Chapter# The Level and Structure of Interest Rates

Outline

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✓ The Determinants of the Structure of Interest Rates
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Q# The rate of interest?

Interest rate is a rate of return paid by a borrower of funds to a lender of them, or a price paid by a borrower for a service, the right to make use of funds for a specified period. Thus it is one form of yield on financial instruments. Two questions are being raised by market participants:

• What determines the average rate of interest in an economy?
• Why do interest rates differ on different types and lengths of loans and debt instruments?

Interest rates vary depending on borrowing or lending decision. There is interest rate at which banks are lending (the offer rate) and interest rate they are paying for deposits (the bid rate). The difference between them is called a spread. Such a spread also exists between selling and buying rates in local and international money and capital markets. The spread between offer and bid rates provides a cover for administrative costs of the financial intermediaries and includes their profit. The spread is influenced by the degree of competition among financial institutions. In the short-term international money markets the spread is lower if there is considerable competition. Conversely, the spread between banks borrowing and lending rates to their retail customers is larger in general due to considerably larger degree of loan default risk. Thus the lending rate (offer or ask rate) always includes a risk premium.

| Concept | **Risk premium** is an addition to the interest rate demanded by a lender to take into account the risk that the borrower might default on the loan entirely or may not repay on time (default risk). |

There are several factors that determine the risk premium for a non-Government security, as compared with the Government security of the same maturity. These are (1) the perceived creditworthiness of the issuer, (2) provisions of securities such as conversion provision, call provision, put provision, (3) interest taxes, and (4) expected liquidity of a security’s issue.

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In order to explain the determinants of interest rates in general, the economic theory assumes there is some particular interest rate, as a representative of all interest rates in an economy. Such an interest rate usually depends upon the topic considered, and can represented by e.g. interest rate on government short-term or long-term debt, or the base interest rate of the commercial banks, or a short-term money market rate (EURIBOR). In such a case it is assumed that the interest rate structure is stable and that all interest rates in the economy are likely to move in the same direction.

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<tr>
<th>Concept</th>
<th><strong>Interest rate structure</strong> is the relationships between the various rates of interest in an economy on financial instruments of different lengths (terms) or of different degrees of risk.</th>
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The rates of interest quoted by financial institutions are nominal rates, and are used to calculate interest payments to borrowers and lenders. However, the loan repayments remain the same in money terms and make up a smaller and smaller proportion of the borrower’s income. The real cost of the interest payments declines over time. Therefore there is a real interest rate, i.e. the rate of interest adjusted to take into account the rate of inflation. Since the real rate of return to the lender can be also falling over time, the lender determines interest rates to take into account the expected rate of inflation over the period of a loan. When there is uncertainty about the real rate of return to be received by the lender, he will be inclined to lend at fixed interest rates for short-term. The loan can be ‘rolled over’ at a newly set rate of interest to reflect changes in the expected rate of inflation. On the other hand, lenders can set a floating interest rate, which is adjusted to the inflation rate changes.

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<tr>
<th>Concept</th>
<th><strong>Real interest rate</strong> is the difference between the nominal rate of interest and the expected rate of inflation. It is a measure of the anticipated opportunity cost of borrowing in terms of goods and services forgone.</th>
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The dependence between the real and nominal interest rates is expressed using the following equation:

\[ i = (1 + r)(1 + i_e) - 1 \]

where \( i \) is the nominal rate of interest, \( r \) is the real rate of interest and \( i_e \) is the expected rate of inflation.

| Example | Assume that a bank is providing a company with a loan of 1000 thous. Euro for one year at a real rate of interest of 3 per cent. At the end of the year it expects to receive back 1030 thous. Euro of purchasing power at current prices. However, if the bank expects a 10 per cent rate of inflation over the next year, it will want 1133 thous. Euro back (10 per cent above 1030 thous. Euro). The interest rate required by the bank would be 13.3 per cent

\[ i = (1 + 0.03)(1 + 0.1) - 1 = (1.03)(1.1) - 1 = 1.133 - 1 = 0.133 \text{ or } 13.3 \text{ per cent} \]

When assumption is made that \( r \) is stable over time, the equation provides the Fisher effect. It suggests that changes in short-term interest rates occur because of changes in the expected rate of inflation. If a further assumption is made that expectations about the rate of inflation of market

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participants are correct, then the key reason for changes in interest rates is the changes in the current rate of inflation.

Q# Fisher’s Classical Approach?

[See the Foundations of Financial Markets and Institutions; 3rd Edition; Page: 194]

Q# The Loanable Funds Theory?

In an economy, there is a supply of loanable funds (i.e., credit) in the capital market by households, business, and governments. The higher the level of interest rates, the more such entities are willing to supply loan funds; the lower the level of interest, the less they are willing to supply. These same entities demand loanable funds, demanding more when the level of interest rates is low and less when interest rates are higher. The extent to which people are willing to postpone consumption depends upon their time preference.

| Concept | Time preference describes the extent to which a person is willing to give up the satisfaction obtained from present consumption in return for increased consumption in the future. |

The term ‘loanable funds’ simply refers to the sums of money offered for lending and demanded by consumers and investors during a given period. The interest rate in the model is determined by the interaction between potential borrowers and potential savers.

| Concept | Loanable funds are funds borrowed and lent in an economy during a specified period of time – the flow of money from surplus to deficit units in the economy. |

The loanable funds theory was formulated by the Swedish economist Knut Wicksell in the 1900s. According to him, the level of interest rates is determined by the supply and demand of loanable funds available in an economy’s credit market (i.e., the sector of the capital markets for long-term debt instruments). This theory suggests that investment and savings in the economy determine the level of long-term interest rates. Short-term interest rates, however, are determined by an economy’s financial and monetary conditions.

According to the loanable funds theory for the economy as a whole:

Demand for loanable funds = net investment + net additions to liquid reserves

Supply of loanable funds = net savings + increase in the money supply

Given the importance of loanable funds and that the major suppliers of loanable funds are commercial banks, the key role of this financial intermediary in the determination of interest rates is vivid. The central bank is implementing specific monetary policy, therefore it influences the supply of loanable funds from commercial banks and thereby changes the level of interest
rates. As central bank increases (decreases) the supply of credit available from commercial banks, it decreases (increases) the level of interest rates.

According to the loanable funds theory, economic agents seek to make the best use of the resources available to them over their lifetimes. One way of increasing future real income might be to borrow funds now in order to take advantage of investment opportunities in the economy. This would work only if the rate of return available from investment were greater than the cost of borrowing. Thus, borrowers should not be willing to pay a higher real rate of interest than the real rate of return available on capital. In a perfect market this is equal to the marginal productivity of capital – the addition to output that results from a one-unit addition to capital, on the assumption that nothing else changes. This is influenced by factors such as the rate of invention and innovation of new products and processes, improvements in the quality of the workforce, and the ability to reorganise the economy to make better use of scarce resources. Savers, on the other hand, are able to increase their future consumption levels by forgoing some consumption in the present and lending funds to investors. We start by assuming that consumers would, other things being equal, prefer to consume all of their income in the present. They are prepared to save and to lend only if there is a promise of a real rate of return on their savings that will allow them to consume more in the future than they would otherwise be able to do. The real rate of return lenders demand thus depends on how much they feel they lose by postponing part of their consumption. Thus, the rate of interest is the reward for waiting – that is, for being willing to delay some of the satisfaction to be obtained from consumption. The extent to which people are willing to postpone consumption depends upon their time preference. The term ‘loanable funds’ simply refers to the sums of money offered for lending and demanded by consumers and investors during a given period. The interest rate in the model is determined by the interaction between potential borrowers and potential savers. We need to explain, however, why we might expect the real rate of interest in a country to remain relatively stable over time as Irving Fisher assumed it would. The principal demands for loanable funds come from firms undertaking new and replacement investment, including the building up of stocks, and from consumers wishing to spend beyond their current disposable income. The current savings of households (the difference between disposable income and planned current consumption) and the retained profits of firms are the principal sources of supply of loanable funds. This can all be shown in the conventional way in a supply and demand diagram. Figure 7.1 follows the usual procedure of putting nominal interest rates on the vertical axis. However, we assume for the moment that there is no inflation in the economy and, hence, there is no distinction between nominal and real interest rates. In Figure 7.1, the supply curve slopes up to the right – as interest rates rise, people become more willing to save and to lend because doing so offers increasing levels of future consumption in exchange for the present consumption foregone. That is, ceteris paribus, current savings increase as interest rates rise. The demand curve slopes down to the right because it is assumed that additions to capital (net investment), with nothing else changing, cause the marginal productivity of capital to fall (there are diminishing returns to capital). Since firms continue to invest only so long as the marginal product of capital is above the interest rate paid on loans, the demand for loanable funds is greater at lower rates of interest. The equilibrium rate of interest is then given by the intersection of the demand and supply curves.
Interest rates are not likely to change frequently in this model because the underlying influences on the behaviour of borrowers and lenders do not change very often and hence the savings and investment curves do not shift very often. Savings at each interest rate are determined by the average degree of time preference in the economy and by the choices people make over their lifetimes between goods and leisure (that is, by their willingness to engage in market work). These are not subject to frequent change. This is true also of investment. It, remember, depends on the relationship between interest rates and the marginal product of capital. The productivity of capital, in turn, depends on the quantity and quality of a country’s factors of production (capital, labour and natural resources). These change but do so, for the most part, fairly slowly and consistently over time. We can, thus, easily explain the view that real interest rates in a country should not be expected to change greatly over time. We can also easily see why real interest rates might differ from one country to another – differences in time preferences among populations, in real income levels, or in the quantity or quality of factors of production. Of course, if capital were perfectly mobile internationally (it moved freely among countries), differences in real interest rates would not persist since funds would move from those countries where real interest rates were low to high real interest rate countries. As this happened, interest rates would come down in the high interest rate countries and rise in the low interest rate ones. Funds would continue to flow until real interest rates were the same everywhere. In practice, there are many interferences with the mobility of capital and differences in real interest rates persist. The biggest differences in real interest rates are likely to be between rich and poor countries. In poor countries, real incomes and hence domestic savings are low. At the same time, the lack of capital in these countries means that the marginal product of capital is likely to be high. Thus, we have a high demand for capital and a low supply of domestic savings. Real interest rates are high. The

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reverse is true for rich countries. The differences persist because capital does not flow at all freely from rich to poor countries. Capital is very mobile internationally only among developed countries. There are many barriers to the movement of capital to developing countries, particularly to the poorest of them. These include lack of information and the many risks that investors face. Exchange rate risk is clearly important when we are discussing the movement of capital from one country to another. This is the risk that the value of the currency of the country to which capital is being exported will fall, resulting in a capital loss when the owner of the capital later converts the funds back into his own currency. It follows that interest rates in countries with currencies thought likely to lose value over time include an exchange risk premium. In addition to facing exchange rate risk, an investor may well fear default risk much more in a foreign country than in his own economy. This may simply reflect a lack of information about the degree of risk in foreign countries. On the other hand, default risk may objectively be much higher in developing countries that are constantly short of foreign currency and have a history of unstable governments. Firms find it harder to plan under such circumstances and may have to deal with frequent changes in regulations and taxes as well as rates of exchange. Default risk refers specifically to the failure of the borrower to repay a loan. Risk may also arise from the actions of governments. For instance, governments may prevent firms from taking funds out of the country in foreign exchange. There have also been many examples of governments declaring a moratorium on the payment of interest on loans or entering into agreements with creditors to reschedule loans so that they are paid back over a much longer period than in the original agreement. These types of risk are referred to as sovereign risk or country risk. Whatever the basis for this increased risk, it is easy to see why the risk premium might vary from one country to another. Consequently, real interest rates might vary greatly among countries. It is even possible that mobile capital moves in the wrong direction – that it moves to countries where rates of return are low but secure, causing differences in real interest rates.

Q# The Liquidity Preference Theory?

Saving and investment of market participants under economic uncertainty may be much more influenced by expectations and by exogenous shocks than by underlying real forces. A possible response of risk-averse savers is to vary the form in which they hold their financial wealth depending on their expectations about asset prices. Since they are concerned about the risk of loss in the value of assets, they are likely to vary the average liquidity of their portfolios.

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<th>Concept</th>
<th>A liquid asset is the one that can be turned into money quickly, cheaply and for a known monetary value.</th>
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Liquidity preference theory is another one aimed at explaining interest rates. J. M. Keynes has proposed (back in 1936) a simple model, which explains how interest rates are determined based on the preferences of households to hold money balances rather than spending or investing those funds. Money balances can be held in the form of currency or checking accounts, however it does earn a very low interest rate or no interest at all. A key element in the theory is the motivation for individuals to hold money balance despite the loss of interest income. Money is the most liquid of all financial assets and, of course, can easily be utilized to consume or to invest. The quantity of money held by individuals depends on their level of income and,
consequently, for an economy the demand for money is directly related to an economy’s income. There is a trade-off between holding money balance for purposes of maintaining liquidity and investing or lending funds in less liquid debt instruments in order to earn a competitive market interest rate. The difference in the interest rate that can be earned by investing in interest-bearing debt instruments and money balances represents an opportunity cost for maintaining liquidity. The lower the opportunity cost, the greater the demand for money balances; the higher the opportunity cost, the lower the demand for money balance.

| Concept        | Liquidity preference is preference for holding financial wealth in the form of short-term, highly liquid assets rather than long-term illiquid assets, based principally on the fear that long-term assets will lose capital value over time. |

According to the liquidity preference theory, the level of interest rates is determined by the supply and demand for money balances. The money supply is controlled by the policy tools available to the country’s Central Bank. Conversely, in the loan funds theory the level of interest rates is determined by supply and demand, however it is in the credit market.

In an uncertain world, then, saving and investment may be much more influenced by expectations and by exogenous shocks than by underlying real forces. One possible response of risk-averse savers is to vary the form in which they hold their financial wealth depending on what they think is likely to happen to asset prices – they are likely to vary the average liquidity of their portfolios. In section 1.1.3, we defined a liquid asset as one that can be turned into money quickly, cheaply and for a known monetary value. It is the risk of loss in the value of assets with which we are concerned here. In periods in which people are confident that asset prices will increase, they are encouraged to hold a high proportion of their portfolios in illiquid assets, benefiting from the higher rate of interest that they offer. Increased doubt about future asset prices, on the other hand, encourages people to give up these higher rates of interest in search of the greater security offered by more liquid assets. This happens in financial markets all the time. For example, in the equity market the shares of some companies are likely to fare better than others in a falling market, and investors become more likely to buy these shares if they fear a fall in share prices. Again, bonds with distant maturity dates carry more capital risk than those nearer to maturity and are thus relatively less attractive when the markets turn bearish. This is not to say that people all have the same expectations regarding future asset prices; that all people with the same expectations behave in the same way; or that everyone is equally risk averse. Nonetheless, there is likely to be a general shift towards greater liquidity whenever confidence in financial markets falls. Even the large pension funds withdraw significant amounts of their funds from the equity and bond markets and hold instead short-term securities and cash during periods of uncertainty. Here we see a quite different role for interest rates than that played in the loanable funds theory. The inverse relationship between interest rates and bond and share prices that we considered in Chapter 6 becomes important. Plainly, an expectation of an increase in interest rates increases the prospect of a fall in financial asset prices generally and of a greater relative fall in the prices of illiquid assets. In other words, an expected increase in interest rates, *ceteris paribus*, increases the preference of asset holders for liquidity. This general idea was developed into an economic theory by J M Keynes within a simplified model in which there were only two types of financial asset – money, the liquid asset, and bonds with no maturity date (consols), the illiquid asset. An increased preference for liquidity in this model is equivalent to an increased demand
for money. Thus, the demand for money increases whenever more people think interest rates are likely to rise than believe they are likely to fall. This is Keynes’s speculative motive for holding money – people hold money instead of less liquid assets in order to avoid a capital loss. This, of course, leaves us with the problem of knowing when people are likely to expect interest rates to rise. Keynes’s approach to this was very simple. It was to suggest that the lower interest rates currently were, relative to their usual level in the economy, the higher would be the proportion of people who thought that the next interest rate move would be up. Thus, the lower interest rates were, the greater would be the fear of a fall in asset prices and the greater would be the preference for liquidity. The resulting demand for money curve slopes down from left to right as shown in Figure 7.2.

There is very little objection to this negative relationship between interest rates and the demand for money since there are other possible explanations for it. Keynes’s theory, however, has two controversial implications. Firstly, the demand for money curve is likely to be less steeply sloped than in most other theories of the demand for money since small changes in interest rates might cause quite large changes in people’s expectations about future rates. This is particularly likely at interest rates that are historically very low because at this level the great majority of people are likely to think that interest rates will next rise. This explains the flatter section of the demand for money curves in Figure 7.2. Secondly, and more importantly, Keynes did not assume that the interest rate was the only factor influencing expectations of future asset prices. Market optimism or pessimism can result from a wide range of economic and political factors, and the views of market agents will be strongly influenced by what they believe other market agents are likely to do. Hence, if we were to believe that there was no objective reason for a fall in bond prices but we thought that other people in the market were likely to sell, we might try to beat the fall by selling bonds and moving to more liquid assets. If enough people behaved in the same way, the price would fall. Under these circumstances, the demand for money curve might be highly unstable. It might shift as a result of exogenous shocks that would be difficult to forecast. This has a number of important implications, but before considering them, we need to complete the model by adding a supply of money curve. The standard model of this kind continues to assume

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that the monetary authorities are able to control the supply of money. The money supply curve can be drawn as either vertical (as it is in the simplest version of these theories) or, as here, as sloping up steeply to the right. The interaction of the demand for money and supply of money curves then determines the interest rate.

**Loanable funds and liquidity preference**

Much effort has been put into trying to show the relationship between the two principal theories of interest rate determination – loanable funds and liquidity preference. It is commonly argued that the two theories are, in fact, complementary, merely looking at two different markets (the market for money and the market for non-money financial assets), both of which have to be in equilibrium if the system as a whole is in equilibrium. Although it is true that, in a technical sense, the two theories can be assimilated, this is done at the cost of losing the spirit of both theories. Let us see why this is so. Let us assume that there is a sudden, unexplained loss of confidence in financial markets, causing an increase in the demand for liquidity. The demand for money at each level of interest rates increases and the demand for money curve in Figure 7.2 shifts out from $MD_1$ to $MD_2$. Interest rates rise from $i_1$ to $i_2$. In the nominal interest rate version of the loanable funds theory, this is expressed as an increase in the demand for liquid reserves, and the demand for loanable funds curve shifts up, also causing an increase in nominal interest rates. So far so good, but this sudden change in confidence would be regarded by loanable funds theorists as irrational behaviour. In other words, it would either not occur or would be seen as temporary and unimportant in an explanation of how the economy operated. Remember that, in our discussion of the loanable funds view, we suggested that any instability in interest rates would be caused by the behaviour of governments or central banks. In liquidity preference theory, on the other hand, instability is inherent in the market economy and there is a possible role for government in stabilizing the economy. This argument that the two theories are essentially very different is carried further the next section when we consider the implications of the two theories for monetary policy.