Monetary policy notes

1. The Federal Reserve

The central bank is the institution in each country that carries out monetary policy and regulates the banking system. It performs some functions of a bank—in a way, it is a bank for banks—but we shouldn't really think of it as a bank.

> (*def.*) **monetary policy**: the use of the central bank's control of the money supply and interest rates to influence the path of the economy over time.

In the U.S., the central bank is called the "Federal Reserve," or just the "Fed."

2. Bank runs

Although banks sometimes go out of business, bank runs no longer happen in the U.S. (and in most countries) because there are two safeguards in place.

(1) The Federal Deposit Insurance Corporation (FDIC) is an independent agency in the federal government (and so it is not a part of the Federal Reserve Bank). It insures all bank deposits up to $250,000. Thus, as long a person has less than $250,000 in an FDIC insured account, that money won't be lost, even if the bank goes out of business. As a result, there is no need to run to the bank if there is a rumor that the bank's assets are less than its deposits.

(2) The Federal Reserve will, if necessary, make loans to banks when either (*i*) a bank needs money to cover any immediate transactions for which it does not have sufficient reserves or (*ii*) a bank does not have enough cash on hand to meet the reserve requirement.

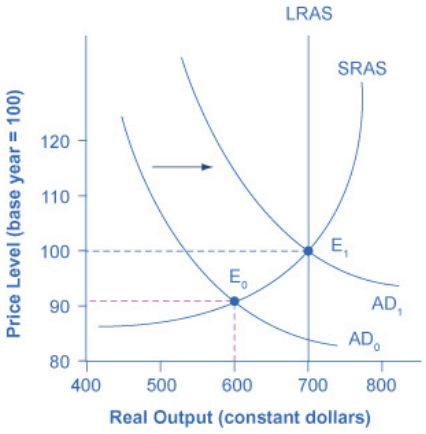
(3) The Federal Reserve also sets the reserve requirements for banks.

3. The AD-AS model and interest rates (or "What else can the Fed do?")

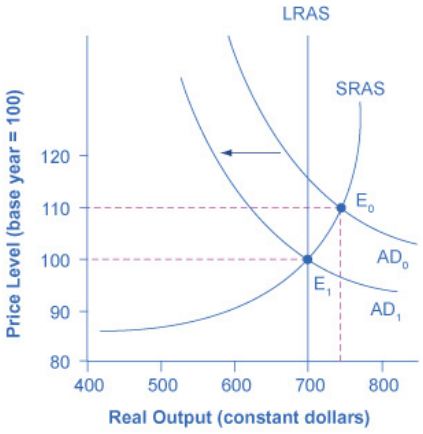
the factors that change aggregate demand (organized by GDP category)	
cause a decrease in aggregate demand	cause an increase in aggregate demand
consumption rise in taxes fall in income **rise in interest rates** desire to save more decrease in wealth fall in future expected income	*consumption* decrease in taxes increase in income **fall in interest rates** desire to save less rise in wealth rise in future expected income
investment fall in expected rate of return **rise in interest rates** drop in business confidence	*investment* rise in expected rate of return **drop in interest rates** rise in business confidence
government spending reduction in government spending	*government spending* increase in government spending
net exports decrease in foreign demand relative price increase of U.S. goods	*net exports* increase in foreign demand relative price drop of U.S. goods

As shown in the table, lowering interest rates will increase aggregate demand—by increasing consumption and investment. And raising interest rates will do the opposite: decrease aggregate demand by decreasing consumption and investment. An increase in aggregate demand, as you know, will increase GDP and lower unemployment (and also increase the price level). A decrease in aggregate demand will lower the price level (and also decrease GDP and raise unemployment).

Thus, if the Fed can raise or lower interest rates (which it can), then it can increase or decrease aggregate demand and affect GDP, unemployment, and the price level.



(a) Expansionary monetary policy

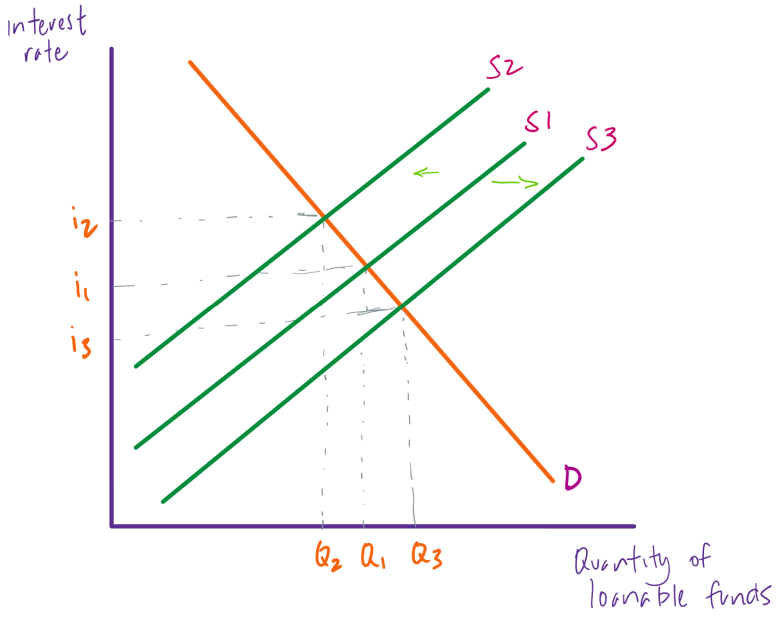


(b) Contractionary monetary policy

(from p. 367)

4. How does the Fed control interest rates?

This is supply and demand for loanable funds. The "interest rate" is on the vertical axis. Of course, there is not a single interest rate, but, in general, we expect that the interest rates on savings deposits, most types of loans (mortgages, car loans, business loans, and so forth) and on bonds to move up and down together.



Now that we are familiar with the bank balance sheet, we can see more precisely where both the supply of loanable funds and the demand for them are found. The supply of loanable

funds is the amount of money that the bank has above its reserve requirement. So, for instance, if there is a 10 percent reserve requirement and a bank has $3,439 in deposits, then it must keep 10 percent of $3,439 or $343.90 as reserves. It can lend the rest, which, in the example right below, will be $656.10 (i.e., $1,000 – 343.90 = 656.10). The demand for loanable funds, meanwhile, comes from anyone or any firm that wants to take out a loan.

Assets ($)		Liabilities ($)	
reserves	1,000	deposits	3,439
loans	2,439		
total	3,439		3,439

Consulting the graph, we can see that, as the supply of loanable funds increases, the interest rate will decrease. This, then, will increase loans and aggregate demand (i.e., the quantity of goods and services demanded). Conversely, as the supply of loanable funds decreases, the interest rate increases. This will decrease the quantity of loans and aggregate demand.

So, if the Fed can increase or decrease the money supply, and in particular, the supply of loanable funds, then it will be able to affect interest rates, which will affect aggregate demand. It can increase or decrease the money supply. But how? There are two ways (actually, there are more than two, but we'll focus on two).

(1) One way that the Fed can change the money supply is by changing the reserve requirement for all banks.

If the reserve requirement is 10 percent and a bank's reserves are $1000, then it can multiply that amount into $10,000 of deposits (assuming that loans are, themselves, deposited). So, the money supply (in this bank) is $10,000:

$$\frac{1}{.10} \times 1000 = 10 \times 1000 = 10{,}000$$

If the Fed lowers the reserve requirement to 8 percent, then banks won't have to keep as much money as reserves and they can increase their lending. (They don't have to increase, but they

can; and since banks make money by making loans, they tend to loan as much as they can—although there are sometimes factors that make them more cautious.) Now, if the bank makes the maximum amount of loans, the money supply (in this bank) can increase to $12,500:

$$\frac{1}{.08} \times 1000 = 12.5 \times 1000 = 12{,}500$$

Alternatively, if the Fed raises the reserve requirement to 12 percent, then the money supply in our example will fall to $8,333:

$$\frac{1}{.12} \times 1000 = 8.333 \times 1000 = 8{,}333$$

So, when the reserve requirement goes down, the money supply increases. And when the reserve requirement goes up, the money supply decreases.

(2) The second way that the Fed can change the money supply is by engaging in "open market operations."

Before getting to open market operations, however, we have to investigate how bonds are bought and sold.

(*def.*) **bond**: A loan that includes an agreement to pay a fixed amount until the end of the loan period.

Here is a description of bonds that MSU made available to investors in 1981 to raise money for building some student housing.

> ***1981 Student Housing Revenue Bond of 1981***
> – MSU issued bonds totaling $2,038,000 in December, 1981 (Series 1981) for the constructing of married student apartments and housing for graduate students on the main campus of MSU. Outstanding coupons bear interest at a rate of 3.00% with a final maturity in December, 2021

If someone bought one $100 MSU bond, then every six months, this person would get $1.50 (and so $3 or 3 percent per year). This would continue for 40 years, at which point, the person

would get his or her $100 back. For loaning MSU the $100 back in 1980, the bondholder would earn $120 (i.e., $3 every year for 40 years would come to $120).

Now, let's say that you (or your parent or grandparent) bought this bond back in 1981. You get your $1.50 every six months, but then, after 10 years (in 1991), you need some cash, and so you decide to sell it on the *secondary bond market*. The person who buys this bond will get the payments every six months, and he or she will also get your $100 back in December 2021. So, in total, this bond is worth $190:

$$\$3 \times 30 \text{ years} = \$90 + \$100 = \$190.$$

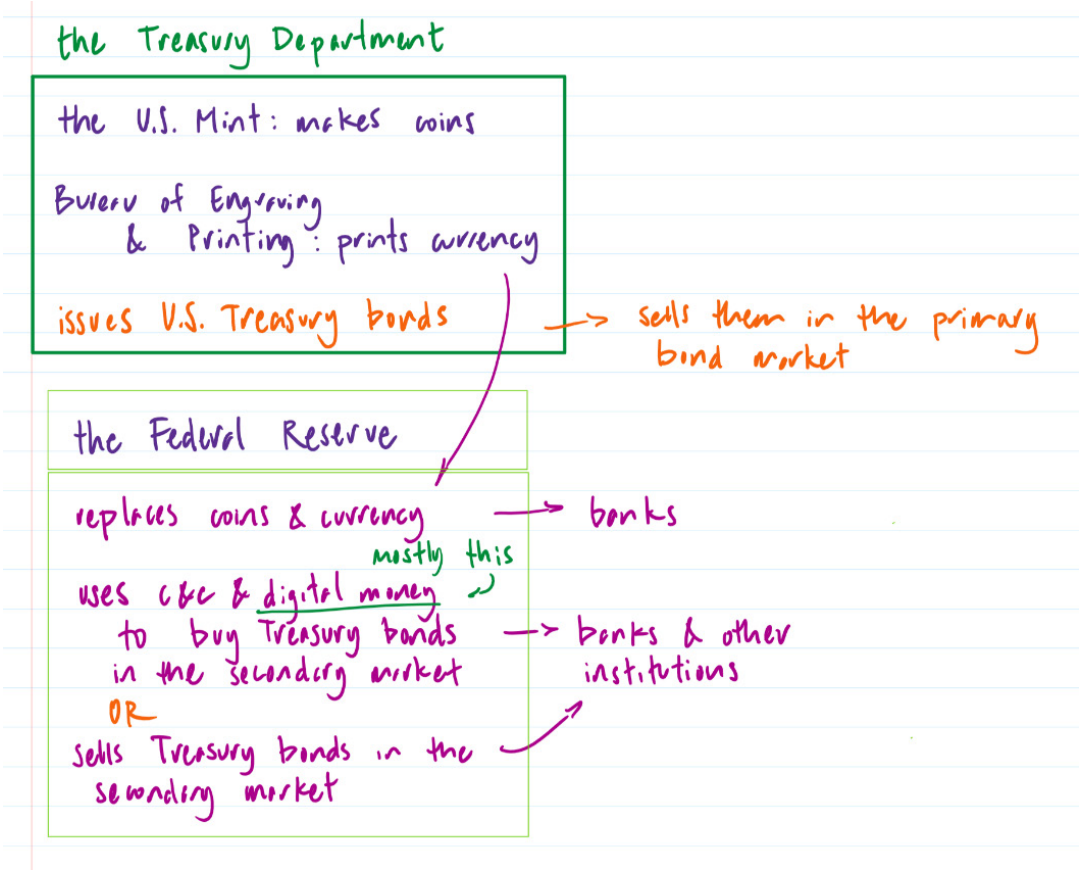
How much should someone pay for this bond? (Not $190 because then this person would just, eventually, get back exactly what he or she paid for it. The idea is to pay less than this amount, and then make some money from the purchase.) How much someone pays would depend on the other investment opportunities that are available and how safe an MSU bond is believed to be in 1991. (One risk of buying a bond is that the issuer, MSU in this case, might not be able to continue making interest payments or pay back the value of the bond. In other words, the issuer might default.) In any case,

Paying $100 would mean 3 percent interest for 30 years.
Paying *less* than $100 would mean *more* than 3 percent for 30 years.
Paying *more* than $100 would mean *less* than 3 percent for 30 years.

For instance, if someone bought the bond for $85, then this person would, in total, earn $105 ($90 from the interest payments plus $15 when the $100 was paid back). This, in effect, would be equivalent to earning $3.50 or 3.5 percent per year for the 30 years.

All this said, what we care about are U.S. Treasury bonds which are 30-year bonds, usually with an interest rate of about 2 percent. (So, instead of MSU issuing the bond, the Treasury department does for the purpose of borrowing money for the federal government.) As this diagram (below) of some of the responsibilities of the Treasury Department and the Federal Reserve Bank shows, Treasury bonds start their life when they are issued by the Treasury Department. These bonds can be held by one person until they mature, or as we discussed with the MSU bond, it can be sold before it matures to some other person (or it can be sold many

times). This buying and selling of Treasury bonds that have already been issued occurs in the *secondary bond market*, and the Federal Reserve can get involved there.



Now, back to open market operations. Let's say that this is the balance sheet for a bank, which has a 10 percent reserve requirement. Since banks are earning interest on their loans while paying a lower rate of interest to depositors, a bank can have assets that are greater than its liabilities. Since U.S. Treasury bonds are believed to be a very safe investment—meaning that the U.S. government will almost certainly always repay the loans and make the interest payments, U.S. Treasury bonds are believed to be a very safe investment. In addition to its reserves and loans, this bank is holding Treasury bonds, which can serve as an investment and a hedge against loans going bad.

Assets ($)		Liabilities ($)	
reserves	1,000	deposits	10,000
Treasury bonds	500		
loans	9,000		
total	10,500		10,000
net worth	500		

Now, the Fed buys $200 worth of Treasury bonds from the bank. This means that the bank's reserves increase by $200 and its bond holdings decrease by the same amount.

Assets ($)		Liabilities ($)	
reserves	1,200	deposits	10,000
Treasury bonds	300		
loans	9,000		
total	10,500		10,000
net worth	500		

Since it is holding more than it is required to hold in its reserves, this bank will lend the excess: $200. If, after this money has been lent, it is deposited (which will bring deposits to 10,200 and reserves back to $1,200), then new loans can be made, and the process can repeat itself many times. With $1,200 in reserves and a 10 percent reserve requirement, the bank will eventually be able to get to $12,000 in deposits and $10,800 in loans.

Assets ($)		Liabilities ($)	
reserves	1,200	deposits	12,000
Treasury bonds	300		
loans	10,800		
total	12,300		12,000
net worth	300		

So, by buying bonds in this way, the Fed has increased the money supply, and in particular, the supply of loanable funds. This increase to the supply of loanable funds shifts this curve to the right, which will increase the amount of money that is lent and lower interest rates.

By selling bonds to the bank, the Fed can do the reverse. When the bank buys bonds, the money it is holding as reserves is lowered, and so it will have to move some money from loans to reserves. Since loans are always being repaid, a bank can shift money from loans to reserves by slowing down the amount of new lending or halting lending altogether for a period. (Normally, it would not make this shift by selling any of its loans.) This decrease to the supply of loanable funds will raise the interest rate.

When the Fed engages in buying and selling bonds so that it can affect the money supply, what we see in the news is "the Fed is raising [or lowering] interest rates." It's not, however, directly controlling interest rates (and it can't). It can only buy and sell Treasury bonds. But it does this buy and selling with the intention of moving a specific interest rate called the "federal funds rate."

> (*def*.) **Federal funds rate**: the interest rate that banks charge when they make short-term loans to each other; these are usually overnight loans, which a bank might get to meet its reserve requirements (p. 377).

The federal funds rate is not an interest rate that an individual or a firm will ever have on a loan, but it indirectly affects the interest rates that we do have on loans, as well as the interest we earn by depositing money in savings accounts. So, if the federal funds rate is rising, other interest rates will rise. And if it is falling, other interest rates will fall.

5. Monetary policy

A monetary policy that lowers interest rates and stimulates borrowing is an **expansionary monetary policy** or loose monetary policy. Conversely, a monetary policy that raises interest

rates and reduces borrowing in the economy is a **contractionary monetary policy** or tight monetary policy.