

**Economic Environment and Business Strategy**  
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**Lecture- 18**

**Theories of Interest Rate Determination – I**

Welcome to this session on how interest rates are determined and the factors that influence their fluctuations. Part of our broader course on the economic environment and business strategy is missing. In this course, we focus on understanding how macroeconomic forces impact business decision-making. One of the most critical forces is the interest rate, a key price in the economy that affects investment, consumption, saving, borrowing, and risk. Understanding how industries are classified and why they fluctuate across instruments, markets, and time horizons is essential for making informed business and financial decisions. Whether you're a firm deciding on capital investment, a bank managing liquidity, or a policymaker evaluating the trade-offs between monetary and fiscal policy, our interest rates are central to your strategic decisions.

In the previous session, we explored the determination of interest rates in the bond market. Today, we turn to the money market, where central bank actions, liquidity preferences, and monetary transmission mechanisms play a dominant role. We begin with a demand for money, where we will distinguish between transactional and precautionary motives in the demand for money. We then consider the supply side, primarily controlled by the central bank, and analyze how changes in the money supply affect interest rates, bond demand, and prices.

After establishing that foundation, we proceed to the theories of interstate determination, which explain why interest rates vary across different instruments and time horizons. Here, we'll examine the risk structure of interest rates. We then examine the role of domestic and international credit rating agencies in shaping perceptions of credit risk and influencing borrowing costs. By the end of this and the next session, you will have a clearer understanding of how interest rates are determined, how they influence business decisions and the environment, and why they are critical variables in business strategy development. Let us begin by examining how interest rates are determined in the money market.

In this session, I have two main objectives: one is to determine interest rates through the

money market, and the second is to explore theories of interest rate determination. Let us begin with the first one, which involves determining interest rates through the money market. Here, we discuss the supply and demand for money. Primarily, we utilize the liquidity preference framework to comprehend the determination of interest rates in the money market. Here, to start with, we assume that there are only two assets in this economy: one is a bond, and the other is money.

Then, we recall that in the previous session, we discussed the bond market, specifically the supply and demand for bonds. In this money market, we talk about the demand for and supply of money. What we're going to do here is express the total wealth in an economy as the sum of total bonds and total money. That is on the supply side, when we look at the bond supply plus money supply equaling bond demand plus money demand. In this case, suppose we rearrange this so that  $B_s$  minus  $B_d$  equals  $M_s$  minus  $M_d$ .

This is the case when the bond market is in equilibrium. If one market is in equilibrium, the other market will also be in equilibrium. If  $B_s$  equals  $B_d$ , then  $M_s$  will equal  $M_d$ . That means if the bond market is in equilibrium, then the money market is also in equilibrium. That means the interest rate determined in the bond market will also be the interest rate in the money market.

When we discuss the bond market, it is more than sufficient. However, we are also utilizing the money market here, which enables us to establish the liquidity preference framework. Using this framework, we can also determine the interest rate. Let's move further to the supply side. Supply is primarily determined by a country's central bank, as it issues the country's money.

Therefore, the supply of money is primarily controlled by the central bank and is interest rate inelastic, meaning it doesn't change with interest rate fluctuations. This supply is exogenously set by the central bank based on the country's economic conditions, which influence the amount of money the central bank decides to supply to the economy. What should the money supply be? What is the money supply in this economy? In that context, we can infer that money demand is interest inelastic. Now I'm showing you the demand for money. Households and firms mainly drive the demand for money.

The demand curve for money represents the amount of money that people are willing to hold at each interest rate. You can see from here that the demand curve slopes downward from left to right. That means it demonstrates a negative relationship between the interest rate and the quantity of money demanded. You can see here that when the rate of interest is  $R_1$ , the quantity of money demanded is  $Q_1$ . When the rate of interest falls to  $R_2$ , the quantity demanded increases from  $Q_1$  to  $Q_2$ .

We will briefly explain why, when the rate of interest falls, the quantity demanded—specifically, the quantity of money demanded—increases. We will also

discuss the reasoning and the theory behind this relationship, which we will explain shortly. To understand this, let's first explore why people demand money. Why do households and firms demand money? Mainly to fulfill the transaction motive, which is the need for cash to conduct regular transactions. A personal and business transaction involves paying for goods and services.

In other words, to handle daily transactions in life, we need money. Simply put, the demand for money primarily arises for transaction purposes, also known as the transaction motive. Additionally, there is a precautionary demand for money, as well. When you demand money, you keep money with you. Some of it is for meeting your daily expenses, while a portion of your money is set aside to cover unexpected expenses or emergencies, such as sudden health costs or other unforeseen events.

Typically, when we define the demand for money, we consider it a redefinition of transaction demand, encompassing both certain and uncertain components. The first component we discuss here is the certain transaction demand, which involves routine payments. The second one is the uncertain transaction demand, which means that the broader definition of transaction demand for money includes meeting day-to-day transactions, routine payments, and covering precautionary needs. Generally, we refer to both aspects as transaction demand, but it has its distinctions. A specific component and an uncertain component.

The demand for money is affected by the income level. Higher income generally boosts the demand for money in transactions. If you have a high income, you need more money because your daily transactions will be higher. To finance that, you need to keep more money with you. And the second is the interest rate on bonds.

Higher interest rates reduce the incentive to hold money. Why? Since there is an opportunity cost to holding money, let's first distinguish between money and bonds. Money is used for immediate transactions, but it doesn't earn interest income; that's very clear. Unlike this, bonds earn interest income but are not readily usable for day-to-day transactions. What you can see here is that when you demand money, there is an opportunity cost of holding it—the interest forgone by not investing in interest-bearing assets like bonds.

So, when you demand more and more money, you are also foregoing the interest income. In this case, when the interest rate is very high, the opportunity cost of holding money is also very high because the amount of interest income you are missing out on is substantial when the market interest rate is high. What you can see is that when the market interest rate is very high, people will reduce their demand for money. They will reduce the transaction demand for money because they know that if they use more

money, they will keep more money instead of investing in bonds, which they will forego a large amount of interest income.

In contrast, when the rate of interest is very low, households and firms, especially households, will demand more money because by investing in the bond market, they will receive lower returns. The opportunity cost of holding money is low. That will motivate them to keep more money for funding their day-to-day transactions. Let's discuss the equilibrium in the money market. We have already seen that the demand curve slopes downward from left to right.

That means the higher the rate of interest, the higher the opportunity cost of holding money, and people will demand a lower amount of money. Similarly, or in contrast, when the rate of interest is very low, the opportunity cost of holding money is very low; then they will demand more money. Let's look here so you can see that this represents the demand curve, and this represents the supply curve. Let's consider different scenarios. Before that, you know that this is the equilibrium where the demand curve intersects with the supply curve.

The rate of interest is 15%, and the quantity demanded and supplied is 300 billion dollars. For instance, here the equilibrium interest rate is 15, but we will see that an interest rate of 25 is not the equilibrium rate because the demand and supply framework will start functioning at this level. Let's examine case 1 here; case 1 involves an interest rate that is very high. Consider, for example, that the interest rate is 25 percent. At this point, you can see that there is an excess supply of money.

The demand for money is 100, and the supply of money is 300. This results in an excess supply of money. At high interest rates, which I already mentioned, the opportunity cost of holding money is high, so people prefer to hold bonds instead of money. That is the point here. When the interest rate is very high, people prefer to demand more bonds.

That means it leads to lower money demand and an excess supply of money. Therefore, the excess money supply is present; \$ 200 billion represents the excess money supply. That money is already in the economy; people must use it. It's already with the people. However, at this rate of interest—uh, if you assume the interest rate is above this equilibrium rate—they will not demand this money.

What happens here is that people then use the excess cash, as they now have \$200 in excess funds; they buy bonds. This increases bond prices and causes interest rates to fall. You know that when the demand for bonds increases, their price increases, and when their price increases, the rate of interest declines, or the rate of interest falls. As interest rates fall, money demand rises. Just look at the y-axis; it gradually reduces the interest rates.

When you reduce the interest rate, you can observe that the demand for money gradually increases. That means you are moving downward in this direction, following the demand curve; as you move in this direction, you will eventually reach the equilibrium interest rate. And at this moment, you can see again that we are back to the initial equilibrium position at point C, where the quantity of money demanded equals the quantity supplied, and you can observe that money demand equals money supply. Let us now look at another case—the opposite case—where the interest rate is too low. For example, let's examine the situation where the equilibrium at point E is not actually an equilibrium position.

At this interest rate, you can see that the rate of interest is 5 percent and the quantity demanded of money is 500. Money demand here is 500, and the money supply is 300. You can see that there is excess demand for money here. There is excess money demand. Now you can systematically follow the interpretation using the logic we discussed a few minutes ago.

At low interest rates, the opportunity cost of holding money remains low. People prefer to hold more money. This results in increased demand for money and an excess of money demanded. People sell bonds to increase their money holdings, causing bond prices to fall and interest rates to rise. As interest rates rise, you can see that, gradually, as people demand more money, they will sell their bonds.

When they sell their bonds, the price will decline; that is, the price of bonds will decrease. Therefore, the rate of interest will gradually start to increase. Therefore, the rate of interest will increase, which means the quantity of money demanded will decline. Because when the rate of interest increases, you know that the opportunity cost of holding money or demanding money increases. Instead of 500, which is the initial demand, they gradually start to reduce the money demand and eventually reach this position.

The quantity demanded decreases as the rate of interest increases; ultimately, the equilibrium position will be at C. Let's now examine the effects of increasing the money supply. Assume that the country's central bank boosts the money supply in the economy. This means that more money is circulating. When there's more money, you may have heard or seen that, to lower the interest rate, the central bank sometimes reduces the interest rate by expanding the money supply.

When they increase the money supply, what we often hear is that the interest rate declines. Why is that? What is the theoretical justification behind this relationship? Because we know that the interest rate is not a reward for money itself, but rather a reward for lending money. Because you know that money doesn't earn any interest, right? That is the case. We need to analyze this diagram and this figure through the bond

market. Now, I'd like to begin our discussion by acknowledging that the central bank has increased the money supply.

An increase in the money supply created by the central bank will shift the demand curve for money to the right. As you can see, the money supply curve is shifting to the right. You can see that initially, there is an excess supply of money, and the new equilibrium position is point B, which is reached from the initial equilibrium position A. Then, the subsequent equilibrium position will be B. B is the new equilibrium position. What you can see here is that the quantity of money demanded and supplied increases to this point, and the rate of interest declines from  $R_0$  to  $R_1$ . What is the reasoning behind it? Whether at the initial interest rate or not, there is an excess supply of money when the central bank increases the money supply. At this moment, when the money supply increases, people are not willing to hold the additional money at the current interest rates. To reduce its cash balance, it purchases bonds. Suddenly, they are getting more money in their hands, but they are not willing to demand that much.

Then what will they do at this rate of interest, for example, the initial rate of interest, which is the high rate of interest? People are not willing to hold onto this extra money; instead, they are willing to spend it. They are now starting to buy bonds, which means that as demand for bonds increases, you know that when the demand for bonds increases, when the demand for bonds increases, the increased bond demand leads to an increase in the bond price, and since we already know that an increase in the bond price means interest rates fall. Therefore, when the demand for bonds increases, bond prices rise, and interest rates fall. This means that when the interest rate drops, the opportunity cost of holding money also decreases. As a result, people will want to hold more money—that is, the extra supply of money—but only when the interest rate is lower.

Now, you can see that when the rate of interest is  $R_1$ , they will be the people who demand all this money due to the increased money supply. This  $\Delta M$  will be absorbed by the households, but it is at a low interest rate. This is the theoretical channel through which an increase in the money supply leads to a decline in the interest rate, which occurs in the bond market. The effects of an increase in the money supply have already been explained. Finally, this represents the new equilibrium position, where the increased demand for bonds pushes up bond prices, equivalent to a decline in the interest rate.

At this point, the money demand at the new interest rate  $R_1$  equals the money supply in the money market. Restoring equilibrium in the money market. Having discussed how interest rates are determined in the money market, let's now move to the second objective of this lecture. Having discussed how interest rates are determined through either the bond market or the money market, let us now examine the sources and causes of fluctuations in interest rates across different types of debt instruments. To motivate this

discussion, I'm showing you a figure that illustrates the movement of interest rates from 1922 to 2020.

From here, it is stated that I have presented the rates of return and yields to maturity for different types of bonds. One is corporate AAA bonds, another is corporate BAA bonds, another is US government long-term bonds, and the fourth is state and local government bonds. We have shown here two private bonds, specifically a corporate bond. One is an AAA rating, which indicates a high rating. The next one has a slightly lower rating: BAA-rated corporate bonds.

Then, you also have two government bonds. One is by the U.S. central government, also known as the U.S. government. Another one is U.S. state and local government bonds. As you can see here, this is of the same maturity level. A bond with the same maturity is showing a different interest rate. Why do interest rates differ across instruments? The instrument refers to the bond I showed here, along with the relevant time periods and countries involved. From this, let us derive some key observations from the figure: one is that credit risk is a significant factor.

You can see from here that corporate and private bonds typically require higher interest rates compared to government bonds. That means credit risk matters. Corporate BAA bonds consistently offer higher yields than AAA bonds and government securities. That means investors require higher returns for lending to riskier borrowers.

Then, the type of issuer influences the rates. Municipal bonds often have yields that are lower than those of government bonds in many periods. The reason is that tax advantages and lower default risks for local governments influence their interest rates. And time-varying trends. All yields spiked in the early 1980s, then trended downward. Therefore, it reflects macroeconomic factors, including inflation expectations and monetary policy.

Then, the fourth inference is that this is not primarily based on this diagram; a global comparison raises deeper questions. Why might India have a 6% interest rate, the US a 4% interest rate, and Afghanistan a 20% interest rate? It all depends on the inflation outlook, central bank credibility, political risk, and the country's economic structure. I have a simple question for you. If you are an investor, would you prefer a 10% interest rate for an Afghan bond? What factors does your answer depend on? You know that if you invest in Afghan bonds, you will get 10%, but from the US, you'll only get 4%. What is your answer? What is your choice? It also depends on the default risk.

You are aware that there are some risks associated with the Afghan bond. Sometimes, you won't recover the money you invested. To understand the structure of this interest rate movement across different instruments and time horizons, there are two broader theories of interest rates. One is referred to as the risk structure of interest rates, and the

other is known as the term structure of interest rates. Let's start with the first one: the risk structure of interest rates. Then, why are bonds risky? Based on the riskiness of bonds, we observe that different types of bonds yield varying interest rates.

Why are bonds risky? One is interest rate risk. Interest rates may rise between the time a bond is purchased and the time it is sold, which can reduce the bond's price. That is one risk. The second risk is inflation; inflation may turn out to be higher than expected, reducing the real return on holding the bond. The third, and major, risk—called default risk—is that the issuer may not make the promised payments on time. Maybe the government or the corporation, the bond issuer, may not make the promised payment on time after issuing or selling the bond, and they might also fail to return the principal amount.

The probability that the issuer of the bond cannot or will not make interest payments and pay the face value is referred to as the default risk. Most of our discussion focuses on default risk, which is primarily measured by rating agencies. Credit rating agencies assess the financial strength of firms and other governments, thus helping investors identify the companies' level of risk and their ability to repay debts. There are three broad groups of ratings from rating agencies. One is called a bond rating, which includes treasury bills, corporate bonds, and government bonds.

The second one is a commercial paper rating, which is a short-term rating. The third one is a sovereign rating, which is the rating of governments. These are the credit rating agencies registered under the Securities and Exchange Board of India: CRISIL, ICRA, CARE, Fitch India, IVP, and Brickwork. These are the main credit rating agencies registered with SEBI. I'm just showing you a screenshot from one of the credit rating agencies, Crystal. You can read about how they define business risk, financial risk, and the types of ratings they provide.

By visiting this website, you will gain valuable insights into ratings, including the methodologies and parameters used to determine them. Don't expect everything they make to be made public. Most of the information they can share is available on their website. This concerns India Ratings of the Fitch Group.

And regarding the international rating agencies—Moody's, S&P, and Fitch. These are the three main international rating agencies. The criteria for ratings indicate that separate ratings are conducted for banks, corporates (which encompass different sectors or regions), infrastructure funds, sovereigns (meaning government ratings), insurance, international public finance, and other categories. I am showing you some additional screenshots from another rating agency, S&P, as well as from Moody's. What we have seen here is that in this lecture, we first discussed the determination of the rate of interest using the liquidity preference framework, which involves the demand for and supply of

money. We then started discussing the reasons and factors that explain fluctuations in interest rates across different credit instruments, countries, and various time horizons.

During that time, we also discussed restructuring bond ratings through credit rating agencies. We have already listed some of the rating agencies. They not only rate firms and their financial instruments, but also conduct ratings of governments, known as sovereign ratings. In the next session, we will continue this discussion. We will explore credit ratings in more detail, including the ratings they provide, the rating criteria, and related aspects. Thank you for watching this session. See you at the next one. Thank you.