goods. They have given up money in the present for a greater sum of money in the future, and the interest rate that they have earned is the agio, or discount on future goods as compared with present goods, i.e., the premium commanded by present goods over future goods. We shall see below that this exchange rate between present and future goods is not only uniform in the production process, but throughout the entire market system. It is the "social rate of time preference." It is the "price of time" on the market as the resultant of all the individual valuations of that good.

How the agio, or pure interest rate, is determined in the particular time-exchange markets, will be discussed below. Here we shall simply conclude by observing that there is some agio which will be established uniformly throughout the economy and which will be the pure interest rate on the certain expectation of future goods as against present goods.

8. Money Costs, Prices, and Alfred Marshall

In the ERE, therefore, every good sold to consumers will sell at a certain "final equilibrium" price and at certain total sales. These receipts will accrue in part to capitalists in the form of interest income, and the remainder to owners of land and labor. The payments of income to the producers have also been popularly termed "costs." These are clearly *money* costs, or money expenses, and obviously are not the same thing as "costs" in the psychic sense of subjective opportunity forgone. Money costs may be *ex post* as well as *ex ante*. (In the ERE, of course, *ex ante* and *ex post* calculations are always the same.) However, the two concepts become linked when psychic costs are appraised as much as possible in monetary terms. Thus, payment to factors may be 95 ounces and recorded as a cost, while the capitalist who earns an interest of five ounces considers 100 as an opportunity cost, since he could have invested elsewhere and earned five (actually, a bit higher) percent interest.

If, *for the moment*, we include as *money costs* factor payments and interest,[19] then in the ERE, money costs equal total money sales for every firm in every line of production. A firm earns entrepreneurial *profits* when its return is more than interest, suffers entrepreneurial *losses* when its return is less. In our production process, consumers will pay 100 ounces (money sales), and money costs are 100 ounces (factor plus interest income) and there will be similar equality for all other goods and processes. What this means, in essence, is that there are no entrepreneurial profits or losses in the ERE, because there is no change of data or uncertainty about possible change. If total money sales equal total money costs, then it evidently follows that total money sales *per unit sold* will equal total money costs per unit sold. This follows from elementary rules of arithmetic. But the money sales per unit are equal to the *money price* of the good, by definition; while we shall call the total money costs per unit the *average money cost* of the good. It likewise follows, therefore, that *price will equal average money cost for every good in the ERE.*

Strange as it may seem, a great many writers on economics have deduced from this a curious conclusion indeed. They have deduced that "in the long run" (i.e., in the ERE), the fact that costs equal sales or that "cost equals price" implies that *costs determine price*. The price of the good discussed above is 100 ounces per unit, allegedly *because* the cost (average money cost) is 100 ounces per unit. This is supposed to be the law of price determination "in the long run." It would seem to be crystal clear, however, that the truth is precisely the reverse. The price

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[19]Strictly, this assumption is incorrect, and we make it in this section only for purposes of simplicity. For interest may be an opportunity cost for an individual investor, but it is *not* a *money cost*, nor is it an opportunity cost for the aggregate of capitalists. For the implications of this widely held error in economic literature, *see* André Gabor and I.F. Pearce, "The Place of Money Capital in the Theory of Production," *Quarterly Journal of Economics*, November, 1958, pp. 537–57; and Gabor and Pearce, "A New Approach to the Theory of the Firm," *Oxford Economic Papers*, October, 1952, pp. 252–65.

of the final product is determined by the valuations and demands of the consumers, and this price *determines what the cost will be*. If the consumers value the product mentioned above so that its price is 50 ounces instead of 100 ounces, as a result, say, of a change in their valuations, then it is precisely in the "long run," when the effects of uncertainty are removed, that "costs of production" (here, factor payment plus interest payment) will equal the final price. We have seen above how factor incomes are at the mercy of consumer demand and fluctuate according to that demand. Factor payments are the *result* of sales to consumers and *do not determine the latter in advance*. Costs of production, then, are at the mercy of final price, and not the other way around. It is ironic that it is precisely in the ERE that this causative phenomenon should be the clearest. For in the ERE we see quite evidently that consumers pay and determine the final price of the product; that it is through these payments and these payments alone that factors and interest are paid; that therefore the amount of the payments and the total "costs of production" are determined by price and not *vice versa*. Money costs are the opposite of a basic, determining factor; they are dependent on the price of the product and on consumer demands.

In the real world of uncertainty it is more difficult to see this, because factors are paid in *advance* of the sale of the product, since the capitalist-entrepreneurs speculatively advance money to the factors in the *expectation* of being able to recoup their money with a surplus for interest and profit after sale to the consumers.[20] Whether they do so or not depends on their foresight regarding the state of consumer demand and the future prices of consumers' goods. In the real world of immediate market prices, of course, the existence of entrepreneurial profit and loss will always prevent costs and receipts, cost and price, from being identical, and it is obvious to all that price is solely determined by valuations of stock—by "utilities"—and not at all by money cost. But although most economists recognize that in the real

[20]Cf. Menger, *Principles of Economics*, pp. 149 ff.

world (the so-called "short-run") costs cannot determine price, they are seduced by the habit of the individual entrepreneur of dealing in terms of "cost" as the determining factor, and they apply this procedure to the case of the ERE and therefore to the inherent long-run tendencies of the economy. Their grave error, as will be discussed further below, comes from viewing the economy from the standpoint of an individual entrepreneur rather than from that of an economist. To the individual entrepreneur, the "cost" of factors is largely determined by forces outside himself and his own sales; the economist, however, must see how money costs are determined and, taking account of all the interrelations in the economy, must recognize that they are determined by final prices reflecting consumer demands and valuations.

The source of the error will become clearer below when we consider a world of nonspecific as well as specific factors. However, the essentials of our analysis and its conclusion remain the same in that more complex and realistic case.

The classical economists were under the delusion that the price of the final product is determined by "costs of production," or rather they fluctuated between this doctrine and the "labor theory of value," which isolated the money costs of labor and picked that segment of the cost of production as the determinant of price. They slurred over the determination of the prices of such goods as old paintings that already existed and needed no further production. The correct relation between prices and costs, as outlined above, was developed, along with other outstanding contributions to economics, by the "Austrian" economists, including the Austrians Carl Menger, Eugen von Böhm-Bawerk, and Friedrich von Wieser, and the Englishman W. Stanley Jevons. It was with the writings of the Austrian School in the 1870's and 1880's that economics was truly established as a science.[21]

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[21]The very interesting researches by Emil Kauder indicate that the essentials of the Austrian marginal utility theory (the basis of the view that

Unfortunately, in the science of economics, *retrogression* in knowledge has taken place almost as often as progression. The enormous advance provided by the Austrian School, on this point as on others, was blocked and reversed by the influence of Alfred Marshall, who attempted to rehabilitate the classicists and integrate them with the Austrians, while disparaging the contributions of the latter. It was unfortunately the Marshallian and not the Austrian approach that exerted the most influence over later writers. This influence is partly responsible for the current myth among economists that the Austrian School is effectively dead and has no more to contribute and that everything of lasting worth that it had to offer was effectively stated and integrated in Alfred Marshall's *Principles*.

Marshall tried to rehabilitate the cost-of-production theory of the classicists by conceding that, in the "short run," in the immediate market place, consumers' demand rules price. But in the long run, among the important reproducible goods, cost of production is determining. According to Marshall, both utility and money costs determine price, like blades of a scissors, but one blade is more important in the short run, and another in the long run. He concludes that

> as a general rule, the shorter the period we are considering, the greater must be the share of our attention which is given to the influence of demand on value; and the longer the period, the more important will be the influence of cost of production on value. . . . The actual value at any time, the market value as it is often called, is often more influenced by passing events and

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price determines cost and not *vice versa* or mutually) had already been formulated by French and Italian economists of the seventeenth and eighteenth centuries and that the English classical school shunted economics onto a very wrong road, a road from which economics was extricated only by the Austrians. *See* Emil Kauder, "Genesis of the Marginal Utility Theory," *Economic Journal*, September, 1953, pp. 638–50; and Kauder, "Retarded Acceptance of the Marginal Utility Theory."

> by causes whose action is fitful and shortlived, than by those which work persistently. But in long periods these fitful and irregular causes in large measure efface one another's influence; so that in the long run persistent causes dominate value completely.[22]

The implication is quite clear: if one deals with "short-run" market values, one is being quite superficial and dwelling only on fitful and transient causes—so much for the Austrians. But if one wants to deal with the "really basic" matters, the really lasting and permanent causes of prices, he must concentrate on costs of production—*pace* the classicists. This impression of the Austrians—their alleged neglect of the "long period," and "one-sided neglect of costs"—has been stamped on economics ever since.

Marshall's analysis suffers from a grave methodological defect—indeed, from an almost hopeless methodological confusion as regards the "short run" and the "long run." He considers the "long run" as actually existing, as being the permanent, persistent, observable element beneath the fitful, basically unimportant flux of market value. He admits (p. 350) that "even the most persistent causes are, however, liable to change," but he clearly indicates that they are *far less* likely to change than the fitful market values; herein, indeed, lies their long-run nature. He regards the long-run data, then, as underlying the transient market values in a way similar to that in which the basic sea level underlies the changing waves and tides.[23] For Marshall, then, the long-run data are something that can be spotted and marked by an observer; indeed, since they change far more slowly than the market values, they can be observed more accurately.

Marshall's conception of the long run is completely fallacious, and this eliminates the whole groundwork of his theoretical

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[22]Alfred Marshall, *Principles of Economics* (8th ed.; London: Macmillan & Co., 1920), pp. 349 ff.

[23]This analogy, though not used in this context, was often used by classical economists as applied to prices and "the price level," an application equally erroneous.

structure. The long run, by its very nature, *never does and never can exist.* This does not mean that "long-run," or ERE, analysis is not important. On the contrary, only through the concept of the ERE can we subject to catallactic analysis such critical problems as entrepreneurial profit, the structure of production, the interest rate, and the pricing of productive factors. The ERE is the goal (albeit shifting in the concrete sense) toward which the market moves. But the point at issue is that it *is not observable*, or real, as are actual market prices.

We have seen above the characteristics of the evenly rotating economy. The ERE is the condition that comes into being and continues to obtain when the present, existing market data (valuations, technology, resources) remain constant. It is a theoretical construct of the economist that enables him to point out in what directions the economy tends to be moving at any given time; it also enables the economist to isolate various elements in his analysis of the economy of the real world. To analyze the determining forces in a world of change, he must construct hypothetically a world of nonchange. This is far different from, indeed, it is the reverse of, saying that the long run exists or that it is somehow *more permanently* or more persistently existent than the actual market data. The actual market prices, on the contrary, are the only ones that *ever* exist, and they are the resultants of actual market data (consumer demands, resources, etc.) that themselves change continually. The "long run" is *not* more stable; its data necessarily change along with the data on the market. The fact that costs equal prices in the "long run" does not mean that costs will actually equal prices, but that the tendency exists, a tendency that is continually being *disrupted* in reality by the very fitful changes in market data that Marshall points out.[24]

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[24]On this error in Marshall, *see* F.A. Hayek, *The Pure Theory of Capital* (Chicago: University of Chicago Press, 1941), pp. 21, 27–28. Marshall is here committing the famous fallacy of "conceptual realism," in which theoretical constructs are mistaken for actually existing entities. For other

In sum, rather than being in some sense more persistent and more real than the actual market, the "long run" of the ERE is not real at all, but a very useful theoretical construct that enables the economist to point out the direction in which the market is moving at any given time—specifically, toward the elimination of profits and losses if existing market data remain the same. Thus, the ERE concept is especially helpful in the analysis of profits and losses as compared to interest. But the market data are the only actual reality.

This is not to deny, and the Austrians never did deny, that subjective costs, in the sense of opportunity costs and utilities forgone, are important in the analysis of production. In particular, the disutilities of labor and of waiting—as expressed in the time-preference ratios—determine how much of people's energies and how much of their savings will go into the production process. This, in the broadest sense, will determine or help to determine the total supply of all goods that will be produced. But these costs are themselves subjective utilities, so that both "blades of the scissors" are governed by the subjective utility of individuals. This is a *monistic* and not a dualistic causal explanation. The costs, furthermore, have no direct influence on the relative amount of the stock of *each good* to be produced. Consumers will evaluate the various stocks of goods available. *How much* productive energy and savings will go into producing stock of one particular good and how much into producing another, in other words, the relative stocks of each product, will depend in turn on entrepreneurial expectations of where the greatest monetary profit will be found. These expectations are based on the anticipated direction of consumer demand.

As a result of such anticipations, the *nonspecific* factors will move to the production of those goods where, *ceteris paribus*, their owners will earn the highest incomes. An exposition of this process will be presented below.

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examples, cf. Leland B. Yeager, "Some Questions on Growth Economics," *American Economic Review*, March, 1954, p. 62.

Marshall's treatment of subjective costs was also highly fallacious. Instead of the idea of opportunity costs, he had the notion that they were "real costs" that could be added in terms of measurable units. Money costs of production, then, became the "necessary supply prices" that entrepreneurs had to pay in order "to call forth an adequate supply of the efforts and waitings" to produce a supply of the product. These real costs were then supposed to be the fundamental, persisting element that backstops money costs of production, and allowed Marshall to talk of the more persisting, long-run, normal situation.[25]

Marshall's great error here, and it has permeated the works of his followers and of present-day writers, is to regard costs and production exclusively from the point of view of an isolated individual entrepreneur or an isolated individual industry, rather than viewing the whole economy in all its interrelations.[26] Marshall is dealing, of necessity, with particular prices of different goods, and he is attempting to show that alleged "costs of production" determine these prices in the long run. But it is completely erroneous to tie up particular goods with labor vs. leisure and with consuming vs. waiting costs, for the latter are only *general* phenomena, applying and diffusing throughout the entire economic system. The price necessary to call forth a nonspecific factor is the highest price this factor can earn elsewhere—an opportunity cost. What it can attain elsewhere is basically determined by the state of consumer demand elsewhere. The forgone leisure-and-consumption costs, in general,

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[25]Marshall, *Principles of Economics*, pp. 338 ff.

[26]We must hasten to point out that this is by no means the same criticism as the neo-Keynesian charge that economists must deal in broad aggregates, and not with individual cases. The latter approach is even worse, since it begins with "wholes" that have no basis in reality whatever. What we are advocating is a theory that deals with all the individuals as they interact in the economy. Furthermore, this is the "Austrian," and not the Walrasian approach, which has recently come into favor. The latter deals with interrelations of individuals ("the general equilibrium approach") but only in the ERE and with mathematical abstractions in the ERE.

only help to determine the size—the general stock—of labor and savings that will be applied to production. All this will be treated further below.

9. Pricing and the Theory of Bargaining

We have seen that, for all goods, total receipts to sellers will tend to equal total payments to factors, and this equality will be established in the evenly rotating economy. In the ERE, interest income will be earned at the same uniform rate by capitalists throughout the economy. The remainder of income from production and sale to consumers will be earned by the owners of the original factors: land and labor.

Our next task will be to analyze the determination of the prices of factor services and the determination of the interest rate, as they tend to be approached in the economy and would be reached in the ERE. Until now, discussion has centered on the capital-goods structure, treated *as if* it were in one composite stage of production. Clearly, there are numerous stages, but we have seen above that earnings in production ultimately resolve themselves, and certainly do so in the ERE, into the earnings of the original factors: land and labor. Later on, we shall expand the analysis to include the case of *many* stages in the production process, and we shall defend this type of temporal analysis of production against the very fashionable current view that production is "timeless" under modern conditions and that the original-factor analysis might have been useful for the primitive era but not for a modern economy. As a corollary to this, we shall develop further an analysis of the nature of capital and time in the production process.

What will be the process of pricing productive factors in a world of purely specific factors? We have been assuming that only *services* and not whole goods can be acquired. In the case of labor this is true because of the nature of the free society; in the case of land and capital goods, we are assuming that the capitalist product-owners hire or rent rather than own any of the productive factors outright. In our example above, the 95

ounces went to all the factor-owners jointly. By what *principles* can we determine how the joint income is allocated to the various *individual* factor services? If all the factors are purely specific, we can resort to what is usually called the *theory of bargaining*. We are in a very analogous situation to the *two-person* barter of chapter 2. For what we have is not relatively determinate prices, or proportions, but exchange ratios with wide zones between the "marginal pairs" of prices. The maximum price of one is widely separated from the minimum price of the other.

In the present case, we have, say, 12 labor and land factors, each of which is indispensable to the production of the good. None of the factors, furthermore, can be used anywhere else, in any other line of production. The question for these factor-owners to solve is the proportionate share of each in the total joint income. Each factor-owner's maximum goal is something slightly less than 100 percent of the income from the consumers. What the final decision will be cannot be indicated by praxeology. There is, for all practical purposes, no theory of bargaining; all that can be said is that since the owner of each factor wants to participate and earn some income, all will most likely arrive at some sort of voluntary contractual arrangement. This will be a formal type of partnership agreement if the factors jointly own the product; or it will be the *implicit* result if a pure capitalist purchases the services of the factors.

Economists have always been very unhappy about bargaining situations of this kind, since economic analysis is estopped from saying anything more of note. We must not pursue the temptation, however, to condemn such situations as in some way "exploitative" or bad, and thereby convert barrenness for economic analysis into tragedy for the economy. Whatever agreement is arrived at by the various individuals will be beneficial to every one of them; otherwise, he would not have so agreed.[27]

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[27]Little of value has been said about bargaining since Böhm-Bawerk. *See* Böhm-Bawerk, *Positive Theory of Capital*, pp. 198–99. This can be seen in J. Pen's "A General Theory of Bargaining," *American Economic Review*,

It is generally assumed that, in the jockeying for proportionate shares, labor factors have less "bargaining power" than land factors. The only meaning that can be seen in the term "bargaining power" here is that some factor-owners might have minimum reservation prices for their factors, below which they would not be entered in production. In that case, these factors would *at least* have to receive the minimum, while factors with no minimum, with no reservation price, would work even at an income of only slightly more than zero. Now it should be evident that the owner of every labor factor has *some* minimum selling price, a price below which he will not work. In our case, where we are assuming (as we shall see, quite unrealistically) that *every* factor is specific, it is true that no laborer would be able to earn a return in any other type of work. But he could always enjoy leisure, and this sets a minimum supply price for labor service. On the other hand, the use of land sacrifices no leisure. Except in rare cases where the owner enjoys a valuable esthetic pleasure from contemplating a stretch of his own land not in use, there is no revenue that the land can bring him except a monetary return in production. Therefore, land has no reservation price, and the landowner would have to accept a return of almost zero rather than allow his land to be idle. The bargaining power of the owner of labor, therefore, is almost always superior to that of the owner of land.

In the real world, labor, as will be seen below, is uniquely the *nonspecific* factor, so that the theory of bargaining could never apply to labor incomes.[28]

Thus, when two or more factors are specific to a given line of production, there is nothing that economic analysis can say further about the allocation of the joint income from their

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March, 1952, pp. 24 ff. Pen's own theory is of little worth because it rests explicitly on an assumption of the measurability of utility. *Ibid.*, p. 34 n.

[28]Contrast the discussion in most textbooks, where bargaining occupies an important place in explanation of market pricing *only* in the discussion of labor incomes.

product; it is a matter of voluntary bargaining between them. Bargaining and indeterminate pricing also take place even between two or more nonspecific factors in the rare case where the proportions in which these factors *must* be used are *identical* in each employment. In such cases, also, there is no determinate pricing for any of the factors separately, and the result must be settled by mutual bargaining.

Suppose, for example, that a certain machine, containing two necessary parts, can be used in several fields of production. The two parts, however, must always be combined in use in a certain fixed proportion. Suppose that two (or more) individuals owned these two parts, i.e., two different individuals produced the different parts by their labor and land. The combined machine will be sold to, or used in, that line of production where it will yield the highest monetary income. But the price that will be established for that machine will necessarily be a *cumulative* price so far as the two factors—the two parts—are concerned. The price of each part and the allocation of the income to the two owners must be decided by a process of bargaining. Economics cannot here determine separate prices. This is true because the proportions between the two are always the same, even though the combined product can be used in several different ways.[29]

Not only is bargaining theory rarely applicable in the real world, but zones of indeterminacy between valuations, and therefore zones of indeterminacy in pricing, tend to dwindle radically in importance as the economy evolves from barter to an advanced monetary economy. The greater the number and variety of goods available, and the greater the number of people with differing valuations, the more negligible will zones of indeterminacy become.[30]

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[29]*See* Mises, *Human Action*, p. 336.

[30]Any zone of indeterminacy in pricing must consist of the coincidence of an absolutely vertical supply curve with an absolutely vertical market demand curve for the good or service, so that the equilibrium price

At this point, we may introduce another rare, explicitly empirical, element into our discussion: that on this earth, labor has been a far scarcer factor than land. As in the case of Crusoe, so in the case of a modern economy, men have been able to choose which land to use in various occupations, and which to leave idle, and have found themselves with idle "no-rent" land, i.e., land yielding no income. Of course, as an economy advances, and population and utilization of resources grow, there is a tendency for this superfluity of land to diminish (barring discoveries of new, fertile lands).

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is in a zone rather than at a point. As Hutt states, "It depends entirely upon the fortuitous coincidence of . . . an unusual and highly improbable demand curve with an absolutely rigid supply curve." W.H. Hutt, *The Theory of Collective Bargaining* (Glencoe, Ill.: The Free Press, 1954), pp. 90, and 79–109.

6

PRODUCTION: THE RATE OF INTEREST AND ITS DETERMINATION

1. Many Stages: The Pure Rate of Interest[1]

UP TO THIS POINT WE HAVE been treating the structure of production as amalgamated into one stage. One or several firms have all been *vertically integrating* all the stages of production of a product (with all factors specific), until finally the product is sold to the consumer. This is certainly an unrealistic assumption. We shall now consider the production situation in the real world, where (*a*) factors are nonspecific as well as specific, and (*b*) production is divided into numerous stages, as the factors continue to work and advance from the higher to the lower stages of the production process.[2] Instead of assuming that one firm—one set of capitalists—purchases factors and retains ownership of the product up through the sale to consumers, let us suppose that there are different firms and different sets of capitalists at definite intervals, and at each interval the product, in

[1]The discussion in this chapter deals with the *pure* rate of interest, as determined by time preference. On the role of the purchasing-power component in the market rate of interest, cf. chapter 11 on money.

[2]On production theory and stages of production, see the important works of F.A. Hayek, particularly *Prices and Production* (2nd ed.; London: Routledge and Kegan Paul, 1935); and *Profits, Interest, and Investment* (London: Routledge and Kegan Paul, 1939).

the stage it has reached up to that point, is sold for money to another capitalist or group of capitalists. It is not necessary to make any restrictive assumptions about how many separate stages occur or what the time intervals between individual stages might be. For purposes of convenience, let us return to our example and the diagram in Figure 40. We shall assume that exchanges of product and service take place at each line marked on the diagram. We shall further assume, for convenience only, that each stage takes the same length of time.

Now, instead of collecting interest income for services in one lump sum at the final stage, the capitalist or capitalists acquire interest income *at each stage*.[3] If each stage takes one year, then the entire production process for the good takes six years. When the stages are all lumped together, or vertically integrated, then one capitalist (or set of capitalists) advances the owners of original factors their money six years ahead of time and then waits for this period to acquire his revenue. (Strictly, since the work and pay of labor and land would be continual as the product advanced to its final form, the earliest hired labor and land would be paid, say, in year one, and the latest toward the end of year six.) With separate stages, however, each capitalist advances the money for only one year.

Let us see the picture on a diagram (Figure 41). We must modify the previous diagram somewhat. A lower bar of 100 ounces is added, and the *interest* income that accrues to the capitalist at this lowest stage is indicated by an arrow going off to the left side. The upward arrow then represents the amount going to owners of original factors, land and labor, at this stage, and the shaded area the amount going to owners of capital-goods factors of a higher rank, i.e., intermediate products. The diagram in Figure 40 did not depict interest income, but simply presented all income as going to the owners of original factors; the time element had not yet been introduced into our discussion.

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[3]Cf. Böhm-Bawerk, *Positive Theory of Capital*, pp. 304–05, 320.

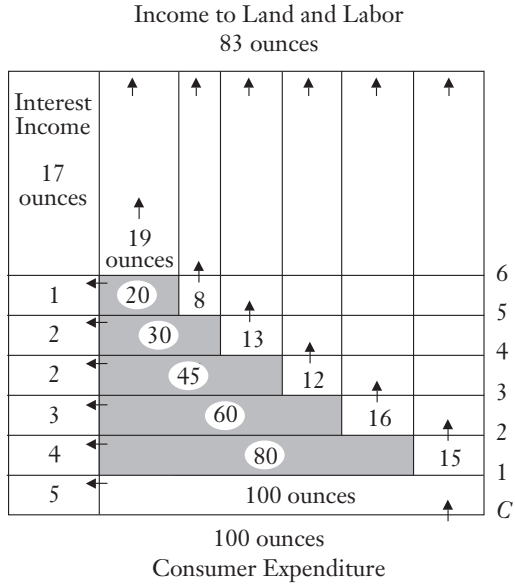

FIGURE 41. INCOME ACCRUING TO FACTORS AT VARIOUS STAGES OF PRODUCTION

The structure of production and payment depicted in this basic diagram is as follows: Consumers spend 100 ounces on the good in question. Of the 100 ounces, five ounces go as interest income to the sellers of the consumers' good, and 95 are paid out to the owners of factors. In our example, 15 ounces go for the use of land and labor (original) factors, and 80 go into the purchase of factor services of capital goods of a higher order. At the second stage, capitalists receive 80 ounces in revenue from the sale of their product.

Of the 80 ounces, 16 go into the purchase of land and labor factors, and four accrue as interest income to the second-level capitalists. The remaining 60 are used for the purchase of higher-order capital goods. The same process is repeated until, on the highest stage, the highest-order capitalists receive 20 ounces of revenue, retain one for themselves, and pay out 19 to land and labor factors. The sum total of income to land and labor factors is 83 ounces; total interest income is 17 ounces.

In the foregoing section on interest we showed that money is always nonspecific, and the result is that in the ERE the interest return on monetary investment (the pure rate of interest) is the same everywhere in the economy, regardless of the type of product or the specific conditions of its production. Here we see an amplification of this principle. *Not only must the interest rate be uniform for each good; it must be uniform for every stage of every good.* In our diagram, the interest-rate return received by product-owners, i.e., by capitalists, is equal at each stage. At the lowest stage, producers have invested 95 ounces in factors (both capital goods and original factors) and receive 100 ounces from consumers—a net income of five ounces. This represents a return on the investment of 5/95, or approximately 5.2 percent. In the ERE, which we are considering, there are no profits or losses due to uncertainty, so that this return represents the rate of pure interest.[4] The capitalist at the next higher stage invests 60 plus 16 or 76 ounces in factors and receives a net return of four ounces, again approximately 5.2 percent. And so on for each stage of investment, where, except for the vagaries of the arithmetic in our example, the interest rate is uniform for each stage. At the highest stage, the capitalist has invested 19 ounces in land and labor, and receives a net return of one, again about 5.2 percent.

The interest rate must be equal for each stage of the production process. For suppose that the interest rate were higher in the higher stages than in the lower stages. Then capitalists would abandon producing in the lower stage, and shift to the higher stage, where the interest return is greater. What is the effect of such a shift? We can answer by stressing the *implications* of differences in the interest rate. A higher interest rate in stage *A* than in stage *B* means that the *price* spread between the sum

[4]In the ERE of our example, the *pure* rate of interest is *the* rate of interest, since, as we shall see, deviations from the pure rate are due solely to uncertainty.

of factors entering into stage *A* and the selling price of its product, *is greater*, in percentage terms, than the price spread in stage *B*. Thus, if we compare stage four and stage one in the diagram in Figure 41, we find a price spread of 43 to 45 in the former case, and 95 to 100 in the latter, for a net interest return of approximately 5.2 percent in each. Let us suppose, however, that the sum of the factor prices for stage four is 35 instead of 43, while the sum of factor prices in stage one is 98. (The sum of factor prices here *excludes* interest income, of course.) Capitalists investing in stage four would earn a net return of 8, or 23 percent, while investors in stage one earned about 2 percent. Capitalists would begin to stop investing in stage one and shift to stage four. As a consequence of this shifting, the aggregate demand in stage one for its factors diminishes, and the prices of the factors used in stage one therefore decline. In the meanwhile, greater investment in stage four raises factor prices there, so that the cumulative price rises from 35. Products of stage four increase, and the increased supply lowers the selling price, which falls from 43. These arbitrage actions continue until the percentage spread in each of the two stages is equal.

It is important to realize that the *interest rate is equal to the rate of price spread in the various stages*. Too many writers consider the rate of interest as only the price of loans on the loan market. In reality, as we shall see further below, the rate of interest pervades all time markets, and the productive loan market is a strictly subsidiary time market of only derivative importance.[5]

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[5]In the reams of commentary on J.M. Keynes' *General Theory*, no one has noticed the very revealing passage in which Keynes criticizes Mises' discussion of this point. Keynes asserted that Mises' "peculiar" new theory of interest "confused" the "marginal efficiency of capital" (the net rate of return on an investment) with the rate of interest. The point is that the "marginal efficiency of capital" *is indeed* the rate of interest! It is a price on the time market. It was precisely this "natural" rate, rather than the loan rate, that had been a central problem of interest theory for many years. The essentials of this doctrine were set forth by Böhm-Bawerk in *Capital and Interest* and should therefore not have been surprising to Keynes. *See*

Not only will the rate of interest be equal in each stage of any given product, but the *same* rate of interest will prevail in *all* stages of *all* products in the ERE. In the real world of uncertainty, the *tendency* of entrepreneurial actions is always in the direction of establishing a uniform rate of interest throughout all time markets in the economy. The reason for the uniformity is clear. If stage three of good *X* earns 8 percent and stage one of good *Y* earns 2 percent, capitalists will tend to cease investing in the latter and shift to greater investments in the former. The price spreads change accordingly, in response to the changing demands and supplies, and the interest rates become uniform.

We may now remove our restrictive assumption about the equality of duration of the various stages. Any stage of any product may be as long or as short as the techniques of production, and the organizational structure of industry require. Thus, a technique of production might require a year's harvest for any particular stage. On the other hand, a firm might "vertically integrate" two stages and advance the money to owners of factors for the period covering *both* stages before selling the product for money. The net return on the investment in any stage will adjust itself in accordance with the length of the stage. Thus, suppose that the uniform interest rate in the economy is 5 percent. This is 5 percent for a certain unit period of time, say a year. A production process or investment covering a period of two years will, in equilibrium, then earn 10 percent, the equivalent of 5 percent *per year*. The same will obtain for a stage of production of any length of time. *Thus, irregularity or integration of stages does not hamper the equilibrating process in the slightest.*

John Maynard Keynes, *The General Theory of Employment, Interest and Money* (New York: Harcourt, Brace & Co., 1936), pp. 192–93. It is precisely this preoccupation with the relatively unimportant problems of the loan market that constitutes one of the greatest defects of the Keynesian theory of interest.

It is already clear that the old classical trinity of "land, labor, and capital" earning "wages, rents, and interest" must be drastically modified. It is *not* true that capital is an independent productive factor or that it earns interest for its owner, in the same way that land and labor earn income for their owners. As we have seen above and will discuss further below, capital is not an independently productive factor. Capital goods are vital and of crucial importance in production, but their production is, in the long run, imputable to land, labor, and time factors. Furthermore, land and labor are not homogeneous factors within themselves, but simply categories of *types* of uniquely varying factors. Each land and each labor factor, then, has its own physical features, its own power to serve in production; each, therefore, receives its own income from production, as will be detailed below. Capital goods too have infinite variety; but, in the ERE, they earn no incomes. What does earn an income is the conversion of future goods into present goods; because of the universal fact of time preference, future satisfactions are always at a discount compared to present satisfactions. The *owning* and holding of capital goods from date one, when factor services are purchased, until the product is sold at date two is what capitalist investors accomplish. This is equivalent to the purchase of future goods (the factor services producing capital goods) with money, followed by the sale at a later date of the present goods for money. The latter occurs when consumers' goods are being sold, for consumers' goods *are* present goods. When intermediate, lower-order capital goods are sold for money, then it is not present goods, but *less distantly future* goods, that are sold. In other words, capital goods have been advanced from an earlier, *more distantly future* stage toward the consumption stage, to a later or *less distantly future* stage. The time for this transformation will be covered by a rate of time preference. Thus, if the market time preference rate, i.e., interest rate, is 5 percent per year, then a present good worth 100 ounces on the market will be worth about 95 ounces for a claim on it one year from now. The *present value* for a claim on 100 ounces one year from now

will be 95 ounces. On this basis, the estimated worth of the good could be worked out for various points in time; thus, the claim for one-half year in the future will be worth roughly 97.5 ounces. The result will be a uniformity of rates over a period of time.

Thus, capitalists advance present goods to owners of factors in return for future goods; then, later, they sell the goods which have matured to become present or less distantly future goods in exchange for present goods (money). They have advanced present goods to owners of factors and, in return, wait while these factors, which are future goods, are transformed into goods that are *more nearly present* than before. The capitalists' function is thus a *time* function, and their income is precisely an income representing the agio of present as compared to future goods. This interest income, then, is *not* derived from the concrete, heterogeneous capital *goods*, but from the generalized investment of time.[6] It comes from a willingness to sacrifice present goods for the purchase of future goods (the factor services). As a result of the purchases, the owners of factors obtain their money in the present for a product that matures only in the future.

Thus, capitalists restrict their present consumption and use these *savings* of money to supply money (present goods) to factor owners who are producing only future goods. This is the service—an advance of time—that the capitalists supply to the owners of factors, and for which the latter voluntarily pay in the form of the interest rate.

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[6]As Böhm-Bawerk declared:

> Interest . . . may be obtained from any capital, no matter what be the kind of goods of which the capital consists: from goods that are barren as well as from those that are naturally fruitful; from perishable as well as from durable goods; from goods that can be replaced and from goods that cannot be replaced; from money as well as from commodities. (Böhm-Bawerk, *Capital and Interest*, p. 1)

2. The Determination of the Pure Rate of Interest: The Time Market[7]

It is clear that the rate of interest plays a crucial role in the system of production in the complex, monetary economy. How is the rate of interest determined? The *pure* rate of interest, with which we are now concerned, we have seen will tend to be equal throughout all stages of all production processes in the economy and thus will be uniform in the ERE.

The level of the pure rate of interest is determined by the market for the exchange of present goods against future goods, a market which we shall see permeates many parts of the economic system. The establishment of money as a general medium of exchange has greatly simplified the present-future market as compared to the laborious conditions under barter, where there were separate present-future markets for every commodity. In the monetary economy, the present-future market, or what we may call the "time market," is expressed completely in terms of money. *Money* is clearly the present good *par excellence*. For, aside from the consumption value of the monetary metal itself, the money commodity is the one completely marketable good in the entire society. It is the open sesame to exchange for consumption goods at any time that its owner desires. It is therefore a present good. Since consumers' goods, once sold, do not ordinarily re-enter the exchange nexus, money is the dominant present good in the market. Furthermore, since money is the medium for *all* exchanges, it is also the medium for exchanges on the time market.

What are the future goods that exchange for money? *Future goods are goods that are now expected to become present goods at some future date.* They therefore have a present value. Because of the universal fact of time preference, a particular good is worth more

[7]Cf. Mises, *Human Action*, pp. 521–42.

at present than is the present *prospect* of its becoming available as a present good at some time in the future. In other words, a good at present is worth more now than its present value as a future good. Because money is the general medium of exchange, for the time market as well as for other markets, money is the present good, and the future goods *are present expectations of the future acquisition of money.* It follows from the law of time preference that *present money is worth more than present expectations of the same amount of future money.* In other words, future money (as we may call present expectations of money in the future) will always exchange at a discount compared to present money.

This discount on future goods as compared with present goods (or, conversely, the premium commanded by present goods over future goods) is the rate of interest. Thus, if, on the time market, 100 ounces of gold exchange for the prospect of obtaining 105 ounces of gold one year from now, then the rate of interest is approximately 5 percent per annum. This is the time-discount rate of future to present money.

What do we mean specifically by "prospects for obtaining money in the future"? These prospects must be carefully analyzed in order to explain all the causal factors in the determination of the rate of interest. In the first place, in the real world, these prospects, like any prospects over a period of time, are always more or less *uncertain*. In the real world this ever present uncertainty necessarily causes interest and profit-and-loss elements to be intertwined and creates complexities that will be analyzed further below. In order to separate the time market from the entrepreneurial elements, we must consider the certain world of the evenly rotating economy, where anticipations are all fulfilled and the pure rate of interest is equal throughout the economy. The *pure* rate of interest will then be the going rate of time discount, the ratio of the price of present goods to that of future goods.

What, then, are the specific types of future goods that enter the time market? There are two such types. One is a *written*

claim to a certain amount of money at a future date. The exchange on the time market in this case is as follows: A gives money to B in exchange for a claim to future money. The term generally used to refer to A, the purchaser of the future money, is "lender," or "creditor," while B, the seller of the future money, is termed the "borrower" or "debtor." The reason is that this *credit transaction*, as contrasted to a *cash* transaction, remains *unfinished* in the present. When a man buys a suit for cash, he transfers money in exchange for the suit. The transaction is finished. In a credit transaction he receives simply a written I.O.U., or note, entitling him to claim a certain amount of money at a future date. The transaction remains to be completed in the future, when B, the borrower, "repays the loan" by transferring the agreed money to the creditor.

Although the loan market is a very conspicuous type of time transaction, it is by no means the only or even the dominant one. There is a much more subtle, but more important, type of transaction which permeates the entire production system, but which is not often recognized as a time transaction. This is the purchase of producers' goods and services, which are transformed over a period of time, finally to emerge as consumers' goods. When capitalists purchase the services of factors of production (or, as we shall later see, the factors themselves), they are purchasing a certain amount and value of net produce, discounted to the *present* value of that produce. For the land, labor, and capital services purchased are *future goods*, to be transformed into *final form as present goods*.

Suppose, for example, that a capitalist-entrepreneur hires labor services, and suppose that it can be determined that this amount of labor service will result in a net revenue of 20 gold ounces to the product-owner. We shall see below that the service will tend to be paid the net value of its product; but it will earn its product *discounted* by the time interval until sale. For if the labor service will reap 20 ounces five years from now, it is obvious that the owner of the labor cannot expect to receive from the capitalist the full 20 ounces *now*, in advance. He will

receive his net earnings discounted by the going agio, the rate of interest. And the interest income will be earned by the capitalist who has assumed the task of advancing present money. The capitalist then waits for five years until the product matures before recouping his money.

The pure capitalist, therefore, in performing a capital-advancing function in the productive system, plays a sort of intermediary role. He sells money (a present good) to factor-owners in exchange for the services of their factors (prospective future goods). He holds these goods and continues to hire work on them until they have been transformed into consumers' goods (present goods), which are then sold to the public for money (a present good). The premium that he earns from the sale of present goods, compared to what he paid for future goods, is the *rate of interest* earned on the exchange.

The time market is therefore not restricted to the loan market. It permeates the entire production structure of the complex economy. All productive factors are future goods: they provide for their owner the expectation of being advanced toward the final goal of consumption, a goal which provides the *raison d'être* for the whole productive enterprise. It is a time market where the future goods sold do not constitute a credit transaction, as in the case of the loan market. The transaction is complete in itself and needs no further payment by either party. In this case, the buyer of the future goods—the capitalist—earns his income through transforming these goods into present goods, rather than through the presentation of an I.O.U. claim on the original seller of a future good.

The time market, the market where present goods exchange for future goods, is, then, an aggregate with several component parts. In one part of the market, capitalists exchange their money savings (present goods) for the services of numerous factors (future goods). This is one part, and the most important part, of the time market. Another is the consumers' loan market, where savers lend their money in a credit transaction, in

exchange for an I.O.U. of future money. The savers are the suppliers of present money, the borrowers the suppliers of future money, in the form of I.O.U.'s. Here we are dealing only with those who borrow to spend on consumption goods, and *not* with producers who borrow savings in order to invest in production. For the borrowers of savings for production loans are not independent forces on the time market, but rather are completely dependent on the interest agio between present and future goods as determined in the production system, equaling the ratio between the prices of consumers' and producers' goods, and between the various stages of producers' goods. This dependence will be seen below.

3. Time Preference and Individual Value Scales

Before considering the component parts of the time market further, let us go to the very root of the matter: the value scale of the individual. As we have seen in the problem of pricing and demand, the individual's value scale provides the key to the determination of all events on the market. This is no less true in regard to the interest rate. Here the key is the schedule of time-preference valuations of the individual.

Let us consider a hypothetical individual, abstracting from any particular role that he may play in the economic system. This individual has, of necessity, a diminishing marginal utility of money, so that each additional unit of money acquired ranks lower on his value scale. This is necessarily true. Conversely, and this also follows from the diminishing marginal utility of money, each successive unit of money given up will rank higher on his value scale. The same law of utility applies to future money, i.e., to prospects of future money. To both present money and future money there applies the general rule that *more* of a good will have greater utility than *less* of it. We may illustrate these general laws by means of the following hypothetical value scale of an individual:

John Smith

..... (19 oz. future) (10 yrs. from now)
..... 4th unit of 10 oz.
..... (18 oz. future)
..... (17 oz. future)
..... (16 oz. future)
..... 3rd unit of 10 oz.
..... (15 oz. future)
..... (14 oz. future)
..... (13 oz. future)
..... 2nd unit of 10 oz.
..... (12 oz. future)
..... 1st unit of 10 oz.
..... (11 oz. future)
..... (1st added unit of 10 oz.)
..... (2nd added unit of 10 oz.)
..... (10 oz. future)

We see in this value scale an example of the fact that all possible alternatives for choice are ranged in one scale, and the truths of the law of utility are exemplified. The "1st unit of 10 oz." refers to the rank accorded to the first unit of 10 ounces (the unit arbitrarily chosen here) to be given up. The "2nd unit of 10 ounces" of money to be given up is accorded higher rank, etc. The "1st added unit of 10 oz." refers to the rank accorded to the next unit of 10 ounces which the man is considering acquiring, with parentheses to indicate that he does not now have the good in his possession. Above we have a schedule of John Smith's value scale with respect to time, i.e., his scale of time preferences. Suppose that the market rate of interest, then, is 3 percent; i.e., he can obtain 13 ounces of future money (considered here as 10 years from now), by selling 10 ounces of present money. To see what he will do, we are privileged to be able to consult his time-preference scale. We find that 13 ounces of future money is preferred to his first unit of 10 ounces and also to the second unit of 10 ounces, but that the third unit of 10 ounces stands higher in his valuation. Therefore, with a market rate of 3 percent per

year, the individual will save 20 ounces of gold and sell them for future money on the time market. He is a supplier of present goods on the time market to the extent of 20 ounces.[8]

If the market rate of interest is 2 percent, so that 12 future ounces would be the price of 10 present ounces, then John Smith would be a *supplier of 10 ounces of present money.* He is never a *supplier of future money* because, in his particular case, there are no quantities of future money above 10 ounces that are ranked below "1st added unit of 10 oz."

Suppose, for example, that James Robinson has the following time-value scale:

James Robinson

..... (19 oz. future) (10 yrs. from now)
..... 2nd unit of 10 oz.
..... (18 oz. future)
..... (17 oz. future)
..... 1st unit of 10 oz.
..... (16 oz. future)
..... (15 oz. future)
..... (14 oz. future)
..... (1st added unit of 10 oz.)
..... (13 oz. future)
..... (12 oz. future)
..... (2nd added unit of 10 oz.)
..... (11 oz. future)
..... (3rd added unit of 10 oz.)
..... (10 oz. future)

[8]This is a highly simplified portrayal of the value scale. For purposes of exposition, we have omitted the fact that the *second* unit of 13 added future ounces will be worth less than the first, the third unit of 13 less than the second, etc. Thus, in actuality, the demand schedule of future goods will be lower than portrayed here. However, the essentials of the analysis are unaffected, since we can assume a demand schedule of any size that we wish. The only significant conclusion is that the demand curve is shaped so that an individual demands more future goods as the market rate of interest rises, and this conclusion holds for the actual as well as for our simplified version.

If the market rate of interest is 3 percent, then Robinson's valuations are such that no savings will be supplied to the time market. On the contrary, 13 ounces future *is lower than* "1st added unit of 10 oz.," which means that Robinson would be willing to exchange 13 ounces of future money for 10 ounces of present money. Thereby he becomes, in contrast to Smith, a supplier of future money. If the rate of interest were 1 percent, then he would supply 22 ounces of future money in exchange for 20 ounces of present money, thus increasing his demand for present money at the lower price.

It will be noticed that there is no listing for less than 10 ounces of future goods, to be compared with 10 ounces of present goods. The reason is that every man's time preference is positive, i.e., one ounce of present money will always be preferred to one ounce or less of future money. Therefore, there will never be any question of a zero or negative pure interest rate. Many economists have made the great mistake of believing that the interest rate determines the time-preference schedule and rate of savings, rather than *vice versa*. This is completely invalid. The interest rates discussed here are simply hypothetical schedules, and they *indicate* and reveal the time-preference schedules of each individual. In the aggregate, as we shall see presently, the interaction of the time preferences and hence the supply-demand schedules of individuals on the time market determine the pure rate of interest on the market. They do so in the same way that individual valuations determine aggregate supply and demand schedules for goods, which in turn determine market prices. And once again, it is utilities and utilities alone, here in the form of time preferences, that determine the market result; the explanation does not lie in some sort of "mutually determining process" of preferences and market consequences.

Continuing with our analysis, let us tabulate the schedules of John Smith and James Robinson, from their time-value scales above, in relation to their position on the time market. John Smith's schedule is given in Table 11. James Robinson's schedule is given in Table 12.

TABLE 11

INTEREST RATE %	SUPPLY OF PRESENT MONEY = DEMAND FOR FUTURE MONEY = SAVINGS OZ. OF GOLD	SUPPLY OF FUTURE MONEY = DEMAND FOR PRESENT MONEY OZ. OF GOLD
9	40	0
8	30	0
7	30	0
6	30	0
5	20	0
4	20	0
3	20	0
2	10	0
1	0	0

TABLE 12

INTEREST RATE %	SUPPLY OF PRESENT MONEY = DEMAND FOR FUTURE MONEY = SAVINGS OZ. OF GOLD	SUPPLY OF FUTURE MONEY = DEMAND FOR PRESENT MONEY OZ. OF GOLD
9	20	0
8	10	0
7	10	0
6	0	0
5	0	0
4	0	0
3	0	10
2	0	10
1	0	20

The Robinson time schedule is of particular interest. Referring to his time-value scale, we find that at an interest rate of 9 percent, 19 ounces of future money is above the second unit of 10 ounces of present money and therefore also above the first unit. At this interest rate, his supply of present money on the time market, i.e., his savings, equals 20 ounces. Because his valuation of the first unit (of 10 ounces—an arbitrary size of unit that we have picked for this discussion) is between 16 and 17 ounces of future money, when the market interest rate is 6 percent, his return of 16 ounces is less valuable to him than his first unit. Therefore, he will not be a saver and supplier of present money at this rate. On the other hand, he will not be a supplier of future goods (i.e., a demander of present goods on the time market) either. In order to be a supplier of future goods, his valuation of the future money that he would have to give up at the ruling rate of interest has to be lower than the present money that he would get. In other words, what he gives up in prospective future money will have to be worth less to him than the utility of the "1st additional unit of 10 oz." on his scale. While the market rate is in the 4-percent to 6-percent range, this will not be true, for the 14 to 16 ounces of future money that he would have to supply would be worth more to him than the additional 10 ounces of present money that he would gain from the exchange. In Robinson's case, the critical point takes place when the hypothetical interest rate drops to 3 percent, for 13 future ounces are worth less than an additional 10 ounces of present money, and he will supply the future ounces on the market. If the interest rate were 1 percent, he would supply 20 ounces of future goods.[9]

It should be evident that an individual, at any one time, will either be a net saver (i.e., a net demander of future goods), a net supplier of future goods, or not be on the time market at all. The three categories are mutually exclusive.

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[9]The reader may drop the parentheses around the future moneys at the lower end of the value scale, for Robinson is considering supplying them as well as demanding them.

The diagram in Figure 42 sketches the schedules of Smith and Robinson in graphic form. Interest rate is on the vertical axis, and money on the horizontal. The supplies of present goods are also demands for future goods, and the demand for present goods is also the supply of future goods.

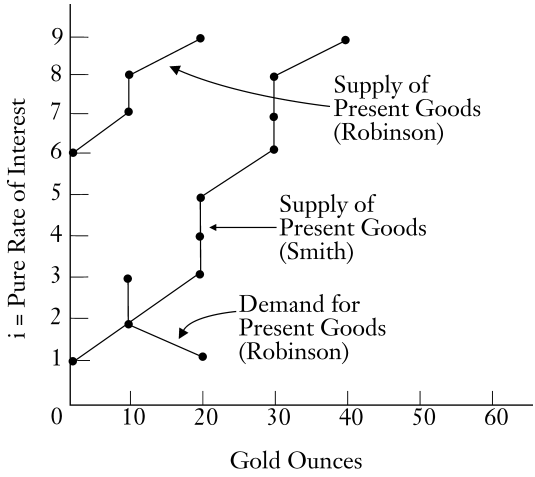

FIGURE 42. COMPARISON OF TIME-PREFERENCE SCHEDULES

We cannot compare utilities or values between persons, but we certainly may say that Robinson's time-preference schedule is *higher* than Smith's. In other words, it cannot make sense to compare the rankings or utilities that the two men accord to any particular unit of a good, but we can (if we know them) compare their *schedules* based purely on their demonstrated time preferences. Robinson's time-preference schedule is *higher* than Smith's, i.e., at each hypothetical rate of interest Robinson's values are such that he will part with less of his present goods in exchange for future goods.[10]

[10]In the same way, though we cannot compare utilities, we can compare (if we know them) individual *demand* schedules for goods.

Let us explore the typical individual time-preference schedule, or time-supply-and-demand schedule, more closely. In the first place, there is no necessity for the unit chosen to be 10 ounces. Since money is perhaps the most *divisible* of goods, it is possible to break down the units into far smaller sizes. Furthermore, because of the arbitrage of the market, the rate of interest return on investments of present in future goods will be equal for all the various sizes of units. We may therefore visualize a comparatively smooth curve, even for each individual.

One inevitable characteristic of an individual's time-preference schedule is that eventually, after a certain amount of present money has been supplied on the market, no conceivable interest rate could persuade him to purchase more future goods. The reason is that as present money dwindles and future money increases in a man's possession, the marginal utility of the former increases on the man's value scale, and the marginal utility of the latter decreases. In particular, every man must consume in the present, and this drastically limits his savings regardless of the interest rate. As a result, after a certain point, a man's time preference for the present becomes infinite, and the line representing his supply of present goods becomes vertical upward. At the other end of the scale, the fact of time preference will imply that at some minimum rate of interest the man will not save at all. At what point the supply curve hits the vertical axis depends on the valuations of the individual; but it must do so, as a result of the operation of the law of time preference. A man could not prefer 10 ounces or even less of future money to 10 ounces of present money.[11]

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[11]It is not valid to object that some might prefer to *use* the money in the future rather than in the present. That is not the issue here, which is one of *availability* for use. If a man wants to "save" money for some future use, he may "hoard" it rather than spend it on a future good, and thus have it always available. We have abstracted from hoarding, which will be dealt with in the chapter on money; it would have no place, anyway, in the evenly rotating world of certainty.

What happens after the individual supply curve hits the vertical axis depends entirely on the time preferences of the individual. In some cases, as in that of John Smith above, the person's marginal utility of money falls too fast, as compared with that of future money, for him to participate as a net demander of present goods at low rates of interest. In other words, Smith's time-preference ratio is too low in this area for him to become a demander of present goods and a supplier of future goods. On the other hand, Robinson's higher schedule of time preferences is such that, at low rates of interest, he becomes a supplier of future goods for present goods. (See Figure 42.)

We may of course, diagram a typical individual's supply and demand curve conventionally, as we have done in Figure 42. On the other hand, we may also modify this diagram, so as to make one continuous curve of the individual's activity on the time market. We may call this curve the "individual's time-market curve." At higher interest rates, down to where it hits the vertical axis, this curve is simply the individual's supply curve of present goods. But below this, we are *reversing* his demand curve and continuing it on to the left on the horizontal axis. (See Figure 43.)

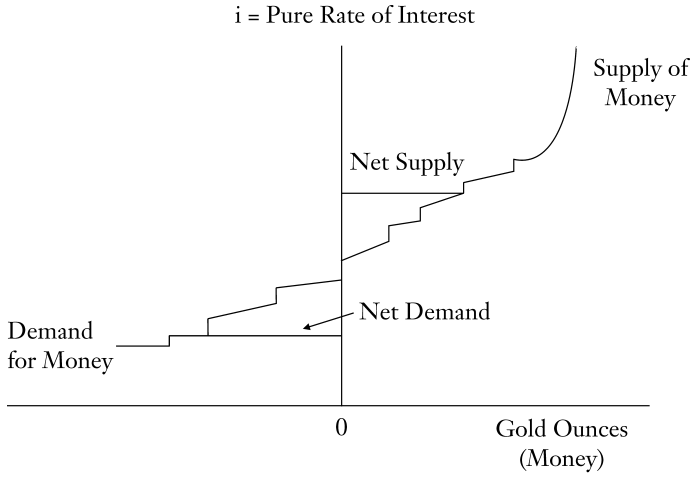

FIGURE 43. INDIVIDUAL TIME-MARKET CURVE

Every individual on the market has a similar type of time-market schedule, reflecting his particular value scale. The schedule of each will be such that at higher rates of interest there will be a greater tendency toward net saving, and at lower rates of interest, less saving, until the individual becomes a net demander. At each *hypothetical* rate of interest there is a possible net saving, net demanding, or abstaining from the market, for each individual. For some changes in the rate of interest, there will be no change (vertical curve), but there will never be a situation where the supply will be greater, or demand less, with lower rates of interest.

The time-market schedules of all individuals are aggregated on the market to form market-supply and market-demand schedules for present goods in terms of future goods. The supply schedule will increase with an increase in the rate of interest, and the demand schedule will fall with the higher rates of interest.

A typical aggregate market diagram may be seen in Figure 44. Aggregating the supply and demand schedules on the time

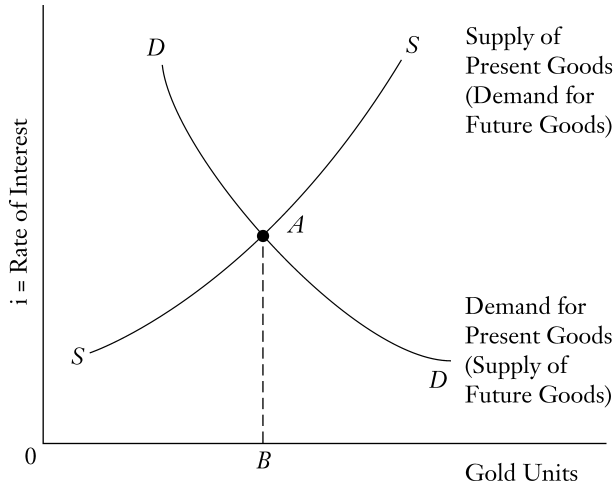

FIGURE 44. AGGREGATE TIME-MARKET CURVES

market for all individuals in the market, we obtain curves such as *SS* and *DD*. *DD* is the demand curve for present goods in terms of the supply of future goods; it slopes rightward as the rate of interest falls. *SS* is the supply curve of present goods in terms of the demand for future goods; it slopes rightward as the rate of interest increases. The intersection of the two curves determines the *equilibrium rate of interest*—the rate of interest as it would tend to be in the evenly rotating economy. This pure rate of interest, then, is determined *solely by the time preferences of the individuals in the society, and by no other factor*.

The intersection of the two curves determines an equilibrium rate of interest, *BA*, *and* an equilibrium amount saved, 0*B*. 0*B* is the total amount of money that will be saved and invested in future money. At a higher interest rate than *BA*, present goods supplied would exceed future goods supplied in exchange, and the excess savings would compete with one another until the price of present goods in terms of future goods would decline toward equilibrium. If the rate of interest were below *BA*, the demand for present goods by suppliers of future goods would exceed the supply of savings, and the competition of this demand would push interest rates up toward equilibrium.

Perhaps more fallacies have been committed in discussions concerning the interest rate than in the treatment of any other aspect of economics. It took a long while for the crucial importance of time preference in the determination of the pure rate of interest to be realized in economics; it took even longer for economists to realize that time preference is the *only* determining factor. Reluctance to accept a monistic causal interpretation has plagued economics to this day.[12]

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[12]The importance of time preference was first seen by Böhm-Bawerk in his *Capital and Interest*. The *sole* importance of time preference has been grasped by extremely few economists, notably by Frank A. Fetter and Ludwig von Mises. *See* Fetter, *Economic Principles*, pp. 235–316; *idem*, "Interest Theories, Old and New," *American Economic Review*, March, 1914, pp. 68–92; and Mises, *Human Action*, pp. 476–534.

4. The Time Market and the Production Structure

The time market, like other markets, consists of component individuals whose schedules are aggregated to form the market supply and demand schedules. The intricacy of the time market (and of the money market as well) consists in the fact that it is also divided and subdivided into various distinguishable submarkets. These are aggregable into a total market, but the subsidiary components are interesting and highly significant in their own right and deserve further analysis. They themselves, of course, are composed of individual supply and demand schedules.

As we have indicated above, we may divide the present-future market into two main subdivisions: *the production structure* and the *consumer loan market*. Let us turn first to the production structure. This may be done most clearly by considering once again a typical production-structure diagram. This diagram is the one in Figure 41, with one critical difference. Previously the diagram represented a typical production structure for any particular consumers' good. *Now the same diagram represents the aggregate production structure for all goods.* Money moves from consumers' goods back through the various stages of production, while goods flow from the higher through the lower stages of production, finally to be sold as consumers' goods. The pattern of production is not changed by the fact that both specific and nonspecific factors exist. Since the production structure is aggregated, the degree of specificity for a *particular product* is irrelevant in a discussion of the time market.

There is no problem in the fact that different production processes for different goods take unequal lengths of time. This is not a difficulty because the flow from one stage to another can be aggregated for any number of processes.

There are, however, two more serious problems that seem to be involved in aggregating the production structure for the entire economy. One is the fact that in various processes there will not necessarily be an exchange of capital goods for money at

each stage. One firm may "vertically integrate" within itself one or more stages and thereby advance present goods for a greater period of time. We shall see below, however, that this presents no difficulty at all, just as it presented no difficulty in the case of particular processes.

A second difficulty is the purchase and use of *durable* capital goods. We have been assuming, and are continuing to assume, that no capital goods or land are *bought*—that they are only *hired*, i.e., "rented" from their owners. The purchase of durable goods presents complications, but again, as we shall see, this will lead to no essential change whatever in our analysis.

The production-structure diagram in Figure 45 omits the numbers that indicated the size of payments between the various sectors and substitutes instead *D*'s and *S*'s to indicate the points where present-future transactions ("time transactions") take place and what groups are engaging in these various

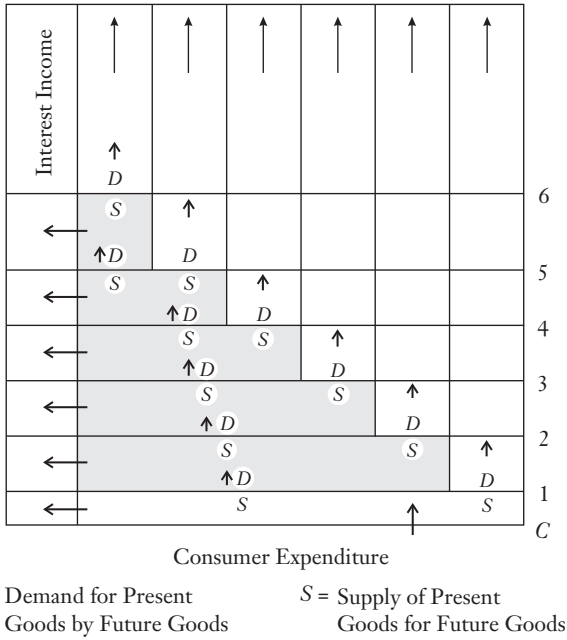

FIGURE 45. AGGREGATE PRODUCTION STRUCTURE FOR ALL GOODS

transactions. *D*'s indicate demanders of present goods, and *S*'s are suppliers of present goods, for future goods.

Let us begin at the bottom—the expenditure of consumers on consumers' goods. The movement of money is indicated by arrows, and money moves from consumers to the sellers of consumers' goods. This is *not* a time transaction, because it is an exchange *of present goods* (money) *for present goods* (consumers' goods).[13]

These producers of consumers' goods are necessarily capitalists who have invested in the services of factors to produce these goods and who then sell their products. Their investment in factors consisted of purchases of the services of land factors and labor factors (the original factors) and first-order capital goods (the produced factors). In both these two large categories of transactions (exchanges that are made a stage earlier than the final sale of consumers' goods), present goods are exchanging for future goods. In both cases, the capitalists are supplying *present money* in exchange for factor services whose yield will materialize in the future, and which therefore are *future goods*.

So the capitalists who are producing consumers' goods, whom we might call "first-stage capitalists," engage in time transactions in making their investments. The components of this particular subdivision of the time market, then, are:

Supply of Present Goods: Capitalists$_1$
Supply of Future Goods: Landowners, Laborers, Capitalists$_2$
(Demand for Present Goods)

Capitalists$_1$ are the first-stage capitalists who produce consumers' goods. They purchase capital goods from the producer-owners — the second-stage capitalists, or Capitalists$_2$. The appropriate *S*'s

[13]The fact that consumers may physically consume all or part of these goods at a later date does not affect this conclusion, because any further consumption takes place outside the money nexus, and it is the latter that we are analyzing.

and *D*'s indicate these transactions, and the arrows pointing upward indicate the direction of money payment.

At the next stage, the Capitalists$_2$ have to purchase services of factors of production. They supply present goods and purchase future goods, goods which are even more distantly in the future than the product that they will produce.[14] These future goods are supplied by landowners, laborers, and Capitalists$_3$. To sum up, at the second stage:

Supply of Present Goods: Capitalists$_2$
Supply of Future Goods: Landowners, Laborers, Capitalists$_3$

These transactions are marked with the appropriate *S*'s and *D*'s, and the arrows pointing upward indicate the direction of money payment in these transactions.

This pattern is continued until the very last stage. At this final stage, which is here the sixth, the sixth-stage capitalists supply future goods to the fifth-stage capitalists, but also supply present goods to laborers and landowners in exchange for the extremely distant future services of the latter. The transactions for the two highest stages are, then, as follows (with the last stage designated as *N* instead of six):

Fifth Stage:

Supply of Present Goods: Capitalists$_5$
Supply of Future Goods: Landowners, Laborers, Capitalists$_N$

[14]No important complication arises from the greater degree of futurity of the higher-order factors. As we have indicated above, a *more* distantly future good will simply be discounted by the market by a greater amount, though at the same rate per annum. The interest *rate*, *i.e.*, the discount rate of future goods per unit of time, remains the same regardless of the degree of futurity of the good. This fact serves to resolve one problem mentioned above—vertical integration by firms over one or more stages. If the equilibrium rate of interest is 5 percent per year, then a one-stage producer will earn 5 percent on his investment, while a producer who advances present goods over three stages—for three years—will earn 15 percent, i.e., 5 percent per annum.

*N*th Stage:

Supply of Present Goods: Capitalists$_N$
Supply of Future Goods: Landowners, Laborers

We may now sum up our time market for any production structure of N stages:

Suppliers of Present Goods	*Suppliers of Future Goods (Demanders of Present Goods)*
Capitalists$_1$	All Landowners
Capitalists$_2$	All Laborers
Capitalists$_3$	Capitalists$_2$
.....	Capitalists$_3$
.....	.....
.....	.....
Capitalists$_N$	Capitalists$_N$

To illustrate clearly the workings of the production structure, let us hark back to the numerical example given in Figure 41 and summarize the quantities of present goods supplied and received by the various components of the time market. We may use the same figures here to apply to the *aggregate* production structure, although the reader may wish to consider the units as multiples of gold ounces in this case. The fact that different durations of production processes and different degrees of vertical integration make no difficulties for aggregation permits us to use the diagram almost interchangeably for a single production process and for the economy as a whole. Furthermore, the fact that the ERE interest rate will be the same for all stages and all goods in the economy especially permits us to aggregate the comparable stages of all goods. For if the rate is 5 percent, then we may say that for a certain stage of one good, payments by capitalists to owners of factors are 50 ounces, and receipts from sales of products are 52.5 ounces, while we can also assume that the aggregate payments for the whole economy in the same period are 5,000 ounces, and receipts 5,250 ounces.

The same interest rate connotes the same rate of return on investments, whether considered separately or for all goods lumped together.

The following, then, are the supplies and demands for present goods from Figure 41, the diagram now being treated as an aggregate for the whole economy:

(Savers) Suppliers of Present Goods			*Demanders of Present Goods Suppliers of Future Goods*	
Capitalists_1	95 oz.	→ 15 oz.	Land and Labor Owners; Capitalists_2	80 oz.
Capitalists_2	76 oz.	→ 16 oz.	Land and Labor Owners; Capitalists_3	60 oz.
Capitalists_3	57 oz.	→ 12 oz.	Land and Labor Owners; Capitalists_4	45 oz.
Capitalists_4	43 oz.	→ 13 oz.	Land and Labor Owners; Capitalists_5	30 oz.
Capitalists_5	28 oz.	→ 8 oz.	Land and Labor Owners; Capitalists_N	20 oz.
Capitalists_N	19 oz.	→ 19 oz.	Land and Labor Owners	
	318 oz.	83 oz.		235 oz.

The horizontal arrows at each stage of this table depict the movement of money as supplied from the savers to the recipient demanders at that stage.

From this tabulation it is easy to derive the *net* money income of the various participants: their *gross* money income minus their money payments, if we include the entire period of time for all of their transactions on the time market. The case of the owners of land and labor is simple: they receive their money in exchange for the future goods to be yielded by their factors; this money is their gross *and* their net money income from the productive system. The total of net money income to the owners of land and labor is 83 ounces. This is the sum of the money incomes to the various owners of land and labor at each stage of production.

The case of the capitalists is far more complicated. They pay out present goods in exchange for future goods and then sell the

maturing less distantly future products for money to lower-stage capitalists. Their *net* money income is derived by subtracting their money outgo from their gross income over the period of the production stage. In our example, the various net incomes of the capitalists are as follows:

Net Incomes of Capitalists Producing Capital Goods

Capitalists_2	80 – 76	=	4 oz.
Capitalists_3	60 – 57	=	3 oz.
Capitalists_4	45 – 43	=	2 oz.
Capitalists_5	30 – 28	=	2 oz.
Capitalists_N	20 – 19	=	1 oz.
			12 oz.

The total net income of the capitalists producing capital goods (orders 2 through *N*) is *12 ounces*. What, then, of Capitalists_1, who apparently have not only no net income, but a deficit of 95 ounces? They are recouped, as we see from the diagram (in Figure 41), *not* from the savings of capitalists, but from the expenditure of consumers, which totals 100 ounces, yielding a net income to Capitalists_1 of five ounces.

It should be emphasized at this point that the general pattern of the structure of production and of the time market will be the same in the real world of uncertainty as in the ERE. The difference will be in the amounts that go to each sector and in the relations among the various prices. We shall see later what the discrepancies will be; for example, the rate of return by the capitalists in each sector will not be uniform in the real market. But the *pattern* of payments, the composition of suppliers and demanders, will be the same.

In analyzing the income-expenditure balance sheets of the production structure, writers on economic problems have seen that we may consolidate the various incomes and consider only the net incomes. The temptation has been simply to write off the various intercapitalist transactions as "duplications." If that is done here, then the total net income in the market is: capitalists,

17 ounces (12 ounces for capital-good capitalists and five ounces for consumers'-good capitalists); land and labor factors, 83 ounces. The grand total net income is then 100 ounces. This is exactly equal to the total of consumer spending for the period.

Total net income is 100 ounces, and consumption is 100 ounces. There is, therefore, no new *net* saving. We shall deal with savings and their change in detail below. Here the point is that, in the endless round of the ERE, zero *net* savings, as thus defined, would mean that there is just enough *gross* saving to keep the structure of productive capital intact, to keep the production processes rolling, and to keep a constant amount of consumers' goods produced per given period.

It is certainly legitimate and often useful to consider net incomes and net savings, but it is not always illuminating, and its use has been extremely misleading in present-day economics.[15] Use of the net "national" income figures (it is better to deal with "social income" extending throughout the market community using the money rather than to limit the scope to national boundaries) leads one to believe that the really important element maintaining the production structure is consumers' spending. In our ERE example, the various factors and capitalists receive their net income and plow it back into consumption, thus maintaining the productive structure and future standards of living, i.e., the output of consumers' goods. The inference from such concepts is clear: capitalists' savings are necessary to increase and deepen the capital structure, but even without any savings, consumption expenditure is alone sufficient to maintain the productive capital structure intact.

This conclusion seems deceptively clear-cut: after all, is not consumer spending the bulwark and end product of activity? This thesis, however, is tragically erroneous. There is no simple automatism in capitalists' spending, especially when we leave the certain world of the ERE, and it is in this real world that the

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[15]Very recently, greater realism has been introduced into social accounting by considering intercapitalist "money flows."

conceptual error plays havoc. For with production divided into stages, it is not true that consumption spending is sufficient to provide for the maintenance of the capital structure. When we consider the maintenance of the capital structure, we must consider *all the decisions* to supply present goods on the present-future market. These decisions are *aggregated*; they do not cancel one another out. Total savings in the economy, then, are not zero, but the aggregation of all the present goods supplied to owners of future goods during the production process. This is the sum of the supplies of Capitalists_1 through Capitalists_N, which totals *318 ounces*. This is the total *gross* savings—the supply of present goods for future goods in production—and also equals total *gross* investment. Investment is the amount of money spent on future-good factors and necessarily equals savings. Total expenditures on production are: 100 (Consumption) plus 318 (Investment = Savings), equals *418 ounces*. Total gross income from production equals the gross income of Capitalists_1 (100 ounces) plus the gross income of other capitalists (235 ounces) plus the gross income of owners of land and labor (83 ounces), which also equals *418 ounces*.

The system depicted in our diagram of the production structure, then, is of an economy in which *418 gold ounces* are earned in gross income, and *100 ounces* are spent on consumption, while *318 ounces* are saved and invested in a certain order in the production structure. In this evenly rotating economy, 418 ounces are earned and then spent, with no net "hoarding" or "dishoarding," i.e., no net additions or subtractions from the cash balance over the period as a whole.[16]

Thus, instead of no savings being needed to maintain capital and the production structure intact, we see that a very heavy proportion of savings and investment—in our example three

[16]Problems of hoarding and dishoarding from the cash balance will be treated in chapter 11 on money and are prescinded from the present analysis.

times the amount spent on consumption—is necessary simply to keep the production structure intact. The contrast is clear when we consider *who* obtains income and who is empowered to decide whether to consume or to invest. The net-income theorists implicitly assume that the only important decisions in regard to consuming vs. saving-investing are made by the factor-owners out of their net income. Since the net income of capitalists is admittedly relatively small, this approach attributes little importance to their role in maintaining capital. We see, however, that what maintains capital is *gross* expenditures and *gross* investment and not net investment. The capitalists at each stage of production, therefore, have a vital role in maintaining capital through their savings and investment, through heavy savings from gross income.

Concretely, let us take the case of the Capitalists$_1$. According to the net-income theorists, their role is relatively small, since their net income is only five ounces. But actually their gross income is 100 ounces, and *it is their decision on how much of this to save and how much to consume that is decisive.* In the ERE, of course, we simply state that they save and invest 95 ounces. But when we leave the province of the ERE, we must realize that there is nothing automatic about this investment. There is no natural law that they must reinvest this amount. Suppose, for example, that the Capitalists$_1$ decide to break up the smooth flow of the ERE by spending all of the 100 ounces for their own consumption rather than investing the 95 ounces. It is evident that the entire market-born production structure would be destroyed. No income at all would accrue to the owners of all the higher-order capital goods, and all the higher-order capital processes, all the production processes longer than the very shortest, would have to be abandoned. We have seen above, and shall see in more detail below, that civilization advances by virtue of additional capital, which lengthens production processes. Greater quantities of goods are made possible only through the employment of more capital in longer processes. Should capitalists shift from saving-investment to consumption,

all these processes would be necessarily abandoned, and the economy would revert to barbarism, with the employment of only the shortest and most primitive production processes. The standard of living, the quantity and variety of goods produced, would fall catastrophically to the primitive level.[17]

What could be the reason for such a precipitate withdrawal of savings and investment in favor of consumption? The only reason—on the free market—would be a sudden and massive increase in the time-preference schedules of the capitalists, so that present satisfactions become worth very much more in terms of future satisfactions. Their higher time preferences mean that the existing rate of interest is not enough to induce them to save and invest in their previous proportions. They therefore consume a greater proportion of their gross income and invest less.

Each individual, on the basis of his time-preference schedule, decides between the amount of his money income to be devoted to saving and the amount to be devoted to consumption. *The aggregate time-market schedules (determined by time preferences) determine the aggregate social proportions between (gross) savings and consumption.* It is clear that the higher the time-preference schedules are, the greater will be the proportion of consumption to savings, while lower time-preference schedules will lower this proportion. At the same time, as we have seen, higher time-preference schedules in the economy lead to higher rates of interest, and lower schedules lead to lower rates of interest.

From this it becomes clear that *the time preferences of the individuals on the market determine simultaneously and by themselves both the market equilibrium interest rate and the proportions between consumption and savings (individual and aggregate).*[18] Both of the latter

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[17]Cf. Knut Wicksell, *Lectures on Political Economy* (London: Routledge and Kegan Paul, 1934), I, 189–91.

[18]For more on the relations between the interest rate, i.e., the price spreads or margins, and the proportions invested and consumed, see below.

are the obverse side of the same coin. In our example, the increase in time-preference schedules has caused a decline in savings, absolute and proportionate, and a rise in the interest rate.

The fallacies of the net product figures have led economists to include some "grossness" in their product and income figures. At present the favorite concept is that of the "gross national product" and its counterpart, gross national expenditures. These concepts were adopted because of the obvious errors encountered with the net income concepts.[19] Current "gross" figures, however, are the height of illogicality, because they are not gross at all, but only partly gross. They include only gross purchases by capitalists of *durable* capital goods and the consumption of their self-owned durable capital, approximated by depreciation allowances set by the owners. We shall consider the problems of durable capital more fully below, but suffice it to say that there is no great difference between durable and less durable capital. Both are consumed in the course of the production process, and both must be paid for out of the gross income and gross savings of lower-order capitalists. In evaluating the payment pattern of the production structure, then, it is inadmissible to leave the consumption of nondurable capital goods out of the investment picture. It is completely illogical to single out durable goods, which are themselves only discounted embodiments of their nondurable services and therefore no different from nondurable goods.

The idea that the capital structure is maintained intact without savings, as it were automatically, is fostered by the use of the "net" approach. If even zero savings will suffice to maintain capital, then it seems as if the aggregate value of capital is a

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[19]On gross and net product, *see* Milton Gilbert and George Jaszi, "National Product and Income Statistics as an Aid in Economic Problems" in W. Fellner and B.F. Haley, eds., *Readings in the Theory of Income Distribution* (Philadelphia: Blakiston, 1946), pp. 44–57; and Simon Kuznets, *National Income, A Summary of Findings* (New York: National Bureau of Economic Research, 1946), pp. 111–21, and especially p. 120.

permanent entity that cannot be reduced. This notion of the permanence of capital has permeated economic theory, particularly through the writings of J.B. Clark and Frank H. Knight, and through the influence of the latter has molded current "neoclassical" economic theory in America. To maintain this doctrine it is necessary to deny the stage analysis of production and, indeed, to deny the very influence of *time* in production.[20] The all-pervading influence of time is stressed in the period-of-production concept and in the determination of the interest rate and of the investment-consumption ratio by individual time-preference schedules. The Knight doctrine denies any role to time in production, asserting that production "now" (in a modern, complex economy) is timeless and that time preference has *no* influence on the interest rate. This doctrine has been aptly called a "mythology of capital." Among other errors, it leads to the belief that there is no economic problem connected with the replacement and maintenance of capital.[21,22]

A common fallacy, fostered directly by the net-income approach, holds that the important category of expenditures in the

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[20]If permanence is attributed to the mythical entity, the aggregate value of capital, it becomes an independent factor of production, along with labor, and earns interest.

[21]The fallacy of the "net" approach to capital is at least as old as Adam Smith and continues down to the present. *See* Hayek, *Prices and Production*, pp. 37–49. This book is an excellent contribution to the analysis of the production structure, gross savings and consumption, and in application to the business cycle, based on the production and business cycle theories of Böhm-Bawerk and Mises respectively. *Also see* Hayek, "The Mythology of Capital" in W. Fellner and B.F. Haley, eds., *Readings in the Theory of Income Distribution* (Philadelphia: Blakiston, 1946), pp. 355–83; *idem*, *Profits, Interest, and Investment*, *passim*.

[22]For a critique of the analogous views of J.B. Clark, *see* Frank A. Fetter, "Recent Discussions of the Capital Concept," *Quarterly Journal of Economics*, November, 1900, pp. 1–14. Fetter succinctly criticizes Clark's failure to explain interest on consumption goods, his assumption of a permanent capital fund, and his assumption of "synchronization" in production.

production system is consumers' spending. Many writers have gone so far as to relate business prosperity directly to consumers' spending, and depressions of business to declines in consumers' spending. "Business cycle" considerations will be deferred to later chapters, but it is clear that there is little or no relationship between prosperity and consumers' spending; indeed almost the reverse is true. For business prosperity, the important consideration is the price spreads between the various stages—i.e., the rate of interest return earned. It is this rate of interest that induces capitalists to save and invest present goods in productive factors. The rate of interest, as we have been demonstrating, is set by the configurations of the time preferences of individuals in the society. It is not the total quantity of money spent on consumption that is relevant to capitalists' returns, but the *margins*, the spreads, between the product prices and the sum of factor prices at the various stages—spreads which tend to be proportionately equal throughout the economy.

There is, in fact, *never any need to worry about the maintenance of consumer spending.* There must always be consumption; as we have seen, after a certain amount of monetary saving, there is always an irreducible minimum of his monetary assets that every man will spend on current consumption. The fact of human action insures such an irreducible minimum. And as long as there is a monetary economy and money is in use, it will be spent on the purchase of consumers' goods. The proportion spent on capital in its various stages and *in toto* gives a clue to the *important* consideration—the real output of consumers' goods in the economy. The total amount of money spent, however, gives no clue at all. Money and its value will be systematically studied in a later chapter. It is obvious, however, that the number of units spent could vary enormously, depending on the quantity of the money commodity in circulation. One hundred or 1,000 or 10,000 or 100,000 ounces of gold might be spent on consumption, without signifying anything except that the quantity of money units available was less or greater. The total

amount of money spent on consumption gives no clue to the quantity of goods the economy may purchase.

The important consideration, therefore, is time preferences and the resultant proportion between expenditure on consumers' and producers' goods (investment). The lower the proportion of the former, the heavier will be the investment in capital structure, and, after a while, the more abundant the supply of consumers' goods and the more productive the economy. The obverse of the coin is the determining effect of time preferences on the price spreads that set the rate of interest, and the income of the capitalist savers-investors in the economy. We have already seen the effect of a lowering of investment on the first rank, and below we shall analyze fully the effect on production and interest of a lowering of time preferences and the effects of various changes in the quantity of money on time preferences and the production structure.

Before continuing with an analysis of time preference and the production structure, however, let us complete our examination of the components of the time market.[23]

The pure demanders of present goods on the time market are the various groups of laborers and landowners—the sellers of the services of original productive factors. Their price on the market, as will be seen below, will be set equal to the *marginal value product* of their units, *discounted* by the prevailing rate of interest. The greater the rate of interest, the less will the price of their service be, or rather, the greater will be the *discount* from their marginal value product considered as the matured present good. Thus, if the marginal value product of a certain labor or land factor is 10 ounces per unit period, and the rate of interest is 10 percent, its earning price will be approximately nine ounces per year if the final product is one year away. A higher rate of interest would lead to a lower price, and a lower rate to a higher price, although the maximum price is one slightly below the full MVP (marginal value product), since the interest rate can never disappear.

[23]Cf. Böhm-Bawerk, *Positive Theory of Capital*, pp. 299–322, 329–38.

It seems likely that the demand schedule for present goods by the original productive factors will be highly inelastic in response to changes in the interest rate. With the large base amount, the discounting by various rates of interest will very likely make little difference to the factor-owner.[24] Large changes in the interest rate, which would make an enormous difference to capitalists and determine huge differences in interest income and the profitableness of various lengthy productive processes, would have a negligible effect on the earnings of the owners of the original productive factors.

On the time market, we are considering all factors in the aggregate; the interest rate of the time market permeates all particular aspects of the present-future market, including all purchases of land and labor services. Therefore, when we are considering the supply of a certain factor on the market, we are considering it *in general*, and not its supply schedule for a specific use. A group of homogeneous pieces of land may have three alternative uses: say, for growing wheat, raising sheep, or serving as the site of a steel factory. Its supply schedule for each of the three uses will be elastic (relatively flat curve) and will be determined by the amount it can obtain in the next best use—i.e., the use in which its discounted MVP is next highest. In the present analysis, we are not considering the factor's supply curve for a *particular* industry or use; we are considering its supply curve for all users *in the aggregate*, i.e., its supply curve on the time market in exchange for present goods. We are

[24]The rate of interest, however, will make a great deal of difference in so far as he is an owner and seller of a durable good. Land is, of course, durable almost by definition—in fact, generally permanent. So far, we have been dealing only with the sale of factor *services*, i.e., the "hire" or rent" of the factor, and abstracting from the sale or valuation of durable factors, which embody future services. Durable land, as we shall see, is "capitalized," i.e., the value of the factor as a whole is the discounted sum of its future MVP's, and there the interest rate will make a significant difference. The price of durable land, however, is irrelevant to the supply schedule of land *services* in demand for present money.

therefore considering the behavior of all owners of a homogeneous factor of land (or of one owner if the land factor is unique, as it often is). Land is very likely to have *no* reservation price, i.e., it will have little subjective-use-value to the owner. A few landlords may place a valuation on the possibility of contemplating the virgin beauty of the unused land; in practice, however, the importance of such reservation-demand for land is likely to be negligible. It will, of course, be greater where the owner can use the land to grow food for himself.

Labor services are also likely to be inelastic with respect to the interest discount, but probably less so than land, since labor has a reservation demand, a subjective use-value, even in the aggregate labor market. This special reservation demand stems from the value of leisure as a consumers' good. Higher prices for labor services will induce more units of labor to enter the market, while lower prices will increase the relative advantages of leisure. Here again, however, the difference that will be made by relatively large changes in the interest rate will not be at all great, so that the aggregate supply-of-labor curve (or rather curves, one for each homogeneous labor factor) will tend to be inelastic with regard to the interest rate.

The two categories of independent demanders of present goods for future goods, then, are the *landowners* and the *laborers*. The suppliers of present goods on the time market are clearly the *capitalists*, who save from their possible consumption and invest their savings in future goods. But the question may be raised: Do not the capitalists also *demand* present goods as well as supply them?

It is true that capitalists, after investing in a stage of production, demand present goods in exchange for their product. This particular demand is inelastic in relation to interest changes since these capital goods also can have no subjective use-value for their producers. This demand, however, is strictly derivative and dependent. In the first place, the product for which the owner demands present goods is, of course, a future good, but

it is also one stage *less distantly future* than the goods that the owner purchased in order to produce it. In other words, Capitalists$_3$ will sell their future goods to Capitalists$_2$, but they had bought future goods from Capitalists$_4$, as well as from landowners and laborers. Every capitalist at every stage, then, *demands* goods that are *more* distantly future than the product that he supplies, and he supplies present goods for the duration of the production stage until this product is formed. He is therefore a *net supplier of present goods*, and *a net demander of future goods*. Hence, his activities are guided by his role as a supplier. The higher the rate of interest that he will be able to earn, i.e., the higher the price spread, the more he will tend to invest in production. If he were not essentially a supplier of present goods, this would not be true.

The relation between his role as a supplier and as a demander of present goods may be illustrated by the diagram in Figure 46.

This diagram is another way of conveniently representing the structure of production. On the horizontal axis are represented the various stages of production, the dots furthest to the left being the highest stages, and those further to the right being the lower stages. From left to right, then, the stages of production are lower and eventually reach the consumers'-good

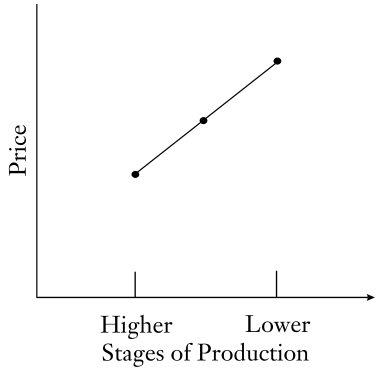

FIGURE 46. RELATION OF CUMULATIVE FACTOR PRICES TO STAGES OF PRODUCTION

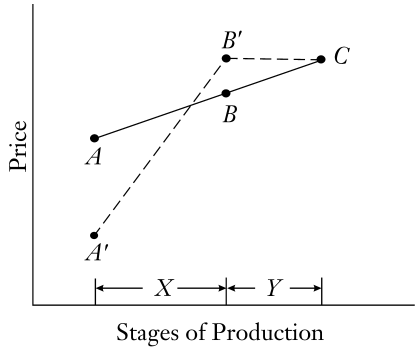

FIGURE 47. EFFECT OF THE TENDENCY TOWARD A UNIFORM RATE OF INTEREST

stage. The vertical axis represents prices, and it could interchangeably be either the production structure of one particular good or of all the goods in general. The prices that are represented at each stage are the *cumulative* prices of the factors at each stage, *excluding* the interest return of the capitalists. At each stage rightward, then, the level of the dots is higher, the difference representing the interest return to the capitalists at that stage. In this diagram, the interest return to capitalists at two adjacent stages is indicated, and the constant slope indicates that this return is equal.

Let us now reproduce the above diagram in Figure 47.[25] The original production structure diagram is marked at points *A*, *B*, and *C*. Capitalists *X* purchase factors at price *A* and sell their product at point *B*, while capitalists *Y* buy at *B* and sell their product at *C*. Let us first consider the highest stage here portrayed—that of capitalists *X*. They purchase the factors at point *A*. Here they *supply* present goods to owners of factors. Capitalists *X*, of course, would prefer that the prices of the factors be

[25]Strictly, of course, the slope would not be constant, since the return is in equal *percentages*, not in equal absolute amounts. Slopes are treated as constant here, however, for the sake of simplicity in presenting the analysis.

lower; thus, they would prefer paying *A′* rather than *A*. Their interest spread cannot be determined until their selling prices are determined. Their activities as suppliers of present goods in exchange for interest return, therefore, are not really completed with their purchase of factors. Obviously, they could not be. The capitalists must transform the factors into products and sell their products for money before they obtain their interest return from their supply of present goods. The suppliers of future goods (landowners and laborers) *complete* their transactions immediately, as soon as they obtain present money. But the capitalists' transactions are incomplete until they obtain present money once again. Their demand for present goods is therefore strictly dependent on their previous supply.

Capitalists *X*, as we have stated, sell their products at *B* to the next lower rank of capitalists. Naturally, they would prefer a higher selling price for their product, and the point *B′* would be preferred to *B*. If we looked only at this sale, we might be tempted to state that, as demanders of present goods, capitalists *X* prefer a higher price, and therefore a lower discount for their product, i.e., a lower interest rate. This, however, would be a superficial point of view, for we must look at both of their exchanges, which are necessarily considered together if we consider their *complete* transaction. They prefer a lower buying point and a higher selling point, i.e., a more steeply sloped line, or a *higher rate of discount*. In other words, the capitalists prefer a higher rate of interest and therefore always act as *suppliers* of present goods. Of course, the result of this particular change (to a price spread of *A′B′*) is that the next lower rung of capitalists, capitalists *Y*, suffer a narrowing of their price spread, along the line *B′C*. It is, of course, perfectly agreeable to capitalists *X* if capitalists *Y* suffer a lowering of their interest return, so long as the return of the former improves. Each capitalist is interested in improving his own interest return and not necessarily the rate of interest in general. However, as we have seen, *there cannot for long be any differences in interest return between one stage and another or between one production process and another*. If the *A′B′C*

situation were established, capitalists would pour out of the *Y* stage and into the *X* stage, the increased demand would bid up the price above *A′*, the sales at *B′* would be increased and the demand lowered, and the supply at C lowered, until finally the interest returns were equalized. There is always a tendency for such equalization, and this equalization is actually completed in the ERE.

5. Time Preference, Capitalists, and Individual Money Stock

When we state that the time-preference schedules of all individuals in the society determine the interest rate and the proportion of savings to consumption, we mean *all* individuals, and not some sort of separate class called "capitalists." There is a temptation, since the production structure is analyzed in terms of different classes—landowners, laborers, and capitalists—to conclude that there are three definite stratified groups of *people* in society corresponding to these classifications. Actually, in economic analysis of the market we are concerned with *functions* rather than *whole persons per se*. In reality, there is no special class of capitalists set off from laborers and landowners. This is not simply due to the trite fact that even capitalists must also be consumers. It is also due to the more important fact that *all* consumers *can be capitalists* if they wish. They will be capitalists if their time-preference schedules so dictate. Time-market diagrams such as shown above apply to every man, and not simply to some select group known as capitalists. The interchange of the various aggregate supply and demand diagrams throughout the entire time market sets the equilibrium rate of interest on the market. At this rate of interest, some individuals will be suppliers of present goods, some will be demanders, the curves representing the supply and demand schedules of others will be coinciding with their line of origin and they will not be in the time market at all. Those whose time-preference schedules at this rate permit them to be suppliers will be the *savers*—i.e., they will be the capitalists.

The role of the capitalists will be clarified if we ask the question: Where did they get the money that they save and invest? First, they may have obtained it in what we might call "current" production; i.e., they could have received the money in their current capacities as laborers, landowners, and capitalists. After they receive the money, they must then decide how to allocate it among various lines of goods, and between consumption and investment. Secondly, the source of funds could have been money earned in *past* rounds of production and previously "hoarded," now being "dishoarded." We are, however, leaving out hoarding and dishoarding at this stage in the analysis. The only other source, the third source, is *new* money, and this too will be discussed later.

For the moment, therefore, we shall consider that the money from which savings derive could only have come from recent earnings from production. Some earnings were obtained as capitalists, and some as owners of original factors.

The reader might here have detected an apparent paradox: How can a laborer or a landowner be a demander of present goods, and then turn around and be a supplier of present goods for investment? This seems to be particularly puzzling since we have stated above that one cannot be a demander and a supplier of present goods at the same time, that one's time-preference schedule may put one in one camp or the other, but not in both. The solution to this puzzle is that the two acts *are not performed at the same time*, even though both are performed to the same extent in their turn in the endless round of the evenly rotating economy.

Let us reproduce the typical individual time-preference schedule (Figure 48). At a market interest rate of 0*A*, the individual would supply savings of *AB*; at a market interest rate of 0*C*, he would demand money of amount *CE*. Here, however, we are analyzing more carefully the horizontal axis. The point 0 is the point of origin. It is the point at which the person deliberates on his course of action, i.e., the position he is in when he is

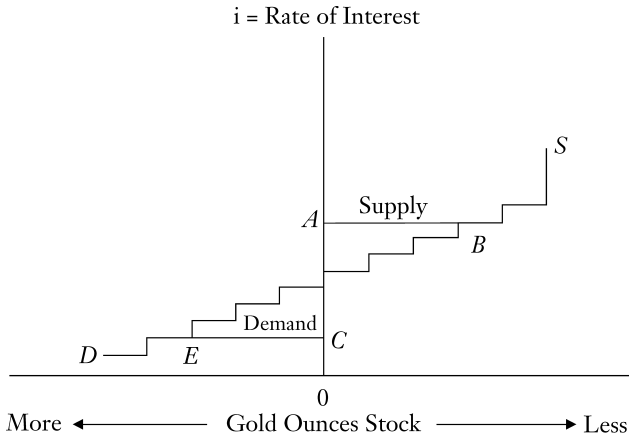

FIGURE 48. RELATION OF INDIVIDUAL TIME-PREFERENCE SCHEDULE TO MONEY STOCK

consulting, so to speak, his time-preference scales. Specifically, this is his position with respect to the *size of his money stock* at the time of origin. At point *O*, he has a certain money stock, and he is considering how much of his stock he is willing to give up in exchange for future goods or how much new stock he would like to acquire while giving up future goods. Suppose that he is a saver. As the curve moves to the right, he is giving up more and more of his present money stock in exchange for future goods; therefore, his minimum interest return becomes greater. The further the curve goes to the right, then, the lower will his final money stock be. On the other hand, consider the same individual when he is a demander of present goods. As the curve proceeds to the left, he increases his stock of present goods and gives up future goods. Considering both sides of the point of origin, then, we see that the further right the curve goes, the less stock he has; the further left, the greater his stock.

Given his time-preference schedule, therefore, he is bound to be in a greater supply position the more money he has, and in more of a demand position the less money he has. Before the laborer or landowner sells his services, he has a certain money