

LECTURE X

THE MONEY SUPPLY AND MONETARY SYSTEM

We will discuss the role of money, how it functions within the framework of the economy and how the monetary authority (the Federal Reserve) influences the level of economic activity. The first thing I want to do is talk about the demand for money. Money is the medium of exchange that is used to lubricate the economy. Exchange, which would involve bartering in a nonmoney economy, can take place much more easily and efficiently with the use of money because money allows for the separation of buying and selling. Money allow you to buy at one point and sell at another point. Thus, the advantages of money on the economy ought to be clear.

The disadvantages of money in the economy also ought to be clear. For one thing, money does not always maintain a constant value; which means that it could affect the economy.

We can consider total economic activity within the economy from the point of view of the amount of money that is circulating in the economy. For instance, suppose we take the money supply (forgetting how that is defined). At this time there are so many dollars circulating in the form of currency, checking deposits and other demand deposits which are simply credits that people possess in banks. So, at any moment in time there is only so much money in circulation. Today, that is around \$550 billion Notice that at around \$1.5 trillion GNP is considerably higher than the supply of money. Why is it that the money supply is so much smaller than GNP?

EJD. IT IS NOT NECESSARILY DESIRABLE TO HOLD MONEY. THEREFORE, SINCE THE MONEY IS IN CIRCULATION THERE IS A MULTIPLIER EFFECT ...

No, not the multiplier, looking at it from the point of view of the money supply. Remember the GNP can be expressed in the form of quantity of real goods multiplied by the average price of those real goods (PQ). The money supply is a "stock" figure; the GNP is a figure for a period of time.

What do you know about the relationship between the stock of money and the GNP, the total expenditure for the total goods and services generated? The money keeps circulating -- it has VELOCITY.

VELOCITY IS DEFINED AS THE NUMBER OF TIMES THE MONEY TURNS OVER DURING THE TIME PERIOD IN WHICH GNP IS GENERATED.

This is not quite the same thing as the multiplier, which refers to the extent to which a given type of expenditure generates income. In this case, we are looking at it from another point of view. That is, the money supply times the velocity (MV). We can then look at the economy from this point of view and say that that is active demand. We can also look at GNP in terms of being the quantity of goods and services available for sale and the average price as aggregate supply.

The question is, suppose aggregate demand increases either because the velocity of money has increased or because the money supply has increased or because of a combination of the two. If aggregate demand increases what has to happen to the equation  $MV = PQ$ ?

EJD. THE PRICE WILL RISE, OR THE QUANTITY OF GOODS WILL RISE, OR SOME COMBINATION OF THE TWO.

If there are resources available so that the economy can expand, then an increase in aggregate demand could conceivably produce an increase in output without an increase in the price level. If, on the other hand, you are operating at close to full employment (where many industries are at or close to capacity), then an increase in the aggregate demand might produce no increase in the quantity of output but only an increase in the price of output.

Increase in Money Supply and Inflation/Output.

What happens as a result of an increase in aggregate demand depends upon the circumstances. If you have a substantial amount of unemployment in the economy, then increasing the money supply to a certain degree could produce an increase in output. If, on the other hand, you increase the money supply too much you may have some of an increase in output and the price level -- you have a little of both. If you are at full

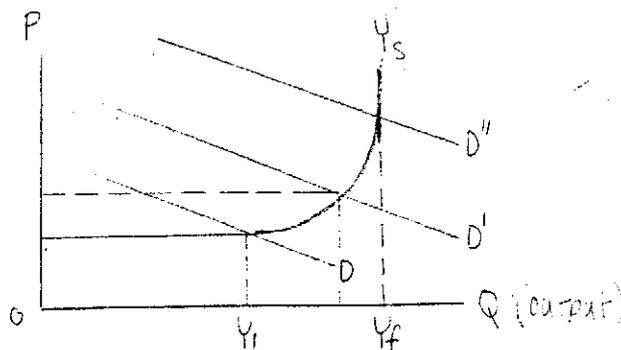
employment already and the money supply or the velocity increases then you could have an increase in the price level without an increase in the quantity of output. Thus, depending on the conditions that exist in the economy, manipulating the money supply will have inflationary effects or real output effects. It is often very difficult to predict what the real effect is going to be. It is also difficult to predict how long it will take for the effect to show up.

Let me try to clarify this with another example. Suppose the money supply is increased at an inordinate level. And suppose output simply is not capable of increasing as rapidly as the money supply so that the result is going to be an increase in the price level (inflation). When inflation occurs how do people react with respect to the money they have? They don't want to hold as much so they spend more. Thus, what happens to velocity? It speeds up. As they hold money they will lose value. During an inflationary period the velocity of money accelerates. And, as the velocity increases that aggravates inflation. Not only do you have the increasing amount of money chasing too few goods but you have the increasing velocity adding to the quantity of money chasing these goods.

EJD. THAT SEEMS TO BE ORIENTED TOWARD CONSUMER SPENDING, SINCE DURING AN INFLATIONARY ENVIRONMENT WHERE COSTS OF ACQUIRING RAW MATERIALS AND CAPITAL EQUIPMENT ARE ESCALATING, BUSINESS TENDS TO NOT INVEST AS MUCH. SO, THE BULK OF INFLATION COMES ...

What we are introducing here is some kind of expectations function where people respond to the expectation of higher prices in the future by buying today, rather than waiting for those higher prices. And, you could get the same kind of reaction in investments. I, too, agree with you that alot of the kinds of expenditures that take place during inflationary periods tend to be expenditures that people will make to hedge against the inflation and often they will involve nonproductive expenditures like buying art and antiques. Buying things whose value will be maintained during the inflationary period rather than putting money into production of goods and services.

We can look at this graphically:



With the price level vertically and the quantity of real output horizontally, we can think of the aggregate supply curve as looking something like the above; where  $Y_f$  could be full employment, where aggregate demand could be anywhere along that aggregate supply curve. So that, depending on how aggregate demand increases, increasing down in the range  $\leq Y_1$  would produce increases in the level of output but not increases in the level of prices, because this is a fairly inelastic, or flat, portion of the supply curve.

Then, there would be a portion of the supply curve which is rising, but output is still increasing as prices are increasing. And, then, finally when you are at full employment increases in aggregate demand will do nothing to increase output. Yet prices will rise because you have more money chasing the existing quantity of goods.

#### The Federal Reserve System.

One of the things that will influence this aggregate demand is the supply of money. And, the supply of money is under the control of a central bank system. In the United States this is the Federal Reserve. There are three basic ways in which the FED can influence the amount of the money in circulation. In order to understand how they can do that we must think about the banking system, which is the instrument the FED employs. A bank is in business to buy or borrow money from individuals, corporations, institutions, etc. and lend that money to individuals, etc.; and, in so doing lend at a higher rate than it borrows at (it is in effect a broker, bringing together lenders and borrowers). For this it takes a cut for its services.

In providing these services one of the things the bank must do is have some inventory. The money the bank has at its disposal can influence the amount of money in

circulation throughout the economy as a whole. At all times a bank will want to have on hand a certain amount of money it needs for daily transactions. The more stable the bank's transactions the less money it is going to need on hand every day. If the bank cannot come up with needed funds from its deposits then it is in trouble. Thus, a bank must always keep on RESERVE a certain percentage of its deposits to satisfy its depositors who may want to withdraw their money.

Banks recognize that under certain economic conditions they must keep a larger portion of their deposits as reserves. The initial deposit of funds generates an expansion of deposits and an increase in the money supply that is greater than the initial deposit. The multiplier effect on the deposit is inversely related to the amount the banks want to hold in the form of reserves.

IMPORTANT: THE MULTIPLIER EFFECT ON THE DEPOSIT IS INVERSELY RELATED TO THE AMOUNT THE BANKS WANT TO HOLD IN THE FORM OF RESERVES.

The greater the amount held in reserve the smaller the amount put back into circulation and the smaller will be velocity.

#### Federal Reserve Tools: Reserve Requirements.

One of the ways the FED regulates banking in the United States is to dictate reserve requirements. This is the first of three major tools the FED employs. It dictates what percentage of bank reserves have to be held in the form of cash.

Suppose the FED raises the reserve requirements? It will lower the money supply because it reduces the amount of money banks are capable of lending out. Suppose the FED reduces the requirement? It SHOULD have the effect of expanding the money supply; however, by setting minimum reserves the FED may not have the same effect in expanding the money supply that it would have in contracting the money supply; because the FED cannot make the banks reduce its reserves, only make it increase its reserves.

The banks may want to keep its cash reserve higher than the FED requires in order to meet demands from depositors. Importantly, reserve requirements must be

met every day. If a bank fails to meet the reserve level of bank can borrow the needed reserves from other banks in the "Federal Funds" market. Every day there are going to be some banks with excess reserves and others that have a shortage of reserves. What happens is that banks with the shortages will go to the market for "Federal Funds" and borrow needed cash overnight. This is a prelude for understanding the second major tool used by the FED, since there may be times when there are no excess reserves in the system and the banks need to borrow to meet their reserve requirements.

Federal Reserve Tools: The Reserve (Discount) Window.

Banks in need of funds that cannot be borrowed in the Fed Funds market can go to the Federal Reserve's "reserve window" and borrow funds at what is known as the "discount rate". The FED will reduce the rate if it wants to increase borrowing and raise the rate if it wants to discourage borrowing.

Keep in mind that any money the FED has is not in circulation. It is not part of the money supply. If it lends money to the bank it is taking money that is not in existence and putting it into circulation through the banking system. However, lowering the discount rate by itself doesn't increase the money supply. The banks have to borrow it first. It may be that the Fed Funds rate is lower than the discount rate and funds will not be borrowed from the FED.

Sometimes banks may be in trouble and not be able to borrow in the Fed Funds market because of the interest rate and the FED may not want to lend it funds, in which case the FED will exert a certain amount of pressure on other banks to help the troubled bank out. But, this doesn't involve injecting new money into the supply. The discount rate also has its shortcomings in that the FED cannot make banks borrow funds, which leads us to the third and most powerful tool utilized by the FED.

Federal Reserve Tools: Open Market Activities.

The FED actually goes into the bond market (for U.S. government securities) and will "secretly" buy bonds. These may be bonds offered for the first time by the Treasury or may be bonds held by the banking public.

Suppose the FED buys bonds. What does it use to buy its bonds? Money that it creates, something it is allowed to do by law. It says to the market we will pay so much for these bonds; will anybody sell? If a slight premium is offered the bond holders will sell. The FED thus gives dollars to the bond seller. Those dollars were not in circulation before; now the banks have dollars to lend out which they did not have before. Money has been put into the system and has expanded the money supply.

If the FED sells bonds, then the cash paid to the FED for the bonds is taken out of the money supply.

#### The Value of Money.

Does increasing the money supply reduce the value of money? The value of money depends on how many goods and services the money will buy. So, if increasing the money supply also serves to increase the amount of goods and services produced then the value of the money need not decline. If increasing the money supply is not in concert with increases in the quantity of goods and services, then the price level will go up. The economy has a certain ability to grow (to produce goods and services). That ability is going to be determined by technology, by the resources available and so on.

Generally speaking, most observers will suggest that the economy's ability to grow is somewhere in the neighborhood of 3-4 percent under ideal conditions. It may be able to grow more rapidly for short periods of time; but over the long haul a average of 3-4 percent a year is about right (the "real" output of the economy).

If the money is growing at the same rate then the value of each dollar will remain about the same.

It is difficult to keep the money supply growing at a rate consistent with the ability of the economy to grow. If for some reason the ability of the economy to grow lags behind, the FED might try to stimulate the economy by speeding up the growth of the money supply, hoping to encourage more spending to employ more resources so as to get the quantity of output growing more rapidly. The FED doesn't know exactly what the response of quantity will be; so, there is a very considerable amount of uncertainty with respect to a

given increase in the money supply being translated into real output growth (or just nominal growth, the growth in prices).

EJD. ISN'T ONE OF THE WEAKNESSES WHAT WE HAVE BEEN TALKING ABOUT IN NOT TAKING THE UNDERGROUND OR ILLEGAL ECONOMY INTO THE GNP CALCULATION. THOSE STATISTICS DON'T COME INTO THE MEASUREMENT.

That is going to be a more important factor if you have high inflation or if you have confiscatory tax rates where people try to avoid exchanging goods that are stated in nominal prices, to avoid paying taxes on those transactions. That will make it more difficult of course to monitor the economy. The interesting thing is that any kind of practice like that that is consistently applied over a long period of time and is universal will not influence the issue. If something is always there and is always consistent you don't have to worry about it. What is difficult is if more and more people are beginning to act that way, then it makes it difficult to determine proper policy.

#### 1984 Inflation Expectations.

In the Wall Street Journal a few days ago there was an article about future inflation and it said that both Milton Friedman and John Kenneth Galbraith, two ideologically opposites, agree that the year inflation would be around 10 percent, whereas the overwhelming majority of economists don't expect inflation to be more than about 5 percent.

Friedman is rarely wrong. Galbraith is usually wrong. Friedman's basis is the fact that between 1982-83 the money supply was growing at over 10 percent, a very rapid rate. In fact, Friedman maintains it was the rapid growth in the money between those years that was responsible for the current boom. Friedman says, with documentation, that increases in the money supply first show up as increases in output and later show up as increases in price. Based on all the historical evidence he is capable of mustering, increases in the money supply usually show up first in increases in output then in prices later. There, he expects a very substantial inflation by the end of 1984.

Galbraith is basing his prediction on the notion that the rate of inflation is a function of the deficit,

something that Friedman denies.

EJD. I HAVE BEEN TRYING TO FOLLOW THE ECONOMY AND ALSO THINK INFLATION IS AGAIN RISING, BUT I KEEP WONDERING WHAT IS THE LINK BETWEEN THAT AND THE FACT THAT WHAT WE HAVE HAD IS NOT A UNIVERSAL RECOVERY WORLDWIDE BUT A VERY LOPSIDED RECOVERY IN THE INDUSTRIALIZED WORLD WITH GREATER RECESSION IN THE THIRD WORLD. IT SEEMS TO ME THAT ONE OF THE THINGS THAT HAS KEPT OUR PRICES DOWN IS THE FACT THAT THERE HAS NOT BEEN VERY MUCH PRESSURE ON WORLD COMMODITY PRICES BECAUSE OF THE REDUCTION IN DEMAND IN THE THIRD WORLD.

Well, I think it is the other way around. I think the thing that has kept the prices down has been a restrictive growth in the money supply in the United States.

EJD. IF YOU VIEW THE MARKET FOR RAW MATERIALS AS A WORLD MARKET AND THAT AGGREGATE DEMAND FOR RESOURCES IS A WORLD DEMAND, YOU HAVE THIS WHOLE SEGMENT OF THE WORLD THAT IS NOT DEMANDING ANYTHING. AND, IF SUPPLIERS HAVE ALREADY COMMITTED THEMSELVES TO PRODUCTION OR HAVE IT IN INVENTORIES THEY HAVE TWO CHOICES. THEY HAVE TO EITHER OFFER IT AT A LOWER PRICE OR HOLD ONTO IT WITH THE RISKS THAT ENTAILS.

What you are asking is why aren't these foreign areas using resources. Their economies are so different from ours. Very high tax rates and considerable inflation. Not the kind of conditions necessary for sound investment. That is the problem. The United States is still the safest place to put your money.

EJD. IF THEY START TO DO BETTER WILL THAT BE A POSITIVE INPUT TO INFLATION?

No. Because if they start to do better they will be producing more.

#### The Deficit and The Federal Reserve.

One of the things the FED can do is help finance the deficit. If the government's expenditures are greater than its tax revenues it sells bonds. If the FED buys those bonds what it is doing in effect is printing money to buy those bonds, which is used to finance government expenditures. Thus, a deficit could or may lead to inflation if the FED uses that deficit to

create money to buy the bonds the Federal government is selling. This borrowing is part of the national debt.

If the FED does not want to finance the deficit it could allow the government to borrow the money from the public. If it does, we have less to spend, the government has more to spend; but the total amount of money in circulation is still the same. In which case the deficit will not be inflationary. So, that is one of the issues.

Galbraith is saying it is the current and future deficit that is going to produce inflation. Friedman is saying it is the monetary growth that took place a year ago or more that is responsible for producing the coming inflation.

#### Monetary Policy and Interest Rates.

There is another issue to be considered with respect to monetary policy and the economy. That is the effect on interest rates. Interest rates are particularly important from the point of view of investment. Lower interest rates will stimulate investment. Some argue that the FED could lower interest rates by increasing the money supply. Some argue that the FED's restrictive practices over the last year or so have led to higher interest rates and that in turn put a damper on investment activity. One of the reasons why interest rates remain high has to do with expectations regarding inflation.

Interest rates are currently around 12 percent and rising. Mortgage rates are at 15.5 percent and rising. If inflation is expected to be in the 10 percent range, then that makes that 15 percent mortgage rate reasonable. If you are lending money you want to be paid back in real terms the amount that you lend plus a premium for having given up the use of that money for a period of time.

During an inflationary period you would expect interest rates to rise. So, increasing the money supply (if it produces inflation) is going to do what to interest rates? Increase them.

A decrease in the money supply would have the opposite effect. Just the opposite of what the conventional wisdom suggests. Politicians will scream about the

FED's restrictive policies causing high interest rates and yet every Thursday afternoon the FED publishes its weekly figures on the money supply telling us whether it has increased or decreased. Invariably, an increase in the money supply serves to lower the value of bonds. If the money supply goes down the value of the bonds rise. Why?

EJD. BECAUSE IT IS THE REAL RATE OF INTEREST THAT IS IMPORTANT, AND ON A FIXED RATE BOND THE REAL RATE GOES DOWN WHEN THE MONEY SUPPLY INCREASES. BECAUSE THERE IS MORE MONEY IN CIRCULATION.

Actually, it is the nominal rate of interest that is important.

EJD. BUT, IT REDUCES THE REAL RATE OF INTEREST, DOESN'T IT?

The point I am trying to make here is that the effect of the money supply is on the nominal rate of interest. If the money supply goes up and inflationary expectations rise, then people will expect interest rates to go up; the value of bonds to drop. The opposite is actually true. IF THE MONEY SUPPLY DOES NOT GO UP THEN PEOPLE WILL EXPECT INFLATION NOT TO BE AS MUCH OF A FACTOR AND INTEREST RATES WILL DECLINE SLIGHTLY AND THE VALUE OF BONDS WILL GO UP. In other words, the market considers these things carefully. And, that is one reason why I think Friedman is right because the market today is talking about 15 percent rates for long term loans.

EJD. THERE IS ANOTHER POINT THAT IS SELDOM MENTIONED. THAT IS THAT WHAT THE LENDER HAS TO CONSIDER IS THE AVERAGE YIELD OF NEW MONEY AND OLD MONEY. THERE ARE MANY LENDERS STILL SADDLED WITH FIXED RATE MONEY AT 5-6-7 PERCENT RATES. BORROWERS OF NEW MONEY MUST SUBSIDIZE THE BORROWERS OF OLD MONEY WHO CONTINUE TO BENEFIT FROM INFLATION BY PAYING BACK THEIR LOANS WITH NOMINAL DOLLARS THAT HAVE LOWER PURCHASING POWER. SO, THE PEOPLE BORROWING AT 15 PERCENT TODAY WOULD, IF ALL LOANS WERE FLOATING AND MARKET SENSITIVE TO INFLATION, PAY A LOWER RATE. WE WOULD HAVE AN AVERAGE RATE ACROSS THE BOARD.

I don't think so. I think it would still be as high. Because what determines the price is the interaction of supply and demand at the current time. What you are

saying, in effect, is that the banks saddled with lower interest rate mortgages are incurring losses. That is a cost of operation. In order for banks to survive they have to cover their costs. Because all banks have these low interest rate mortgages and portfolios they have to cover those costs. Costs are universal to all banks, so they are all trying to cover them. Many have sold those mortgages at discount by now, but have incurred losses in doing so. When they are sold the discount they incur is a real capital loss and to a certain degree covering those losses will produce a higher real rate of interest.

Government Influence over Aggregate Demand.

The real issue is how can government influence aggregate demand? Clearly, it cannot influence aggregate demand very much without an accommodating monetary policy. If the government increases a deficit and if that deficit is financed through the sale of bonds to the FED then you are injecting new purchasing power into the economy so that aggregate demand increases. If that aggregate demand increases within the range where the supply of goods and services can increase, then economic activity can be stimulated. If, on the other hand, there are certain bottlenecks and constraints in the economy, then that increase in government expenditure financed through the monetary process will serve no purpose except to raise prices.

Too much money chasing an existing quantity of goods. Prices go up.

EJD. THIS ANALYSIS SAYS THAT IN A DEPRESSION A KEYNESIAN APPROACH WILL WORK, BUT AT ANYTHING APPROACHING FULL EMPLOYMENT, FORGET IT.

Right. During the great depression there was a considerable amount of hoarding going on. That could have been treated by imposing taxes and spending the money, or those hoards could have been indirectly dissolved by the government just expanding the money supply to the point where people were no longer going to hold onto the money because there wasn't any anticipation of it increasing in value. Actually, from 1929 to 1933 the amount of money in circulation decreased by one-third. This was because the FED didn't allow it to rise. It kept cutting the money supply.

Today, if the money supply just doesn't grow that brings on a tremendous recession impact. What we went through in 1980-82 was a result of the fact that the money supply just didn't grow. If the lubricant (money) doesn't exist the mechanism grinds to a halt. That is why it is important for the money supply to grow at a steady rate, not too rapidly and not too slowly.