond and they would give you cash. Since bonds are not part of the money supply but cash is, the money supply would immediately increase by the amount of the cash that you are given. The cash would have formerly been in a Fed vault and therefore would not have been part of M1. If you take that cash and deposit it in a bank, the bank's excess reserves go up and the potential increase in the money supply grows through the money creation process described in the previous section. For example, if the reserve requirement were 5%, the multiplier would be 20—if the Fed buys $2 billion in bonds, the money supply will go up by $40 billion. If more money is injected into the economy (shifting the money supply curve to the right), interest rates will fall, creating an environment where the economy can more easily grow.

If the Fed were to sell bonds, you would give the Fed cash and they would give you bonds. The cash that was formerly in your hands (or in your bank account) was part of M1, but as soon as the Fed gives you a bond and you give the Fed your money the money, supply immediately falls. If you take the money to pay for the bond out of your bank account, excess reserves will fall and the money contracts by a multiple of the reduction in excess reserves. Think of the opposite of money creation—in fact, it is sometimes called destroying money. For example, if the reserve requirement were 10%, then the multiplier would be 10 and if the Fed sells $1 billion in bonds, the money supply decreases by $10 billion. If the money supply shifts to the left (a reduction in the money supply), interest rates will rise, causing the economy to slow down.

Adjusting the Reserve Requirement Ratio

Within limits established by Congress, the Federal Reserve has the discretion to raise or lower the legal reserve ratio for commercial banks. Recall that if the Fed reduces the reserve ratio, then banks will have additional excess reserves that they can lend out, and the money supply may be expanded by an amount equal to excess reserves

times $\frac{1}{r}$. If banks are can hold less of their deposits as reserves, they will have more money to lend out. More borrowing means more spending, and faster growth in GDP. On the other hand, increasing the reserve ratio will reduce the amount of excess reserves that banks can lend out and will result in a contraction of the money supply by an equivalent amount. If banks are required to hold more of their deposits as reserves, they will have less money to lend out. Less borrowing means less spending, and slower growth in GDP. Therefore, the ability to set the reserve ratio becomes an instrument of monetary policy to the extent that the reserve ratio effects the money supply.

As noted earlier in the lesson, the Fed currently requires a reserve ratio of 10 percent. However, it has not changed that level since 1980 because it is too expensive for banks to make the programming changes necessary to accommodate frequent changes, and the banking system as a whole holds enough excess reserves that raising the required reserve ratio to say, 12 or 13 percent would have minimal impact. Thus, changing the required reserve ratio is not an effective monetary policy tool.

Adjusting the Discount Rate

What would happen to a commercial bank that lends out so much money that they do not have enough on hand to meet their required reserves? In other words, in our example of the LNB that had required reserves of $100 and could lend out $900, what would happen if the bank made of loan of $950 and found at the end of the day that they only had $50 in actual reserves? When commercial banks are short on reserves, they can borrow from a Federal Reserve Bank. Remember that when banks borrow money from the Fed, the interest rate they pay is known as the **discount rate**.

When the discount rate is low, the Fed encourages borrowing by member banks, which tends to expand the money supply. If I lend out $50 dollars too many to a bank customer and charge him 6% interest, and the Fed sets the discount rate at 2%, it makes sense for me to just borrow the $50 from the Fed to make up my required reserves. In effect, low discount rates encourage commercial banks to loan out their required reserves and then borrow the reserves back from the Fed. Obviously, the more loans that banks make, the higher the money supply, as discussed in the section on money creation.

When the discount rate is high, the opposite is true. High discount rates discourage banks from borrowing from the Fed, and banks will therefore be more cautious in making loans. As banks make fewer loans, the money supply falls. Because the money supply rises or falls as the discount rate is lower or higher, the discount rate becomes an instrument of monetary policy. The Feds ability to manipulate the discount rate allows it to also manipulate the money supply.

Since the discount rate is always set above the Fed Funds rate, banks can typically borrow as much as they want at a lower interest rate from other banks, rather than borrowing from the Fed. Furthermore, the Fed has no control over when or how much banks will borrow at the discount rate. Consequently, changing the discount rate is not an effective monetary policy tool.

Remember: You should not confuse the Discount Rate with the Federal Funds Rate. The discount rate is the interest rate that the Federal Reserve charges member banks when these banks borrow money from the Fed. The Federal Funds Rate is the rate that one commercial bank charges another commercial bank when banks borrow money from each other. The Federal Funds Rate is sometimes called an overnight rate because banks usually borrow money from each other for very short periods of time—sometimes just overnight.

Non-traditional Monetary Policy

The Fed can also use open-market operations to purchase government bonds directly from other banks and financial institutions in a process known as **quantitative easing (QE)**. During the slow economic times of 2008-2011, the Fed resorted to this type of tool on several occasions. Even though it had lowered interest rates through open market operations, the Fed did not feel that there was sufficient growth occurring in the U.S. economy. As a result, it started three QE programs in order to flood the economy with liquidity.

To begin a QE program, the Fed first credits its own balance sheet with additional money. In essence, it simply creates money for itself by adding a lump-sum amount to its balance sheet. The Fed can legally do this under the Federal Reserve Act. These include three rounds of quantitative easing (QE).

Quantitative Easing 1 (QE 1): From December 2008 - August 2010, the Fed purchased $300 billion of longer-term Treasury securities, $175 billion in housing-related agency debt from Fannie Mae and Freddie Mac, and $1.25 trillion of **mortgage-backed securities,** which are a pool of mortgages or contractual debt obligations that were packaged together as a security or bond by financial institutions and then sold to investors. They were seen as being a good investment since housing prices were rising. However, these mortgage-backed securities became toxic when housing prices started to fall and defaults on mortgages increased. Now, investors did not know if the mortgages in their package of mortgages were good mortgages or not. Therefore, the Federal Reserve purchased these mortgage-backed securities to take them out of the hand of investors to help stabilize the financial system. By purchasing these mortgage-backed securities it increased the amount of money in the financial system.

By purchasing long-term Treasury securities, the Federal Reserve was able to put downward pressure on mortgage rates. This was seen as an effort to stimulate the housing sector of the economy and help those that already had mortgages. It allowed some homeowners to refinance their mortgages at lower rates allowing them to have more money to spend on other goods and services. Notice, that the Federal Reserve continued to purchase long-term Treasury securities in all three QEs.

Quantitative Easing 2 (QE 2): In QE2 from November 2010 - June 2011, the Fed purchased an additional $600 billion of long-term U.S. Treasury securities.

Quantitative Easing 3 (QE 3): Starting in September 2012, the Federal Reserve began purchasing $40 billion per month of mortgage-backed securities. In January 2013, the extended this to include purchasing long-term Treasury securities at a pace of $45 billion per month. This means that the Federal Reserve is putting $85 billion into the economy every month through this program. As of June 2013 the program is still ongoing.

The QE programs always carry considerable risk. First they are a signal that the economy is in pretty bad shape, and the Fed is resorting to fairly extreme measures. Second, even though banks have a huge amount of money, they may still not lend it out. Banks may be skeptical of borrowers' ability to repay when overall economic conditions are still tepid. Third, if the Fed overshoots the amount of money it should put into the economy, it can result in a significant level of inflation. If high inflation is coupled with a high unemployment rate (a condition known as **stagflation**), then it is extremely difficult for policy makers to fight.

There are other actions the Federal Reserve has taken during and after the Great Recession. They have all been done in response to the financial crisis, economic downturn, and the slow growth after the Great Recession. They will not be discussed in this lesson.

Section 4: Monetary Policy Impacts

In the previous section, the different tools of monetary policy were discussed. In this section we focus on the impacts of monetary policy. When the Federal Reserve buys and sells government bonds (treasury securities) to target the Federal Funds rate it changes the money supply. Changes to the money supply enter into the Aggregate Expenditure and the AD/AS models through the effect on interest rates. Changes to the interest rate then lead primarily to changes in I (business investment), although interest rate changes also affect C, G and NX to some degree.

A decrease in the money supply would cause the interest rate to rise; an increase in the money supply would lower the interest rate. The change in the interest rate as the Fed exercises monetary policy will either increase investment and interest sensitive consumption (if the interest rate falls) or decrease investment and interest sensitive consumption (if the interest rate rises). Since investment and consumption are two components of Aggregate Demand, a change in investment and consumption will either stimulate (if investment and consumption go up) or contract (if investment and consumption go down) AD.

Shifting AD to the right will expand the economy (GDP will increase), cause inflation (price level increases), and decrease unemployment. Shifting AD to the left will contract the economy (GDP will decrease), cause reductions in inflation, and increase unemployment. The graph below illustrates the impact of monetary policy on the economy using the AD/AS model.

One–Period Model (Static) – AD/AS

The graph below illustrates a one–time period model where maroeconomic equilibrium is at potential GDP (GDP=LRAS), where macroeconomic equilibrium is above potential GDP (GDP>LRAS), and where macroeconomic equilibrium is less than potential GDP (GDP<LRAS). One of the purposes of macroeconomics policy is to get macroeconomic equilibrium to potential GDP (LRAS). Monetary policy works through the aggregate demand curve (AD). Expansionary monetary policy includes decreasing interest rates by purchasing Treasury securities, which shifts the aggregate demand curve to the right. Contractionary monetary policy includes increasing interest rates by selling Treasury securities, which shifts the aggregate demand curve to the left. If the economy is overheated (GDP>LRAS) then contractionary monetary policy is usually undertaken to cool down the economy. If the economy is struggling (GDP<LRAS) then expansionary monetary policy is usually undertaken to try and heat up the economy. Watch what happens to equilibrium price level and real GDP when expansionary and contractionary policies are implemented. The arrows in the table indicate if the equilibrium price level and real GDP has increased (↑), decreased (↓), or stayed at the same value (⟷).

LRAS

GDP=LRAS | GDP>LRAS | GDP<LRAS

Monetary Policy (Shifts in AD)

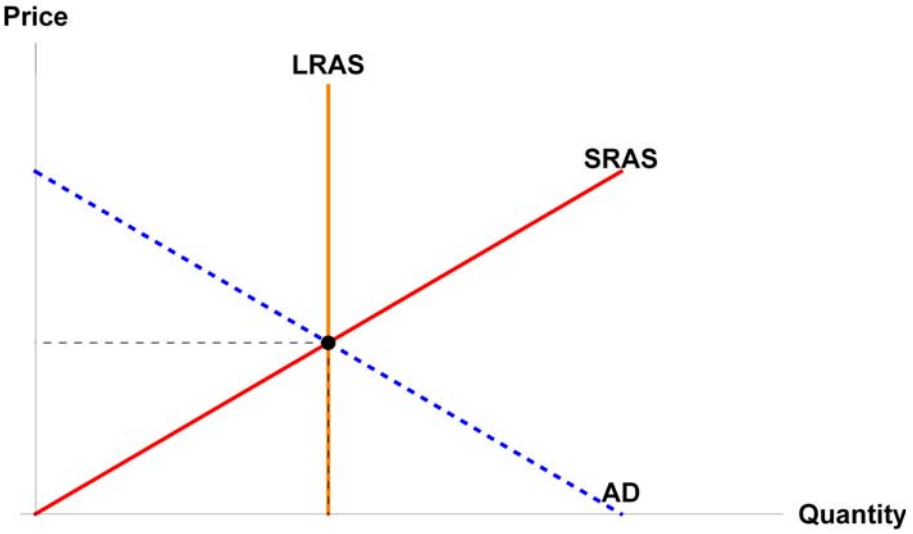
Contr.....Expans.

Shifts in SRAS

Left.....Right

	↑,↓,⟷
Eq. Price Level =	⟷
Eq. Real GDP =	⟷
Unemployment Rate =	⟷

Reset



Expansionary Monetary Policy

Typically, expansionary monetary policy is undertaken if the Fed thinks that unemployment is rising too sharply. This expansionary monetary policy designed to stimulate output and reduce unemployment.

If the Fed pursues an easy monetary policy or expansionary monetary policy (i.e., increasing the money supply), it could:

a. Lower reserve requirements

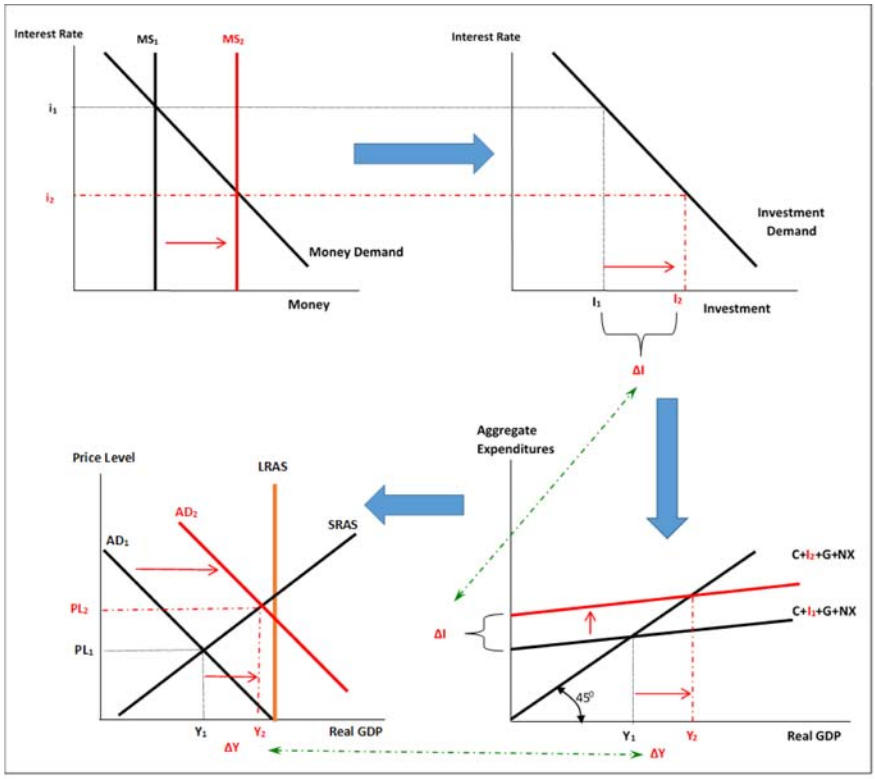
b. Lower the discount rate

c. Transact open market purchases--this has the effect of shifting money from the Fed to banks by increasing bank reserves. The Fed Funds rate is decreased and subsequently other interest rates will fall as well. The primary impact on the macro-economy is to increase Investment spending by businesses and shift the aggregate demand curve to the right, increasing RGDP and potentially reducing unemployment. The Fed would primarily use this tool to

stimulate a weak economy and to pull it out of a recession. This process is illustrated in the graphic below.

Expansionary Monetary Policy

In the figure below, start at the upper left–hand corner. The Federal Reserve decides to pursue expansionary monetary policy. They buy government bonds (treasury securities). This shifts the money supply to the right and interest rates drop. This is shown in the first graph. In the second graph, the lower interest rates increase the level of investment. In the third, graph the increase in investments shifts the aggregate expenditure curve up. GDP increases. In the fourth graph, since the aggregate expenditure curve shifted up the aggregate demand (AD) curve shifts right. This results in higher levels of GDP and a higher price level.



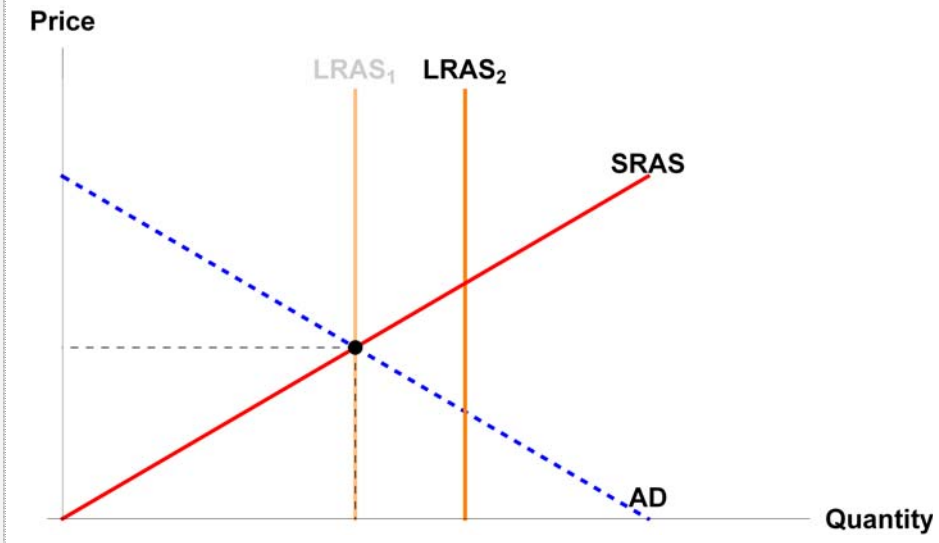
(Optional) The graph below illustrates the impact of monetary policy in a two-time period (dynamic) model. Notice that for expansionary monetary policy the Federal Reserve will buy government bonds (Treasury securities). By buying the securities the Federal Reserve is increasing the money supply which leads to AD shifting right. The exact process is illustrated in the graphic above.

Two–Period Model (Dynamic) – Expansionary Monetary Policy

The graph below illustrates a two–period model. We use it to help us understand how expansionary monetary policy will impact unemployment, GDP, and inflation. We are currently in period 1. Each scenario forecasts what the economy will be like in period 2. In scenarios 1 (slow economic growth) and 2 (recession), the Federal Reserve can enact expansionary monetary policy (decreasing interest rates by purchasing Treasury securities) to combat the problem. After clicking on 'AD Period 2' and 'SRAS Period 2' under scenarios 1 and 2, select 'Buy Securities' to see how the forecast for period 2 changes. The purpose of expansionary monetary policy is to increase the growth rate of GDP and decrease unemployment rates. The cost of expansionary monetary policy is higher inflation rates.

Scenario 1: Slow Growth
Forecast
AD Period 2 | Reset
SRAS Period 2 | Reset
Policy Response
Buy Securities
Reset

Scenario 2: Recession
Forecast
AD Period 2 | Reset
SRAS Period 2 | Reset
Policy Response
Buy Securities
Reset



Contractionary Monetary Policy

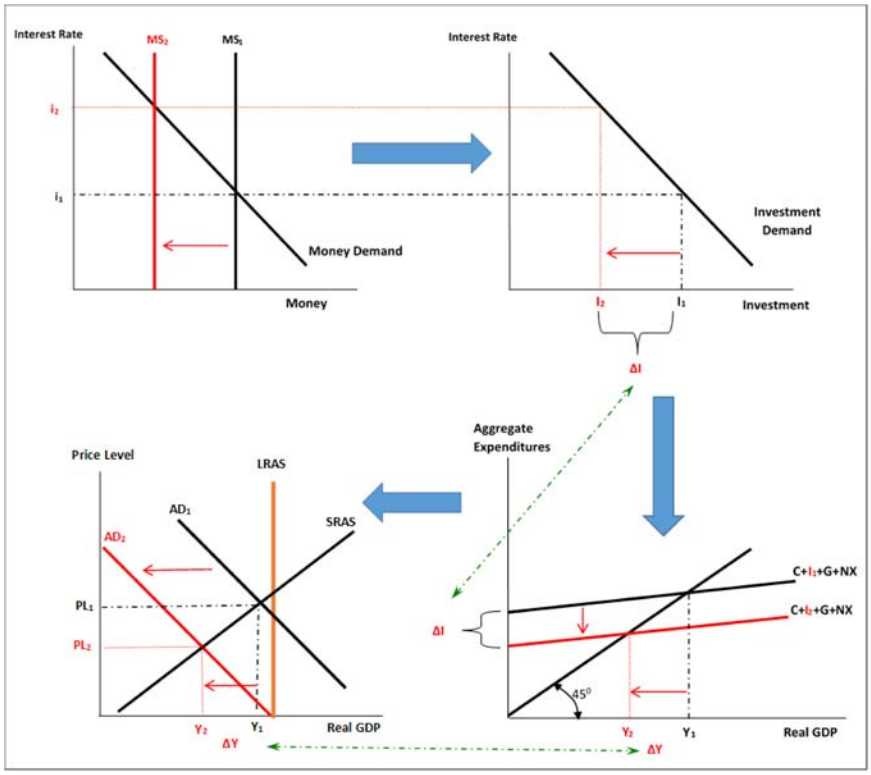
Typically, contractionary monetary policy is undertaken if the Fed thinks that inflation is too high in the economy. This contractionary monetary policy is designed to reduce the price level.

To accomplish this tightening of monetary policy or contractionary money policy (i.e., reducing the money supply), it could:

a. Raise reserve requirements
b. Raise the discount rate
c. Transact open market sales—this has the effect of shifting money from banks to the Fed by decreasing bank reserves. The Fed Funds rate is increased and subsequently other interest rates will rise as well. The primary impact on the macroeconomy is to reduce investment spending by businesses and shift the aggregate demand curve to the left, reducing RGDP and potentially raising unemployment. The Fed would primarily use this tool to fight inflationary pressures. This process is illustrated in the graphic below.

Contractionary Monetary Policy

In the figure below, start at the upper left–hand corner. The Federal Reserve decides to pursue contractionary monetary policy. They sell government bonds (treasury securities). This shifts the money supply to the left and interest rates increases. This is shown in the first graph. In the second graph, the higher interest rates decrease the level of investment. In the third, graph the decrease in investments shifts the aggregate expenditure curve down. GDP decreases. In the fourth graph, since the aggregate expenditure curve shifted down the aggregate demand (AD) curve shifts left. This results in lower levels of GDP and a lower price level.



(Optional) The graph below illustrates the impact of monetary policy in a two-time period (dynamic) model. Notice that for contractionary monetary policy the Federal Reserve will sells government bonds (Treasury securities). By selling the securities the Federal Reserve is decreasing the money supply which leads to AD shifting right. The exact process is illustrated in the graphic above.

Two–Period Model (Dynamic) – Contractionary Monetary Policy

The graph below illustrates a two–period model. We use it to help us understand how contractionary monetary policy will impact unemployment, GDP, and inflation. We are currently in period 1. Each scenario forecasts what the economy will be like in period 2. In scenarios 1 (demand–pull inflation) and 2 (cost–push inflation), the Federal Reserve can enact contractionary monetary policy (increasing the interest rate by selling Treasury securities) to combat the problem. After clicking on 'AD Period 2' and 'SRAS Period 2' under scenarios 1 and 2, select 'Sell Securities' to see how the forecast for period 2 changes. The purpose of contractionary fiscal policy is to slow the growth rate of prices (inflation). The cost of contractionary policy is lower GDP and higher unemployment. If demand–pull inflation exists then we would just expect lower economic growth than forecast. For cost–push inflation it could potentially make the economy grow even slower. This makes fixing cost–push inflation tricky.

Scenario 1: Demand–Pull Inflation

Forecast

AD Period 2 | Reset

SRAS Period 2 | Reset

Policy

Sell Securities

Reset

Scenario 2: Cost–Push Inflation

Forecast

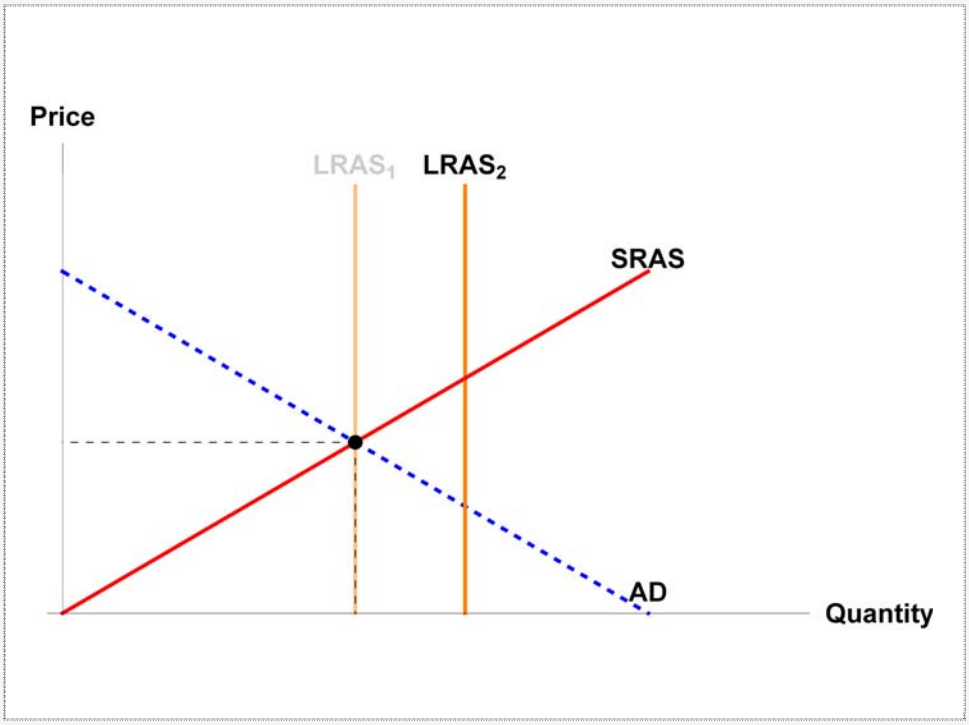
AD Period 2 | Reset

SRAS Period 2 | Reset

Policy

Sell Securities

Reset



Section 5: Monetary Policy Issues

While implementation of monetary policy actions are fairly easily understood, the results of the policy actions are much more difficult to define. As you can imagine, there are many different thoughts about the effectiveness of monetary policy. If, indeed, it was as simple as discussed above, we would not have had the economic slowdown beginning in 2008, or it would have been much more short-lived.

Much of the debate surrounding the effectiveness of monetary policy develops from the same perspectives surrounding fiscal policies. That is, if you believe that government should be actively engaged in managing the economy, then you tend to fall into a Keynesian camp. If you believe that the market is better left to fend for itself with minimal government intervention, you tend to fall into a more Classical economic school of thought. Note the differences discussed below, as they relate to the effectiveness of monetary policy.

1. **Keynesian View:** Monetary policy, particularly in the form of open market operations, can and should be used to fight inflationary and recessionary tendencies in the economy. Occasionally monetary policy may need to be supplemented by fiscal policy to be fully effective.

Furthermore, many economists believe that markets are inherently unstable and have failed in that they do not fully address such issues as equity, fairness, poverty, corruption, education, health, and environmental protection. They

further believe that government should take an active role in protecting the people against the unfettered market and alleviating these issues. While monetary policy does not directly address all of these issues, it can create jobs or dampen inflation by attempting to stabilize markets, which in turn provides incomes and opportunities for the population. If this view is adopted, then activist government intervention in both monetary and fiscal policy areas can be rationalized in order to correct such inequalities and problems. Market instability then is taken as the primary reason why capitalism should be reigned-in, regulated, managed or controlled, and Keynesian economics is the tool used for this purpose.

2. **Classical View:** The Classical economic school, as developed by Adam Smith, David Ricardo, John Stuart Mill and others holds that monetary policy cannot be used to solve problems of income, output and employment. Classical monetary policy is best exemplified in the **Equation of Exchange**:

M x V = P x Q

where
M = money supply,
V = **velocity of money-** velocity at which money moves from transaction to transaction (i.e., how fast money is exchanged)
P = price level
Q = output or GDP at full employment

In the Classical theory, velocity is considered fixed throughout the economy, and the economy generally operates at full employment levels, if government does not interfere with prices and wages. That is, if prices and wages are allowed to flex with on-going market demand and supply conditions, then producers, consumers and workers will all find the correct market positions. Cyclical unemployment will be virtually eliminated, and the economy will operate at consistent full output levels. Since V and Q are fixed, any change in the money supply (M) must mean a corresponding change in the price level, with no effect on the amount of output or employment levels. Thus there is no need for government monetary policy intervention because it will only affect prices unnecessarily.

Classical economists would also assert that activist fiscal policy has virtually no role either, since under the equation of exchange the economy maintains itself at full employment. Hence, there is no need for taxation and spending programs by government, other than for national defense, basic education, basic infrastructure development, and maintenance of rights and contracts. Classical economic positions also hold that it is government interference that causes the negative impacts on the economy and prevent markets from reaching their natural equilibrium points. They believe that markets are in fact stable and that it is the government inefficiency that really creates market instability. Regulation, taxation and spending programs, political cronyism, lack of accountability, and decision-making simply to win the next election are some of the primary sources of social problems faced by Americans. They argue that if government would allow markets to operate normally, many of today's social issues could be solved. A welfare state disrupts private incentives, leads to a rise in moral hazard, and the dissolution of public virtue. They content that markets are much more efficient than government and create the only real means of economic prosperity.

3. **Monetarist View**: Monetarists adopt the equation of exchange, but hold that velocity is "stable" but not fixed. That is, velocity changes gradually over time in accordance with people's perception of the changes in the macro-economy. Because of this stability, then the equation of exchange allows for a predictable relationship between the money supply and GDP, which in the equation is equal to PxQ. Thus monetarists say that the money supply is the single most important factor in regulating the economy. Consequently, the central bank should take steps to increase the money supply at a steady and known rate, referred to as adopting a Constant Growth Rate Rule, approximately equal to the growth rate of the economy, and not attempt to fine-tune the money supply. Monetarists tend to believe that the Fed, with its operating policies hidden from public view, creates too much uncertainty, and injects markets with too much risk. As a result, Monetarists tend also to adopt many of the other social/political positions of the Classical economists.

4. **Other Views:** There are a number of other schools of economic opinion that discuss the relative merits of fiscal and monetary policy actions. These include the **New Keynesians**, the **Real Business Cycle proponents**, the **New Classicals**, the **Supply-Siders**, and several others. All of them have specific ideas and theories about how the economy works, and the ability and desirability of activist government intervention. As you have probably guessed

by now, much of the debate centers on positive and normative ideas about what creates market stability, efficiency, incentives, and opportunities.

Summary

Key Terms

Adjusting Reserve Requirement Ratio
Assets
Banks
Banks Create Money
Ben Bernanke
Board of Governors
Chairman of the Fed
Classical View
Contain Systemic Risk
Contractionary Monetary Policy
Credit Unions
Deposit at a Federal Reserve Bank
Depository Financial Institutions (DFI)
Equation of Exchange
Excess Reserves
Expansionary Monetary Policy
Fed
Federal Funds Rate
Federal Open Market Committee
Federal Reserve
Federal Reserve Act of 1913
Federal Reserve System
FOMC
Formula of the Maximum Amount of Money Created
Fractional Reserve
Fractional Reserve Banking System
Implement Monetary Policy
Keynesian View
Liabilities
Maximum Amount of Money Created
Model Assumptions
Monetarist View
Monetary Policy
Net Worth
New Classicals
New Keynesians
Open Market Operations
Presidents of the Federal Reserve District Banks
Primary Dealers
Provide Financial Services
Quantitative Easing (QE)
Quantitative Easing 1 (QE 1)
Quantitative Easing 2 (QE 2)
Quantitative Easing 3 (QE 3)

Quasi-public Bank
Real Business Cycle Proponents
Required Reserve
Required Reserve Ratio
Reserve Ratio
Reserve Requirements
Reserves
Simple Money Multiplier
Stagflation
Supervise and Regulate Banking Institutions
Supply-Siders
Three Goals of Banks
Thrift Institutions
Total Potential Money Expansion
Treasury Securities
Twelve Federal Reserve District Banks
Vault Cash
Velocity of Money