stock—a cash balance that he apparently does not reduce below a certain minimum. After he sells his services, he acquires his money income from production, thereby adding to his money stock. He then allocates this income between consumption and savings-investment, and we are assuming no hoarding or dishoarding. At this point, then, when he is allocating, he is in a far different position and at a different point in time. For now he has had a considerable addition to his money stock.

Let us consider (Figure 49) the individual's time-market graph with two different points of origin, i.e., two different sizes of money stock, one before he earns his income (I), and one immediately after (II).

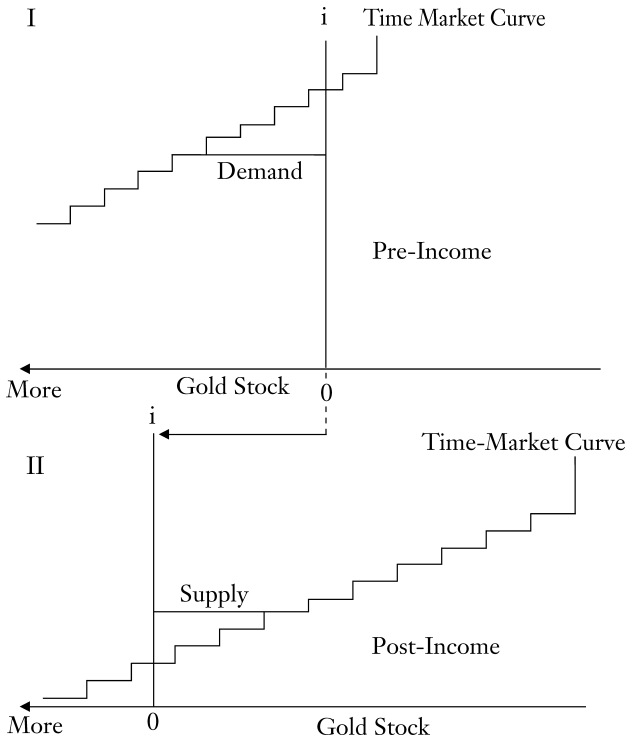

FIGURE 49. EFFECT OF CHANGE IN INDIVIDUAL'S MONEY STOCK ON HIS ALLOCATION OF MONEY TO SAVINGS AND CONSUMPTION

Here we see how a laborer or a landowner can be a demander at one time, in one position of his money stock, and a supplier at another time. With very little money stock, as represented in the first diagram, he is a demander. Then, he acquires money in the productive arena, greatly increases his money stock, and therefore the point of origin of his decision to allocate his money income shifts to the left, so that he might well become a supplier out of his income. Of course, in many cases, he is still a demander or is not on the time market at all. To coin a phrase to distinguish these two positions, we may call his original condition a "pre-income position" (before he has sold his services for money), and the latter a "post-income position"—his situation when he is allocating his money income. Both points of origin are relevant to his real actions.

We have seen above that a landowner's pre-income demand for money is likely to be practically inelastic, or vertical, while a laborer's will probably be more elastic. Some individuals in a post-income position will be suppliers at the market rate of interest; some will be demanders; some will be neutral. The four diagrams in Figure 50 depict various pre-income and post-income time-preference situations, establishing individual time-market curves, with the same market rate of interest applied to each one.

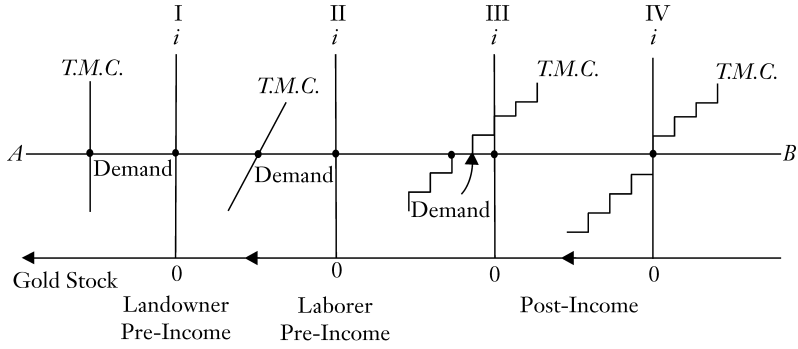

FIGURE 50. DIFFERENT INDIVIDUALS' TIME-MARKET CURVES AT A GIVEN RATE OF INTEREST

The line *AB*, across the page, is our assumed market rate of interest, equilibrated as a result of the individual time-preference scales. At this rate of interest, the landowner and the laborer (I and II) are shown with demands for present money (pre-income), and diagrams III and IV depict a demander at this rate and a neutral at this rate, one who is moved neither to supply nor to demand money in the time market. Both the latter are in post-income situations.

We conclude that any man can be a capitalist if only he wants to be. He can derive his funds solely from the fruits of previous capitalist investment or from past "hoarded" cash balances or solely from his income as a laborer or a landowner. He can, of course, derive his funds from several of these sources. *The only thing that stops a man from being a capitalist is his own high time-preference scale*, in other words, his stronger desire to consume goods in the present. Marxists and others who postulate a rigid stratification—a virtual *caste* structure in society—are in grave error. The same person can be at once a laborer, a landowner, and a capitalist, in the same period of time.[26]

It might be argued that only the "rich" can afford to be capitalists, i.e., those who have a greater amount of money stock. This argument has superficial plausibility, since from our diagrams above we saw that, for *any given individual* and a given time-preference schedule, a greater money stock will lead to a greater supply of savings, and a lesser money stock to a lesser supply of savings. *Ceteris paribus*, the same applies to changes in money income, which constitute additions to stock. We *cannot*, however, assume that a man with (post-income) assets of 10,000 ounces of gold will necessarily save more than a man with 100 ounces of gold. We *cannot compare time preferences interpersonally*, any more than we can formulate interpersonal laws for any

[26]This Marxian error stemmed from a very similar error introduced into economics by Adam Smith. Cf. Ronald L. Meek, "Adam Smith and the Classical Concept of Profit," *Scottish Journal of Political Economy*, June, 1954, pp. 138–53.

other type of utilities. What we can assert as an economic law for one person we cannot assert in comparing two or more persons. Each person has his own time-preference schedule, apart from the specific size of his monetary stock. Each person's time-preference schedule, as with any other element in his value scale, is entirely of his own making. All of us have heard of the proverbially thrifty French peasant, compared with the rich playboy who is always running into debt. The commonsense observation that it is generally the rich who save more may be an interesting historical judgment, but it furnishes us with no scientific economic law whatever, and the purpose of economic science is to furnish us with such laws. As long as a person has any money at all, and he must have some money if he participates in the market society to any extent, he can be a capitalist.

6. The Post-Income Demanders

Up to this point we have analyzed the time-market demand for present goods by landowners and laborers, as well as the derived demand by capitalists. This aggregate demand we may call the *producers' demand* for present goods on the time market. This is the demand by those who are selling their services or the services of their owned property in the advancing of production. This demand is all *pre-income demand* as we have defined it; i.e., it takes place prior to the acquisition of money income from the productive system. It is all in the form of selling factor services (future goods) in exchange for present money. But there is another component of net demand for present goods on the time market. This is the *post-income* component; it is a demand that takes place even after productive income is acquired. Clearly, this demand cannot be a productive demand, since owners of future goods used in production exercise that demand *prior* to their sale. It is, on the contrary, a *consumers' demand.*

This subdivision of the time market operates as follows: Jones sells 100 ounces of future money (say, one year from now) to Smith in exchange for 95 ounces of present money. This

future money is not in the form of an expectation created by a factor of production; instead, it is an I.O.U. by Jones promising to pay 100 ounces of money at a point one year in the future. He exchanges this *claim* on future money for present money—95 ounces. The discount on future money as compared with present money is precisely equivalent to that in the other parts of the time market that we have studied heretofore, except that the present case is more obvious. The rate of interest finally set on the market is determined by the aggregate net supply and net demand schedules throughout the entire time market, and these, as we have seen, are determined by the time preferences of all the individuals on the market. Thus, in the case of Figure 50 above, in diagram III we have a case of a net (post-income) demander at the market rate of interest The form that his demand takes is the sale of an I.O.U. of future money—usually termed the "borrowing" of present money. On the other hand, the person whose time-market curve is shown in diagram IV has such a time-preference configuration that he is neither a net supplier nor a net demander at the going rate of interest—he is not on the time market at all—in his post-income position.

The net borrowers, then, are people who have relatively higher time-preference rates than others at the going rate of interest, in fact so high that they will borrow certain amounts at this rate. It must be emphasized here that we are dealing *only* with consumption borrowing—borrowing to add to the present use of Jones' money stock for consumption. Jones' sale of future money differs from the sales of the landowners and laborers in another respect; their transactions are completed, while Jones has not yet completed his. His I.O.U. establishes a claim to future money on the part of the buyer (or "lender") Smith, and Smith, to complete his transaction and earn his interest payment, must present his note at the later date and claim the money due.

In sum, the *time market's components are as follows*:

I. *Supply of Present Goods for Future Goods:*
Savings (of all)

II. *Demand for Present Goods by Suppliers of Future Goods:*
a. *Producers' Demand*
Landowners Laborers
b. *Consumers' Demand*
Borrowing Consumers

These demands are aggregated without regard to whether they are post- or pre-income; they both occur within a relatively brief time period, and they recur continually in the ERE.

Although the consumption and the productive demands are aggregated to set the market rate of interest, a point of great importance for the productive system is revealed if we separate these demands analytically. The diagram in Figure 51 depicts the establishment of the rate of interest on the time market.

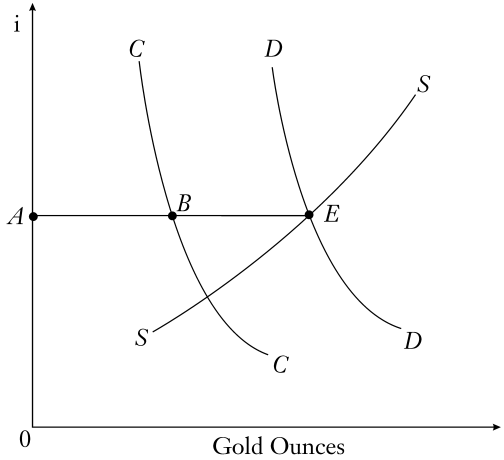

FIGURE 51. DETERMINATION OF THE EQUILIBRIUM RATE OF INTEREST ON THE TIME MARKET

The vertical axis is the rate of interest; the horizontal axis is gold ounces. The *SS* curve is the supply-of-savings schedule, determined by individual time preferences. The *CC* curve is the schedule of consumers' loan demands for present goods,

consisting of the aggregate net demand (post-income) at the various hypothetical rates of interest. The *DD* curve is the total demand for present goods by suppliers of future goods, and it consists of the *CC* curve *plus* a curve that is not shown—the demand for present goods by the owners of original productive factors, i.e., land and labor. Both the *CC* and the *DD* curves are determined by individual time preferences. The equilibrium rate of interest will be set by the market at the point of intersection of the *SS* and *DD* curves—point *E*.

The point of intersection at *E* determines two important resultants: the rate of interest, which is established at *0A*, and the total supply of savings *AE*. A vital matter for the productive system, however, is the position of the *CC* curve: the larger *CC* is at any given rate of interest, the larger the amount of total savings that will be competed for and drawn away from production into consumers' loans. In our diagram, the total savings going into investment in production is *BE*.

The relative strength of productive and consumption demand for present goods in the society depends on the configurations of the time-preference schedules of the various individuals on the market. We have seen that the productive demand for present goods tends to be inelastic with respect to interest rates; on the other hand, the consumers' loan curve will probably display greater elasticity. It follows that, on the demand side, changes in time preferences will display themselves mostly in the consumption demand schedule. On the supply side, of course, a rise in time preferences will lead to a shift of the *SS* curve to the left, with less being saved and invested at each rate of interest. The effects of time-preference changes on the rate of interest and the structure of production will be discussed further below.

It is clear that the gross savings that maintain the production structure are the "productive" savings, i.e., those that go into productive investment, and that these exclude the "consumption" savings that go into consumer lending. From the point of view of the production system, we may regard borrowing by a

consumer as dissaving, for this is the amount by which a *person's consumption expenditures exceed his income*, as contrasted to savings, the amount by which a person's income exceeds his consumption. In that case, the savings loaned are canceled out, so to speak, by the dissavings of the consumption borrowers.

The consumers' and producers' subdivisions of the time market are a good illustration of how the rate of interest is equalized over the market. The connection between the returns on investment and money loans to consumers is not an obvious one. But it is clear from our discussion that both are parts of one time market. It should also be clear that there can be no long-run deviation of the rate of interest on the consumption loan market from the rate of interest return on productive investment. Both are aspects of one time market. If the rate of interest on consumers' loans, for example, were higher than the rate of interest return from investment, savings would shift from buying future goods in the form of factors to the more remunerative purchase of I.O.U.'s. This shift would cause the price of future factors to fall, i.e., the interest rate in investment to rise; and the rate of interest on consumers' loans to fall, as a result of the competition of more savings in the consumer loan arena. The everyday arbitrage of the market, then, will tend to equalize the rate of interest in both parts of the market. Thus, the rate of interest will tend to be equalized for all areas of the economy, as it were in three dimensions—"horizontally" in every process of production, "vertically" at every stage of production, and "in depth," in the consumer loan market as well as in the production structure.

7. *The Myth of the Importance of the Producers' Loan Market*

We have completed our analysis of the determination of the pure rate of interest as it would be in the evenly rotating economy—a rate that the market tends to approach in the real world. We have shown how it is determined by time preferences on the time market and have seen the various components of

that time market. This statement will undoubtedly be extremely puzzling to many readers. Where is the producers' loan market? This market is always the one that is stressed by writers, often to the exclusion of anything else. In fact, "rate of interest" generally refers to money loans, including loans to consumers and producers, but particularly stressing the latter, which is usually quantitatively greater and more significant for production. The rate of interest of money loans to the would-be producer is supposed to be the significant rate of interest. In fact, the fashionable neoclassical doctrine holds that the producers' loan market *determines* the rate of interest and that this determination takes place as in Figure 52, where *SS* is the supply of savings *entering the loan market*, and *DD* is the *demand for these loans* by producers or entrepreneurs. Their intersection allegedly determines the rate of interest.

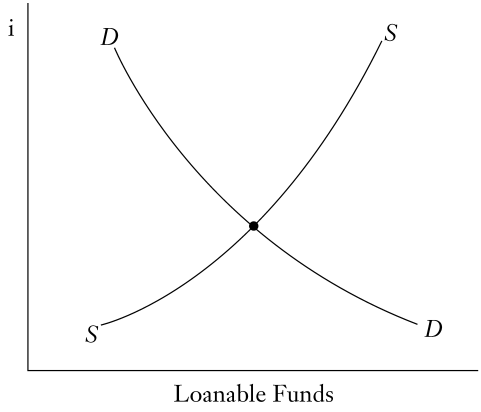

FIGURE 52. NEOCLASSICAL CONCEPTION OF THE DETERMINATION OF THE RATE OF INTEREST

It will be noticed that this sort of approach completely overlooks the *gross savings of the producers* and, even more, *the demand for present goods by owners of the original factors*. Instead of being fundamentally suppliers of present goods, capitalists are portrayed as demanders of present goods. What determines the *SS*

and *DD* schedules, according to this neoclassical doctrine? The *SS* curve is admittedly determined by time preferences; the *DD* curve, on the other hand, is supposed to be determined by the "marginal efficiency of capital," i.e., by the expected rate of return on the investment.

This approach misses the point very badly because it looks at the economy with the superficial eye of an average businessman. The businessman borrows on a producers' loan market from individual savers, and he judges how much to borrow on the basis of his expected rate of "profit," or rate of return. The writers assume that he has available a shelf of investment projects, some of which would pay him, say 8 percent, some 7 percent, some 3 percent, etc., and that at each hypothetical interest rate he will borrow in order to invest in those projects where his return will be as high or higher. In other words, if the interest rate is 8 percent, he will borrow to invest in those projects that will yield him over 8 percent; if the rate is 4 percent, he will invest in many more projects—those that will yield him over 4 percent, etc. In that way, the demand curve for savings, for each individual, and still more for the aggregate on the market, will slope rightward as demand curves usually do, as the rate of interest falls. The intersection sets the market rate of interest.

Superficially, this approach might seem plausible. It usually happens that a businessman foresees such varying rates of return on different investments, that he borrows on the market from different individual savers, *and* that he is popularly considered the "capitalist" or entrepreneur, while the lenders are simply savers. This lends plausibility to terming the *DD* curve in Figure 52, the demand by capitalists or entrepreneurs for money (present goods). And it seems to avoid mysterious complexities and to focus neatly and simply on the rate of interest for producers' loans—the loans from savers to businessmen—in which they and most writers on economics are interested. It is this rate of interest that is generally discussed at great length by economists.

Although popular, this approach is wrong through and through, as will be revealed in the course of this analysis. In the first place, let us consider the construction of this *DD* curve a little more closely. What is the basis for the alleged shelf of available projects, each with different rates of return? *Why does a particular investment yield any net monetary return at all?* The usual answer is that each dose of new investment has a "marginal value productivity," such as 10 percent, 9 percent, 4 percent, etc., that naturally the most productive investments will be made first and that therefore, as savings increase, further investments will be less and less value-productive. This provides the basis for the alleged "businessman's demand curve," which slopes to the right as savings increase and the interest rate falls. The cardinal error here is an old one in economics—the attribution of *value*-productivity to monetary investment. There is no question that investment increases the *physical* productivity of the productive process, as well as the productivity per man hour. Indeed, that is precisely why investment and the consequent lengthening of the periods of production take place at all. But what has this to do with value-productivity or with the monetary return on investment, especially in the long run of the ERE?

Suppose, for example, that a certain quantity of physical factors (and we shall set aside the question of how this quantity can be measured) produces 10 units of a certain product per period at a selling price of two gold ounces per unit. Now let us postulate that investment is made in higher-order capital goods to such an extent that productivity multiplies fivefold and that the same original factors can now produce 50 units per period. The selling price of the larger supply of product will be less; let us assume that it will be cut in half to one ounce per unit. The gross revenue per period is increased from 20 to 50 ounces. Does this mean that value-productivity has increased two and a half times, just as physical productivity increased fivefold? Certainly not! For, as we have seen, producers benefit, not from the gross revenue received, but from the *price spread* between their selling price and their aggregate factor prices. The increase in

physical productivity will certainly increase revenue in the short run, but this refers to the profit-and-loss situations of the real world of uncertainty. The *long-run* tendency will be nothing of the sort. The long-run tendency, eventuating in the ERE, is toward an equalization of price spreads. How can there be any permanent benefit when the cumulative factor prices paid by this producer increase from, say, 18 ounces to 47 ounces? This is precisely what will happen on the market, as competitors vie to invest in these profitable situations. The price spread, i.e., the *interest rate*, will again be 5 percent.

Thus the productivity of production processes has no basic relation to the rate of return on business investment. This rate of return depends on the price spreads between stages, and these price spreads will tend to be equal. The size of the price spread, i.e., the size of the interest rate, is determined, as we have seen at length, by the time-preference schedules of all the individuals in the economy.

In sum, the neoclassical doctrine maintains that the interest rate, by which is largely meant the producers' loan market, is co-determined by time preference (which determines the supply of individual savings) and by marginal (value) productivity of investment (which determines the demand for savings by businessmen), which in turn is determined by the rates of return that can be achieved in investments. But we have seen that *these very rates of return are, in fact, the rate of interest* and that their size is determined by time preferences. The neoclassicists are partly right in only one respect—that the rate of interest in the producers' loan market is dependent on the rates of return on investment. They hardly realize the extent of this dependence, however. It is clear that these *rates of return*, which will be equalized into one uniform rate, *constitute the significant rate of interest in the production structure*.[27,28]

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[27]For brilliant dissections of various forms of the "productivity" theory of interest (the neoclassical view that investment earns an interest return because capital goods are *value*-productive), see the following

Discarding the neoclassical analysis, we may ask: What, then, is the role of the productive loan market and of the rate of interest set therein? This role is one of complete and utter dependence on the rate of interest as determined above, and manifesting itself, as we have seen, in the rate of investment return, on the one hand, and in the consumers' loan market, on the other. These latter two markets are the independent and important subdivisions of the general time market, with the former being the important market for the production system.

In this picture, the producers' loan market has a purely subsidiary and dependent role. In fact, from the point of view of fundamental analysis, there need not be any producers' loan market at all. To examine this conclusion, let us consider a state of business affairs without a producers' loan market. What is needed to bring this about? Individuals save, consuming less than their income. They then *directly invest* these savings in the production structure, the incentive for investment being the rate of interest return—the price spread—on the investment. This rate is determined, along with the rate on the consumers' loan market, by the various components of the time market that

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articles by Frank A. Fetter: "The Roundabout Process of the Interest Theory," *Quarterly Journal of Economics*, 1902, pp. 163–80, where Böhm-Bawerk's highly unfortunate lapse into a productivity theory of interest is refuted; "Interest Theories Old and New," pp. 68–92, which presents an extensive development of time-preference theory, coupled with a critique of Irving Fisher's concessions to the productivity doctrine; *also see* "Capitalization Versus Productivity, Rejoinder," *American Economic Review*, 1914, pp. 856–59, and "Davenport's Competitive Economics," *Journal of Political Economy*, 1914, pp. 555–62. Fetter's only mistake in interest theory was to deny Fisher's assertion that time preference (or, as Fisher called it, "impatience") is a universal and *necessary* fact of human action. For a demonstration of this important truth, *see* Mises, *Human Action*, pp. 480 ff.

[28]On Keynes' failure to perceive this point, see p. 371 of this chapter, note 5 above.

we have portrayed above. There is, in that case, no producers' loan market. There are no loans from a saving group to another group of investors. And it is clear that the rate of interest in the production structure still exists; it is determined by factors that have nothing to do with the usual discussion by economists of the producers' loan market.

8. The Joint-Stock Company

It is clear that, far from being the centrally important element, the producers' loan market is of minor importance, and it is easy to postulate a going productive system with no such market at all. But, some may reply, this may be all very well for a primitive economy where every firm is owned by just one capitalist-investor, who invests his own savings. What happens in our modern complex economy, where savings and investment are *separated*, are processes engaged in by different groups of people—the former by scattered individuals, the latter by relatively few directors of firms? Let us, therefore, now consider a second possible situation. Up to this point we have not treated in detail the question whether each factor or business was owned by one person or jointly by many persons. Now let us consider an economy in which factors are *jointly owned* by many people, as largely happens in the modern world, and we shall see what difference this makes in our analyses.

Before studying the effect of such jointly owned companies on the producers' loan market, we must digress to analyze the nature of these companies themselves. In a *jointly* owned firm, instead of each individual capitalist's making his own investments and making all his own investment and production decisions, various individuals pool their money capital in one organization, or *business firm*, and jointly make decisions on the investment of their joint savings. The firm then purchases the land, labor, and capital-goods factors, and later sells the product to consumers or to lower-order capitalists. Thus, the firm is the joint owner of the factor services and particularly of the *product*

as it is produced and becomes ready for sale. The firm is the product-owner until the product is sold for money. The individuals who contributed their saved capital to the firm are the joint owners, successively, of: (*a*) the initial money capital—the pooled savings, (*b*) the services of the factors, (*c*) the product of the factors, and (*d*) the money obtained from the sale of the product. In the evenly rotating economy, their ownership of assets follows this same step-by-step pattern, period after period, without change. In a jointly owned firm, in actual practice, the variety of productive assets owned by the firm is large. Any one firm is usually engaged in various production processes, each one involving a different period of time, and is likely to be engaged in different stages of each process at any one particular time. A firm is likely to be producing so that its output is continuous and so that it makes sales of new units of the product every day.

It is obvious, then, that if the firm keeps continually in business, its operations at any one time will be a mixture of investment and sale of product. Its assets at any one time will be a mixture of cash about to be invested, factors just bought, hardly begun products, and money just received from the sale of products. The result is that, to the superficial, it looks as if the firm is an automatically continuing thing and as if the production is somehow timeless and instantaneous, ensuing immediately after the factor input.

Actually, of course, this idea is completely unfounded. There is no automatic continuity of investment and production. Production is continued because the owners are continually making decisions to proceed; if they did not think it profitable to do so, they could and do at any point alter, curtail, or totally cease operations and investments. And production takes *time* from initial investment to final product.

In the light of our discussion, we may classify the types of assets owned by any firm (whether jointly or individually owned) as follows:

A. *Money*
B. *Productive Assets*
Melange of factors, such as land and capital goods, embodying future services (this will be analyzed below); various stages of product; the completed product

On this entire package of assets, a monetary evaluation is placed by the market. How this is done will be examined in detail later.

At this point, let us revert to the simple case of a one-shot investment, an investment in factors on one date, and the sale of the resulting product a year later. This is the assumption involved in our original analysis of the production structure; and it will be seen below that the same analysis can be applied to the more complex case of a melange of assets at different stages of production and even to cases where one firm engages in several different production processes and produces different goods. Let us consider a group of individuals pooling their saved money capital to the extent of 100 ounces, purchasing factors with the 100 gold ounces, obtaining a product, and selling the product for 105 ounces a year later. The rate of interest in this society is 5 percent per annum, and the rate of interest return on this investment conforms with this condition. The question now arises: *On what principle do the individual owners mutually apportion their shares of the assets?* It will almost always be the case that every individual is vitally interested in knowing his share of the joint assets, and consequently firms are established in such a way that the principle of apportionment is known to all the owners.

At first one might be inclined to say that this is simply a case of bargaining, as in the case of the product jointly owned by all the owners of the factors. But the former situation does not apply here. For in the case discussed above, there was no principle whereby any man's share of ownership could be distinguished from that of anyone else. A whole group of people worked, contributed their land, etc., to the production process, and there was no way except simple bargaining by which the

income from the sale of the product could be apportioned among them. Here, each individual is contributing a certain amount of money capital to begin with. Therefore, the proportions are naturally established from the outset. Let us say that the 100 ounces of capital are contributed by five men as follows:

A . . . . . 40 oz.
B . . . . . 20 oz.
C . . . . . 20 oz.
D . . . . . 15 oz.
E . . . . . 5 oz.

In other words, A contributes 40 percent of the capital, B 20 percent, C 20 percent, D 15 percent, E 5 percent. Each individual owner of the firm then owns the same percentage of all the assets that he contributed in the beginning. This holds true at each step of the way, and finally for the money obtained from the sale of the product. The 105 ounces earned from the sale will be either reinvested in or "disinvested" from the process. At any rate, the ownership of these 105 ounces will be distributed in the same percentages as the capital invested.

This natural structure of a firm is essentially the structure of a *joint-stock company*. In the joint-stock company, each investor-owner receives a *share*—a certification of ownership in proportion to the amount he has invested in the total capital of the company. Thus, if A, B, . . . E above form a company, they may issue 100 shares, each share representing a value, or an asset, of one ounce. A will receive 40 shares; B, 20 shares; C, 20 shares, etc. After the sale of the product, each share will be worth 5 percent more than its original, or *par*, value.

Suppose that after the sale, or indeed at any time before the sale, another person, F, wishes to invest in this company. Suppose that he wishes to invest 30 ounces of gold. In that case, the investment of money savings in the company increases from 100 (if before the sale) or 105 (if after the sale) by 30 ounces. Thirty new shares will be issued and turned over to F, and the capital value of the firm increases by 30 ounces. In the vast

majority of cases where reinvestment of monetary revenue is going on continuously, at any point in time the capital value of a firm's assets will be the appraised value of all the productive assets, including cash, land, capital goods, and finished products. The capital value of the firm is increased at any given time by new investment and is maintained by the reinvestments of the owners after the finished product is sold.

The shares of capital are generally known as *stock*; the total *par* value of capital stock is the amount originally paid in on the formation of the company. From that point on, the total capital value of assets changes as income is earned, or, in the world of uncertainty, as losses are suffered, and as capital is reinvested or withdrawn from the company. The total value of capital stock changes accordingly, and the value of each share will differ from the original value accordingly.

How will the group of owners decide on the affairs of the company? Those decisions that must be made jointly will be made by some sort of voting arrangement. The natural voting arrangement, which one would expect to be used, is to have one vote per share of voting stock, with a majority of the votes deciding. This is precisely the arrangement used in the joint-stock company and its modern form, the *corporation*.

Of course, some joint-stock company arrangements differ from this, according to the desires of the owners. *Partnerships* can be worked out between two or more people on various principles. Usually, however, if one partner receives more than his proportionate share of invested capital, it is because he is contributing more of his labor or his land to the enterprise and gets paid accordingly. As we shall see, the rate paid to the labor of the "working partner" will be approximately equal to what he could earn in labor elsewhere, and the same is true for payment to the land or any other originally owned factor contributed by a partner. Since partnerships are almost always limited to a few, the relationships are more or less informal and need not have the formal patterns of the joint-stock company.

However, partnerships will tend to work quite similarly. They provide more room for idiosyncratic arrangements. Thus, one partner may receive more than his share of capital because he is loved and revered by the others; this is really in the nature of a gift to him from the rest of the partners. Joint-stock companies hew more closely to a formal principle.

The great advantage of the joint-stock company is that it provides a more ready channel for new investments of saved capital. We have seen how easy it is for new capital to be attracted through the issuance of new shares. It is also easier for any owner to withdraw his capital from the firm. This greater ease of withdrawal vastly increases the temptation to invest in the company. Later on we shall explore the pricing of stock shares in the real world of uncertainty. In this real world, there is room for great differences of opinion concerning the appraised value of a firm's assets, and therefore concerning the monetary appraised value of each share of the firm's stock. In the evenly rotating economy, however, all appraisals of monetary value will agree—the principles of such appraisal will be examined below—and therefore the appraised value of the shares of stock will be agreed upon by all and will remain constant.

While the share market of joint-stock companies provides a ready channel for accumulating savings, *the share market is strictly dependent on the price spreads*. The savings or dissavings of capitalists are determined by time preferences, and the latter establish the price spread in the economy. The value of capital invested in the enterprise, i.e., its productive assets, will be the sum of future earnings from the capital discounted by the rate of interest. If the price spreads are 5 percent, the rate of interest return yielded on the share market (the ratio of earnings per share to the market price of the share) will tend to equal the rate of interest as determined elsewhere on the time market—in this case, 5 percent.

We still have a situation in which capitalists supply their own saved capital, which is used to purchase factors in expectation of a net monetary return. The only complications that

develop from joint-stock companies or corporations are that many capitalists contribute and own the firm's assets jointly and that the price of a certain quantum of ownership will be regulated by the market so that the rate of interest yield will be the same for each individual share of stock as it is for the enterprise as a whole. If the whole firm buys factors for a total price of 100 and sells the product a year later for 105, for a 5-percent return, then, say, $1/5$ of the shares of ownership of this firm will sell for an aggregate price of 20 and earn an annual net return of one ounce. Thus, the rates of interest for the partial shares of capital will all tend to be equal to the rate of interest earned on the entire capital.[29]

Majority rule in the joint-stock companies, with respect to total shares owned, does not mean that the minority rights of owners are overridden. In the first place, the entire pooling of resources and the basis on which it is worked out are voluntary for all parties concerned. Secondly, all the stockholders, or owners, have one single interest in common—an increase in their monetary return and assets, although they may, of course, differ concerning the means to achieve this goal. Thirdly, the members of the minority may sell their stock and withdraw from the company if they so desire.

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[29]The shares of stock, or the units of property rights,

> have the characteristic of fungibility; one unit is exactly the same as another. . . . We have a mathematical division of the one set of rights. This fungible quality makes possible organized commodity and security markets or exchanges. . . . With these fungible units of . . . property rights we have a possible acceleration of changes of ownership and in membership of the groups. . . . If a course of market dealings arises, the unit of property has a swift cash conversion value. Its owner may readily resume the cash power to command the uses of wealth. (Hastings Lyon, *Corporations and their Financing* [Boston: D.C. Heath, 1938], p. 11)

Thus, *shares* of property as well as total property have become readily marketable.

Actually, the partners may arrange their voting rights and ownership rights in any way they please, and there have been many variations of such arrangements. One such form of group ownership, in which each owner has one vote regardless of the number of shares he owns, has absurdly but effectively arrogated to itself the name of "co-operative." It is obvious that partnerships, joint-stock companies, and corporations are *all* eminently *co-operative* institutions.[30]

Many people believe that economic analysis, while applicable to individually owned firms, does not hold true for the modern economy of joint-stock companies. Nothing could be further from the truth. The introduction of corporations has not fundamentally changed our analysis of the interest rate or the savings-investment process. What of the separation of "management" from ownership in a corporation? It is certainly true that, in a joint-stock firm, the owners hire managerial labor to supervise their workers, whereas individual owners generally perform their own managerial labor. A manager is just as much a hired laborer as any other worker. The president of a company, just like the ditch digger, is hired by the owners; and, like the ditch digger, he expends labor in the production process. The price of managerial labor is determined in the same way as that of other labor, as will be seen below. On the market, the income to an independent owner will *also* include the going wage for that type of managerial labor, which joint-stock owners, of course, will not receive. Thus, we see that, far from rendering economic analysis obsolete, the modern world of the corporation aids analysis by separating and simplifying functions in production—specifically, the managerial function.

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[30]The literature on the so-called "co-operative movement" is of remarkably poor quality. The best source is *Co-operatives in the Petroleum Industry*, K.E. Ettinger, ed. (New York: Petroleum Industry Research Foundation, 1947), especially pt. I, Ludwig von Mises, "Observations on the Co-operative Movement."

In addition to the capital-supplying function, the corporate capitalists also assume the *entrepreneurial* function: the crucial directing element in guiding the processes of production toward meeting the desires of the consumers. In the real world of uncertainty, it takes sound judgment to decide how the market is operating, so that present investment will lead to future profits, and not future losses. We shall deal further with the nature of profit and loss, but suffice it to say here that the active entrepreneurial element in the real world is due to the presence of uncertainty. We have been discussing the determination of the pure rate of interest, the rate of interest as it always tends to be and as it will be in the certain world of the ERE. In the ERE, where all techniques, market demands and supplies, etc., for the future are known, the investment function becomes purely passive and waiting. There might still be a supervisory or managerial labor function, but this can be analyzed under prices of labor factors. But there will no longer be an entrepreneurial function because future events are known.

Some have maintained, finally, that joint-stock companies make for a separation of savings and investment. Stockholders save, and the managers do the investing. This is completely fallacious. The managers are *hired agents* of the stockholders and subject to the latters' dictation. Any individual stockholder not satisfied with the decisions of the majority of owners can dispose of his ownership share. As a result, it is effectively the *stockholders* who save and the *stockholders* who invest the funds.[31]

Some people maintain that since most stockholders are not "interested" in the affairs of their company, they do not effectively control the firm, but permit control to pass into the hands of the hired managers. Yet surely a stockholder's interest is a matter of his own preference and is under his own control. Preferring his lack of interest, he permits the managers to continue their present course; the fundamental control, however, is still

[31]*See* Mises, *Human Action*, pp. 301–05, 703–05.

his, and he has absolute control over his agents.[32] A typical view asserts:

> The maximizing of dividend income for stockholders as a group is not an objective that is necessarily unique or paramount. Instead, management officials will seek to improve the long-run earnings and competitive position of the firm and their own prestige as managers.[33]

But to "improve the long-run earnings" is identical with maximizing stockholders' income, and what else can develop the "prestige" of managers? Other theorists lapse into the sheer mysticism of considering the "corporation"—a conceptual name which we give to an institution owned by real individuals—as "really" existing and acting by itself.[34]

9. Joint-Stock Companies and the Producers' Loan Market

We are now ready to embark on an analysis of the effect of joint-stock companies on the producers' loan market.

Let us take the aforementioned firm with a total capital stock and capital value of 130 ounces and owned by six stockholders. The firm earns a net income of 5 percent per year for its owners, and this is the interest rate earned by all the firms in the economy.

We have already seen how the firm expanded its capital by 30 ounces through the sale of new capital stock to F. Let us see what happens when a productive loan is made. Suppose that the

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[32]The proxy fights of recent years simply give dramatic evidence of this control.

[33]Edgar M. Hoover, "Some Institutional Factors in Business Decisions," *American Economic Review*, *Papers and Proceedings*, May, 1954, p. 203.

[34]For example, *see* Gerhard Colm, "The Corporation and the Corporation Income Tax in the American Economy," *American Economic Review*, *Papers and Proceedings*, May, 1954, p. 488.

firm borrows 20 ounces from the producers' loan market for a five-year period. What has happened? The firm has exchanged a future good—a promise to pay money in the future—for present money. The present money has been supplied by a saver, G. It is clear that G has done the saving and is the capitalist in this transaction, while the joint stockholders A–F are here supplying future goods; and further, it is the stockholders who invest the new capital in the production system. On the surface, this seems to be a positive case of the separation of savings and investment.

However, let us look at the transaction further. G has supplied new capital, worth 20 ounces, to the firm, for a five-year period. The owners A–F take this new capital and invest it in future goods, i.e., factors of production. In other words, to the extent of 20 ounces, A–F are intermediary investors of the savings of the creditors. What will the rate of interest on this loan be? It is obvious that this rate of interest in the ERE, will be equal to 5 percent, i.e., it will be purely dependent on the rate of interest return that prevails in the price spreads of the production structure. The reason for this should be clear. We have already seen how the interest rate is determined in the production structure; we have assumed it to be 5 percent everywhere. Now, suppose that the firm offers to pay G 3 percent on the loan. Clearly, G will not lend the firm 20 ounces for a 3-percent return when he could get 5 percent as a stockholder either in the same firm or in any other firm. On the other hand, the firm is in no position to pay G any more than 5 percent, since its net return on the investment will be only 5 percent. If the maximum that the firm can pay in interest is 5 percent, and the minimum that the creditor can accept is 5 percent, it is obvious that the transaction will take place at 5 percent.

It is clear that, in essence, G, the creditor on the prospective loan market, is no different from F, the man who has invested in stock. Both have saved money instead of spending it on consumption, and both wish to sell their saved capital in exchange for future goods and to earn interest. The time-preference

schedules of both F and G, as well as of everyone else, are aggregated on the time market to arrive at the rate of interest; both F and G are net savers at the market rate. The interest rate, then, is determined by the various time-preference schedules, and the final rate is set by the saving schedules, on the one hand, and by the demand-for-present-goods schedules, on the other. The demand schedules consist (and consist only) of the productive demand by laborers and landowners and the consumption demand by borrowing consumers. F and G are both net savers, interested in investing their capital for the highest return. There is no essential difference between F's method of investing his capital and G's method of investing his; *the difference between investing in stock and lending money to firms is mainly a technical one*. The separation between saving and investment that occurs in the latter case is completely unimportant. The interest return on investment, as set by total savings and total demands by owners of factors, *completely determines the rate of interest on the producers' loan market* as well as the rate of earning on stock. The producers' loan market is totally unimportant from the point of view of fundamental analysis; it is even useless to try to construct demand and supply schedules for this market, since its price is determined elsewhere.[35] Whether saved capital is channeled into investments *via* stocks or *via* loans is unimportant. The only difference is in the legal technicalities.

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[35]As Frank Fetter brilliantly stated:

> Contract [interest] is based on and tends to conform to economic interest [i.e., the "natural interest" price differential between stages]. . . . It is economic interest that we seek to explain logically through the economic nature of the goods. Contract interest is a secondary problem—a business and legal problem—as to who shall have the benefit of the income arising with the possession of the goods. It is closely connected with the question of ownership. (Fetter, "Recent Discussions of the Capital Concept," pp. 24–25)

Indeed, even the legal difference between the creditor and the owner is a negligible one. G's loan has increased the capital value of the assets in the firm from 130 to 150. The invested 150 pays 5 percent, or 7.5 ounces per year. Let us examine the situation and see who the actual owners of this capital are (see Figure 53).

In this diagram, the left-hand rectangle represents assets at any one point in time. We see in the right-hand rectangle that 130 ounces of these assets is represented by owners' capital, and 20 by liabilities—i.e., by I.O.U.'s due to creditors. But what does

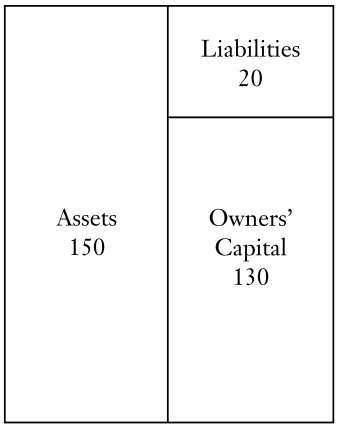

FIGURE 53. DISTRIBUTION OF OWNERSHIP OF JOINT-STOCK COMPANY'S ASSETS

this "representation" mean? It means that if, for example, the firm were to liquidate and go out of business, 20 ounces of its assets would be used to pay off the creditors, and 130 would go to the legal owners. It means, further, that of the seven and a half ounces paid out as net earnings per year, six and a half ounces go to the legal owners and one ounce to the creditors, each being 5 percent of their saving. In fact, each group gets 5 percent on its *investment*, for are not the creditors just as much investors as the

stockholders? In fact, are not the creditors the *owners* of 20 ounces' worth of the firm's assets, and do they not own the pro rata earnings of those 20 ounces? What functions of ownership do the creditors *not* have as compared to the stockholders? Even from the legal point of view, the creditors *get first claim* on the assets of a corporation, and they get paid before the stockholders. They are therefore definitely owners of these assets. It might be stated that since they are not shareholders, they do not vote on the decisions of the corporation, but there are many situations in which joint-stock companies issue *nonvoting* shares, the holders of which do not vote on company affairs, even though they receive their prorata value of the earnings.

We must conclude that economically and even in basic law, there is no difference between shareholders and productive creditors; both are equally suppliers of capital, both receive interest return as determined on the general time market, both own their proportionate share of the company's assets. The differences between the two are only technical and semantic. It is true that our discussion has so far applied only to the evenly rotating economy, but we shall see that the real world of uncertainty and entrepreneurship, while complicating matters, does not change the essentials of our analysis.[36]

In recent writings there has been a growing acknowledgment of the essential identity between shareholders and creditors, in contrast to the old tradition that postulated a sharp cleavage between them. But it is curious that the new literature interprets the identity in precisely the wrong way: instead of treating the creditors like shareholder-owners, it treats the shareholders like creditors. In other words, the correct approach is to consider creditors as actually part owners of the firm; but the new literature treats stockholders as merely creditors of the firm, in keeping with the new tradition of picturing the hired managers as its

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[36]"The creditor is always a virtual partner of the debtor or a virtual owner of the pledged and mortgaged property." Mises, *Human Action*, p. 536. *Also see* Fetter, "Recent Discussions of the Capital Concept," p. 432.

real controllers and owners. Managers are depicted as somehow owning the firm and paying out interest to creditors, as well as dividends to stockholders, just as any factor payment is made—as a grudging cost of production. In reality, the managers are only the hired agents of the stockholders, and it is the latter who decide how much of their earnings to reinvest in the firm and how much to "take out of the firm" in the form of "dividends."

The commonly made distinction between "dividends" and "retained earnings" is not a useful one for the purposes of economic analysis. Retained earnings are not necessarily reinvested; they may be held out of investment in a cash balance and later paid out as dividends. Dividends, on the other hand, are not necessarily spent on consumption; they may be invested in some other firm. Therefore, this distinction is a misleading one. Earnings are either reinvested or they are not; and all corporate earnings constitute earnings of the individual owners.

Savings may be channeled through intermediaries before entering the actual producers' loan (or the consumers' loan) market. *Finding* a productive investment is one of the tasks of entrepreneurs, and it is often far more convenient for all concerned when the individual, instead of making up his mind himself on the proper channels of investment, lends or invests his money in other institutions specially set up to be experts in investment. These institutions may serve as channels, gathering in the small savings of isolated individuals, whose investments by themselves are too small to be worth the cost of finding a market for them. The institutions then invest the funds knowledgeably in larger lump sums. A typical example is the *investment trust*, which sells its own stock to individuals and then uses this capital to buy stock of other companies. In the ERE, the interest that will be earned from individuals' savings via intermediaries will equal the interest earned from direct investments minus the cost of the intermediary's service, this price to be determined on the market just like other prices. Thus, if the interest rate throughout the market is 5 percent, and the cost of intermediary service is 1 percent, then, in the ERE, those who

channel their savings via the convenient intermediary method will receive a 4-percent interest return on the investment of their savings.

We have thus seen the unimportance of the producers' loan market as an independent determining factor in the establishment of the market rate of interest or in the productive system.

In many cases it is convenient to designate by different terms the rate of interest on contractual loan markets and the rate of interest in the form of earnings on investments as a result of price spreads. The former we may call the *contractual rate of interest* (where the interest is fixed at the time of making the contract), and the latter the *natural rate of interest* (i.e., the interest comes "naturally" via investments in production processes, rather than being officially included in an exchange contract). The two interest rates will, of course, coincide in the ERE.

Throughout our analysis we have been making one underlying assumption that might be modified: that individuals will always try to obtain the highest interest return. It is on this basis that we have traced the arbitrage actions and eventual uniformities of the ERE. We have assumed that each investor will try to earn as much as he can from his investment. This might not always be true, and critics of economics have never tired of reproaching economists for neglecting other than monetary ends. Economics does not neglect such ends, however. In fact, praxeological analysis explicitly includes them. As we have repeatedly pointed out, each individual attempts to maximize his *psychic* income, and this will translate itself into maximizing his *monetary* income only if other psychic ends are neutral. The ease with which economics can accommodate nonmonetary ends may readily be seen. Suppose that the interest rate in the society is 5 percent. Suppose, however, that there is a line of production that is distasteful to a large number of people, including investors. In a society, for example, where the making of arms is held in disfavor, simple arbitrage would not work to equate returns in the armament industry with those in other

industries. We are not here referring to the displeasure of consumers of arms, which would, of course, reflect itself in a lowered demand for the product. We are referring to the particular displeasure of producers, specifically investors. Because of this psychic dislike, investors will require a higher return in the armament industry than in other industries. It is possible, for example, that they might require an interest return of 10 percent in the armament industry, even though the general rate of interest is 5 percent. What factors, then, will have to pay for this increased discount? We are not overly anticipating the results of our subsequent analysis if we state that the owners of *nonspecific* factors, i.e., those factors which can be employed elsewhere (or, strictly, the *services* of which can thus be employed) will certainly not accept a lower monetary return in the armament industry than in the other industries. In the ERE, their prices as determined in this industry will, then, be the same as in the other industries. In fact, they might be even higher, if the owners share the investors' specific antipathy toward engaging in the armament industry. The burden of the lower prices at each stage of production, then, falls on the *purely specific* factors in the industry, those which *must* be devoted to this industry if they are to be in the production system at all. In the long run of the ERE, these will not be capital goods, since capital goods always need to be reproduced, and the equivalent resources can gradually or rapidly leave the industry, depending in each case on the durability of the capital good and the length of the process of its production. The specific factor may be labor, but this is not empirically likely, since labor is almost always a nonspecific factor that may shift to several occupations. It is therefore likely to be specific *land* factors that bear the brunt of the lower return.

The opposite will occur in the case of an industry that most investors specifically are very eager to engage in for one reason or another. In that case, they will accept a lower interest return in this production process than in others. The force of competition on the market will, once again, keep nonspecific factors at

the same price from industry to industry, although the price might be lower if the factor-owners were also particularly eager to work in this industry. The higher prices at the various stages are therefore reaped by the owners of specific factors, generally land factors.

The rate of interest, then, always tends toward equality throughout its various submarkets and in its various forms. In the ERE, the rates will be uniformly equal throughout. This conclusion must be modified, however, to state that the rates of interest will differ in accordance with a "psychic" component, either positive or negative, depending on whether there is an acute dislike or liking among investors for a particular production process.[37] We may say that, in the case of a particular liking, the investors are "consuming" the enjoyment of investing in the particular process and paying the price of a lower return; in the case of a particular dislike, they are charging more for a particular disutility. It must be emphasized, however, that these differences in return do not occur if merely *one person* particularly likes or dislikes a certain field, but only if there is a significant aggregate of strong preferences in one direction or another. This type of consumption, positive or negative, is intertwined in the production process and occurs directly with production, and thus differs from ordinary consumption, which occurs at the end of the production process.

10. Forces Affecting Time Preferences

Praxeology can never furnish an ultimate explanation for a man's time preferences. These are psychologically determined by each person and must therefore be taken, in the final analysis, as data by economists. However, praxeological analysis can supply some truths about time preferences, using *ceteris paribus*

[37]Similar psychic components may occur in the consumers' loan market—for example, if there is general strong liking or dislike for a certain borrower.

assumptions. Thus, as we have seen above, each person has a time-preference schedule relating to his money stock. A lower money stock will cause a higher time-preference rate for any unit of money remaining in his possession, until finally his time-preference rate will rise to infinity when the money stock—or rather, the money for consumption—is low enough. Here, one element, a man's money stock, is varied and his value scale is otherwise assumed to remain constant. Hence, we can in this way gauge the effects of a change in one determinant, the money stock.

Actually, it is not his *money* stock that is relevant to his time preferences, but the *real* value of his money stock. In the ERE, of course, where the purchasing power of the money unit remains unchanged, the two are identical. *Ceteris paribus*, an increase in his real income—real additions to his money stock—will lower the time-preference rate on his schedule. Of course, historically, there is no reason why his time-preference *schedule* should remain unchanged. It is important to know, however, that, given an unchanged schedule, his relevant time-preference rate will fall.

There are other elements that enter into the determination of the time-preference schedules. Suppose, for example, that people were certain that the world would end on a definite date in the near future. What would happen to time preferences and to the rate of interest? Men would then stop providing for future needs and stop investing in all processes of production longer than the shortest. Future goods would become almost valueless compared to present goods, time preferences for present goods would zoom, and the pure interest rate would rise almost to infinity. On the other hand, if people all became immortal and healthy as a result of the discovery of some new drug, time preferences would tend to be very much lower, there would be a great increase in investment, and the pure rate of interest would fall sharply.

11. The Time Structure of Interest Rates

It is clear that the natural interest rates are highly flexible; they tend toward uniformity and are easily changed as entrepreneurial expectations change. In the real world the prices of the various factors and intermediate products, as well as of the final products, are subject to continual fluctuation, as are the prices of stock and the interest return on them. It is also clear that the interest rate on short-term loans is easily changed with changed conditions. As the natural interest rate changes, the new loans for short periods can easily conform to the change.

A difficulty seems to arise, however, in the case of *long-term* producers' loans. Here is an apparently clear-cut rigid element in the system, and one which can conform to the natural rate of interest in investments only after a great lag. After all, a 20-year loan is contracted at an original interest rate that remains fixed for the duration; is this not a fixed element that cannot conform to changing conditions and valuations? This superficial view is incorrect. Long-term I.O.U.'s can also be bought and sold in a market. Most of these long-term debts are called *bonds*, and they are traded in a flourishing and flexible bond market. The fixed rate of interest at the beginning is unimportant. Thus, a 100-ounce long-term loan is contracted at 5-percent fixed interest, or five ounces per year. If the general interest rate rises, people will tend to sell their bonds, which have been yielding them only 5 percent, and invest their money elsewhere—either in whole firms, stocks of firms, or short-term loans. This increased willingness to sell bonds—an increased supply schedule—depresses the *price* of the bond until the interest *yield* to the buyer is the same as the general interest rate elsewhere. Thus, if the general interest rate goes up from 5 percent to 10 percent, the price of the bond will fall from 100 to 50, so that the fixed annual return of 5 will provide an interest yield of 10 percent. The important element in bond investment is not the original interest rate (the fixed return on the so-called "par value" of the bond), but the interest *yield* on the market price of the bond. A

general lowering of the interest rate will, on the other hand, raise the bond prices above par and push yield below 5 percent. As the day of redemption of the bond draws near, the market price of the bond will, of course, rapidly approach the par value, until it finally sells at par, since the amount redeemed will be the original par value, or principal, of the loan.

It is clear that, in the ERE, the interest rates for all periods of time will be equal. The *tendency* toward such equality at any one time, however, has been disputed in the case of *expected future changes* in the interest rate. Although surprisingly little attention has been devoted to this subject, the prevailing theory is that, on the loan market, there will not be a tendency toward equalization if a change in interest rates is expected in the near future.[38] Suppose that the interest rate is now 5 percent, and it is expected to remain there. Then the interest rate on loans of all maturities will be the same, 5 percent. Suppose, however, that the interest rate is expected to increase steadily in the near future, say to increase each year by 1 percent until it will be 9 percent four years from now. In that case, since the short-run rate (say the rate of interest on loans lasting one year or less) is expected to increase over the next four-year period, then the present long-run rate for that period—e.g., the present rate for five-year loans—will be an average of the expected future short-run rates during this period. Thus, the present rate on five-year loans will be 5 percent plus 6 percent plus 7 percent plus 8 percent plus 9 percent divided by 5, equaling 7 percent. The long-run rate will be the average of short-run rates over the relevant period. Consequently, the long-run rates will be proportionately higher than short-run rates when the latter are expected to increase, and lower when the latter are expected to be lower. (See Figure 54.)

This, however, is a completely question-begging theory. Suppose that a rise in interest rates is expected; why should this be simply confined to a rise in the *short-term rates*? Why should

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[38]Thus, cf. Friedrich A. Lutz, "The Structure of Interest Rates" in *Readings in the Theory of Income Distribution*, pp. 499–532.

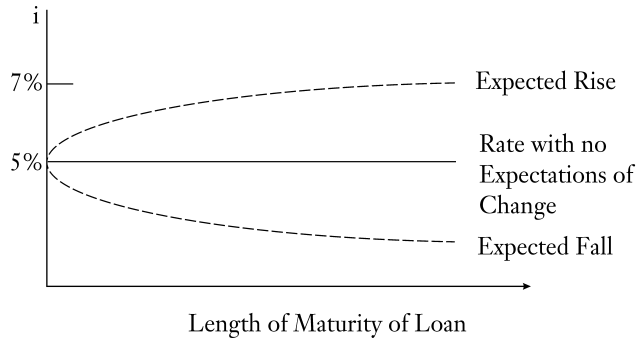

FIGURE 54. LONG-RUN INTEREST RATES CONCEIVED AS AVERAGES OF SHORT-RUN INTEREST RATES

not the expectation be equally applicable to long-term rates so that they rise as well?[39] The theory rests on the quite untenable assumption that it sets out to prove, namely, that there is no tendency for short-term and long-term rates to be equal. The assumption that a change in the interest rate will take place only over the short term is completely unproved and goes against our demonstration that the short-run and long-run rates tend to move together. Further, the theory rests on the implicit assumption that individuals will be content to remain lenders in "shorts" at 5 percent while their fellow investors reap 7 percent on the long market, simply because they expect that eventually, if they stay in the short market, they will earn an average of 7 percent. *What is there to prevent a present lender in shorts from selling his currently earning 5-percent loan, purchasing a 7-percent long, waiting for the presumed rise in shorts above 7 percent after two years, and then re-entering the short market, earning 8 percent or 9 percent?* If he does this, he will not simply earn 7 percent as the

[39]Since the writing of this text, Professor Luckett has published a critique of Lutz similar in part. *See* Dudley G. Luckett, "Professor Lutz and the Structure of Interest Rates," *Quarterly Journal of Economics*, February, 1959, pp. 131–44. *Also see* J.M. Culbertson, "The Term Structure of Interest Rates," *ibid.*, November, 1957, pp. 485–517.

foregoing diagram postulates (either directly in longs or in an average of 5 percent–9 percent in shorts); he will earn 7 percent plus 7 percent plus 7 percent plus 8 percent plus 9 percent, or an annual average of 7.6 percent. By striving to do so, he will set up an *irresistible* arbitrage movement from shorts to longs, with the rate of interest in the former thereby rising from the sales of loans on the market, and the rate of interest in longs falling, *until the rate of interest is uniform throughout the time structure*.

The same thing occurs in the case of an expectation of a future fall. Longs cannot remain in equilibrium below shorts for any length of time, since there will be a present movement from longs to shorts on the market, until the rates of interest for all time structures are equal and the arbitrage movement ceases.

The interest rate, then, always tends to be uniform throughout its time structure. What happens if the interest rate is expected to *change* in the near future? In that case, there will be a similar process as in the case of speculation in commodities. Speculators will bid up the interest rate in the expectation of an imminent rise or bid down the rate in expectation of a fall. Clearly, the earlier a rise or fall is expected to take place, the greater proportionately will be the effect on the speculators, and the greater impact it will have on current movement in the rate. In the case of a commodity, stocks would be withheld in expectation of a rise in demand and price, and then released, thereby effecting a more rapid transition to the price eventually established by underlying supply-and-demand forces. Similarly, in this case money will tend to be withheld from investments and held in cash balances until the rate reaches its expected higher level, or dislodged from cash balances and added to investment if the rate of interest is expected to be lower. This action will speed up the transition to the rate determined by the new alignment of basic time preferences. Just as speculative errors in regard to commodity prices cause losses and impel further change to the "real" underlying price, so

speculative errors will be self-correcting here too and lead the rate of interest to the height determined by underlying time preferences.

The time-structure diagram of interest, then, will rather tend to be as depicted in Figure 55.

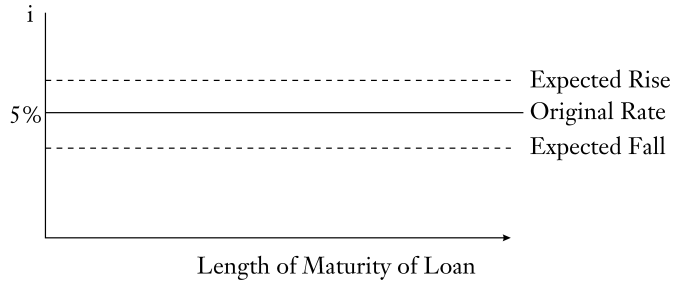

FIGURE 55. TIME STRUCTURE OF INTEREST RATES

The absurdity of separating the long-run and the short-run interest rates becomes evident when we realize that the basic interest rate is the natural rate of interest on investments, not interest on the producers' loan market. We have already seen the essential identity of the rate of earnings on the loan market with that on the stock market. If we consider the stock market, it becomes obvious that there is no distinction in rates between short-run and long-run investments. Different firms engage in stages of production of varying lengths; yet the stock market equates the rate of interest on all investments, obliterating the differences in time structure so thoroughly that it becomes difficult for many writers to grasp the very concept of period of production. But since the operations of the stock market and the loan market are essentially the same, it is obvious that there is no difference in causal explanation between short-run and long-run interest rates. Those writers who postulate an essential difference between the nature of long-run and short-run rates have been misled by a common penchant for considering

the time market as confined exclusively to the loan market, when in fact the loan market is only a dependent one.[40]

In actual practice, it may well happen that either the short-run loan market or the long-run market may change first, with the other market following. Which market characteristically changes first is the outcome of the concrete conditions.[41]

Appendix
Schumpeter and the Zero Rate of Interest

The late Professor Joseph Schumpeter pioneered a theory of interest which holds that the rate of interest will be zero in the evenly rotating economy. It should be clear from the above discussion why the rate of interest (the *pure* rate of interest in the ERE) could never be zero. It is determined by individual time preferences, which are all positive. To maintain his position, Schumpeter was forced to assert, as does Frank Knight, that capital maintains itself permanently in the ERE. If there is no problem of maintenance, then there appears to be no necessity for the payment of interest in order to maintain the capital structure. This view, treated above, is apparently derived from the static state of J.B. Clark and seems to follow purely *by definition*, since the value of capital is maintained by definition in the ERE. But this, of course, is no answer whatever; the important question is: *How* is this

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[40]It is remarkable that in his empirical study of the time structure of interest rates, Charls Walker found an irresistible tendency of interest rates to equalize, but was forced to multiply his assumptions in order to try to demonstrate that this was a proof of the theory that interest rates do not necessarily equalize. Charls E. Walker, "Federal Reserve Policy and the Structure of Interest Rates on Government Securities," *Quarterly Journal of Economics*, February, 1954, pp. 19–42. Walker's article has considerable merit in demonstrating the impossibilities of governmental maintenance of a differential interest pattern in the face of the market's drive to equality. Cf. Luckett, "Professor Lutz and the Structure of Interest Rates," p. 143 n.

[41]*See* Mises, *Human Action*, p. 541.

constancy maintained? And the only answer can be that it is maintained by the decisions of capitalists induced by a rate of interest return. If the rate of interest paid were zero, complete capital consumption would ensue.[42]

The conclusive Mises-Robbins critique of Schumpeter's theory of the zero rate of interest, which we have tried to present above, has been attacked by two of Schumpeter's disciples.[43] First, they deny that constancy of capital is assumed by definition in Schumpeter's ERE; instead it is "deduced from the conditions of the system." What are these conditions? There is, first, the absence of uncertainty concerning the future. This, indeed, would seem to be the condition for any ERE. But Clemence and Doody add: "Neither is there time preference unless we introduce it as a special assumption, in which case it may be either positive or negative as we prefer, and there is nothing further to discuss." With such a view of time preference, there is indeed nothing to discuss. The whole basis for pure interest, requiring interest payments, is time preference, and if we casually assume that time preference is either nonexistent or has no discernible influence, then it follows very easily that the pure rate of interest is zero. The authors' "proof" simply consists of ignoring the powerful, universal fact of time preference.[44]

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[42]*See* Mises, *Human Action*, pp. 527–29. *Also see* Lionel Robbins, "On a Certain Ambiguity in the Conception of Stationary Equilibrium" in Richard V. Clemence, ed., *Readings in Economic Analysis* (Cambridge: Addison-Wesley Press, 1950), I, 176 ff.

[43]Richard V. Clemence and Francis S. Doody, *The Schumpeterian System* (Cambridge: Addison Wesley Press, 1950), pp. 28–30.

[44]As has been the case with all theorists who have attempted to deny time preference, Clemence and Doody hastily brush *consumers' loans* aside. As Frank A. Fetter pointed out years ago, only time preference can integrate interest on consumers' as well as on producers' loans into a single unified explanation. Consumers' loans are clearly unrelated to "productivity" explanations of interest and are obviously due to time preference. Cf. Clemence and Doody, *The Schumpeterian System*, p. 29 n.

7

PRODUCTION: GENERAL PRICING OF THE FACTORS

1. Imputation of the Discounted Marginal Value Product

UP TO THIS POINT, WE have been investigating the rate of interest as it would be determined in the evenly rotating economy, i.e., as it always *tends* to be determined in the real world. Now we shall investigate the pricing of the various factors of production in the same terms, i.e., as they tend to be in the real world, and as they would be in the evenly rotating economy.

Whenever we have touched on the pricing of productive factors we have signified the prices of their *unit services*, i.e., their *rents*. In order to set aside consideration of the pricing of the factors as "wholes," as embodiments of a series of future unit services, we have been assuming that no businessmen purchase factors (whether land, labor, or capital goods) outright, but only unit services of these factors. This assumption will be continued for the time being. Later on, we shall drop this restrictive assumption and consider the pricing of "whole factors."

In chapter 5 we saw that when all factors are specific there is no principle of pricing that we can offer. Practically, the only thing that economic analysis can say about the pricing of the productive factors in such a case is that voluntary bargaining among the factor-owners will settle the issue. As long as the factors are all purely specific, economic analysis can say little more about the determinants of their pricing. What conditions

must apply, then, to enable us to be more definite about the pricing of factors?

The currently fashionable account of this subject hinges on the *fixity* or *variability* in the proportions of the combined factors used per unit of product. If the factors can be combined only in certain fixed proportions to produce a given quantity of product, it is alleged, then there can be no determinate price; if the proportions of the factors can be varied to produce a given result, then the pricing of each factor can be isolated and determined. Let us examine this contention. Suppose that a product worth 20 gold ounces is produced by three factors, each one purely specific to this production. Suppose that the proportions are variable, so that a product worth 20 gold ounces can be produced either by four units of factor *A*, five units of factor *B*, and three units of factor *C*, or by six units of *A*, four units of *B*, and two units of *C*. How will this help the economist to say anything more about the pricing of these factors than that it will be determined by bargaining? The prices will still be determined by bargaining, and it is obvious that the variability in the proportions of the factors does not aid us in any determination of the specific value or share of each particular product. Since each factor is purely specific, there is no way we can analytically ascertain how a price for a factor is obtained.

The fallacious emphasis on variability of proportion as the basis for factor pricing in the current literature is a result of the prevailing method of analysis. A typical single firm is considered, with its selling prices and *prices of factors given*. Then, the proportions of the factors are assumed to be variable. It can be shown, accordingly, that if the price of factor *A* increases compared to *B*, the firm will use less of *A* and more of *B* in producing its product. From this, demand curves for each factor are deduced, and the pricing of each factor established.

The fallacies of this approach are numerous. The chief error is that of basing a causal explanation of factor pricing on the *assumption of given factor prices*. On the contrary, we cannot

explain factor prices while assuming them as given from the very beginning of the analysis.[1] It is then assumed that the price of a factor changes. But *how* can such a change take place? In the market there are no uncaused changes.

It is true that this is the way the market looks to a typical firm. But concentration on a single firm and the reaction of its owner is not the appropriate route to the theory of production; on the contrary, it is likely to be misleading, as in this case. In the current literature, this preoccupation with the single firm rather than with the interrelatedness of firms in the economy has led to the erection of a vastly complicated and largely valueless edifice of production theory.

The entire discussion of variable and fixed proportions is really technological rather than economic, and this fact should have alerted those writers who rely on variability as the key to their explanation of pricing.[2] The one technological conclusion that we know purely from *praxeology* is the law of returns, derived at the beginning of chapter 1. According to the law of returns, there is an optimum of proportions of factors, given other factors, in the production of any given product. This optimum may be the *only* proportion at which the good can be produced, or it may be one of many proportions. The former is the case of fixed proportions, the latter of variable proportions. Both cases are subsumed under the more general law of returns, and we shall see that our analysis of factor pricing is based only on this praxeological law and not on more restrictive technological assumptions.

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[1]The mathematical bent toward replacing the concepts of cause and effect by mutual determination has contributed to the willingness to engage in circular reasoning. *See* Rothbard, "Toward a Reconstruction of Utility and Welfare Economics," p. 236; and Kauder, "Intellectual and Political Roots of the Older Austrian School."

[2]Clearly, the longer the period of time, the more variable will factor proportions tend to be. Technologically, varying amounts of time are needed to rearrange the various factors.

The key question, in fact, is not variability, but *specificity* of factors.[3] For determinate factor pricing to take place, there must be *nonspecific* factors, factors that are useful in several production processes. It is the prices of these nonspecific factors that are determinate. If, in any particular case, only one factor is specific, then its price is also determined: it is the residual difference between the sum of the prices of the nonspecific factors and the price of the common product. When there is more than one specific factor in each process, however, only the *cumulative* residual price is determined, and the price of each specific factor singly can be determined solely by bargaining.

To arrive at the principles of pricing, let us first leap to the conclusion and then trace the process of arriving at this conclusion. Every capitalist will attempt to employ a factor (or rather, the service of a factor) at the price that will be at least *less than its discounted marginal value product.* The *marginal value product* is the monetary revenue that may be attributed, or "imputed," to one service unit of the factor. It is the "marginal" value product, because the supply of the factor is in discrete units. This MVP (marginal value product) is *discounted* by the social rate of time preference, i.e., by the going rate of interest. Suppose, for example, that a unit of a factor (say a day's worth of a certain acre of land or a day's worth of the effort of a certain laborer) will, imputably, produce for the firm a product one year from now that will be sold for 20 gold ounces. The MVP of this factor is 20 ounces. But this is a future good. The *present value of the future good*, and it is this present value that is *now* being purchased, will be equal to the MVP discounted by the going rate of interest. If the rate of interest is 5 percent, then the discounted MVP will be equal to 19 ounces. To the employer—the

[3]This justifies the conclusion of Mises, *Human Action*, p. 336, as compared, for example, with the analysis in George J. Stigler's *Production and Distribution Theories*. Mises adds the important proviso that if the factors have the same fixed proportions in *all* the processes for which they are nonspecific, then here too only bargaining can determine their prices.

capitalist—then, the maximum amount that the factor unit is now worth is 19 ounces. The capitalist will be willing to buy this factor at any price up to 19 ounces.

Now suppose that the capitalist owner or owners of one firm pay for this factor 15 ounces per unit. As we shall see in greater detail later on, this means that the capitalist earns a *pure profit* of four ounces per unit, since he reaps 19 ounces from the final sale. (He obtains 20 ounces on final sale, but one ounce is the result of his time preference and waiting and is not pure profit; 19 ounces is the *present value* of his final sale.) But, seeing this happen, other entrepreneurs will leap into the breach to reap these profits. These capitalists will have to bid the factor away from the first capitalist and thus pay more than 15 ounces, say 17 ounces. This process continues until the factor earns its full DMVP (discounted marginal value product), and no pure profits remain. The result is that in the ERE every isolable factor will earn its DMVP, and this will be its price. As a result, each factor will earn its DMVP, and the capitalist will earn the going rate of interest for purchasing future goods with his savings. In the ERE, as we have seen, all capitalists will earn the same going rate of interest, and no pure profit will then be reaped. The sale price of a good will be necessarily equal to the sum of the DMVPs of its factors plus the rate of interest return on the investment.

It is clear that if the marginal value of a specific unit of factor service can be isolated and determined, then the forces of competition on the market will result in making *its price equal to its DMVP in the ERE*. Any price higher than the discounted marginal value product of a factor service will not long be paid by a capitalist; any price lower will be raised by the competitive actions of entrepreneurs bidding away these factors through offers of higher prices. These actions will lead, in the former case to the disappearance of losses, in the latter, to the disappearance of pure profit, at which time the ERE is reached.

When a factor is isolable, i.e., if its service can be separated out in appraised value from other factors, then its price will

always tend to be set equal to its DMVP. The factor is clearly not isolable, if, as mentioned in note 3 above, it must always be combined with some other particular factor in fixed proportions. If this happens, then a price can be given only to the cumulative product of the factors, and the individual price can be determined only through bargaining. Also, as we have stated, if the factors are all purely specific to the product, then, regardless of any variability in the proportions of their combination, the factors will not be isolable.

It is, then, the nonspecific factors that are directly isolable; a specific factor is isolable if it is the only specific factor in the combination, in which case its price is the difference between the price of the product and the sum of the prices of the nonspecific factors. But by what process does the market isolate and determine the share (the MVP of a certain unit of a factor) of income yielded from production?

Let us refer back to the basic law of utility. What will be the marginal value of a unit of any good? It will be equal to the individual's valuation of the end that must remain unattained should this unit be removed. If a man possesses 20 units of a good, and the uses served by the good are ranked one to 20 on his value scale (one being the ordinal highest), then his loss of a unit—regardless of which end the unit is supplying *at present*—will mean a loss of the use ranked 20th in his scale. Therefore, the marginal utility of a unit of the good is ranked at 20 on the person's value scale. Any further unit to be acquired will satisfy the next highest of the ends *not yet being served*, i.e., at 21—a rank which will necessarily be *lower* than the ends already being served. The greater the supply of a good, then, the lower the value of its marginal utility.

A similar analysis is applicable to a producers' good as well. A unit of a producers' good will be valued in terms of the revenue that will be lost should one unit of the good be lost. This can be determined by an entrepreneur's knowledge of his "production function," i.e., the various ways in which factors can

technologically be combined to yield certain products, and his estimate of the demand curve of the buyers of his product, i.e., the prices that they would be willing to pay for his product. Suppose, now, that a firm is combining factors in the following way:

$$4X + 10Y + 2Z \rightarrow 100 \text{ gold oz.}$$

Four units of X plus 10 units of Y plus two units of Z produce a product that can be sold for 100 gold ounces. Now suppose that the entrepreneur estimates that the following would happen if one unit of X were eliminated:

$$3X + 10Y + 2Z \rightarrow 80 \text{ gold oz.}$$

The loss of one unit of X, other factors remaining constant, has resulted in the loss of *20 gold ounces of gross revenue*. This, then, is the marginal value product of the unit at this position and with this use.[4]

This process is reversible as well. Thus, suppose the firm is at present producing in the latter proportions and reaping 80 gold ounces. If it adds a fourth unit of X to its combination, keeping other quantities constant, it earns 20 more gold ounces. So that here as well, the MVP of this unit is *20 gold ounces*.

This example has implicitly assumed a case of variable proportions. What if the proportions are necessarily fixed? In that case, the loss of a unit of X would require that proportionate quantities of Y, Z, etc., be disposed of. The combination of factors built on $3X$ would then be as follows:

$$3X + 7.5Y + 1.5Z \rightarrow 75 \text{ gold oz.}$$
(assuming no price change in the final product)

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[4]Strictly, we should be dealing with *discounted* MVPs here, but treating just MVPs at this stage merely simplifies matters.

With fixed proportions, then, the marginal value product of the varying factor would be greater, in this case 25 gold ounces.[5]

Let us for the moment ignore the variations in MVP *within* each production process and consider only variations in MVP among different processes. This is basic since, after all, it is necessary to have a factor usable in more than one production process before its MVP can be isolated. Inevitably, then, the MVP will differ from process to process, since the various production combinations of factors and prices of products will differ. For every factor, then, there is available a sheaf of possible investments in different production processes, each differing in MVP. The MVPs (or, strictly, the discounted MVPs), can be arrayed in descending order. For example, for factor *X*:

25 oz.
24 oz.
22 oz.
21 oz.
20 oz.
19 oz.
18 oz.
etc.

Suppose that we begin in the economy with a zero supply of the factor, and then add one unit. Where will this one unit be employed? It is obvious that it will be employed in the use with the highest DMVP. The reason is that capitalists in the various

[5]We are here postulating that equal quantities of factors produce equal quantities of results. The famous question whether this condition actually holds (sometimes phrased in pretentious mathematical language as whether the "production function is linear and homogeneous") is easily resolved if we realize that the proposition: equal causes produce equal results, is the major technological axiom in nature. Any cases that appear to confute this rule only do so in appearance; in reality, supposed exceptions always involve some "indivisibility" where one factor, in effect, cannot change proportionately with other factors.

production processes will compete with one another for the use of the factor. But the use in which the DMVP is 25 can bid away the unit of the factor from the other competitors, and it can do this finally only by paying 25 gold ounces for the unit. When the second unit of supply arrives in society, it goes to the second highest use, and it receives a price of 24 ounces, and a similar process occurs as new units of supply are added. *As new supply is added, the marginal value product of a unit declines.* Conversely, *if the supply of a factor decreases* (i.e., the total supply in the economy), *the marginal value product of a unit increases*. The same laws apply, of course, to the DMVP, since this is just the MVP discounted by a common factor, the market's pure rate of interest. As supply increases, then, more and more of the sheaf of available employments for the factor are used, and lower and lower MVPs are tapped.

Diagrammatically, we may see this situation as in Figure 56.

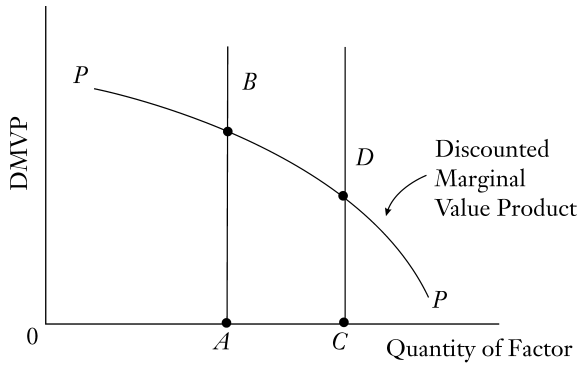

FIGURE 56. INFLUENCE OF SUPPLY OF A FACTOR ON ITS MARGINAL VALUE PRODUCT

The line *PP* is the curve of the marginal value product (or discounted MVP) of a factor. It is *always declining* as it moves to the right, because new units of supply always enter those uses that are most productive of revenue. On the horizontal axis is

the quantity of supply of the factor. When the supply is *0A*, then the MVP is *AB*. When the supply is larger at *0C*, then the MVP is lower at *CD*.

Let us say that there are 30 units of factor *X* available in the economy, and that the MVP corresponding to such a supply is 10 ounces. The price of the 30th unit, then, will tend to be 10 ounces and will be 10 ounces in the ERE. This follows from the tendency of the price of a factor to be equal to its MVP. But now we must recall that there takes place the inexorable tendency in the market for the *price of all units of any good to be uniform throughout its market.* This must apply to a productive factor just as to any other good. Indeed, this result follows from the very basic law of utility that we have been considering. For, since factor units by definition are interchangeable, the value of one unit will be equal to the value of every other unit at any one time. The value of every unit of a good will be equal to the value of the lowest-ranking use now served by a unit. In the present case, every unit of the factor will be priced at 10 gold ounces.

Suppose, for example, that the owner of the factor unit serving the top-ranking use in our array should demand that he receive 24 ounces, instead of 10 ounces, as his price. In that case, the capitalist in that line of production can refuse to hire this factor and instead bid away the unit employed in the lowest-ranking use, say by paying for the latter 10.5 ounces. The only alternative left to the owner of the factor who had demanded 24 ounces is to replace the other factor in the lowest-ranking spot, at 10 ounces. Effectively, all factors will shift until the prices that they can attain will be uniform throughout the market for their services.

The price of *X*, then, is determined at 10 ounces. It is determined by the MVP (or rather the DMVP) of the supply, which decreases as the supply increases, and *vice versa*. Let us assume that *Y* is also a nonspecific factor and that *Z* is a factor *specific* to the particular process considered above. Let us further assume that, by a similar process, the DMVP, and therefore the price, of *Y* is determined at two ounces.

At this point, we must reintroduce the concept of production *within* each line. We have been discussing MVPs of factors shifted from one use to another. In our example, a unit of X may have an MVP (or DMVP) of 20 ounces in a particular use; yet its price, as determined by the MVP of the lowest-ranking use for which it is employed, is 10 ounces. This means that, in this use, the capitalist is hiring a factor for 10 ounces which earns for him 20 ounces. Spurred on by this profit, he will hire more units of the factor until the MVP in this use will equal the MVP in the lowest-ranking use, i.e., the factor price, 10 ounces. The same process will occur in regard to each of the other uses. The tendency will always be, then (and this will always obtain in the ERE), *for the DMVP of any factor to be equal in each line of production*. We will see shortly why increased purchase of a factor even within each line will lower the MVP in that line.

Suppose, then, that the prices of X and Y are 10 and two ounces respectively and that all the capitalists have so arranged their production as to equate the DMVP of each factor in each line with this price. Suppose, further, that the equilibrium point in this particular use is the combination:

$$3X + 10Y + 2Z \rightarrow 80 \text{ oz.}$$

Substituting the given prices of X and Y:

$$\begin{aligned} 30 + 20 + 2Z &\rightarrow 80 \text{ oz.} \\ 2Z &\rightarrow 30 \text{ oz.} \\ Z &\rightarrow 15 \text{oz.} \end{aligned}$$

Therefore, $Z = 15$ oz.

The price of the specific factor Z, residual to the other factors, is thereby determined at 15 ounces.

It is obvious that the impact of a change in consumer demand on a specific factor will be far greater, in either direction, than it will be on the price of employment of a nonspecific factor.

It is now clear why the temptation in factor-price analysis is for the *firm* to consider that factor prices are given externally to

itself and that it simply varies its production in accordance with these prices. However, from an analytic standpoint, it should be evident that the array of MVPs as a whole is the determining factor, and the lowest-ranking process in terms of MVP will, through the medium of factor prices, transmit its message, so to speak, to the various firms, each of which will use the factor to such an extent that its DMVP will be brought into alignment with its price. But the ultimate determining factor is the DMVP schedule, not the factor price. To make the distinction, we may term the full array of all MVPs for a factor, the *general DMVP schedule* of a factor, while the special array of DMVPs *within* any particular production process or stage, we may term the *particular DMVP schedule* of the factor. It is the *general* DMVP schedule that determines the price of the supply of the factor, and then the *particular* DMVP schedules within each production process are brought into alignment so that the DMVPs of the factor equal its price. Figure 56 above was a *general* schedule. The particular MVPs are subarrays within the widest array of all the possible alternatives—the general MVP schedule.

In short, the prices of productive factors are determined as follows: Where a factor is isolable, its price will tend toward its discounted marginal value product and will equal its DMVP in the ERE. A factor will be isolable where it is nonspecific, i.e., is useful in more than one productive process, or where it is the *only* specific factor in a process. The nonspecific factor's price will be set equal to its DMVP as determined by its general DMVP schedule: the full possible array of DMVPs, given various units of supply of the factor in the economy. Since the most value-productive uses will be chosen first, and the least abandoned first, the curve of general MVP declines as the supply increases. The various particular MVPs in the various processes will be arranged so as to equal the factor price set by the general DMVP schedule. The specific factor's imputed DMVP is the residual difference between the price of the product and the sum of the prices of the nonspecific factors.

The marginal utility of a unit of a good is determined by a man's diminishing marginal utility schedule evaluating a certain supply or stock of that good. Similarly, the market's establishment of the price of a consumers' good is determined by the aggregate consumer demand schedules—diminishing—and their intersection with the given supply or stock of a good. We are now engaged in pursuing the problem still further and in finding the answer to two general questions: What determines the prices of factors of production on the market, and what determines the quantity of goods that will be produced? We have seen in this section that the price of a factor is determined by its diminishing general (discounted) marginal value productivity curve intersecting with the given supply (stock) of the factor in the economy.

2. Determination of the Discounted Marginal Value Product

A. Discounting

If the DMVP schedules determine the prices of nonspecific factor services, what determines the shape and position of the DMVP schedules? In the first place, by definition it is clear that the DMVP schedule is the MVP schedule for that factor *discounted*. There is no mystery about the *discounting*; as we have stated, the MVP of the factor is discounted in accordance with the going pure rate of interest on the market. The relation of the MVP schedule and the DMVP schedule may be diagrammed as in Figure 57.

The supply of the factor is the *EF* line at the given quantity 0*E*. The solid line is the MVP schedule at various supplies. The MVP of the supply *0E* is *EA*. Now the broken line D_1D_1 is the discounted marginal value product schedule at a certain rate of interest. Since it is discounted, it is uniformly lower than the MVP curve. In absolute terms, it is relatively lower at the left of the diagram, because an equal percentage drop implies a greater absolute drop where the amount is greater. The