

CHAPTER XI

INTEREST

1. A FUNDAMENTAL approach to the problem of interest suggests itself naturally, after the discussions of the preceding chapter. We have learnt to distinguish transactions according to the date at which they are due to be executed. Spot transactions are due to be executed currently—that is to say, in the current week in which they are drawn up. Forward transactions are due to be executed entirely at a future date—both sides of the bargain in the same future week. But there is no reason why the two sides of a bargain should be due to be executed at the same date. Thus we get a third type, loan transactions, which are such that only one side of the bargain is executed currently, the other side being due to be executed at some future date, or perhaps a series of future dates. The essential characteristic of a loan transaction is that its execution is divided in time.

Any exchange of present goods or services for a promise to deliver goods or services in the future has the economic character of a loan; but in practice the whole class of loan transactions is dominated by a particular sub-species: the type where both sides of the transaction are in money form. It is not that this is the only kind of loan practised. Direct exchange of present real goods for future real goods is rare, for the same reason as the exchange of one sort of real goods in the present for another sort of real goods in the present is rare: the inconvenience of barter. But people do not infrequently exchange present commodities for promises to pay money in the future (deferred payment); or, vice versa, they exchange ready money for promises to deliver goods in the future (payment in advance). It is not that these transactions are not practised, but that they are naturally thought of as reducible to a money loan *plus* a spot transaction (or a forward transaction). In fact any loan transaction can be reduced in that way.

Even a pure barter of present commodities for future commodities (say an exchange of coffee now for coffee a year hence) can be similarly reduced to a spot transaction, a forward transaction, and a money loan. Where forward markets exist, rates of interest in real terms are always implicitly established. Suppose the money

rate of interest for a year's loan is 5 per cent., and the futures price of coffee for twelve months' delivery is 3 per cent. above the spot price; then it is possible to lend coffee for one year by selling coffee spot, lending the money proceeds, and covering the sale by a purchase on the forward market. The whole chain of transactions establishes an absolutely definite rate of interest in coffee terms. One unit of coffee now is exchanged for $105/103$ units of coffee to be delivered in a year's time, so that the rate of interest fixed is approximately 2 per cent. in terms of coffee.¹ (The coffee rate will only be the same as the money rate if the spot price of coffee and the forward price are equal.)²

Commodity rates of interest are thus of little direct importance for us; they are parts of the system we do not emphasize, just as we do not emphasize the rate of exchange between two commodities in spot transactions, when neither of the two commodities is the standard of value. Without assuming any more of the properties of money than we have assumed up to the present (that it is a commodity selected as the standard of value) we are entitled to assume that all loans are in money terms; for any loan transaction which takes place otherwise is always capable of being reduced to a money loan combined with a spot transaction and a forward transaction.

2. We can thus confine ourselves to the study of money rates of interest; but even within that field we have to face a somewhat bewildering complexity. The money rates of interest paid for different loans at the same date differ from one another for two main reasons: (1) because of differences in the length of time for which the loans are to run, and in the way repayment is to be

¹ Cf. Keynes, *General Theory*, pp. 222-3. The formula which thus emerges—that a commodity rate of interest approximately equals the money rate of interest *minus* the contango (percentage excess of futures price over spot)—is worth noting.

² In the case of foreign exchange dealing, we do have an example of what happens when there is a loan market in each of two commodities (currencies) and also spot and forward trading between them. If all four markets are free, not even temporary equilibrium is possible unless the above relation holds—unless, say, the discount on forward francs equals the difference between interest rates in Paris and London for the relevant period. If this relation ceases to hold altogether, it is an indication that dealings are being restricted in one at least of the four markets. (It should be emphasized that the four markets are mutually interdependent, and any or all of them may be affected in the process of equilibration.)

distributed over time; (2) because of differences in the risk of default by the borrower. Other differences in the terms of the loan may sometimes reckon for something, but these are the main things that have to be considered.

Questions of risk come up in the discussion of both these reasons for divergence, but it is the second which is responsible for the element of 'risk-premium' in interest rates as generally understood. When a borrower's credit is poor, people will not be prepared to pay the same price for his promise to pay certain sums in the future as they would do if his credit were good. There are two reasons for this which can be distinguished. First, a completely trustworthy borrower gives complete assurance that the promised sums will be paid; the lender thus receives a practically certain prospect, as against the uncertain prospect he receives in the other case. Secondly, even if the supposedly untrustworthy borrower does discharge his obligations, he will not pay more than he is obliged; that sets a maximum to the receipts which can be expected by the lender; all the possible variations from it are in one direction. This means that the mean value of the probable outcomes is less than in the case of the sound borrower; and the other consideration means that the dispersion of probable outcomes is greater. Both of these things may be expected to deter the lender; so that he will only be induced to lend to the less sound borrower if he is offered better terms.

The full analysis of the working of this risk factor in the market for loans would be very complicated; we shall not attempt to pursue it very far here. One thing to be considered is the fact that a borrower's creditworthiness is a matter for the individual estimate of lenders; and these individual estimates are likely to differ. Thus, if a business requires to raise only a small amount of capital, it can do so by appealing only to that inner circle of potential lenders with which it has a good standing, and who may thus be expected to be willing to lend to it on relatively favourable terms. If it desires to raise more, it must either apply directly to a less trusting section of the market (to whom it will have to offer better terms), or it must get some of the inner circle to stand surety for it (either by borrowing themselves and re-lending the proceeds to it, or by some method of guarantee or acceptance). But if they are persuaded to this, they will be involving themselves in an additional risk, for which they will require compensation.

The amount which a particular borrower can raise from any particular lender is limited partly by the limitation of that lender's resources, but perhaps more immediately limited by the risk a lender incurs by investing too much of his resources in one direction—by 'putting all his eggs in one basket'. By offering better terms (which may be taken to amount to a higher rate of interest, but need not necessarily take that overt form), it may be possible to extract more from individual lenders; and, for the reasons we have just seen, it will usually be possible to extract more from the market as a whole, by persuading new lenders to come in. Each particular borrower thus finds himself confronted with a sort of 'supply curve for loan capital', analogous to the supply curves of other factors of production which confront a producer when he is in a 'monopsonistic' (or monopoly buyer) position. There is no reason to suppose that this curve will be perfectly elastic, at least for large variations in the amount of capital to be raised. This consideration introduces into the theory of interest questions analogous to those which have been discussed by writers on Imperfect Competition, and there is no doubt that a complete theory of interest ought to take them formally into account.¹ I cannot undertake that here, but we must not allow these matters to slip our minds altogether.

3. Rather more can be said on our present methods about the differences between rates of interest which arise from differences in the duration of loans. These also turn out to be partly a matter of risk; but they are also influenced by other considerations.

There is a distinct analogy between long-period loan contracts and those long-period contracts for the delivery of goods or services which, as we saw in the last chapter, can be reduced to a combination of spot and forward trading. A contract to deliver goods at monthly intervals over a period of six months is equivalent to a spot transaction and a series of forward transactions; similarly, a loan for six months is equivalent to a loan for one month, combined with a series of forward loan transactions, each renewing the loan (re-lending the principal, or principal and interest) for a successive month. If we decide upon some minimum period of time, loans for less than which time we shall be prepared to dis-

¹ Thus the complications of the financial structure of firms seem to be largely due to attempts at discrimination on the capital market.

regard, every loan of every duration can be reduced to a standard pattern—a loan for the minimum period, combined with a given number of renewals for subsequent periods of the same length, contracted forward. It is clearly most in accordance with our general method if we take as the minimum period one 'week'.

Looking at it in this way, the rate of interest for loans of two weeks, running from our first Monday, is compounded out of the 'spot' rate of interest for loans of one week and the 'forward' rate of interest, also for one-week loans, but for loans to be executed in the second week. If no interest is to be paid until the conclusion of the whole transaction, then the same capital sum must be arrived at by accumulating for two weeks at the two-weeks rate of interest, or alternatively by accumulating for one week at the one-week rate, and then accumulating for a second week at the 'forward' rate. The two transactions are ultimately identical. Thus, if we write R_2, R_3, \dots for the current two-weeks, three-weeks, ... rates (the 'long' rates), r_2, r_3, \dots for the 'forward' short rates, r_1 (or R_1) for the current short rate (it belongs to both systems), we shall have¹

$$1 + R_1 = 1 + r_1,$$

$$(1 + R_2)^2 = (1 + r_1)(1 + r_2),$$

$$(1 + R_3)^3 = (1 + r_1)(1 + r_2)(1 + r_3).$$

If, as a first approximation, we allow ourselves to assume simple interest, these relations are much simplified. They become

$$R_1 = r_1,$$

$$2R_2 = r_1 + r_2,$$

$$3R_3 = r_1 + r_2 + r_3.$$

The long rate is the arithmetic average between the current short rate and the relevant forward short rates.²

4. The system of interest rates for loans of various durations can thus be reduced to a standard type of short rate (the rate of interest for a loan of one week) combined with a series of forward

¹ All rates taken per week, and measured in fractions rather than percentages; a rate of $\frac{1}{10}$ per cent. per week is thus written 0.001.

² If the long loan involves a promise to pay interest at regular intervals instead of all together at the conclusion of the transaction, the general formulae are more complicated, but the simple interest formulae are naturally unaffected.

short rates: rates for loans of one week, to be executed not in the current week, but in some future week. These latter rates are strictly analogous to the futures prices we discussed in the last chapter, and are determined in almost exactly the same way.

It is not usual to think of the market for long-term loans in terms of hedgers and speculators; but that distinction does in fact continue to be relevant here. Other things being equal, a person engaging in a long-term loan contract puts himself into a more risky position than he would be in if he refrained from making it; but there are some persons (and concerns) for whom this will not be true, because they are already committed to needing loan capital over extensive future periods. They may be embarking on operations which take a considerable time to come to fruition; or they may merely be laying down plans for continuous production, in the form of a long series of planned inputs and outputs, which it will not be easy to break off at any particular point. These persons will want to hedge their future supplies of loan capital, just as they will want to hedge their future supplies of raw materials. They will have a strong propensity to borrow long.

On the other side of the market there does not seem to be any similar propensity, though there is an important circumstance which demands attention. The actual making of any transaction involves some time and trouble, and loan transactions are no exception to the rule. But the amount of gain which can be expected to accrue from making a very short loan is very small, so that it will not counterbalance the trouble of arranging the loan unless the lender is well placed for operating in the short-term market. This difficulty has been largely overcome in modern times by the development of banks, whose offer of interest on deposit accounts provides what is in substance a 'short' market for the small investor. (That it really is a short market is proved by the maintenance of the bank's right to alter the rate of interest it pays.) Nevertheless, the difficulty of short lending may sometimes have the effect of driving lenders into the long market.¹

Taking these things together, it still appears that the forward market for loans (like the forward market for commodities) may be expected to have a constitutional weakness on one side, a weakness which offers an opportunity for speculation. If no extra return is offered for long lending, most people (and institutions)

¹ We shall be returning at length to this important matter. See below, Ch. XIII.

would prefer to lend short, at least in the sense that they would prefer to hold their money on deposit in some way or other. But this situation would leave a large excess of demands to borrow long which would not be met. Borrowers would thus tend to offer better terms in order to persuade lenders to switch over into the long market (that is to say, enter the forward market). A lender who did this would be in a position exactly analogous to that of a speculator in a commodity market. He would only come into the long market because he expected to gain by so doing, and to gain sufficiently to offset the risk incurred.

The forward rate of interest for any particular future week (which we have seen to be the unit from which long-term rates are built up) is thus determined, like the futures price of a commodity, at that level which just tempts a sufficient number of 'speculators' to undertake the forward contract. It will have to be higher than the short rate expected by these speculators to rule in that week, since otherwise they would get no compensation for the risk they are incurring; it will, indeed, have to exceed it by a sufficient amount to induce the marginal speculator to undertake the risk. The forward short rate will thus exceed the expected short rate by a risk-premium which corresponds exactly to the 'normal backwardation' of the commodity markets. If short rates are not expected to change in the future, the forward rate will exceed the current short rate by the extent of this premium; if short rates are expected to rise, the excess will be greater than this normal level; it is only if short rates are expected to fall that the forward rate can lie below the current rate.

The same rules must apply to the long rates themselves, which, as we saw in the last section, are effectively an average of the forward rates. If short rates are not expected to change, the long rate will exceed the short rate by a normal risk-premium; if the current short rate is regarded as abnormally low, the long rate will lie decidedly above it; the short rate can only exceed the long rate if the current short rate is regarded as abnormally high.¹

5. This analysis of the relation between short and long rates of interest has a distinct bearing upon the decision of policy we took

¹ One practical consequence of this, whose implications we shall examine at length later, is that short rates are bound to be liable to much greater fluctuations than long rates. See below, pp. 260-1.

at the end of the preceding chapter; in that connexion it is, indeed, rather disconcerting. It seemed then to be a convenient simplification which might be of use in further analysis, if we began by concentrating attention on a pure 'Spot Economy', defined as one in which all goods and services are sold *spot*, no forward trading taking place. So far as commodity trading is concerned, this simplification seemed quite legitimate; forward markets in commodities are not, in fact, of such great importance that we do much violence to reality by leaving them out. But now long lending turns out to be a concealed form of forward trading; and so it would seem that a pure spot economy ought to exclude long lending as well. That is a much more drastic abstraction. Let us try to visualize it.

In a pure spot economy where only short lending is allowed no goods are bought and sold forward, and all loans are made for the minimum period—one week. Consequently, when the markets open on the first Monday, all debts carried over from the preceding week must be supposed to be paid off, so that there are no outstanding contracts at all. On the other hand, since no forward contracts can be made now, entrepreneurs (and every one else) have to draw up their plans on the basis of their own individual expectations of future prices (including the future course of the short rate of interest). In both these ways—the complete clearing of decks every Monday, and the absence of the security given to enterprise by long-term borrowing—this model looks very unrealistic. Although we could probably adjust it subsequently to allow for its deficiencies, there would be much to be gained if we could find an equally simple model which would give a closer approximation to actual conditions.

The great advantage of this first model, which we should desire to retain, is its reduction of the complex system of interest rates for various maturities, which exists in practice, to a single rate. (If default risks are neglected, only one rate has to be considered altogether.) Economists, in their discussions of interest problems, often talk about the determination of *the* rate of interest. It would seem that they must have some such reduction as this in mind; yet *the* rate of interest which they discuss is more usually the long rate.¹

Consider the working of an economic system in which there is

¹ *The* rate of interest in Mr. Keynes's *General Theory* is the long rate.

still no forward trading in goods and services, and in which there is still only one type of lending. But now, instead of that one type of lending being lending for one week only (the type which characterized our previous 'Spot Economy'), suppose that it is lending for an indefinite period. In each system there is only one type of security. But whereas, in the spot economy with short lending previously discussed, that one security was the bill (a promise to pay such-and-such a capital sum at the end of the week), in our new model—the spot economy with long lending—it is the undated debenture (a promise to pay such-and-such a sum in perpetuity at regular intervals, as interest on the loan).

If the only rate of interest established on the market is a rate for loans of indefinite duration, the rate which must be paid in this economy for loans of *any* finite length is always a matter for conjecture. Even the rate of interest for loans of one week (the one rate which was determinate in our first model) becomes a matter for personal anticipation in the spot economy with long lending. For if a person desires to borrow money for one week, he can now only do it in one way. He must issue a loan of indefinite duration at the current rate of interest R , and then plan to redeem the loan at the end of the week, at the market price then ruling, which will depend upon the rate of interest R' , which rules in the second week. The effective rate for a loan of one week thus depends upon the borrower's expectation of the future rate of interest R' . The capital value of the loan will change in the course of the week in the proportion R/R' . Thus the effective rate he will have to pay will be

$$R + \frac{R}{R'} - 1,$$

which is less than R if $R' > R$. Thus the rate at which people can expect to borrow or lend for short periods will depend upon their anticipations of the future course of market rates; it will be less than the current market rate if the market rate is expected to rise, greater than the market rate if the market rate is expected to fall.

In a spot economy with long lending, loans are not necessarily paid back at the beginning of the week; so we must suppose a typical individual to find himself on the first Monday in the possession of certain securities, debts due from other persons issued at certain dates in the past, or with certain debts due to other

persons which he has acquired in the past. If, during the week, he decides to borrow, he can do so either by selling some old securities which he possesses, or by issuing new securities. Similarly, the acquisition both of old securities and of new securities will reckon as lending. The prices of old securities will have to adjust themselves to the rate of interest established on new securities (or, if we like to put it that way, the rate of interest on new securities will have to adjust itself to the prices of old securities); since, for an equal degree of default risk, it will be indifferent to an individual whether he buys or sells new securities or old securities. Since there is this purely arithmetical relation between the prices of old securities and the rate of interest, the prices of old securities need not be reckoned among the prices that have to be determined. Effectively, there is only one market rate of interest in the system.

6. There are thus two possible ways of constructing an economy with only one market rate of interest; each of them has its uses. We shall find, as we go on, that it is a distinct convenience to possess these alternative lines of approach; some things come out more clearly if we use the one route, some more clearly by the other. We shall therefore try to drive them for a while in double harness.

We have seen that it is possible to build up the whole system of interest rates, using the short rate as unit; if the spot economy with long lending is also to be a useful tool, it will have to be possible to build up the whole system in a parallel manner from the long rate. Can this be done? We saw that a system of nothing but short lending would break down in practice because many borrowers would desire the additional security that comes of borrowing for longer periods, and lenders would be prepared to grant them this security in return for a concession of rather higher rates of interest. How would it fare with a system of nothing but indefinitely long lending?

Such a system would be quite satisfactory to a certain class of borrowers—those who are embarking on continuous production; and even those borrowers who would prefer not to borrow quite indefinitely may not be ill content with doing so, if the length of time for which they would prefer to borrow would in any case extend into the distant future. These two classes probably cover

a large proportion of industrial borrowing (roughly speaking, that borrowing which is for investment in fixed capital). On the other side, there may be a certain class of lenders who would be content with indefinite lending—those whose object is simply to derive a regular income from their capital, and have no thought of anything else. How large this class is can be disputed (broad historical movements may well have changed its size very drastically); nevertheless, in any circumstances the qualification—*they have no thought of anything else*—is important. As soon as a lender begins to envisage the possibility that he may want his capital back in conceivable cases—and it is hard to believe that this idea is ever wholly absent—the drawback of indefinitely long lending begins to be evident. As we have seen, the rate of interest which can be earned on a loan of any finite duration, by investing in undated debentures, is always highly conjectural. If there is a serious rise in the long-term rate of interest, the effective yield may be completely wiped out. But this is much less likely to happen if the security acquired has a definite maturity, even if it is disposed of at a different date from that at which it falls due.

Thus lenders will always tend to reduce the risks to which they are subject if they can substitute shorter lending for longer lending, although the extent to which they are conscious of this advantage may differ at different times. In general, we may suppose that they will be willing to make some sacrifice of interest (which may be large or small) in order to achieve greater security. Now we have seen how to determine the most probable rate of interest which can be earned on a loan of finite length through investing in undated debentures; lenders may be expected to accept something less than this in order to get the greater security of lending short. In this way short (and medium-term) rates of interest will be determined. They will lie below the most probable yield of undated debentures over the period of the loan—differing from it, once again, by some sort of 'normal' risk-premium, whose size will depend upon the estimate put upon the gain in security.

As we have seen, the most probable yield, over a finite period, of investment in undated debentures will lie below the current (long-term) market rate when that rate is expected to rise in the future, above it in the contrary case. Thus, in stable conditions, when the long rate is expected to remain steady, the short rate will lie below it to the extent of the normal risk-premium; when

the long rate is expected to rise, the short rate will lie below it still further; it is only when the long rate is expected to fall that the short rate may lie above the long rate.

These conclusions, it will be seen, are perfectly consistent with those reached by our earlier method. The only difference between them is that while we there explained the span of interest rates in terms of expectations about the future course of the short rate, here we explain in terms of expectations about the future course of the long rate. In practice, the relevant expectations are no doubt expectations about the course of the whole system of rates; but (provided that they are fairly consistent) they can be reduced to either terms. The short rate can only lie above the long rate if the short rate is regarded as abnormally high, and if the long rate is regarded as abnormally high; but these phenomena are in fact mutually consistent, and do indeed tend to produce one another. A position of temporary equilibrium in which the long rate is expected to fall appreciably in the near future can only exist if speculators are prevented from buying securities at once in order to profit from the expected rise in their value—as they will be prevented if the short rate is high enough to offset this anticipated profit. But at the same time (looking at it the other way) this high short rate tends to raise the long rate rather above normal; for the long rate is an average of current and forward short rates, and this average is somewhat raised. From either point of view, there is a tendency for short and long rates to move in the same direction, but for the movement of short rates to have the larger amplitude.