unused array. Further, in order for the new invention to be used, *more capital must be invested. The ships for whaling have already been built; the oil wells and machinery, etc., must be created anew.* Even the newly invented method will yield a greater product only through further investment in longer processes. In other words, the only way to obtain more oil now is to invest more capital in more machinery and lengthier production periods in the oil-drilling business. As Böhm-Bawerk pointed out, White's criticism would apply only if the invention were *progressively* capital-saving, so that the product would always increase with the shortening of the process. But in that case, boring for oil with one's bare hands, unaided by capital, would have to be more productive than drilling for oil with machinery.[29]

Böhm-Bawerk drew the analogy of an agricultural invention applied to two grades of land, one grade previously yielding a marginal product of 100 bushels of wheat, the lower grade yielding 80 bushels. Now suppose use of the invention raises the marginal product of the lower-grade land to 110 bushels. Does this mean that the poorer land *now* yields more than the fertile land and that the effect of agricultural inventions is to make poorer lands more productive than fertile ones? Yet this is precisely analogous to White's position, which maintains that inventions may cause shorter production processes to be more productive! As Böhm-Bawerk pointed out, it is obvious that the source of the error is this: inventions increase the physical productivity of *both* grades of land. The better land becomes *still* better. Similarly, perhaps it is true that an invention will cause a shorter process to be more productive now than a longer process was previously. But this does not mean that it is superior to *all* longer processes; longer processes using the invention will still be more productive than the shorter ones. (Boring for oil *with* machinery is more productive than boring for oil without machinery.)

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[29]Böhm-Bawerk, "The Positive Theory of Capital and Its Critics, Part III," pp. 128 ff.

Technological inventions have received a far more important place than they deserve in economic theory. It has often been assumed that production is limited by the "state of the arts"—by technological knowledge—and therefore that any improvement in technology will immediately show itself in production. Technology does, of course, set a limit on production; no production process could be used at all without the technological knowledge of how to put it into operation. But while knowledge is a limit, *capital* is a narrower limit. It is logically obvious that while capital cannot engage in production beyond the limits of existing available knowledge, knowledge can and does exist without the capital necessary to put it to use. Technology and its improvement, therefore, play no *direct* role in the investment and production process; technology, while important, must always *work through* an investment of capital. As was stated above, even the most dramatic capital-saving invention, such as oil-drilling, can be put to use only by saving and investing capital.

The relative unimportance of technology in production as compared to the supply of saved capital becomes evident, as Mises points out, simply by looking at the "backward" or "underdeveloped" countries.[30] What is lacking in these countries is not knowledge of Western technological methods ("know-how"); that is learned easily enough. The service of imparting knowledge, in person or in book form, can be paid for readily. What is lacking is the supply of saved capital needed to put the advanced methods into effect. The African peasant will gain little from looking at pictures of American tractors; what he lacks is the saved capital needed to purchase them. That is the important limit on his investment and on his production.[31]

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[30]Mises, *Human Action*, pp. 492 ff.

[31]The futility of "Point 4" and "technical assistance" in furthering production in the backward countries should be evident from this discussion. As Böhm-Bawerk commented, in discussing advanced techniques: "There are always thousands of persons who know of the existence of the

A businessman's new investment in a longer and more physically productive process will therefore be made from a sheaf of processes previously known but unusable because of the time-preference limitation. A lowering of time preferences and of the pure interest rate will signify an expansion of saved capital at the disposal of investors and therefore an expansion of the longer processes, the time limitation on investment having been weakened.

Some critics charge that not all net investment goes to lengthening the structure—that new investments might duplicate pre-existing processes. This criticism misfires, however, because our theory does not assume that net saving must be invested in an actually longer process in some specific line of production. A longer production structure can just as well be achieved by a shift from consumption to investment that will lengthen the *aggregate* production structure by greater investment in already existing longer processes, accompanied by less investment in existing shorter processes. Thus, in the case of Crusoe mentioned above, suppose that Crusoe now invests in a *second* net, which will permit him to catch a total of 150 fish a day. The structure of production is now lengthened even though the second net may be no more productive than the first. For the total period of production, from the time he must build and rebuild his total capital until his product arrives, is now considerably longer. He must now cut down again on present consumption (including leisure) and work on his second net.[32]

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machines, who would be glad to secure the advantage of their use, but who do not dispose of the capital necessary for their purchase." Böhm-Bawerk, "The Positive Theory of Capital and Its Critics, Part III," p. 127. *See also idem*, *Further Essays on Capital and Interest*, pp. 4–10.

[32]As Hayek states:

> It is frequently supposed that all increases in the quantity of capital per head . . . must mean that some commodities

5. The Adoption of a New Technique

At any given time, then, there will be a shelf of available and more productive techniques that remain unused by many firms continuing with older methods. What determines the extent to which these firms adopt new and more productive techniques?

The reason that firms do not scrap their old methods immediately and begin afresh is that they and their ancestors have invested in a certain structure of capital goods. As times and tastes, resources, and techniques change, much of this capital investment becomes an *ex post* entrepreneurial error. If, in other words, investors had been able to foresee the changed pattern of values and methods, they would have invested in a far different manner. Now, however, the investment has been made, and the resulting capital structure is a given residue from the past that supplies the resources they have to work with. Since costs in the *present* are only present and future opportunities forgone, and bygones are bygones, existing equipment must be used in the

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> will now be produced by longer processes than before. But so long as the processes used in different industries are of different lengths, this is by no means a necessary consequence. . . . If input is transferred from industries using shorter processes to industries using longer processes, there will be no change in the length of the period of production in any industry, nor any change in the methods of production of any particular commodity, but merely an increase in the periods for which particular units of input are invested. The significance of these changes in the investment periods of particular units of input will, however, be exactly the same as it would be if they were the consequence of a change in the length of particular processes of production. (Hayek, *Pure Theory of Capital*, pp. 77–78)

Also see Hayek, *Prices and Production*, p. 77, and Böhm-Bawerk, *Further Essays on Capital and Interest*, pp. 57–71.

most profitable way. Thus, there undoubtedly would have been far less investment in railroads in late nineteenth-century America if investors had foreseen the rise of truck and plane competition.[33] Now that the existing railroad equipment remains, however, decisions concerning how much of it is to be used must be based on current and expected future costs, not on past expenses or losses.

An old machine will be scrapped for a new and better substitute if the superiority of the new machine or method is great enough to compensate for the additional expenditure necessary to purchase the machine. The same applies to the shifting of a plant from an old location to a superior new location (superior because of greater access to factors or consumers). At any rate, the adoption of new techniques or locations is limited by the usefulness of the already given (and specific) capital-goods structure. This means that those processes and methods will be adopted at any time which will best satisfy the desires of the consumers. The fact that investment in a new technique or location is unprofitable means that the use of capital in the new process at the cost of scrapping the old equipment is a waste from the point of view of satisfying consumer wants. How fast equipment or location is scrapped as obsolescent, then, is not decided arbitrarily by businessmen; it is determined by the values and desires of consumers, who decide on the price and profitability of the various goods and on the values of the necessary nonspecific factors used to produce these goods.[34]

As is often true, critics of the free market have attacked it from two contradictory points of view: one, that it unduly slows down the rate of technological improvement from what it could and should be; and, two, that it unduly accelerates the rate of

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[33]*And* if there had been fewer land grants and other governmental subsidies to railroads! Thus, *see* E. Renshaw, "Utility Regulation: A Reexamination," *Journal of Business*, October, 1958, pp. 339–40.

[34]*See* Mises, *Human Action:*

technological improvement, thereby unsettling the peaceful course of society. We have seen that a free market will, as far as the knowledge and foresight of entrepreneurs permit, produce so that factors are best allocated to satisfy the wishes of consumers. Improvement in productivity through new techniques and locations will be balanced against the opportunity costs forgone in value product from using the existing old plant.[35] And ability in entrepreneurial foresight will be assured as much as possible by the market's process of "selection" in "rewarding" good forecasters and "penalizing" poor ones proportionately.

The Entrepreneur and Innovation

Under the stimulus of the late Professor Schumpeter, it has been thought that the essence of entrepreneurship is *innovation*

> The fact that not every technological improvement is instantly applied in the whole field is not more conspicuous than the fact that not everyone throws away his old car or his old clothes as soon as a better car is on the market or new patterns become fashionable. (p. 504)

Also see *ibid*., pp. 502–10. Specifically, the old equipment will continue in use as long as its operating costs are lower than the total costs of installing the new equipment. If, in addition, total costs (including replacement costs for wear and tear on capital goods) are greater for the old equipment, then the firm will gradually abandon old equipment as it wears out and will invest in the new technique. For an extensive discussion, *see* Hayek, *Pure Theory of Capital*, pp. 310–20.

[35]"Technocrats" condemn the market for rewarding investments according to their (marginal) *value-productivity* instead of their (marginal) *physical productivity*. But we see here an excellent example of a technique more physically productive but less value-productive, and for a very good reason: that the given specific capital goods already produced lend an advantage to the old technique, so that "out-of-pocket" operating costs of the old technique are lower, until the equipment wears out, than total costs for the new project. Consumers are benefited by continuing the old techniques while they remain profitable, for then factors are spared for more valuable production elsewhere.

—the disturbance of peaceful, unchanging business routine by bold innovators who institute new methods and develop new products. There is, of course, no denying the importance of the discovery and institution of more productive methods of obtaining a product or of the development of valuable new products. Analytically, however, there is danger of overrating the importance of this process. For innovation is only one of the activities performed by the entrepreneur. As we have seen above, most entrepreneurs are not innovators, but are in the process of investing capital within a large framework of available technological opportunities. Supply of product is limited by supply of capital goods rather than by available technological know-how.

Entrepreneurial activities are derived from the presence of *uncertainty*. The entrepreneur is an adjuster of the discrepancies of the market toward greater satisfaction of the desires of the consumers. When he innovates he is *also* an adjuster, since he is adjusting the discrepancies of the market as they present themselves in the potential of a new method or product. In other words, if the ruling rate of (natural) interest return is 5 percent, and a business man estimates that he could earn 10 percent by instituting a new process or product, then he has, as in other cases, discovered a discrepancy in the market and sets about correcting it. By launching and producing more of the new process, he is pursuing the entrepreneurial function of adjustment to consumer desires, i.e., what he estimates consumer desires will be. If he succeeds in his estimate and reaps a profit, then he and others will continue in this line of activity until the income discrepancy is eliminated and there is no "pure" profit or loss in this area.

6. The Beneficiaries of Saving-Investment

We have seen that an increase in saving and investment causes an increase in the real incomes of owners of labor and land factors. The latter is reflected in increases in the capital value of ground lands. The benefits to land factors, however,

accrue only to particular lands. Other lands may lose in value, although there is an aggregate gain. This is so because usually lands are relatively specific factors. For the nonspecific factor *par excellence*, namely, labor, there is, on the contrary, a very general rise in real wages. These laborers are "external beneficiaries" of increased investment, i.e., they are beneficiaries of the actions of others without paying for these benefits. What benefits do the investors themselves acquire? In the long run, they are not great. In fact, their rate of interest return is reduced. This is not a loss, however, since it is the outcome of their changed time preferences. Their *real* interest return may well be increased, in fact, since the fall in the interest rate may be offset by the rise in the purchasing power of the monetary unit in an expanding economy.

The main benefits gained by the investors, therefore, are short-run entrepreneurial profits. These are earned by investors who see a profit to be gained by investing in a certain area. After a while, the profits tend to disappear as more investors enter this field, although changing data are always presenting new profit opportunities to enterprising investors. But the short-run benefits earned by the workers and landowners are more certain. The entrepreneur-capitalists take the risks of speculating on the uncertain market; their investment may result in profits, in breaking even with no profits at all, or in suffering outright losses. No one can guarantee profits to them.[36] Aggregate new investment will result in aggregate net profits, to be sure, but no one can predict with certainty in what areas the profits will appear. On the other hand, the workers and landowners in the fields of new investment gain *immediately*, as new investment bids up wages and rents in the longer processes. They gain even if the investment turns out to have been uneconomic and unprofitable. For in that case, the error in satisfying consumers

[36]As will be seen below, actuarial risks can be "insured" against, but not the entrepreneurial uncertainty of the market.

is borne by the heavy losses of the capitalist-entrepreneurs. In the meanwhile, the workers and landowners have reaped a gain. This is hardly a clear gain, however, since consumers have, as a whole, suffered in real income through entrepreneurial error in producing the wrong kind of goods. Yet it is obvious that the brunt of the loss from making the error is suffered by the entrepreneurs.

7. *The Progressing Economy and the Pure Rate of Interest*

It is clear that a feature of the progressing economy must necessarily be a fall in the pure rate of interest. We have seen that in order for more capital to be invested, there must be a fall in the pure rate of interest, reflecting general declines in time preferences. If the pure rate remains the same, this is an indication that there will be no new investment or disinvestment, that time preferences are generally stable, and that the economy is *stationary*. A fall in the pure rate of interest is a corollary of a drop in time preferences and a rise in gross investment. A rise in the pure rate of interest is a corollary of a rise in time preferences and net disinvestment. Hence, for the economy to keep advancing, time preferences and the pure rate of interest must continue to fall. If the pure rate of interest remains the same, capital will only just be maintained at its same real level.

Since praxeology never establishes quantitative laws, there is no way by which we can determine any sort of *quantitative* relation between changes in the pure rate of interest and the amount that capital will change. All we can assert is the qualitative relation.

It should be noticed what we are *not* saying. We are *not* asserting that the pure rate of interest is determined by the quantity or value of capital goods available. We are not concluding, therefore, that an increase in the quantity or value of capital goods lowers the pure rate of interest because interest is the "price of capital" (or for any other reason). On the contrary, we are asserting *precisely the reverse*: namely, *that a lower pure rate of interest increases the quantity and value of capital goods available.*

The causative principle is just the other way round from what is commonly believed. The pure rate of interest, then, can change at any time and is determined by time preferences. If it is lowered, the stock of invested capital will increase; if it is raised, the stock of invested capital will fall.

That a change in the pure rate of interest has an *inverse* effect on the stock of capital is discovered by deduction from accepted axioms and not inferred from uncertain and complex empirical data.[37] The law is not deduced, for example, by observing that the *market rate* of interest in backward nations is higher than in advanced nations. It is clear that this phenomenon is at least partly due to the higher entrepreneurial risk component in the backward countries and is not *necessarily* caused by differences in the *pure* rate of interest.

8. The Entrepreneurial Component in the Market Interest Rate

In the ERE, as we have seen, the interest rate throughout the economy will be uniform. In the real world there is an additional *entrepreneurial (or "risk") component*, which *add*s to the interest rate in particularly risky ventures, and in accordance with the degree of risk. (Since "risk" has an actuarially "certain" connotation, we may better call it "degree of uncertainty.") Thus, suppose that the basic social time-preference rate, or *pure* rate of interest, in the economy is 5 percent. Capitalists will buy 100 ounces of future goods to sell less remotely future goods one year later at 105 ounces. Thus, a 5-percent return is a "pure" return, i.e., it is the return assuming that the 105 ounces will *definitely* be accruing. The pure rate, in other words, abstracts from any entrepreneurial uncertainty. It gauges the premium of present over future goods on the assumption that the future goods are known as *certain* to be forthcoming.

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[37]It is evident that Mises' strictures in *Human Action*, p. 530, apply to the doctrine that the quantity of capital determines the pure rate of interest, and not to the present argument.

In the real world, of course, nothing is absolutely certain, and therefore the pure rate of interest (the result of time preference) can never appear alone. Now suppose that in one particular venture or industry it is fairly certain that 105 ounces will be earned from the sale of a product one year in the future. Then, with a social time preference rate of 5 percent, the capitalist-entrepreneurs will be willing to pay 100 ounces for factors and reap a 5-percent return. But suppose that there is another possible venture considered very risky by entrepreneurs. The product is expected to sell for 105 ounces, but there are definite possibilities that the price of the product might plummet. In that case, the entrepreneurs will not be willing to pay 100 ounces for factors. They would have to be compensated for the extra risks that they run; the price of the factors might finally be 90 ounces. Thus, the riskier a given venture appears *ex ante*, the higher will be the expected interest return that capitalists will require before they make the investment.

On the market, then, a whole structure of interest rates will be superimposed on the pure rate, varying positively in accordance with the expected risks of each venture. The counterpart of this structure will be a similar variety of interest rates on the loan market, which, as usual, is derivative from the goods market.[38] In

[38]The loan market will diverge from the "natural" market to the extent that conditions for repayment of loans, etc., establish such differences. The two would be the same if the loans were clearly recognized as entrepreneurial, so that in cases where there was no deliberate fraud, the borrower would not be considered criminal if he did not repay the loan. However, if, as discussed in chapter 2 above, there are no bankruptcy laws and defaulting borrowers are considered criminal, then obviously the "safety" of all loans would increase in relation to "natural" investments, and the interest rates on loans would decline accordingly. In the free society, however, there would be nothing to prevent borrowers and lenders from agreeing, at the time the contract is made, that borrowers would *not* be held criminally responsible and that the loan would really be an entrepreneurial one. Or they could make any sort of arrangement in dividing gains or losses that they might choose.

the *long run*, of course, the tendency, given no changes of data, will be for people to realize that such and such a venture is pretty consistently yielding a higher than 5-percent return. The risk component for this venture will then fall, other entrepreneurs will enter this type of venture, and the interest rate will tend to fall back to 5 percent again. Thus, the varying risk structure of interest does not invalidate the tendency toward uniformity of the interest rate. On the contrary, any variety is something of an index of the various "risks" of uncertainty which still remain in the market and which would be eliminated if data were frozen and an ERE were reached. If data *did* remain constant, then the uniformity of the ERE would ensue. It is because data are always changing and thus setting up new uncertainties in place of the old that we do not have the uniformity of the ERE.

9. Risk, Uncertainty, and Insurance

Entrepreneurship deals with the inevitable uncertainty of the future. Some forms of uncertainty, however, can be converted into *actuarial* risk. The distinction between "risk" and "uncertainty" has been developed by Professor Knight.[39] "Risk" occurs when an event is a member of a class of a large number of homogeneous events and there is fairly certain knowledge of the frequency of occurrence of this class of events. Thus, a firm may produce bolts and know from long experience that a certain almost fixed proportion of these bolts will be defective, say 1 percent. It will not know whether any given bolt will be defective, but it will know the proportion of the total number defective. This knowledge can convert the percentage of defects into a definite cost of the firm's operations, especially where enough cases occur *within* a firm. In other situations, a given loss or hazard may be large and infrequent in relation to a firm's operations (such as the risk of fire), but over a large number of

[39]Knight, *Risk, Uncertainty, and Profit*, pp. 212–55, especially p. 233.

firms it could be considered as a "measurable" or actuarial risk. In such situations, the firms themselves could pool their risks, or a specialized firm, an "insurance company," could organize the pooling for them.

The principle of insurance is that firms or individuals are subject to risks which, in the aggregate, form a class of homogeneous cases. Thus, out of a class of a thousand firms, no one firm has any idea whether it will suffer a fire next year or not; but it is fairly well known that ten of them will. In that case, it may be advantageous for each of the firms to "take out insurance," to pool their risks of loss. Each firm will pay a certain premium, which will go into a pool to compensate those firms which suffer the fires.

As a result of competition, the firm organizing the insurance service will tend to obtain the usual interest income on its investment, no more and no less.

The contrast between risk and uncertainty has been brilliantly analyzed by Ludwig von Mises. Mises has shown that they can be subsumed under the more general categories of "class probability" and "case probability."[40] "Class probability" is the only scientific use of the term "probability," and is the only form of probability subject to numerical expression.[41] In the tangled literature on probability, no one has defined class probability as cogently as Ludwig von Mises:

> Class probability means: We know or assume to know, with regard to the problem concerned, everything about the behavior of a whole class of events or phenomena; but about the actual singular events or phenomena we know nothing but that they are elements of this class.[42]

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[40]Mises, *Human Action*, pp. 106–16, which also contains a discussion of the fallacies of the "calculus of probability" as applied to human action.

[41]*See* Richard von Mises, *Probability, Statistics, and Truth* (2nd ed.; New York: Macmillan & Co., 1957).

[42]Mises, *Human Action*, p. 107.

Insurable risk is an example of class probability. The businessmen knew how many bolts would be defective out of a total number of bolts, but had no knowledge as to which particular bolts would be defective. In life insurance the mortality tables reveal the proportion of mortality of each age group in the population, but they tell nothing about the particular life expectancy of any given individual.

Insurance firms have their problems. As soon as something specific is known about individual cases, firms break down the cases into subaggregates in an effort to maintain homogeneity of classes, i.e., the similarity, as far as is known, of all individual members in the class with respect to the attribute in question. Thus, certain subgroups within one age group may have a higher mortality rate because of their occupation; these will be segregated, and different premiums applied to the two cases. If there were knowledge about differences between subgroups, and insurance firms charged the same premium rate to all, then this would mean that the healthy or "less risky" groups would be subsidizing the riskier. Unless they specifically desire to grant such subsidies, this result will never be maintained in the competitive free market. In the free market each homogeneous group will tend to pay premium rates in proportion to its actuarial risk, plus a sum for interest income and for necessary costs for the insurance firms.

Most uncertainties are uninsurable because they are unique, single cases, and not members of a class. They are unique cases facing each individual or business; they may bear resemblances to other cases, but are not homogeneous with them. Individuals or entrepreneurs know something about the outcome of the particular case, but not everything. As Mises defines it:

> Case probability means: We know, with regard to a particular event, some of the factors which determine its outcome; but there are other determining factors about which we know nothing.[43]

[43] *Ibid.*, p. 110.

Estimates of future costs, demands, etc., on the part of entrepreneurs are all unique cases of uncertainty, where methods of specific understanding and individual judgment of the situation must apply, rather than objectively measurable or insurable "risk."

It is not accurate to apply terms like "gambling" or "betting" to situations either of risk or of uncertainty. These terms have unfavorable emotional implications, and for this reason: they refer to situations where *new* risks or uncertainties are *created* for the enjoyment of the uncertainties themselves. Gambling on the throw of the dice and betting on horse races are examples of the deliberate creation by the bettor or gambler of new uncertainties which otherwise would not have existed.[44] The entrepreneur, on the other hand, is not creating uncertainties for the fun of it. On the contrary, he tries to reduce them as much as possible. The uncertainties he confronts are already inherent in the market situation, indeed in the nature of human action; someone must deal with them, and he is the most skilled or willing candidate. In the same way, an *operator* of a gambling establishment or of a race track is not creating new risks; he is an entrepreneur trying to judge the situation on the market, and neither a gambler nor a bettor.

Profit and loss are the results of entrepreneurial *uncertainty*. Actuarial *risk* is converted into a cost of business operation and is not responsible for profits or losses except in so far as the actuarial estimates are erroneous.

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[44]There is a distinction between gambling and betting. Gambling refers to wagering on events of class probability, such as throws of dice, where there is no knowledge of the unique event. Betting refers to wagering on unique event about which both parties to the bet know something—such as a horse race or a Presidential election. In either case, however, the wagerer is creating a new risk or uncertainty.

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PRODUCTION: PARTICULAR FACTOR PRICES AND PRODUCTIVE INCOMES

1. Introduction

UP TO THIS POINT WE have analyzed the determination of the rate of interest and of the prices of productive factors on the market. We have also discussed the role of entrepreneurship in the changing world and the consequences of changes in saving and investment. We now return to analysis of the particular ultimate factors—labor and land—and to a more detailed discussion of entrepreneurial incomes. Our analysis of general factor pricing in chapter 7 treated prices as they would be in the ERE, a state toward which they are always tending. Our discussion of entrepreneurship in chapter 8 showed that this tendency is a result of drives toward profits and away from losses by capitalist-entrepreneurs. Now let us return to the particular factors and analyze their pricing, their supplies and incomes, and the effects of a changing economy upon them.

2. Land, Labor, and Rent

A. RENT

We have been using the term *rent* in our analysis to signify the hire price of the services of goods. This price is paid for *unit services*, as distinguished from the prices of the *whole factors*

yielding the service. Since all goods have unit services, *all* goods will earn rents, whether they be consumers' goods or any type of producers' goods. Future rents of durable goods tend to be capitalized and embodied in their capital value and therefore in the money presently needed to acquire them. As a result, the investors and producers of these goods tend to earn simply an interest return on their investment.

All goods earn *gross rent*, since all have unit services and prices for them. If a good is "rented out," it will earn gross rent in the hire charge. If it is bought, then its present price embodies discounted future rents, and in the future it will earn these rents by contributing to production. All goods, therefore, earn gross rents, and here there is no analytic distinction between one factor and another.

Net rents, however, are earned only by labor and land factors, and not by capital goods.[1] For the gross rents earned by a capital good will be imputed to gross rents paid to the owners of the factors that produced it. Hence, on net, only labor and land factors—the ultimate factors—earn rents, and, in the ERE, these, along with interest on time, will be the only incomes in the economy.

The Marshallian theory holds that durable capital goods earn "quasirents" temporarily, while permanent lands earn full rents. The fallacy of this theory is clear. Whatever their durability, capital goods receive gross rents just as lands do, whether in the changing real world or the ERE. In the ERE, they receive no *net* rents at all, since these are imputed to land and labor. In the real world, their capital value changes, but this does not mean that they earn net rents. Rather, these changes are *profits* or *losses* accruing to their owners as entrepreneurs. If, then, incomes in the real world are net rents (accruing to labor and land factors) and entrepreneurial profits, while the latter disappear in the

[1] *Net* rents equal *gross* rents earned minus gross rents paid to owners of factors.

ERE, there is no room in *either* world for the concept of "quasirent." Nowhere does this special type of income exist.

A *wage* is the term describing the payment for the unit services of a *labor* factor. A *wage*, *therefore*, *is a special case of rent*; it is labor's "hire." On a free market this rent cannot, of course, be capitalized, since the whole labor factor—the man—cannot be bought and sold for a price, his income to accrue to his owner. This is precisely what occurs, however, under a regime of slavery. The wage, in fact, is the only source of rent that *cannot* be capitalized on the free market, since every man is necessarily a self-owner with an inalienable will.

One distinction between wages and land rents, then, is that the latter are capitalized and transformed into interest return, while the former are not. Another distinction is purely *empirical* and not apodictically true for mankind. It has simply been an historical-empirical truth *that labor factors have always been relatively scarcer than land factors*. Land and labor factors can be ranged in order of their marginal value productivity. The result of a relative superfluity of land factors is that not all the land factors will be put to use, i.e., the poorest land factors will be left idle, so that labor will be free to work the most productive land (e.g., the most productive agricultural land, urban sites, fish hatcheries, "natural resources," etc.). Laborers will tend to use the most value-productive land first, the next most productive second, etc. At any given time, then, there will be some land—the most value-productive—under cultivation and use, and some not in use. The latter, in the ERE, will be free land, since its rental earnings are zero, and therefore its price will be zero.[2] The former land will be "supramarginal" and the latter land will be "submarginal." On the dividing line will be the poorest land now in use; this will be the "marginal" land, and it will be earning *close* to zero rent.

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[2]Its capital value will be positive, however, if people *expect* the land to earn rents in the near future.

It is important to recognize the qualification that the marginal land will earn *not zero*, but only *close* to zero, rent.[3] The reason is that, in human action, there is no infinite continuity, and action cannot proceed in infinitely small steps. Mathematically minded writers tend to think in such terms, so that the points before and after the point under consideration all tend to merge into one. Using marginal land, however, will pay only if it earns *some* rent, even though a small one. And, in cases where there are large discontinuities in the array of MVPs for different lands, the marginal land might be earning a substantial sum. It is obvious that there is no praxeological precision in terms like "close," "substantial," etc. All that we can say with certainty is that if we arrange the MVPs of lands in an array, the rents of the *sub*marginal lands will be zero. We cannot say what the rent of the marginal land will be, except that it will be closer to zero than that of the supramarginal lands.[4]

Now we have seen above that the marginal value product of a factor decreases as its total supply increases, and increases as the supply declines. The three major categories of factors in the economy are land, labor, and capital goods. In the progressing

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[3]As Frank Fetter stated in "The Passing of the Old Rent Concept," *Quarterly Journal of Economics*, May, 1901:

> The last unit of product of any finite amount would . . . have to pay its corresponding rent. The only product obtained, in the strict theory of the case, without paying rent, would be one unit infinitesimally small—in plain Anglo-Saxon, would be nothing at all. No finite unit of product can be shown to be a no-rent unit. (p. 489)

[4]The terms "marginal," "supramarginal," etc., are rather differently used here from the way they are used above. Instead of dealing with the supply and demand for a homogeneous good or factor, we are here referring to one *class* of factors, such as lands, and comparing different *qualities* of the various factors in that class. The near-zero-earning land is "marginal" because it is the one just barely put to use.

economy, the supply of capital per person increases.[5] The supply of all ranks of capital goods increases, thereby decreasing the marginal value productivities of capital goods, so that the prices of capital goods fall. The *relative* MVPs of land and labor factors, in the aggregate, tend to rise, so that their income will rise in real terms, if not in monetary ones.

What if the supply of capital remained the same, while the supply of labor or land factors changed? Thus, suppose that, with the same capital structure, population increases, thus expanding the total supply of labor factors. The result will be a *general fall in the MVP of labor and a rise in the MVP of land factors.* This rise will cause formerly submarginal, no-rent lands to earn rent and to enter into cultivation by the new labor supply. This is the process particularly emphasized by Ricardo: population pressing on the land supply. The tendency for the MVP of labor to drop, however, may well be offset by a rise in the MPP schedules of labor, since a rise in population will permit a greater utilization of the advantages of specialization and the division of labor. The constant supply of capital would have to be reoriented to the changed conditions, but the constant amount of money capital will then be more physically productive. Hence, there will be an offsetting tendency for the MVPs of labor to rise. At any time, for any given conditions of capital and production processes, there will be an "optimum" population level that will maximize the total output of consumers' goods per head in the economy. A lower level will not take advantage of enough division of labor and opportunities for labor, so that the MPP of labor factors will be lower than at the optimum point; a higher level of population will decrease the MVP of labor and will therefore lower real wages per person.[6]

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[5]Here we shift the definition of progressing economy to mean increasing capital *per person*, so that we can contrast the effects of changes in the supply of one type of factor to changes in the supply of another.

[6]There is, of course, no reason to assume that maximum real income per head is necessarily the best ethical ideal; for some, the ideal might be

Recognition of the existence of a theoretical "optimum" population that maximizes real output per head, given existing land and capital, would go far to end the dreary Malthusian controversies in economic theory. For whether a given increase in population at any time will lead to an increase or decrease in real output per head is an *empirical* question, depending on the concrete data. It cannot be answered by economic theory.[7]

It might be wondered how the statement that increasing population might increase MPP and MVPs can be reconciled with the demonstration above that factors will always be put to work in areas of *diminishing* physical returns. The conditions here are completely different, however. In the previous problem we were assuming a given total supply of the various factors and considering the best method of their relative arrangement. Here we are dealing, not with particular production processes and given supplies of factors, but with the vague concept of "production" in general and with the effect of change in the total supply of a factor. Furthermore, we are dealing not with a true factor (homogeneous in its supply), but with a "class of factors," such as land-in-general or labor-in-general. Aside from the problem of vagueness, it is evident that the conditions of our present problem are completely different. For if the *total* supply of a factor changes and it has an effect on the productivity of the labor factor, this is equivalent to a *shift* in the MPP curves (or schedules) rather than a movement *along the curves* such as we considered above.[8]

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maximum real income plus maximum population. In a free society, parents are free to choose their own ethical principles in the matter.

[7]Economics can say little else about population and its size. The inclusion of a corpus of "population theory" under economics instead of biology or psychology is the unfortunate result of the historical accident that the early economists were the first to delve into demographic problems.

[8]The Lausanne way (of Walras and Pareto) of phrasing this distinction would be to say that, in the former case (when we are moving along the curve), we implicitly assumed that "(the supply of) tastes, techniques,

Because we are accustomed to viewing labor implicitly as scarcer than land factors, we speak in terms of *zero-rent* land. If the situations were reversed, and lands were scarcer than labor factors, we would have to speak of zero-wage laborers, submarginal labor, etc. Theoretically, this is certainly possible, and it might be argued that in such static societies with institutionally limited markets as ancient Sparta and medieval or post-Medieval Europe, this condition actually obtained, so that the "surplus labor" earned a below-subsistence wage in production. Those who were "surplus" and did not own invested capital were curbed by infanticide or reduced to beggary.

That submarginal land earns no rent has given rise to an unfortunate tendency to regard the very concept of rent as a "differential" one—as referring particularly to *differences in quality* between factors. Sometimes the concept of "absolute" or pure rents is thrown overboard completely, and we hear only of rent in a "differential sense," as in such statements as the following:

> If land A earns 100 gold ounces a month, and land B earns zero, land A is making a differential rent of 100.
>
> If laborer A earns 50 gold ounces a month, and laborer B earns 30 gold ounces, A earns a "rent of ability" of 20 ounces.

On the contrary, rents are absolute and do not depend on the existence of a poorer factor of the same general category. The "differential" basis of rent is purely dependent on, and derived from, absolute rents. It is simply a question of arithmetical subtraction. Thus, land A may earn a rent of 100, and land B a rent

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and resources remains given in the economy." In the present case, we are considering a change in a resource (e.g., an increase in the supply of labor). We would amend this to say that only *tastes* and resources were considered given. As we saw in the previous section, techniques are not immediate determinants of production changes. The techniques must be put to use via saving and investment. In fact, we may deal with tastes and resources *alone*, provided that we include time preferences among the "tastes."

of zero. Obviously, the difference between 100 and zero is 100. In the case of the laborer, however, laborer A's "rent," i.e., wage, is 50 and B's is 30. If we want to compare the two earnings, we may say that A earns 20 more than B. There is little point, however, in adding to confusion by using "rent" in this sense.

The "differential rent" concept has also been used to contrast earnings by a factor in one use with those of the same factor in another use. Thus, if a factor, whether land or labor, earns 50 ounces per month in one use and *would* have earned 40 ounces in some other use, then its "rent" is 10 ounces. Here, "differential rent" is used to mean the difference between the actual DMVP and the opportunity forgone or the DMVP in the next best use. It is sometimes believed that the 10-ounce differential is in some way not "really" a part of costs to entrepreneurs, that it is surplus or even "unearned" rent acquired by the factor. It is generally admitted that it is not without cost to *individual firms*, which have bid the factor up to its MVP of 50. It is supposed, however, to be without cost from the "industry point of view." But there *is no* industry "point of view." Not "industries," but *firms*, buy and sell and seek profits.

In fact, the entire discussion concerning whether or not rent is "costless" or enters into cost is valueless. It belongs to the old classical controversies about whether rents are "price-determined" or "price-determining." The view that *any* costs can be price-determining is a product of the old cost-of-production theory of value and prices. We have seen that costs do not determine prices, but *vice versa*. Or more accurately, prices of consumers' goods, through market processes, determine the prices of productive factors (ultimately land and labor factors), and the brunt of price changes is borne by *specific* factors in the various fields.

B. The Nature of Labor

As we have mentioned earlier, "labor" is a category that includes a myriad variety of services. Generally, labor is the expenditure of pure human energy on a production process.

Catallactically, labor is hired by entrepreneur-capitalists.[9] It is grossly unscientific to separate laborers into arbitrary categories and to refer to one group as "labor" and "workers," while the other group receives various other names. To give them other names implies a difference in *kind* between their contribution and the contribution of others, but this difference does not exist. Thus, the popular custom is to call some hired labor, "labor," while others are called "managers," "executives," etc. "Management" is a particularly popular category as contrasted with "labor," and we hear a great deal of the term "labor-management relations." But these categories are valueless. "Management" is hired by the owners or owner to direct production; managers are supposed to obey the orders of their superiors—something they consent to do as part of the terms of their employment. The lower-quality workers, further down the scale—the "laborers"—are treated by these writers as a different breed.[10] Their function is supposed to be not to obey orders and engage in a production process, but in some way to be different—to act as an independent entity, asserting its "rights," quarreling with "management," etc.

Yet there is no difference in kind between "workers" and "management." The vice president of a company, if hired by its owners, has exactly the same amount of justification, or lack of justification, for joining a union as does a hired mechanic. Both are supposed to abide by the terms of their employment, i.e., to obey the relevant orders of their superiors. Both are free at any time to haggle over the terms of their employment, just as in

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[9]When an owner performs, and earns a return for, an essentially labor activity which he could *also* perform as an employee (e.g., the owner-manager), that return is an implicit wage. On definitions of "labor," *see* Spencer Heath, *Citadel, Market, and Altar* (Baltimore: Science of Society Foundation, 1957), pp. 235–36.

[10]When we use the term "quality" here and in other parts of catallactic analysis, we are not employing it in some metaphysical sense or from some "higher" ethical point of view. We mean quality *as expressed by choice of the market*, in the form of a higher MVP and therefore a higher wage.

any other voluntary exchange on the market. Both are *laborers*, who expend human energy in the production of goods. No special quality attaches to one set of laborers or another that makes it more or less justifiable for them to join a union.

The union question will be explored below, in chapter 10 on Monopoly and Competition. Here we might note that this false "labor-management" dichotomy crops up in an interesting way in the struggle over foremen's unions.[11] For some reason, even the most ardent union advocate thinks absurd the idea of unionizing the vice presidents. Those more critical of unions think it monstrous if unions attempt to organize foremen, who are in the lower echelons of "management," and would of course be horrified at the very thought of unionizing vice presidents. Yet if there is no real dichotomy and all employees are labor, then our views on unions must be altered accordingly. For if everyone admits that the unionizing of vice presidents is absurd or evil, then perhaps the same adjective would have to apply to the unionization of *any* workers.

C. Supply of Land

We have seen throughout that the processes of price determination for the unit services of land and labor are exactly the same. Both sets of factors tend to earn their MVP; both receive advances of present money from capitalist-entrepreneurs; etc. The analysis of the pricing of unit services of original or "permanent" factors applies equally to each. There are three basic differences between the conditions of land and those of labor, however, that make separation of the two important. One we have already dealt with in detail: that (in the free economy) land

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[11]For an example of an interesting work on bargaining with unions based squarely on the false labor-management dichotomy, *see* Lee H. Hill and Charles R. Hook, Jr., *Management at the Bargaining Table* (New York: McGraw-Hill, 1945). On foremen's unions, *see* Theodore R. Iserman, *Industrial Peace and the Wagner Act* (New York: McGraw-Hill, 1947), pp. 49–58.

can be capitalized in its price as a "whole factor" and therefore earns simply interest and entrepreneurial changes in asset value; while labor cannot be capitalized. A second difference we have been considering—the empirical fact that labor has been more scarce than land factors. A corollary of this is that labor is preeminently the nonspecific factor, which is applicable to all processes of production, whereas land tends to be far more specific. A third difference derives from the fact that laborers are human beings and—also an empirical fact—that leisure is always a consumers' good. As a result, there will be reserve prices for labor against leisure, whereas land—in the broadest sense—will not have a reserve price. We shall deal with the effects of this distinction presently.

The fact that labor is scarcer and nonspecific means that there will always be *unused land.* Only the best and most productive land will be used, i.e., the land with the highest DMVPs. Similarly, in the real world of uncertainty, where errors are made, there will also be unused *capital goods*, i.e., in places where malinvestments had been made which turned out to be unprofitable.

We may now trace the supply and demand curves for land factors. We have shown above that, for any factor, the *particular* demand curve for any use, i.e., the particular MVP curve for a factor in that use, will slope downward in the region in which the factor is working. Also, we have seen that the *general* demand curve for the factor in the range of all its uses will slope downward. *What of the supply curves* for land factors? If we take the *general* supply curve (the factor considered in relation to all of its uses), then it is clear that there is no reservation demand curve for land; at least this will be true in the ERE. The *particular* supply curves for each use will depend on the alternate uses a piece of land may have. If it has any alternative uses, its supply curve for each use will slope upward as its price increases, since it can be shifted from one use to another as a use yields a higher rental return.

In its *particular* uses, the landowner will have a reservation demand, since he may obtain a higher return by shifting to another use. The greater the extent of alternate uses, the flatter each particular supply curve will tend to be.

In Figure 62, the left-hand diagram depicts the supply and demand curves for the general use of a land factor, including all uses. The supply curve will be the stock—a vertical straight line. The right-hand diagram below depicts typical demand and supply curves for a particular use; here, the supply curve slopes upward because it can shift to and from the alternative use or uses. The intersection of the supply and demand curves, in each instance, yields the rental price, equaling the discounted marginal value product for the total quantity of the factor available. The price for the general uses, *0C*, will be the same as the prices 0*E*, etc., for any particular use, since the price of the factor must, in equilibrium, be the same in all uses. The *general* diagram also yields the total quantity that will be sold for rent, $0S_1$, which will equal the total supply of the land factor available. The *sum* of the equilibrium quantities (such as *EB* on the diagram) supplied for particular uses would equal the total supplied for all uses, $0S_1$.

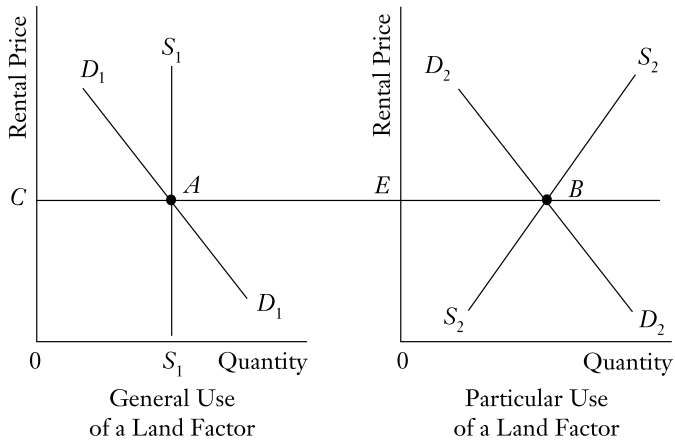

FIGURE 62. SUPPLY OF AND DEMAND FOR LAND

We have seen that the prices of consumers' goods are set by consumers' demand schedules, as determined by their value scales, i.e., by the way that the quantity supplied by producers (the first-rank capitalists) will be valued by consumers. When, in the changing economy, producers have speculative reservation demands, the price will, at any moment, be set by the total demand for the given stock, and this will always tend to approach the true consumers' demand price. A similar situation obtains in land. The prices of land factors will be determined by the general schedule of the factors' DMVPs and will be set according to the point of intersection of the total quantity, or stock, of the factor available, with its discounted marginal value productivity schedule. The DMVP, in turn, is, as we have seen at length, determined by the extent to which this factor serves the consumers. The MVP is determined directly by the degree that a factor unit serves the consumers, and the discount is determined by the extent that consumers choose saving-investment as against present consumption. Therefore, the *value scales of the consumers* determine, given the stocks of original factors, all the various results of the market economy that need to be explained: the prices of the original factors, the allocation of original factors, the incomes to original factors, the rate of time preferences and interest, the length of the production processes in use, and the amounts and types of the final products. In our changing real world, this beautiful and orderly structure of the free market economy tends to be attained through the drive of the entrepreneurs toward making profit and avoiding loss.[12]

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[12]This "rule" by consumers' valuations holds in so far as entrepreneurs and owners of factors aim at maximum money income. To the extent that they abstain from higher money income to pursue *nonmonetary ends* (e.g., looking at one's untilled land or enjoying leisure), the producers' own valuations will be determining. From the general praxeological point of view, these producers are to that extent acting as *consumers*. Therefore, the full rule of consumers' value scales would hold even here. However, for purposes of catallactic market analysis, it may be convenient to separate man

At this point, let us consider a great bugaboo of the Henry Georgists—speculation in land that withholds productive land from use. According to the Georgists, a whole host of economic evils, including the depressions of the business cycle, stem from speculative withholding of ground land from use, causing an artificial scarcity and high rents for the sites in use. We have seen above that speculation in consumers' goods (and the same will also apply to capital goods) performs the highly useful function of speeding adjustment to the best satisfaction of consumer demand. Yet, curiously, speculation in *land* is far less likely to occur and is far less important than in the case of any other economic good. For consumers' or capital goods, being nonpermanent, can be used either now or at some later date. There is a choice between use in the present *or* use at various times in the future. If the owner of the good estimates that demand for the good will be higher in the future and therefore its price will be greater, he will, provided that the length of waiting time is not too costly in terms of time preference and storage, keep the goods on hand (in inventory) until that date. This serves the consumers by shifting the good from use at present to a more highly valued use in the future.

Land, however, is a permanent resource, as we have seen. It can be used all the time, *both* in the present *and* in the future. Therefore, any withholding of land from use by the owner is simply silly; it means merely that he is refusing monetary rents unnecessarily. The fact that a landowner may anticipate that his land value will increase (because of increases in future rents) in a few years furnishes no reason whatever for the owner to refuse to acquire rents in the meanwhile. Therefore, a site will remain

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as a producer from man as a consumer, even though, considered in his entirety, the same man performs both functions. In that event, we may say that to the extent that nonmonetary goals enter, not consumers' values are determining, but the values of *all individuals* in society. For further discussion of this question and of "consumer sovereignty," see chapter 10 below.

unused simply because it would earn zero rent in production. In many cases, however, a land site, once committed to a certain line of production, could not easily or without substantial cost be shifted to another line. Where the landowner anticipates that a better line of use will soon become available or is in doubt on the best commitment for the land, he will withhold the land site from use if his saving in "change-over cost" will be greater than his opportunity cost of waiting and of forgoing presently obtainable rents. The speculative site-owner is, then, performing a great service to consumers and to the market in not committing the land to a poorer productive use. By waiting to place the land in a superior productive use, he is allocating the land to the uses most desired by the consumers.

What probably confuses the Georgists is the fact that many sites lie unused and yet command a capital price on the market. The capital price of the site might even *increase* while the site continues to remain idle. This does not mean, however, that some sort of villainy is afoot. It simply means that no rents on the site are expected for the first few years, although it will earn positive rents thereafter. The capital value of ground land, as we have seen, sums up the discounted total of all future rents, and these rental sums may exert a tangible influence from a considerable distance in the future, depending on the rate of interest. There is therefore no mystery in the fact of a capital value for an idle site, or in its rise. The site is not being villainously withheld from production.[13]

Let us now consider the effect of a change in the supply of a land factor. Suppose that there is an increase in the supply of land in general, the supply of labor and savings remaining constant. If the new land is submarginal in relation to land presently in use, it is obvious that the new land will not be used,

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[13]In the free society, as we have indicated above, the site could not originally become the property of anyone until it had been "used" in some way, such as being cleared, cultivated, etc. There need be no subsequent use, however, until rents can be obtained.

but will, instead, join its fellow submarginal land sites in idleness. If, on the other hand, the new land is superior, and therefore would earn a positive rent, it comes into use. There has been, however, no increase in labor or capital, so that it will not be profitable for these factors to be employed on a greater total amount of land than before. The new productive land, competing with the older land, will therefore push the previously just-marginal land into the submarginal category. Labor will always employ capital on the best land, and so the new acquisition of supramarginal land will oust the previously marginal land from production. Since the new land is more value-productive than the old marginal land which it replaces, the change increases the total output of goods in the society.

D. Supply of Labor

In the case of a labor factor, the particular demand curve for its use will slope downward, and the particular supply curve of a labor factor for a specific use will slope upward to the right. In fact, since labor is the relatively nonspecific factor, the particular supply curve of a labor factor is likely to be flatter than the supply curve of the (usually more specific) land factor. Thus, the *particular* supply and demand curves for a labor factor may be as represented in Figure 63.

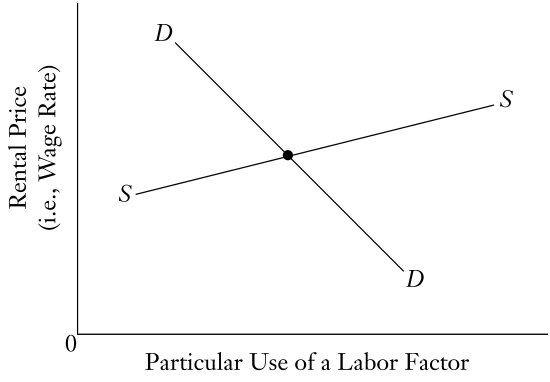

Figure 63. Supply of and Demand for Labor for a Particular Use

The general demand curve for a labor factor will also slope downward in the relevant area. One of the complications in the analysis of labor is the alleged occurrence of a "backward supply curve of labor." This happens when workers react to higher wage rates by reducing their supply of labor hours, thus taking some of their higher incomes as increased leisure. This may very well occur, but it will not be relevant to the determination of the wages of a factor. In the first place, we saw that particular supply curves of a factor will be flat because of the competition of alternative uses. But even the *general* supply curve of a factor will be "forward-sloping," i.e., rightward-sloping. For labor, though hardly homogeneous, is a peculiarly nonspecific factor. Therefore, higher wage rates for one set of factors will tend to stimulate other laborers to train themselves or bestir themselves to enter this particular "market." Since skills differ, this does not mean that all wages will be equalized. It does mean, however, that *general* supply curves for a labor factor will also be forward-sloping. We might arrange an array of general supply and demand curves for various labor factors as in Figure 64.

The only case in which a backward supply curve may occur is for the total supply of *all* labor factors, and here the elements

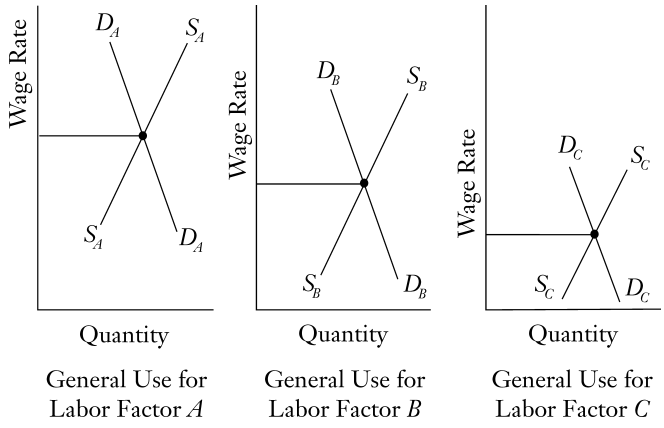

FIGURE 64. GENERAL SUPPLY AND DEMAND CURVES FOR VARIOUS LABOR FACTORS

are so imprecise, since these factors are not homogeneous, that diagrams are of little avail in analysis. Yet this is an important question. As wage rates in general rise, in all their connexity between various specific labor markets, the supply of all labor (i.e., the quantity of labor-hours) can either increase or decrease, depending on the value scales of the individuals concerned. Rising wages may draw nonworking people into the labor force and induce people to work overtime or to obtain an extra part-time job. On the other hand, it may lead to increased leisure and a falling off in total hours worked. Rising wages may lead to population growth, swelling the total supply of labor "in general," or may lead to a cutback in population and the taking of some of the gains of increased wages in the form of increased leisure and an increased standard of living per person in the population.[14] Changes in the total supply or stock of labor-in-general will affect the particular markets by shifting all the specific schedules to the left if the stock decreases, or to the right if it increases.

A backward supply curve might conceivably take place for a land factor as well, when the owner has a high reserve demand for the land in order to enjoy its unused (in the catallactic sense) beauty. In that case, the land would have an increasing marginal disutility of visual enjoyment forgone, just as leisure is forgone in the process of expending labor. In the case of land, since there is not as great a connexity between land factors as there is between nonspecific labor factors, this circumstance will, in fact, impinge more directly on the market rental price. It may be revealed in a backward general supply curve for the *land factor*. Higher rental prices offered for his land will then induce the landowner to withhold more of it, taking the higher income partially in nonexchangeable consumption goods as well as in more money received. These cases may be rare in practice, but

[14]There will be such a backward supply curve if the marginal utility of money falls rapidly enough and the marginal disutility of leisure forgone rises rapidly enough as units of labor are sold for higher prices in money.

only because of the freely chosen values of the individuals themselves.

Thus, there is no reason for the would-be preserver of a monument or of a park to complain about the way the market treats his treasured objects. In the free society, these conservationists are at perfect liberty to purchase the sites and preserve them intact. They would, in effect, be deriving consumption services from such acts of preservation.

To return to labor, we have mentioned another component in wage rates. This is the *psychic* income, or psychic disutility, involved in any particular line of work. People, in other words, are often attracted to a certain line of work or to a specific job by other considerations than the monetary income. There may be positive psychic benefits and satisfactions derived from the particular type of work or from the particular firm employing the worker. Similarly, psychic disutilities may be attached to particular jobs.

These psychic elements will enter into the curves for particular uses. In order to isolate such elements, let us suppose for the moment that all laborers are equally value-productive, that labor is a homogeneous factor. In such a world, all wage rates in all occupations would be equal. All industries need not be equally value-productive for this result to occur. For as a result of the connexity of labor, i.e., its nonspecificity, laborers can enter wide ranges of occupations. If we assume, as we do for the moment, that all laborers are equally value-productive, then they will enter a high-wage industry to push the particular supply curve of labor in that industry downward, while quitting workers raise the supply curve of labor in the low-wage industry.

This conclusion follows from the general tendency toward the *uniformity of the price of any good on the market.* If all labor were homogeneous and therefore one factor, its price (wage rate) would be uniform throughout industry, just as the pure interest rate tends to be uniform.

Now let us relax one of the conditions of our hypothetical construct.[15] While retaining the assumption of equal productivity of all laborers, let us now introduce the possibility of psychic benefits or psychic disutilities accruing to workers at particular jobs. Some jobs are actively liked by most people, others actively disliked. These jobs may be common to certain industries or, more narrowly, to individual firms which may be considered particularly pleasant or unpleasant to work for. What will happen to money wage rates and to the supply of labor in the various occupations? It is obvious that, in the generally *disliked* occupation or firm, *higher* money wage rates will be necessary to attract and hold labor in that job. On the other hand, there will be so much labor competing in the generally liked jobs that they will pay *lower* wage rates. In other words, our amended conclusion is that not *money* wage rates, but *psychic* wage rates, will be equalized throughout—psychic wage rates being equal to money wage rates plus or minus a psychic benefit or psychic disutility component.

Many economists have assumed, implicitly or explicitly, an essential homogeneity among laborers. And they have made this assumption not, as we have done, as a purely temporary construct, but as an attempt to describe the real world. The question is an empirical one. It is a fundamental, empirically derived postulate of this book that there is a great variety among

[15]It will be noted that we have avoided using the very fashionable term "model" to apply to the analyses in this book. The term "model" is an example of an unfortunate bias in favor of the methodology of physics and engineering, as applied to the sciences of human action. The constructs are imaginary because their various elements never coexist in reality; yet they are necessary in order to draw out, by deductive reasoning and *ceteris paribus* assumptions, the tendencies and causal relations of the real world. The "model" of engineering, on the other hand, is a mechanical construction in miniature, *all parts of which* can and must coexist in reality. The engineering model portrays in itself all the elements and the relations among them that will coexist in reality. For this distinction between an imaginary construct and a model, the writer is indebted to Professor Ludwig von Mises.

men in labor skills, in insight into future events, in ability, intelligence, etc. It seems empirically clear that this is the case.[16] The denials seem to be based on the simple faith that all men are "really" equal in all respects or could be made equal under proper conditions. Generally, the assumptions of uniformity and equality are made implicitly rather than explicitly, perhaps because the absurdities and obvious errors of the position would then become clear. For who would deny that not everyone could be an opera singer or a batting champion?

Some writers try to salvage the uniformity assumption by demonstrating that differences in wages occur solely because of the heavy *cost of training* for certain jobs. Thus, a doctor will earn more than a clerk because, in the nature of the task, a doctor will have to undergo the expenses of years of training (the expenses including actual money costs as well as opportunity costs forgone of earning money in such jobs as clerking). Therefore, in long-run equilibrium, money wage rates will not be uniform in the two fields, but income rates will be enough higher in medicine to just compensate for the loss, so that the *net* wage or income rates, considered over the person's lifetime, will be the same.

It is true that costs of training do enter in this way into market wage rates. But they do not account for all wage differentials by any means. Inherent differences in personal ability are also vital. Decades of training will not convert the average person into an opera star or a baseball champion.[17]

Many writers have based their analyses on the assumption of the homogeneity of all workers. Consequently, when they find

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[16]For some philosophical discussions of human variation, *see* Harper, *Liberty*, pp. 61–83, 135–41; Roger J. Williams, *Free and Unequal* (Austin: University of Texas Press, 1953); George Harris, *Inequality and Progress* (Boston: Houghton Mifflin, 1898); Herbert Spencer, *Social Statics* (New York: D. Appleton & Co., 1890), pp. 474–82; A.H. Hobbs, *The Claims of Sociology* (Harrisburg, Pa.: The Stackpole Co., 1951), pp. 23–64; and Hobbs, *Social Problems and Scientism* (Harrisburg, Pa.: The Stackpole Co., 1953), pp. 254–304.

[17]Cf. Van Sickle and Rogge, *Introduction to Economics*, pp. 178–81.

that generally well-liked jobs, such as television-directing, pay more than such disliked jobs as ditch-digging, they tend to assume that there is injustice and chicanery afoot. A recognition of differences in labor productivity, however, eliminates this bugbear.[18] In such cases, a psychic component still exists that relatively lowers the wage of the better-liked job, but it is offset by the higher marginal value productivity and skill attached to the latter. Since TV-directing takes more skill than ditch-digging, or rather skill that fewer people have, the wage rates in the two occupations cannot be equalized.

E. Productivity and Marginal Productivity

Great care must be taken in dealing with the productivity concept. In particular, there is danger in using a term such as "productivity of labor." Suppose, for example, we state that "the productivity of labor has advanced in the last century." The implication is that the cause of this increase came from within labor itself, i.e., because current labor is more energetic or personally skillful than previous labor. This, however, is not the case. An advancing capital structure increases the *marginal* productivity of labor, because the labor supply has increased less than the supply of capital goods. This increase in the marginal productivity of labor, however, is not due to some special improvement in the labor energy expended. It is due to the increased supply of capital goods. The causal agents of increased wage rates in an expanding economy, then, are *not* primarily the workers themselves, but the capitalist-entrepreneurs who have invested in capital goods. The workers are provided with more and better tools, and so their labor becomes relatively scarcer as compared to the other factors.[19]

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[18]For a treatment of wage rates and geography, see the section below on "The Economics of Location and Spatial Relations."

[19]It should be understood throughout that when we refer to increases in wage rates or ground rents in the expanding economy, we are referring to real, and not necessarily to money, wage rates or ground rents.

That each man receives his marginal value product means that each man is paid what he is worth in producing for consumers. But this does not mean that increases in his worth over the years are necessarily caused by his own improvement. On the contrary, as we have seen, the rise is primarily due to the increasing abundance of capital goods provided by the capitalists.

It is, then, clearly impossible to impute absolute "productivity" to any productive factor or class of factors. In the absolute sense, it is meaningless to try to impute productivity to any factor, since all the factors are necessary to the product. We can discuss productivity only in *marginal terms*, in terms of the productive contribution of a single unit of a factor, given the existence of other factors. This is precisely what entrepreneurs do on the market, adding and subtracting units of factors in an attempt to achieve the most profitable course of action.

Another illustration of the error in attempting to attribute increased "productivity" to the workers themselves occurs within the various segments of the labor market. As we have seen, there is a definite *connexity* between all the occupations on the labor market, since labor is the prime nonspecific factor. As a result, while wage rates are not equalized, psychic wage rates will all tend, in the long run, to move together and maintain a given skill-differential between each occupation. Therefore, when a certain branch of industry expands its capital and production, an increase in DMVP, and therefore in wage rates, is not confined to that particular branch. Because of the connexity of the supply of labor, labor tends to leave other industries and enter the new ones, until finally all the wage rates throughout the labor market have risen, while maintaining the same differentials as before.

Suppose, for example, that there is an expansion of capital in the steel industry.[20] The MVP of the steel worker increases, and

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[20]This assumes, of course, that there is no offsetting *decline* in capital elsewhere. If there is, then there will be no *general* rise in wages.

his wage rates go up. The increase in wage rates, however, is governed by the fact that the rise will attract workers from more poorly paid industries. For example, suppose that steel workers are receiving 25 grains of gold per hour, while domestic servants receive 15 grains per hour. Now, under the impetus of expansion, the MVP and hence the wage rate of the steel workers go up to 30 grains. The differential has been increased, inducing domestic servants to enter the steel industry, lowering steel wages, and especially raising servants' wages, until the differential is re-established. Thus, a rise in capital investment in steel will increase the wages of workers in domestic service. The latter increase is clearly not caused by some sort of increase in the "productivity" or in the quality of the output of the domestic servants. Rather, their *marginal* value productivity has increased as a result of the greater scarcity of labor in the service trades.

The differentials will not remain precisely constant in practice, of course, since changing investment and changing methods also alter the types of skills required in the economy.

The shift in labor supply will not usually be as abrupt as in our example. Generally, it will take place from one occupation or one grade to a closely similar grade or occupation. Thus, more ditchdiggers might become foremen, more foremen supervisors, etc., so that shifts will take place from grade to grade. It is as if the labor market consisted of linked segments, a change in one segment transmitting itself throughout the chain from each link to the next.

F. A Note on Overt and Total Wage Rates

It is "total wage rates" that are determined on the market. They tend to be equalized on the market and to be set at the DMVP of the worker. *Total wage rates* are the money paid out by the employer for labor services. They do not necessarily correspond to the "take-home pay" of the worker. The latter may be called the "overt wage rates." Thus, suppose that there are two competing employers bidding for the same type of labor.

One employer, Mr. A, pays out a certain amount of money, not in direct wages, but in pension funds or other "welfare" benefits. These benefits, it must be realized, will not be added as a gift from the employer to the workers. They will not be additions to the total wage rates. Overt wage rates paid out by Mr. A will instead be correspondingly *lower* than those paid out by his rival, Mr. B, who does not have to spend on the "welfare" benefits.

To the employer, in other words, it makes no difference in what form workers cost him money, whether in "take-home pay" or in welfare benefits. But he cannot pay more than the worker's DMVP; i.e., the worker's total wage income is set by this amount. The worker, in effect, chooses in what *form* he would like his pay and in what proportion of net wage rates to "welfare" benefits. Part of these benefits is money that the employer might spend to provide particularly pleasant or plush working conditions for all or some of his employees. This cost is part of the total and is deducted from the overt wage rates of the employee.

The institutional manner of paying wage rates is a matter of complete indifference to our analysis. Thus, while "piece rates" or "time rates" may be more convenient in any given industry, they do not differ in essentials; both are wage rates paid for a certain amount of work. With time rates, the employer has in mind a standard of performance which he expects from a worker, and he pays according to that rate.[21]

G. The "Problem" of Unemployment

An economic bugbear of our times is "unemployment." Not only is this considered the pre-eminent problem of the "depression" in the "business cycle"; it is also generally considered the primary "problem" of the "capitalist system," i.e., of the developed free-market economy. "Well, at least socialism solves

[21]For a discussion of these problems, *see* Mises, *Human Action*, pp. 598–600.

the unemployment problem," is supposed to be the most persuasive argument for socialism.

Of particular interest to us is the sudden emergence of the "unemployment problem" in economic theory. The Keynesians, in the mid-1930's, inaugurated the fashion of declaiming: Neoclassical economics is all right for its special area, but it assumes "full employment." Since "orthodox" economics "assumes full employment," it holds true only so long as "full employment" prevails. If it does not, we enter a Keynesian wonderland where all economic truths are vitiated or reversed.

"Full employment" is supposed to be the condition of no unemployment and therefore the goal at which everyone aims.

In the first place, it should be emphasized that economic theory does not "assume" full employment. Economics, in fact, "assumes" *nothing*. The whole discussion of alleged "assumptions" reflects the bias of the epistemology of physics, where "assumptions" are made without originally knowing their validity and are eventually tested to see whether or not their consequents are correct. The economist does not "assume"; he *knows*. He *concludes* on the basis of logical deduction from self-evident axioms, i.e., axioms that are either logically or empirically incontrovertible.

Now what does economics *conclude* on the matter of unemployment or "full employment"? In the first place, there is no "problem" involved in the unemployment of either land or capital goods factors. (The latter condition is often known as "idle" or "unused capacity.") We have seen above that a crucial distinction between land and labor is that labor is relatively scarce. As a result, there will always be land factors remaining unused, or "unemployed."[22] As a further result, *labor factors will always be fully employed on the free market to the extent that laborers are so willing*. There is no *problem* of "unemployed land," since land

[22]Capital goods will remain unemployed because of previous entrepreneurial error, i.e., investing in the wrong type of capital goods.

remains unused for a good reason. Indeed, if this were not so (and it is conceivable that some day it will not be), the situation would be most unpleasant. If there is ever a time when land is scarcer than labor, then land will be fully employed, and some labor factors will either get a zero wage or else a wage below minimum subsistence level. This is the old classical bugbear of population pressing the food supply down to below-subsistence levels, and certainly this is theoretically possible in the future.

This is the only case in which an "unemployment problem" might be said to apply in the free market. But even here, if we consider the problem carefully, we see that there is no unemployment problem *per se*. For if what a man wants is simply a "job," he could work for zero wages, or even pay his "employer" to work for him. In other words, he could earn a "negative wage." Now this could never happen, for the good reason that labor is a disutility, especially as compared to leisure or "play." Yet all the worry about "full employment" makes it appear that the "job," and not the income from the job, is the great desideratum. If that were really the case, then there *would* be negative wages, and there would be no unemployment problem either. The fact that no one will work for zero or negative wages implies that in addition to whatever enjoyment he receives, the laborer requires a monetary income from his work. So what the worker wants is not just "employment" (which he could always get in the last resort by *paying* for it) but *employment at a wage*.

But once this is recognized, the whole modern and Keynesian emphasis on employment has to be revalued. For the great missing link in their discussion of unemployment is precisely *the wage rate*. To talk of unemployment or employment without reference to a wage rate is as meaningless as talking of "supply" or "demand" without reference to a price. And it is precisely analogous. The demand for a commodity makes sense only with reference to a certain price. In a market for goods, it is obvious that whatever stock is offered as supply, it will be "cleared," i.e., sold, at a price determined by the demand of the consumers. No

good need remain unsold if the seller wants to sell it; all he need do is lower the price sufficiently, in extreme cases even below zero if there is no demand for the good and he wants to get it off his hands. The situation is precisely the same here. Here we are dealing with labor services. Whatever supply of labor service is brought to market can be sold, but only if wages are set at whatever rate will clear the market.

We conclude that there can never be, on the free market, an unemployment problem. If a man wishes to be employed, he will be, provided the wage rate is adjusted according to his DMVP. But since no one wants to be simply "employed" without getting what he considers sufficient payment, we conclude that employment *per se* is not even a desired goal of human action, let alone a "problem."

The problem, then, is not employment, but employment at an above-subsistence wage. There is no guarantee that this situation will always obtain on the free market. The case mentioned above—scarcity of land in relation to labor—can lead to a situation where a worker's DMVP is below a subsistence wage for him. There also may be so little capital invested per worker that any wage will be below-subsistence for many people. Even in a relatively prosperous society there may be individual workers so infirm or lacking in skill that their particular talents could not command an above-subsistence wage. In that case, they could survive only through the gifts of those who are making above-subsistence wages.

But what of the able-bodied worker who "can't find a job"? This situation cannot obtain. In those cases, of course, where a worker insists on a certain type of job or a certain minimum wage rate, he may well remain "unemployed." But he does so only of his own volition and on his own responsibility. Thus, suppose that perhaps half the labor force suddenly insisted that they would not work unless they received a job in New York City in the television industry. Obviously, "unemployment" would suddenly become enormous. This is only a large-scale example

of something that is always going on. There may be a shift of industry away from one town or region and toward another. A worker may decide that he wants to remain in the old town and insists on looking for a job there. If he fails to get one, however, the fault lies with himself and not with the "capitalist system." The same is true of a clerk who insists on working only in the TV industry, or of a radio employee who refuses to leave for television and insists on working only in radio. We are not condemning these workers here. We are simply saying that by their decisions they are themselves choosing not to be employed.

The able-bodied in a developed economy can always find work, and work that will pay an over-subsistence wage. This is so because labor is scarcer than land, and enough capital has been invested to raise the marginal value product of laborers sufficiently to pay such a wage. But while this is true in the general labor market, it is not necessarily true for particular labor markets, for particular regions or occupations, as we have just seen.

If a worker can withdraw from the labor market by insisting on a certain type of work or location of work, he can also withdraw by insisting on a certain minimum wage payment. Suppose a man insisted that he would not work at any job unless he is paid 500 gold ounces per year. If his best available DMVP is only 100 gold ounces per year, he will remain unemployed. Whenever a man insists on a wage higher than his DMVP, he will remain unemployed, i.e., *unemployed at the wage that he insists upon*. But then this unemployment is not a "problem," but a voluntary choice on the part of the idle person.[23]

The "full employment" provided by the free market is employment to the extent that workers wish to be employed. If they refuse to be employed except at places, in occupations, or

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[23]*See* Mises, *Human Action*, pp. 595–98. As Mises concludes, "Unemployment in the unhampered market is always voluntary." Particularly recommended is Mises' critique of the theory of "frictional unemployment."

at wage rates they would like to receive, then they are likely to be choosing unemployment for substantial periods.[24]

It might be objected that workers often do not *know* what job opportunities await them. This, however, applies to the owner of *any* goods up for sale. The very function of *marketing* is the acquisition and dissemination of *information* about the goods or services available for sale. Except to those writers who posit a fantastic world where everyone has "perfect knowledge" of all relevant data, the marketing function is a vital aspect of the production structure. The marketing function can be performed in the labor market, as well as in any other, through agencies or other means for the discovery of who or where the potential buyers and sellers of a particular service may be. In the labor market this has been done through "want ads" in the newspapers, employment agencies used by both employer and employee, etc.

Of course "full employment," as an absolute ideal, is absurd in a world where leisure is a positive good. A man may choose idleness in order to obtain leisure; he benefits (or believes he benefits) more from this than from working at a job.[25] We can see this truth more clearly if we consider the hours of the work week. Will anyone maintain that an 80-hour work week is necessarily better than a 40-hour week? Yet the former clearly represents a fuller employment of labor than the latter.

One alleged example of a possible case of involuntary unemployment on the free market has been suggested by Professor Hayek.[26] Hayek maintains that when there is a shift from

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[24]Economics does not "assume mobility of labor." It simply analyzes the consequences of a laborer's decision to be "mobile" or "immobile," the latter amounting to a voluntary choice of at least temporary unemployment.

[25]The "idleness" referred to here is catallactic, and not necessarily total. In other words, it means that a man does not seek to sell his labor services for money and therefore does not enter the societal labor market. He might well be very "busy" working at hobbies, etc.

[26]Hayek, *Prices and Production*, pp. 91–93.

investment to consumption, and therefore a shortening of the production structure on the market, there will be a necessary temporary unemployment of workmen thrown out of work in the higher stages, lasting until they can be reabsorbed in the shorter processes of the later stages. It is true that there is a loss in income, as well as a loss in capital, from a shift to shorter processes. It is also true that the shortening of the structure means that there is a transition period when, at final wage rates, there will be unemployment of the men displaced from the longer processes. However, during this transition period there is no reason why these workers cannot bid down wage rates until they are low enough to enable the employment of all the workers during the transition. This transition wage rate will be lower than the new equilibrium wage rate. But at no time is there a necessity for unemployment.

The ever-recurring doctrine of "technological unemployment"—man displaced by the machine—is hardly worthy of extended analysis. Its absurdity is evident when we look at the advanced economy and compare it with the primitive one. In the former there is an abundance of machines and processes completely unknown to the latter; yet in the former, standards of living are far higher *for far greater numbers of people.* How many workers have been "displaced" because of the invention of the shovel? The technological unemployment motif is encouraged by the use of the term "labor-saving devices" for capital goods, which to some minds conjure up visions of laborers being simply discarded. Labor needs to be "saved" because *it is the pre-eminently scarce good* and because man's wants for exchangeable goods are far from satisfied. Furthermore, these wants would not be satisfied at all if the capital-goods structure were not maintained. The more labor is "saved," the better, for then labor is using more and better capital goods to satisfy more of its wants in a shorter amount of time.

Of course, there will be "unemployment" if, as we have stated, workers insist on their own terms for work, and these terms cannot be met. This applies to technological changes as

well as any other. The clerk who, for some reason, insists nowadays on working *only* for a blacksmith or in an old-fashioned general store may well have chosen a large dose of idleness. Any workers who insisted on working in the buggy industry or nothing found themselves, no doubt, unemployed after the development of the automobile.

A technological improvement in an industry will tend to *increase* employment in that industry if the demand for the product is elastic downward, so that the greater supply of goods induces greater consumer spending. On the other hand, an innovation in an industry with *inelastic* demand downward will cause consumers to spend less on the more abundant products, contracting employment in that industry. In short, the process of technological innovation shifts workers from the inelastic-demand to the elastic-demand industries. One of the major sources of new employment demand is in the industry making the new machines.[27]

3. Entrepreneurship and Income

A. Costs to the Firm

We have seen the basis on which the prices of the factors of production and the interest rate are determined. Looked at from the point of view of an individual entrepreneur, payments to factors are money *costs*. It is clear that we cannot simply rest on the old classical law that prices of products tend, in the long run, to be equal to their costs of production. Costs are not fixed by some Invisible Hand, but are determined precisely by the total force of entrepreneurial demand for factors of production. Basically, as Böhm-Bawerk and the Austrians pointed out, *costs conform to prices*, and not *vice versa*. Confusion may arise because, looked at from the point of view of the individual firm rather than of the economist, it *appears* as if costs (at least in the sense of the prices

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[27]Cf. Fred R. Fairchild and Thomas J. Shelly, *Understanding Our Free Economy* (New York: D. Van Nostrand, 1952), pp. 478–81.

of factors) are somehow given, and beyond one's control.[28] If a firm can command a selling price that will more than cover its costs, it remains in business; if not, it will have to leave. The illusion of externally determined costs is prevalent because, as we shall presently see, most factors can be employed in a wide variety of firms, if not industries. If we take the broader view of the economist, however, the various "costs," i.e., prices of factors, determined by their various DMVPs in alternative uses, are ultimately determined solely by consumers' demand for all uses. It must not be forgotten, furthermore, that changes in demand and selling price will change the prices and incomes of *specialized factors* in the same direction. The "cost curves" so fashionable in current economics assume fixed factor prices, thereby ignoring their variability, even for the single firm.

It might be noted that, in this work, there is none of that plethora and tangle of "cost curves" which fill the horizon of almost every recent "neoclassical" work in economics.[29] This omission has been deliberate, since it is our contention that the cost curves are at best redundant (thus violating the simplicity principle of Occam's Razor), and at worst misleading and erroneous.

As an explanation of the pricing of factors and the allocation of output it is obvious that cost curves add nothing new to discussion in terms of marginal productivity. At best, the two are reversible. This can be clearly seen in such texts as E.T. Weiler's *The Economic System* and George J. Stigler's *Theory of*

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[28]Hence, when the economist considers only the single firm (as in recent years), he goes completely astray by ignoring the generality of economic interrelations. To analyze means-ends relations logically, as economics does, requires taking all relations into account. Failure to do so, either by treating the single firm only or by treating unreal holistic aggregates or by taking refuge in the irrelevant mathematics of the Lausanne "general equilibrium" school, is equivalent to abandoning economics.

[29]Many beginning students come away with the impression that economics consists of an indigestible brew of "cost curves" to be memorized by rote and drawn neatly on the blackboard.

Price.[30] But, in addition, the shift brings with it many grave deficiencies and errors. This is revealed in the very passage in which Stigler explains the reasons for his switch from a perfunctory discussion of productivity to a lengthy treatment of cost curves:

> The law of variable proportions has now been explored sufficiently to permit a transition to the cost curves of the individual firm. The fundamentally new element in the discussion will, of course, be the introduction of prices of the productive services. The transition is made here only for the case of competition—that is, the prices of the productive services are constant because the firm does not buy enough of any service to affect its price.[31]

But by introducing *given* prices of productive services, the contemporary theorist really abandons any attempt to explain these prices. This is one of the cardinal errors of the currently fashionable theory of the firm. It is highly superficial. One of the aspects of this superficiality is the assumption that prices of productive services are given, without any attempt to explain them. To furnish an explanation, marginal productivity analysis is necessary.

Marginal productivity analysis and the profit motive are sufficient to explain the prices of productive factors and their allocation to various firms and industries in the economy. Furthermore, there are in production theory two important and interesting concepts involving periods of time. One is what we may call the "immediate run"—the market prices of commodities and factors on the basis of given stocks and speculative demands and given consumer valuations. The immediate run is important, since it provides an explanation of the actual market prices of all goods at any time. The other important concept is that of the "final price," or the long-run equilibrium price, i.e.,

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[30]E.T. Weiler, *The Economic System* (New York: Macmillan & Co., 1952), pp. 141–61; Stigler, *Theory of Price*, pp. 126ff.

[31]Stigler, *Theory of Price*, p. 126.

the price that would be established in the ERE. This is important because it reveals the direction in which the immediate-run market prices tend to move. It also permits the analytic isolation of interest, as compared to profit and loss, in entrepreneurial incomes. In the ERE all factors will receive their discounted marginal value product, and interest will be pure time preference; there will be no profit and loss.

The interesting phases, then, are the immediate run and the long run. Yet cost-curve analysis deals almost exclusively with a hybrid intermediate phase known as the "short run." In this short run, "costs" are sharply divided into two categories: fixed (which must be incurred regardless of the amount produced) and variable (which vary with output). This whole construction is a highly artificial one. There is no actual "fixity" of costs. Any alleged fixity depends purely on the length of time involved. In fact, suppose that production is zero. The "cost-curve theorists" would have us believe that even at zero output there are fixed costs that must be incurred: rent of land, payment of management, etc. However, it is clear that if data are frozen—as they should be in such an analysis—and the entrepreneurs *expect a situation of zero output to continue indefinitely*, these "fixed" costs would become "variable" and disappear very quickly. The rent contract for land would be terminated, and management fired, as the firm closed its doors.

There are no "fixed" costs; rather there are different degrees of variability for different productive factors. Some factors are best used in a certain quantity over a certain range of output, while others yield best results over other ranges of output. The result is not a dichotomy into "fixed" and "variable" costs, but a condition of many degrees of variability for the various factors.[32]

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[32]Robbins points out that the length of a period of productive activity depends upon the expectations of entrepreneurs concerning the permanence of a change and the technical obstacles to a change. Robbins, "Remarks upon Certain Aspects of the Theory of Costs," pp. 17–18.

Even if none of these difficulties existed, it is hard to see why the "short run" should be picked out for detailed analysis, when it is merely one way station, or rather a series of way stations, between the *important* periods of time: the immediate run and the long run. Analytically, the cost-curve approach is at best of little interest.[33]

With these *caveats*, let us now turn to an analysis of the costs of the firm. Let us consider what will happen to costs at alternate hypothetical levels of output. There are two elements that determine the behavior of *average costs*, i.e., total costs per unit output.

(*a*) There are "physical costs"—the amounts of factors that must be purchased in order to obtain a certain physical quantity of output. These are the obverse of "physical productivity"—the amounts of the physical product that can be produced with various amounts of factors. This is a technological problem. Here the question is *not* marginal productivity, where one factor is varied while others remain constant in quantity. Here we concentrate on the scale of output when all factors are permitted to vary. *Where all factors and the product are completely divisible, a proportionate increase in the quantities of all the factors must*

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[33]For a critique of cost-curve theory, see the articles by Robbins, Thirlby, and Gabor and Pearce cited above, especially Gabor and Pearce, "A New Approach to the Theory of the Firm." *Also see* Milton Friedman, "Survey of the Empirical Evidence on Economies of Scale: Comment" in *Business Concentration and Price Policy* (Princeton, N.J.: National Bureau of Economic Research, 1955), pp. 230–38; Armen Alchian, "Costs and Outputs" in *The Allocation of Economic Resources* (Stanford: Stanford University Press, 1959), pp. 23–40; F.A. Hayek, "Unions, Inflation, and Prices" in Philip D. Bradley, ed., *The Public Stake in Union Power* (Charlottesville: University of Virginia Press, 1959), pp. 55 f.; Hayek, *Pure Theory of Capital*, pp. 14, 20–21; Harrod, "Theory of Imperfect Competition Revised" in *Economic Essays*, pp. 139–87; G. Warren Nutter, "Competition: Direct and Devious," *American Economic Review, Papers and Proceedings*, May, 1954, pp. 69 ff.; Scott, *Natural Resources: The Economics of Conservation*, p. 5.

lead to an equally proportionate increase in physical output.[34] This may be called the law of "constant returns to scale."

(*b*) The second determinant of average costs is factor prices. "Pure competition" theorists assume that these prices remain unchanged with a changing scale of output, but this is impossible.[35] As any firm's scale of output increases, it necessarily bids factors of production away from other firms, raising their prices in the process. And this is particularly true for labor and land factors, which cannot be increased in supply via new production. The increase in factor prices as output increases, combined with constant physical costs, raises the average money cost per unit output. We may therefore conclude that *if factors and product were perfectly divisible, average cost would always be increasing.*

In the productive world, perfect divisibility does not always, or even usually, obtain. Units of factors and of output are *indivisible*, i.e., they are not purely divisible into very small units. First, the *product* may be indivisible. Thus, suppose that three units of factor A + 2 units of factor B may combine to produce one refrigerator. Now it may be true that $6A + 4B$ will produce two refrigerators, according to our law of returns to scale. But it is also true that $4A + 3B$ will *not* produce one-and-a-fraction refrigerators. There are bound to be *gaps* where an increased supply of factors will *not* lead to an increased product, because of the technological indivisibility of the unit product.

In the areas of the gaps, average costs increase rapidly, since new factors are being hired with no product forthcoming; then, when expenditures on factors are increased sufficiently to produce more of the product, there is a precipitate *decline* in average cost compared to the situation during the gap. As a result,

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[34]This law follows from the natural law that every quantitatively observable cause-effect relation can be duplicated. For example, if $x + 2y + 3z$ are necessary and sufficient to form $1p$, *another* set will form another p, so that $2x + 4y + 6z$ will yield $2p$.

[35]See chapter 10 for more on the theory of pure competition.

no businessman will knowingly invest in the area of the gaps. To invest more without yielding a product is sheer waste, and so businessmen will invest only in the trough points outside the gap areas.[36]

Secondly, and more important, *the productive factors* may be indivisible. Because of this indivisibility, it is not possible simply to double or halve the quantities of input of every one of the productive services simultaneously. Each factor has its own technological unit size. As a result, almost all business decisions take place in zones in which many factors have to remain constant while others (the more divisible ones) may vary. And these relative divisibilities and indivisibilities are due, not to variations in periods of time, but to the technological size of the various units. In any productive operation there will be many varieties of indivisibility.

Professor Stigler presents the example of a railroad track, a factor capable of handling up to 200 trains a day.[37] The track is most efficiently utilized when train runs total precisely 200 a day. This is the technologically "ideal" output and may be the one for which the track was designed. Now what happens when output is below 200? Suppose output is only 100 per day. The *divisible* factors of production will then be cut in half by the owners of the railroad. Thus, if engineers are divisible, the railroad will hire half as many engineers or hire its engineers for half their usual number of hours. But (and this is the critical point here) the railroad cannot cut the track in half and operate on half a track. The technological unit of "track" being what it

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[36]For example, suppose that 1,000 gold ounces invested in factors yield 100 units of product and that 1,100 ounces yield 101 units. All the points in the gap between 1,000 and 1,100 will yield no more than 100 units. The excess of investment over 1,000 and under 1,100 ounces is clearly sheer waste, and no businessman will invest within the gap. Instead, investments will be made at such trough points for average cost as 1,000 and 1,100.

[37]Stigler, *Theory of Price*, pp. 132 ff.

is, the number of tracks has to remain at one. Conversely, when output increases to 200 again, other productive services may be doubled, but the quantity of track remains the same.[38]

What happens should output increase to 250 trains a day—a 25-percent increase over the planned quantity? Divisible services such as engineers may be increased by one-fourth; but the track must either remain at one—and be overutilized—or be increased to two. If it is increased, the tracks will again be underutilized at 250, because the "ideal" output from the point of view of utilizing the tracks is now 400.

When an important indivisible factor is becoming *less and less underutilized*, the tendency will be for "increasing returns," for *decreasing average costs* as output increases. When an important indivisible factor is becoming *more and more overutilized*, there is a tendency for *increasing average costs.*

In some spheres of production, indivisibilities may be such that full utilization of one indivisible factor requires full utilization of *all.*[39] In that case, all the indivisible factors move together and can be lumped together for our purposes; they become the equivalent of *one* indivisible factor, such as the railroad track. In such cases again, average costs will first decline with an increase in output, as the increased output remedies an underutilization of the lumped indivisible factors. After the technologically most efficient point is reached, however, costs will increase, given the indivisible factors. The tendency for costs to decline will, in addition, be offset by the rise in factor prices caused by the increase in output.

In the overwhelming majority of cases, however, each factor will *differ* from the others in size and degree of divisibility. As a

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[38]We are not discussing the fact that the railroad could, of course, cut down or increase the mileage of its track by including less or more geographic area in its service. The example assumes a given geographic area in which the railroad operates.

[39]*See* Mises, *Human Action*, pp. 338–40. This is the unrealistic condition implicitly assumed by textbook "cost curves."

consequence, any size or combination chosen might utilize one indivisible factor most efficiently, but at the expense of *not utilizing* some other indivisible factor at peak efficiency. Suppose we consider a hypothetical schedule of average money cost at each alternative output. When we start at a very low level of output, all the indivisible factors will be underutilized. Then, as we expand production, average costs will decrease *unless* offset by the price rise for those divisible factors needed to expand production. As soon as one of the indivisible factors is fully utilized and becomes overworked, average costs will rise sharply. Later, a tendency toward decreasing costs sets in again as another underutilized factor becomes more fully utilized. The result is an alternating series of decreases and increases in average costs as output increases. Eventually, a point will be reached at which more indivisible factors will be overutilized than underutilized, and from then on the general trend of average cost as output increases will be upward. Before that point, the trend will be downward.

Mingling with these influences from the technological side of costs are the continuing rises in factor prices, which also become more important as output increases.

In sum, as Mises states:

> Other things being equal, the more the production of a certain article increases, the more factors of production must be withdrawn from other employments in which they would have been used for the production of other articles. Hence—other things being equal—average production costs increase with the increase in the quantity produced. But this general law is by sections superseded by the phenomenon that not all factors of production are perfectly divisible and that, as far as they can be divided, they are not divisible in such a way that full utilization of one of them results in full utilization of the other imperfectly divisible factors.[40]

[40] *Ibid.*, p. 340.

Some indivisible factors, such as the railroad track, can be available in only one particular size. Other indivisible factors, such as machinery, can be built in various sizes. Cannot a small factory, then, use small-scale machinery which will be just as efficient as large-scale machinery in a larger factory, and would this not eliminate indivisibilities and result in constant costs? No, for here too, one particular size will probably be most efficient. Below the most efficient size, operating the machine will be more costly. Thus, as Stigler says, "fitting together of the parts of a ten-horsepower motor does not require ten times the labor necessary to fit those of a one-horsepower motor. Similarly, a truck requires one driver, whether it has a half-ton or two-ton capacity."[41]

It is also true that an oversized machine will be more costly than the optimum. But this will be no limitation on the size of the firm, for a large firm can simply use several (smaller) optimum-sized machines instead of one huge machine.

Labor is usually treated as a perfectly divisible factor, as one that varies directly with the size of the output. But this is not true. As we have seen, the truck driver is not divisible into fractions. Further, management tends to be an indivisible production factor. So also salesmen, advertising, cost of borrowing, research expenditures, and even insurance for actuarial risk. There are certain basic costs in borrowing which simply arise from investigating, paperwork, etc. These will tend to be proportionately smaller the larger the size—another indivisibility, with returns increasing over a certain area. Also, the broader the coverage, the lower insurance premiums will be.[42]

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[41]Stigler, *Theory of Price*, p. 136.

[42]It is particularly important not to limit possible efficiencies from large-scale production to narrow technological factors such as the "size of the plant." There are also efficiencies derived from the *organization of a firm* owning several plants—e.g., management utilization, specialization, efficiency of large-scale purchasing and selling, research expenditures, etc. Cf. George G. Hagedorn, *Studies on Concentration* (New York: National Association of Manufacturers, 1951), pp. 14 ff.

Then there are the well-known gains from the increase in the division of labor with larger outputs. The benefits from the division of labor may be considered indivisible. They arise from the specialized machines that must first be used with a larger product, and similarly from the increased labor skills of specialists. Here too, however, there is a point beyond which no further specialization is possible or where specialization is subject to increasing costs. Management has usually been stressed as particularly subject to overutilization. Even more important is the factor of *ultimate-decision-making ability*, which cannot be enlarged to the extent that management can.

What any given firm's size and output will be is therefore subject to a host of conflicting determinants, some impelling a limitation, some an expansion, of size. At what point any firm will settle depends on the concrete data of the actual case and cannot be decided by economic analysis. Only the actual entrepreneur, through the give and take of the market, can decide where the maximum-profit size is and can set the firm at that point. This is the task of the businessman and not of the economist.[43]

Furthermore, the cost-curve diagrams, so simple and smooth in the textbooks, misinterpret real conditions. We have seen that there are a whole host of determinants which tend at any point toward increasing and toward decreasing costs. It is, of course, true that an entrepreneur will seek to produce at the point of maximum profit, i.e., of maximum net returns over costs. But the factors that influence his decision are too numerous and their interactions too complex to be captured in cost-curve diagrams.

It is clear to almost everyone that the optimum size of a firm in some industries is larger than in others. The economic optimum for a steel plant is larger than the optimum barbershop. In industries where large-scale firms have demonstrated the

[43] *See* Friedman, "Survey of the Empirical Evidence on Economies of Scale: Comment," pp. 230–38.

most efficiency, however, many people have worried a great deal about an alleged tendency for decreasing costs to continue permanently and therefore for "monopoly" to result from ever-larger firms. It should be obvious, however, that there is no infinite tendency for ever-larger size; this is clear from the very fact that *every firm*, *at any time*, *always has a finite size* and that, therefore, an economic limit must have been imposed upon it from *some* direction. Furthermore, we have seen that the general rule of operating in a zone of diminishing marginal productivity for each factor, as well as the tendency for product prices to decline and factor prices to increase as output increases, establishes limits on the size of each firm. And, as a neglected point, we shall see that ultimate limits are set on the relative size of the firm by the necessity for *markets* to exist in every factor, in order to make it possible for the firm to calculate its profits and losses.[44]

Money costs will equal opportunity costs to the businessman only when he *plans* an investment in factors. To the extent that his money costs are "sunk" in any production process, they are committed irrevocably, and any future plans must consider them as irretrievably spent.[45] The businessman's market-supply curve will depend on his *present opportunity cost*, *not* his past money cost. For the businessman sells his goods at any price that will more than cover any further costs that must be incurred in selling them. As capital goods move toward final output in any stage of the production structure, more and more investment

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[44]For a good, largely empirical, study of size of firm, *see* George G. Hagedorn, *Business Size and the Public Interest* (New York: National Association of Manufacturers, 1949). *Also see idem*, *Studies on Concentration*, and John G. McLean and Robert W. Haigh, "How Business Corporations Grow," *Harvard Business Review*, November–December, 1954, pp. 81–93.

[45]Plans are relevant, not only in the ERE, but also to all decisions on maintenance or replacement, as well as additions to capital goods when they wear out or fall into disrepair.

has been sunk into the process. Therefore, the *marginal* cost of further production (roughly the opportunity cost) becomes ever lower as the product moves toward final output and sale. This is the simple meaning of the usual cost-curve morass. When, for example, some costs are not "fixed," but irrevocable from the point of view of *further* short-run production, they are not included in the businessman's estimated costs of such further production. As we have seen above, the sale of immediate stock completely ready for sale is virtually "costless," since there are no further costs for *its* production—in the immediate run.[46] In the ERE, of course, all costs and investments will be adjusted, and irrevocably incurred costs will present no problem. In the ERE average money costs for all firms will equal the price of the product minus pure interest return to the capitalist-entrepreneurs, and also, as we shall see, minus the return to the "discounted marginal productivity of the owner," a factor which does not enter into the firm's money costs.[47, 48]

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[46]It is costless only if no rise in the price of the good is foreseen for the near future. If it is, then there will arise the opportunity cost of forgoing a higher price. Hence, if there is no hope of a higher price, the businessman will sell, however low the price (adjusting for the costs of selling minus the costs of continued storage).

[47]Conventional "cost-curve" analysis depicts average cost and demand curves as tangential in the ERE—i.e., that price = average cost. *But* (aside from the unreality of assuming smooth curves rather than discontinuous angles), interest return—as well as return to the owner's decision-making ability—will accrue to the entrepreneurs even in the ERE. Hence, no such tangency can arise. See chapter 10 below for the implications of this revision for "monopolistic competition" theory.

[48]For further readings on cost, *see* G.F. Thirlby, "The Marginal Cost Controversy: A Note on Mr. Coase's Model," *Economica*, February, 1947, pp. 48–53; F.A. Fetter's classic "The Passing of the Old Rent Concept," p. 439; R.H. Coase, "Business Organization and the Accountant," *The Accountant*, October l–November 26, 1938; and *idem*, "Full Costs, Cost Changes, and Prices" in *Business Concentration and Price Policy*, pp. 392–94; John E. Hodges, "Some Economic Implications of Cost-Plus Pricing,"

B. Business Income

The net incomes in the economy accrue to labor in wages, to landowners in ground rents (both wages and ground rents being "rents," i.e., unit-prices of productive factors), to capitalists in interest—all of which continue in the ERE—and profits and losses to entrepreneurs, which do not. (Ground rents are capitalized in the capital value of land, which therefore earns the interest rate in the ERE.) But what of the owners? Are their incomes exhausted by the category of entrepreneurial profit and loss, which we have studied in chapter 8, or will they continue to earn income beyond interest in the ERE?

So far we have seen that owners of businesses perform an *entrepreneurial* function: the function of uncertainty-bearing in an ever-changing world. Owners are also capitalists, who advance present funds to labor and land factors and earn interest. They may also be their own managers; in that case, they earn an implicit *wage of management*, since they are performing work which could also be performed by employees.[49] We have seen that, catallactically, labor is the personal energy of nonowners in production, and that this factor receives wages. When the owner does laboring work himself, then he too earns an implicit wage. This wage, of course, continues also in the ERE.

But is there a function which owning businessmen perform, and would still perform in the ERE, beyond the advancing of

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Southwestern Social Science Quarterly, December, 1954, pp. 225–34; I.F. Pearce, "A Study in Price Policy," *Economica*, May, 1956, pp. 114–27; I.F. Pearce and Lloyd R. Amey, "Price Policy with a Branded Product," *Review of Economic Studies*, Vol. XXIV (1956–57), No. 1, pp. 49–60; James S. Earley, "Recent Developments in Cost Accounting and the 'Marginal Analysis'," *Journal of Political Economy*, June, 1955, pp. 227–42; and David Green, Jr., "A Moral to the Direct-Costing Controversy," *Journal of Business*, July, 1960, pp. 218–26.

[49]This implicit wage will equal the DMVP of the owner's managerial services, which will tend to equal the "opportunity wage forgone" that he could be earning as a manager elsewhere.

capital or possible managerial work? The answer is that they do execute another function for which they *cannot* hire other factors. It goes beyond the simple capital-advancing function, and it still continues in the ERE. For want of a better term, it may be called the *decision-making function*, or the *ownership function*. Hired managers may successfully direct production or choose production processes. But the ultimate responsibility and control of production rests inevitably with the *owner*, with the businessman whose property the product is until it is sold. It is the owners who make the decision concerning how much capital to invest and in what particular processes. And particularly, it is the *owners* who must choose the managers. The ultimate decisions concerning the use of their property and the choice of the men to manage it must therefore be made by the owners and by no one else. It is a function necessary to production, and one that continues in the ERE, since even in the ERE there are skills needed to hire proper managers and invest in the most efficient processes; and even though these skills remain constant, the efficiency with which they are performed will differ from one firm to another, and differing returns will be received accordingly.[50]

The decision-making factor is necessarily *specific* to each firm. We cannot call what it earns a *wage* because it can never be hired, and thus it does not earn an implicit wage. We may therefore call the income of this factor, the "rent of decision-making

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[50]In one of those extremely fertile but neglected hints of his, Böhm-Bawerk wrote:

> But even where he [the businessman] does not personally take part in the carrying out of the production, he yet contributes a certain amount of personal trouble in the shape of intellectual superintendence—say, in planning the business, or, at the least, in the act of will by which he devotes his means of production to a definite undertaking. (Böhm-Bawerk, *Capital and Interest*, p. 8)

ability."[51] It is clear that this rent will be equal to the factor's DMVP, the amount which it specifically contributes to the firm's revenue. Since this ability differs from one owner to the next, the rents will differ accordingly. This difference accounts for the phenomena of "high-cost" and "low-cost" firms in any industry and indicates that differences in efficiency among firms are not solely functions of ephemeral uncertainty, but would persist even in the ERE.

Granting that the "*supra*marginal" (i.e., the lower-cost) firms in an industry are earning *rents of decision-making ability* for their owners, what of the "marginal" firms in the industry, the "high-cost" firms just barely in business? Are *their* owners earning rents of decision-making ability? Many economists have believed that these marginal firms earn no such income, just as they have believed that the marginal land earns zero rent. We have seen, however, that the marginal land earns *some* rent, even if "close to" zero. Similarly, the marginal firm earns *some* rent of decision-making ability. We can never say quantitatively how much it will be, only that it will be less than the corresponding "decision rents" of the *supra*marginal firms.

The belief that marginal firms earn no decision rents whatever seems to stem from two errors: (1) the assumption of mathematical continuity, so that successive points blend together; and (2) the assumption that "rent" is basically differential and therefore that the most inferior working land or firm must earn zero to establish the differential. We have seen, however, that rents are "absolute"—the earnings and marginal value products of factors. There is no necessity, therefore, for the poorest factor to earn zero, as we can see when we realize that *wages* are a subdivision of rents and that there is clearly no one making a zero wage. And so neither does the marginal firm earn a decision rent of zero.

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[51]For an interesting contribution to the theory of business income, though not coinciding with the one presented here, *see* Harrod, "Theory of Profit" in *Economic Essays*, pp. 190–95. *Also see* Friedman, "Survey of the Empirical Evidence on Economies of Scale: Comment."

That the decision rent earned by the marginal firm *must* be positive and not zero becomes evident if we consider a firm whose decision rent is only zero. Its owner would then be performing certain functions—making and bearing responsibility for ultimate decisions about his property and choosing the top managers—and yet receiving no return. And this in the ERE, where it cannot be simply the unforeseen result of entrepreneurial mistakes! But there will be no reason for the owner to continue performing these functions without a return. He will not continue to earn what is *psychically* a negative return, for while he remained in business he would continue to expend energy in ownership while receiving nothing in return.

To sum up, the income accruing to a business owner, in a changing economy, will be a composite of four elements:

Remains in ERE	(*a*) interest on capital invested (uniform in ERE) (*b*) wages of management, when owner is self-employed (set according to DMVP) (*c*) rents of ownership-decision (set according to DMVP)
Disappears in ERE	(*d*) entrepreneurial profit or loss

We have, so far, been dealing almost exclusively with *capitalist*-entrepreneurs. Since the entrepreneur is the actor in relation to natural uncertainty, the capital investor, who hires and makes advances to other factors, plays a peculiarly important entrepreneurial role. Making decisions concerning how much and where to invest, he is the driving force of the modern economy. *Laborers* are also entrepreneurs in the sense of predicting demand in the markets for labor and choosing to enter certain markets accordingly. Someone who emigrates from one country to another in expectation of a higher wage is in this sense an entrepreneur and may obtain a monetary profit or loss from his move. One important distinction between capitalist-entrepreneurs and laborer-entrepreneurs is that only the former may suffer *negative incomes* in production. Even if a laborer emigrates

to a nation where pay turns out to be lower than expected, he absorbs only a differential, or "opportunity," loss from what he might have earned elsewhere. But he still earns a positive wage in production. Even in the unlikely event of a labor surplus vis-à-vis land, the laborer earns zero and not *negative* wages. But the capitalist-entrepreneur, the man who hires the other factors, can and does incur actual monetary losses from his entrepreneurial effort.

C. Personal Consumer Service

A particularly important category of laborer-entrepreneurs is that of the sellers of personal services to consumers. These laborers are generally capitalists as well. The sellers of such services—doctors, lawyers, concert artists, servants, etc.—are self-employed businessmen, who, in addition to interest on whatever capital they have invested, earn an implicit "managerial" wage for their labor.[52,53] Thus, they earn a peculiar type of income: a business return consisting almost exclusively of labor income. We may call this type of work *direct labor*, since it is labor that serves *directly* as a consumers' good rather than hired as a factor of production. And since it is a consumers' good, this labor service is priced directly on the market.

The determination of the prices of these goods will be similar on the demand side to that of any consumers' good. Consumers evaluate marginal units of the service on their value scales and decide how much, if any, to purchase. There is a difference, however, on the supply side. The market-supply curves

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[52]Since the scope of their business property and decisions is relatively negligible compared to their labor services, we may neglect their decision rents here.

[53]It is a managerial wage, even though the only employee may be the owner himself. It may seem strange to classify a domestic servant as "self-employed," but actually he is no different from a doctor or a lawyer to the extent that the latter sells his services to *consumers* rather than to capitalists.

for most consumers' goods are vertical straight lines, since the sale of the product, *once produced*, is costless to the entrepreneur. He has no alternative use for it. The case of *personal service*, however, is different. In the first place, leisure is a definite alternative to work. In the second place, as a result of the connexity of the labor market, the worker can shift to a higher-paying occupation further up on the structure of production if his income in this occupation is unsatisfactory. As a result, for this type of consumers' good, the supply curve is likely to be a rather flat, forward-sloping one.

The seller of the service, or the *direct laborer*, earns, as do all factors, his DMVP to the consumer. He will allocate his labor to whatever branch, whether high or low in the structure of production, where his DMVP will be the highest, and where, as a consequence, his wage rate will be the greatest. The principles of allocation, then, between direct labor and indirect labor in production are the same as those among the various branches of indirect productive use.

D. Market Calculation and Implicit Earnings

We have seen that a musician or a doctor earns wages without being an employee; the wages of each are *implicit* in the income that he receives, even though they are received directly from the consumers.

In the real world, each *function* is not necessarily performed by a different person. The same person can be a landowner and a worker. Similarly, a particular firm, or rather its owner or owners, may own land and participate in the production of capital goods. The owner may *also* manage his own firm. In practice, the different sources of income can be separated only by referring to these incomes *as determined by prices on the market.* For example, suppose that a man owns a firm which invests its capital, owns its own ground land, and produces a capital good, and that he manages the plant himself. He receives a net income over a year's period of 1,000 gold ounces. How can he estimate the different *sources* of his income? Suppose that he had invested

5,000 gold ounces in the business. He looks around at the economy and finds that what he can pretty well call the ruling rate of interest, toward which the economy is tending, is 5 percent. He then concludes that 250 gold ounces of his net income was implicit interest. Next, he estimates approximately what he would have received in wages of management if he had gone to work for a competing firm rather than engaging in this business. Suppose he estimates that this would have been 500 gold ounces. He then looks to his ground land. What could he have received for the land if he had rented it out instead of using it himself in the business? Let us say that he could have received 400 ounces in rental income for the land.

Now, our owner received a net money income, as landowner-capitalist-laborer-entrepreneur, of 1,000 gold ounces for the year. He then estimates what his *costs* were, in money terms. These costs are not his explicit money expenses, which have already been deducted to find his net income, but his implicit expenses, i.e., his opportunities forgone by engaging in the business. Adding up these costs, he finds that they total:

250 gold ounces	interest
500 gold ounces	wages
400 gold ounces	rent
1150 gold ounces	total opportunity costs

Thus, the entrepreneur suffered a *loss* of 150 ounces over the period. If his opportunity costs had been less than 1,000, he would have gained an entrepreneurial profit.

It is true that such estimates are not precise. The estimates of what he would have received can never be wholly accurate. But this tool of *ex post calculation* is an indispensable one. It is the only way by which a man can guide his *ex ante* decisions, his future actions. By means of this calculation, he may realize that he is suffering a loss in this business. If the loss continues much longer, he will be impelled to shift his various resources to other

lines of production. It is only by means of such estimates that an owner of more than one type of factor in the firm can determine his gains or losses in any situation and then allocate his resources to strive for the greatest gains.

A very important aspect of such estimates of implicit incomes has been overlooked: *there can be no implicit estimates without an explicit market!* When an entrepreneur receives income, in other words, he receives a complex of various functional incomes. To isolate them by calculation, *there must be in existence an external market to which the entrepreneur can refer.* This is an extremely important point, for, as we shall soon see in detail, this furnishes a most important limitation on the relative potential size of a single firm on the market.

For example, suppose we return for a moment to our old hypothetical example in which each firm is owned jointly by all its factor-owners. In that case, there is no separation at all between workers, landowners, capitalists, and entrepreneurs. There would be no way, then, of separating the wage incomes received from the interest or rent incomes or profits received. And now we finally arrive at the reason why the economy cannot consist completely of such firms (called "producers' co-operatives").[54] For, without an external market for wage rates, rents, and interest, there would be no rational way for entrepreneurs to allocate factors in accordance with the wishes of the consumers. No one would know where he could allocate his land or his labor to provide the maximum monetary gains. No entrepreneur would know how to arrange factors in their most value-productive combinations to earn the greatest profit. There could be no efficiency in production because the requisite knowledge would be lacking. The productive system would be in complete chaos, and everyone, whether in his capacity as

[54]Another reason why an economy of producers' co-operatives could not calculate is that every original factor would be tied indissolubly to a specific line of production. There can be no calculation where all factors are purely specific.

consumer or as producer, would be injured thereby. It is clear that a world of producers' co-operatives would break down for any economy but the most primitive, because it could not calculate and therefore could not arrange productive factors to meet the desires of the consumers and hence earn the highest incomes for the producers.

E. Vertical Integration and the Size of the Firm

In the free economy, there *is* an explicit time market, labor market, and land-rent market. It is clear that while chaos would ensue from a world of producers' co-operatives, other critical points even before that would, as it were, introduce *little bits of chaos* into the productive system. Thus, suppose that workers are separated from capitalists, but that *all* capitalists own their own ground land. Further, suppose, that for one reason or another, no capitalist will be able to rent out his land to some *other* firm. In that case, land and a particular capital and production process are indissolubly wedded to each other. There would be no rational way to allocate land in production, since it would have no explicit price anywhere. Since producers would suffer heavy losses, the *free market would never establish such a situation*. For the free market always tends to conduct affairs so that entrepreneurs make the greatest profit through serving the consumer best and most efficiently. Since absence of calculation creates grave inefficiencies in the system, it also causes heavy losses. Such a situation (absence of calculation) would therefore never be established on a free market, particularly after an advanced economy has already developed calculation and a market.

If this is true for such cases as a world of producers' co-operatives and the absence of a rent market, it also holds true, on a smaller scale, for "vertical integration" and the size of a firm. Vertical integration occurs when a firm produces not only at *one* stage of production, but over two or more stages. For example, a firm becomes so large that it buys labor, land, and capital goods of the fifth order, then works on these capital goods, producing other capital goods of the fourth order. In another plant, it then

works on the fourth-order capital goods until they become third-order capital goods. It then sells the *third*-order product.

Vertical integration, of course, lengthens the production period for *any* firm, i.e., it lengthens the time before *the firm* can recoup its investment in the production process. The interest return then covers the time for two or more stages rather than one.[55] There is a more important question involved, however. This is the role of implicit earnings and calculation in a vertically integrated firm. Let us take the case of the integrated firm mentioned in Figure 65.

Figure 65 depicts a vertically integrated firm; the arrows represent the movement of goods and services (not of money). The firm buys labor and land factors at both the fifth and the fourth stages; it also makes the fourth-stage capital goods itself and uses them in another plant to make a lower-stage good. This movement *internal* to the firm is expressed by the dotted arrow.

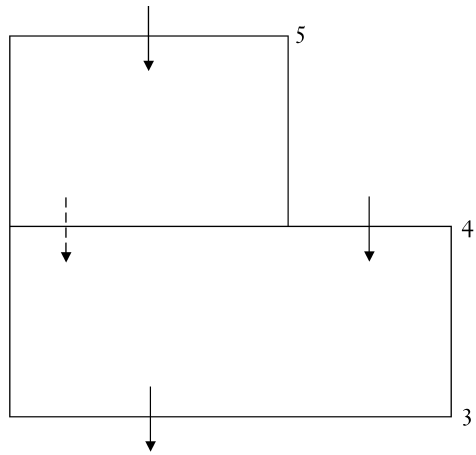

FIGURE 65. MOVEMENT OF GOODS AND SERVICES IN A VERTICALLY INTEGRATED FIRM

[55]Vertical integration, we might note, tends to reduce the demand for money (to "turn over" at various stages) and thereby to lower the purchasing power of the monetary unit. For the effect of vertical integration on the analysis of investment and the production structure, *see* Hayek, *Prices and Production*, pp. 62–68.