Elements of

ECONOMIC ANALYSIS

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Elements of

ECONOMIC ANALYSIS

by

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PREFACE

This book was written to provide a brief introduction to economic analysis for students in liberal arts, business administration, engineering, forestry, and other fields, the majority of whom do not expect to continue with advanced work in economics or to become professional economists. The primary objective, therefore, has been to present the essentials of economic analysis in a form that will be useful to them in later life, either in attacking business problems or in understanding questions of public policy that relate to the functioning of business enterprise and of the economy as a whole. By adopting certain analytical techniques now widely employed in industry, but not hitherto commonly utilized by economists, it appears possible to achieve a very considerable simplification of economic analysis without any loss of effectiveness or rigor. Additional gains in simplification have been achieved by dropping out concepts and analytical tools that, although a part of the equipment of the professional economist, are of little use or interest to the nonprofessional.

This book is, frankly, experimental in a number of important respects.

In the first place, although this book approaches economic analysis in terms of the individual firm or industry, it seeks to bridge the apparent gap between the economics of the firm and the economics of the entire economy, and to present a picture of microeconomics and macroeconomics in terms of the relations between the parts and the whole. Much emphasis has been placed upon the strategic role of entrepreneurial decisions and motivation, and on the interaction of the particular and the aggregate processes of

the economy. It is hoped that, through such a presentation, the student can achieve an appreciation of the fact that what happens in the economy in the aggregate is the resultant of the decisions and actions of millions of people and business firms, and that these decisions and actions are themselves conditioned by what is happening, or is expected to happen, in the economy as a whole.

A second major objective has been to introduce into the teaching of economic principles some of the devices that, in recent years, have been widely employed in industry as guides to managerial decisions, notably the break-even chart technique. Experimental use of this device during the past two or three years has led to the conviction that very material advantages may be achieved by employing an adaptation of this technique in place of the now conventional approach based on explicit marginal analysis. The fact that the break-even chart is now extensively used in industry gives this approach a context of realism that is difficult to achieve in an exposition of marginal analysis, for which few, if any, examples of actual practical employment can be found. Even a casual comparison of the two techniques will suffice to show the economy of the technique here employed, because it by-passes completely the difficulties inherent in presenting the concept of differentials or rates of change, which is inherent in conventional marginal analysis. Yet the results achieved are at least as rigorous, and involve fully as deep an understanding of the fundamental relationships involved, as can be achieved with the aid of the marginal analysis. A further gain that may be achieved is the possibility of treating total revenue and total cost curves or schedules in terms of statistical estimates or probabilities, rather than as definitely fixed and known functions. This statement should not be interpreted as an attack on the validity of marginal analysis itself, within an appropriate context, but simply as a claim that the framework of a simple and effective, and withal realistic economic analysis can be developed without taking aboard the impedimenta of the marginal concepts.

A third feature of the book is the deliberate concentration of attention upon types of market organization that are predominant in the contemporary economy, and the relegation of the case of pure competition to a subsidiary role as one of the more extreme variants among possible market situations. No attempt has been made to develop a detailed classification of market forms or to deal

at length with such variations. Other steps toward simplification include the virtual elimination of the analysis of elasticity, and a corresponding increase in emphasis upon shifting or changes in demand, reflecting the impact of income changes and changes in expectations. Here again the way is opened for the explicit recognition of the interrelations of the particular and the aggregate processes of the economy.

This book was originally undertaken to provide a brief introduction to formal economic analysis to be used in the elementary economics course at Syracuse University as a supplement to a widely used introductory text that is focused primarily on the structural and institutional aspects of the present-day American economy, and on the major economic and public policy problems of that economy. It has been organized and written, however, in such a way that it could be used, with some supplementary materials, as the basis of a one-term introduction to economic principles, or as a supplement to other content in a basic course in business administration.

The author is deeply indebted to several friends and colleagues who have read the manuscript at various stages in its preparation, and whose comments and suggestions have contributed greatly to its evolution. Among these particular mention should be made of Professors Theo Suranyi-Unger, W. Nelson Peach, Jesse V. Burkhead, and Mr. Paul Hirseman. Mr. Herbert Sim has been of great assistance in the final editing and checking of the manuscript.

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Part One

PRICE ANALYSIS

Chapter 1

DEMAND

Demand as an Expression of Consumer Attitudes and Preferences

A noted economist once said, "Teach a parrot to say 'supply and demand' and you have made a political economist." That many people are inclined to take his prescription at face value is indicated by the glibness with which they invoke the "law of supply and demand" to prove the unworkability of any proposal of which they happen to disapprove. For the sake of precision of thought and accuracy in analysis it is, however, desirable to examine the concepts of demand and supply a little more closely.

As ordinarily used in economics, the term *demand* is used to express the attitudes and preferences of consumers at a given moment of time. These attitudes may be those of an individual or of a group. An individual's demand for a certain commodity, whether shoes or sealing wax or cabbages, stands for the amounts of that commodity that he or she would be willing to buy, at a given time, at various possible prices. Depending on the amount of income at his disposal, on his personal tastes, and on the number of alternative attractions, there would ordinarily be some price above which the prospective consumer would not go, if necessary, in order to secure a single unit of the commodity. He would, however, be quite glad to pay less, and if the price were less he might be willing to buy in larger quantity.

Commodities differ greatly in the degree to which a lower or higher price would tend to evoke larger or smaller purchases. By the same token there are marked differences in the ability and

willingness of different people to buy the same commodity at any given price, even though all other circumstances are the same. Thus at any given time the group of potential buyers of a commodity will generally include some who would be prepared to buy even if the price were relatively high, and others who would be induced to buy only if the price were relatively low.

There are also marked differences in the frequency with which different commodities are purchased by individual consumers, and in the deliberation with which people make up their minds to buy or not to buy. Many items of personal consumption are bought from day to day or week to week, often on a habitual basis, as, for example, newspapers, cigarettes, gasoline, or the weekly groceries. Less frequently does the average person find himself in the market for major items of wearing apparel or housefurnishings. At still less frequent intervals does the practical problem present itself of choosing an engagement ring or purchasing a new house. There are, therefore, endless variations in the patterns of individual expenditure of income. But in any sizable community or trading area the number of people actively "in the market" for any staple commodity at a given time is likely to be large. If so, even though individual consumers' purchases may be made only occasionally, there will be a more or less regular off-take of a commodity from the market by the entire group of potential buyers.

The rate of demand at a given time

For the great generality of commodities that are continuously being produced and offered for sale, it is convenient to think in terms of *rates* of demand; that is, in terms of the quantities of a particular good that would be purchased, per unit of time, at different possible prices.

If, for example, the price of ground beef were sixty cents per pound at the neighborhood butcher shop, how many pounds would the butcher's customers buy per day or per week? Would they be likely to buy more pounds per day if the price were fifty cents? And still more if the price were forty cents? Suppose that the butcher made an estimate of the number of pounds that he could sell per day at various prices, from a dollar a pound down to thirty cents, assuming that all other conditions affecting the customers' choices, excepting price, were unchanged. These estimates could be summarized in the form of a *demand schedule,* as in Table 1.

This schedule represents the current demand situation as visualized by the butcher. In terms of such a schedule he must make his own calculations as to the "best" price to charge and the amount of meat to order each day in serving his trade.

TABLE 1

HYPOTHETICAL DEMAND SCHEDULE

If price were	*Entire group of customers would be willing to buy*	*Total amount that would be spent per day*
$1.00 per pound	10 pounds per day	$10.00
.90 " "	15 " " "	13.50
.80 " "	20 " " "	16.00
.70 " "	40 " " "	28.00
.60 " "	80 " " "	48.00
.50 " "	140 " " "	70.00
.40 " "	190 " " "	76.00
.30 " "	240 " " "	72.00

In the ensuing discussion the word *demand,* when used without other qualifying words, will be used in the sense of a demand schedule, indicating the quantities of a given commodity that the prospective buyers would be willing to purchase per day or per week, or during any other appropriate unit of time, at various possible prices.

The demand curve: Graphic representation of demand

It has become customary to make frequent use of a simple graphic device to picture the demand conditions for a commodity at a given time. This device is the demand curve as represented in Figure 1, which is based on the price and quantity figures assumed in Table 1. The various possible prices are indicated on a scale on the vertical axis, or *ordinate,* and quantities are measured on the base line or *abscissa.* To the right of the price scale a point is plotted, opposite each price, and directly above the quantity that the group of buyers would be willing to purchase, per unit of time, at that price. A *demand curve* may then be drawn in, by connecting the plotted points, to represent the functional relationship of price and quantity that might be sold, the implication being that at intermediate prices there would be a more or less proportionate adjustment in potential sales. Note that the demand curve in Fig-

ure 1 slopes downward to the right, indicating that the lower the price asked, the larger the quantity that could be sold. Such a curve is said to be *negatively sloped.*

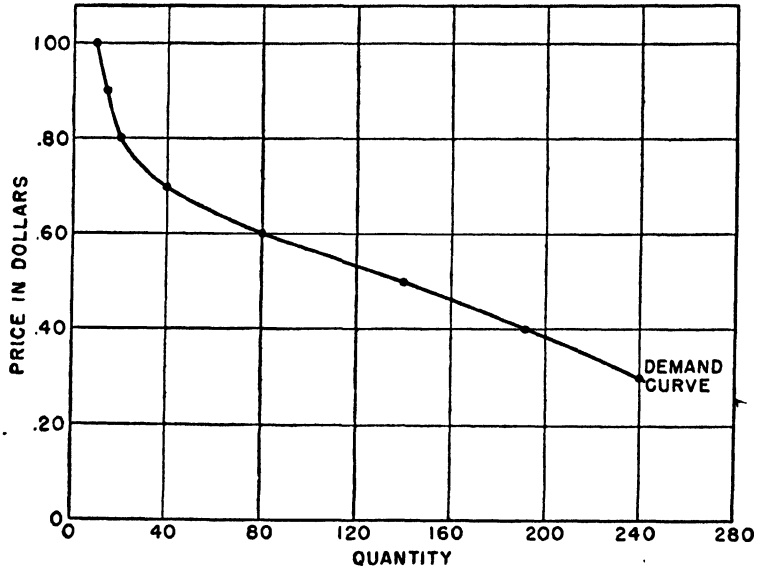

FIGURE 1. HYPOTHETICAL DEMAND CURVE

The responsiveness of demand

Under the demand conditions assumed in Table 1 and Figure 1, a reduction in price would, over a certain range, result in a more than proportionate increase in sales per day, and as a consequence total consumer expenditures would be increased. In the range below forty cents per pound, however, a further lowering of price would not be fully compensated by the increased volume of consumer purchases, so that total consumer expenditures on this commodity would be smaller than if the price were higher. This sort of relation between price, quantity that would be purchased, and total amount that would be spent, has been found to prevail for many different kinds of commodities. Over a certain range of prices, a lowering of price would increase the quantity that could be sold and also the total amount that would be spent out of consumer budgets. But beyond a certain point, a further lowering of price, although it would increase the quantity that could be sold,

would nevertheless involve reduced consumer expenditures. This fact is obviously significant both from the standpoint of consumer budgeting and also from the standpoint of planning by merchants and manufacturers.

The term *responsiveness of demand* [1] will be used to describe the reaction of consumers to lower, as compared with higher, prices for a certain commodity, other things being equal. A responsive demand would be one in which a lowering of price would induce a more than proportionate increase in purchases, and therefore a larger total expenditure for the commodity under consideration. *Unresponsiveness of demand* describes the situation in which a lowering of price would be accompanied by an increase in purchases, but not sufficient to cause an increase in total expenditures for the commodity in question. If a lowering of price would induce an increase in purchases just sufficient to keep total expenditures the same, the responsiveness of demand would be said to have a value of *unity*.

It should be noted that the responsiveness of demand is not the same throughout the entire demand schedule or along the entire length of the demand curve. In the previous example demand would be responsive over the range of prices down to forty cents, or slightly less, and unresponsive below that price.

The total expenditures or total sales revenue curve

An even more complete picture of the entire demand situation, including the responsiveness of demand, may be obtained by replotting the data from Table 1 in the form of a cumulative *total expenditures curve,* as in Figure 2. This figure will repay very careful study, as it constitutes the basic pattern for much of the analysis in this and the following chapters on cost and price analysis.

In Figure 2 the abscissa scale is used to indicate the quantities of the commodity (in this case chopped beef) that the consumers would purchase per day at various possible prices. The ordinate scale is employed to measure in dollars the total amount that consumers would spend in purchasing the indicated amounts of the

[1] The term *responsiveness of demand* as used here is identical in meaning with the term *elasticity of demand* as commonly used in economic literature. It seems desirable to reserve the term *elasticity of demand* to describe other features of economic behavior, particularly those relating to changes in economic conditions occurring over a period of time.

commodity. For example, a point is plotted at the $10 level directly above the point representing 10 pounds of meat. Another point is plotted at the $16 level, directly above the point representing 20 pounds of meat, and so on.

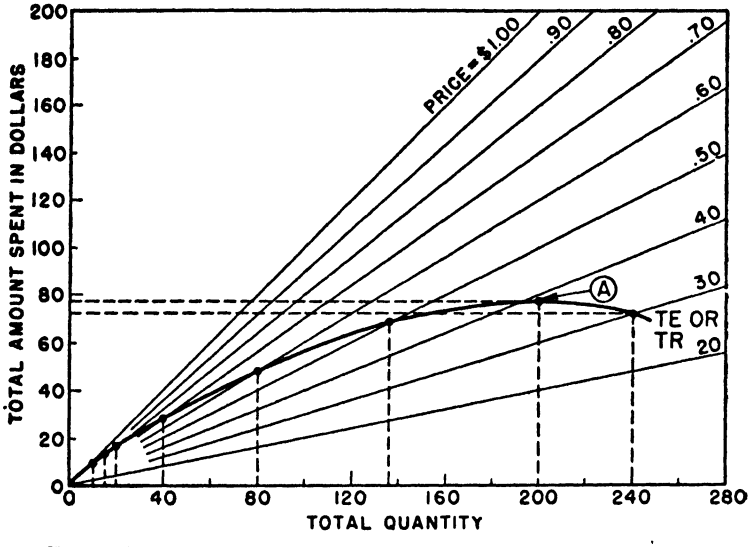

FIGURE 2. TOTAL EXPENDITURES OR TOTAL SALES REVENUE CURVE

A indicates the price and quantity at which the responsiveness of demand is "unity."

The various prices at which the chopped meat might be offered for sale are not represented on either the abscissa or the ordinate scale, but rather by a series of *price radials,* that is, straight lines sloping upward and to the right from the origin or zero point on the graph. A low price is represented by a gradually sloped radial; a high price by a steeply sloped radial. In each case the slope is so determined that the line serves as a graphic means of indicating the total amount that the buyers would spend for the commodity in question if they were to buy a certain number of units at the particular price in question.

By this method of representing prices it is possible to show in the same graph the three important aspects of estimated consumer demand, namely the *quantities* that the buyers would be prepared to take at each of the possible *prices,* and the *total amounts that would be spent* in purchasing the commodity at each of the possible prices.

In fact, Figure 2 may be regarded as a *nomograph,* that is, a graph that can be used to make computations by reference to a series of scales instead of arithmetically. In this case the use of Figure 2 would make it unnecessary to calculate arithmetically the amounts that consumers would be prepared to spend on the commodity at each of the possible prices.

For example, it was assumed in Table 1 that if the price of chopped meat were thirty cents per pound the customers would buy 240 pounds per day from the obliging butcher. In Figure 2 a dotted line is drawn perpendicularly from the point on the abscissa scale representing 240 pounds to a corresponding point on the thirty-cent price radial. Another horizontal guide line is drawn from this point to the ordinate scale representing total consumer expenditures. In this case the horizontal guide line cuts the total expenditure scale at a point representing a total expenditure of $72. Thus, by drawing two guide lines, with the price radial as a turning point, the computation of the total amount that would be spent (*i.e.,* $240 \times \$.30 = \$72$) is accomplished graphically.

In like manner a vertical guide line drawn from 190 on the abscissa to the forty-cent price radial and another horizontal guide line drawn from that point to the ordinate scale indicate that if the consumers would buy 190 pounds of chopped meat at forty cents per pound, their total expenditure for that purpose would be approximately $76. In the same way the total amount that would be spent by the consumers for the purchase of chopped meat if the price were fifty cents, sixty cents, and so on upward can be determined graphically. Each total is represented by a point plotted on the corresponding price radial.

To complete the graphic picture of the demand situation, all that is necessary is to draw in a smoothed curve connecting the various plotted points on the various price radials. This curve may be called a *total expenditures curve,* and is labeled *TE* in Figure 2. As will be seen subsequently, it also may be looked upon as presenting the total sales revenue picture for the supplier of the commodity in question and, in later figures, will be identified by the symbol *TR.*

The total expenditures curve starts at the origin and rises to the right, at first rather steeply and then more and more gradually, until it reaches a maximum value and thereafter it declines. In

this example the maximum point on the total expenditures curve is reached at a point representing an estimated total expenditure of about $78 for the purchase of about 200 pounds of chopped meat at a price of thirty-nine cents per pound. (See point *A* on the graph.) For any higher price (represented by a more steeply sloped price radial), the price radial would cut the total expenditures curve at a point where it was still rising, so that a lowering of price would result in a further increase in total expenditures. For any price lower than thirty-nine cents, the price radial would cut the total expenditures curve at a point where it was declining, indicating that a further lowering of price would reduce the total amount spent by the consumers, although they would purchase a larger quantity.

So long as the total expenditures curve is rising, the demand is responsive. If the total expenditures curve is declining, the indication is that demand is unresponsive over the corresponding range of prices (represented by the price radials). The maximum point on the total expenditures curve indicates the price-quantity combination for which the responsiveness of demand has a value of unity.

Demand as affected by changes in income and other changes occurring over a period of time

Over a period of time there may be substantial changes in the quantities of a given commodity that could be sold at various possible prices. For example, a change in tastes might increase or decrease the quantity of cigarettes, food, or other consumers' goods that people would be willing to buy at given prices. Or changes in the prices of other commodities that are substitutes for the one immediately under consideration may react upon the demand for it. Thus, if the price of pork is low in comparison with the price of beef, less beef will be bought at a given price than if the price of pork were also high. Changes in income also affect the willingness and ability of people to buy, and so affect the demands for all kinds of goods. This is true not only of increases or decreases in the incomes of individuals, but also of changes in the total income received by the people in the community or nation occurring in the course of the business cycle.

Such changes in the entire pattern or structure of demand are referred to as *changes in demand* or *shifts in demand,* and should

be thought of as entirely distinct from the responsiveness of demand, which refers to the willingness of the consumers to buy more or less of a given commodity if its price were lower or higher, other things being equal. From a practical standpoint, changes or shifts in demand, occurring as a consequence of changes in the prices of other commodities or in general economic conditions, or in the structure of people's tastes, are often of greater importance for businessmen than is the responsiveness of demand at a moment of time. Nevertheless, estimates of the responsiveness of demand may play a very considerable role in the formulation of price and production policies of business firms, as will be seen in the later discussion of price formation.

In Figure 3, two total expenditures curves have been drawn in, one labeled TE_1 and the other TE_2. A comparison of these two curves will indicate that at each of the prices represented by the various price radials, the number of units that could be sold under the conditions represented by TE_2 would exceed the number that could be sold under the conditions represented by TE_1. Thus, TE_2 as compared with TE_1 may be taken as representing an *increase* in demand, or a *positive shift* in demand, if TE_1 be regarded as representing the original demand conditions. Or, if TE_2 be taken as representing the original demand conditions, then TE_1 may be regarded as illustrating a *decrease* in demand or a *negative shift* in demand.

Estimates of Demand as a Basis for Producer's Calculations

The businessman, whether he is a retailer, a manufacturer, or a producer of ultimate raw materials, has an obvious interest in the demand for the product, because there is little gain to be made by piling up stocks of unsalable goods. At the same time, it is frequently difficult to determine, in advance, just how much the customers would be willing to buy at any given price, particularly if economic conditions are changing.

Many different methods are utilized by business firms in an effort to ascertain consumer attitudes and preferences. These methods include opinion polls, market research studies on a local, regional, or national basis, studies of past experience with variations in prices for similar products, and various other techniques for forecasting the prospective level of business activity and in-

come. On the basis of such information as is available, supplemented by his own experience or "hunches," the businessman must make some sort of forecast of the demand for his own product to serve as a guide in formulating production plans, purchasing materials and supplies, hiring labor, and setting or revising the price of the product to be turned out.

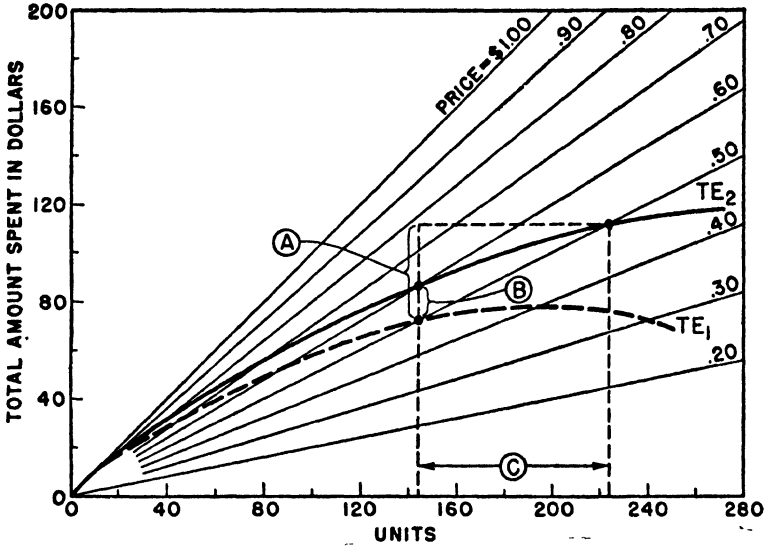

FIGURE 3. CHANGE IN TOTAL EXPENDITURES CURVE, REFLECTING CHANGE IN DEMAND

A represents increase in total amount that would be spent if price remained unchanged at $.50; *B*, increase in total amount that would be spent if price were raised and quantity sold were held the same; *C*, increase in quantity that could be sold if price remained unchanged at $.50.

Sometimes the sales organization for the firm will prepare two forecasts of demand, one representing the most optimistic and the other the most pessimistic estimates that can reasonably be made in the light of the information available at the time the forecasts are made. The two total expenditures curves, TE_1 and TE_2, in Figure 3 might be taken to represent the pessimistic and optimistic forecasts of expected consumer expenditures and purchases at various possible prices. Plans might then be made on the assumption that actual consumer purchases and expenditures at the various possible prices would fall somewhere between these limits.

It should be noted that from the standpoint of the business firm the consumers' total expenditures curve for the product offered by

the firm constitutes its own expected *total sales revenue curve.* It represents the best estimate that can be made of the quantities of the firm's product that the customers would take at various possible prices, and the corresponding amounts of total revenue that could be expected to accrue to the firm from the sale of the product at any price that might be chosen. In discussing the pricing and production policy of the firm, the term *total sales revenue* will be used to indicate that consumer demand is being considered from the business firm's point of view. Thus, the total expenditures curves of Figure 3, TE_1 and TE_2, may also be regarded as estimated total sales revenue curves, and in subsequent figures such curves will be identified by the symbol TR.

On the basis of its forecast of the consumers' demand for its own product, the management of the firm must decide what volume of output would be most advantageous to produce and what price would be the "best" to choose. If a low price were chosen, it would probably be possible to sell a larger quantity of product than if a higher price were set, and the total sales revenue might be greater at the lower price. Whether a high price and a low volume of sales would be better from a profit standpoint than a lower price and a larger volume depends in part upon the responsiveness of demand (as reflected in estimated total sales revenue) and in part upon the costs of producing the product.

Presumably the firm would not sell at a loss if that could be avoided. Presumably, also, some particular combination of price and sales volume would afford the largest possible prospective profit under current demand and cost conditions. The formulation of production and pricing policy therefore involves a consideration of both the estimated demand for the product and the cost structure of the firm itself. The cost aspect of the problem will be dealt with in the following chapter.

Limitations on the producer's freedom to set prices

The initiative in setting the price or prices at which goods are sold lies with the seller (the merchant or manufacturer) in the great majority of cases. But the range within which the price may be set is often narrowly limited by a variety of factors affecting the demand for the product, and therefore the expected total sales revenue curve for the firm. In some instances the merchant or the manufacturer has virtually no choice at all, but finds that the

price is determined by circumstances entirely beyond his own control.

Take, for example, a retailer who is selling a popular brand of women's hosiery. It is common for the manufacturers of such hosiery to stipulate the retail price at which the brand may be sold, and to utilize the provisions of state and federal Fair Trade laws to prevent deviations from the specified price. In that event, the retailer's volume of sales will depend entirely on the willingness of consumers to buy from him at the stipulated price rather than from other retailers offering the same merchandise at the same price.

Or suppose that the retailer, in order to achieve some freedom in pricing, should elect to purchase an equivalent quality of hosiery and sell it under his own brand name, as many large department store and mail order organizations have done. Even so, it may prove inexpedient to establish a price substantially higher or lower than the prices fixed for widely advertised and popular brands. If the price set by the retailer for his own brand were higher, many customers would prefer to buy the widely advertised brands. As a consequence, his volume of sales and total sales revenue would be limited. If his price were set substantially lower, consumers who take price as an indicator of quality would be hesitant to buy, at least until experience had convinced them that the quality was satisfactory. Moreover, a change in the prices at which other brands were offered would react upon his own volume of sales at any given price. One purpose of brand advertising is, of course, to build up consumer acceptance of, and loyalty to, familiar brands, and to reduce the inclination to shift from brand to brand in response to moderate changes in the relative prices of different brands. The effect of advertising, if successful, is to raise the total sales revenue curve and make it less subject to adverse changes if the prices of other brands are altered.

In general, the more closely the brands or kinds of goods offered by different firms resemble one another in use, appearance, and quality, from the standpoint of consumers, and hence are good substitutes for one another, the narrower is the range within which any particular seller is free to set his own price. The extreme limiting case is presented by the comparatively rare situation in which a large number of sellers offer identical goods to the same body of customers, and there are no other considerations, such as

convenience, differences in credit terms, or variations in the quality of services provided, that would cause some customers to prefer to buy from one seller rather than another. In such a situation, any significant difference in price would lead all the customers to attempt to buy from the seller who offered the goods at the lowest price, and to purchase nothing from those who asked higher prices. No significant difference in price could persist for any length of time; all of the sellers would be forced to sell at the same price if they wished to sell at all. Such a situation is commonly described as a case of *pure competition.* There are, however, few examples of pure competition in real economic life, although in some branches of agriculture conditions approaching those of pure competition may be found.

At the opposite extreme is the almost equally rare situation of the seller for whose product there are no acceptable substitutes. In such a case, prospective buyers would have no alternative source of supply; if they wished to purchase the commodity in question, they would of necessity deal with the single supplier. Under such circumstances the seller might have a fairly wide range of choice in setting the price. But there are comparatively few commodities for which some sort of substitute does not exist. And even where there are no substitutes capable of serving the same purposes, consumers still have limits beyond which they are unwilling to go in purchasing particular kinds of goods. Thus, an attempt to exact a very high price would tend to reduce total sales revenue for the seller. The case in which there are no close substitutes for a particular firm's product is commonly referred to as the case of *pure monopoly.*

In technical economic literature, an elaborate classification of "market forms" has been developed to aid in identifying and analyzing the principal types of market situations that are encountered in real economic life. The most common situations, however, are those described by the terms *oligopoly* and *monopolistic competition.*

The word *oligopoly* literally means "a few sellers." It is used to describe the situation in which the number of rival firms offering the same type of goods to the same group of buyers is so small that each firm has to take careful account of the reactions of its rivals to any change in its own price and production policy. The term is commonly employed in analyzing a situation where the

rival sellers are few in number, whether the products turned out are identical, or similar to each other but differentiated to some degree by branding, advertising, and other methods of product identification. The steel industry may be taken as an example of an industry in which a few major producers are turning out virtually standardized products. The automobile industry is an example of an industry in which a few major producers are turning out clearly differentiated, but still closely substitutable, products.

The term *monopolistic competition* is usually applied to the situation in which many firms are offering closely related, but not identical, products to the same group of buyers. The term suggests that there is an intermixture of some elements of competition (because of the relative ease of substitution of products on the part of the buyers) with some elements of monopoly (ability to pursue a somewhat independent pricing policy within limits set by consumer loyalties). Many kinds of consumers' goods are produced and sold under conditions of monopolistic competition, familiar examples being packaged foods, drugs, cosmetics, and other branded and widely advertised wares.

In formulating price and production policies, the business firm is inevitably concerned with the prospective demand for the product to be turned out. It is with this phase of the producer's problem that this chapter has been concerned. But before a decision can be reached as to the price to be set and the production schedule to be established, it is necessary also to consider what costs would be entailed in production. Only with that information also at hand would it be possible to determine what price and output would probably be most profitable. The next chapter will turn to the other side of the picture and investigate the problems of supply and costs of production, as they present themselves to the businessman or enterpriser.

Chapter 2

SUPPLY AND COSTS OF PRODUCTION

The Meaning of Supply

The meaning of the term *supply,* as commonly used in economic analysis, is correlative with that of the term *demand. Supply* stands for the quantities of a given product that an individual seller or group of sellers would be prepared to offer for sale within a given period of time at each of several possible prices. A supply schedule for a given commodity may therefore be thought of as expressing a functional relationship between possible prices for a commodity and the rates at which that commodity would be offered for sale at a given time, other things being equal.

In comparatively few cases, however, is it possible to think of the supply of a commodity as being determined independently, or without direct reference to the prevailing conditions of demand. In the great majority of cases, apart from the comparatively rare examples of pure competition, it is not possible to determine just what quantities of a given product would be offered for sale by each of several different producers at different possible prices by referring solely to the costs that would be incurred in production by each of the producers. Under conditions of monopolistic competition, for example, each of the rival producers has a group of customers who are more or less firmly attached to his own product. And although some of them would shift to other suppliers if there were a significant difference in price as between substitute brands, each supplier has some range of freedom in picking his own price. The actual choice of a price will depend on a simultaneous consideration of the estimated demand of the customers for the par-

ticular brand in question and of the prospective costs of turning out the product.

Having selected a price, each firm will ordinarily be prepared to deliver whatever quantity of goods its customers choose to purchase at that price. On the basis of actual sales experience, a given firm may decide that it would be advantageous to raise the price, even though that might reduce sales somewhat. Or it may appear expedient to reduce the price in an effort to increase the sales volume and total sales revenue of the firm. But there is, literally, no specific quantity that the firm would be prepared to offer, at a given time or at a given price, without reference to the demand for its own product. That is what is meant when it is said that the supply offered by a particular firm is not independently determined. Such a firm, under conditions of monopolistic competition, has something of a market of its own and possesses some degree of freedom in formulating its own price and production policy. To be sure, the "markets" of the various sellers may overlap a great deal, and the possibilities of substitution may be so numerous as to impose strict limits on the pricing policy of each firm; but still the initiative in pricing lies with the seller in each case, and therefore each must necessarily take the demand conditions into account.

Herein lies the chief difference between the usual demand situation and the usual supply situation. Only occasionally is the buyer of consumers' goods in position to take the initiative in naming the price. Usually the price is set by conditions beyond the control of the individual buyer, and his decision, therefore, is confined to determining how much of a commodity he would be willing to take at any given price. If the price were high, he might take nothing; if it were low, he might purchase a considerable quantity; but whatever he may decide to do as an individual will ordinarily have a negligible influence on the prevailing price. Thus for the individual buyer and for buyers as a whole, the demand for the product is not directly affected by, or does not react to, the conditions of supply.

Only under conditions of pure competition, with numerous sellers offering identical goods to the same group of buyers, is the *individual* seller powerless to influence the price of the product by his own actions. Only under such conditions, therefore, is the

action of the *individual* supplier limited to determining how much of the product it would be to his advantage to offer for sale at a price set by forces beyond his own control. And only under such conditions is it feasible to think of either the supply by the individual firm, or the supply offered by the entire group of sellers, as being independently determined. Only under conditions of pure competition is there a *group* of sellers facing a *group* of buyers under circumstances such that no individual in either group can, by his own action, influence the prevailing level of prices. Only under such circumstances is the level of market price determined *impersonally* by the interplay of market forces.

But, as was noted in the preceding chapter, there are few instances, in real economic life, of markets in which the conditions of pure competition are fully realized. In reality, then, the discussion of supply is largely concerned with an analysis of the role which a consideration of production costs will ordinarily play in the formulation of price and production policies of individual firms, whatever the market conditions under which the finished product may be sold.

Costs of Production

The term *cost* is used in various ways in economic literature. For some purposes it is significant to think of costs as representing the efforts and sacrifices entailed in producing goods that people want. This sense of the word is most appropriate when people are engaged in providing goods and services for their own use, or when the living standards of people in different communities or countries are being compared.

Suppose that a family decides to raise vegetables or fruit for its own use. Then the cost of producing the crop includes more than the amounts spent for seed, fertilizer, and insecticides. It includes also the effort expended by the members of the household in preparing the ground, planting, cultivating, and harvesting the crop, and preserving that crop for future use. To an enthusiastic gardener, the effort involved might seem to be nothing but healthful recreation, whereas to another it might appear to be unadulterated drudgery. Obviously, the cost in terms of effort or sacrifice might be quite unequal in the two instances, even though the time spent

and the crops produced were identical. And in neither case would the cost of a can of peas be the same as the cost of an equivalent can of peas to the person who preferred to do his gardening at the shelves of the chain store.

Actually, there is no satisfactory way of measuring the "real" costs of production in terms of the efforts and sacrifices incurred by different people in producing the same kind of goods. Such a conception of cost has little significance in explaining the processes of price determination in a modern economy.

Another sense in which the term *cost* is often used is that of *opportunity cost* or *alternative cost.* The opportunity cost of producing one commodity is the necessity for giving up something else in order to produce it. Suppose that the amateur gardener is also an enthusiastic fisherman. If he chooses to spend his leisure time in fishing, he cannot raise a garden. In that event, the opportunity cost of the fish that he catches is the garden produce that he otherwise could raise. Here again difficulties arise in any effort to measure opportunity costs. Nevertheless, the concept helps to cast light on many problems of choice that arise in the course of economic life. Some of these applications will become apparent at a later stage in the analysis.

Money Costs of Production

For the business firm or enterprise, the most important concept of cost is *money cost of production,* that is, the money outlays (or their equivalent) that are necessary in order to produce goods destined for sale in the market. It is in this sense that the term *cost* will be used in this and in ensuing chapters, unless there is a clear indication to the contrary.

The money costs of production, from the standpoint of the individual producing firm, include all the outlays that must be made in order to carry through the productive activities in which the firm is engaged. If the firm is engaged in retailing, its money costs include outlays for the purchase of goods, for the employment of clerical and sales staffs, for the conduct of store operations, and for the myriad other processes connected with retail distribution. If the firm is engaged in manufacturing, the money costs include all the outlays that must be made for raw materials or component parts, fuel, labor and supervision, the use of plant buildings and

machinery, and the sale of the finished product to jobbers or wholesalers or to whatever group of buyers comprises the immediate market for the product.

At this point, however, certain difficulties arise. Some of the outlays that must be incurred in order to carry on production depend more or less directly on the amount of output to be turned out each day, or each week, or each month, whereas others do not. More raw materials and more labor, for example, might be required to turn out a large output than would be needed for a small output. A decision to expand production schedules would entail greater expenditures for raw materials and for certain types of labor. But within limits, an expansion of output would require no increase in the amount of machinery in place, no expansion of the plant building, no increase in the number of foremen or office staff, and perhaps no increase in the sales force. Conversely, a reduction in output would reduce the total outlays necessary for raw materials and for certain types of labor, but might not permit a reduction in supervisory or office staff, or the disposal of a part of the plant and machinery. It thus appears that certain costs of production tend to increase or decrease *in total amount* as output is increased or decreased, whereas other costs of production tend to vary only slightly *in total amount* as output is changed within comparatively wide limits.

This difference in the behavior of different types of production costs is of very great significance for the individual business firm. Its recognition leads to a broad distinction between two categories of cost: (1) *variable costs* and (2) *fixed costs* of production.

Variable costs and fixed costs

Variable costs of production include all elements in cost that tend to increase or decrease *in total amount* as output is increased or decreased, within the limits of existing plant capacity. *Fixed costs* of production include all elements of cost that tend to remain constant *in total amount* as output is increased or decreased, within the limits of existing plant capacity.

It is difficult in practice to draw a sharp line of distinction between these two broad types of cost, and many items required for production are partly variable and partly fixed. Although labor costs may be thought of as largely variable, the employer might be reluctant to lay off certain types of labor in a period of reduced

production because of possible difficulties in getting the laborers back when production schedules are stepped up again at some later date. Or if a machine breaks down, the wages of the machine operator are temporarily a fixed cost while the machine is being put back in running shape. Moreover, there are instances in which just one man with a certain type of skill or ability is needed, and there is little chance of partially "firing" him. Half of a sales manager, for example, might be less desirable than no sales manager at all.

By the same token, costs that are "fixed" at a certain time may become "variable" over a period of time. If the demand for the product is increasing, more and more output may be produced in the already existing plant. But a point may be reached where the existing plant facilities are being crowded to the limit. Any further expansion of production would require the purchase and installation of more machinery, the enlargement of plant buildings, the employment of a larger administrative and supervisory staff, the expansion of the sales organization, and so on. At such a time, the "fixed" costs also increase in total amount and hence become variable with output, at least while plans for expansion are being considered and executed.

Although the distinction between fixed and variable costs may sometimes be blurred, it is still important to recognize the fact that at any given time some elements of cost are fixed in total amount, and some are variable, as output is increased or decreased. This fact is of major significance for the analysis of the processes of price determination.

"Out-of-pocket" versus calculated costs

One other point must be kept in mind in discussing the money costs of production for the individual firm. That point is that some of the costs of current production involve immediate cash outlays or "out-of-pocket" expenditures, whereas others are merely calculated money costs that do not necessarily involve any immediate cash expenditures. Much of the physical plant and machinery employed in production is durable and, if properly maintained, may be utilized for many years. The plant building may last for half a century before it has to be replaced, and much of the machinery likewise may have a service life of ten, twenty, or thirty years. The cost of using this durable plant and equip-

ment in any one year, or in any one month or week, will be only a small fraction of the total investment involved.

This means that the money cost of using the plant facilities for current production will often not be an actual money outlay, but merely a calculated figure to account for the wear and tear or *depreciation* of the plant facilities in the process of production, together with some sort of a return on the investment tied up in the existing productive facilities.

The calculation of an adequate provision for the use of the plant and equipment is the task of the accountant, involving estimates of expected service life, the possibility of obsolescence, and other considerations. Failure to make adequate provision for depreciation would understate the current costs of production and might involve the enterprise in ultimate losses. An excessive allowance for depreciation, and for similar calculated elements in cost, would overstate current costs of production and understate the profits on current operations. Such calculated costs for the most part are not substantially altered by changes in the current rate of production, and hence are normally included in "fixed" costs.

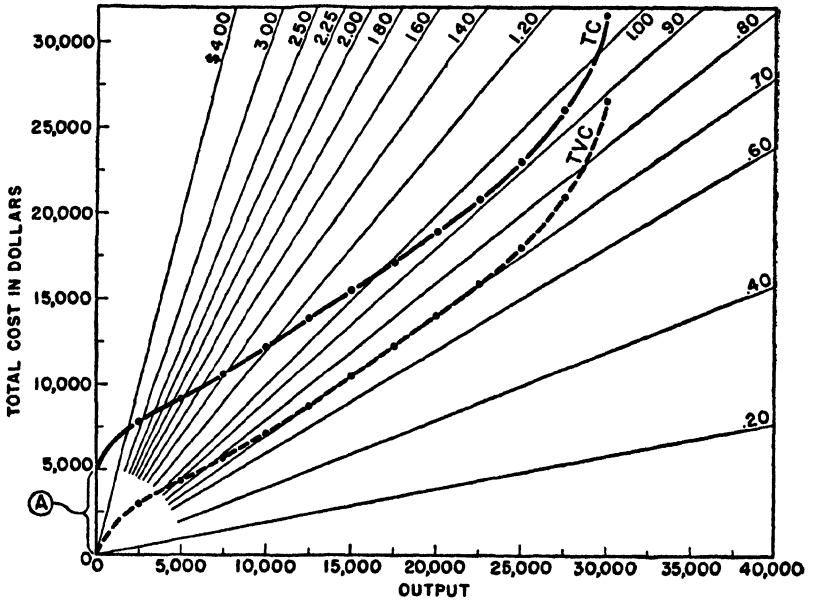

FIGURE 4. TOTAL COST AND TOTAL VARIABLE COST CURVES

A represents the assumed fixed cost of $5,000.

Graphic Analysis of Costs

With the foregoing distinction between variable and fixed costs in mind, it is possible to construct a graphic picture to show how changes in output would affect the total costs of production for the individual business firm. Such a graphic analysis is presented in Figure 4.

In Figure 4, the construction is much the same as in Figures 2 and 3 in Chapter 1, except that in this figure total costs are plotted against total output, instead of total consumer expenditures or total sales revenue against quantity sold. The quantity of output is measured on a scale on the base line (abscissa), and the total cost of production for each amount of output is plotted against the ordinate scale. The total cost of production is broken down into two major components: (1) total variable cost and (2) total fixed cost. It is assumed that the figures presented represent a month's operations. The data used in the construction of Figure 4 are set forth in Table 2.

TABLE 2

TOTAL VARIABLE, TOTAL FIXED, AND TOTAL COSTS, AVERAGE VARIABLE AND AVERAGE COSTS

(Data for Figures 4 and 5)

Output	*Total Variable Cost (TVC)*	*Total Fixed Cost (TC)*	*Total Cost (TC)*	*Average Variable Cost (AVC)*	*Average Cost (AC)*
2,500	$3,000	$5,000	$8,000	$1.20	$3.20
5,000	4,100	5,000	9,100	.82	1.82
7,500	5,400	5,000	10,400	.72	1.39
10,000	7,000	5,000	12,000	.70	1.20
12,500	8,750	5,000	13,750	.70	1.10
15,000	10,500	5,000	15,500	.70	1.03
17,500	12,250	5,000	17,250	.70	.99
20,000	14,000	5,000	19,000	.70	.95
22,500	15,750	5,000	20,750	.70	.93
25,000	18,000	5,000	23,000	.72	.92
27,500	21,200	5,000	26,200	.77	.95
30,000	26,400	5,000	31,400	.88	1.05

Look first at the curve in Figure 4 that is labeled *total variable cost (TVC)*. It originates at the zero point or origin and slopes

upward to the right, indicating that increased output would involve increased *total* outlays for labor, raw materials, power, and the other variable factors of production. Note also that at the lower end, and also at the upper end, the curve bends rather sharply, but that the mid-section is virtually straight.

The curvature at the lower end reflects the fact that with a given size of plant it is difficult to maintain efficiency at very low levels of output, inasmuch as essential machines have to be manned whether they are working continuously or not. The curvature at the upper end of the graph reflects the fact that when the plant is being operated under "forced draft" it is also difficult to maintain full efficiency. When all machines are being operated continuously it is difficult to make repairs or to carry on normal maintenance activities, and to see that the mechanical equipment of the plant is "balanced up" so that bottlenecks do not develop in certain processes, thus impairing the flow of work through the plant as a whole. If a further expansion of output is attempted by putting the plant on a multi-shift basis where one-shift or two-shift operation is normal, it is also often difficult to maintain full production schedules on the third shift. Under such circumstances the total variable cost of production may rise more rapidly than output as production schedules are pushed to high levels. In fact, one may say that the "capacity" of a plant is represented by the level of output at which the total variable cost of production begins to rise sharply as output is increased.

But how about total fixed cost of production? By definition, fixed costs are elements in total cost that do not vary significantly as output is varied. Suppose that such elements in cost (depreciation, minimum return on investment, supervision, and general administrative and sales expenses) amount to $5,000 per month. Even if the plant were shut down temporarily, these expenses would continue without significant change. This fact can be shown on the graph by plotting a point on the ordinate scale at $5,000, which indicates that even though output were zero, $5,000 in expenses would still be incurred. (See point *A* on the graph.) From this point another curve is drawn in, labeled *total cost* (*TC*), each point on this curve being plotted $5,000 higher than the corresponding point on the total variable cost curve (*TVC*). This simply represents the fact that the total cost of producing any specified quantity of product will be equal to the sum of the total

variable cost of producing that output, plus the total fixed cost, namely $5,000. *Total cost is equal to total variable cost plus total fixed cost.*

This method of showing the effects of changes in output upon total costs of production is widely used in industry as a guide to managerial decisions. It represents the first step in the construction of a *break-even chart,* a device first introduced about forty years ago by Dr. Walter Rautenstrauch as an industrial management technique.[1]

Graphic determination of average costs from the chart

The preceding section has shown how total costs of production tend to vary as output is increased or decreased. But often the business management is interested in figuring the *average cost* of production, that is, how much it would cost per unit of product turned out, if the plant were operating at various levels of production.

Obviously, the average cost of production is equal to the total cost of production divided by the number of units of product turned out. However, it is possible to estimate the average cost of production (and also the average variable cost) directly from the graph, without any arithmetical calculations. Such estimates are made possible by including in the graph itself a series of *cost radials,* which are constructed in precisely the same way as were the price radials of Figures 2 and 3 in the preceding chapter.

Suppose that 20,000 units of product were being turned out. An inspection of the chart indicates that the total cost of producing 20,000 units would be approximately $19,000, and that this point on the total cost curve lies about halfway between the $.90 and the $1.00 cost radials. The *average cost* of production might therefore be estimated at about ninety-five cents. Carrying through the actual division gives the computed average cost as ninety-five cents (19,000/20,000 = $.95).

The *average variable cost* of producing 20,000 units may be estimated in the same way and with about the same degree of accuracy. The total variable cost curve shows the total variable cost of producing 20,000 units of product to be approximately $14,000. That point on the curve lies directly on the $.70 cost radial.

[1] See page 48.

Hence the average variable cost may be estimated to be about seventy cents. Although the calculations of average and average variable cost could be as easily performed by mental arithmetic for the examples given above, the graphic method of estimation is convenient if a rough measure of such costs is desired for odd quantities of output, such as 7,700 units, or 8,400 units, or 16,700 units.

It is interesting to calculate (or estimate) the average cost and average variable cost of production for different levels of output, particularly in the middle and upper ranges of output, and to plot these figures in the form of an average cost graph, such as is presented in Figure 5. In this chart the abscissa scale again measures quantity of output (per month), but the ordinate scale now represents average variable costs and average costs rather than total variable and total costs.

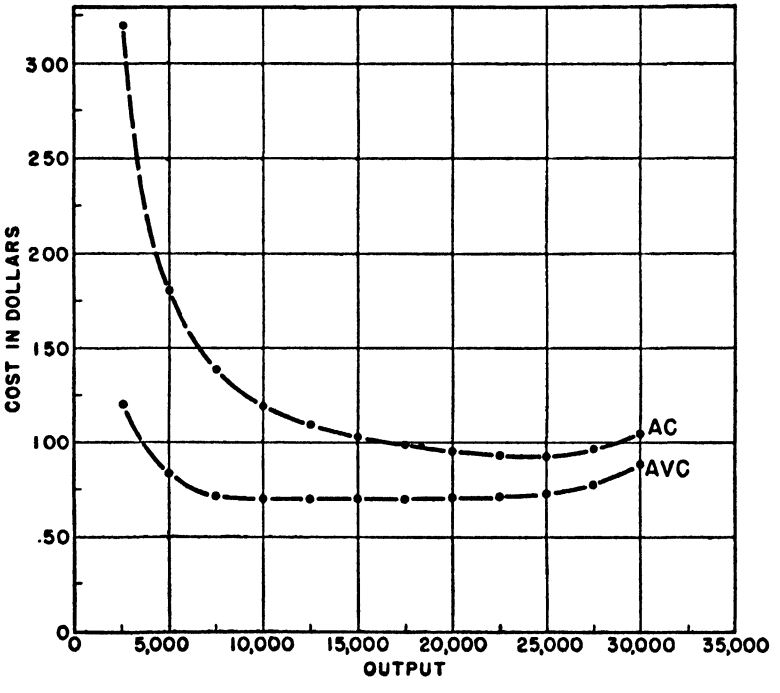

FIGURE 5. AVERAGE VARIABLE COST AND AVERAGE COST CURVES

Note that the average variable cost drops as output is increased from very low levels, remains comparatively low over a certain

range of output, and then rises sharply as output approaches plant capacity. Average cost, however, continues to decline over a wider range of output than does average variable cost, and bends upward as capacity is approached, but not as sharply as does the average variable cost curve. Note that the two curves in fact tend to approach each other as output is increased. This is true because the total fixed cost ($5,000) does not change as output is increased. Consequently, the *average fixed cost* tends to decrease as output is increased. For example, if 10,000 units were being produced, the average fixed cost would be fifty cents per unit, whereas if 20,000 units were being produced, the average fixed cost would be only twenty-five cents.

The difference between average cost and average variable cost represents average fixed cost, and as total fixed cost is "spread" over more units, the difference becomes smaller and smaller; therefore, the average cost curve and the average variable cost curve tend to approach each other.

Inasmuch as average fixed costs do tend to become smaller as output is increased, it is normally to the advantage of the firm to operate at a high level of production. However, it may not be possible to reach that level of operations, particularly in periods when the demand for the product falls short of what was expected at the time the plant was built and the level of "fixed" costs established. It is possible to determine what price and volume of production would be most advantageous to the firm only by considering *both* the current conditions of cost (as reflected in the total cost curve) and the current conditions of demand (as reflected in the expected total sales revenue curve). This analysis will be carried forward in Chapter 4.

Before passing to the discussion of the formulation of pricing and production policy, it is desirable to consider briefly how the pattern of total cost would be affected by changes in certain of the components of total cost. Specifically, how would the total cost of production be affected by (1) an expansion of plant facilities, involving an increase in total fixed costs, (2) an increase in the generally prevailing prices of raw materials or in wage rates, or (3) an increase in raw-material prices or in wage rates that was a direct result of an increase in output by the particular employing firm? Each of these possible changes in conditions will be considered in turn.

Increase in total fixed costs resulting from plant expansion

Suppose that the management of the firm were to decide to expand the plant facilities by adding a new building and installing additional machinery and equipment. This expansion would involve an added investment, increased provision for depreciation, and other added costs of administration and supervision. Suppose that these additional fixed costs amounted to $5,000 per month, increasing the total fixed costs from $5,000 per month to $10,000.

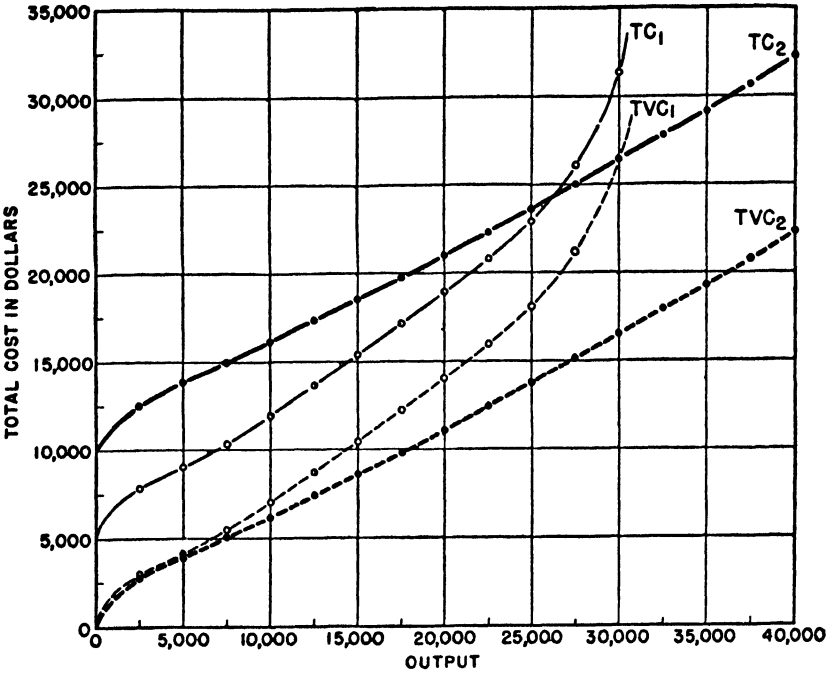

FIGURE 6. CHANGES IN COSTS ACCOMPANYING CHANGE IN INVESTMENT

This would have the effect of pushing the origin of the total cost curve upward from $5,000 to $10,000, and would also tend to raise the total cost curve all along the line. But with the new plant facilities it is probable that the labor force could be redeployed and used more effectively, particularly at higher levels of production. It is reasonable to suppose, therefore, that the total variable cost of producing any given output would be altered somewhat, and that output could be carried to considerably higher levels

before total variable costs would tend to increase sharply. In other words, the plant capacity would normally be greater than before the expansion of plant was undertaken.

This situation is depicted numerically in Table 3 and graphically in Figure 6, in which the first total variable cost curve, TVC_1, is the same as the total variable cost curve of Figure 4, and the total cost curve, TC_1, is also the same as the total cost curve of Figure 4. The second total variable cost curve, TVC_2, reflects the change in total variable costs attributable to the increase in plant facilities, and the second total cost curve, TC_2, takes account of the increase in total fixed costs from \$5,000 to \$10,000 per month.

TABLE 3

CHANGES IN COSTS ACCOMPANYING INCREASE IN INVESTMENT

Output	*Total Variable Cost*	*Total Fixed Cost*	*Total Cost*	*Average*	*Average Cost*
2,500	\$2,500	\$10,000	\$12,500	\$1.00	\$5.00
5,000	3,900	10,000	13,900	.78	2.78
7,500	5,000	10,000	15,000	.67	2.00
10,000	6,100	10,000	16,100	.61	1.61
12,500	7,250	10,000	17,250	.58	1.38
15,000	8,500	10,000	18,500	.57	1.23
17,500	9,750	10,000	19,750	.56	1.13
20,000	11,000	10,000	21,000	.55	1.05
22,500	12,375	10,000	22,375	.55	.99
25,000	13,750	10,000	23,750	.55	.95
27,500	15,125	10,000	25,125	.55	.91
30,000	16,500	10,000	26,500	.55	.88
32,500	17,875	10,000	27,875	.55	.86
35,000	19,300	10,000	29,300	.55	.84
37,500	20,700	10,000	30,700	.55	.82
40,000	22,400	10,000	32,400	.56	.81
42,500	24,500	10,000	34,500	.58	.80
45,000	27,800	10,000	37,800	.62	.84
47,500	33,000	10,000	43,000	.69	.91

Note that the second total variable cost curve lies below the first, particularly for the upper range of output, at which the smaller plant would have been working near its capacity. Note also that the second total cost curve, TC_2, lies *above* the first total cost curve, TC_1, for low and intermediate levels of output, but below TC_1 at higher levels of output. If it were expected that the normal out-

put of the plant would fall in the intermediate range, the smaller plant would be preferable, for the total cost of producing any output in that range would be less with the smaller plant than with the larger one. But for higher levels of output the larger plant would have an increasing advantage over the smaller one. In this range of output the total (and average) variable cost would be less with the larger plant than with the smaller one, and this would more than offset the greater total (and average) fixed cost of production.

It is thus apparent that any decision as to the size of investment to be made in fixed plant and equipment must be based on the forecasts of the firm with respect to the probable demand for the product and the volume of production that is likely to be called for. If the demand for the product is incorrectly forecast, the firm may find itself operating with a plant that is either too small or too large to achieve the maximum gains from its operations.

Effects of increased raw-material prices or wage rates

Suppose, as the second case, that there is no change in plant facilities or equipment, so that the total fixed cost remains the same as in the original example, namely $5,000 per month. Raw-material prices, however, have gone up, and wage rates for labor likewise, the increase in each case amounting to about 10 per cent. This situation is illustrated numerically in Table 4 and graphically in Figure 7. In this case the total variable cost curve, labeled TVC_2, would rise more steeply than would the original total variable cost curve, labeled TVC_1. (TVC_1 is identical with the TVC curve of Figure 4 and with the TVC_1 curve of Figure 6.) The steeper slope of TVC_2 reflects the increased amounts payable for raw materials and wages, which obviously will increase the total variable cost of producing any given output in more or less direct proportion. In other words, a general increase in raw-material prices and in wage rates will tend to swing the total variable cost curve upward, assuming that there is no change in the physical efficiency with which the materials and labor are employed. By the same token, the total cost curve, TC_2, would exceed the new total variable cost curve, TVC_2, at all points by $5,000, or the amount of the total fixed cost. Thus TC_2 would also rise more steeply throughout its length than would the original total cost curve, TC_1.

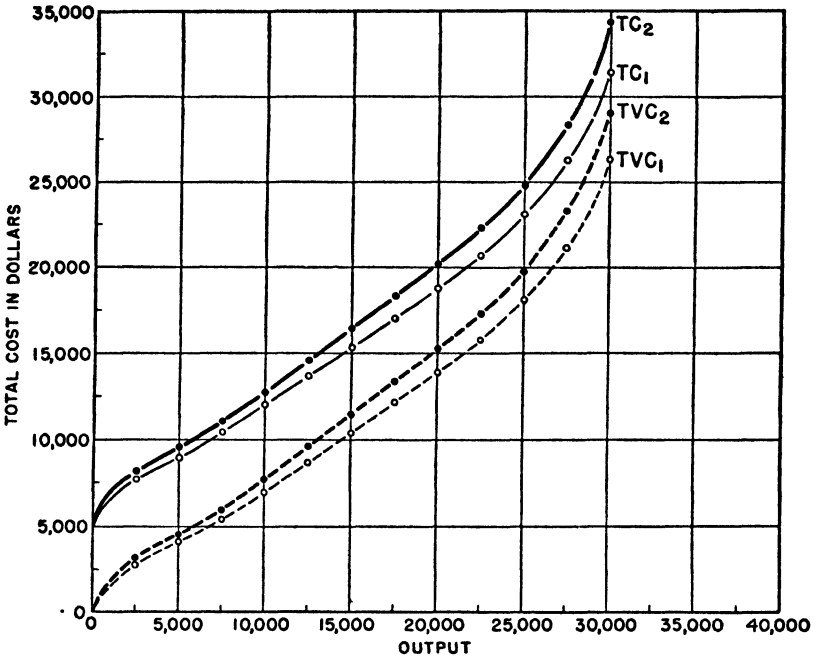

FIGURE 7. CHANGES IN COST RESULTING FROM INCREASES IN FACTOR PRICES

Effects on total costs when factor prices react to the volume of employment by the particular firm

Another situation occasionally arises in which an employer finds that an expansion in the output of the firm (without any change in plant facilities) would involve the payment of higher prices to obtain additional raw materials, or higher wages to attract additional labor, needed for the production of the additional output. Suppose that the plant had already been operating two shifts a day, and it is proposed to add a third shift to step up production. In recent years it has been a common requirement of union contracts that workers employed on a third shift be paid a premium rate. Time-and-one-half rates are also commonly stipulated for overtime work beyond the basic day or the basic week. Also, attempts to recruit additional workers often involve the offering of higher wages to induce them to commute or move from adjacent communities, or to hire them away from other employers. Under such circumstances as these, an expansion of output may involve considerably more than proportionate increases in total costs. Such increases differ from those discussed in the preceding section in

that they arise only if output is expanded, and they would not occur if the increase in output were not attempted.

This situation is illustrated graphically in Figure 8, in which TVC_1 and TC_1 are the same as the corresponding curves in Figures 4 and 6. The second set of total variable cost and total cost curves,

TABLE 4

CHANGES IN COSTS ACCOMPANYING CHANGES IN FACTOR PRICES

A. *Data for Figure 7:*

Output	*Total Variable Cost Before Change* (TVC_1)	*Total Variable Cost After Change* (TVC_2)	*Total Cost After Change* (TC_2)
2,500	$3,000	$3,300	$8,300
5,000	4,100	4,510	9,510
7,500	5,400	5,940	10,940
10,000	7,000	7,700	12,700
12,500	8,750	9,625	14,625
15,000	10,500	11,550	16,550
17,500	12,250	13,475	18,475
20,000	14,000	15,400	20,400
22,500	15,900	17,490	22,490
25,000	18,000	19,800	24,800
27,500	21,200	23,320	28,320
30,000	26,400	29,040	34,040
32,500			
35,000			

B. *Data for Figure 8*—TVC_2 is the same as TVC_1 above except for the following range of output:

22,500		$15,900	$20,900
25,000		18,800	23,800
27,500		24,000	29,000
30,000		29,000	34,000

TVC_2 and TC_2, represent the situation in which raw-material costs and wage rates are bid up progressively as output is increased beyond a certain critical level. The two sets of curves coincide for low and intermediate ranges of output, but TVC_2 and TC_2 rise above TVC_1 and TC_1 respectively beyond a point which may be thought of as representing the change from a two-shift to a three-shift basis. Inasmuch as total fixed costs are assumed to be un-

changed as output is increased, the spread or difference between the total variable cost curve, TVC_2, and the total cost curve, TC_2, remains the same throughout, namely $5,000.

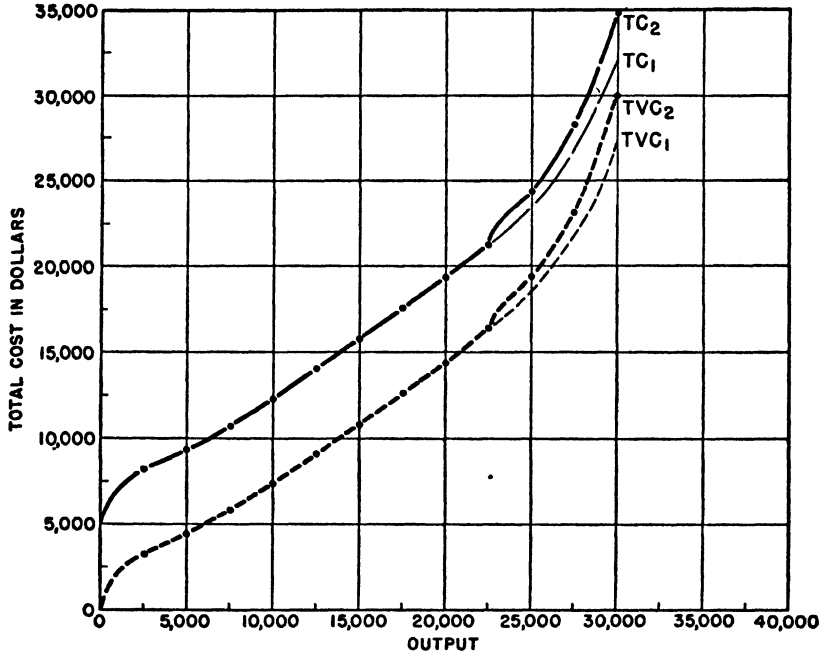

FIGURE 8. CHANGES IN COSTS DUE TO INCREASE IN PRODUCTION SCHEDULES

Composite situations

It is unlikely that in reality any one of the changes in cost conditions just discussed would occur in isolation, that is, unaccompanied by changes of the other types. Thus, a more realistic picture would be one that showed some change in aggregate fixed cost, combined with some changes in variable costs, as output was either increased or decreased. Such changes would be reflected in some raising of the total cost curve as output was increased, together with some reduction of its slope over certain ranges of output (reflecting gains in efficiency due to increased plant investment) and some steepening of its slope over the higher ranges (reflecting the bidding up of raw-material prices and wage rates needed to turn out the additional output). Just how important each of these possible effects upon total cost might be would be

difficult to determine in advance; thus, some element of guesswork attaches to forecasts of future costs of production, just as it attaches to forecasts of demand for the product.

Other Problems of Cost: Multiple Products, Joint Products, and Cost Allocations

Thus far it has been assumed that the business firm is engaged in producing a single product, so that all expenses incurred can appropriately be allocated to that one kind of product. Frequently, however, the firm is engaged in producing several, or perhaps hundreds of, different products. The same administrative staff, the same factory building, and perhaps much of the same machinery and labor force may be employed in producing several different products. How are the total fixed costs of production to be allocated to the various items turned out in such a plant? How are the raw-material costs and the labor costs to be apportioned? How are sales expenses to be distributed?

Many different techniques have been employed by cost accountants and others in trying to answer questions such as these. One common method of distributing overhead expense is to make an allocation based on the relative values or sales revenues derived from the various products. To a certain extent it is possible to determine what raw materials and what percentage of labor time are devoted to different lines of product, and to make an allocation of such expenses on that basis. Nevertheless, at best, a considerable element of judgment and arbitrary allocation is unavoidable. The primary intent, in any case, is to obtain some sort of an estimate of total costs to provide a basis for determining the price and production policy to be applied to each of the different products turned out.

A special case arises occasionally in which the production of one commodity involves *by-products* or *joint products.* In many copper mines, for example, traces of silver occur along with the copper ore. Thus it happens that silver is frequently recovered as a by-product in the process of producing metallic copper, the quantity of silver produced being determined by the quantity of copper that is produced. If copper production be regarded as the primary activity of the firm, and if the processing costs be allocated to the copper that is produced, then the costs of silver production are

negligible, except for such additional processes as may be necessary to isolate the silver. But should all the costs of processing be allocated to the copper produced? Here again there is room for considerable difference of opinion and practice, resulting in corresponding differences, from one firm to another, in the estimated total costs of producing each of the joint products.

In the public utility field the problem of joint cost is frequently encountered. It is necessary to have electric power plants with sufficient generating capacity to meet the peak load of demand for service, which may occur during certain hours of the day and early evening. During the night, however, industrial, commercial, and residential lighting and appliance loads decline, and part of the generating facilities are not needed. Yet the cost of the fuel needed to keep the plant running to capacity is very small, and hence the direct or variable cost of providing additional electric energy in off-peak hours may be a fraction of a cent per kilowatt-hour. The utility plant is in position to provide a large quantity of off-peak energy as a joint product to the energy provided at the peak. This situation is sometimes described as a case of *time-jointness.*

To build up off-peak loads, many utility companies have offered separately metered energy to residential customers and others for water-heating and other power-consuming uses at very much reduced rates, on condition that timing clocks or other control devices be installed to prevent the use of power for such purposes except during off-peak hours. Here again it is apparent that the calculation of the costs of providing off-peak service as contrasted with on-peak service poses many interesting and often perplexing problems. These problems carry over into the determination of the pricing policy to be followed in dealing with different commodities or services that are joint in character.

Chapter 3

PRICE FORMATION

Methods of Pricing

Impersonally determined market prices

In the past, the processes of price determination have often been treated chiefly in terms of market pricing under conditions now described by the term *pure competition*, with the implication that this was the "normal" pricing situation. In this analysis it was assumed that the number of firms producing and selling a particular commodity in a given market was sufficiently large that no one of the firms would be in position to provide a substantial part of the total market supply. With freedom on the part of the buyers to shift their purchases from one supplier to another—if any advantage could be gained by doing so—it would be impossible for any individual seller to charge a higher price than was asked by any other supplier because, if he did, he would be unable to make any sales.

The price, under such circumstances, would be established, by the interplay of the forces of market demand and supply, at whatever level would just equate the total quantity demanded and the total quantity offered by the entire group of sellers. At any higher price, the quantity demanded by the potential buyers would be less than the quantity offered by the suppliers, and competition among the latter would force the price down toward the *equilibrium* level. At any price lower than the equilibrium price, the quantity demanded by the potential buyers would exceed the quantity offered by the sellers, and competition among the buyers to obtain the goods that they desired would force the price up to

the equilibrium level. The price, under such circumstances, would be impersonally determined, or *market determined*, rather than set by the "price policy" of any particular seller or group of sellers, or of any particular buyer or group of buyers. A graphic illustration of price determination in a purely competitive market is presented in Figure 9.

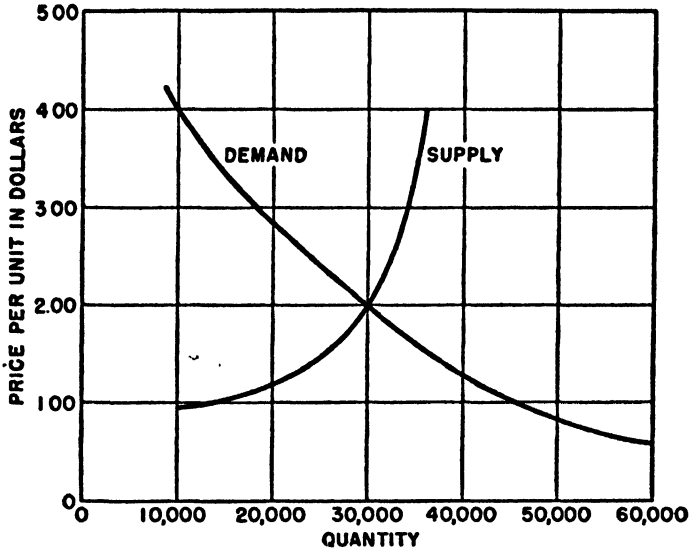

FIGURE 9. PRICE DETERMINATION IN A PURELY COMPETITIVE MARKET

Market-determined prices are not only impersonally determined prices but they also tend to be *flexible* prices, in the sense that they are free to move upward or downward from day to day or from week to week, in response to changes in demand or in supply conditions, to whatever extent is necessary to equate the quantities demanded and offered for sale at any given time.

In few segments of the present-day American economy is it possible to find examples of prices determined under conditions approximating those of pure competition. The great agricultural staples, wheat, corn, cotton, livestock, and the like, were commonly cited in the past as examples of purely competitive, market-determined pricing and production. Such commodities are produced on hundreds of thousands of farms, and there is no way of distinguishing the wheat or corn produced on the Smith farm from

wheat or corn of the same grade produced on the Jones farm, or on thousands of other farms. There is no way in which Jones could command a higher price for his wheat than could be obtained by any other farmer producing the same grade of wheat, and if Jones were to withhold his entire output from the market, it would not make an appreciable dent in the total quantity of wheat of that grade that was offered for sale. Conversely, if Jones were to double his production of wheat, the increase in his own output would not appreciably increase the total quantity offered for sale, and so would have a negligible influence upon the market price. Thus, all that Jones could do, in making his plans for a particular year, would be to forecast as best he could the probable price at harvest time, and operate accordingly. If he thought that the price would be high, in relation to costs, he would plan for a larger crop. If he thought that the price would be low, he might plan to cut his wheat production and shift a part of his acreage into some other crop. In either case, however, he had to take the price as he found it; he could exercise no personal initiative in determining the price. His discretion was limited to determining what output to attempt to produce, in the light of his expectations as to the probable market price.

But even for the staple agricultural commodities, the situation has been altered in the past two decades by the development of measures to "stabilize," or at least to "support," the prices of basic agricultural commodities. In the early 1930's, cooperative marketing organizations for several of the major agricultural commodities, with the backing of the Federal Farm Board, attempted with relatively little success to prevent a drastic decline in prices by withholding a part of the total production from the market. After 1933, the Agricultural Adjustment Administration in turn attempted to raise the prices of "basic" agricultural commodities by various measures, including crop controls, marketing arrangements, and the withholding of "surplus" production from the market by means of loans to finance the storage of a part of the crop or by outright purchase. Thus the prices of agricultural commodities can no longer be regarded as purely "market determined"; but to the extent that they are determined or influenced as a matter of policy, the initiative lies in the first instance with the government, rather than with the producers.

"Administered" prices

In the great generality of cases, the initiative in setting prices lies with the seller. This is true in retail and wholesale trade, in the services and in the professions, and in most branches of manufacturing. It is true also of the production of many basic raw materials or commodities such as copper, steel, lead, chemicals, lumber of many types, cement, petroleum, and the like. There are, however, great differences in the ways in which the prices of different commodities are "set" or chosen by sellers in different branches of trade or industry. A brief review of some of the different ways in which prices may be set will help to put the subsequent discussion of pricing and production policy in proper perspective.

It is chiefly at the retail trading level that the flow of goods and services produced in the economy reaches the ultimate consumer, and therefore the pattern of retail pricing is of major significance in relation to ultimate consumer demand. Studies of the pricing of consumers' goods and services have disclosed many different ways in which different types of consumers' goods are commonly priced.

Many "convenience" goods are priced largely on a conventional basis, as, for example, the newspaper or the five-cent candy bar. Another technique is described by the term *in-line pricing;* that is, a particular seller may set the price on a certain item or service by "shopping" adjacent stores to see what prices they are getting for comparable merchandise, and then establishing his own price in line with theirs. For many widely advertised consumers' goods the retail price is set by the manufacturer under state and federal Fair Trade laws. For such items the retailer has no freedom of choice with respect to the price at which he will sell the items in question.

In many branches of retail trade, it is customary to set retail prices by adding a conventional *mark-up* to the wholesale price of the goods to cover the costs of store operation. Such mark-ups vary greatly from one type of merchandise to another and often appear to be established by convention or custom rather than by any precise calculation based on the costs of operation in the particular store. Mark-ups tend to be larger on types of merchandise, such as furniture, that ordinarily have a slow "turnover." Mark-

ups on goods that have a high unit value are frequently smaller than on goods having a lower unit value, but that is not always true.

In the women's apparel field *price-lining* is a widely followed pricing practice. There are certain well established price lines or brackets in which dresses are sold—$3.98, $4.98, $5.98, $8.98, $11.98, and so on. In selecting merchandise the buyer chooses items that will "go" in a particular price line, taking into account the normal mark-up for the particular type of garment and also the percentage of *mark-downs* that will be necessary to clear out slow-moving items at the end of the season. Price-lining is not confined to the apparel field by any means, for many examples may be found even in the merchandising of such durable goods as refrigerators, radios, and washing machines.

No attempt to list representative examples of the diversity of pricing techniques would be complete without a reference to the *loss-leader*—an item priced on a very narrow margin, and sometimes even below invoice cost, in order to attract customers to the store. In some states resort to this pricing technique is limited by laws forbidding "selling below cost."

In industry the variety of pricing techniques is nearly as great as in the field of retail trade. Usually the manufacturer has to deal with a smaller number of items than does the average retailer, and so he is frequently in position to give more consideration to the pricing of a particular item. In some lines, particularly the manufacture of specialized industrial equipment, in which the product is designed and manufactured to meet the special requirements of the buyer, the price is established by negotiation. Standard types of equipment, however, may be priced on the basis of production costs and offered for sale at regularly listed prices.

Consumers' durable goods, such as automobiles, refrigerators, washing machines, stoves, and other appliances, are often produced in a variety of models to sell to the ultimate users in fairly well defined price lines or brackets. Often a "standard" or "competitive" model is produced to sell at the bottom price bracket, it being left to the ingenuity of the salesman to switch as many customers as possible from the stripped model to the more elaborately trimmed and more expensive "de luxe" offering. In many fields in-line pricing is a practical necessity for the particular manufacturer, because he cannot hope to maintain sales volume if his

price deviates substantially from the prices established by other manufacturers whose products, in the eyes of the ultimate buyers, are of approximately the same quality as his own.

Whatever techniques are employed in setting prices, so long as the initiative in establishing those prices lies with the seller the price may be said to be *administered.* This term has often been used in a way that suggests the sinister: that administered prices in some way involve the abuse of a strategic position enjoyed by the seller, or the exploitation of the consuming public generally. Yet as a practical matter it is difficult to see how business could be carried on if manufacturers or wholesalers or retailers did not announce the prices at which they are prepared to sell their wares. Indeed, few people would find it convenient to trade if every purchase involved a process of negotiation, as in an Oriental bazaar.

Actually, the real point at issue is not the way in which prices may be established, but the conditions that in particular instances may put particular business firms or groups of firms in position to exploit strategic advantages or to wield a substantial element of monopoly power. Of perhaps even greater importance is the fact that where the initiative in pricing lies with the sellers, a whole complex of considerations may impede, if not prevent, price changes that appear to be necessary to preserve balance between different segments of industry or that conform to changes in general business conditions. The objection, in other words, is not so much to the way in which prices are initiated, but to the type of price and production behavior that is often associated with administered pricing.

Organizational influences in pricing

From what has already been said it is apparent that prices are not set in a vacuum. Each business firm must formulate its pricing policy and set prices in the light of what is known about its "own" market. This market includes the buyers who are accustomed to trade with the firm, or who possibly may be induced to do so. In a particular trading area or in a particular industry each of the rival sellers or producers may be thought of as having a market of its own, which, however, may touch or overlap the markets of other sellers or producers. Unless the products turned out and offered for sale by the various firms are completely alike, moderate variations in relative prices would not result in a com-

plete transference of trade from one supplier to another. In a technical sense, each of the firms may be said to have a monopoly in its own market, but that monopoly is tempered, in the great majority of cases, by the possibility of shifting patronage on the part of the buyers. This is the significance of the term *monopolistic competition.* No one seller can afford to get very far out of line with his rivals, because to do so may involve a serious loss of trading volume.

If the number of rival sellers is small, then each one may become highly conscious of the interaction of the pricing policies of the several members of the group. If one firm should reduce its price in comparison with the others, it might thereby achieve a significant increase in sales volume. But the other firms, in turn, would experience significant losses of sales, as a consequence of the shifting of customers, and might therefore feel compelled to make countervailing price adjustments to halt the shift. Under such circumstances it is possible for a price war to develop, with alternating price cuts being made by the various rivals in an effort to maintain (or increase) their respective "shares" of the "market." Such a price war may achieve such proportions, and drive prices down so far, that the prospective profits of the participants are reduced below the level at which they stood before the reductions were initiated. Long experience has engendered in businessmen a deep fear of the consequences of price warfare. There is a corresponding inclination to anticipate the reactions of business rivals to price change and to avoid anything that might touch off an explosive chain reaction in the pricing field. At times this desire to avoid "too much" competition may lead to informal agreements among the "competitors." This simply means that price-making, like any other human activity, is not carried on in isolation, but is a social process. And even though the business firm undertakes to formulate its own policies independently, it seldom can do so without giving some consideration to the prices prevailing for similar products and to the probable attitudes of its business rivals.

Not infrequently the practice of "price leadership" develops in an industry, particularly if there are one or two outstanding firms in the industry. In such a case the smaller firms commonly pattern their own prices on those established by the "leader," with perhaps minor variations to reflect differences in the popular acceptance of their products as compared with those of the dominant

firm. In the steel industry, the United States Steel Corporation was for many years the recognized leader, and other firms customarily quoted prices that conformed closely to those announced by Big Steel. Where such a pricing practice is followed, there is relatively little price competition among the rival firms, although at times "price-shading" or concealed price-cutting assumes substantial proportions. For the most part, however, competition is chiefly in speed of delivery and in various forms of service.

If business firms wish to maintain their prices in line with those of rival firms (either to assure themselves of a share of the total sales volume or to avoid unintentional price competition and its attendant hazards), it is important that they know what those prices are. Very often trade associations have undertaken to collect and disseminate to their members trade statistics that will enable the members to keep track of current prices. It may, however, be difficult to determine just what prices are being charged, particularly for commodities involving relatively high transportation costs for delivery to the point of use.

In a number of basic industries, particularly those producing heavy and relatively standardized products, such as steel, cement, lead, lumber, and the like, it has been a common practice for all the firms to sell on a delivered-price basis, the delivered price being calculated by taking the "base" prices currently in force at a number of key points or "basing points" and adding to each base price the rail freight charges from the corresponding base to the point of delivery. The price actually quoted would then be the lowest combination of base price plus transportation, even though the firm quoting the price might actually make delivery from a plant located elsewhere than at one of the basing points. So long as this practice was observed by all of the rival producers, each one could quote prices with reasonable assurance that no other producer would undersell in dealing with any particular customer or group of customers. Thus, competition was put largely on a service or "nonprice" basis, and price competition was likely to occur only surreptitiously or as an accident.

Although it has been strenuously maintained in industrial circles that the basing-point system of pricing was a "natural" evolution and not established or maintained by agreement among the producers concerned, it was condemned by the Supreme Court of the United States in 1948 as a violation of the antitrust laws. The

court took the position that although an individual firm might sell its product on whatever basis it chose, the adherence of all the firms to a systematic procedure of price quotation set the stage for the elimination of price competition by price leadership or by agreement, and hence was contrary to public policy as expressed in the antitrust laws.

Much more highly organized controls of pricing and production have been not uncommon in the annals of American industry. These include price agreements and pools, under which the various firms in an industry agree among themselves on the prices to be charged, and perhaps on the output to be produced by each firm. At times, firms holding important patents have incorporated provisions covering prices and production in licenses granted to other firms to operate under the patents, thereby achieving some measure of organized control of the entire industry. Many of the devices employed have been condemned by the courts as violations of the antitrust laws. As a consequence, there has been a marked trend over the years toward the outright consolidation of once separate firms into large single enterprises, it being thought that the legal status of such combinations was less doubtful than that of the looser types of combination.

It is not to be inferred that the sole reason for the growth of large corporate enterprises through the process of corporate consolidation or merger has been the desire to eliminate competition. But the fact remains that the growth of large corporate enterprise has resulted, in many industries, in the reduction of the number of rival firms to the point where strategic considerations of the sort discussed previously are likely to deter aggressive price competition on the part of any of the rivals.

In this chapter an attempt has been made to sketch briefly some of the principal ways in which prices may be arrived at in different segments of trade and industry, and to suggest the role that considerations of business strategy may play in the formulation of the price policies of rival firms. But prices are only a means to an end. If the business firm is to prosper, it must find a price that will afford a volume of sales and a total sales revenue that compare favorably with the total cost of producing the corresponding quantity of output. The following chapter, therefore, will be devoted to the analysis of pricing and production policy as related to the prospective demand for the product of the firm

and to the prospective costs of production. Inasmuch as the great majority of business enterprises operate under conditions which leave the initiative in price determination in the hands of the firm itself, primary emphasis will be placed upon the problems of price and production policy that present themselves to the firm under such circumstances. Only brief reference will be made to the problems facing the firm operating under conditions of pure competition.

Chapter 4

PRICE AND PRODUCTION POLICY

The Basic Problem

It is commonly assumed in economic analysis that business activity is motivated primarily by the desire for gain or profit, and that price and production policies of business firms are formulated in an effort to achieve the maximum profit possible under prevailing conditions of demand and cost, as appraised by responsible business managements. This view is in accord with the attitude frequently assumed by hard-boiled businessmen who say that they are not in business for their health. There may, however, be a considerable difference between maximizing immediate profit opportunities and achieving maximum gains for the enterprise over the long pull, that is, over the "planning horizon" of responsible management. Many examples exist of business firms that have refrained from exploiting immediate profit opportunities to the utmost.

Thus far, little systematic study has been directed to the motivation of business decisions; indeed, grave difficulties are likely to beset such a study. But it seems clear that increased emphasis must be placed upon elements in motivation other than the desire for profits. These motives may include the attainment of prestige, the maintenance of a position of security for the enterprise that has already "arrived," the protection of capital investment in the enterprise, and many considerations of long-range business strategy.

Nevertheless, it also seems clear that no responsible business management would willingly or for long undertake to operate at

a loss if that loss could by any legitimate means be avoided. Thus, although it may be an oversimplification of the problem to say that business policies are constantly framed in an effort to maximize profits, it can be said with some degree of confidence that an effort will be made to maintain a profit position if at all possible, and to conduct business operations in such a way as to more than "break even." To understand what this means it is appropriate to turn to a device that is widely used as a guide to managerial decisions in industry, the break-even chart, by which it is possible to bring together the basic information in the light of which price and production policies must be formulated.

The Break-Even Chart as a Guide to Pricing and Production Policy

Construction of the break-even chart

Break-even charts of several different types are widely used in industry.[1] Figure 10 is an adaptation of one of the simplest types of break-even chart. It is constructed by bringing together, in a single graph, a total sales revenue curve similar to the one presented in Figure 2 of Chapter 1 and a total cost curve similar to the one presented in Figure 4 of Chapter 2. For the cost and revenue data used in Figure 10 see Tables 2 and 4A, pages 24 and 50.

The abscissa scale represents units of output (and sales) while the ordinate scale represents total sales revenue and total costs in terms of dollars. Note that the total sales revenue curve, labeled *TR,* starts at zero (since there would be no sales revenue if no goods were produced and sold) and slopes upward to the right. In Figure 10 it is assumed that the firm in question is operating under conditions of monopoly or monopolistic competition and that at any given time, unit sales could be increased only by reducing the price. This assumption is reflected in the gradual leveling out of the total sales revenue curve. The total cost curve, labeled *TC,* on the other hand, originates at $5,000 (representing total fixed costs, which would exist whether any goods were produced

[1] Many references to break-even analysis can be found in trade journals for the steel, automotive, and other industries. Interesting explanations of the uses to be made of this type of analysis may be found in *Fortune* for February, 1949, and in *Modern Industry* for December 15, 1948. See also Walter Rautenstrauch and Raymond Villers, *The Economics of Industrial Management,* Funk & Wagnalls Co. (1949).

or not) and slopes upward to the right. The slope of the total cost curve becomes increasingly steep as output approaches plant capacity, for reasons outlined in Chapter 2.

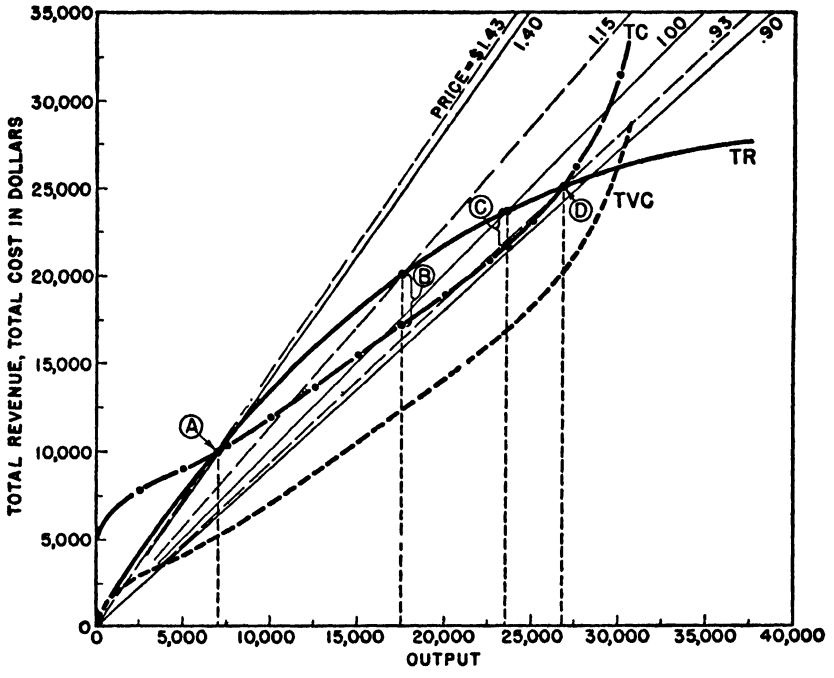

FIGURE 10. PRICING BY THE INDIVIDUAL FIRM

A represents lower break-even point; *B*, maximum profit position; *C*, a profit position, but not maximum profit; *D*, upper break-even point.

For very low levels of production, total sales revenue would be insufficient to cover the total cost of producing the corresponding volume of output, even though the price at which that output could be sold were quite high. (The price at which any quantity of output could be sold, under the current demand conditions, is represented by the *price radial* that cuts the total sales revenue curve at a point corresponding to the output in question.) A glance at the chart will show that at an output of about 7,000 units the total sales revenue of $10,000 (represented by the height of the total sales revenue curve, *TR*) would be just equal to the total cost of producing that output (represented by the height of the total cost curve, *TC*). At that output, the total sales revenue curve cuts or intersects the total cost curve; therefore, 7,000 units

of product is the *break-even output* under the demand and cost conditions assumed. (See point *A*.) A change either in demand or in costs would alter the total sales revenue curve or the total cost curve and hence would alter the break-even output or the *break-even point.* Under the conditions here assumed, the price at which the break-even output could be sold can be estimated with a fair degree of accuracy by seeing what price radial cuts the total sales revenue curve nearest to the point representing an output of 7,000 units. In this case, the nearest price radial is the one labeled $1.40, and therefore the price at which 7,000 units could be sold may be estimated at $1.42. By calculation it proves to be $1.43 (*i.e.*, $10,000/7,000 = $1.43).

TABLE 4A

CHANGES IN TOTAL SALES REVENUES ACCOMPANYING A CHANGE IN DEMAND

(Data for Figures 10, 11, 13, 14, 17, and 18)

Output That Could Be Sold (units)	*Before Change in Demand*		*After Change in Demand*	
	Price	*Total Sales Revenue*	*Price*	*Total Sales Revenue*
2,500	$1.70	$4,250	$1.98	$4,950
5,000	1.50	7,500	1.70	8,500
7,500	1.41	10,600	1.58	11,800
10,000	1.35	13,450	1.50	15,000
12,500	1.28	16,000	1.42	17,800
15,000	1.21	18,150	1.36	20,400
17,500	1.15	20,000	1.30	22,750
20,000	1.08	21,500	1.27	25,200
22,500	1.02	23,000	1.21	27,250
25,000	.97	24,300	1.16	29,000
27,500	.92	25,300	1.11	30,500
30,000	.88	26,250	1.05	31,500
32,500	.85	27,000	1.04	34,000

At a price of $1.43, then, the firm would just break even. At any higher price, the total cost of producing the output that could be sold at the higher price would exceed the total sales revenue, and the firm would be involved in a loss. At a price less than $1.43, a larger quantity of product could be sold, and total sales revenue would exceed the total cost of producing the output that could be sold, as is indicated by the fact that the total sales revenue

curve, *TR*, lies above the total cost curve, *TC*, for the range of output from about 7,000 units to about 26,700 units. (See point *D* on the graph.) Beyond an output of about 26,700 units, the total cost curve, *TC*, would again rise above the total sales revenue curve, *TR*, and the production and sale of more than that quantity of output would also entail losses.

As a practical matter, therefore, the problem facing the management of the concern is to determine, as nearly as possible, what price and quantity of output and sales would afford the greatest spread or difference between total sales revenue, as represented by the *TR* curve, and total cost of production, as represented by the *TC* curve. The output at which this spread would be greatest can be determined with reasonable accuracy by comparison of the two curves to ascertain where they are farthest apart. In this case the spread would appear to be greatest (and profits therefore at a maximum) with an output and sales volume of approximately 17,500 units per month. The price at which that output could be sold would be about $1.15 per unit (as estimated by reference to the nearest price radial) and total sales revenue would be about $20,000. The total cost of producing 17,500 units would be about $17,250, and the total profit would be about $2,750. (See points *B* on the graph.)

If a lower price were chosen, say $1 per unit, the total sales revenue would be still greater (approximately $23,500, indicated by the point at which the $1 price radial cuts the *TR* curve), but the total cost of producing the 23,500 units that could be sold at that price would be about $21,750, and hence the total profit would be reduced from about $2,750 to about $1,750. (See points *C* on the graph.) And if a still lower price of approximately $.93 per unit were chosen, the total sales revenue of about $25,000 would be just equal to the total cost of producing the 26,700 units that could be sold at that price. (See point *D* on the graph.)

This illustration has assumed a somewhat greater degree of precision in the information available to the firm with respect to demand conditions, and perhaps also with respect to cost conditions, than is to be found in most real situations. Nevertheless, even though precise information is lacking, the management of the firm must estimate its demand and cost conditions as best it can, and if

the curves of Figure 10 be regarded as reflecting these estimates, then it is at least possible to say that the choice of price and output would fall somewhere in the range between the lower and upper break-even points, with the "best" choice lying somewhere in the middle. In this case, a choice of $1.15 would give a close approximation to maximization of profits under the assumed demand and cost conditions.

Relation to "marginal" analysis of price determination

The approach to the price and production combination that would afford maximum profits to the firm, under given market conditions, is very often expressed in terms of the relationship between *marginal* cost and *marginal* revenue. The marginal cost of production represents the increase in total cost that would accompany a small increase in output, and is represented, approximately, by the upward slope of the total cost curve over a small range corresponding with the range of output under consideration. The marginal revenue represents the increase in total sales revenue that could be obtained from the sale of a small additional quantity of output, assuming that the price of the product were readjusted to whatever extent appeared necessary to sell the additional output. The marginal revenue is represented, approximately, by the slope of the total sales revenue curve over a small range corresponding with the range of output under consideration.

A glance at Figure 10 will show that the spread between the total cost curve, *TC*, and the total sales revenue curve, *TR*, is greatest (and therefore profits are at a maximum) when the output is such that the upward slopes of the two curves are parallel to each other. At that point a small increase in total output would increase total sales revenue and total cost by equal amounts, so that total profit would be neither increased nor decreased. At any smaller total output, a small increase in total output would increase total sales revenue more than it would increase total cost, and therefore would result in an increase in total profits. At any still larger total output, a small increase in total output would increase total sales revenue by a smaller amount than total cost, and therefore would tend to reduce total profit.

This analysis may be summed up by saying that the firm in question would maximize its profits by producing the output at which the marginal cost and marginal revenues are equal—that is, the

output at which the slopes of the total sales revenue and total cost curves are the same.

Effects of a Change in Demand Unaccompanied by Changes in Costs

Suppose that the demand for the product turned out by the firm were to increase, perhaps as a consequence of increased incomes at the disposal of customers, or a skillful advertising campaign, or for any other reason, and that this change in demand were regarded as more than temporary. Whatever the cause, it becomes apparent that the customers would be willing to buy a larger quantity of the product, at each of the possible prices, than previously. Demand for the product has shifted positively, and the total sales revenue curve will be altered correspondingly.

How may such a shift in demand affect the firm's price and production policy? Will it be advantageous to keep the price unchanged and simply sell the larger quantity that the customers are willing to take at that price, or will it appear preferable to raise the price somewhat and expand output and sales volume somewhat less?

Many considerations may enter into the decision in such a case. The management may feel that an increase in price, although of immediate profit advantage, would have adverse effects in the long pull. Many customers might be irritated by the price increase, particularly if it did not appear that production costs had increased, or had not increased sufficiently to justify the price increase. Or, if the price increase were to result in a very obvious increase in profits for the firm, other firms in related fields of production, or completely new firms, might be led to offer closely competitive products. The offering of such substitutes might have the effect, in time, of attracting away some of the customers, and therefore of causing a reduction or negative shift in the demand for the product of this particular firm, the effects of which would be unfavorable in the long run. Such *strategic* considerations may lead the firm to refrain from taking full advantage of every opportunity to maximize *immediate* profits.

With these reservations in mind, it can be seen how an increase in demand would affect the break-even chart for the firm under consideration, assuming that there are no significant changes in

raw-material prices or other variable costs of production, so that the cost situation remains virtually the same as it was before the shift in demand occurred. Figure 11 represents these assumed conditions. (For the cost and revenue data used in Figure 11 see Tables 2 and 4A.) In this figure the total cost curve, TC, is the same as in Figure 10. The effect of the shift in demand is represented by the inclusion of a second total sales revenue curve, labeled TR_2, which rises more steeply than did the original total sales revenue curve, TR_1, and continues to slope upward over a greater range of output before leveling off toward a maximum. This simply means that at each possible price (represented by the successive price radials) a larger quantity of product could be sold than before. For example, the \$1.15 price radial cut the original total sales revenue curve, TR_1, at an output of about 17,500 units; it cuts the new total sales revenue curve, TR_2, at an output of about 25,700 units.

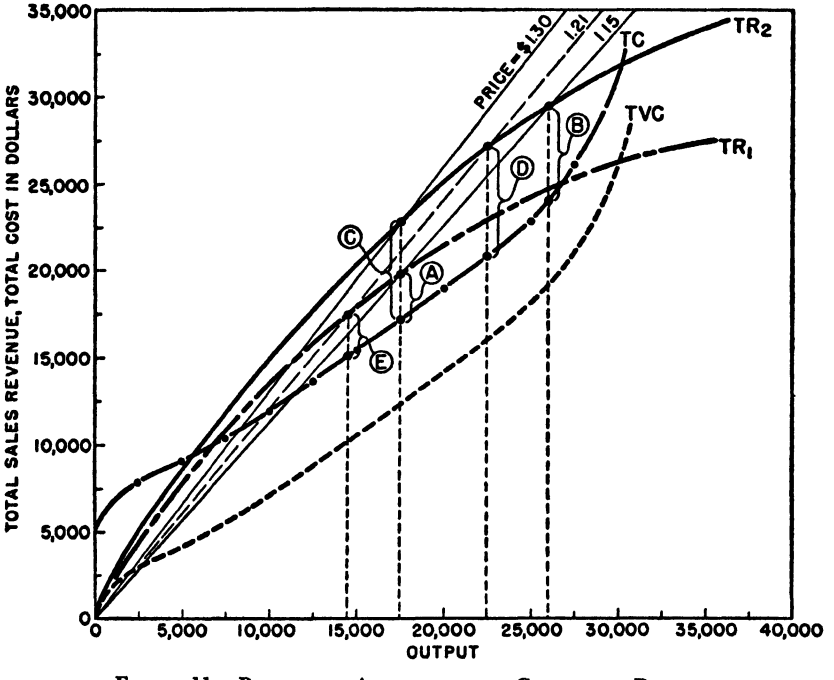

FIGURE 11. PRICING AS AFFECTED BY A CHANGE IN DEMAND

A indicates maximum profit position under original demand conditions; *B*, profit under increase in demand, if no change in price; *C*, profit under increase in demand, if price is raised; *D*, maximum profit position under increase in demand; *E*, profit if demand is decreased to original level, with no change in price from *D*.

Suppose that the firm were to maintain the price of the product unchanged at \$1.15, which would have afforded maximum profits of about \$2,750 under the original demand conditions. (See points *A* on the graph.) Under the new conditions, the sale of 25,700 units at that price would bring in a total sales revenue of approximately \$29,500 (as indicated by the height of the TR_2 curve at an output of 25,700 units). The total cost of producing that quantity of product (indicated by the height of the total cost curve, *TC*), would be about \$24,000, leaving a total profit of about \$5,500. (See points *B* on the graph.) Approximately the same total profit could also be attained, under the new demand conditions, by holding the production and volume of sales constant at about 17,500 units and raising the price from \$1.15 to about \$1.30. This procedure would give a total sales revenue of about \$22,750, as compared with a total cost, for 17,500 units, of about \$17,250, leaving a total profit of about \$5,500. (See points *C* on the graph.) The largest possible profit, under the new demand conditions, would be attained by raising the price to about \$1.21. At this price, about 22,500 units could be sold, with a total sales revenue of about \$27,250 and a total cost of about \$20,750, giving a total profit of approximately \$6,500. (See points *D* on the graph.)

The manufacturer would have to decide whether the additional profits that would result from raising the price from \$1.15 to \$1.21, as compared with those that could be obtained by holding the price unchanged at \$1.15, would be worth while, in view of the disturbance of the price structure that would result and the resentment that might be built up among the customers. No gain, however, would be achieved by raising the price above \$1.21. Thus the price range within which price may be changed, as a consequence of a change in consumer demand, may be quite narrow, as long as cost conditions are not changing at the same time.

Suppose that demand were to decrease rather than increase. The effects of such a *negative* shift in demand may be visualized by assuming that the total sales revenue curve, TR_2, represents the "original" situation as viewed by the manufacturer, and that the lower total sales revenue curve, TR_1, represents the new situation prevailing as a consequence of the shift. Assume that the price had been set initially at \$1.21, which under the "original" demand conditions would have afforded maximum profits of \$6,500. (See points *D* on the graph.) If the manufacturer were to maintain this

price unchanged in the face of the decline in demand, it would be necessary to cut back production and sales from 22,500 units to about 14,500 units, which would bring in a total sales revenue of about $17,500. The cut-back in production would reduce total costs to about $15,000, leaving a total profit of about $2,500. (See points *E* on the graph.) It would be possible to gain a larger total profit by reducing the price from $1.21 to $1.15 and selling an output of about 17,500 units. This would give a total sales revenue of $20,000, a total cost of $17,250, and a total profit of about $2,750. (See points *A* on the graph.)

Again it would be necessary to decide whether the slightly greater profit that might be achieved by reducing the price would be sufficient to offset the disturbing effects of the price reduction. Such a reduction would doubtless be welcomed by the customers. But if it led them to think that perhaps still larger reductions might be made later, they might be stimulated to hold off in buying, with the effect of reducing still further the current demand for the product. There is also the possibility that the reduction in price might stimulate other manufacturers of similar products to reduce their prices, with the chance that a price war would result. Hence, strategic considerations might stand in the way of a price reduction, even though some improvement in immediate profit position might appear to be possible if that step were taken.

Effects of Changes in Costs

Change in variable costs not accompanied by a change in demand

Turn now to the other side of the picture and examine the effects of changes in manufacturing costs, assuming that there are no changes in demand occurring at the same time. Certain raw-material prices may have gone up, or higher wage rates may have been established in the course of negotiating a new labor contract covering the workers employed in the plant. Such changes would tend to steepen the slope of the total variable cost curve, as was indicated in Chapter 2. How would such changes in variable costs tend to alter the price and output policy of the manufacturer?

Suppose that the increase in total variable costs is about 10 per cent. The effect of this change is reflected, in Figure 12, by the steeper slope of the total cost curve, TC_2, as compared with the

original total cost curve, TC_1. (For the cost and revenue data used in Figure 12, see Tables 4 and 4A. The TC_1 curve is the same as the TC curve in Figures 10 and 11.) [2]

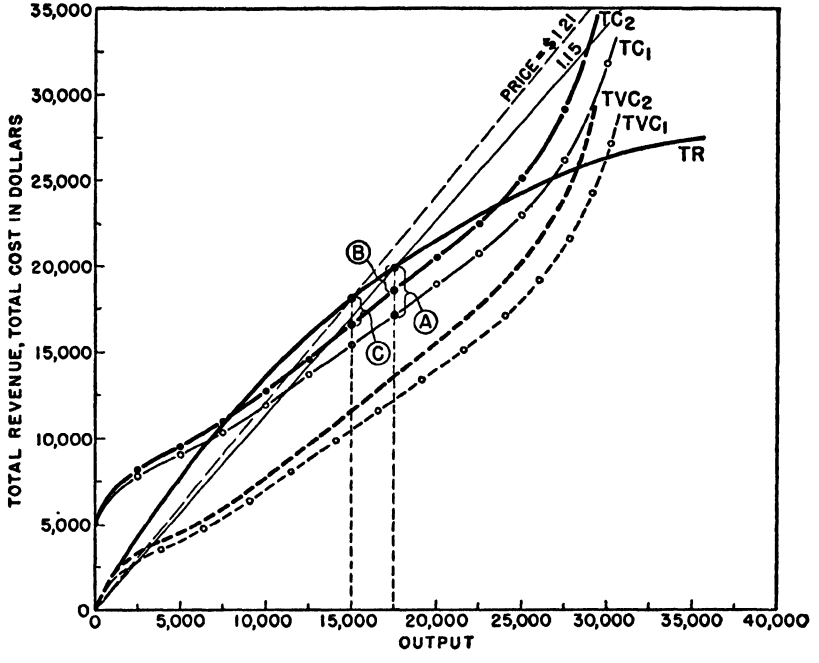

FIGURE 12. PRICING AS AFFECTED BY A CHANGE IN VARIABLE COSTS

A indicates maximum profit before change in cost; *B*, profit after change in cost, if price is held unchanged; *C*, maximum profit position after change in cost, with price and output readjusted.

Before the increase in costs occurred, the manufacturer would have obtained the largest possible profit by setting the price at $1.15. At that price about 17,500 units could have been sold, with a total sales revenue of about $20,000, a total cost of about $17,250, and a total profit of about $2,750. (See points *A* on the graph.) As a result of the increase in raw-material prices and in wage rates, the total cost of producing 17,500 units would be increased to about $18,500. This would cut the total profit, on that output, to about $1,500. (See points *B* on the graph.)

No possible change in output and price could restore profits to the original level as long as demand conditions remained the same. However, it would appear, from a comparison of the new total cost

[2] The TC_1 and TC_2 curves are also the same as the TC_1 and TC_2 curves of Figure 7 in Chapter 2.

curve, TC_2, and the total sales revenue curve, TR, that a slightly larger profit could be obtained by raising the price to about $1.21 and cutting back production to about 15,000 units. This would give a total sales revenue of about $18,150, as compared with a total cost of about $16,550, leaving a total profit of about $1,600. (See points C on the graph.)

Although the customers would not be elated at the increase in price, they would be less inclined to regard the price increase as unjustified, particularly if the manufacturer's public relations counsel were successful in explaining that the step was taken with extreme reluctance and only under the pressure of increasing costs for which the manufacturer was not responsible. Furthermore, if other manufacturers of similar products were faced with similar increases in costs, their prices also would presumably be increased.

Changes in fixed costs resulting from plant expansion

It was indicated in Chapter 2 that an increase in fixed cost resulting from an increase in the amount invested in plant and equipment would tend to raise the total cost of production. This would increase the average cost of production (cost per unit of product) for low levels of output, but it might tend to reduce the average cost of production for higher levels of output by increasing the efficiency of plant operation and extending the limits of plant capacity. (See pages 29-30 and Figure 6.) This possibility suggests that one way of coping with an increase in variable costs, such as was considered in the preceding section, would be to expand the investment in fixed plant facilities. Such a step would appear to be particularly appropriate in the case of increases in wage rates, if the installation of additional machinery would "save" labor and hence reduce the amount of labor required to turn out a given quantity of product.

This possibility is illustrated graphically in Figure 13. Here it is assumed, as in Figure 12, that there is no change in demand, so that the total sales revenue curve, TR, remains unchanged. If there were no increase in plant investment, the increase in wage rates would raise total costs, thus swinging the total cost curve from TC_1 to TC_2. (TC_1 and TC_2 in Figure 13 are the same as the TC_1 and TC_2 curves of Figure 12 and are also identical with the TC_1 and TC_2 curves of Figure 6 of Chapter 2. For the cost and revenue data used in Figure 13, see Tables 2, 3, and 4A.) Suppose,

however, that plant investment were increased, with the effect of raising the total fixed cost from $5,000 per month to $10,000 per month. This increased investment would raise very substantially the total costs of production for low levels of output, as is indicated by the lower portion of the total cost curve, TC_3, which represents the cost situation as it would exist after the expansion had been completed. But for higher levels of output the enlarged plant would permit greater economy of operation, due to the relative reduction in the amount of labor required. This effect is indicated by the more gradual slope of the TC_3 curve as compared with TC_2.

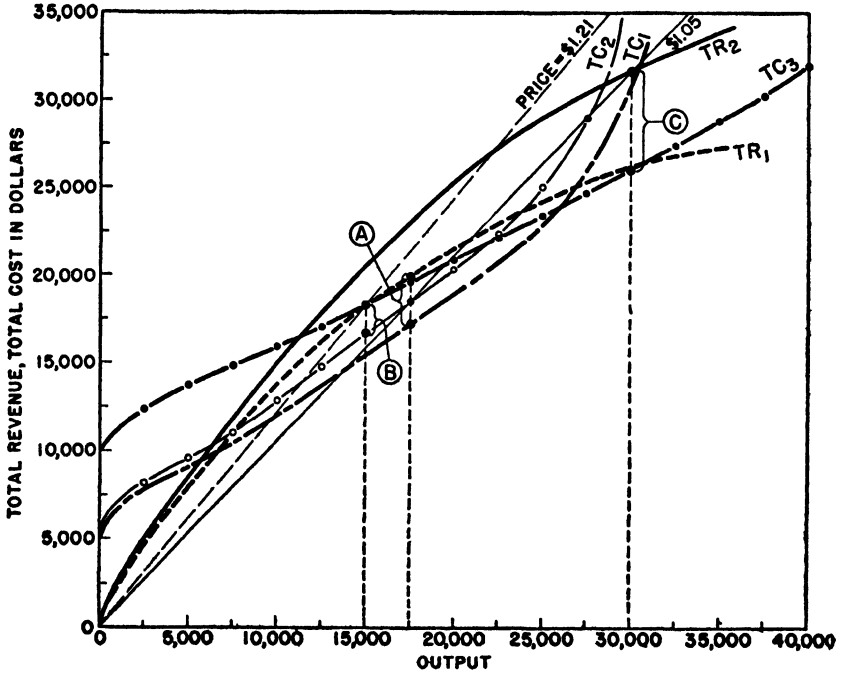

FIGURE 13. PRICING AS AFFECTED BY AN INCREASE IN INVESTMENT

A indicates maximum profit position with original plant and original demand situation; *B*, maximum profit position with increased total variable cost and original demand situation; *C*, maximum profit position with increased plant investment and increased demand.

Would the change in total cost of production attributable to plant expansion be sufficient to improve the profit position of the firm, in comparison with what it would be if the expansion were not undertaken? The answer depends on the extent of the change

in costs that could be obtained by so doing, and also upon the demand for the product.

Assume to begin with that the demand for the product remains unchanged, as represented by the original total sales revenue curve, TR_1, which is the same as the TR_1 curve of previous figures. With cost conditions as represented by TC_1 (before the increase in variable costs occurred), maximum profits of about $2,750 would have been obtained by producing about 17,500 units and selling at a price of $1.15. (See points *A* on the graph.) After the increase in variable costs occurred, but before the plant expansion was undertaken, maximum profits of about $1,600 would have been obtained by producing about 15,000 units and selling at a price of $1.21. (See points *B* on the graph.) If the plant expansion program were carried through, the total cost of producing 15,000 units would be raised from about $16,550 to about $18,500. With a total revenue of $18,150 obtainable under the demand conditions as represented by TR_1, the total profit would be reduced to zero or less. Thus, unless an increase in demand were anticipated, no advantage would be gained by a plant expansion on the scale here assumed. Nor would there be any other output, greater or less than 15,000 units, at which the profit would be as large as could be obtained by producing 15,000 units in the "original" plant.

Suppose, however, that demand were to increase to the extent indicated by TR_2. If the increase in demand were expected to be permanent, the proposed plant expansion would be advantageous. With an output of 30,000 units, for example, which, under the demand conditions as represented by TR_2, could be sold at a price of about $1.05, total sales revenue would be about $31,500, as against a total cost (with the enlarged plant, as represented by TC_3) of about $26,500, giving a total profit of about $5,000. (See points *C* on the graph.) This profit would be greater than the profit of $2,750 that could have been obtained, before the increases in costs and demand occurred, on an output of 17,500 units. It would also substantially exceed the profit that could be obtained by any other adjustment of price and output that could be made, subsequent to the increase in variable costs, without expanding the plant.

Thus a rise in variable costs would provide an incentive to expand plant facilities, in so far as such an expansion would tend in part to offset the effects of the increase in variable costs, provided

demand conditions were also such as to permit the sale of a volume of output sufficiently enlarged to achieve the cost-reducing effect of plant expansion.

It should be noted that in this example the enlargement of plant is assumed to lead to a reduction in average cost of production when the plant is being worked toward capacity. Such a situation is described by the phrase "decreasing costs to scale." It is not, however, always true that an expansion of plant would reduce the average cost of production. If the average cost runs about the same for plants of different sizes, when each size of plant is being operated at the output that is most economical for it, the situation is described by the phrase "constant costs." Or if an expansion in the size of plant would give no output at which the average cost for the larger plant would be as low as the average cost in a smaller plant, when operated at the most economical output, the situation is described by the term "increasing costs to scale."

Industries differ considerably in the effect of changes in plant investment upon the level of production costs, but it is generally believed that in most instances there are limits to the reductions in average costs that can be achieved by increasing the size of the individual plant. These limits may be associated with technological problems or with problems of management and supervision that arise when the plant becomes very large.

Changes in technology

The development of improved methods of production as well as improved methods in management and distribution would tend to have effects on total production costs somewhat like the effects of an increase in plant investment, that is, they would tend toward a reduction in the total cost of production, at least over certain ranges of output. If they did not, there would be little incentive to introduce such changes. The analysis thus far developed would seem, therefore, to provide a basis for the study of the effects of technological changes on pricing and production policy.

No attempt will be made at this point to deal with the ramifications of the problem of technological changes, except to note that they have played a very important part, over the years, in reducing the costs of production of many familiar products. In general, although not always, such changes have involved an increase in the size of plant that is most economical to operate and have, as a con-

sequence, been closely associated with the increase in the scale of manufacturing operations.

Very often the full import of technological change cannot be appraised in advance. There is frequently a reluctance on the part of responsible industrial management to plunge into large-scale commitments for the reconstruction of plant facilities until the possibilities of a new technique have been tested on a pilot-plant basis, or tried out in practical operations by some of the more venturesome firms in an industry. There is, however, a strong incentive to carry on experimental and developmental work and, wherever possible, to maintain a strong strategic position by acquiring patents, or patent licenses, covering the use of all developments that seem to have some possibility of assuming practical significance in the future, even though there may be no occasion to put them into operation at once. Otherwise there is a danger that the firm may find itself hampered in subsequent periods by an inability to gain access to the most advantageous technical methods of production.

Effects of Advertising

It is a commonplace of modern economic life that demands for goods do not just exist—they are created. Although it may be true that the man who invents a better mousetrap will find the world beating a path to his door, the world has to know that a better substitute for a cat has been invented. To this end the arts of modern advertising are bent.

Suppose, then, that the manufacturer becomes convinced that some people are still unaware of the virtues of his product, and feels an urge to dispel their ignorance. Assume that the total sales revenue curve, TR_1, of Figure 14 reflects the demands of those who are already familiar with this product. Assume also that the total costs of production are as represented by the total cost curve, TC_1. (TR_1 and TC_1 are the same as the TR and TC curves of Figure 10. For the cost and revenue data used in Figure 14 see Tables 2 and 4A.) Under these assumed demand and cost conditions, the maximum total profit would be obtained by producing 17,500 units and selling them at a price of $1.15.

Now suppose that the manufacturer decides to spend $3,000 per month in advertising the product (or, if he were already doing some

advertising, to increase the advertising budget by that amount). Would that advertising expenditure be worth while? Obviously it would be if the effect of the advertising expenditure were to increase the total sales revenue more than sufficiently to offset the additional expense involved in the advertising campaign. This does not mean that the entire total sales revenue curve would have to be boosted by $3,000 throughout its entire range, but only over a certain range. Suppose that the effect of the advertising expenditures were to raise the total sales revenue curve from TR_1 to TR_2. Total sales revenues would be materially increased in the intermediate range. But at the same time total costs would also have been increased by $3,000 per month all along the line, so that the total cost situation would now be reflected by TC_2 rather than by TC_1. The effect is much the same as that of an increase in total fixed cost, except that there is no corresponding change in variable costs, such as was assumed in Figure 13 and in the discussion of an expansion in plant investment.

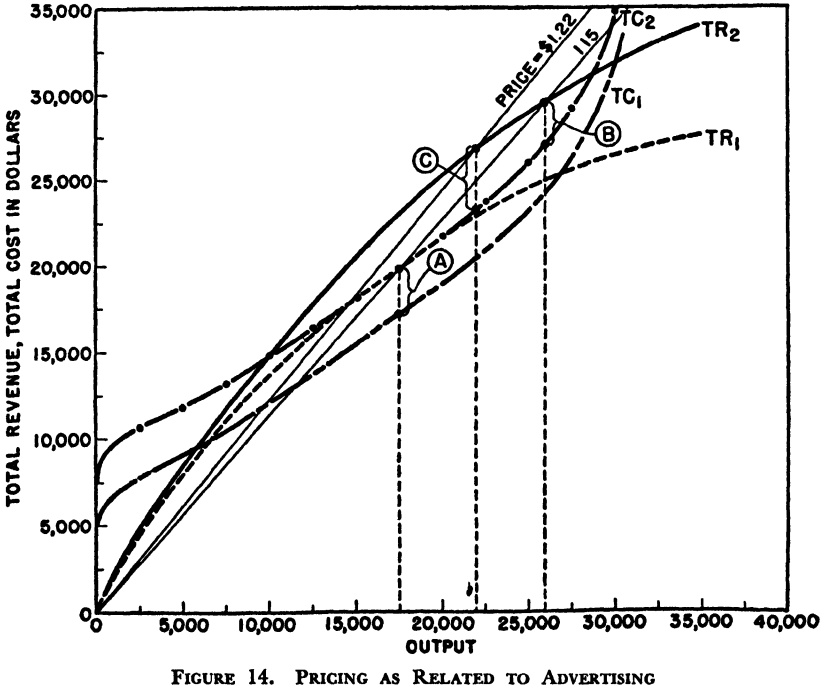

FIGURE 14. PRICING AS RELATED TO ADVERTISING

A indicates maximum profit position without advertising; *B*, profit if price is held unchanged with demand increased by advertising; *C*, maximum profit position with demand increased by advertising.

With the conditions here assumed, the effect of the advertising campaign would be to increase the quantity of product that could be sold at a price of $1.15 from 17,500 units to about 25,700 units, giving a total sales revenue of about $29,500. The total cost of producing that output would be about $24,000, and, with an additional $3,000 spent on advertising, the total profit remaining would be about $2,500. That would be slightly less than the total profit that could have been obtained from the sale of 17,500 units at the same price, without advertising. (See points *A* and *B* on the graph.) But better results, in terms of profits, could be obtained by undertaking the advertising program to stimulate demand and at the same time raising the price to about $1.21. At that price, approximately 22,500 units could be sold, bringing in a total revenue of about $27,250. The total cost of producing that output would be in the neighborhood of $20,750, and with an additional expenditure of $3,000 on advertising, the total profit remaining would be about $3,500, or an amount considerably greater than the $2,750 representing the maximum profit obtainable without advertising. (See points *C* and *A* on the graph.)

In this instance it would appear that the advertising program would be of advantage to the firm. It is not equally clear that the customers who were already familiar with the product would gain any advantage from the institution of the campaign and the associated increase in price, except, perhaps, the satisfaction of seeing more people using the same product, and whatever satisfactions they might derive from the art work of the advertising agency or from the appeal to their vanity.

However, the situation presented here covers only one of several possibilities. It was chosen primarily to illustrate the point that expenditures on advertising could be extended, with advantage to the firm, so long as the effect of such expenditures was to increase total sales revenue more than total costs (including both the costs of producing the additional goods that could be sold and the advertising expenditures themselves). Obviously it would not pay to incur added costs for advertising if it were probable that there would be no *addition* to total profits as a consequence.

If advertising were to result in a substantial increase in the demand for the product, that might, in turn, make possible a substantial increase in the scale of plant operations, of the sort dealt with on pages 58-61, accompanied by a reduction of total production

costs for higher ranges of output. In that event the ultimate effect of the advertising program might be a reduction, rather than an increase, in the price that would be most advantageous for the manufacturer to set.

One further point in connection with advertising designed to increase the demand for the product of a particular firm is that the same technique of influencing demand is available to rival firms as well. And to the extent that advertising techniques are utilized by the entire group, the effectiveness of any one firm's program may be largely canceled out by counter-advertising, just as the effectiveness of a price reduction designed to attract customers from business rivals may be canceled out by offsetting cuts in their prices. Thus, one of the possible effects of "competitive" advertising is an increase in total costs (including advertising expenditures) not matched by corresponding gains in total sales revenues. But once an extensive advertising program has been undertaken and matched by similar progress of rival firms, it may be virtually impossible for any one of the firms to abandon the competitive advertising struggle. This situation is not peculiar to advertising alone; it is also characteristic of many other devices that may be employed to promote sales to ultimate consumers or to secure favorable distributive outlets.[3]

Production and Supply Under Conditions of Pure Competition

Reference has already been made to the case of pure competition in which a large number of producers is engaged in turning out the same product for sale to the same group of customers, that is, for sale in the same market. Where the customers have no basis for preferring the product of one producer to that of another producer, no one producer can follow an independent pricing policy of his own. He must take the price prevailing in the market and adjust his own undertakings as best he can to the prevailing level of that price. The price is set by the joint forces of total market

[3] In this discussion it has been assumed that advertising appropriations are made in a lump sum, so that they can be treated as a fixed cost item for the accounting period under consideration. In some cases, however, firms follow a policy of earmarking a certain percentage of total sales revenue for advertising purposes. In that event, it would be more appropriate to treat advertising expenditures as a deduction from total sales revenue rather than as an increase in the total cost curve.

demand and supply. The total market supply will reflect the quantities that individual producers would be willing to sell at different possible prices at a given time, other things being equal.

To visualize the conditions determining the supply that would be offered by an individual producer at a given time, it is convenient to construct a break-even chart of the sort represented by Figure 15. In this figure a total cost curve similar to the *TC* curve of Figure 10 represents the cost conditions confronting the individual producing firm. The total sales revenue curve, *TR*, however, is somewhat different, because any individual producer, under the assumed conditions of pure competition, could sell any quantity of product that he might turn out (up to the capacity of his plant) at the prevailing market price. If the market price were $1.20, represented by the $1.20 price radial, the individual producer's total sales revenue curve would be a straight line sloping upward to the right, lying on the $1.20 price radial. If he sold 10,000 units, his total sales revenue would be $12,000; if he sold 20,000 units, his total sales revenue would be $24,000, and so on. If the market price were $1 per unit, then the total sales revenue curve for the individual producer would coincide with the $1 price radial. If he sold 10,000 units, his total sales revenue would be $10,000; if he sold 20,000 units, his total sales revenue would be $20,000. Thus, under conditions of pure competition, each price radial may be regarded as representing the total sales revenue curve for each individual producer of that commodity, providing that happened to be the prevailing market price.

Suppose, to begin with, that the market price were $1.30. At that price the individual producer here under consideration would break even on an output of about 8,500 units (see point *A* on the graph), but maximum profits would be obtained with an output of about 26,500 units. At that volume of sales, total sales revenue would amount to about $34,450, as against a total cost of about $24,750, giving a total profit of approximately $9,700. Thus the quantity that this producer would find most profitable to produce at a price of $1.30 would be in the neighborhood of 26,500 units. (See points *B* on the graph.)

Suppose, however, that the market price were $1.20 rather than $1.30. At a price of $1.20, the greatest spread between the $1.20 price radial (which may be taken to represent the *TR* curve if the market price were $1.20) and the total cost curve, *TC*, would be

reached with an output of about 26,000 units. The total sales revenue of $31,200 would exceed the total cost of producing that output, approximately $24,100, by some $7,100. Thus the quantity that this producer would be prepared to sell at a price of $1.20 would be approximately 26,000 units.

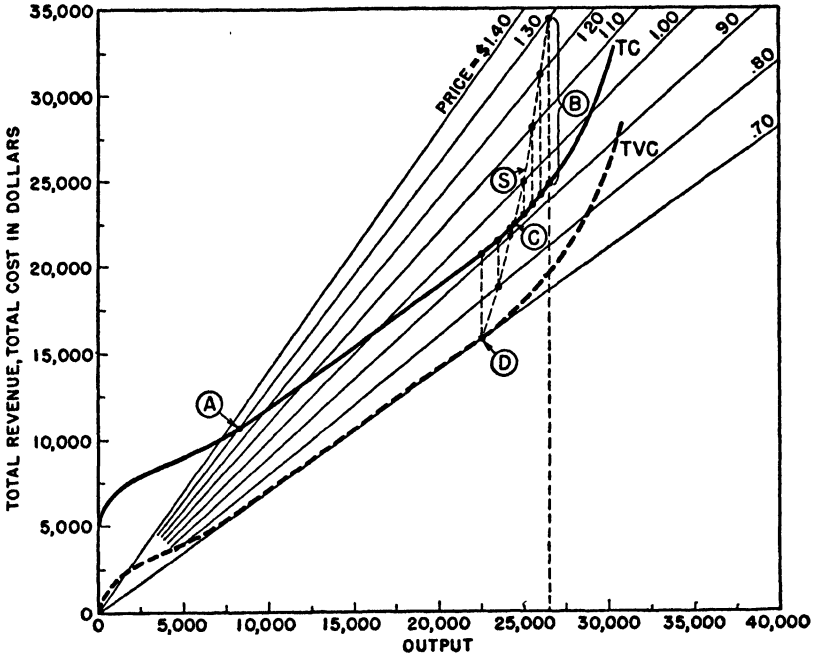

FIGURE 15. PRICE AND PRODUCTION UNDER PURE COMPETITION: THE FIRM

A indicates break-even point at a price of $1.30; *B*, maximum profit position for the firm at a price of $1.30; *C*, minimum price at which the firm could break even ($.92); curve *S* connects points indicating outputs that would give maximum profits to the firm under each of the indicated prices.

In the same way the quantity which it would be most advantageous for the individual producer to turn out at other possible prices may be determined. At any price below ninety-two cents, however, there would be no output at which the producer in question could fully cover his costs. At ninety-two cents, the producer would just break even on an output of about 24,400 units, with total sales revenue and total costs of about $22,500. (See point *C* on the graph.)

At any price below ninety-two cents the individual producer in question would fail to break even, but this does not mean that he would discontinue production. As long as there was some output

at which total sales revenue would exceed total *variable* cost it would be better to produce and sell the output that would give the greatest excess of total revenue over total variable cost, inasmuch as some contribution would still be made toward the fixed cost. The producer, of course, would not be delighted by the prospect of making a loss, but if loss were unavoidable, a small loss would be preferable to a larger one. Thus, at a price of ninety cents the producer would keep his loss to a minimum by producing about 24,000 units, with total revenues of about $21,600 and total costs of $22,000, giving a loss of some $400. At a price of eighty cents, the producer's loss would be held to a minimum with an output of about 23,500 units, giving a total revenue of $18,800 as against a total cost of about $21,500, or a total loss of some $2,700. And at a price of seventy cents, an output of 22,500 units would bring in a total sales revenue of $15,750, barely sufficient to cover the total variable cost of producing that output; the fixed cost would be entirely uncovered. At any price below seventy cents, total sales revenue would be insufficient, at any output, to cover total variable costs, and it would be preferable to suspend operations entirely. (See point *D* on the graph.)

Summing up this analysis, it is possible to construct a supply schedule to show how much the individual producer under consideration would be willing to sell, under the given cost conditions, at each of several different possible prices. Table 5 presents such a schedule for the individual firm.

TABLE 5

SUPPLY SCHEDULE FOR INDIVIDUAL FIRM

Price	*Units Produced*	*Total Sales Revenue*	*Total Cost*	*Total Profit*
$1.30	26,500	$34,450	$24,750	$9,700
1.20	26,000	31,200	24,100	7,100
1.10	25,500	28,000	23,500	4,500
1.00	25,000	25,000	23,000	2,000
.92	24,400	22,500	22,500	——
.90	24,000	21,600	22,000	−400
.80	23,500	18,800	21,500	−2,700
.70	22,500	15,750	20,750	−5,000

Not all producers in the industry would have precisely the same costs of production; some might find themselves in a position to make losses (as a consequence of a drop in price), whereas others

were still able to show a profit. Hence, a fall in market price would tend to cause some producers to drop out sooner than others, although all would have an incentive to curtail output somewhat in the face of a fall in price and to expand somewhat in response to a higher price. Thus, for the entire group of producers supplying a particular market, the responsiveness of supply to a change in price would tend to be somewhat greater than is indicated by the schedule for a single producer.

In Figure 15 a dotted line is drawn to connect the quantities that it would be to the advantage of the individual firm to turn out at the different prices indicated. If the indicated prices and quantities be replotted as in Figure 16, with quantities indicated by the abscissa scale and the various possible prices by the ordinate scale, the curve fitted to the plotted points constitutes the *supply curve* of the individual firm. A similar figure, representing the quantities that would be offered by the entire group of producers at various possible prices, would depict the market supply.

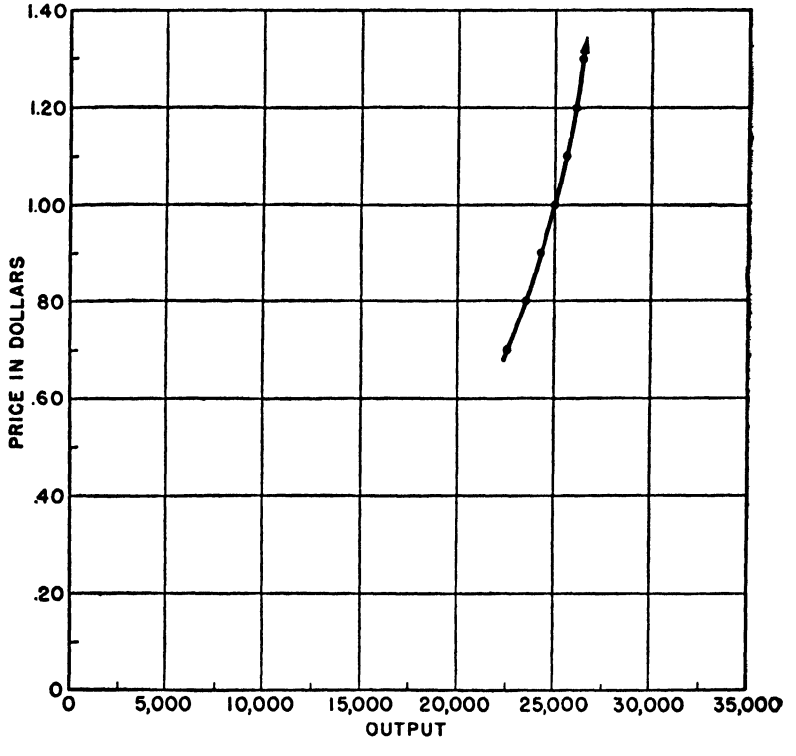

FIGURE 16. SUPPLY CURVE FOR THE FIRM UNDER PURE COMPETITION

Chapter 5

PRICE STRUCTURES, LEVELS, AND TRENDS

Price Structures

Preceding chapters have dealt with the analysis of the price and production policy of an individual firm, as influenced by the management's appraisal of the prospective demand for the product of the firm and of the prospective costs of production. It was also noted that business firms seldom find themselves in the position of being able to formulate their price and production policies without giving close attention to the pricing and production policies of other firms which are in position to offer similar goods or substitute goods in the market in competition with the firm immediately under consideration. Frequently the manufacturer of a particular commodity also finds that the sales of his own product are influenced, not only by the offering of similar goods by rival suppliers, but also by the competition of quite different goods turned out by other industries. Thus a radio manufacturer may find that his prospective customers are influenced not only by the blandishments of other radio manufacturers but also by the sales appeals of television receivers, household appliances of various kinds, and countless other goods on which the customers may spend their dollars.

It would be almost impossible for any single producer to recognize and take into account all of the alternative forms of expenditure that may influence the willingness of his prospective customers to purchase his own product, but it may be possible to single out a few alternatives that seem to be most significant. As a practical

matter, market research studies often seek to determine the probable demand for the particular product under study, taking into account the relative prices of three or four other products that seem most likely to be chosen as substitutes.

It will be helpful in understanding the way in which the whole economy functions to think of the prices of different kinds of goods as being tied together in a price structure which includes all kinds of goods and services. The structure as a whole embraces many different groups of commodities and services, or many different industries; and these groups, in turn, embrace many different commodities, some of which are close substitutes for each other.

Any individual firm is most immediately concerned with that part of the general price structure which embraces his own product and the products of his close rivals; his price and production policies will be chiefly influenced, at any time, by a consideration of his relationships with them. Individually and collectively they represent the "competition" in terms of which he must formulate his own plans. For example, a reduction (or an increase) in the price of Plymouth automobiles would react most directly upon the prospective sales of Fords and Chevrolets, and somewhat less directly on prospective sales of cars in adjacent price brackets; it would have comparatively little influence on the prospective sales of cars in the higher price brackets. There are, of course, great differences in the sensitivity of the demand for the product of one firm to changes in the relative prices at which similar products are offered by other firms.

In general, the greater the real or fancied differences between products of the same type, the less is the likelihood of a substantial transfer of patronage from one firm to another in response to small changes in relative prices. The greater the degree of standardization of the products turned out by several rival firms, the greater is likely to be the response to small changes in relative prices. A representative of one of the major cement companies once testified that a difference of a few cents a barrel for Portland cement, which is produced to meet well established specifications, would suffice to drive the higher-priced brand almost completely out of the market. Much the same could be said of standardized steel products and many other kinds of producers' goods.

The working of the competitive process is also greatly affected by the number of close rivals facing one another in competition

for the favor of the buyers in the market. If there are many rivals offering the same type of goods in the market, it may be difficult, if not impossible, for any one firm to appraise the impact on its own sales which results from small changes in the prices at which other firms are offering their wares. This is the sort of situation that is commonly described by the term *monopolistic competition.* If the number of rivals facing one another in the market were small, as in the case of *oligopoly,* it is more likely that a change in price initiated by one firm would have an immediate and substantial reaction on the sales prospects of the rival firms, and that those firms would be forced to take immediate defensive countermeasures. In the ensuing pages consideration will be given first to the workings of the competitive process under conditions of monopolistic competition, and thereafter to the competitive process under conditions of oligopoly. Consideration of the hypothetical case of *pure competition,* with a large number of firms producing and selling a completely standardized product, will be postponed to the end of this section.

Interfirm price and production relationships under monopolistic competition

Under conditions of monopolistic competition, each firm's price and production policy must be formulated in the light of its own estimates of the demand for its own product (as depicted graphically by its total revenue curve) and its own expected production costs (as depicted graphically by its total cost curve). But the demand for its own product at any given price will be influenced by the prices at which similar products are available in the market and will be changed if those prices are changed. By the same token, the sales of the product of any one firm might perhaps be substantially increased by reducing its price slightly, in comparison with the prevailing level of prices for comparable products, providing they were not reduced at the same time. Alternatively, increased sales might be obtained without a reduction in price if the firm were to increase its advertising expenditures or to make improvements in the product that would increase its appeal to prospective customers, in comparison with similar products.

Take first the possibility of increasing sales volume and total sales revenue by reducing the price of the product in comparison with the prices of similar products. This situation is illustrated

graphically in Figure 17, in which the first total revenue curve, TR_1, represents the estimated total sales revenues obtainable at various possible prices, assuming that other firms selling in the same market would make roughly comparable changes in their own prices at about the same time. The second total revenue curve, TR_2, represents the estimated total sales revenues obtainable at various possible prices, assuming that other firms would *not* make corresponding changes in their prices if this firm were to reduce (or increase) the price of its product. It is assumed, in TR_2, that the generally prevailing price for similar products offered by other firms is in the neighborhood of $1.15 per unit. In line with this assumption, the TR_2 curve cuts through the TR_1 curve at a point representing a price of approximately $1.15 per unit. (See point A on the graph.) For prices higher than $1.15 per unit, the TR_2 curve lies below the TR_1 curve, suggesting that if the firm in question were to raise its own price substantially above the prevailing level it would rapidly lose sales to its competitors. For prices below $1.15, the TR_2 curve sweeps above the TR_1 curve, suggesting that as the firm reduced its price below the prevailing level it would gain rapidly in sales at the expense of the other firms, unless the prospective customers felt that the lowering of the price was incident to a deterioration of quality.

If the firm in question felt that it could "get away with" a moderate price reduction, the extent of the gain to be achieved by so doing would be determined by the additional costs involved in producing the added volume of output. The effect of an expansion of output on total costs of production is illustrated by the total cost curve, TC, in Figure 17. In this particular case a reduction in price to about $1.08 would result in an increase in estimated profits (indicated by the greater spread between the TC curve and the TR_2 curve. See points B on the graph). But this gain, it must be remembered, can be realized only if the general level of prices for similar products is not reduced at the same time. If it is, the estimated total revenue at a price of $1.08 would be smaller, as indicated by the TR_1 curve, and the total profit would be less than could be obtained by holding the price at the original level. (See points C as compared with A.)

It is apparent, therefore, that in formulating its own price policy the management of the firm must take into account the probable impact of any change in its own prices upon the pricing policies of

other firms, and therefore on the prevailing level of prices for the same type of product. An aggressive management might feel disposed to take the chance, whereas a conservative management might feel that it was safer to avoid rocking the boat by taking the lead in price reductions.

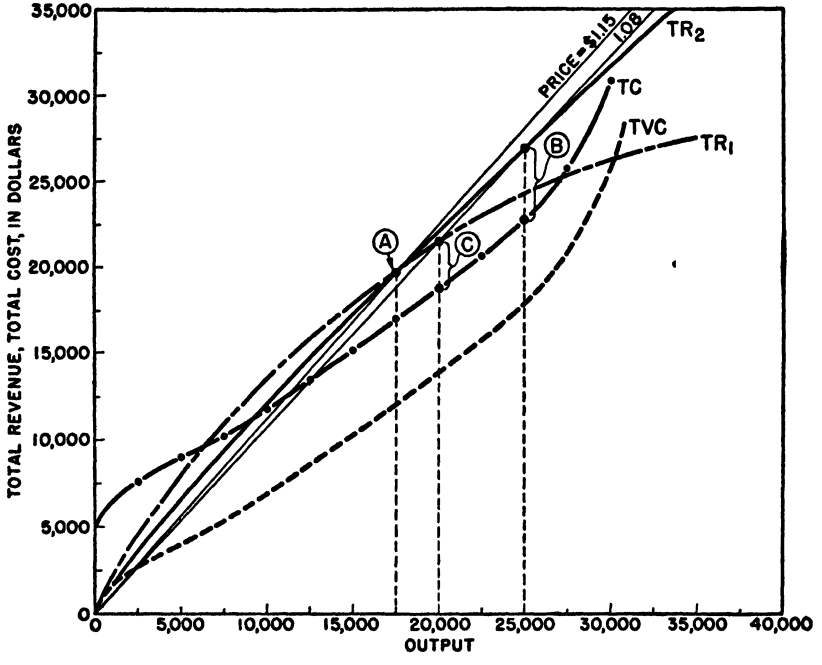

FIGURE 17. PRICING AS AFFECTED BY ANTICIPATED REACTIONS OF RIVAL FIRMS

TR_1 represents anticipated sales revenues if other firms are expected to vary their prices concurrently; TR_2, anticipated sales revenues if other firms are expected to hold their prices constant; *A*, situation in which the price of this firm is roughly in line with prices of rival firms; *B*, possible profit if a price reduction by this firm were not countered by price reductions by rival firms; *C*, possible profit if a price reduction by this firm were countered by corresponding price reductions by other firms.

Much the same analysis may be applied to the possibility of increasing sales volume and total sales revenue by increasing the advertising outlays of the firm or making product improvements. The chief difference is that such steps would also tend to raise the total cost curve, as well as to alter the total sales revenue curve. If increased advertising outlays were not matched by correspondingly increased outlays by other firms, the gains in total sales revenues would be clinched; if they were offset by increased advertising outlays by other firms, the total sales revenue curve would

tend to be shifted back toward its original position. The added outlays, however, would have raised the total cost curves for all of the firms. Each of them might find its ultimate position no better, or perhaps even worse, than the original position, if the effect of the combined advertising expenditures did not result in the diversion of consumer purchases from alternative kinds of goods to the products offered by the firms in this particular industry.

There is, obviously, no single set of prices or production and sales schedules for all of the firms in an industry that "must" prevail at any given time. However, it might be said that there would be at least a momentary, if perhaps somewhat unstable, "equilibrium" in the industry concerned if each firm, through a process of trial and error, had achieved a position in which the management felt that no further change in its own prices, relative to those of other firms, and no change in its own advertising outlays or modifications of its product, was likely to result in a further improvement in its own position, in terms of prospective profits, or security, or prestige, or any other goal that the management might have in mind.

Evidently such an equilibrium situation, if ever achieved, might be upset by any number of possible events either inside or outside the industry. Suppose, for example, that the firms already engaged in an industry had achieved a situation in which they were all relatively well satisfied with their respective shares of the total volume of business, and had no prospect of immediate advantage through an alteration of their respective price and sales policies. They might, nevertheless, find their positions threatened or impaired by efforts on the part of new firms to enter the industry, or on the part of already existing firms in other industries to break into the field. The entry of new firms would tend to attract some business away from already existing firms. It would therefore tend to reduce their respective total sales revenue curves, unless the demand for the type of product involved was increasing at a sufficiently rapid rate to absorb the output of new firms without diminishing the sales of the older firms.

If the increase in demand were not sufficient to offset the entry of new firms, then the effect of that entry would be to cut back the total sales revenue curves of the firms in the industry and to reduce their anticipated profits from operations. It is unlikely that all firms would be equally affected by the force of the competition

offered by the newer firms, or that all firms would have similar total cost conditions.

If the firms, however, were much alike in cost conditions and in the relative appeal of their respective products, then the tendency would be for all of them to suffer approximately equal reductions in profit prospects. On that assumption it could be said that a new equilibrium would tend to be established when the division of the total sales in the market had reached the point at which none of the firms, old or new, could find *any* adjustment of their respective prices and outputs that would enable them to more than break even. In graphic terms, that equilibrium position would be reached when the total sales revenue curves for each of the firms were tangent to their respective total cost curves. Such a situation is depicted graphically in Figure 18, in which total sales revenue curves and total cost curves are depicted for three firms, which may be taken as representative of the entire group.

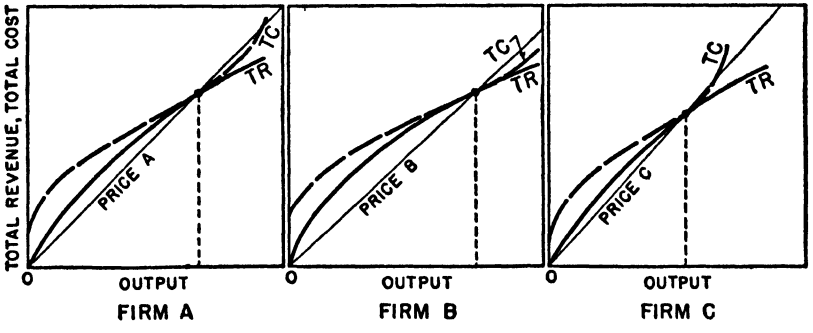

FIGURE 18. GROUP EQUILIBRIUM IN AN INDUSTRY CHARACTERIZED BY CONDITIONS OF MONOPOLISTIC COMPETITION

In such a situation, all of the firms would be "breaking even" with total revenues sufficient to cover total costs, but no more. If so, there would be no further stimulus to the entry of additional firms into the industry, or for further expansion on the part of those already in. There is the chance, however, that mistaken forecasts of market prospects might have led more firms to enter than were in fact warranted by the demands for the products of the firms in the industry, or that existing firms might have over-expanded on the basis of mistaken forecasts. In that event some firms, or perhaps the entire group, might find themselves unable to break even at any price or output that they individually might choose.

Under such circumstances the industry as a whole would be characterized by overcapacity and by losses on current operations. Some firms might be unable to continue in operation indefinitely in the face of losses, and others might seek to improve their positions by diverting their facilities, in part or in whole, to the production of some other kind of product not directly competitive with the products of the firms remaining in the industry. Such a process of withdrawal from the industry would tend to increase the shares of the total business obtainable by the firms which remained and to increase their respective total sales revenue curves once more. This process presumably would continue until the majority, if not all, of the remaining firms were at least breaking even, with total revenues sufficient to cover the total costs of producing their respective outputs. When and if none of the remaining firms could foresee any advantage to be obtained by further changes in their respective prices and outputs, and there were no incentives to the entry of new firms or the exit of existing firms from the industry, a position of equilibrium would once more be established for the industry.

It must be emphasized again that such an equilibrium position is seldom, if ever, fully attained or maintained over any period of time, because general economic conditions do not remain static. Changes in people's tastes and preferences, in their incomes, in business prospects generally, and in the technology of production, to name but a few of the relevant circumstances, are constantly occurring and setting in motion processes of further adaptation on the part of different firms in any industry and in different industries. One may think of business firms as being engaged more or less constantly in making changes in their own price and production policies in an effort to adapt themselves to prospective changes, as they see them. These changes represent tendencies toward equilibrium. But the processes of adjustment are never fully completed, and the direction of adjustment may itself be altered by changes in conditions that lie far beyond the control of any individual firm, or even of an entire industrial group.

Interfirm price and production relationships under oligopoly

What has been said of monopolistic competition applies likewise to the case of oligopoly, where the number of rival producers of similar products is small. But in the latter case strategic considera-

tions are more likely to lead the few rival producers to avoid price competition if at all possible. Where the rival producers are few in number, a small reduction in price by one firm might result in an increase in its sales if the other firms did not follow suit. But the additional customers would be drawn away from a few rivals, and the cause of their losses in sales would be much more obvious than if the shift of customers were distributed over a large number of rivals. The likelihood, therefore, is that countervailing price adjustments would be made quickly by other firms in order to halt the shift in customers or to reverse it. Thus the chance of gaining sales volume at the expense of rival concerns must be, and commonly is, heavily discounted. There is also a widespread fear, in industrial circles, that the initiation of a price reduction by one firm may touch off a "price war," with repeated price cuts by each of the various rivals in a see-saw battle for the available business.

As a consequence, competition in oligopolistic situations is much more likely to take indirect forms: advertising (where the products are somewhat differentiated from one another), or the offering of additional services, generous credit terms, and the like. All of these tend to affect profit margins by raising total costs rather than by lowering prices; they will tend to lower profits if they raise the total cost curve for a given firm more than they raise its total sales revenue curve. A certain degree of stability or "equilibrium" might be said to exist in the price structure of an oligopolistic industry if each of the rival firms had achieved an adjustment of its own prices, advertising and selling activities, and product modification, in comparison with those of other firms, such that no firm saw a prospect of advantage to itself in undertaking any further change in its own policies.

As in the previous case of monopolistic competition, it is possible that such an equilibrium, if attained, might be upset by the entry of new firms if it appeared that the firms already in the industry were making substantial profits. But in such situations, there are frequently serious obstacles to the entry of new firms. In some instances, a heavy initial investment is necessary to construct a plant of the size required to achieve a degree of economy of operation comparable to that of firms already in existence. Very large risks of loss would therefore face the promoters of any new firm seeking to enter the field, particularly if it seemed likely that the firms already in existence might be disposed to fight off the

threat of new competition by temporary price reductions. In other cases, the entry of new firms may be difficult because large sums would have to be expended in establishing market outlets, and servicing facilities, and gaining consumer acceptance of the product, as, for example, in the automobile industry. In still other cases the product itself, or important processes of production, are covered by patents held by one or more of the existing firms. In such cases, a refusal of a license to the prospective newcomer to utilize the patents may operate as an effective barrier to the entry of new firms into the industry.

Where such barriers to the entry of new firms do exist, it may be possible for the firms already in the industry to achieve and maintain a position of equilibrium among themselves, with each firm reaping substantial profits from current operations, and with a considerable measure of security in the continued enjoyment of those profits. Under such circumstances there is no reason to suppose that the forces of competition, either from within or without, will necessarily tend to force prices into close approximation to production costs. Even so, however, the firms in the industry are seldom in position to prevent the possible impairment of their position as a consequence of the development of competition from other industries.

In the case of oligopoly, as in the case of monopolistic competition, there is little reason to suppose that a position of equilibrium, if attained, could in fact persist for any great length of time, because economic conditions are constantly changing and creating opportunities and incentives for further adaptation on the part of the firms concerned. It is more appropriate to think of competition among rival firms, whether they be few or many, as a continuous process, in which readjustments are made from time to time, sometimes smoothly and sometimes only in a rather jerky fashion, as the various firms find modifications in their respective price and production policies prospectively of advantage to themselves.

Interfirm price and production relationships under pure competition

Under conditions of pure competition, with a large number of producers turning out an identical product and selling it in a common market, none of the producers is in position to frame a price policy of his own. He must sell at the prevailing market

price if he wishes to sell at all. His planning, therefore, is concerned primarily with forecasting the probable market price at the time his product will be ready for the market, and deciding what output would be most profitable for him to produce in the light of that price forecast.

Inasmuch as the quantity of product actually placed on the market depends on the production plans formulated by perhaps many thousands of separate producers, whose forecasts of probable future prices may also diverge widely from one another, the actual price that equates the supply of and demand for the product may turn out to be either relatively high, in comparison with the unit costs of production of many producers, or relatively low. In the first case many, if not all, of the producers may reap substantial profits. In the second case, many of the producers, if not all, may experience losses of varying magnitudes.

In a period when the producers in a purely competitive industry are in general making substantial profits, there will be an incentive for producers already in the field to expand their productive operations, and also for new producers to enter the industry, either by shifting over from other products or by establishing new enterprises. The net effect will be a tendency to increase the supply of the commodity in question relative to the demand for it, and therefore to drive the price downward. Conversely, if the price of the product is relatively low, and many producers are suffering losses, there will be an incentive for the existing producers to curtail their operations, if possible, and for some of them to shift their activities to other industries or to other types of products, if there is any possibility of utilizing their productive facilities in other ways. Such shifts of productive facilities, however, are often difficult to accomplish quickly, and a long period of time may elapse before such a transfer can be accomplished on a large scale. The interim period may be one of severe pressure and hardship for the producers in the industry concerned.

If all producers in a purely competitive industry had substantially similar costs of production, it could be argued that the forces of competition would tend to drive the market price toward equality with unit costs of production, that is, toward a position in which the total revenue and total cost curves of each of the producers were tangent to each other, each producer receiving total revenues approximately equal to the total cost of producing the

output of each firm. It would be strange, however, if all of the producers in the industry had identical costs of production, so that all would just break even at the same level of market price. Differences in the relative positions of different producers may arise because of differences in the ability of management, in the age and character of productive equipment, in the ease of access to the market (reflected in costs of transporting the product to market), in the availability or quality of raw materials or labor, or in natural advantages of one sort or another. One wheat farmer or dairy farmer, for example, may operate under much more advantageous conditions than another, and be able to produce the product profitably at a price that would be ruinous to another.

If it is possible for firms having higher costs of production than others to duplicate the facilities of their lower-cost competitors, there may be a gradual shift in the relative positions of different firms in terms of profitability. But anything that tends to give a firm a permanent position of advantage will stand in the way of such an equalizing process. If some producers owe their advantage to superiority of location, for example, it may be impossible for other firms, no matter how able their managements, to offset that advantage. Anything, however, that tends to give one firm a position of permanent advantage will tend to be valued in proportion to the advantage it confers. A good location or superior land will increase in value if it is found that a firm occupying that site or using that land can achieve lower variable costs than firms located elsewhere. A farmer who has very productive land finds that he could sell his land at a higher price than would be paid for poorer land in the same locality. If he were willing to retire from active farm operation, he could rent his land to another farmer at a comparatively high rental. If he should sell his land at a high price to another farmer, the latter would find that although the land was very productive, and that a large crop could be raised with relatively low variable costs, the interest on the necessary investment in the land would make his fixed costs of production relatively high, thereby partially offsetting the advantage of using the superior land. Or if the original farmer were to rent his land to another, the rental payment would in the same way tend to offset the advantage of comparatively low variable costs of production.

This means that from the standpoint of the more favorably sit-

uated producers, their advantages in terms of variable costs are partially canceled out by relatively greater fixed cost elements. As a consequence, the differences in total costs for well situated producers, as compared with those using poorer resources, may be much less than the differences in their respective variable costs; and if there were no elements of friction involved in revaluing advantages of location, the total costs of all producers would be the same as the total revenues that they respectively received for the outputs that they produced. In other words, the unit costs of each of the producers would be the same as the prevailing market prices, and none of the producers, in an equilibrium situation, would show a profit spread between total costs and total revenues.

This hypothetical equilibrium situation is depicted graphically in Figure 19, in which Firm *A* represents a producer with a superior location or superior resources, Firm *B* a producer operating with resources of average quality, and Firm *C* a producer operating with comparatively poor resources. Their respective outputs differ, but for each firm total costs and total revenues are equal at the output indicated, and no other output would enable any one of the firms to break even.

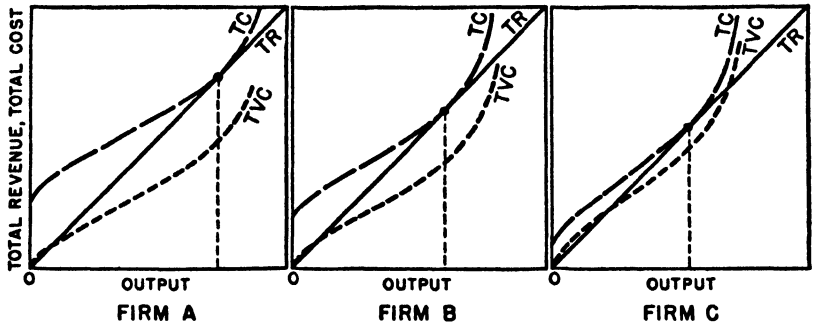

FIGURE 19. GROUP EQUILIBRIUM IN AN INDUSTRY CHARACTERIZED BY CONDITIONS OF PURE COMPETITION

If the prevailing market price were to decline, all of the firms would fall short of breaking even. If the price were to fall to the point where Firm *C* could not cover its variable costs of production, it would be forced to withdraw from production. Firms *A* and *B* would show losses under such circumstances, but they would not necessarily be forced out of production. However, if the lower level of market price were expected to persist, a lower

valuation would be placed on the possession of specialized resources needed for production. Superior land or location would be less desirable and would command lower prices or rentals. A new producer seeking a favorable location would offer a lower price for its possession, and if he obtained such a location at a lower price, his fixed costs of production would be correspondingly reduced. That in turn would lower his total costs of production, and he might be in position to break even at the lower level of market price.

This point—that certain components in total costs of production for the firm depend on the valuations placed upon specialized resources of different qualities—has long been recognized by economists. It is summed up by the traditional statement that high rentals of land and the costs of other similar resources are not the *cause* of high prices but rather a *consequence* of high prices for the products concerned. This is, however, but one example of the interdependence of prices of different kinds of goods and productive services, an interdependence which in some measure characterizes the entire price structure for all kinds of goods and services. These relationships, as they apply to the valuation of the agents of production, will be dealt with in somewhat greater detail in Chapter 8.

Interindustry price structures

Thus far the discussion of price structures has been concerned with the relationships linking the activities of firms producing similar if not identical products, so that they could be loosely classified as operating in the same industry. But just as no one firm in an industry can commonly pursue a completely independent course, so also is it necessary to recognize the fact that industries themselves are but parts or segments in an even larger structure. Rarely are the prices or sales of any given type of product unaffected by changes in the prices and sales of the products of other industries. The competitive aspect of interindustry substitution was symbolized years ago by the cigarette manufacturer's advertising slogan "Reach for a Lucky instead of a sweet" and by the well organized campaign of the dairy industry to prevent the sale of colored oleomargarine. The prices and sales of lumber are affected by the prices of other building materials; the prices and sales of copper are in part determined by the prices and sales of

steel, aluminum, and other nonferrous metals, and so on. Even where products are not capable of serving the same uses, they still stand in a semicompetitive relationship to each other as rivals for a place in the budgets of consumers or of industrial users.

In most instances no single firm is in position to determine just what alternative products of other industries are responsible for the behavior of the demand for its own product, or for changes in its own prospective total sales revenue at any given price. All that the single firm can do is to try to maintain the sales of its own product either by expending added sums on advertising or product improvement (if the product is identifiable) or by readjusting prices if it appears that they have "got out of line" with the prevailing level for alternative products.

Interindustry price structures have a manifold significance because they embrace not only the "horizontal" interrelationships of firms and industries producing different types of finished goods but also the "vertical" interrelationships of firms and industries producing commodities at different stages of the over-all process of production. For example, the price structure of the automobile industry reflects the competition of the various automobile manufacturers in their attempts to attract the favor of ultimate users of automobiles at any given time. But automobile prices may also be compared with the prices of component parts purchased from other firms, with the prices of steel, fabrics, glass, and other materials used in motor car production, with the wages of workers employed in automobile manufacturing, and so on. Obviously the prices of semimanufactured goods and raw materials, of equipment, and of labor, affect the costs of automobile production, and therefore are linked with the prices of these "end products" of the industry. Changes in prices at any level of the whole process of production and distribution will react up and down the entire chain, resulting either in widened profit margins or in "squeezes" at various levels, that in turn stimulate further changes in price and production policies on the part of the firms affected.

Thus the entire economy embraces manifold industrial segments and segmental price and production structures that are linked with one another, sometimes very closely and sometimes only loosely or indirectly. As changes in prices and production occur in certain segments, horizontal and vertical price dislocations or disparities tend to develop and to force changes in other

segments. One of the major problems of industrial and public economic policy is to find ways and means of bringing about readjustments that will ease the strains and repercussions of such dislocations.

During the first part of this century, the cotton textile industry found itself involved in an extensive and prolonged structural maladjustment that resulted from the rapid development of cotton textile manufacturing in the South. The cotton textile manufacturers of New England found themselves faced with increasingly severe competition from newer southern mills, and many were ultimately forced to close down because they were unable to achieve reductions in production costs that would enable them to survive. Others found it possible to continue in operation by concentrating on finer goods or specialty products to which their plants were relatively better adapted than were the facilities and labor force of the southern mills.

More recently the cotton growers of the South have found themselves faced by a changing demand for raw cotton because of the development of the synthetic fibers, paper, and plastic materials which have come to supply an increasing, though still comparatively small, part of the nation's requirements for fiber. As a consequence, a price for cotton that at one time would have insured very large sales of raw cotton may now be one that would cause a continuing loss of outlets for cotton because it is *relatively* high in comparison with the prices of newer alternative materials.

The point is that price structures that may represent conditions of comparative equilibrium at one point in time, either within a given industry or as between industries (in that they do not provide any immediate incentive to any producer or group of producers to initiate changes in prices or in output), may and do get "out of focus" over a period of months or years, as a consequence of changes of many kinds. Changes in people's tastes and modes of living, the development of new products and production techniques, changes in the amount of income that people have to spend, the opening up of new sources of materials, changes in population and in the distribution of the population as between different sections of the country, all these and many other circumstances operate to prevent the achievement or maintenance of equilibrium. The economy as a whole is dynamic, not static, and the economic process is one of continuous adaptation.

Price Levels and Trends

Changes in relative prices over time

Studies of the prices and production of different commodities over considerable periods of time show that some are much more sensitive than others to changes of the sort discussed in the preceding section. There is also no reason to suppose that all industries would be affected equally by the impact of new products or new methods of production, or by changes in people's tastes or modes of living, or by changes in population or in the geographical distribution of the population. Furthermore, changes in the prices and production in certain segments of the economy might be offset by opposite changes in other segments. Thus, to get an accurate picture of the functioning economy, it is necessary to see whether the prices and production of certain kinds of commodities are tending, with any degree of persistence, to rise or fall in comparison with others. When such a clear-cut tendency is evident, one may say that the *trend* in the prices (or production) of these commodities is upward or downward. A knowledge of these trends, supplemented by a careful analysis of the underlying forces that they reflect, is important to economists, businessmen, public administrators and lawmakers, and the public at large because it will provide a better basis for formulating business and governmental policies aimed at avoiding the development of critical stresses in the economy or relieving stresses that may already have arisen.

Attention has been focused thus far on the competitive forces that link firms and industries and give rise to changes in their relative positions. But the demands for, and prices and sales of, different commodities are also influenced in varying degrees by changes of a more general sort affecting the economy as a whole. Over the years, changes in population, in the general level of employment and spendable income, and in volume of money and credit in the country (to name but a few of the forces acting over a broad front) are reflected in the demands for, and prices of, many different kinds of goods. Some of these changes in basic economic conditions show a definite cyclical pattern of expansion and decline, and are, indeed, major manifestations of the business cycle. Other changes show no definite pattern of expansion followed by

decline, but continue to operate in the same direction for periods of time that are not directly related to the level of business activity.

Cyclical changes in prices and production

Over the years, changes in the general level of economic activity, employment, and income, associated with alternating periods of general prosperity and depression, have had a profound impact upon the demands for, and prices and sales of, all kinds of commodities. In periods of general prosperity and high-level employment, people, whether wage earners or salaried workers, owners or managers of business, or creditors or owners of real estate, in general have larger incomes than in periods of widespread unemployment and depression. With these incomes they are in position to buy and pay for a larger variety and quantity of consumers' goods. Hence the demands for virtually all kinds of goods, and the expected total sales revenue curves of business firms in general, tend to be shifted positively. More goods, under such circumstances, could be sold at any given price than when the incomes of the people of the community were smaller. Gains in sales for a particular firm, under such circumstances, may be obtained without aggressive competition to attract customers from rival firms.

In periods of general business activity, moreover, business firms themselves have an incentive to expand their operations, and hence to increase their purchases of machinery, plant facilities, and all the other means of providing an increased total output. Thus the demands for producers' goods, as well as consumers' goods, tend to be increased in a period of general prosperity.

Conversely, a decline in the general level of economic activity, as in the downward phase of the business cycle, tends to reduce the demands for all kinds of goods and services, both at the consumers' and the producers' level. If people are working short time, or fearful of losing their jobs entirely, they feel constrained to curtail their expenditures wherever possible. Thus the demand for any given firm's product, and its estimated total sales revenue curve, tend to be shifted negatively. Here again the change in the situation facing any single firm is not necessarily a consequence of intensified competition from rival firms; all may be losing sales at the same time. There is also no assurance that a reduction in the price of the firm's product would fully arrest the loss in sales, be-

cause people are seeking to conserve whatever incomes they have at their disposal.

In explaining the sales of different commodities, such considerations suggest that, in both a period of expansion and of contraction, the influence of changes in the incomes of the people in the community may often be greater than the influence of changes in the prices of commodities. In other words, the prosperity of a given firm may be affected in much greater degree by the force of changes in the general level of economic activity, employment, and income in the economy than by the competition of its own immediate business rivals.

The individual business firm, or even all the firms in a single industry, however, can do comparatively little to cope with changes in demand which result from changes in the general level of employment and income in the entire community. Measures to cope with such changes must be formulated and put into operation on an economy-wide basis if they are to be effective. Hence they fall primarily within the scope of national or governmental economic policy rather than of individual firm or industry planning.

Noncyclical forces affecting price levels and production

Many forces affecting the level of prices and production over broad sectors of the economy, or over the entire economy, are noncyclical in character. The growth of the nation's population is one such force. Changes in the volume of money and credit with which business is carried on, and, even more important, changes in governmental fiscal policies and expenditures reflecting the impact of war, are also responsible for major changes in the general level of prices and production. An adequate consideration of the working out of these forces, in the light of American experience, would greatly prolong the present discussion. For the moment it is sufficient to note that these forces do play a prominent role in determining the general level of prices and production, and that the forces themselves lie far outside the control of individual business firms or industries. To account for the broad movements of prices and production, it is necessary to think constantly in terms of the behavior of the economy as a whole, and to view individual firms or industries, not as entities functioning by themselves, but as articulated parts of the larger "macroeconomic" system.

Part Two

ENTERPRISE, FACTOR PRICING, EMPLOYMENT, AND INCOMES

Chapter 6

PROFIT EXPECTATIONS AND INCENTIVES OF ENTERPRISE

Nature of Enterprise

Goods and services are not produced for their own sake, but because it is believed that a demand for them exists or can be created by skillful sales effort or advertising. Furthermore, goods and services do not produce themselves. They are brought into existence only because someone takes the initiative in assembling the necessary means and directing the processes of production.

Some goods and services are, of course, produced by people for their own use, as can be seen in the operations of any household or farm. The activities of government—federal, state, and local—also comprise an important segment of our entire economy. But a major part of the economic activity in the modern economy still is carried on by business enterprises which undertake to produce goods to meet the anticipated demands of consumers or other users of goods and services. Any person or organization undertaking the production of goods or services for sale to others is an *enterpriser,* from the bootblack or popcorn vendor to the United States Steel Corporation or the Tennessee Valley Authority. The essence of enterprise is the initiation and conduct of economic activities. It would, however, be rash indeed to suppose that entrepreneurial decisions made by such diverse enterprisers are all of equal weight in explaining the behavior of production in the economy as a whole.

Dual role of business enterprise

It is significant to note, in this connection, that the business enterprise plays a dual role. On the one hand, it is a supplier of the goods or services that it undertakes to produce, and so appears as a *supplier* in the market or markets in which those goods and services are sold. This phase of the operations of the enterprise has been analyzed in preceding chapters. But the enterprise is also an employer of the productive resources and services needed to turn out the finished product. Thus it appears as a *demander* for labor services, raw materials and supplies, and all the other productive facilities required to turn out its product. Obviously, any individual firm's demands for these productive resources and services will be closely linked with the demand for its own particular product. Very seldom would the firm voluntarily employ larger quantities of resources than are needed to produce the output of finished goods that is believed to be salable at a profit.

Enterprise as related to employment and income

Inasmuch as the enterprise is in position to exercise the initiative in determining the extent of its own productive operations, and hence the amounts of the various resources employed, the employing firm's demands are significantly related to the *incomes* that are received by those who provide resources and services for use in production. The wage earner's income depends largely upon the wage rate at which he is employed and on the number of hours he works per week; thus he looks to his employer as the immediate source of the income he receives. A change in wage rates or in the amount of employment offered him will directly affect the amount of his income. And the same thing is true, although somewhat more indirectly, of those who obtain incomes by virtue of the ownership of property of one kind or another.

Thus, in any discussion of the circumstances that tend to determine the prices paid for the use of productive services and resources, the extent to which they are employed, and the incomes received by those who provide or own them, it is necessary to start with an analysis of the factors that influence entrepreneurial decisions with respect to production. This chapter, therefore, is devoted to a discussion of the incentives that influence the decisions of enterprisers, large or small, with respect to production and employment.

The Dominant Role of Expectations

Expectations as determinants of production plans

At this point it is necessary to emphasize once again the significant role that the *expectations* of business enterprisers play in determining their plans with respect to production and employment. Expectations are important because, with few exceptions, days, weeks, or perhaps months must elapse before the production of goods or services can be completed and the sale of the finished product to consumers or other users accomplished. Consumers' goods to be sold for the Christmas trade must be produced and in the hands of wholesalers or retailers by early fall; the body design of next year's car must have been selected, and the necessary dies and fixtures put into production, many months before the new model appears on the streets.

Thus, production budgets must be drawn up, commitments made for raw materials, supplies, and equipment, and large expenses incurred in the production of the initial run of product weeks or perhaps months before the acceptance of the product by the public can be ascertained. Normally, the firm will seek to maintain some degree of flexibility in its operations. But there is no escape from the necessity of making extensive commitments in advance, based on forecasts or estimates of the future demand for the finished product, as well as of the probable costs of production, with allowances made for many contingencies that may arise as production plans are carried into execution.

Expected or ex ante returns versus realized or ex post returns

A distinction must thus be drawn between the planning or *budgeting* aspect of business enterprise, which involves the making of plans for a subsequent operational period (perhaps three months, six months, or a year) and the *accounting* aspect of the enterprise, which involves a recapitulation of the results of these operations at the end of the operational period. A corresponding distinction must be made between the expected or *anticipated* earnings or profits of business enterprise, on the basis of which policies are formulated and plans made, and the *realized* earnings or profits of enterprise as determined by the accountants after the results are all in.

The plans determine how many goods or services will be pro-

duced and what quantities of resources will be employed. As the processes of production and sale progress, the actual results may be quite different from what was expected when the original plans and commitments were made. At the end of the year, or the quarter, or any other conventional accounting period, it may be found that actual sales revenues for the period were either greater or less than had been expected, and also that production costs actually incurred were greater or less than had been anticipated. What remains as earnings for the enterprise (the excess of total sales revenue over total costs incurred) therefore may exceed or fall short of the original expectations.

By that time, however, labor and other productive resources have already been employed, and in general paid for, and the goods or services have been produced and sold. There is no way of going back, on the basis of hindsight, and changing what has already been done. Therefore, the profits or earnings that are actually realized have no direct significance in determining the production, employment, and pricing policies of the enterprise. For example, an aircraft manufacturing firm might have found, at the end of 1945, that it had made large profits on its production of military aircraft during that year. But that would provide no basis for planning for an equally large or larger production of such aircraft for 1946, when presumably government requirements for planes would be drastically reduced.

It is now common in economic literature to refer to *expected* or anticipated profits, on the basis of which plans are made, as *ex ante profits* (profits as viewed before the fact) and to refer to actually *realized* or accounting profits as *ex post profits* (profits as viewed after the fact). The following discussion is concerned with profit expectations or anticipations, that is, earnings or profits *ex ante.* The latter part of the chapter will deal in some detail with the calculations by which actually realized earnings or profits are determined *ex post,* and with the disposition that may be made of such earnings among the various groups who have claims against those earnings.

Realizations of one period as an element conditioning future prospects

It must be recognized, of course, that the results of past operations may condition what the business enterprise can do in the

future. For example, a firm that has shown a long record of profitable operation in the past may have ample resources at its disposal and find little difficulty in obtaining additional funds, if needed, to carry out its plans for the future. A new firm, on the other hand, or a firm that has experienced severe losses in the past, may encounter serious difficulties in seeking to attract resources with which to carry on production, even though the prospects for profitable operation in the future are regarded as bright by those at the helm of the enterprise. Granting all this, it is still true that the decisions of those responsible for the conduct of the enterprise will be guided by their own views or forecasts of the future, and that they will be unlikely to make commitments for future production, regardless of the resources that could be commanded, unless there is a prospect that the operation will be profitable.

It is possible that, in forecasting the future, those responsible for the conduct of the enterprise may simply assume that the conditions affecting the operations of the firm are unlikely to change radically and that future returns are likely to be about the same as were those realized in the past. That may or may not be a rational forecast, but if it is made, then it will condition the decisions that must be made now in order to keep production going at the same level.

If there is an expectation of increased demand for the product of the firm, and therefore of increased total sales revenues, an incentive exists for making such adjustments in production plans, and in the employment of productive resources, as seem most likely to afford the maximum gain to the enterprise. Or, if there is a prospect of increased production costs, a corresponding readjustment of production and employment plans, and perhaps prices, will appear to be in order. Conversely, if there is an expectation of diminished demand for the product, or of alterations in costs, there will be a basis for altering the plans of the firm for future production.

The time span of expectations as related to planning

Obviously the future stretches on to eternity, and no business firm would seek to plan once and for all for such an indefinite span of time. Actually there are great differences in the period of time that must be contemplated by business management with

respect to different parts of its planning problem. Production plans and commitments can be varied, within the limits of existing plant capacity, on comparatively short notice. Production schedules may be adjusted quarter by quarter, or month by month, or sometimes even day by day, depending on the amount of notice required to vary the procurement of raw materials and labor. The decision to install additional machines, or to erect new buildings, or to develop a new sales organization involves much longer forecasts, covering a few years or perhaps two or three decades. Thus a much greater degree of uncertainty and risk of potential loss affects certain business decisions than affects others, because they involve longer spans of time, within which unpredictable changes of conditions may occur.

Profit Expectations as Contrasted with Other Incentives to Enterprise

How precisely can future prospects be evaluated?

In recent years, it has frequently been charged that economic analysis is based on the assumption that business activity is motivated exclusively by the desire for profit, and that an unrealistic degree of emphasis is placed on the maximization of profit prospects. In the first place, it is said that conventional economic analysis assumes that businessmen know far more than they actually do about the demands for their products and their costs of production, and that, in fact, business decisions rest on far less precise calculations than would be supposed from a study of a textbook on economics.

An effort has been made in this book to indicate that business decisions are necessarily based on estimates of prospective demands and costs, which may or may not be accurate. Those estimates may be thought of in terms of probabilities, with respect to which a considerable margin of error in estimation may be involved. It is clear, also, that a businessman's estimate of what is likely to happen in the future is often swayed by the views of his friends or associates, by what he reads in the newspapers or in trade journals, by his political convictions, or by the prevailing tone of optimism or pessimism in the community. But in the last analysis it is what a man thinks that influences his action, even though later events may prove that his forecast or estimate was

wrong. Thus, by recognizing the element of fallibility in human judgment, it is possible to escape at least a part of the weight of this first charge.

The significance of nonpecuniary motives

A second point in the charge against conventional economic analysis is that it puts exclusive stress on the desire to maximize profits and ignores other incentives that may have great importance in determining the plans and undertakings of business enterprise. These other incentives or motives may differ widely. For example, certain prominent business leaders and others have stressed the ideas of "business as a profession" and the public responsibilities of business enterprise. In times of war or emergency also, patriotic considerations may exercise a powerful influence on business decisions. But at the same time the position of self-styled "hard-headed" businessmen must be recalled. These men take the attitude that they are not in business for their health, that no one else will pay their bills, and that in the last analysis the acid test of any proposition is whether or not it will make money. Even the most altruistic business leader is unlikely to embark deliberately upon a venture that promises to result in loss if, by any legitimate alternative, that loss could be avoided.

In other quarters stress has been placed on such incentives as the desire for security for the enterprise or the protection of the capital position of the enterprise. The effort to achieve security may lead to the development of policies designed to protect the position of the firm in its field against the encroachment of rivals, but not necessarily designed to exploit all opportunities for gain. Or, alternatively, the desire for power or prestige may induce continued expansion of large firms, even though there is no clear evidence to support a belief that such expansion would carry with it commensurate gains in earnings.

Long-term versus short-term gains, and strategic considerations in business policy

It must be noted that there may be a difference between maximizing immediate profit expectations and maximizing the profit expectations of the firm for a longer period in the future. Strategic considerations that concern the position of the firm for many years to come, both in relation to its business rivals and in relation

to its sales prospects and its structure of production costs, may also play a significant role in the formulation of policy.

This point is perhaps illustrated by the history of the automobile industry in the years following World War II, when the major manufacturers refrained from raising new car prices and boosting manufacturing profits to the full extent that the pent-up demand for automobiles would have permitted. By adopting a more moderate policy, the automobile manufacturers escaped a part of the resentment on the part of car buyers that might have been directed at them had they exploited current opportunities for profit to the hilt, and most of the opprobrium was directed to the "gray-market profiteers" who "gouged" the buying public. It is also possible that the automobile manufacturers held within narrower limits the price reductions that might subsequently have to be made to maintain the salability of their products. They may also have limited to some extent the increase in wages demanded by their employees, and so kept down the future level of production costs.

Granting that to place exclusive emphasis upon the maximization of profit prospects may give an erroneous impression of the factors that govern entrepreneurial decisions, it may be said that profit expectations represent only one of many considerations playing upon the plans and commitments of enterprise. But no business firm can expect to remain long in existence if it is consistently unable to obtain, in revenue from the sale of its product, an amount sufficient to meet the obligations incurred in production. In general, a firm's price, production, and employment policies will necessarily be formulated with an eye to the avoidance of losses, if that is humanly possible, whether or not those policies are intended to wring every last penny of profit from the conduct of the firm's operations. Moreover, few business enterprises would regard the showing of a handsome profit from operations as an unmitigated calamity.

Expectations, Risk Assumption, and Profits

Assumption of risk as an element in enterprise

Whatever the complex of motives that may influence present business decisions, the fact remains that in order to carry on operations at all, present commitments must be made commensurate

with the magnitude of the projected operations. In making these commitments, a risk is necessarily assumed that the conditions that emerge with the passage of time may be quite different from those that are now forecast, and that the results may be either much more favorable or much less favorable than are now anticipated.

Obviously, there will be no complaint if the returns are unexpectedly good; but what if they are bad? The incentive to take this risk exists because the only way by which the enterprise can be put in position to reap the hoped-for gain is to assume the risk; "nothing ventured, nothing won." The larger the possible gain, generally speaking, the greater will be the willingness to assume the risk. And, conversely, the greater the apparent chance of loss if things go poorly, the greater will be the prospective chance of gain needed to induce the assumption of that risk.

Are profits a reward for risk-taking?

This sort of analysis has often led to the conclusion that "profit" is a "reward" for risk-taking, which, in turn, is necessary if the processes of production are to go on. The difficulty with such a view is that the profits that are important from the standpoint of *incentives* are *ex ante profits,* that is, *profit anticipations* before the fact, and that these anticipations have little connection with the *realized profits,* or *profits ex post.* The risks that are important are expected hazards and not those adverse events which may or may not in fact occur. Indeed, one may say that realized profits tend to be large if anticipated risks or hazards do not materialize, and vice versa.

The case of monopoly profits

Furthermore, difficulties beset an explanation of profits as a reward for risk-taking when one comes to grips with the problem of *monopoly profits,* or gains that may result from policies designed to exclude potential rivals from the market. In such a case, the monopolistic firm, by following out policies designed to assure itself of a preferred market position, may greatly reduce the risks which it faces. Yet that does not necessarily reduce either its profit expectations or its profits actually realized. What can be said in such a case as to the significance of risk as an element related to profits?

A way out of this difficulty may be found by reexamining the relation of risk assumption to profit anticipations. Business enterprisers assume risks (up to a certain limit) in order to put themselves in position to cash in on profit opportunities as they see them; they do not go out deliberately to assume risks for their own sake. If they believed that they faced no risks at all, their enthusiasm would doubtless be even greater. But at any given time, the risks involved in making present commitments, even in the same industry, are not the same in the eyes of all potential enterprisers. For the firm already established in the field, the risks attaching to present commitments are likely to appear much less grave than the risks as appraised by a newcomer or by those who are considering an attempt to enter the field. And if the firm or firms already in the field are large or very aggressive, other firms, new or old, that might be competent to enter the field, may be deterred by fears that an attempt to do so will be met by retaliatory action on the part of those already "in." The history of American industry is strewn with the records of firms that tried to crash their way in and failed.

Thus, the risks of possible loss, as appraised by would-be competitors, bulk much larger than do the risks of already established firms and serve as a deterrent to entry. By holding down the extent of competition faced by those already in, the risks that the latter must assume are correspondingly reduced and their profit prospects thereby protected. Handsome realized profits and generous profit prospects for firms operating in protected markets are to be explained thus; not in terms of the prospective risks that they themselves must assume, but in terms of the large risks that would have to be assumed by anyone else who sought to challenge their position—risks that may in fact prevent new rivals from appearing at all.

The assumption of risk, then, represents the stake that must be put up to participate in the game, and if some of the players can control the deal of the cards, they may stand to gain more than if they did not, with little chance that their hands will be low on the show-down.

Profit expectations, not profits realized, the key to enterprise

A further point may be made with respect to the significance of profits as an incentive to economic activity, namely, that though

profit expectations are essential as a stimulus to the initiation and continued conduct of business operations, it is not necessary that profits actually realized from such operations exceed the losses of those whose expectations are disappointed. It has been said that the amount spent over the centuries in prospecting for gold exceeds the value of the gold taken out of the ground by those who struck pay dirt. And in every successful sweepstakes the amounts expended by hopeful gamblers exceed the value of the prizes distributed. Yet the clear recognition of these facts does not deter the hopeful venturer who believes that in his own individual case the gamble will pay off. What is important is the prospect of possible gain which lures men on, not the post-mortem comparison of realized gains and losses for the entire group.

Questions of Public Interest and Public Policy

Opportunities for gain that are not associated with public benefit

A final point in the consideration of profits is that the opportunities for gain that present themselves to businessmen may or may not be associated with activities that result in general social advantage. Our system of private enterprise is based on the assumption that, on the whole, profit opportunities will be associated with the production of goods and services that are desired by the people of the community. It is assumed that profits will accrue as a result of the skillful forecasting of people's demands for those goods and services and the mobilization and effective utilization of the human and material resources and services needed to turn them out. However, as Thorstein Veblen and others have pointed out, there is no necessary connection between making goods and making money, and many of our problems of public policy arise from the fact that such a disparity does exist. In so far as opportunities exist for obtaining enhanced gains by restricting production or raising artificial barriers to potential competition, there is a basis for conflict between the interest of the particular enterprise or industrial group and the general public interest.

What if expectations of gain are insufficient to insure full employment?

Even where opportunities for the exploitation of monopolistic advantages are slight, problems of general public concern still

arise as a consequence of the fact that profit opportunities do not present themselves as a steadily burning light, producing a constant stimulus to economic activity. On the contrary, individual profit expectations are subject to drastic fluctuations in response to changes in the general level of economic activity and income.

To a certain extent, profit expectations are self-realizing, in the sense that when profit expectations are high, business firms are generally motivated to expand their activities, with concomitantly increased demands for productive goods and services. These demands in turn contribute to an expansion of the aggregate demand for all kinds of goods and services and a higher level of employment and incomes, which help to "make good" the opportunities of disposing of the products of industry at a profit. Conversely, when general business prospects are worsening, most individual enterprises are prudentially inclined to cut back production and to reduce, if not eliminate, plans for expansion. But such cutbacks in the employment of labor and other resources carry with them reduced outpayments of income and therefore reduce the aggregate amounts available for expenditure on the purchase of goods and services. Thus, sales and sales revenues decline, and profit realizations also tend to decline, or to be replaced by losses.

As a consequence, a major problem of public policy in the modern economy is to devise ways of offsetting the effects of fluctuations in the profit anticipations of private enterprise in the aggregate, and to find means of maintaining the level of production and income for the economy as a whole at the highest level permitted by the available resources and technical knowledge in the community. This is the central problem of *macroeconomics,* the analysis of the functioning of the economy as a whole.

Realized Profits of Enterprise: the Economic and the Accounting Viewpoints

The foregoing pages were concerned with the significance of profit expectations as an incentive to enterprise. But what of the profits (or losses) that may actually accrue as the production plans of enterprise are carried into execution? How are the operating results of the enterprise determined, and how are the gains or losses from current operations apportioned among those who have an interest in the enterprise?

In approaching this analysis, it is important to keep in mind that there is a difference between realized profits as viewed from the standpoint of economic analysis, and realized profits or earnings as customarily viewed from the standpoint of the accountant or the business firm itself.

Economic analysis of realized profits

In carrying on its operations, the business firm must purchase raw materials, hire labor, and rent or own land, buildings, and machinery in amounts sufficient to carry on current productive operations. For those resources or services that can be purchased from day to day, the firm must make immediate current outlays in order to carry on production. Costs of administration and supervision, and also selling costs, may be partly variable with output, and partly fixed. In the case of plant and other durable productive facilities owned by the enterprise itself, the calculated amounts allowed for or imputed to their use during a given period of time constitute fixed costs of production, from the standpoint of economic analysis, although they do not necessarily involve any immediate cash expenditures. These calculated costs or allowances include depreciation and a "return" (equivalent to the going rate of interest) on the investment in fixed plant and equipment as well as on inventories of goods in process. From the economic point of view, taxes paid to various governmental units, except those levied on profits, are also regarded as costs. If the revenues from the sale of the product are more than sufficient to cover variable costs and fixed costs, as calculated, the firm will show a profit.

Accounting analysis of operational results

From the accounting point of view, the various items indicated above are broken down in a somewhat different way. The gross profit of the enterprise is the difference between total current revenue, from the sale of the firm's product, and the direct cost of producing the goods sold. This cost includes expenditures for raw materials, labor, and similar items. Certain other items listed in the preceding section are commonly classed as "expenses" and deducted from *gross profit* to determine the *net income* of the enterprise. These items include administrative and selling expenses, interest on borrowed funds, taxes (except corporate income taxes), and also an allowance for depreciation to compensate for that part

of the service life of the plant and other durable productive facilities which is estimated to have been used up in the process of current production. The allowance for depreciation is a calculated expense and not a cash outlay, but if an allowance were not made for it, the result would be an overstatement of the apparent earnings on current operation.

It should be noted that although depreciation is regarded as a part of fixed cost in the economic sense, it is not the only element included, because the concept of fixed cost in the economic sense includes also an allowance of at least a minimum return (equivalent to the going rate of interest) on the investment in the durable assets used. But, in figuring the cost of goods sold, the accountant does not include any allowance of a return on investment in productive plant as a *cost.* It follows, therefore, that the accounting concept of gross profit includes sums which, from the economic point of view, are treated as costs.

Certain additional items of expense, associated with the sale of the product and with the general administration of the business, are customarily deducted from the gross profit of the enterprise in determining its *net profit from operations.* Even net profit from operations, however, includes certain items that from an economic point of view are regarded as costs. These include taxes payable by the enterprise (except corporate income taxes) and net interest payable to others as a consequence of either short-term or long-term borrowing. What remains after these items are deducted is referred to as net income (before corporate income taxes), that is, income accruing to the enterprise from its operations. This is the amount that is available (after payment of corporate income taxes) for distribution to the stockholders of a corporation, or for withdrawal by the proprietor or partners of an unincorporated enterprise.

Even the net income, in the accounting sense, does not fully correspond to realized profits in the economic sense, because it does not seek to differentiate between that part of the earnings which represents a return on the investment (equivalent to the interest that might have been obtained had the investment funds been loaned to others) and the part that represents a return attributable to the undertaking of whatever *venture* was involved in current production. With this latter component of earnings profit, in the economic sense, is primarily associated.

Income statements from the economic and accounting viewpoints

A numerical illustration may help to clarify the comparison of the economic and accounting viewpoints. Suppose that a business firm utilizes a building and equipment valued at $1,000,000. Depreciation on the fixed plant and equipment is calculated to be 10 per cent per year, or $100,000. If the amount invested in the plant facilities had been loaned at interest, an annual income of perhaps $40,000 in interest might have been obtained (corresponding to a 4 per cent interest rate on long-term loans). Thus the use

TABLE 6

INCOME ACCOUNTS FROM THE ECONOMIC AND ACCOUNTING VIEWPOINTS

Economic Viewpoint			*Accounting Viewpoint*		
Total sales revenue (net)		$500,000	*Total sales revenue* (net)		$500,000
Less: variable costs			*Less: cost of sales*		
Labor	$100,000		Labor	$100,000	
Materials	140,000		Materials	140,000	
Administration and sales *	15,000		Depreciation	100,000	
Interest (short term)	5,000				340,000
		260,000	*Gross profit*		160,000
		240,000	*Less: selling expenses*		
Less: fixed costs			Administration, advertising, sales salaries, etc.**	20,000	
Administration and sales *	45,000		*Less: general expenses*		
Depreciation	100,000		Administration and office expenses **	40,000	
Taxes	45,000				60,000
Interest on investment	40,000		*Net profit from operations*		100,000
		230,000	*Less:*		
Profit on operations		$10,000	Taxes	45,000	
			Interest	5,000	
					50,000
			Net income		$50,000

* Assuming that one-fourth of administrative and selling costs are variable with output and that three-fourths are not.

** Assuming that nonmanufacturing expenses are divided about one-third for selling and two-thirds for general administration.

of the plant and equipment involves a fixed cost, in the economic sense, of $140,000. Taxes of various kinds, except corporate income taxes, amount to another $45,000. Other costs of production include $140,000 paid for raw materials, $100,000 for labor, and $60,000 for administrative and selling expenses. In addition, $5,000 is payable as interest on short-term credits extended to the firm by suppliers of materials or by banks. The total amount received from the sale of the finished product is $500,000. Note how this situation would appear if presented in the form of an income statement, first in terms of customary economic analysis, and second, in terms of customary accounting procedures.

Reconciliation of economic and accounting viewpoints

The difference between the "profit on operations," as computed in the left-hand part of the table, and "net income," as computed on the right, arises because the $40,000 of "imputed" interest on investment in plant and equipment was included as a part of the fixed cost of production in the income account from the economic point of view, but was not included as a cost or expense in the accounting analysis. The deduction of this amount from the net income as shown in the right-hand section of the table would leave a remainder corresponding to the $10,000 shown as profit on operations from the economic viewpoint.

One may be tempted to inquire what purpose is served by differentiating between profits in the economic sense and net income as calculated by the accountant, particularly since the figures reported by business enterprises almost invariably relate to net income. One reason for making such a distinction, and deducting imputed interest on investment from net income, is that unless this is done, differences in the financial structures of different firms may give rise to misleading impressions of their relative profitability.

Suppose, for example, that the firm whose operations were summarized in Table 6 had obtained half of the funds invested in plant and equipment by selling $500,000 worth of bonds bearing 4 per cent interest per year, involving an annual interest payment of $20,000, and that the remaining $500,000 had been provided by the stockholders. In that case, the income account for the firm, from the accounting viewpoint, would be the same as in Table 6, down to and including the computation of net profit from opera-

tions. From there on, however, the allocations from net profit would be different, as indicated in Table 7.

TABLE 7

ALLOCATION OF NET PROFIT FROM OPERATIONS, WITH AND WITHOUT BONDED DEBT

Without Bonded Debt		*With Bonded Debt*	
Net profit from operations	$100,000	*Net profit from operations*	$100,000
Interest (short term) $ 5,000		Interest (short term) $ 5,000	
Taxes 45,000		Bond interest 20,000	
		Taxes 45,000	
	50,000		70,000
Net income	$50,000	*Net income*	$30,000

It is thus apparent that unless allowance is made for imputed interest on the investment of the owners of the enterprise the operating results of the firm that had no bonded debt would seem to be better than those of the firm that had a bond issue outstanding, although in fact the results might be precisely equivalent.

The Distribution of the Earnings of Enterprise

In the foregoing discussion it was apparently implied that the net income of the enterprise accrues to the stockholders. However, it is by no means always true that the entire net income remaining after payment of corporate income taxes is distributed as dividends to the stockholders; indeed, in many cases it is not.

Dividend disbursements versus retained earnings

The directors of a corporation are empowered to determine what part of net income, after corporate income taxes, shall be distributed as dividends, and what part shall be retained as undistributed profits or corporate surplus and reinvested in the business. To be sure, the directors are normally elected by the stockholders and so are presumably amenable to their wishes. But since, in the modern corporation, directors are often elected by a small minority of the whole group, in some instances they constitute a virtually self-perpetuating body. Thus it often happens that they, with the active management, can exercise very nearly a free hand in determining just how the earnings of the enterprise shall be distributed.

It follows that there is no necessary correspondence between the net income of any specific enterprise (or of all the business enterprises in the economy) and the amounts distributed as dividends to stockholders in any given year, or over a period of years. Many corporations follow a policy of maintaining a relatively steady rate of dividends from year to year, despite fluctuations in earnings, by appropriating a part of earnings to surplus in good years, and drawing against surplus to maintain dividend payments in poor years. Other corporations regularly appropriate to surplus each year a significant share of earnings, utilizing these as a means of financing business expansion. The magnitude of the share of earnings retained as undistributed profits, as compared with dividends paid out, is indicated, for the United States as a whole, by the figures in Table 8.

TABLE 8

DISPOSITION OF CORPORATE PROFITS, 1929–1948

(Millions of Dollars)

Year	*Corporate Profits**	*Inventory Valuation Adjustment*	*Profits Before Taxes*	*Corporate Income Tax*	*Profits After Taxes*	*Dividends*	*Undistributed Profits*
1929	10,290	472	9,818	1,398	8,420	5,823	2,597
1930	6,563	3,260	3,303	848	2,455	5,500	−3,045
1931	1,631	2,414	− 783	500	−1,283	4,098	−5,381
1932	−1,995	1,047	−3,042	382	−3,424	2,574	−5,998
1933	−1,981	−2,143	162	524	− 362	2,066	−2,428
1934	1,098	− 625	1,723	746	977	2,596	−1,619
1935	2,997	− 227	3,224	965	2,259	2,872	− 613
1936	4,946	− 738	5,684	1,411	4,273	4,557	− 284
1937	6,166	− 31	6,197	1,512	4,685	4,693	− 8
1938	4,292	963	3,329	1,040	2,289	3,195	− 906
1939	5,753	− 714	6,467	1,462	5,005	3,796	1,209
1940	9,177	− 148	9,325	2,878	6,447	4,049	2,398
1941	14,615	−2,617	17,232	7,846	9,386	4,465	4,921
1942	19,894	−1,204	21,098	11,665	9,433	4,297	5,136
1943	24,279	− 773	25,052	14,406	10,646	4,493	6,153
1944	24,046	− 287	24,333	13,525	10,808	4,680	6,128
1945	19,153	− 564	19,717	11,215	8,502	4,699	3,803
1946	18,331	−5,229	23,560	9,620	13,940	5,808	8,132
1947	25,615	−5,987	31,602	12,511	19,091	7,018	12,073
1948	32,623	−2,170	34,793	13,619	21,174	7,932	13,242

* Corporate profits and inventory valuation adjustment figures reflect estimates of changes in the value of inventories that are not fully reflected in stated corporate profits.

Source: U. S. Department of Commerce, *National Income Supplement to Survey of Current Business*, July, 1949, Table 1, page 10.

From these figures it is apparent that the amounts paid out in dividends to their stockholders by American business corporations have fluctuated less, from year to year, than have net incomes. As a consequence, the incomes received by stockholders as a group have been more stable than have business earnings (though not necessarily more stable than the incomes of any other economic groups in the community). Also it is apparent that over the span of years covered by these figures the amounts retained out of corporate earnings as corporate surplus (undistributed profits) have considerably exceeded the amounts by which surplus has been reduced in poor years to maintain dividend payments. Thus, in the nine years (1930–1939) covering the period of the great depression, the aggregate reduction in undistributed profits amounted to approximately twenty billion dollars, whereas, in the subsequent nine years, the additions to undistributed profits aggregated very nearly forty-six billions. This, then, affords an indication of the magnitude of the amounts retained as corporate savings and hence available for the financing of corporation expansion without undertaking the offering of new securities to the public.

Obviously, the share of earnings retained by corporations is not paid out in personal incomes to the stockholders, and hence is not available to them either for current consumption or for direct personal savings. Earnings retained by the business enterprise are not, of course, lost so far as the stockholders are concerned. The stockholder has an undivided interest or equity in all of the assets of the corporation, including those acquired by reinvestment of surplus, and the market value of his stock is likely to rise as the enterprise expands and prospective earnings improve. Nevertheless, there is no way in which he can realize on earnings that have not been distributed as dividends, except by selling his stock to someone else for a higher price. There is also no necessary correspondence between changes in the market value of the stock and the amount of undistributed earnings plowed back into the business. Thus, a stockholder who sells out his stock may obtain a "capital gain" either greater or smaller in amount than the amount of earnings retained for reinvestment.[1]

[1] Under the Federal Income Tax law a part of long-term capital gains is taxable as income.

Diversion of earnings

Furthermore, where a corporation is subject to management control, as may be the case when stock ownership is widely distributed among small owners, it may be possible for a small group closely connected with management to divert, by one device or another, a part of the true earnings of the corporation to themselves. One such technique is for a few individuals to set up another enterprise to perform certain types of service (management, financing, construction, or distribution) for a major corporation which they control, and to set fees or prices for such services at relatively high levels. Payments of these padded prices or fees then appear as contractual costs on the books of the main corporation, and hence operate to dilute the apparent earnings of the latter.

In still other cases the directors of a corporation have approved the payment of unusually large salaries to key management personnel, or bonuses or other rewards that supposedly compensate exceptional contributions by these individuals to the business of the corporation. Inasmuch as definite standards for the measurement of such contributions are lacking, there may be wide differences of opinion concerning the actual worth of the services performed. Still another device by which the allocation of the earnings of the business corporation may be affected is the institution of pension plans providing retirement income for executive personnel.

Such practices may offend the traditional view that the management of a corporation stands in a position of trusteeship for the stockholders as the legal owners of the corporation, and the assumption that the owners have a rightful and legal interest in all earnings resulting from the activity of the enterprise. They also raise serious questions as to the economic functions or activities with which profits are connected.

Obviously the effect of such practices is to blur the distinction between personal service incomes and proprietary incomes. They emphasize the difficulty of associating the receipt of "profits" with the performance of any unique "function" in the conduct of economic activity.

Chapter 7

PRODUCTION, EMPLOYMENT, AND INCOME

Production Plans of Enterprise as Determinants of Employment and Income

For the individual firm and for business enterprises generally, the current state of business expectations plays a dominant role in the formulation of pricing, production, and employment policies. On the basis of the expected receipts from the sale of the product, the enterprise undertakes to pay the wages of the labor force employed, the rental for property owned by others and used in production, interest on funds advanced by others, and the bills for materials, supplies, power, transportation, and all the other items needed to carry on production. The firm must also pay taxes to federal, state, and local governments, and make provision for the depreciation of physical equipment owned by the enterprise itself. If there is an expectation that, after all of these expenses have been met, something will remain as profit for the enterprise, an incentive will exist to put the production plans into execution. An incentive to continue production will also exist, even if there is a prospect that loss will ensue, provided it appears that an even greater loss would result if production were halted or curtailed.

Upon the plans made by individual business firms and by business enterprises as a whole depends the extent to which the different kinds of productive factors are employed at any given time in the private enterprise segment of the economy, that is, in nongovernmental activities. On those decisions, likewise, depend the amounts that are paid out in the form of wages, expenditures for

materials, supplies and components, rentals, interest, and the like. Thus, the incomes received by different economic groups in the community directly reflect the magnitude of the production plans of business enterprises, and they rise or fall as those plans call for an expansion or contraction of the production schedules for all enterprises taken collectively. If the receipts from the sale of all finished goods exceed the aggregate costs involved in their production, a gain will be recorded for the enterprises concerned. If total receipts fall short of covering all costs, a loss will be recorded, reflecting a negative return to the enterprises concerned.

Before going on to the discussion of the problems associated with the formulation of the employment policy of a particular firm, it will be helpful to consider further the over-all picture of the connections between production, employment, and income for the economy as a whole. This consideration is desirable because the general level of business activity and income plays a major role in determining what the particular employer is able to do in formulating his own policy.

Measurement of Production and Income for the Whole Economy

In recent years the National Income Division of the United States Department of Commerce has formulated several important and related measures to reflect the level of economic activity in the United States and to show the way in which the income arising out of this activity is apportioned or allocated to different economic groups. If one knows something about these methods of measurement and the magnitudes of the incomes received by various economic groups from year to year, he is in better position to analyze the operation of the economy both in terms of its over-all behavior and of the behavior of different industries or enterprises within industries.

Gross national product

To reflect the general level of economic activity, the National Income Division has published estimates of the *gross national product* of the country for each year from 1929 to the present. The gross national product purports to represent the value of all

finished goods and services produced in the course of a year, the value being estimated in terms of market prices.

It is necessary to express the total production of the economy in terms of value rather than physical units because there is no way of adding together the automobiles, loaves of bread, phonograph records, shoes, suits of clothes, and all the other kind of goods produced, so as to get a sensible total figure, except by converting them all to common terms, such as dollar prices.

In estimating the gross national product, an allowance is made for the value of goods and services produced, even though they may never actually be sold, as, for example, foodstuffs produced and consumed on the farm. Certain types of service are not included, such as the service that a man performs for himself in shaving or mowing the lawn, or the activities of a housewife in her own home, because of the difficulty of attaching any definite monetary value to such services. But an allowance is made for governmental services, although many of them are not sold and are difficult to evaluate. Governmental services and activities are valued in terms of what they cost, that is, in terms of the total expenditures made by governmental units for salaries or wages to government employees and for purchases of materials and supplies.

The gross national product could be estimated theoretically in either of two ways: (1) by summing up the values of all *finished* goods and services produced in the course of a year, or (2) by summing up the *values added* to goods and services by business units (and governmental agencies) at each stage of production. If the value of the products (both finished goods and raw materials or semifinished goods) turned out by all the business units of the country in the course of a year were added up directly, a great deal of double counting would occur and the total volume of production would be overstated. For example, if the value of all the coal, all the iron ore, all the steel, and all the automobiles produced in a year were added together, the coal and iron ore used in producing steel would be counted for the third or fourth time in the value of the automobiles produced. If, however, the summary figures include only the value of finished goods produced and ready for final sale to consumers or to other users for use rather than resale, then the double counting is eliminated.

The alternative way of viewing the gross national product is to

regard it as summing up the value added in manufacturing or processing activities by the different enterprises of the economy. If, for each business firm or unit, the amounts paid to other business firms for raw or semifinished materials, supplies, or nonpersonal services are deducted from the sales value of the product turned out, the remainder represents the value added in manufacturing or processing by that firm. For example, if the amounts paid by an automobile manufacturer for steel, parts, and other components and services supplied by other firms are subtracted from the value of the finished cars produced, the difference represents the gross product of the automobile firm. It is then possible to sum up the values added at different stages of production, without double counting, and so arrive at a total figure for the gross national product, providing that amounts representing the values added by governmental activities are also included.

In actual practice, not all of the information is available that would be needed to determine the gross national product according to either of the approaches outlined above. The figures published by the National Income Division represent the most accurate estimates that can be made with the available data, several different sources or techniques often being used in arriving at particular items that enter into the total.

Net national product

Turning out the goods and services that constitute the gross national product of the economy in any given year involves not only the use of manpower but also the employment of a tremendous mass of productive plant and equipment built up over past decades. Although much of that equipment is durable, still its use in production involves depreciation, which must be provided for or offset if the productive capacity of industry is to be maintained for the future. Moreover, at the beginning of any year there are large stocks of unfinished goods in process with which to start out. If the inventories of such goods are smaller at the end of the year than at the beginning, then again the potential output of the succeeding year may be impaired. Therefore, to get a more accurate picture of the real productive activity that has occurred during the year, it is necessary to make an allowance for the depreciation of productive equipment and for any reduction in inventories that may have occurred. This allowance is referred to as

a *capital consumption allowance.* When it is subtracted from the value of the gross national product, the remainder is termed the *net national product.*

National income

The net national product may be regarded as representing *current production* in the economy as a whole during the year, valued at market prices or their equivalent. The value of the net national product, in turn, must be allocated in various ways. Business enterprises are obligated to pay taxes of various kinds to different governmental units if they are to do business. These taxes represent a claim against the value of the goods produced that, from a legal standpoint, takes priority over other claims. Therefore, *indirect business taxes* (which in practice include all taxes except corporate income taxes and personal income taxes) are treated as the first deduction from, or allocation of, the net national product. The remainder is referred to as the *national income,* or *net national product valued at factor cost.*

The significance of the term *national income* is that it represents the aggregate value attached to the services performed by the various groups participating in productive activities during the course of the year, and hence constitutes the basis of their claims to income. It also represents the "factor cost" of producing the goods and services turned out during the year, including wages and other compensation of labor, interest paid or payable to those who have advanced funds for use in production, rentals paid or payable to individual owners of property, and the earnings (or losses) of enterprise in the aggregate. In the statistics published by the Department of Commerce, the national income is allocated to five major categories: (1) compensation of employees, (2) rental income of persons, (3) net interest, (4) income of unincorporated enterprises, and (5) corporate profits. It should be noted in passing that none of these income categories represents "profits" in the strict economic sense of the term. Instead, they represent mixed types of incomes.

Personal income

The national income comprises the claims of the various economic groups to "shares" in the current national product. There are, however, some differences between these claims and the

amounts of income actually received by individuals as *personal income.* It is not necessary for present purposes to list all the adjustments that must be made in order to reconcile the estimated national income with the personal income actually received by individuals, but the major items may be indicated briefly.

Compensation of employees, for example, as figured in national income, includes not only wages paid to employees but also sums paid over by employers as contributions to social security funds. Inasmuch as the employees will ultimately benefit by these contributions, they are regarded as compensation, even though they do not appear in the pay envelope.

Similarly, corporate income taxes paid to the government are regarded as coming out of the earnings of enterprise, to which the stockholders have a claim. If a corporation does not pay out all its earnings (after payment of corporate income taxes) as dividends to its stockholders, the undistributed profits do not appear as personal income to the stockholders, although they are included in the figures for national income. On the other hand, in a year when the earnings of business are poor, a corporation may pay dividends in excess of its earnings, drawing on previously accumulated surpluses or undistributed profits to do so. Such dividend payments out of surplus will be reflected in personal income for the years in which paid, but not in estimated national income, because they do not arise out of current economic activity.

Amounts paid out as social security benefits, or as aid to dependent persons, also appear as personal income but not as a part of national income. The National Income Division does not treat interest paid on the government debt, incurred largely to finance the war, as arising in connection with current production, and hence does not include it as a part of national income. It does, however, include such interest in estimating personal income.

Disposable income

Even after personal income for the economy as a whole has been estimated, it is necessary to deduct personal income taxes before arriving, finally, at a figure which indicates the total amount that the people of the economy can dispose of according to their own wishes. It is this final remainder, referred to as *disposable income,* which people may spend on goods or services, or give away, or save. It is this disposable income, therefore, that is of primary signifi-

cance in dealing with the demands of people for different kinds of consumers' goods and services, because the amount of disposable income determines how much they can buy.

Statistics of Production and Income, 1929–1948

The various steps by which the value of the goods and services produced during a year may be broken down into significant component parts have now been traced. But a much better picture of what it all means may be obtained by looking at the actual summary figures compiled by the National Income Division for the past two decades. Table 9 includes the figures for the gross national product, net national product, national income, personal

TABLE 9

NATIONAL PRODUCT, INCOME, AND EMPLOYMENT IN THE UNITED STATES, 1929–1948

(In billions of dollars; millions of persons)

Year	*Gross National Product*	*Net National Product*	*National Income*	*Personal Income*	*Disposable Income*	*Employment*	*Unemployment*
1929	103.8	95.0	87.4	85.1	82.5	47.6	1.6
1930	90.9	82.1	75.0	76.2	73.7	45.5	4.3
1931	75.9	67.6	58.9	64.8	63.0	42.4	8.0
1932	58.3	50.7	41.7	49.3	47.8	38.9	12.1
1933	55.8	48.5	39.6	46.6	45.2	38.8	12.8
1934	64.9	57.7	48.6	53.2	51.6	40.9	11.3
1935	72.2	64.8	56.8	59.9	58.0	42.3	10.6
1936	82.5	74.8	64.7	68.4	66.1	44.4	9.0
1937	90.2	82.2	73.6	74.0	71.1	46.3	7.7
1938	84.7	76.7	67.4	68.3	65.5	44.2	10.4
1939	91.3	83.2	72.5	72.6	70.2	45.8	9.5
1940	101.4	93.0	81.3	78.3	75.7	47.5	8.1
1941	126.4	117.1	103.8	95.3	92.0	50.4	5.6
1942	161.6	151.6	137.1	122.7	116.7	53.8	2.7
1943	194.4	183.7	169.7	150.3	132.4	54.5	1.1
1944	213.7	201.8	183.8	165.9	147.0	54.0	.7
1945	215.2	202.8	182.7	171.9	151.1	52.8	1.0
1946	212.6	200.7	179.6	176.9	158.1	55.3	2.3
1947	235.7	222.0	201.7	193.5	172.0	58.0	2.1
1948	262.4	246.7	226.2	211.9	190.8	59.4	2.1

Sources: U. S. Department of Commerce, *National Income Supplement to Survey of Current Business*, July, 1949, Tables 3 and 4, pages 10-11; U. S. Department of Labor, *Handbook of Labor Statistics*, 1947 edition (Bulletin 916), Table A-12, page 36; *The Economic Report of the President to Congress, January 7, 1949*, Table C-7, page 105.

income, and disposable income, and also, to provide a different type of indicator of the level of economic activity, the number of persons gainfully employed in the United States for each of the years covered. Table 10 repeats the national income figures and shows the break-down of the national income into the five major categories to which it is allocated.

TABLE 10

ALLOCATION OF NATIONAL INCOME IN THE UNITED STATES BY DISTRIBUTIVE SHARES, 1929–1948

(In billions of dollars)

Year	*National Income*	*Compensation of Employees*	*Rental Incomes of Persons*	*Proprietorship Incomes**	*Net Interest Received by Persons*	*Corporate Income Before Tax**
1929	87.4	50.8	5.8	13.9	6.5	10.3
1930	75.0	46.5	4.8	11.0	6.2	6.6
1931	58.9	39.5	3.6	8.2	5.9	1.6
1932	41.7	30.8	2.5	4.9	5.4	−2.0
1933	39.6	29.3	2.0	5.2	5.0	−2.0
1934	48.6	34.1	2.1	6.6	4.8	1.1
1935	56.8	37.1	2.3	9.9	4.5	3.0
1936	64.7	42.7	2.7	9.9	4.5	4.9
1937	73.6	47.7	3.1	12.2	4.4	6.2
1938	67.4	44.7	3.3	10.8	4.3	4.3
1939	72.5	47.8	3.5	11.3	4.2	5.8
1940	81.3	51.8	3.6	12.7	4.1	9.2
1941	103.8	64.3	4.3	16.5	4.1	14.6
1942	137.1	84.9	5.4	23.0	3.9	19.9
1943	169.7	109.2	6.1	26.7	3.6	24.3
1944	183.8	121.2	6.5	29.0	3.1	24.0
1945	182.7	123.0	6.3	31.2	3.0	19.2
1946	179.6	117.0	6.2	35.0	3.0	18.3
1947	201.7	127.6	6.5	38.5	3.4	25.6
1948	226.2	140.3	6.6	42.8	3.8	32.6

* Including inventory valuation adjustment.

Source: U. S. Department of Commerce, *National Income Supplement to Survey of Current Business*, July, 1949, Table 1, page 10.

Fluctuations in Production, Employment, and Income

The figures presented in Table 9 spotlight the drastic fluctuations that have occurred over the years in the general level of economic activity, employment, and income. Between 1929 and 1933 the gross national product declined more than 40 per cent,

from almost $104 billion to $56 billion, and national income declined similarly, from about $87 billion to less than $40 billion. Not until after the outbreak of World War II did the level of economic activity, as reflected in the gross national product figures, surpass the 1929 level, nor did the national income exceed the 1929 level in any of the intervening years.

In the succeeding years, however, the unprecedented requirements of World War II were accompanied by a rise in both gross national product and national income to levels previously regarded as unattainable, and after the end of the war both continued to rise. A part of this gain can be regarded as a nominal, rather than as a real, increase in production and income, inasmuch as prices rose during the war and even more after its close. Nevertheless, allowing for the increase in prices, there was a substantial gain in the volume of goods and services actually produced, as compared with prewar production, and a corresponding rise in the "real" value of the national income.

Here emerges one of the most significant and important problems posed for economic analysis. Why is it that the American economy as a whole displays such variability in its performance? Why can it at times reach very high levels of activity, with the production of a veritable flood of goods and services, and a high level of income for the people of the community, and at other times decline into a prolonged depression, with low production, unemployment, and scanty income? The question is one of vital and direct concern to everyone in the economy, because, as can be seen from the figures on the distribution of the national income, every class in the community is affected in very large degree by changes in the general level of economic activity and income. When production expands, employment and incomes expand concurrently. When production declines, employment and incomes fall off, and the well-being of the entire community is reduced.

The Distribution of National Income

In considering the figures on the distribution of the national income, in Table 10, it must be remembered that they stand for types of income and that any given individual may derive personal income not only in wages or salary but also by virtue of property ownership.

By type of income

Furthermore, the category of compensation of employees covers remuneration for all types of personal services, from those of the scrubwoman in the office building to those of the president of a giant corporation, or from those of the movie extra to those of the highest-paid star. Similarly, the incomes of unincorporated enterprises include incomes ranging from that of the poorest sharecropper to that of a partner in a highly lucrative law firm or brokerage business or that of a prominent medical practitioner. Thus, relatively little significance attaches to the calculation of the average wage or salary received by the "gainfully employed" persons in the country, because the personal incomes of people vary widely above and below the average.

By size of income

A better picture of what the national income means in terms of the living standards and well-being of the people of the country may be gained by examining the distribution of the national income among different income groups or brackets. Table 11 presents the data on the distribution of income in the United States for two different years, 1935–1936 and 1947, according to size of

TABLE 11

SHARES OF TOTAL MONEY INCOME RECEIVED BY EACH TENTH OF THE NATION'S CONSUMER UNITS, 1935–1936 AND 1947

Consumer Units Ranked by Size of Income	1935–1936		1947	
	Range of Incomes Received	*Per Cent of Total Money Income*	*Range of Incomes Received*	*Per Cent of Total Money Income*
Top tenth	$2,600 and up	36.2	$5,700 and up	33.0
Ninth	1,925– 2,600	14.5	4,200– 5,700	15.
Eighth	1,540– 1,925	11.5	3,500– 4,200	12.
Seventh	1,275– 1,540	9.3	3,000– 3,500	10.
Sixth	1,070– 1,275	7.5	2,550– 3,000	9.
Fifth	880– 1,070	6.6	2,100– 2,550	7.
Fourth	720– 880	5.5	1,700– 2,100	6.
Third	545– 720	4.3	1,200– 1,700	4.
Second	340– 545	2.9	750– 1,200	3.
Lowest tenth	Under $340	1.7	Under $750	1.

Sources: National Resources Committee, *Consumer Incomes in the United States*, 1938, Table 1B, page 95; *Federal Reserve Bulletin*, June, 1948, page 653.

income. The income-receiving units (families or single individuals) are arranged in ten groups or deciles, each representing 10 per cent of the entire number, and these deciles are ranked from top to bottom according to the size of income. Thus, the top decile includes those income-receiving units that had the highest incomes; the bottom decile includes the tenth of the entire group that received the lowest incomes, and so on.

The first year, 1935–1936, is representative of the period of the great depression, and the second represents the postwar era of high employment, production, and income.

Relative stability in the distribution of income

One fact stands out at a glance at these figures. Although the total national income increased nearly four times between 1935–1936 and 1947, the percentage of total national income received by each group changed very little, although the aggregate amount received by each group did rise.

The striking fact that emerges from such a comparison is that, despite great changes in the total national income, the distribution pattern changed very little. Whether the national income was large or small, nearly half of the total was received by the upper two-tenths of all income recipients. And in neither year did the lowest tenth receive as much as 2 per cent of the total national income.

Inequality of income

The figures shown in Table 11 indicate that the distribution of income in the United States is far from equal and that there is little tendency for the inequalities to be diminished by an expansion of production and employment and the attainment of a high level of national income. To a certain extent, the persistence of differences in income may be explained in terms of the typical progression of the individual or family from a relatively low income in the days of struggle to get established to a more comfortable position in years of maturity. Thus in any given year the newcomers to the ranks of those gainfully employed would account for a part of the lower-income groups. But this is only a part of the explanation, and a very considerable part of the working population has little prospect of lifting itself out of the bottom 10 or 20 per cent of income recipients.

What significance attaches to this fact of unequal distribution of income, apart from ethical, sociological, or psychological questions that might be raised? To this query no complete answer can be attempted at this point. Certain important implications, however, do warrant emphasis, particularly those having to do with the use that people at different income levels are disposed to make of the income they receive.

Inequality of income as related to use of income

In the use of disposable income (after payment of personal income taxes) the two alternatives open to people are (1) expenditure on current consumption and (2) personal saving, whether represented by the accumulation of bank deposits, the purchase of insurance, the purchase of a home, or the purchase of securities. Although the modern income tax takes a much larger slice out of large incomes than out of smaller incomes, it merely reduces, but does not eliminate, the differences in disposable income from one level to another.

Studies of the use made of income at different income levels clearly indicate that at the lower end of the income scale all disposable income is expended on current family living and even more. That is, consumption expenditures, for the group as a whole, absorb more than current income, the deficiency being made good by aid received from other sources. As the income level increases, total expenditures on consumption increase, but the *percentage* of income that is spent on consumption decreases and the percentage that is saved increases. Thus it was estimated that in 1935–1936 the income groups receiving $20,000 per year or more in income paid out about one-seventh of the total income received in personal income taxes and in gifts to others, spent a little more than one-third on current consumption, and saved a little more than one-half. In the $5,000 to $10,000 bracket, nearly two-thirds of income received was spent on consumption, a little less than a third was saved, and the remainder went for gifts and taxes. In the $2,000 to $2,500 bracket, nearly seven-eighths of income was spent, less than a tenth was saved, and about 4 per cent went for gifts and taxes.

This does not necessarily mean that receivers of low incomes are improvident and unwilling to exercise the virtues of thrift and frugality. It merely means that virtually all of the income re-

ceived has to be expended in keeping the wolf beyond the threshold. At the same time, it is clear that a very large part of all individual savings are made by people in the middle and upper income brackets, and that a much smaller proportion of income in those brackets is expended on current consumers' goods and services. With larger incomes, it becomes increasingly possible to set aside a part of current income for saving without a drastic impairment of living standards. Thus it appears that the amount of personal saving is closely related to the level of income and tends to vary as the level of income varies.

Propensity to consume and propensity to save

In recent years it has become customary in economic literature to use the term *consumption function* to describe the relationship between the size of income and the amount spent on consumption, both for individuals and for the economy as a whole. Studies of the amounts spent from year to year on consumers' goods in relation to the national income for the corresponding years have indicated that the higher the level of income the smaller the percentage of income spent and the larger the percentage saved. Thus the total amount spent for consumption in any given year, and also the total amount saved, tends to be determined by, or is a "function of," the total amount of income received.

The *average propensity to consume* at any given level of income is represented by the percentage of total income that would be spent for consumption purposes at that level of income. The *average propensity to save,* conversely, is represented by the percentage of total income that would be saved at that level of income.

Suppose that total income is increased or decreased. The change in income will carry with it changes in the total amounts spent for consumption and utilized for savings. The ratio of the change in consumption to the change in income with which it is associated is referred to as the *marginal propensity to consume.* Correspondingly, the ratio of the change in savings to the change in income with which it is associated is referred to as the *marginal propensity to save.*

As an example, assume that, at a given level of national income, the people as a whole were spending 80 per cent of their incomes for consumption and saving 20 per cent. The average propensity to consume, under such circumstances, would be 0.8 and the aver-

age propensity to save would be 0.2. Suppose, however, that if income were to increase the people as a whole would divide *additional* income between spending and saving in the proportions of 75 per cent and 25 per cent. In other words, seventy-five cents out of an additional dollar of income would be spent, and twenty-five cents would be saved. In that event, the marginal propensity to consume would be 0.75 and the marginal propensity to save would be 0.25. In general, the larger the income, the further short of total income do expenditures for consumption fall, and the larger becomes the amount representing personal savings.

Significance of the level and distribution of income

The level and distribution of income in the community are factors of major importance for business enterprisers because they determine the character and extent of the demands of consumers for all kinds of goods and services. A producer of luxury goods is interested in knowing how many people fall in the income bracket for which his wares are designed. A bond salesman would have slim pickings among the sharecroppers of the cotton belt or the migratory laborers in the sugar-beet, potato, or vegetable-canning sections of the country. The mass-production industry, on the other hand, is directly concerned with the amount of income enjoyed by the vast bulk of the population, because that will affect the demands for its products.

From the standpoint of the economy as a whole, the facts of income level and distribution are also important, because they bear directly on the determination of the aggregate demand of the community for all kinds of goods and services as well as the quantity of savings for which people are seeking acceptable forms of investment.

That part of income which is spent on consumers' goods and services is obviously converted directly into demand for the output of industry. As and if the savings of individuals, together with business earnings retained as undistributed profits, are utilized to finance the purchase of machinery, tools, and equipment to make possible a further expansion of production, then the savings of the community, just as much as the sums expended on current consumption, are converted into demands for goods and services of the appropriate kinds, and hence afford a stimulus to economic activity.

That is not, however, always the case, because the existence of outlets for savings depends on the state of business expectations for the future. Only if business leaders, individually and collectively, believe that the prospects for the future are good will there be an incentive to seek funds for purposes of expansion by offering new securities to prospective investors. Lacking such prospects, business enterprises will offer restricted opportunities for the investment of savings. As a consequence, current savings will not be translated immediately into demands for goods and services, but will tend to accumulate in idle funds or bank balances.

It is with this general problem of the interrelationships of income, consumption, savings, investment, production, and employment that the remainder of this book is primarily concerned. But in order to understand the behavior of the economy as a whole it is necessary to see how these interrelated factors present themselves to and influence the policies of the responsible managers of business enterprises through which the economic activities of the community are carried on. Production, employment, and national income expand when businessmen or enterprisers as a group believe that they can advantageously expand their respective undertakings. But those expectations will exist only if there is ground for believing that, if they do expand their operations, the added output can be sold at a profit. That means that the consumers or other users of finished goods and services must have either in hand or in prospect the means with which to buy the added product. But in general the means for making such purchases will become available only if employment increases. Thus again it becomes apparent that production, employment, and income are all inextricably linked in the same process.

In an effort to trace through the interwoven strands of this process, the next two chapters will be devoted to a consideration of the conditions influencing the production and employment plans of the individual enterprise and the supply of productive resources for current use. The latter part of the book will be concerned with those aspects of the economic process that have to do with investment by business enterprise, the interrelationships of savings, investment, interest rates, and property incomes generally, and the level of production, employment, and income for the economy as a whole.

Chapter 8

EMPLOYERS' DEMAND FOR PRODUCTIVE FACTORS

The Problem of Employment from the Standpoint of the Firm

The preceding chapter dealt with the interrelationships of production, employment, and income for the economy as a whole, both analytically and in terms of the statistics of production and income for the United States during the two decades 1929–1948. But the aggregate level of production and income, and the extent of employment of productive resources, depend on the formulation and execution of production plans by literally millions of business enterprises, large and small, which organize and carry on the productive activities of the community.

It is necessary, therefore, to consider the problems of production, employment, and income not only from the standpoint of the economy as a whole, but also from the standpoint of the individual enterprise faced with the necessity of deciding upon its own production, pricing, and employment policies. How much labor would it be to the advantage of the firm to employ at a given rate of wages, in the light of the estimated demand for the product of the firm? Would an increase or decrease in wages tend to alter significantly the amount of labor employed and the amount of product turned out? How would an increase or decrease in the prices of raw materials or components affect the production plans of the enterprise and the amounts of such resources employed? Under what circumstances would it be to the advantage of the

firm to increase its investment in productive plant facilities and to substitute machinery for labor? The answers to such questions will help to round out the consideration of the functioning of business enterprise, both singly and for the economy as a whole.

Character of Employer's Demand for Productive Factors

It has already been noted that the employing firm plays a dual role. It is both a supplier of the finished goods it turns out and a buyer of the resources and services needed for production. The market conditions faced by the employer as a buyer of productive resources and services may be quite different from those which prevail in the market or markets in which the finished goods are sold. For example, a firm that has something of a monopolistic position in the sale of the finished product may be only one of many buyers of certain types of labor or raw materials. On the other hand, a firm that faces the competition of many rivals in the sale of the finished product may be the only buyer, or one of a few rival buyers, of certain resources or services needed for production. A manufacturer located in a small town may provide virtually the only opportunity for employment to skilled mechanics or other workers living in that community. A canning house in a rural locality may offer the only near-by outlet for farmers specializing in the production of tomatoes, peas, beans, or small fruits. Moreover, the same employer may find quite different market conditions prevailing in each of the several different markets from which supplies of labor, materials, and components are obtained. These variant conditions may exercise a very considerable influence on the employer's demands for the various items required for production.

Employer's demand contrasted with consumer's demand

An employer's demands for productive resources and services differ in certain significant respects from a consumer's demand for finished goods and services. The consumer's demands reflect his own personal tastes, preferences, and spendable income. The employer's demands, largely impersonal, are derived from the anticipated demand of consumers for the finished product. The business firm employs productive services and resources, not for their own sake, but because there is a prospect that the amounts

expended in employing them will be more than returned by the sale of the finished product. There are, of course, instances in which an employer feels an obligation to keep the workers employed even though it might be more advantageous from a profit standpoint to lay some of them off. Thus it would be wrong to regard the employer as a mere calculating machine. Nevertheless, there are distinct limits within which humanitarian considerations can operate; the firm can seldom run the risk of going "broke" by keeping its workers employed in producing goods that cannot be sold for an amount sufficient to cover the costs of current operation.

In the remainder of this chapter attention will be concentrated on the two major elements affecting the particular employer's demands for productive resources or services: (1) the demand for the finished product, as it affects the quantities of the various resources required for production, and (2) the possibilities of achieving economies in production by substituting one kind of resource or service for another.

Outlays or expenses versus costs: the unit of calculation

In considering the problems of pricing and production policy for the firm in earlier chapters it was convenient to work in terms of units of the finished product that was to be sold. The relations of prices, total sales revenues, and total costs were analyzed in terms of quantities of finished product. But in turning to the position of the firm as an employer or buyer of different kinds of productive resources or services, it is convenient to shift the basis of calculation from units of finished product to units of the particular productive factor immediately under consideration. The situation of the employing firm presents itself in a different perspective, although it is still the same basic situation. But the questions that arise have a different focus.

Suppose that the employing firm is faced with a demand for an increase in wages. How much more could the firm afford to pay in wages without significantly changing the number of men employed? Here, obviously, the unit in terms of which it is convenient to calculate is not a unit of finished product, but the unit of labor which is the subject of bargaining, whether it be an hour's labor, a day's labor, or a month's labor. Of course, what the management of the firm believes it can afford to pay will de-

pend on how much labor is required to turn out a unit of finished product, and on how many units of finished product can be sold at a given price; but it is much simpler to shift the basis of calculation from units of finished product to units of labor employed.

In translating the analysis of the operations of the firm into terms of employment policy, it is desirable to use some term other than "cost" to refer to the payment that the employer makes for a unit of labor (or of any other productive resource or service), even though a change in the amount so paid will result in a change in the cost of the finished product. In the ensuing discussion the words "outlay" or "expense" will be used in referring to the payments made by the employer for factors of production, whenever the pricing and employment of those factors are being considered, and the word "cost" will be employed only when the analysis refers to calculations in terms of units of finished product.

Suppose, for example, that a firm were employing 8,000 man-hours of labor at a wage rate of $1.25 per hour, and that, with the employment of that amount of labor, 24,000 units of product could be turned out. The total outlay for labor, or the total labor expense, would be $10,000, and that, of course, would also represent the total labor cost of producing the 24,000 units of product. The labor cost per unit of product would be $10,000 divided by 24,000 units of product, or about forty-two cents per unit. The average outlay per unit of labor employed would be $10,000 divided by 8,000 man-hours, or $1.25 per man-hour. By using the term "labor cost" only in referring to the cost of labor in turning out finished product, and by using the terms "labor outlay" or "labor expense" in referring to the employment of labor, it becomes unnecessary to add other terms to indicate which phase of the employer's activities is under consideration.

Employer's Demand as Related to Demand for Finished Product

Once an employer has decided how much of the finished product to turn out, the amount of labor and other resources needed to produce that volume of output will be pretty well determined by the technical conditions of production in the plant. But how much labor (or how much of any other resource or service) would it be to the advantage of the employer to utilize if the wage rate

(or the price of any other resource or service) were either higher or lower? Inasmuch as factor prices have an obvious bearing on production costs, it is to be expected that variations in wage rates and in other factor prices would react in some measure upon the pricing and production policy of the firm, and therefore upon the amounts of the productive factors employed.

In the discussion of pricing and production policy in Chapter 4, changes in factor prices were taken into account in the discussion of the effects of changes in variable costs (see pages 56-58). At that point, no attempt was made to break down the variable costs into the different component elements (labor cost, raw-material cost, and so on). But when one turns to the discussion of the conditions influencing the employment of the various productive factors, it becomes necessary to try to segregate the effects of changes in the price of whatever factor is immediately under investigation. Inasmuch as labor is commonly the productive factor that is most easily varied in employment, the ensuing discussion will deal with the employment of labor, but the analysis is broadly applicable to other factors as well.

If the employer found that it was necessary to pay higher wage rates for labor than before, that would tend to increase the total outlay for any given amount of labor, and hence would also raise the total labor cost of turning out the product. This might very well alter the quantity of product that would be most profitable, under given market conditions for the finished product, and hence would alter the amount of labor that would be employed. Conversely, a lower wage rate would tend to reduce the total outlay for any given quantity of labor, and also the total labor cost of any specified quantity of product. This in turn might alter the quantity of product that would be most profitable, and hence would alter the quantity of labor employed.

The extent to which a higher or lower wage rate for labor would increase or decrease the amount of labor demanded by the employer will depend on whether the demand for the finished product is changing at the same time. It is likely, in fact, that at a time when wage rates for labor are either increasing or decreasing the demands for many kinds of finished goods are also changing. Indeed, it is the view of many economists, based in part upon the general statistics of income and employment, that the volume of employment is much more directly affected by the general level

of income and aggregate demand than by variations in wage rates for specific groups of workers. It is, nevertheless, important to get a clear picture of the interrelationship of wage rates and other factor prices and the pricing and production policy of the individual employing firm, inasmuch as the initiative in production and employment lies with the employer in any particular instance.

The problem for consideration at this point, therefore, is to isolate the effects of variations in wage rates upon the cost structure and pricing situation as seen by a given employer at the time when production plans are being formulated and commitments for labor and other resources are being made. With a certain estimate or forecast of the demand for the finished product, the question is to determine how much labor and other resources it would be advantageous to employ in producing goods or services to meet that demand, assuming that wage rates were either higher or lower.

The analysis is made difficult by virtue of the fact that in most cases a change in the output of the individual firm would involve not only a change in the amount of labor employed in production, but also a change in the amounts of raw materials and other elements that go into the finished product. How, then, can the effects of variations in wage rates upon employment and production be segregated?

There are different ways in which such a segregation may be attempted, for purposes of analysis, but one of the simplest methods is to subtract from total sales revenue the outlays that must be made for all the other variable factors of production required to produce the corresponding output of finished product. If the employing firm, for example, were a manufacturer of men's clothing, then the outlays for cloth, trimmings, and other items needed for the production of finished suits could be subtracted from the total sales revenue that could be obtained from the sale of a given number of garments. The remainder could be regarded as the net total revenue or the *total value product* obtained by the firm for the *making* of the suits in question, in which the labor outlay would represent the principal *variable* element. It would then be possible to analyze the effects of changes in wage rates and in the employment of labor upon the total expense of making different numbers of suits, as compared with the net total revenue, or total value product, obtainable from their sale. Such a comparison would show the quantity of labor that it would be most profitable

to employ at any given rate of wages, with a given demand for the finished suits.

This approach may appear to be highly unrealistic, but as a matter of fact it is very common in compiling statistics of industry to show the *value added in manufacturing,* that is, the difference between the total sales value of the product turned out and the total cost of raw materials and supplies purchased by the manufacturer from outside sources. In the ensuing discussion, therefore, the total sales revenue for the firm will be taken as equal to the net amount remaining from the sale of any given quantity of product, after subtracting raw material and other variable expenses apart from labor. Total fixed expenses, however, will continue to be treated as a component in total expense of production.

As an illustration of the effects of a change in wage rates upon total costs of production, and upon the production and employment policy of the particular firm, it will be convenient to translate the previous analysis of changes in variable costs (as presented in Chapter 2, pages 31-32, and in Chapter 4, pages 56-58) into terms that will emphasize the labor aspect of the situation. This is done in Figure 20, in which the abscissa scale represents *units of labor employed,* in terms of man-hours, and the ordinate scale represents *total labor outlays* or expense involved in employing the corresponding numbers of man-hours. The price radials shown here represent wage rates per man-hour, and not prices for the finished product as in previous figures. Thus, if the employer were to hire 10,000 man-hours of labor at a wage rate of $1.25 per hour, the total labor outlay for that quantity of labor would be $12,500, indicated by a point on the $1.25 wage-rate radial directly above the 10,000-unit point on the abscissa scale. If the employer were to employ 8,000 man-hours at a wage rate of $1.25, the total labor outlay for that quantity of labor would be $10,000, indicated by a point on the $1.25 wage-rate radial directly above the 8,000-unit point on the abscissa scale. It follows, then, that the wage-rate radial corresponding to the prevailing rate of wages may be looked upon as a total outlay curve for labor, reflecting the way in which the total labor expense would vary as the amount of labor employed was varied, assuming that the wage rate remained unchanged. By the same token, a change in wage rates would carry with it a corresponding change in the total outlay curve for labor.

To determine how many man-hours of labor it would be to the

advantage of the firm to employ at a given wage rate, it is necessary to see how changes in the amount of labor employed would affect the total amount of product that could be turned out, and also the total value product (as defined above) obtainable from the sale of the product under current demand conditions.

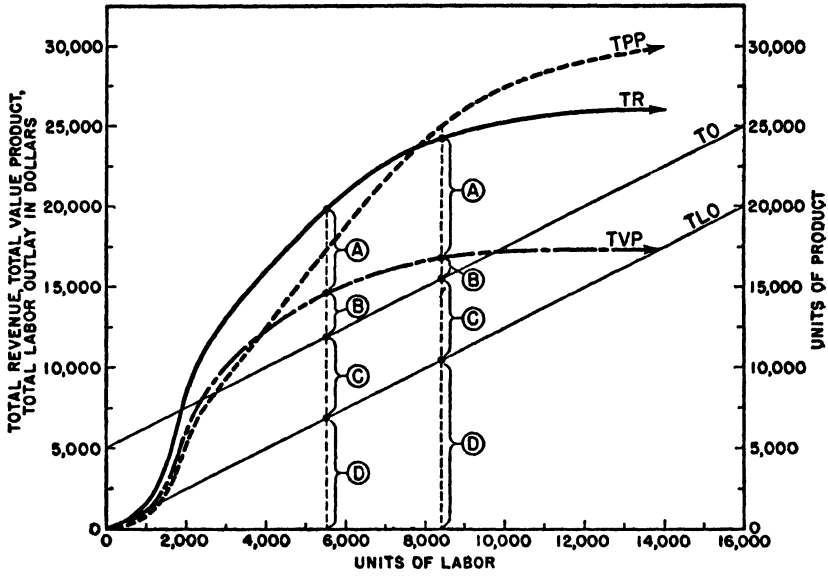

FIGURE 20. EMPLOYER'S DEMAND FOR LABOR: BASIC CONDITIONS OF EMPLOYMENT

For each of the indicated levels of employment	5,600	8,400
Estimated total output in units of product	17,500	25,000
Estimated total sales revenue	$20,000	$24,300
A represents raw materials expense of	5,250	7,500
Giving a total value product of	14,750	16,800
D represents total labor expense of	7,000	10,500
C represents total fixed expense of	5,000	5,000
B represents total expected profit of	2,750	1,300

The first step in picturing this situation is to add another curve to Figure 20 to indicate the quantities of product that could be turned out in the plant if various quantities of labor were employed. This curve may be referred to as the *total physical product* curve, and is labeled *TPP* in Figure 20. Note that this curve starts at the origin and slopes upward to the right, rising more and more sharply as the number of man-hours employed is increased over a certain range, and then "damping-off" or rising less and less rapidly as still larger numbers of man-hours are employed. The curvature of the *TPP* curve reflects the fact that with a very

small amount of labor employed the existing productive facilities would be undermanned, so that an increased output *per man-hour* could be obtained by stepping up employment and production. Conversely, the "damping-off" of the *TPP* curve toward its upper end represents the difficulty of obtaining substantial additions to total product as the utilization of plant facilities approaches capacity.

To provide a means of estimating the total physical product associated with any given number of man-hours employed, a second ordinate scale is included on the right-hand margin of Figure 20 as a measure of total physical product. Thus, for example, a total output of 12,500 units of product could be turned out if 4,000 man-hours were employed, whereas if 5,600 man-hours were employed, 17,500 units could be turned out, and 20,000 units of product could be obtained if 6,400 man-hours were employed.

The basic employment and output figures used in the construction of Figure 20 and also the figures for total sales revenue, total value product, total outlay, total raw materials expense, and total labor expense are presented in Table 12. These assumed data

TABLE 12

EMPLOYMENT, REVENUE, VALUE PRODUCT, AND EXPENSE DATA FOR FIGURE 20

(1) *Man-hours Employed*	(2) *Output Units*	(3) *Total Sales Revenue*	(4) *Total Material Expense*	(5) *Total Value Product*	(6) *Total Labor Expense*	(7) *Spread*	(8) *Total Fixed Cost*	(9) *Total Profit*
1,800	2,500	$4,250	$ 750	$3,500	$2,250	$1,250	$5,000	−$3,750
2,080	5,000	7,500	1,500	6,000	2,600	3,400	5,000	−1,600
2,485	7,500	10,600	2,250	8,350	3,150	5,200	5,000	200
3,200	10,000	13,450	3,000	10,450	4,000	6,450	5,000	1,450
4,000	12,500	16,000	3,750	12,250	5,000	7,250	5,000	2,250
4,800	15,000	18,150	4,500	13,650	6,000	7,650	5,000	2,650
5,600*	17,500*	20,000*	5,250*	14,750*	7,000*	7,750*	5,000	2,750*
6,400	20,000	21,500	6,000	15,650	8,000	7,500	5,000	2,500
7,320	22,500	23,000	6,750	16,250	9,150	7,100	5,000	2,100
8,400	25,000	24,300	7,500	16,800	10,500	6,300	5,000	1,300
10,360	27,500	25,300	8,250	17,050	12,950	4,100	5,000	−900
13,920	30,000	26,250	9,000	17,250	17,400	−150	5,000	−5,150

* Most profitable level of employment.
Column (5) is equal to Column (3) minus Column (4).

are, incidentally, the same as those underlying the construction of Figure 10 in Chapter 5. The only difference is that in Figure 20 the data are rearranged in order to put the emphasis on the wage

and employment aspects of the situation. The data on raw-materials expense assume that the raw material cost *per unit* of finished product remains unchanged at thirty cents regardless of variations in the output of the plant.

In order to obtain a graphic picture of the effect of changes in the number of man-hours employed, and corresponding changes in total output (as indicated by the *TPP* curve), the total sales revenue curve has been redrafted so as to show the total amount that would be received from the sale of the product that could be turned out with any given quantity of labor. Thus, with 8,400 man-hours, a total output of about 24,300 units could be produced, as indicated by the corresponding point on the *TPP* curve. The sale of that output would bring in a total sales revenue of about $25,000. Deducting the $7,500 representing the raw materials expense for that quantity of product leaves a total value product of about $16,800, indicated by the corresponding point on the net total revenue or total value product curve, *TVP*. At a wage rate of $1.25 per hour, the total labor outlay for 8,400 man-hours would amount to $10,500, indicated by the corresponding point on the total labor outlay curve, *TLO*. Adding to the total labor outlay the $5,000 representing total fixed or overhead expense would give a total outlay (excluding raw-materials expense) of $15,500. The difference between this total outlay of $15,500 and the $16,800 representing the total value product would constitute the total profit that could be derived from the employment of 8,400 man-hours in production. In this case, the total profit, with that volume of employment, would be approximately $1,300. (See points *A*, *B*, *C*, and *D* on the graph.)

A larger total profit could, however, be obtained by cutting back employment to about 5,600 man-hours. With that number of man-hours employed, total output would be about 17,500 units, which would give a total sales revenue of about $20,000. The deduction of $5,250 of raw-materials expense would leave a total value product (*TVP*) of $14,750, as against a total outlay of $12,000, of which $7,000 would represent the total labor expense in employing 5,600 man-hours at a wage rate of $1.25, and $5,000 would constitute total fixed expense of production. The $2,750 difference between the total value product and the total outlay would represent the total profit obtainable with that volume of employment. (See points *A*, *B*, *C*, and *D* on the graph.)

Note that at this volume of employment the spread between total value product, as represented by the *TVP* curve, and total outlay, as represented by the *TO* curve, exceeds the spread obtainable at any other volume of employment. (See points *B* on the graph, for 5,600 man-hours.) This, then, represents the most profitable volume of employment and production, under the assumed conditions of demand for the finished product, raw-materials expense, and wage rate for labor employed. A change in any one of these elements would alter to some extent the volume of production that would be most profitable for the firm. As a consequence, there would be some change in the amount of labor that it would be most advantageous to utilize in production.

Demand for labor as related to wage rates

Suppose that, with no change in the demand for the product or in raw-material prices, the prevailing wage rate were to rise or fall. That would involve a corresponding increase or decrease in the total outlay for labor if the employment of labor were not changed, and would therefore decrease or increase the total profit that the firm could obtain from the sale of any given quantity of product. In many instances a moderate change in wage rates might have so small an influence on the profit position of the firm that it would not be worth while to change the volume of production and the employment of labor. But if it were believed that a significant improvement in the position of the firm could be achieved by altering the production schedule, there would be an incentive to add to the labor force if the wage rate decreased, or to cut back on the labor force if the wage rate increased. The demand for labor on the part of the individual firm represents the quantities of labor that it would be most advantageous to employ at different rates of wages, assuming that other conditions remain unchanged.

A graphic illustration of the conditions underlying the demand of the individual firm for labor is presented in Figure 21. The construction of this figure is basically the same as that of Figure 20, except that the total physical product curve (*TPP*) has been omitted, as unnecessary for further comparisons. The total value product curve (*TVP*) is the same as in Figure 20 and represents the net total sales revenue obtainable from the sale of the product that could be turned out by employing different quantities of labor, after deducting the raw-material costs of the product.

In Figure 21, however, a series of wage-rate radials has been added to represent different possible wage rates, from seventy-five cents per hour to $4 per hour. Each of these radials may be regarded as representing not only a given wage rate, but also the total labor outlay that would be incurred in employing different amounts of labor at the wage rate indicated.

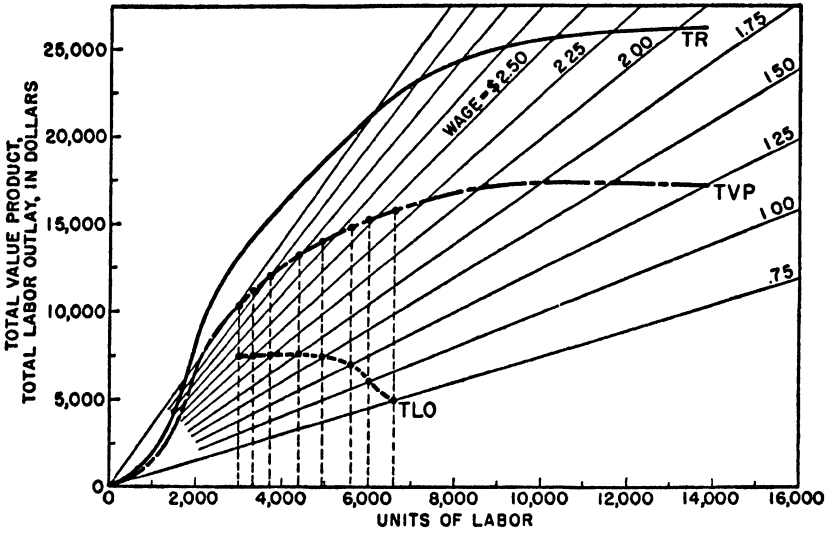

FIGURE 21. EMPLOYER'S DEMAND FOR LABOR AS RELATED TO WAGE RATES

TLO represents the variation in total amount that the employer would find it profitable to expend on the employment of labor at different wage rates, with given demand for the finished product, as represented by the total sales revenue curve, *TR*.

The profit obtainable with any given volume of employment at a given wage rate would therefore be determined by deducting the total fixed cost, $5,000, from the spread between the total value product curve (*TVP*) and the appropriate wage-rate radial at points corresponding to that amount of employment. The most profitable volume of employment, at any given wage rate, would be the employment at which the spread between the *TVP* curve and the wage-rate radial in question was greatest.

In Figure 21 a series of points has been plotted on the *TVP* curve and on the successive wage-rate radials to indicate the amounts of labor that would afford the maximum profit to the firm at each of the different wage rates. To facilitate the identification of these points, they have been connected by a dotted-line

curve, *TLO*, which serves to show how the total labor outlay of the firm would vary, with different wage rates, if production and employment were adjusted in each case to the maximum profit position.

At a wage rate of $1.25 per hour, the maximum profit would be obtained by employing about 5,600 man-hours, with a total value product, as indicated by the *TVP* curve, of $14,750, and a total labor outlay of $7,000, giving a spread of $7,750. Deducting the $5,000 representing total fixed costs would leave a total profit of about $2,750.

At a wage rate of $1.50 per hour, the greatest spread between the *TVP* curve and the $1.50 wage-rate radial would be obtained with an employment of about 4,900 man-hours of labor. The total value product would be about $14,000, and the total labor outlay about $7,350, giving a spread of about $6,650. Deducting the $5,000 representing total fixed costs would leave a total profit of approximately $1,650.

Or if the wage rate were $1 per man-hour, the greatest spread between the *TVP* curve and the $1 wage-rate radial would be obtained with an employment of about 6,000 man-hours. With that volume of employment, the total value product would be about $15,300, the total labor outlay about $6,000, the total outlay, including fixed costs, about $11,000, and the total profit approximately $4,300.

Similar comparisons of the total value product curve, *TVP*, with the other wage-rate radials give the following approximate results. At a wage rate of seventy-five cents, the most profitable amount of employment of labor would be 6,600 man-hours; at $1.75, about 4,400; at $2.00, about 3,750; at $2.25, about 3,450.

These results may be arranged in the form of a demand schedule for labor, as in Table 13, or plotted graphically in the form of a demand curve (labeled D_1), in Figure 22.

It may appear surprising that the amount of labor it would be advantageous to employ would not increase to a larger degree at lower wage rates. A major element in the failure of employment to expand more nearly in proportion to the change in wage rates is the assumption that the product of the firm is sold under conditions of monopoly or monopolistic competition, so that increased output could be disposed of only if the price of the finished prod-

TABLE 13

EMPLOYER'S DEMAND SCHEDULE FOR LABOR; EFFECT OF A CHANGE IN DEMAND FOR THE FINISHED PRODUCT

Wage Rate per Hour	*Man-hours of Labor Demanded Before Change in Demand for Product* (D_1)	*Man-hours of Labor Demanded After Change in Demand for Product* (D_2)
$2.50	3,000	3,850
2.25	3,350	4,200
2.00	3,750	4,700
1.75	4,400	5,175
1.50	4,900	6,000
1.25	5,600	7,200
1.00	6,000	7,900
.75	6,600	8,600

uct were reduced. This has the effect of "damping-off" the total sales-revenue curve and the derived total value product curve for labor, as is evidenced in Figures 20 and 21, by the flattening out of the total value product curve.

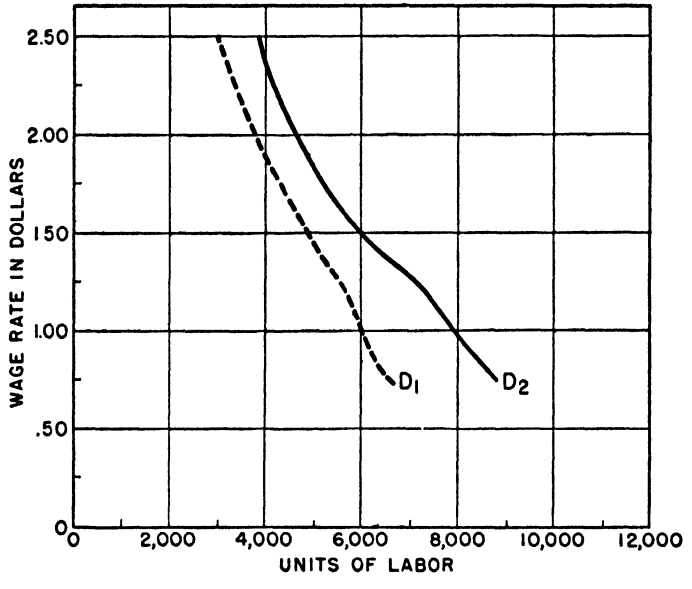

FIGURE 22. EMPLOYER'S DEMAND FOR LABOR

D_1 represents the employer's demand for labor under conditions of demand for the product represented in Figure 21; D_2, the employer's demand for labor under conditions of demand for the product represented in Figure 23.

Effect of a change in demand for the finished product

Suppose that the demand for the finished product of the firm were to increase. The effect of such a change would be to raise the total revenue curve, *TR*, and also the total value product curve, *TVP*. The effects of such a change in the demand for the finished product upon the employer's demand for and employment of labor are represented graphically in Figure 23. In this figure, the total value product curve, TVP_1, is the same as the *TVP* curves of Figures 20 and 21, whereas the TVP_2 curve represents the change in the demand for the product. It is assumed that raw-material expenses and total fixed costs are unchanged from the earlier illustration.

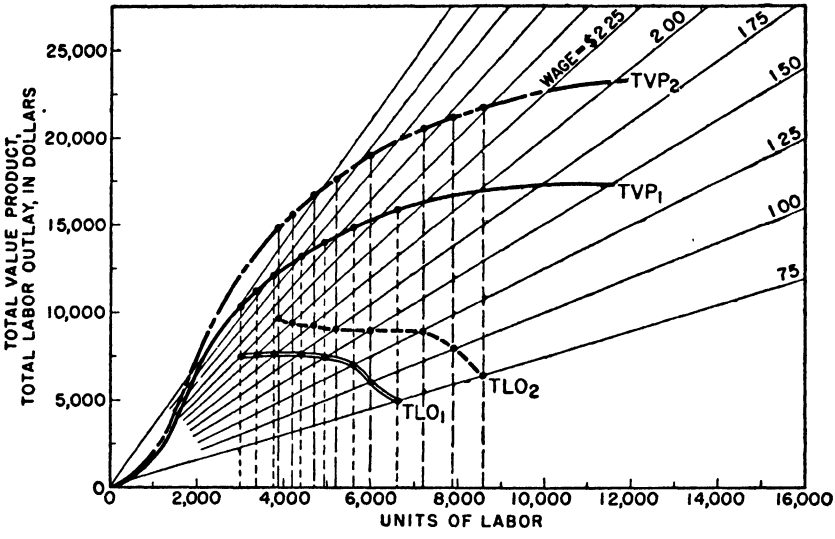

FIGURE 23. EMPLOYER'S DEMAND FOR LABOR AS AFFECTED BY CHANGE IN DEMAND FOR FINISHED PRODUCT

TVP_1 is the same as the *TVP* curve of Figure 20 and Figure 21; TLO_1 is the same as the *TLO* curve of Figure 21.

By the same procedure as has already been demonstrated, the most advantageous amounts of labor to be employed at different possible wage rates have been determined and are indicated by pairs of points plotted on the TVP_2 curve and the wage-rate radials. The third column of Table 13 shows the demand schedule of the firm for labor following the shift in demand for the finished product. A comparison of columns two and three in the

table indicates that the amount of labor that could advantageously be employed would be greater, at each of the possible wage rates, as a consequence of the change in the demand for the finished product.

The figures from column three of Table 13 are plotted in the form of a demand curve for labor, labeled D_2, in Figure 22. A comparison of the D_1 and D_2 curves serves to suggest the reaction of the employer's demand for labor to a change in the demand for the finished product. It is interesting to note that with figures which were not hand picked for this particular example, but were originally employed in Chapters 2 and 4 to illustrate cost conditions and price adjustments, the change in employment which would tend to follow a shift in demand appears to be greater than that which would be associated with a comparable proportionate change in wage rates.

For example, a 20 per cent decline in wage rates, from $1.25 to $1.00, would make possible an increase in employment from 5,600 man-hours to about 6,000 man-hours, or about 7.2 per cent, assuming that other conditions, including the demand for the finished product, remained unchanged. On the other hand, a change in the demand for the finished product, as represented by the shift from the TVP_1 curve to the TVP_2 curve, would increase the most advantageous volume of employment from 5,600 man-hours to 7,200 man-hours, or about 28.5 per cent.

The percentage change in demand may be figured in either of two ways. First, it may be computed by comparing the total sales revenue that could be obtained, under the changed demand conditions, from the sale of the same output as would have been most profitable under the original demand conditions, but at the higher price made possible by the change in demand. Reference to Figure 11 in Chapter 4 indicates that under the original demand conditions the 17,500 units of product turned out with 5,600 man-hours of labor would have brought in a total sales revenue of approximately $20,000.[1] After the change in demand occurred, the same output could have been sold at a price that would bring in a total sales revenue of about $22,750. The increase in total sales revenue, for the same employment and output, would be about 14 per cent.

[1] See pages 53-56.

The second way of measuring the change in demand is to see how much more of the finished product could be sold, after the shift in demand occurred, if the price of the finished product were not changed. Reference once more to Figure 11 indicates that if the price were not changed, consumer purchases of the product following the shift in demand would be about 26,000 units as compared with 17,500 prior to the shift. Measured in that way, the change in demand would be about 48.5 per cent. Even so, the increase in employment associated with the change in demand would be proportionately greater than the increase in employment associated with a 20 per cent reduction in wage rates.

It would be rash indeed to generalize from a single example, particularly when the example itself is hypothetical. However, the conclusion to which the example leads is in line with the view, now widely held among students of labor economics, that changes in wage rates are less significant in their influence upon employment than are changes in demand associated with changes in the general level of income. In summarizing the argument, it may be said that either a change in demand for the finished product or a change in wage rates will tend to change the volume of employment that would be most profitable for the firm, but that a change in demand for the finished product is more likely to result in a substantial change in the volume of employment than is a moderate change in wage rates.

Application of the analysis to other productive factors

Although the analysis of the individual firm's demand for a productive factor has thus far been presented in terms of labor, the same technique might equally well be applied to the analysis of the demand for any other productive resource or service employed in production. The demand for raw materials, for example, might be derived in the same way: by treating labor expense as a deduction from total sales revenue, and comparing the remainder with the different total outlays that would be required to purchase different quantities of raw materials at different raw-material prices. And in somewhat the same way the demand of the individual firm for machinery and other productive facilities at different prices for such equipment might be derived. It seems scarcely necessary, however, to go on at this point to the

detailed examination of these other cases of the individual employer's demand for the productive factors.

Market demand schedules for particular factors of production

In some instances, the individual firm is the only buyer of a particular type of labor or of a particular type of raw material in a certain community, or perhaps within a comparatively large region. In that case, the particular employer's demand also constitutes the entire market demand for the service or resource in question. The telephone company, for example, is virtually the only employer for certain specialized types of workers. In other instances, there are only a few employers of certain classes of labor or purchasers of raw materials within a particular market, as, for example, the major tobacco manufacturers or the major meat packers. In that event, strategic considerations may play an influential role in determining the employment policies of the firms in question.

In still other cases, the individual employer is only one of many firms making use of about the same type of labor or material resources. In such instances it is possible to visualize a market demand schedule which represents the amounts of labor (or of other resources) that the employers as a group would stand ready to employ at various possible wage rates (or prices), other things being equal.

It should be kept in mind that a general change in the demands for the finished products turned out by the various employers would tend to carry with it a roughly corresponding shift in their combined demands for labor and other resources. Also, the larger the segment of industry that is embraced in the analysis, the greater is the likelihood that an increase or decrease in the wages of labor or in the prices of other resources would result in concurrent changes in the demands for finished products, brought about by changes in the incomes received by wage earners and property owners. It therefore does not follow that for a large segment of industry a lowering of wage rates, or of the prices of other resources or services, would induce employers to increase employment even to the degree suggested in the earlier analysis of the demand of the individual firm. The larger the segment of industry involved, the less is the justification for assuming that "other

things remain equal" when a change in wages or in raw-material prices is under consideration. In other words, for a large segment of the economy it is inappropriate to assume that the demand for finished products is "independent" of the incomes paid out by the employers as a group to those who provide labor services or materials for use in production.

Employer's Demand as Affected by Substitution of Factors

It was suggested at the beginning of this chapter that the individual employer's demand for any particular resource or service is influenced not only by the demand for the finished product but also by the possibility of substituting one resource or service for another. The possibility of making such substitutions is governed primarily by the technical conditions of production. In some instances, there is little possibility of varying the amounts of different resources or services used in turning out a given quantity of finished product, whereas in other cases a great deal of flexibility exists. In making men's suits, for example, the yardage of cloth needed for each garment is fixed within comparatively narrow limits. However, there is a greater possibility of substituting machine work for hand tailoring if an advantage in production can thereby be obtained.

Generally speaking, the degree of flexibility in substitution is greater over a period of time than it is at the moment. For example, a manufacturer faced by an increase in wage rates might have little opportunity to substitute labor-saving machinery immediately. But over a period of a few months it might be possible to install (or even develop) machines that would reduce substantially the amount of labor required to turn out a given amount of product. It would be advantageous to do so if the ultimate effect would be to reduce the total cost of producing the desired output, taking into account the cost of maintaining, repairing, and ultimately replacing the machines, as well as the additional fixed costs resulting from the increase in plant investment.

Substitution as related to changes in relative factor prices

The general theory of substitution may be stated simply. It will be to the advantage of an employer to substitute one factor for another, as long as that would tend to reduce the total outlay for

the resource that was being displaced, in greater degree than it would add to the total outlay for the resource that was being substituted. In other words, it would pay to substitute labor-saving machinery for hand labor as long as the total labor outlay was reduced more than the total outlay for machine operation was increased.

It should be remembered that seldom does substitution involve the complete displacement of the factor that is being "economized." The introduction of labor-saving machinery rarely permits the complete displacement of labor, inasmuch as some labor is required to operate the machines or to perform supplementary operations. However, the type of labor required may be different from that which is displaced. But in any event, it would be advantageous to continue substituting machinery for labor as long as the reduction in the total wage bill was greater than the corresponding increase in fixed and maintenance expense, plus the expense of operating the machines. The process of substitution would reach its limit when the "saving" in labor expense was just offset by the increase in other expenses.

What the "saving" in labor expense and the increase in other expenses will amount to depends (1) on the technical conditions of production, and (2) on the relative prices of the factors that are capable of being substituted for each other. Suppose, for example, that it was found by experiment that, when a certain amount of product was being turned out in a given plant, the addition of 100 man-hours of labor to the existing labor force would result in an increase of 200 units of finished product, with no increase in the amount of machinery in place. Alternatively, the installation of an additional machine would permit the same increase in output to be achieved, with no increase in the labor force.

Under such circumstances one machine or 100 man-hours of labor could be regarded as technically the equivalent of each other. Whether the employer would gain, or lose, or just break even, by adding a machine and cutting the labor force by 100 man-hours, would depend on the wage rate currently being paid for labor, as compared with the expense of operating the machine for the period of time required to turn out 200 additional units of product. Suppose that the wage rate for labor were $1.25 per hour and that the fixed and operating expenses chargeable to the machine for the given period of time were $125. Under those cir-

cumstances, no net gain would be achieved by substituting the machine for labor, or vice versa.

Suppose that the wage rate were to increase to $1.50 per hour, and that there were no corresponding increase in machine expense. It would then be advantageous to substitute the machine for 100 man-hours of labor, because total labor expense would be reduced by $150, whereas total machine expense would be increased by only $125 for each machine added. But as the process of substituting machines for labor continued, the size of the total labor force would be progressively reduced in comparison with the number of machines in use.

Eventually a point would be reached beyond which the further substitution of machines for labor would entail increasing difficulties, because operators would still be needed to man the machines and to carry through other processes. As the number of machines was increased, in relation to the labor force, the larger amount of mechanical equipment in use per worker would tend to increase the output of product per man-hour employed. As labor became increasingly "short," in comparison with the amount of machinery employed, it might be found that a further reduction of the labor force by 100 man-hours would cut back the output as much as 240 units. To make up that deficiency it would now be necessary to add 1.2 machines.

Obviously it would not be possible to add a fraction of a machine, but machines could be added in the ratio of 6 machines to 500 man-hours of labor displaced. However, the addition of 6 machines would entail an increase of $750 in machine expense, an amount just equal to the reduction in total labor expense that would result from cutting back 500 man-hours at a wage rate of $1.50 per hour. The process of substitution would therefore reach its limit when it had run far enough to equalize the saving in labor expense and the addition to machine expense. Clearly, the greater the increase in wages, the further the process of substitution could go before reaching the economic limit.

A decrease in wages, conversely, would open opportunities for substitution in the opposite direction. However, the process of substitution resembles a chemical reaction that is only partially reversible. If an employer has once expanded plant facilities by installing additional durable mechanical equipment, the investment could be liquidated only by reselling the machinery. But

conditions are not always favorable for the disposition of used equipment. Thus, once machinery has been substituted for labor, a considerable decline in wages might occur without stimulating a reverse process of substitution.

The preceding analysis of substitution may be stated in somewhat more technical economic terms, as follows. It would be to the advantage of an employer to substitute factor *A* for factor *B* until the *additional* physical product resulting from the employment of an additional unit of *A* stands in the same ratio to the *reduction* in physical product that would result from the elimination of a unit of *B*, as does the outlay for a unit of *A* to the outlay for a unit of *B*.[2] Expressed symbolically, the limit to the substitution of *A* for *B* is reached when

$$\frac{\dfrac{\text{Increase in total product}}{\text{Increase in amount of } A}}{\dfrac{\text{Decrease in total product}}{\text{Decrease in amount of } B}} = \frac{\text{Price per unit of } A}{\text{Price per unit of } B}$$

The left-hand member of such an equation represents the *marginal rate of substitution* of *A* for *B*, and the right-hand member expresses the price ratio of the substitutable factors. This formulation of the principle of substitution is valid, assuming that the prices of the factors are not directly affected by the amounts in which they are employed by the particular employer. In cases where a change in the amount of a factor employed by a given firm would tend to push the price of that factor up or down, it is necessary to replace the right-hand member of the equation with a term that will reflect the change in total outlay for each of the factors as their employment is varied.

There is no very simple way of illustrating graphically the step-by-step process of substitution. However, a glance back to the discussion of the effects of an expansion of plant investment in Chapter 2 and in Chapter 4 (pages 29-35 and 56-61) will help to picture the way in which the substitution of machinery for labor may alter cost conditions for the employer and also the output and employment levels at which the profit position of the firm would be maximized. In the illustration employed in Chapter 4,

[2] Assuming that the change in the amount of a factor employed is small, the *ratio* of the change in output to the change in the amount of that factor employed is commonly referred to as the *marginal physical product* of that factor.

the expansion of plant investment, on the comparatively lar assumed there, was found to be dependent not only upon crease in the prices of the variable factors of production, b upon an increase in the demand for the finished product. been possible to substitute machinery for labor in smaller ' some substitution might have been profitable even withou crease in the demand for the finished product.

Very often, however, the piecemeal substitution of machi labor is impracticable; an entire process must be change from one method to another if significant results are to tained. And where the process of substitution is "lumpy," be possible for the wage rate for labor, or the price of an factor, to change considerably before substitution becom nomically practicable. Once the critical point is reached ever, an extensive substitution may occur. The possibility substitution may provide an upper limit or *ceiling* beyond a change in wage rates (or in the price of any other factor not go without resulting in a drastic change in the amount factor employed. Within that limit, changes in wage rate other factor prices might have comparatively little effect o employment, assuming that the demand for the finished p remained about the same.

Chapter 9

SUPPLY OF PRODUCTIVE FACTORS

General Considerations Relating to Supply

Differences in degree of control over supply

In turning from the analysis of the employer's demand for productive resources and services to the investigation of the supply side of the markets for such productive factors, several points should be kept in mind. The first point is that there are marked differences in the degree to which the supplies of different types or kinds of productive factors are controlled by the suppliers. For example, a manufacturer of women's hosiery might find that there was only one source of the particular type of yarn (such as Nylon) that he wished to use, that there were few firms supplying machinery of the types required in his plant, that there was only one public utility company from which he could purchase his power, and that the available labor force was organized under the banners of the Full-fashioned Hosiery Workers' union. Under such circumstances, the supply of each of the major factors needed for production would be subject to a considerable degree of control. In other cases, however, the employer has alternative sources of supply for some if not all of the factors that he needs, and thus the degree of control over supply is smaller.

Where there is a considerable degree of control over supply, the pricing of the corresponding factors may involve a process of two-sided bargaining, or the individual employer may find the price set on a take-it-or-leave-it basis by the suppliers. Where the alternative sources of supply are more numerous, the prices of the corresponding factors of production are more likely to be set by the play

of competitive market forces and to fluctuate more readily in response to changes in employment conditions.

Differences in the responsiveness of supply

A second point to be kept in mind is that there are marked differences in the responsiveness of different factors of production to changes in the prices paid for their use, and that responsiveness of supply over a period of time may be greater than at the moment. At a certain time, the offering of a considerably higher wage for a given type of labor might not attract many additional workers, particularly in a period of reasonably full employment in the locality. However, some additional workers might be drawn away from other employers; some people, including housewives and younger or older people not normally employed, might be induced to take jobs; and some workers might find it worth while to move from other localities. Thus, given time, an increase in wages offered may elicit a larger increase in the labor force than could be obtained immediately.

In other cases, the supply of productive resources may be unresponsive to the offer of increased factor prices, even in the long pull. The classic example of unresponsiveness is found in the case of certain types of land, notably urban land. An increase in the price offered for land on which to build houses or commercial buildings or factories can have virtually no effect upon the amount of land of suitable kinds available, because there is no way in which additional land of the desired type can be brought into existence, except, occasionally, where swamp areas or the shores of rivers and bays can be filled in. To be sure, the needs for additional space may be met by pushing out the fringes of towns and cities, but for many purposes (particularly commercial uses), such outlying sites are not the full equivalent of sites in the centers of commercial activity. For industrial use, access to transportation facilities, power, and other advantages give some locations desirable characteristics that cannot be fully duplicated elsewhere. Even for residential purposes, some land equally desirable in terms of accessibility to light, air, and pleasant surroundings may involve transportation difficulties or other disadvantages that, from the standpoint of the prospective home owner or tenant, make it inferior in attractiveness to other locations. Over the years, changes in methods of transportation, in industrial technology, and in the

tastes of people may cause substantial changes in the relative desirability of different locations for residential, industrial, and commercial purposes, but such changes can seldom be brought about by the efforts of any individual or small group in the business community. It is in this sense, then, that the supply of land uses must be classified as relatively unresponsive to changes in the prices offered for land use.

Differences in the urgency of need for current income

A third point to be kept in mind is that there may be great differences in the importance attached to current income by those who are in position to supply resources or services for use in current production and, therefore, in the minimum terms on which such resources or services will be made available. The individual worker, for example, is usually directly dependent on his job for income with which to meet current living expenses and seldom has other resources on which he can fall back if he should be laid off. Even with unemployment insurance or union out-of-work benefits, or the aid of relatives or friends or of charitable agencies, the alternative to employment is ordinarily an immediate impairment of the living standard of his family. Moreover, days lost in idleness can never be recovered. Hence the worker is usually under considerable pressure to accept employment on such terms as are offered to him.

There is also a direct connection between the wage rate at which the worker is employed and the standard of living that his family can maintain. With a given amount of employment, a higher wage rate means more money in the pay envelope and the ability to buy more goods and services, if the prices of those goods and services do not rise proportionately at the same time. Conversely, a lower rate of wages, with a given amount of employment, means pressure on the worker's standard of living. In other words, the wage rate and the amount of employment jointly determine the personal income of the worker, and the amount of labor supplied at the wage rate reflects the willingness of workers to work at that wage in return for the standard of living that it makes possible.

The prices paid for resources or services other than labor are often just as directly translated into personal incomes as are the wages of labor. The owner of a house or small apartment building may look to that building for a major part of his or her personal

income and be largely dependent on that income for the maintenance of a standard of living. Failure to rent the property may entail an irrecoverable loss of the income that might have been obtained from its current use. Strong pressure may therefore exist to take whatever may be offered in the way of current income for the use of the property, if the alternative is to receive no income at all.

It is impossible, therefore, to draw a sharp line of distinction between personal service incomes and property incomes on the basis of the urgency of need for current income, and the degree of pressure that there may be to accept relatively unfavorable terms rather than risk the chance of receiving nothing at all. However, property incomes are for most people supplementary to other sources of personal income, whereas wage incomes are usually the primary reliance of industrial and other workers. Thus the pressures upon the latter to sell their services for what they will bring at the moment are likely to be greater than the pressure upon property owners to accept low returns, rather than nothing, under currently unfavorable conditions.

Labor Services and Labor Organization

Supply of labor in the absence of organization

Where workers are not organized, the supply of labor services will tend to reflect the varying degrees of pressure on different members of the group to exchange their services for money wages and all that those wages represent in terms of things needed for family living. If the wage rate offered by a particular employer or employers were quite low, the number of workers willing to work on those terms might be small. Alternative employment opportunities, indignant refusal to take less than the work was "worth," optimistic belief that something better could be found later or somewhere else, or the ability to turn to others for aid, would determine for each individual the minimum wage rate at which he would continue on the job. It would be surprising, indeed, if this minimum were the same for the whole group of workers.

At progressively higher wage rates, then, the number of workers offering their services would become larger, other things being equal. This situation is described technically by the statement

that at a given time and under given conditions the supply curve for labor tends to be *positively sloped:* the higher the wage offered, the larger the number of people who would be willing to work.

To this general statement, however, there are possible exceptions or qualifications. Under certain circumstances, the offering of higher wages (beyond some critical level) might tend to reduce rather than increase the total number of man-hours of labor service made available. If wages are comparatively high, a worker may feel that he could meet the needs for family living by working fewer hours and devoting the rest of his time to leisure occupations. Or the larger take-home pay of the head of the family may make it possible for the wife or other members of the family to withdraw from full-time or part-time employment. Conversely, a decline in wages may compel the wife or other members of the family group to seek employment in order to supplement the wage income of the head of the family. In such a case, the supply curve for labor would tend to be negatively sloped, at least over a certain range of wages; that is, the higher the wage offered, the smaller the total amount of labor time made available to employers, and vice versa.

It may be granted that for any individual a point would be reached beyond which the appeal of additional income would be outweighed by the pull of alternative leisure-time activities. But it is also apparent that different people differ greatly in their needs for money income, and therefore in the degree to which they would prefer leisure to the additional income that could be derived from working up to or beyond the full normal working day or week at a higher wage rate. Moreover, the conditions of modern industrial employment are such that the individual worker is usually not altogether free to decide how many hours he will work per day or per week. He has to conform to the usual practice of the establishment, except, perhaps, for occasional lapses into absenteeism. Thus, those who would prefer to increase their leisure-time activities, if wage rates were comparatively high, are likely to be more than offset by the inclusion of additional recruits to the labor force who are attracted by the offer of good pay.

Experience has also indicated that most workers are willing to work longer hours, within reason, when the additional hours are paid for at overtime rates. This would lend support to the assumption that in general the supply curve for labor is positively

sloped. At a given time and in a given locality, the supply of a certain class of labor may be relatively unresponsive; that is, a rather substantial increase or decrease in wage rates might not result in a very large change in the number of workers available for employment. Over a longer period of time, which would permit the attraction of workers from other localities or the training of new workers, the responsiveness of the labor supply might be considerably greater.

Labor not a single homogeneous factor

In speaking of the supply of labor, it must be remembered that there are many different types and classifications of labor employed in different occupations, and also that workers are relatively immobile, both geographically and occupationally. Even in the United States, with a deeply rooted tradition of migration in the quest of economic opportunity, many people are reluctant to pull up stakes, and leave friends and familiar surroundings behind, in the hope of finding a better job somewhere else. Furthermore, different occupations require different skills and training; and a worker who has attained experience in one occupation may stick with it, even though employment conditions are not particularly good, because in any other occupation he would have to start over again as an unskilled worker. Seniority rights, pension rights, and other vested interests attaching to particular employments also operate as barriers to the shifting of workers from one firm to another in the same industry, or from one occupation to another.

Such obstructions to the shifting of workers from firm to firm, from locality to locality, and from occupation to occupation, subdivide the labor force of the country into a vast number of geographically and occupationally separated labor markets. A skilled machinist or textile worker in New England is primarily interested in the employment conditions in that area, and only indirectly in the conditions prevailing in the South or on the Pacific Coast. By the same token, the New England machine-tool manufacturer or textile mill operator is more interested in the local labor supply than in the employment conditions prevailing elsewhere in the country. It is necessary, therefore, to think in terms of relatively localized and occupationally specialized labor markets, rather than in terms of a great single labor market for the country as a whole.

It is possible for wages and employment conditions for a particu-

lar class of workers in a given labor market to change considerably, in comparison with those prevailing for other types of labor in the same community, or in comparison with those prevailing for the same class of workers in other communities, before there is any marked tendency on the part of the workers to shift occupations or to move to other communities. The greater the geographical or occupational obstructions to movement, the greater are the relative shifts in wages and employment conditions that may occur before equalizing processes are set in motion.

Trade unionism and collective bargaining

The progressive expansion of trade unionism under modern industrial conditions has tended to increase the barriers to the transference of workers from one industry or occupation to another, particularly where union contracts with employers specify union membership as a condition of employment or establish preference for union members in adding to the working force. Seniority rules applicable to promotion and to retention of workers in lay-offs also tend to increase the rigidity of occupational lines, and therefore to reduce the "lateral mobility" of labor.

An avowed object of union organization has been to substitute collective bargaining for individual bargaining on wages and other conditions of employment. This clearly brings the supply side of the labor market under some degree of unified or group control. It normally precludes the acceptance, by the individual worker, of employment on terms which he might, as an individual, be willing to accept as an alternative to no employment at all. Common union procedure is to bargain with employers for a minimum rate of pay, either per hour or on a piece-work basis, and to bring pressure to bear upon individual workers not to accept terms that undercut the union scale. This practice has the effect of cutting off the supply curve of labor at the lower end and putting a floor under the minimum rate, even though some workers might be willing to work for less if that were necessary in order to secure employment. It should be noted that there have been many instances in the past in which the workers in a plant, without any formal organization at all, have utilized the pressure of group opinion and interest to prevent individual workers from undercutting what the group regarded as a fair standard of remuneration and performance on the job. There may thus be some element of col-

lective action on the supply side of a particular labor market, even where there is no formal collective bargaining procedure, and in the absence of union organization itself.

The wage policies of American unions have been based in the past largely on a bargaining approach, which has assumed that within comparatively wide limits an increase or decrease in wages would not greatly alter the amount of labor that an individual employer (or an entire industry) could afford to hire. Demands for increased wages have often been coupled, in the past, with the contention that the profit position of the firm was such as to permit the payment of higher wages, without necessarily increasing the price of the finished product. As a practical matter, unions have been successful in pushing up wage rates by collective bargaining chiefly in periods of expanding economic activity in which the demands for finished products are increasing. Under such circumstances, increases in wage rates have not typically resulted in a decline in employment. Conversely, periods of wage reductions have in general been periods of declining business activity and employment, in which the demands for finished goods are decreasing. And in such periods, even drastic reductions in wages have been unavailing to prevent deep cuts in employment. It is on the basis of such pragmatic experience as this, rather than on any formal economic analysis, that the traditional union wage policy was formulated. It is interesting to note that the traditional union view that wage rates are not the major factor determining the volume of employment is not far out of line with the inference that may be drawn from the analysis of derived demand in Chapter 8.

Union leaders have also commonly buttressed their demands for increased wages with the contention that, unless the purchasing power in the hands of wage earners (who constitute the bulk of the consumers of the country) is progressively increased, it will be impossible to dispose of all the goods and services that can be produced under modern industrial conditions. This view, which dates back long before the modern formulation of national income analysis, has certain elements in common with the latter. In both, a minor rather than a major role is assigned to wage *rates* among the various factors tending to determine the general level of production and employment. In both, great stress is placed upon the

role of aggregate demand for the products of industry, which in turn depends on the amount of disposable income in the hands of consumers. But, as will be seen in later chapters, the national income and production analysis does not necessarily support the conclusion that the way to stimulate increased production, employment, and income is to start with a general increase in wages.

It would probably be conceded (off the record) by thoughtful union leaders that there is some upper limit beyond which the wages of a certain class of workers could not be raised, by collective bargaining or otherwise, without causing a substantial curtailment of employment. If only a part of an industry were unionized, and the products of union and nonunion firms were sold in the same or closely connected markets, an attempt to establish substantially higher wage rates in the unionized plants than prevailed in nonunion shops would put the union employers at a competitive disadvantage. Inability of the United Mine Workers to extend their organization into the southern coal fields led to the virtual collapse of the union in the late 1920's, as northern coal operators, theretofore covered by union contracts, broke away in an effort to realign their wage rates with those of the nonunion competitive areas. Ability to make the union organization coextensive with the area of competitive production is essential if the union is to follow a strong wage policy.

Even with strong union organization over the area of competitive production, it is possible that the wage rate could be pushed to the point where increased costs and curtailed sales would cause a cut-back in employment. In other cases, a practical limit to the upward movement of wages might be set by the increasing advantage to be gained by substituting labor-saving machinery, or making other changes in production methods. The policies of many unions, however, are directly or indirectly aimed at limiting the possibility of such substitution. Union rules or contract provisions, defining the union's jurisdiction over certain classes of work, restrict substitution by preventing the transfer of part of the work to other classes of employees not covered by the union. Many unions have in the past developed and enforced policies designed to minimize the advantage that the employer could derive from the introduction of machinery to do part of the work that was done before by union members. Such policies include the insistence

that workers employed in operating machines be paid at rates that absorb a substantial part of the advantage of substituting the machine.

The ability of the union to enforce such policies depends on whether the employer still requires the services of the workers belonging to the union in some parts of the productive process to which the machine is not adapted. If some skilled work is necessary, the union may still be in a sufficiently good strategic position to insist on the policy of handicapping the machine, because it is in position to withdraw the services of its members as a group if the employer fails to come to terms. Unless the employer is in position to dispense entirely with the services of workers of the type covered by the union, he may be faced with an all-or-nothing alternative, which would preclude the partial substitution of machinery for some of the work done by members of the union.

Pricing of labor services

As already indicated, the conditions surrounding the pricing of different types of labor service are extremely varied, reflecting differences from one labor market to another, differences in the number of employers competing for labor in the same or in closely related markets and in the degree of organization that prevails both on the demand side and on the supply side of the particular labor market. Seldom, however, do conditions approaching those of pure competition prevail. In some cases, the initiative in wage determination lies with the employer or group of employers, as in cases where the employer sets the hiring rate at whatever level appears necessary to obtain labor in the amount required to implement current production schedules. In other cases, the union may establish a minimum rate below which its members are not permitted to seek employment, thereby taking the initiative in setting the going rate of wages.

In labor markets in which wage rates and other terms of employment are established by collective bargaining, there is likely to be a range of possible wage rates between an upper limit, established in the minds of the employers by their appraisal of current and prospective demands for the finished products they turn out, and a lower limit representing the minimum that the union would voluntarily accept in preference to calling a strike. The wage rate actually agreed upon will normally fall somewhere within this

range, at a level determined by the relative bargaining strength of the two sides. Should a settlement fail to be reached by direct agreement, and a strike eventuate, the ultimate terms will depend upon the amount of pressure to which each side is subjected by a work stoppage. For the employer, the stoppage represents a loss of current production and sales, and a possible impairment of profit position that may outweigh the effects of a wage increase upon total costs. For the union, the pressure arises as a consequence of the immediate loss of wage income for the union members and the possibility that, if the strike were long drawn out, the union resources and morale might be dissipated and the strike defeated.

Supply of Materials

With respect to raw materials or components required by a producer for the production of the finished product, the conditions of supply are extremely varied. In some instances, the alternative sources of supply are so numerous, and the total supply so large in comparison with the amounts used by any single employing firm, that any desired quantity can be obtained by a given employer without causing any significant change in price. However, a general increase in the amounts demanded by all of the firms using a particular type of material would tend to result in a substantial increase in price, as the suppliers approached full employment of their own facilities and resources and encountered increasing costs as a consequence of enlarged output.

In many other cases, the producers of particular types of raw materials or component parts used by other firms are few in number, and the supply then comes to be characterized by conditions of oligopoly or monopolistic competition. In that event, as in the comparable situation with respect to the production of finished goods, there is no well defined supply schedule or supply curve. Instead, the quantity which it will be to the advantage of the individual supplier or suppliers to provide, and the price policy adopted, will be influenced by the supplier's appraisal of the current demand situation for the materials in question. If both buyers and sellers are few, or if, as is not uncommon, the situation is one of dealing between a single buying firm and a single supplying firm, the pricing process may be reduced to a matter of bar-

gaining. The upper limit of the bargaining range would be a price at which the buyer would find it preferable to curtail production to a drastic degree (or even to shut down) or to shift to the use of substitute materials obtained from other sources. The lower limit would be a price at which the supplier in turn would find it preferable to curtail production, or to seek alternative outlets for its output. The width of the bargaining range would depend on the availability of alternative sources and outlets to the bargaining firms and would tend to vary with changes in general business conditions and in the relative prosperity of the firms in question.

This bargaining situation is not unlike that already considered in the discussion of wage determination under collective bargaining. The chief difference is that effective organization and control of the supply side of the market for raw materials, and particularly for semimanufactured items, is often more easily accomplished than in the case of labor. However, in the case of agricultural commodities and other basic raw materials that may be produced by many thousands of small producers, the difficulties of achieving and maintaining a voluntary control of supply are at least as formidable as in the case of labor organization.

Supply of Land Use

As already noted, the total quantity of land available for use is fixed by circumstances beyond human control, and with few exceptions there is no way of increasing the amount of land of any particular quality or location. The ownership of land in the United States, however, is in general widely diffused, and even in urban areas the control is seldom highly concentrated. The supply of land use in any locality, therefore, reflects the attitudes of the various land owners with respect to the disposition of their holdings at various possible levels of rental. By and large, no effort or cost is involved in making the land itself available for use (apart from costs of administration), and if land owned by a particular individual is withheld for use, it does not produce any immediate income. It seems reasonable to suppose that different owners of land of about the same quality and location would differ somewhat in the urgency of their needs for current property income, and therefore in the minimum rentals at which they would be willing to make their property available for use. If so,

the higher the rental offered, the larger is the quantity of land of a certain quality and location that would be made available, and vice versa.

Even in the same locality there are likely to be considerable differences in the desirability of different tracts of land, from the standpoint of prospective users, and hence it is more appropriate to think of the land as a differentiated rather than an homogeneous factor of production, with supply conditions in general resembling those of monopolistic competition. And under such conditions of supply, individual owners of land may feel constrained to withhold land from use at rentals that they would otherwise be prepared to accept, because they are fearful of "breaking the market" and precipitating a competitive scramble that would drive rentals still lower. In some cases, such prudential considerations are supplemented or reinforcd by formal organization on the part of particular groups of land owners through which concerted action to maintain rentals is accomplished, even though the consequence of such action may be a larger percentage of vacancy than would exist if rentals were allowed to gravitate to the "competitive" level.

Supply of Other Durable Productive Facilities

Much of the land used by industrial and commercial enterprises, and an even larger percentage of buildings, machinery, and other durable productive facilities used in production, are owned by the employing firms themselves. It seems a bit difficult to think of the firm owning such facilities as supplying itself with their uses, yet that is virtually what the situation amounts to. If a manufacturing firm has a building equipped with machines, the firm can make as much or as little use of those facilities as seems advantageous at any given time (up to the limits of the plant capacity). In purchasing and installing the equipment, the firm made a certain investment, and the costs associated with that investment, including the depreciation of the equipment itself, go on without much reference to the amount of use made of the equipment at any given time. It will be advantageous to make use of the equipment whenever the value attributable to its use exceeds any additional costs that would arise if the equipment were used rather than left idle. Whether the value attributable to the use of the

existing plant facilities is also sufficient to provide full coverage for depreciation and a return on the investment will not greatly affect the decision as to the extent to which it will be used; that decision hinges on a consideration of the special costs that arise only if it is used.

If the employing firm finds itself in the position where its existing facilities are being fully utilized, then the question of plant expansion arises. An incentive to increase the investment in plant facilities will exist if it appears that the demand for the finished product will be sufficient, in the future, to warrant the employment of additional productive facilities, considering the costs incident to such an expansion. If an expansion is decided upon, the firm may be thought of as putting itself in position to supply itself with a larger supply of productive services than was previously available. If more machines and other equipment were purchased, an additional fixed expense would be involved, as a consequence of the increased investment required, and depreciation and maintenance expense would also be increased. A comparison of these increased expenses, with the value attributed to the use of the additional facilities during their service life, would help to determine how far the expansion of plant facilities could be carried with a reasonable expectation of increased profit for the firm.

The relationship between the value attributed to the use of durable productive facilities and the value attached by the employing firm to the ownership of those facilities themselves will be explored in greater detail in the following chapter on the valuation of durable productive assets.

Part Three

INVESTMENT

Chapter 10

REAL INVESTMENT AND THE VALUATION OF DURABLE ASSETS

A Dual Problem of Valuation

In order to carry on business activities at all, an enterprise must be in position not only to purchase needed raw materials and meet payroll expenses, but it must also be in possession of durable plant facilities in at least such amounts as are required by current production schedules. Such facilities may in some cases be rented rather than owned, but in the great majority of cases they are owned outright by the employing firms.

In the case of such durable productive facilities, a dual problem arises because they are not exhausted in a single use. If properly cared for, their service lives may extend over several or perhaps many years. Thus a building or a machine represents a whole bundle of potential uses that may be extracted year after year until it is ultimately worn out or becomes obsolete. By and large there is no way of obtaining all of these potential uses, or even a substantial part of them, at one time. There is no way of putting through a machine today all of the materials that could be processed on it tomorrow, and the next day, and in all the months or years to come before it is worn out. It is necessary to wait for months or years to obtain all the services that the machine is capable of rendering.

This means that although a machine or any other durable agent may be regarded as a bundle or series of uses, these uses differ from one another with respect to their *location in time*. Some may be obtained today, some tomorrow, and others at more and more dis-

tant dates in the future, over the entire life span of the agent in question. Obviously the use that can be made of a machine next year is of little significance from the standpoint of today's productive activity, because there is no way of obtaining that use today. Suppose that a machine has an expected service life of ten years. If the volume of production in the plant is such as to require the use of ten machines, there is no way of getting the entire output produced by using one machine and extracting its entire ten years of potential usefulness in one year.

Inasmuch as durable agents require time in which to obtain the full measure of their potential uses, the value that will attach to the ownership of such an agent will depend not only on the value of the use that can be made of it at the present time, but also on the values that are expected to attach to its use in future years, up to the limit of its service life. Thus the value of a durable agent itself may be thought of as being equal to the sum of the present values now imputed to all of the uses that are expected to be derived from it, taking into account their differing location in time.

In other words, two problems of valuation arise in connection with durable productive agents. The first is that of how much the use of the agent for a given period of time—say this month or this year, or next month or next year—will be worth at the time it is rendered. The second problem is that of determining what the entire expected series of uses is worth *now* to the employing firm, because that solution will determine the value of the agent itself. The first of these two problems was dealt with in Chapter 8; the second is the subject for consideration in this chapter.

The meaning of real investment

The term *real investment* is customarily used to designate the value of physical resources used in production, including both durable productive facilities and materials and goods in process of production. The fixed investment of a business enterprise corresponds to the value of the durable plant and machinery which it owns; the amounts tied up in materials and goods in process represent the working capital requirements of the firm. When a machine or a building is first acquired by the enterprise, the real investment in it will correspond to its purchase price plus costs of installation. But as the years pass, the real investment represented by any given piece of durable equipment will gradually decline as

its service life passes or as it becomes obsolete. This decline in real investment is recognized by allowing for depreciation of plant and equipment as an expense of current operations.

The real investment in the plant *as a whole* may be maintained intact by making regular purchases of new productive equipment to offset the wearing out of units previously installed. If such new acquisitions are just sufficient to offset the depreciation of older facilities and equipment, there will be no *net* real investment by the firm. If they are more than sufficient to offset depreciation, there will be *net* real investment or *new* real investment on the part of the firm. If they are insufficient to offset depreciation, there will be a *net real disinvestment* in the enterprise.

In any case, real investment refers to the value of the means of production owned by the enterprise itself and available for use in productive operations. This use of the term *investment* is more restricted than the common usage of the term to refer to the value of any kind of a property right, including the ownership of stocks or bonds or other types of intangible property that people may purchase or own. There is, of course, a connection between *financial investment* in stocks and bonds (representing ownership of, or claims against, business enterprise) and the *real investment* of the enterprise itself in the means of production. The connection, however, is not immediate or direct, and therefore the consideration of the *financial overlay* of the productive process will be deferred to subsequent chapters.

The problem for immediate consideration is to trace in somewhat greater detail the connection between the values attaching to the use of durable productive resources and the values imputed to the agents themselves. It would not be to the advantage of a business firm to make a real investment by purchasing and installing equipment that did not promise to "pay for itself" by "returning" the purchase price within a reasonable time. But what might appear to be a reasonable period of time for a motor truck may be quite different from the period that seems reasonable for a factory building or a railroad right of way.

Basic Elements in the Valuation of Durable Agents

A more systematic statement of the problem will help to bring out the main factors that determine how much a given productive

agent would be worth to the firm; if it is worth more than its current purchase price, plus installation expense, the firm will have an incentive to purchase it, thereby increasing the real investment of the firm.

The first factor influencing the value of a durable productive agent is its expected service life. There is no way of knowing in advance just how long it can continue to be used in production before it is worn out or becomes obsolete as a consequence of technical improvements. It is necessary, therefore, to estimate the prospective service life under normal conditions of use, recognizing that the margin of error may sometimes be quite large.

The second factor influencing the value of a durable productive agent is the value attributed to the use of the machine during each operational period (whether a month or a year) in which it is used, throughout its service life. Chapter 8 dealt with the problem of valuing the current use of the machine. Whether in subsequent operational periods the value imputed to the use of the machine will be the same as, or less than, or greater than, the value attributed to its current use is also uncertain. Here again it is necessary to operate on the basis of the best forecast or estimate that can be made at the present time, in the light of the expected trend of demand for the finished product. That estimate may prove, in the course of time, to have been either good or bad, but it is the only basis on which current decisions can be made. If in subsequent years the use of the machine proves consistently to be worth less than had been anticipated, the investment in the machine will then appear to have been unwise. If the use of the machine in later years proves to be worth more than had been expected, the investment in the machine will be more than justified.

The third factor affecting the value of a durable productive agent is the element of *time discount* that is reflected in any present valuation of the future uses of a productive agent as compared with the present use. Inasmuch as the element of time discount enters into every problem of valuation in which time is a factor, the ensuing analysis is applicable to many other problems, aside from the valuation of machines or other types of productive equipment, and is extensively developed in connection with the mathematics of finance.

Time Discount and Present Worth

Suppose that the management of a business firm is considering the purchase of a new machine, the service life of which is estimated at ten years, assuming that the plant continues to run about the same number of hours per week during that period. It is also estimated that the use of the machine during the current year would be worth $1,000 after making allowance for necessary maintenance and repairs. So far as is now known, there is no reason to suppose that the value of the machine in any of the later years would be much more or much less than $1,000 per year. In that event, the machine may be thought of as affording a return to the firm of $1,000 each year for ten years. What then would be the maximum amount that the firm could invest at the present time in the purchase of the machine? Would it be worth while to invest as much as $10,000 to acquire it? That amount would correspond to the full estimated value of the use that could be made of the machine during its entire ten-year life. To do so would mean that the firm was willing to make an immediate outlay of $10,000, with the expectation of getting back the same sum in a series of $1,000 installments spread out over the entire ten-year period. Although it is possible to visualize circumstances under which that might be done, it would appear that the firm would be in equally good position if it put ten $1,000 bills in a safe-deposit box and then took out one bill each year.

As a matter of fact, the firm could do better than that if it were simply to lend the $10,000 at the going rate of interest on long-term loans. Suppose, for example, that it were possible to lend this amount at 5 per cent interest, splitting up the total amount into ten loans of $1,000 each, the first loan to be repaid at the end of one year, the second at the end of two years, the third at the end of three years, and so on. Then on the $1,000 loaned for one year the firm would receive back $1,050 at the end of the year in the repayment of principal plus interest. On the $1,000 loaned for two years the firm would receive $50 in interest at the end of the first year, and $1,050 in principal and interest at the end of the second. On the $1,000 loaned for three years the firm would receive $50 in interest at the end of the first and second years, and $1,050 in principal and interest at the end of the third year. If

the interest received each year were also loaned out at the same rate (that is, compounded), then the $1,000 loaned for two years would accumulate to $1,102.50 by the end of the second year (equal to $1,000 in return of principal, plus $50 in interest for the first year, plus $52.50 representing interest on $1,050 for the second year).

If $1,000 loaned now would bring back $1,050 at the end of one year, or $1,102.50 at the end of two years, then the *present worth* of $1,000, which is expected to accrue from the use of a machine by the end of one year, will be worth less than $1,000 now. Its present worth (still assuming that funds could be loaned at 5 per cent) would be reduced, or discounted, in the ratio of $\frac{\$1,000}{\$1,050}$, or 0.952. That is, the present worth of $1,000 accruing at the end of the first year would be $1,000 $\times$ 0.952, or $952. By the same token, the present worth of the $1,000 expected to accrue from the use of the machine during the second year would have a present worth of $1,000 $\times \frac{\$1,000}{\$1,102.50}$, or $907.

Present-worth tables to be found in any financial handbook make it unnecessary, as a practical matter, to compute the present worth of any single future sum or income by the method indicated above. In Table 14, the column labeled "Present Worth" is taken from such a tabulation. The first figure in the present-worth column represents the amount which, if loaned at a 5 per cent interest rate, would bring back $1,000 in return of principal plus interest by the end of one year. Thus the present worth of the use of the machine during the first year is represented by the first figure in the first column of Table 14, and the value attributed to the use of the machine during that year is represented by the $1,000 at the top of column 2. The second figure in column 1, or $907, represents the present worth of the use of the machine during the second year, as compared with the $1,000 which the use of the machine is expected to bring in during that year (indicated by the $1,000 appearing at the top of column 3). These additional columns are included simply to show the progressively greater discount that attaches at the present time to the returns expected to flow from the use of the machine in later years, even though, when those uses are ultimately obtained, they may prove to be worth no

less than the uses obtained in earlier years. In other words, the *present worth of expected future uses* differs from the *present worth of the current use.*

TABLE 14

PRESENT WORTH OF A SERIES OF $1,000 INCOMES RECEIVABLE ANNUALLY OVER A PERIOD OF TEN YEARS, DISCOUNTED AT FIVE PER CENT

(Figures are in dollars)

Present Worth	*Expected value of the income in the year in which it accrues*									
	1st Year	*2d Year*	*3d Year*	*4th Year*	*5th Year*	*6th Year*	*7th Year*	*8th Year*	*9th Year*	*10th Year*
952	1,000									
907	952	1,000								
864	907	952	1,000							
823	864	907	952	1,000						
784	823	864	907	952	1,000					
746	784	823	864	907	952	1,000				
711	746	784	823	864	907	952	1,000			
677	711	746	784	823	864	907	952	1,000		
645	677	711	746	784	823	864	907	952	1,000	
614	645	677	711	746	784	823	864	907	952	1,000
7,725										

This table is based fundamentally on a compound interest rate of 5 per cent, and may be used either to calculate the present worth of a given future income or series of incomes, or the future sum to which a given present amount of money would accumulate in any number of years, up to 10, if that sum were invested in such a way as to bring in an annual return at a rate of 5 per cent and if the annual return were in turn reinvested at 5 per cent.

For example, refer to the bottom line of the table. $614 invested at 5 per cent would bring in approximately $31 ($30.70) in interest at the end of the first year, giving an accumulated total of $645 by that time. In the second year, 5 per cent interest on $645 would amount to approximately $32 ($32.25), giving an accumulated total of $677 by the end of the second year. The successive figures in this line, therefore, show the progressive accumulation, at compound interest, reaching $1,000 by the end of the tenth year. But if $614 would accumulate to $1,000 in 10 years, at a 5 per cent compound interest rate, then in 10 years one dollar invested now, at the same rate, would accumulate to $1,000/$614, or approximately $1.63.

The present worth of the entire series of uses expected to flow from the machine over its ten-year life would be equal to $7,725, or the sum of the present worths of the ten-year series, as represented in column 1 of Figure 14. Viewing the situation somewhat differently, if $952 were loaned at 5 per cent for one year, $907 for two years, $864 for three, $823 for four, and so on, the accumulation of interest would bring the principal of each loan, plus interest, up to $1,000 by the maturity date of each loan. The first loan would bring in $1,000 at the end of the first year, the second would bring in $1,000 at the end of the second year, and so on.

The total amount loaned at the beginning would be $7,725; the total amount received back in principal plus interest over the ten-year period would be $10,000 in a series of $1,000 annual payments.

Thus, $7,725 represents the maximum amount that the firm would be willing to pay for the machine in question, if the expected returns were no more than $1,000 per year for ten years, and if, as an alternative, the firm could lend that amount at a 5 per cent rate of interest. Conversely, if the firm did not have the funds already on hand to purchase the machine, $7,725 represents the maximum amount that it could afford to pay for the machine if it were necessary to pay as much as 5 per cent interest on funds borrowed from outside sources. If it were possible to borrow funds at a rate of interest lower than 5 per cent, then a larger present sum could be expended, if necessary, in order to purchase the machine. If funds could be obtained only at a rate of interest higher than 5 per cent, less than $7,725 could be expended on the purchase of the machine, assuming, still, that the expected returns amount to $1,000 per year for ten years.

Demand for durable agents

It is unlikely that all prospective purchasers of the same kind of machine would assume the same service life as a basis of valuation, or attach the same estimated values to the future uses of the machine. Nor is it necessarily true that they could all obtain present funds on the same terms. Differences in any one of these elements might lead one firm to regard the machine as "worth" as much as $8,000, and another to consider it worth no more than $4,000. With the possibility of such variations in the estimates of the present worth of a particular kind of machine, the demand schedule for the machines may be thought of as representing the numbers of machines that would be purchased at a given time by all of the potential users, at different possible prices. At a high price, the investment necessary to purchase and install a machine would exceed its present worth to many prospective employers; at a lower price, the necessary investment would be less than the present worth attached to the machine itself by many potential employers.

Suppose that, under current conditions of demand and supply in the market for the type of machine considered above, the prevail-

ing price was approximately $7,365, or substantially less than the $7,725 which a machine would be "worth" to the employer in the preceding example. In that case, a definite gain would accrue to the firm from the purchase of the machine, because the price might be as high as $7,725 before it would fully cancel out the advantage of adding the machine.

"Rate of return over cost" or "efficiency of capital"

By calculations much like those involved in the determination of the present worth of the machine, it is possible to compute the "rate of return over cost" or the rate of return on purchase price that is expected to flow from its use. The problem is to determine what rate of interest or discount would make the purchase price of the machine equivalent to the series of returns expected from it during its service life. Suppose that a machine selling for $7,365 can be used in such a way as to obtain returns estimated at $1,000 each year for ten years. At what rate of discount would the present worth of that series be $7,365? (From the preceding example it is known that the present worth would be $7,725 with a 5 per cent discount rate; therefore the discount rate involved in a present worth of $7,365 would be greater than 5 per cent.)

The problem may be expressed in the form of an equation, in which the unknown element to be determined is the rate of discount, r. Thus,

$$\$7{,}365 = \frac{\$1{,}000}{(1+r)} + \frac{\$1{,}000}{(1+r)^2} + \frac{\$1{,}000}{(1+r)^3} \cdots + \frac{\$1{,}000}{(1+r)^{10}}.$$

If the actual calculation were followed through, it would be found that the value of r is 0.06 or 6 per cent. That is, if the machine could be purchased for $7,365, and is expected to return $1,000 each year for ten years, then the expected rate of return over cost is 6 per cent. In present-day economic literature, the rate of return over cost that is expected to result from the installation of an additional unit of productive equipment is frequently referred to as the *marginal efficiency of capital.*[1]

Note that in the previous calculation of the present worth of the machine to a particular employer it was assumed that the firm

[1] *See* J. M. Keynes, *The General Theory of Employment, Interest, and Money,* page 135.

could lend surplus funds at its disposal in such a way as to obtain a 5 per cent interest return on those funds. Or, alternatively, if it needed additional funds to finance the purchase of such a machine, it could obtain those funds by borrowing from outside sources at a rate of interest not greater than 5 per cent. On that basis, the present worth of the machine was fixed at $7,725. But if the market price of the machine were less than $7,725, a rate of return over cost, or marginal efficiency of capital, greater than 5 per cent could be obtained. Thus, a comparison of the rate of return over cost, or marginal efficiency of capital, with the prevailing rate of interest on borrowed funds, gives a basis for determining whether a particular expansion of the investment of the firm in productive facilities would be advantageous or not. The higher the expected rate of return over cost, in comparison with the prevailing interest rate, the greater the advantage to be derived from a given expansion of investment.

The Problem of Depreciation and Replacement as Related to the Rate of Return over Cost

Suppose that the business firm decides to invest $7,365 in a new machine of the type considered above. Can the entire $1,000 expected to accrue each year from its use be regarded as net return on the investment? If it were, the rate of return would appear to be much more than 6 per cent, because $1,000 is approximately 13.5 per cent of $7,365. But the machine is expected to last only ten years, and unless during that time provision is made for its replacement, the end of the tenth year will see the machine worn out and the returns from its use will terminate. Therefore, in estimating the true or net return from the use of the machine each year, an allowance must be made for its depreciation or loss of service life during the year. Unless depreciation is recognized as one of the costs of current operation, the profits of the enterprise will be overstated; and if the apparent earnings were all distributed in the form of dividends to the stockholders, a part of their capital investment would in fact be returned to them in the guise of current income. It should be remembered, however, that the making of an allowance for depreciation of plant and equipment as an expense of current operation does not in itself make provision for the replacement of that equipment when worn out. It

merely insures that the resources of the firm will not be unwittingly dissipated. How and when to replace worn-out or obsolete productive plant facilities is another question that must be decided as a matter of managerial policy, to be discussed in a little more detail below.

In computing depreciation expense, different methods are frequently employed by business firms, but a very common method is the "straight-line" method. This involves estimating the prospective service life of any particular piece of equipment and writing off a uniform percentage of the original purchase price each year, the percentage being based on the length of the expected service life. In terms of the preceding illustration, the annual allowance for depreciation expense would be 10 per cent of the purchase price of the machine, or $736.50. The difference between the $1,000 which represents the expected value of the use of the machine during a year, and the $736.50 figured as depreciation expense, or $263.50, would constitute the approximate net return on the investment in the machine.

Actually such a calculation would understate the real rate of return on the investment, inasmuch as $736.50, if set aside each year to provide for the replacement of the machine, would in ten years equal the purchase price, even though such funds were left completely idle. In practice, they are usually utilized by the firm itself to finance piecemeal replacements, or, occasionally, they are transferred to earmarked funds, called *sinking funds,* and invested in securities. The latter practice is seldom followed in making provision for the replacement of specific items of productive equipment, because ordinarily a firm expects to make a rate of return on its own operations that is higher than the prevailing interest rate on loanable funds.

Suppose that it were expected that the over-all rate of earnings for the enterprise as a whole would average not less than 6 per cent in future years. In that event, the setting aside of not more than $559 per year would be sufficient, over a ten-year period, to provide a lump sum of $7,365 for replacement purposes at the end of ten years, assuming that the earnings of the amounts so set aside were credited to the replacement funds (that is, compounded at a 6 per cent rate). The difference between the $559 needed to provide for replacement and the $1,000 representing the estimated value of the use of the machine each year, or approximately $441,

would amount to a 6 per cent rate of return on the $7,365 invested in the machine.[2]

What this all means is that, by regarding a part of the annual return from the use of a machine as provision for its replacement when worn out, the amount originally invested in one machine is ultimately reinvested in another machine to take its place, so that in effect the $7,365 is permanently invested or kept intact, despite the fact that any particular machine has a definitely limited service life.

Changes in the Rate of Return over Cost or Efficiency of Capital

As noted earlier, the rate of return over cost, or the efficiency of a piece of productive equipment, depends on the size and duration of the returns expected to flow in the future from the use of that piece of equipment in production. It follows that any change in current expectations regarding either the probable service life of a durable productive agent, or the probable returns to be obtained from its use, will alter the rate of return over cost.

Suppose, for example, that the demand for the finished product turned out by the firm were to increase. That demand would provide a basis for some expansion of output and would lead to a fuller utilization of the existing plant facilities. With such increased utilization, the value attributable to the use of the plant facilities would be increased, thereby tending to increase the ratio of the returns on such facilities to the original investment in them. If existing facilities were being used to capacity, and the increase in demand appeared to be permanent, the returns that could reasonably be expected to be obtained by purchasing and installing additional plant facilities would be comparatively high, in comparison with the cost of such additional facilities, and thus a demand for them would be stimulated. Even if the plant as a whole were not being operated to capacity, bottlenecks in certain processes or operations might exist that could be relieved by adding certain critical pieces of equipment. In that event, the value

[2] Reference to a financial handbook will show that if one dollar were set aside each year, and the interest compounded annually at a rate of 6 per cent, the total accumulation would amount in ten years to $13.18. Thus, to accumulate $7,365 by the end of ten years would require the setting aside of $7,365/$13.18, or approximately $559 each year.

attached to the possession and use of such types of equipment would rise, and the prospective rate of return over cost that could be obtained by increasing the investment of the firm in those types of equipment would rise.

Or suppose that the variable costs of production were to increase—as a consequence, perhaps, of an increase in wage rates—and that such an increase could be offset, in part, by the substitution of labor-saving machinery. In that event, again, the prospective use-value of the machinery in question would rise, thereby increasing the rate of return over the cost of such machines. In other cases, improvements in the machines themselves may make new equipment superior in productivity to machines already in use. In that event, the rate of return over cost with new machines would exceed the rate of return on investment in existing equipment, unless the prices of new machines exceeded the prices of older types by sufficient amounts to offset the differences in productivity.

In any case, the determining factor with respect to new investment is the prospective ability of new equipment to "pay for itself," which means, fundamentally, that the present worth of the expected future uses, or returns, must exceed the present cost of acquiring and installing the equipment in question. In every case the decision on this point must be made on the basis of forecasts or estimates covering several years, if not many years, in the future. On the basis of these forecasts, the firm must make present commitments and invest funds in "fixed" forms, taking the risk that the actual course of events over the years may be quite different from the forecast. As time passes, the actual events may be more favorable to the firm than was anticipated, but there is a chance that they may prove very much less favorable. This, however, is one of the elements of unavoidable risk that must be faced by the enterprise, and only to a limited degree can it be insured against.

Suppose that the business firm finds itself faced with a declining demand for its product, either as a consequence of adverse conditions affecting the particular industry of which it is a part, or as a phase of a general decline in business activity. In that event the value attributable to the use of any particular piece of mechanical equipment, or of all of the plant facilities together, will decline, thus tending to reduce the rate of return over cost for all existing equipment. Moreover, in the prevailing atmosphere of uncer-

tainty, the values of prospective future uses or returns tend to be discounted more sharply than in periods of prosperity. As a consequence, the rate of return over cost, or the marginal efficiency of capital, tends to be cut even further.

Under such circumstances, there will be little incentive to invest in new machines, or even to replace existing equipment that is fully depreciated, except where the use of new machines, in place of those already in use, would give promise of very substantial economies in production. Thus a decline in the demand for the finished product of a firm, even though it is not particularly severe, may lead to an almost complete cessation of the purchase of equipment even for replacement purposes. This is an important part of the explanation of the violent changes in demand for many kinds of durable producers' goods that occur in the course of the business cycle, changes that greatly exceed the changes that are commonly observed in the demands for most kinds of consumers' goods.[3]

This chapter has been concerned with the analysis of the factors influencing the demands of business firms for the various kinds of durable productive agents needed to carry on production. In order to purchase and install additional machines and other equipment, or to construct additional buildings for use in production, current funds will, of course, be required. Thus, a demand for additional productive equipment will also involve a demand for additional funds with which to finance the expansion. In some instances, such funds may already be available to the firm in the form of retained earnings, or undistributed profits, that have been held in liquid form. In other cases, new financing will be necessary in order to carry through a proposed program of expansion. The following chapter will deal at somewhat greater length with the ways in which a firm may undertake to finance an expansion of its real investment, and the chapters following that will undertake an analysis of the conditions affecting the supply of funds for purposes of real investment.

[3] This relationship, in which fluctuations in demand at one level are accompanied by wider fluctuations in the demand at other levels in the productive process, is commonly described by the term *acceleration principle*.

Chapter 11

DEMAND FOR INVESTMENT FUNDS

Methods of Financing New Real Investment

There are three principal ways in which funds may be obtained by a business enterprise to finance an expansion of its operations. These are: (1) the reinvestment of past earnings of the enterprise itself, accumulated in the form of undistributed profits, (2) the sale of new securities (bonds or stocks) to the investing public, and (3) borrowing from banks or other lending agencies, public or private.

Where earnings on past operations have been retained by the enterprise in liquid form, that is, in the form of cash balances in banks or temporarily invested in securities, these funds may be utilized, at the discretion of the directors and management, to finance an expansion of real investment. A certain amount of increase in real investment is also likely to occur as sums corresponding to depreciation allowances are utilized to make replacements of equipment that is retired. This is possible because conservative business practice tends toward an overstatement of depreciation, and therefore the writing off of asset values more rapidly than their actual service lives expire. But where funds already at the disposal of the firm are insufficient to finance the proposed expansion, additional funds must be sought from outside sources, either by borrowing from banks and other lending agencies, or by selling new securities to private investors or to insurance companies, investment trusts, and other agencies through which the funds of private individuals are brought together for investment.

TABLE 15

SOURCES AND USES OF CORPORATE FUNDS, 1947 AND 1948 *

(Billions of dollars)

Uses	*1947*	*1948*
Plant and equipment outlays	15.0	17.2
Inventories (changes in book value)	7.2	5.4
Changes in customer receivables	5.9	2.5
Other current assets	—0.1	..
Total uses	28.0	25.1
Sources		
(a) Internal		
Retained profits and depletion allowances	10.6	11.6
Depreciation allowances	4.5	4.9
Reduction in cash and U. S. securities	.3	—.1
Subtotal	15.4	16.5
(b) External		
Change in trade debt	2.6	1.0
Change in Federal income tax liability	2.4	1.1
Change in other current liabilities	.7	..
Change in bank loans	2.6	1.1
Change in mortgages	.8	.8
Net new issues:		
Bonds	3.1	4.7
Stocks	1.3	1.2
Subtotal	13.5	9.9
Total sources	28.9	26.4
Discrepancy (uses less sources)	—.9	—1.3

* Excludes banks and insurance companies.
** Less than 50 million dollars.
Source: *Midyear Economic Report of the President, July, 1949*, p. 117.

Sources and uses of funds

A rough idea of the relative importance of different sources of funds for business use may be obtained by glancing at the figures in Table 15, which show the principal sources and uses of corporate funds for the two years 1947 and 1948. Although these figures do not cover certain segments of the economy, such as agriculture, in which the bulk of production is carried on by unincorporated enterprises, they nevertheless represent a very large part of the operation of the entire economy.

In considering the uses of funds it must be remembered that

plant and equipment outlays (which represent sums expended on durable productive assets) include both replacement of existing assets and new investment. In 1947, for example, such expenditures amounted to about 15 billion dollars in gross amount. But in the lower part of the table it appears that in that year depreciation allowances amounted to about 4.5 billion. The difference, or about 10.5 billion dollars, would therefore represent the approximate amount of new real investment in the form of additions to fixed plant and equipment.

Changes in the book values of inventories indicate the expansion of the volume of goods in process of production and distribution, together with changes in their prices, and thus represent an increase in investment, but of a current rather than a fixed character. Changes in customer receivables reflect an expansion of credit extended to customers in connection with the sale of the product. They are largely offset by changes in trade debt and bank loans representing credit extended by outside sources to corporate enterprises, as indicated by the corresponding items listed as sources of funds in the lower part of the table.

As to the sources of funds, it is noteworthy that in 1947 retained or undistributed profits amounted to 10.6 billion dollars, depreciation allowances to 4.5 billions, and new issues of securities to 4.4 billions, giving a total of about 19.5 billion dollars available from those three sources for the financing of replacement of existing plant, the construction of new plant facilities, and the expansion of the volume of goods and services in process of production.

From these figures it is apparent that, at least in a period of prosperity such as existed during and after the war, internal sources of funds were much more significant, in relation to new real investment in productive facilities, than was the offering of new securities to the general investing public. It is important to keep that point in mind in any consideration of the problems of industrial expansion and investment, because it indicates that to a very considerable extent enterprises have achieved independence of the securities markets as a source of funds. This is not by any means a new development, because many large corporations have been built up mainly by "plowing in earnings" rather than by selling new issues of securities in order to raise capital. The Ford organization is but one notable example of such a process of expansion from within.

Expansion Financed by Retention of Earnings

Where the directors and management of a business enterprise consistently follow the policy of retaining a substantial part of the earnings from current operations, that policy is normally based on the existence of opportunities within the organization itself of putting the funds so retained to profitable use. If there were little prospect that an expansion of its operations would improve the position of the firm, there would appear to be little reason for failing to distribute virtually all of the earnings in the form of current dividends. The expected improvement in the position of the firm may, however, take the form of an increased security of its position in relation to existing or potential rivals, rather than of an increase in profits. Thus, funds arising out of the retention of earnings may be utilized to acquire an interest in other firms in the same or related industries, or in industries that provide outlets for the products of the firm. In some instances, industrial corporations primarily engaged in one industry have built up rather widely diversified investments in quite different industries, so that a significant part of their incomes is drawn from varied sources and a greater degree of stability of income is achieved by the spreading of risks. Such firms may in time come to have many of the characteristics of an investment trust.

If, however, retained earnings are accumulated chiefly with the intention of reinvesting them in an expansion of the firm's own primary operations, the amount of earnings retained will be governed by the prospective possibilities of using them to finance the expansion of productive plant facilities, either to increase total output or to achieve further economies in production. If the corporation is closely held, that is, controlled by a small group of people whose interests are closely identified with the corporation itself, a very large percentage of current earnings may be retained. If the ownership of the corporation is widely diffused, a decision to pay very small dividends out of substantial earnings might result in complaints from the stockholders that would jeopardize the public relations of the firm with the investing public and render it difficult to attract additional investment funds from outside sources should a public offering of new securities be necessary at some later date.

Public Offerings of New Securities

If a business firm lacks sufficient current funds in the form of retained earnings and other internal funds to finance a contemplated expansion, it is necessary to look to outside sources for financing. Such funds may be obtained either by borrowing from banks and similar lending agencies, or by selling new issues of securities to the general investing public. If the latter alternative is chosen, a further decision must be made as to the type of securities to be offered. The choice of offering a new issue of stock or a new issue of bonds will be governed by a wide variety of considerations, involving the already existing financial structure of the corporation, the stability or instability of its earnings, and the tastes and preferences of the investing public.

An important outlet for new issues of securities under modern conditions is found among "institutional" investing agencies—insurance companies, savings banks, investment trusts, and the like—which commonly have large sums in the form of reserves for which income-yielding forms of investment are sought. Many such agencies operate under legal specifications as to the types of securities that are eligible for purchase, and these specifications must often be taken into account by a business firm in deciding what types of securities to offer. Consideration must also be given to the expenses involved in "floating" a new issue of stocks as compared with a new issue of bonds, that is, the fees and other charges representing the returns to the investment banks or other organizations that handle the distribution and sale of the new issue. The effects of the changes in the financial structure of the enterprise that will attend a new issue of stocks as compared with a new issue of bonds must likewise be appraised in terms of their probable impact on the interests of the various groups of management, stockholders, and others intimately concerned with the affairs of the firm.

Borrowing through the sale of long-term bonds

Suppose, for purposes of illustration, that a business firm is now operating a plant in which the fixed investment amounts to approximately $1,000,000, and that its financial structure is very simple, represented by common stock having a value, at par, of

$1,000,000, with no bonded debt outstanding. (These figures correspond with those assumed in Tables 6 and 7 in Chapter 6.) Suppose also that, as a consequence of an increase in the demand for the product of the firm, it is estimated that the net profit from operations of the firm could be increased by at least $9,000 a year if the output of product were increased to meet the increased demand. But to achieve that increase in output it would be necessary to install additional machinery at a cost of approximately $150,000. Such liquid funds as the firm has at its disposal are needed to finance additional purchases of raw materials and for other current purposes, so that, if the expansion is to be undertaken, additional funds must be obtained from outside sources. Assume, to begin with, that it is prepared to finance the expansion by offering a $150,000 bond issue to the public.

Whether the proposed expansion would be to the interest of the firm would depend on the rate of interest that would have to be offered in order to induce prospective investors to purchase the bond issue. The higher the contractual rate of interest that must be offered, the smaller the advantage of the expansion to the enterprise; the lower the rate, the greater the advantage, other things remaining equal. It would appear that 6 per cent would be the maximum rate that could be offered, because at a 6 per cent rate the bond interest on an issue of $150,000 in bonds would amount to $9,000 per year, and would entirely eat up the expected increase in net profits. If the bonds could be sold at a 4 per cent rate, the annual bond interest would amount to $6,000, leaving an annual gain to the corporation of $3,000 in additional net income. In that event the bond issue would appear to be advantageous.

However, in considering the advisability of financing such an expansion of investment by issuing bonds, it must be remembered that the bond issue involves a contractual obligation to pay the stipulated bond interest each year, regardless of the size of the actual earnings of the enterprise. As the years go by, the actual earnings resulting from operations may be either greater or less than was anticipated when the expansion was undertaken and the interest obligations assumed. If they are better than was anticipated, the net income will be unexpectedly large. If they are worse, what remains as net income may be smaller than had the expansion not been undertaken and the burden of fixed interest charges taken on. And if at any time the firm is unable to meet

its interest obligations to its bondholders (or other creditors), it may be forced into receivership or bankruptcy.

Thus, the firm that undertakes to finance a prospectively profitable expansion by selling fixed interest obligations takes the risk that the expected gains may not materialize, and that the consequence may be disastrous for the firm. How serious that risk may be depends on the magnitude of the variations in earnings that may occur from year to year as a consequence of changes in the demand for the product of the firm, and also upon the proportion of its capital that is obtained by borrowing on a fixed interest basis, as compared with investment that does not carry fixed income obligations. Also, the higher the rate of interest that must be offered in order to sell bonds, the larger is the burden of fixed charges in proportion to the prospective earnings.

It seems reasonable to conclude, therefore, that with given prospects of returns from additional real investment, the demands of business firms for additional funds on long-term loan would tend to be greater at low rates of interest than at high. This may be expressed by saying that the demand curve for long-term investment funds is negatively sloped. But at the same time it also seems clear, from experience, that changes in expectations of future returns from additional investment play a considerably larger role than do changes in interest rates in determining the amounts of new funds sought by business enterprises on long-term loan. Changes in business prospects can swiftly raise or lower the anticipated rate of return over cost or marginal efficiency of additional real investment, producing drastic changes or shifts in the demand for long-term investment funds.

Financing through the sale of stock

Some of the hazards inherent in long-term financing through the sale of bonds may be avoided if funds are obtained through the sale of "equities," that is, stock or other securities that do not involve fixed contractual income payments to the investors. The owner of a share of stock has merely a claim to a share in such earnings as the corporation may make from year to year, and there is no maturity date at which the amount originally invested must be repaid to the stockholder. If the funds to finance the expansion are obtained through the sale of stock, a failure of the expected returns from an expansion of investment to be fully

realized, or a temporary dip in earnings, would not involve the possibility of receivership or bankruptcy for the firm.

The corporation which offers a new issue of stock for sale in the market may easily be seen as demanding additional investment funds, but what is given in return for the funds obtained is far less definite than the promise of an annual interest payment plus the return of the principal at some future date. What the investor receives, in exchange for his money, is a claim to a certain proportionate share in the distribution of the earnings of the enterprise, and in the distribution of its assets should its affairs be wound up and its property liquidated. It is thus more difficult in the case of "equity" financing to picture the demand for funds in terms of the amounts of such funds that an enterprise would seek to obtain at different possible "prices" for funds, because these "prices" are more or less indeterminate.

One way of visualizing the situation, however, is to think of the dilution of earnings (and possibly of control) resulting from the issuance of additional stock as representing the "price" involved in obtaining additional investment funds through the sale of stock. The amount of dilution will depend on the price at which new stock can be sold to the investing public, because that will determine how many shares must be issued and sold in order to raise a given amount of new investment funds.

Suppose, as in the preceding example, that a corporation with $1,000,000 in stock already oustanding is contemplating an expansion requiring $150,000 in additional investment funds. Suppose also that the stock has a par value of $50 per share, that there are 20,000 shares outstanding, and that the stock is selling currently at about par. If it were possible to sell additional stock at a price that approximated the par value, then an offering of 3,000 additional shares would suffice. In that event the new issue would reduce by slightly less than one-sixth the proportionate interest in the corporation represented by a single share of stock, from 1/20,000 to 1/23,000. As a consequence of the new issue, any stockholder's participation in the earnings of the enterprise would be *proportionately* smaller than before.[1]

This does not mean that the value of a share of stock, or the corporation's assets per share, would necessarily be reduced, because

[1] Usually new stock must be offered to existing stockholders, pro rata, so that they can protect themselves against such a dilution of their interests, if they so desire.

the assets of the corporation would be increased as a consequence of the new investment. Nor would it mean that the earnings per share would be reduced, because the additional investment is expected to result in an increase in earnings in future years. There would be little incentive to undertake the expansion if that expectation did not exist. If earnings were expected to increase in direct proportion to the increase in stock outstanding, the original stockholders would be neither better nor worse off than before, in terms of earnings and dividends. If earnings were expected to increase more than in proportion to the increase in stock outstanding, the original stockholders would stand to gain, because prospective earnings per share would increase. The worst that could happen, from the standpoint of the original stockholders, would be that the additional investment would fail to bring forth *any* increase in earnings, as compared with what they might have been had the expansion not been undertaken. In that event, the earnings of the corporation, *per share,* would be about one-sixth less than had the expansion not occurred.

The other aspect of new financing through the sale of stock is the dilution of control that may accompany an increase in the number of shares of stock outstanding. If the new issue carried voting rights, the share in control of the corporation represented by any given block of stock would be reduced. But the dilution of control could be avoided by issuing nonvoting stock, since many investors, particularly small buyers, are uninterested in control because they feel that they would be powerless to influence the direction of the corporation even if they had the voting privilege. And even though the voting privilege does attach to all outstanding stock, if the stock is widely held by comparatively small owners, it is in fact very difficult for any group outside the management and interests affiliated with it to capture control. Thus the possibility of dilution of control may, or may not, exercise an influence on the decision regarding the type of securities to offer, and indeed, the decision whether or not to undertake an expansion program.

The extent of dilution of earnings and control will depend on the price at which the new issue of stock can be sold. Suppose that, instead of being able to sell a new issue at a price of $50 a share, the firm could obtain only $40 per share. In that event, 3,750 shares instead of 3,000 would have to be sold in order to raise $150,000 in additional investment funds. Obviously, the

degree of dilution of earnings would be somewhat greater in that case than if the additional stock could be sold for $50 per share. The lower the price at which additional shares could be sold, the greater the number that would have to be issued to raise a given amount of new funds, and therefore the greater the amount of dilution of earnings and control. The higher the price, the less the degree of dilution.

Trading on the equity

If the expansion of real investment in the enterprise is expected to result in a sustained increase in earnings, in excess of the rate of interest that would have to be offered in order to sell a new bond issue, the original stockholders would stand to gain by having the expansion financed in that way rather than through the sale of additional stock. If the additional investment were expected to produce earnings at a rate of 6 per cent, and the necessary bonds could be sold on a 4 per cent basis, then the earnings in excess of 4 per cent bond interest would be added to net income and would more than proportionately increase the amounts available for distribution as dividends or for the accumulation of surplus.

This practice of financing a corporation's investment in part by the sale of bonds is known as *trading on the equity*. However, it involves the risk that in bad years earnings would be insufficient to meet bond interest, and that a series of bad years would result in insolvency and the partial or complete loss of the stockholders' interest in the enterprise. Thus, trading on the equity is a safe expedient only if carried to a limited degree, so that the fixed charges do not exceed the minimum earnings that could be obtained on the operations of the enterprise as a whole under the least favorable conditions possible.

Borrowing from banks

Borrowing from commercial banks represents an alternative source of either short-term or long-term funds. The considerations involved in bank borrowing are not greatly different, from the standpoint of the enterprise itself, from those involved in the sale of long-term bonds. There are, indeed, significant differences between the lending operations of the commercial banks and those of other institutional or private investors, but those differences will be dealt with in Chapter 13 on the supply of investment funds.

Demand for Investment Funds and the State of Business Expectations

From what has been said it should be clear that the demands of business enterprises for funds with which to finance new real investment are largely determined by the state of business expectations at the time the new investment is under consideration. These expectations immediately concern the future prospects of the enterprise, both as to the demand for the product and the anticipated sales revenue, on the one hand, and the level of production costs on the other. The state of expectations is largely conditioned by the prospective trend of activity for the economy as a whole, because few businesses are immune to changes in the level of demand and of costs accompanying changes in the aggregate amounts of income received by the people of the economy during the course of the business cycle.

Nor are individual business enterprisers' own judgments as to the future arrived at in isolation. On the contrary, they are influenced, consciously or unconsciously, by the tone of pessimism or optimism pervading the business community at the time. If other businessmen are forecasting the future in gloomy terms, it would be a hardy enterpriser indeed who would not be influenced in some degree by the attitude of friends and associates.

Thus, decisions to undertake new investment, and the associated financing, although made in terms of individual enterprise, still tend to fall into a rather definite pattern of cyclical change over time, and to be bunched in periods of rising general business activity. If the general level of activity in the economy is rising, brighter forecasts of future earnings prospects lead increasing numbers of firms to undertake expansion. At the same time, brighter expectations for the future, as seen by prospective investors, diminish some of the hazards of security ownership, so that larger sums are available for the financing of increased real investment.

In a period of declining general business activity, conversely, there are poorer prospects of earnings for business enterprises in general, and for most individual business undertakings. Indeed, fear of prospective losses may replace anticipations of future gains. Under such circumstances, there is little or no incentive to undertake additional real investment, no matter how low the interest

rate might be. Instead, the firm might be able to improve its position if it could liquidate a part of its already existing investment and concurrently reduce its obligations to others. Thus, apart from instances in which some additional investment is necessary in order to keep the firm going at all (and so salvage some part of its undertakings), there is little incentive to seek additional investment funds.

In line with the preceding analysis, studies of the behavior of investment during the course of the business cycle indicate that new investment, and new offerings of securities, tend to rise sharply in periods of expanding general business activity and to decline sharply in periods of business decline. This cyclical pattern in investment is itself an important factor, acting and reacting with the rise and fall in production and employment over a period of years.

Chapter 12

FINANCIAL INVESTMENT AND TRADING IN SECURITIES

Financial Investment as Viewed by Private Investors: the Financial Overlay of the Productive Process

As indicated at an earlier point, real investment involves the expenditure of current funds by business enterprise for the acquisition of the means of production required to execute production plans, these means including not only durable plant facilities but also raw materials, components, and services essential to production. Funds for real investment may arise out of earnings of previous productive activities, or may be obtained by borrowing from banks or from the sale of new corporate securities or other types of property rights. The essential point is that under modern industrial conditions, with a large part of economic activity carried on under the corporate form, an increasingly complex financial overlay of various kinds of *intangible* property rights has come to be superimposed on the productive structure of the economy.

For the most part, the opportunities for investment that people find open are opportunities to purchase bonds or stocks or other kinds of property rights, through which they may share in the earnings of enterprise, rather than opportunities to invest directly in the means of production themselves. Only where a person decides to set up in business for himself, or in partnership with a few other people, is he likely to be the direct legal owner of the means of production used in turning out the product. If he elects to purchase a few shares of stock in the Pennsylvania Railroad, he

does not thereby become the owner of a few hundred feet of track, or of a small wayside station building, or of a part of some specific locomotive or box car. What he owns is simply a proportionate share of the entire enterprise, which carries with it the right to participate in the earnings of the company and to cast votes, if he wishes, in proportion to the number of shares that he owns, in the election of the directors of the corporation.

The person who invests his funds in the purchase of the bonds or stock of a large business corporation may know and care little or nothing about the operations of the enterprise, or of the character of the real investment that it has made. What he is primarily concerned with is the income that can be obtained by virtue of his ownership of the bonds or the stock. The operations of the enterprise are significant to him only as they affect the size and certainty of that income. The development of modern industrial organization, therefore, has separated the process of financial investment on the part of individual private investors from the process of real investment in the means of production as carried on by corporate enterprise. As a consequence, there is no necessary correspondence between the amounts that private investors may wish to invest in intangible property rights at any given time and the amounts that business enterprises require to finance contemplated new real investment in productive facilities. This fact—that there is no close linkage between the amounts that investors may seek to invest and the amounts that business enterprises require for the financing of their production plans—is of crucial importance in analyzing the behavior of the economy as a whole.

As a matter of fact, a decision, on the part of an individual, to invest funds in the purchase of some shares of stock or some bonds, may involve no new real investment at all, but result merely in an interchange of liquid funds and property rights as between individuals. A person who decides to buy a few shares of American Telephone & Telegraph Company stock usually cares very little whether the shares in question were previously owned by someone else or are newly issued. But in the first case, the money that he invests is simply transferred to the previous owner of the shares and is available to that person for whatever use he may wish to make of the funds. No additional funds are, by such a trans-

action, made available to A. T. & T. for use in building a new long-distance line or a new telephone exchange. In other words, trading in already outstanding securities involves a financial investment by the buyer of securities that is matched by a corresponding financial disinvestment on the part of the seller, with no direct effect on real investment at all. Only where an individual makes a financial investment in newly issued securities are additional funds made available for use by business enterprise in financing new real investment.

This does not mean that trading in already outstanding securities has no significance in relation to the financing of new real investment; the significance is indirect. A business firm which seeks funds for purposes of expansion by offering new issues of securities must face the fact that these offerings will be taken by the investing public only if they appear to be as attractive as other already outstanding issues. The price at which a new issue of stock can be sold, and the interest rate offered on a new issue of bonds, will be determined by the prices at which comparable stocks are currently selling in the securities markets and the rates of return obtainable by investors who buy already outstanding bonds. It follows that in order to understand the conditions that affect the supply of new investment funds for use by business enterprise it is necessary to analyze the forces influencing the evaluation of securities and similar property rights, either new or old, by the investing public.

Individual Valuation of Investment Opportunities

Any current funds that a person has at his disposal, and that he does not choose to expend on the purchase of current goods and services, constitute personal savings. Such funds may be held in the form of money or in the form of bank balances; in either case they are classified as *liquid funds.* But funds held in that form do not bring in any income. Therefore, there is an incentive to the holder of such funds to exchange them (except for such amounts as may be kept to meet unforeseen contingencies or to cover ordinary expenditures until the next pay check comes in) for some form of income-yielding investment. Such investment may be represented by the purchase of a house that can provide its

owner with a rental income, by the taking out of life insurance, by the making of an interest-bearing loan to someone else, or by the purchase of securities of one kind or another.

The choice of the form of investment will be governed in part by the amount of funds that the person has at his disposal, by his preferences for one type of investment as compared with another, and by the size of the expected income and his degree of confidence that the promised income will in fact be forthcoming in the future. Some people prefer to put their money in real estate or in mortgage loans because they can keep an eye on the property that they own, or against which they have a claim. Others, feeling that they would rather leave the problems of investment management to a life insurance company, a savings bank, or an investment trust, turn their money over to such institutions for investment. Still others have sufficient funds and sufficient confidence in themselves to venture into the purchase of corporate bonds or stock.

The question facing any individual prospective investor, in trying to decide whether to tie up his funds in a particular form of investment, is how much the ownership of that particular kind of property right—whether a share of stock, a bond, or a piece of real estate—is worth to him. If its value to him as a prospective source of income is greater than, or at least equal to, its current purchase price, he will have an incentive to invest in it, assuming, of course, that no more attractive alternative investment opportunity is in sight. But what is the basis of his present valuation of a particular property right or form of investment?

This problem is similar in character to the one already dealt with in Chapter 10 in connection with the valuation of durable assets by a business firm. A share of stock or a bond (or any other comparable property right) may be looked upon as a source of a series of annual incomes stretching out over years to come. There is no way of obtaining at the present time the incomes that are expected to accrue five years hence or in any other future year; they must be "waited for." Also, in the case of a share of stock, and many other kinds of property rights, there is no assurance of the size of the income to be obtained in future years, because that will depend on the course of subsequent events. The dividends received by a stockholder may be large or small; there is a chance that none at all will accrue, or that the enterprise may "go broke." Thus the prospective investor must forecast as best he

can the income prospects associated with the ownership of any particular stock or other property right. In the case of a bond, the annual income is fixed by the terms of the contract, and in most cases a definite maturity date is set at which the principal is to be repaid. Even so, some chance of loss may attach to the ownership of a bond, for the issuing firm may fall on evil days and be unable to make good on its obligations.

Given the investor's best guess as to the probable size and duration of the future incomes represented by the ownership of a share of stock or a bond or some other property right, the questions are: What is the present worth of that series of prospective incomes to him? What is the maximum amount of current funds that he would be willing to part with in order to obtain the right to receive those incomes? What is his maximum demand price for the property right under consideration?

Time discount and the present worth of property rights

The basis of the answer to these questions is the same as in the ase of the valuation of a durable productive agent, except that the calculations are likely to be a great deal less precise. The present worth of any particular property right to an individual prospective investor will depend upon, or reflect, the rate at which he discounts prospective future incomes. Generally speaking, people do not regard the right to receive a given sum of money income at some future date as the full equivalent of the same amount of money immediately in hand. Thus, a person is unlikely to be willing to exchange $1,000 of funds now at his disposal for the promise of someone else to return $1,000 to him at the end of three or five or ten years, even though he has full confidence that the promise will be fulfilled. (There may, of course, be certain circumstances under which he would do so.) In general, however, the individual can be induced to part with current funds only if there is a prospect of receiving back a larger sum at some future date. The difference between the present sum and the future sum to be returned represents a source of gain to the holder of present funds and provides the inducement to part with liquidity. The difference may also be regarded as representing the degree to which the future repayment is discounted in estimating its present worth, and that degree of discount may be expressed as a *rate of time discount.*

Time preference and time discount

People differ greatly in the extent to which they discount future incomes, and for many different reasons. One explanation often given is that, if a person invests present funds in exchange for the right to receive a series of future incomes, he gives up the possibility of spending those funds on goods and services that he might enjoy right now. Instead, he postpones the satisfactions that might be obtained from current goods and services to the more or less distant future dates when the receipt of the incomes will again put him in position to purchase desired goods and services. Inasmuch as the satisfactions obtainable from goods and services in future years are not immediately present in the foreground of consciousness, they tend to be undervalued or discounted in comparison with present satisfactions. And similarly, the sums to be received in the future, with which such goods and services could be purchased, are valued less than the same sums in the present. If this explanation is valid, the individual would be willing to purchase the right to receive a given series of future incomes only at a price that involved a discount of the future incomes for which he would have to "wait." Or, stated somewhat differently, he would give up present funds only if he were offered a premium or additional payment to compensate for waiting and postponing consumption to a later time. Such explanations of time discount are often referred to as *time preference* or *impatience* theories, and the anticipated incomes are described as the expected "rewards" for "waiting."

Although there is undoubtedly a great deal of substance to such explanations of people's attitudes, they do not fit all possible cases. Indeed, they collide with the fact that the great bulk of investment in business enterprise is made by people in upper and middle income brackets, where the funds devoted to investment may not cut substantially into current consumption. Furthermore, amounts received year by year as income from investments, or as the repayment of principal on loans, are more likely to be reinvested than spent for consumption purposes at the time they are received. And there appear to be cases in which people would be willing to forego present consumption and "save" for the future, even though the sums receivable in the future would not necessarily exceed the amounts currently saved. Thus, a person who wishes

to assure himself or his family some measure of security in old age would not necessarily refrain from current saving and investment, even though there was no prospect of obtaining any income from the amounts so saved during the intervening years.

Liquidity preference and time discount

Another approach to the explanation of time discount is based on the idea of *liquidity preference*. As long as a prospective investor holds his funds in the form of cash or bank deposits, he has the option of disposing of them in many different ways and is free to use them in whatever way may appear to be most advantageous. Once he decides to invest his funds by purchasing a share of stock, or a bond, or some other kind of property right, he no longer has them in liquid form, available for use at a moment's notice in whatever way may then appear desirable. Instead, they are tied up, for a longer or shorter period of time, in the ownership of the share of stock, the mortgage loan, the piece of real estate, the bond, or the life insurance policy. Different types of investment vary in the length of time for which the investor's funds are tied up. If invested in short-term loans, they may be returned within a few months, when the loans mature. If invested in bonds, they may be returnable in a few years or perhaps only after a long period, depending on the date of maturity. If invested in stocks, which represent permanent shares in the ownership of enterprise, there is no date of maturity, and the resale of the stock therefore represents the only way in which the investor can get back into the position of holding liquid funds.

A decision to invest, therefore, involves a sacrifice of liquidity for a longer or shorter period, and the loss of flexibility or strategic initiative that goes with the holding of current funds. It involves the chance that making an investment now will preclude the making of some alternative investment next week, or next month, or next year, that would then appear more promising than the one now chosen. Should the investor decide at some later date to *liquidate* his present investment, that is, "get his money out" of the investment and into the form of liquid funds once more, he must find someone else who is willing to buy the property right from him, giving current or liquid funds in exchange. There is a chance that he would be unable to sell out at a price as high as the price he originally paid, and if so, the liquid funds

that he could command by liquidation of his investment might be less than those originally invested. In that event, he would incur a *capital loss* on the entire transaction. On the other hand, he might find that the conditions prevailing at the time he chose to liquidate were more favorable than when he originally made his investment. If so, he would obtain a *capital gain* on the transaction, in addition to whatever income he received in the interim.

The person who has liquid funds at his disposal may be thought of as weighing two alternatives. The first is to continue to hold those funds in liquid form, without resulting income but with the advantage of flexibility of disposal that goes with liquidity. The second alternative is to invest the funds in property rights that give a promise of income, but involve a sacrifice of liquidity for a longer or shorter period and a risk of possible loss of a part of the funds invested should the course of subsequent events be unfavorable.

Different forms of investment differ, as already noted, in the periods of time for which funds are tied up, and also in the risk of partial loss of capital value should the investor wish to liquidate his holdings on short notice. For example, the government commonly issues large amounts of short-term obligations, payable within a few months, in connection with its current operations. These represent a convenient form in which to invest current funds to earn a small return while maintaining a degree of liquidity very nearly equal to the holding of cash, inasmuch as they mature within a short period, and, if necessary, can be sold even sooner with virtually no risk of loss of capital value. Even government bonds having comparatively long periods to run before maturity also have a high degree of liquidity, since the government has undertaken, as a matter of fiscal and monetary policy, to maintain the prices of such bonds at very near their par value. As a consequence, funds invested in such securities can be liquidated on short notice with virtually no risk of loss. For other types of securities, however, a corresponding degree of assurance as to the liquidating value does not exist, and so a decision to invest in them involves a greater sacrifice of liquidity.

A person's *rate of liquidity preference* may be thought of as representing the prospective rate of return on a given investment that would be necessary to induce him to sacrifice liquidity by investing current funds. Suppose, for example, that he would be will-

ing to lend $1,000 for a year in exchange for a promise of the return of $1,050 at the end of the year, but would be unwilling to make the loan in exchange for any smaller future sum. Assuming that the fulfillment of the promise was amply secured, the $50 interest payment would represent the required inducement to part with liquidity for the period of a year, and the rate of liquidity preference would be 5 per cent (*i.e.*, $50/$1,000).

If an investment were under consideration that would involve tying up funds for a longer period, with a series of incomes payable in the interim, the liquidity preference rate of the individual investor would determine the maximum amount that he would be prepared to invest in that form, in exchange for the promised series of incomes and ultimate return of principal. Suppose that a bond issue which is to mature in five years, and bearing interest at a rate of 4 per cent per year, is offered to the investing public. What is the maximum amount that an investor who has a liquidity preference rate of 5 per cent would be willing to pay for one of these bonds having a face or maturity value of $1,000? Such a bond may be regarded as the equivalent of five annual payments of $40 each, plus a payment of $1,000 at the end of the fifth year. Discounted at a rate of 5 per cent per year, this series would have a present worth of approximately $957 to this individual investor, and that would be the maximum amount that he would be willing to invest in the purchase of the bond in question.[1] If he could buy the bond at any price lower than $957, he would have an inducement to invest, that is, part with liquidity, because the rate of return which he could get on his investment, at any lower price, would be greater than his rate of liquidity preference. At any price higher than $957, however, the inducement to invest would be insufficient to offset his liquidity preference, and he would not buy.

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[1] The present worth of this series would be equal to the sum of the following:

$$\frac{\$40}{(1.05)} + \frac{\$40}{(1.05)^2} + \frac{\$40}{(1.05)^3} + \frac{\$40}{(1.05)^4} + \frac{\$1040}{(1.05)^5}.$$

This calculation can be short-cut by referring to Table 14 on page 171, which shows the present worth of $1,000 receivable at the end of each year from one to ten years, assuming a discount rate of 5 per cent. If $1,000 receivable at the end of one year is the equivalent of $952 in present funds, then $40 receivable at the end of one year would have a present worth equal to $\frac{40}{1{,}000} \times \$952$, or $38.08. Figured in the same way, the present worths of the other items in the series are $36.28, $34.56, $32.92, and $815.36, giving a total of $957.20.

In reality, there are probably few cases in which the individual consciously thinks in terms of a rate of time discount or a rate of liquidity preference, particularly where the prospective returns from property ownership are not definitely assured and therefore must themselves be estimated or forecast. A decision to invest in a certain type of property right, or not to invest, is therefore likely to be made on the basis of optimistic or pessimistic guesses, or the belief that conditions in the future will not be radically different from those prevailing in the past, or because friends or associates or financial advisers have said that it is the thing to do. But in any case, reluctance to get "tied up" for the future is a factor influencing judgment and introducing an element of time discount into the processes of valuation as applied to property rights to future income.

It must also be remembered that any individual investor's liquidity preference is not constant, but is subject to change as a consequence of changes in his own circumstances and in his feeling of confidence or distrust in the probable trend of future events. If he feels that a period of general prosperity is ahead, he will have little fear of a possible loss of capital value should he find it necessary to liquidate his investment a few months or a few years later. But if he takes a gloomy view of the future, the chance of capital loss on a possible sale of his investment will bulk larger in his mind, and his preference for holding current funds in liquid form will be intensified. Thus, for individual investors, and for investors as a group, changes in liquidity preference rates may cause drastic fluctuations in their valuations of different kinds of property rights. This is an important factor in the explanation of the rise and fall of security prices, real estate prices, and other types of property rights to income.

Market Valuations of Property Rights

Under modern conditions, the number of people who own stocks or bonds issued by a single large corporation such as the United States Steel Corporation or the American Telephone & Telegraph Company may run into the hundreds of thousands, and therefore the total value of all corporate securities outstanding amounts to many billions of dollars. Although there is a marked concentration of such ownership in a comparatively small per-

centage of the total population, nevertheless, millions of people derive at least a small part of their incomes from the ownership of securities.

It is to be expected that there would be differences in the valuations that different people would attach, at any given time, to the ownership of particular issues of stocks. These differences would reflect differences in their respective estimates of future income prospects, or in their rates of liquidity preference, or both. Those who had either the most optimistic estimates of future income, or the lowest rates of liquidity preference, would place higher present valuations on the ownership of particular property rights than would people who were less optimistic about future income prospects, or had higher rates of liquidity preference.

Market demand for securities

The market demand for any particular issue of securities—say the common stock of the X.Y.Z. Corporation—may be thought of as representing the number of shares of that stock that existing and potential investors would be willing to hold (in preference to equivalent amounts of current funds) at different possible prices, other things being equal. Suppose that there were 50,000 shares of X.Y.Z. stock outstanding. Some people might be willing to pay as much as $150 per share to acquire such stock, if that were necessary; or, if they were already owners of X.Y.Z. stock, they would prefer to hold on to it at any price below $150 per share. In either case, the individuals in question would regard the ownership of the stock as preferable to the possession of $150 in liquid funds. Other people, however, might attach lower valuations to the ownership of X.Y.Z. stock, in comparison with the possession of liquid funds or other types of property ownership.

The market demand situation for X.Y.Z. stock, as it stands at a given moment of time, may be represented graphically as in Figure 24. In this figure, the ordinate scale represents possible prices for X.Y.Z. stock, while the abscissa scale indicates the numbers of shares that would be held by investors at each of the possible prices. The plotted curve labeled D_1 shows how many shares would be held at each possible price in the range from $170 per share down to $90 per share.

Inasmuch as all outstanding shares of stock must be held by someone, the current market price of the stock would have to be

such that the entire 50,000 shares would voluntarily be held by people who regarded the stock as worth at least as much as, or more than, the amount of current funds that could be obtained by disposing of the stock at the market price. An inspection of the demand curve D_1, in Figure 24, will show that at any price above $110 per share fewer than 50,000 shares would be held voluntarily by the investing public. Thus, if the price were above $110, efforts on the part of some existing stockholders to dispose of their shares for money would tend to force the price downward. If the price were below $110, the amount of stock that would be retained by already existing stockholders, plus the shares that would-be owners were willing to buy, would exceed the total number of shares outstanding. The price therefore would tend to be forced upward. At a price of $110, all outstanding shares would be voluntarily held by investors; the total demand would be just equal to the available number of shares.

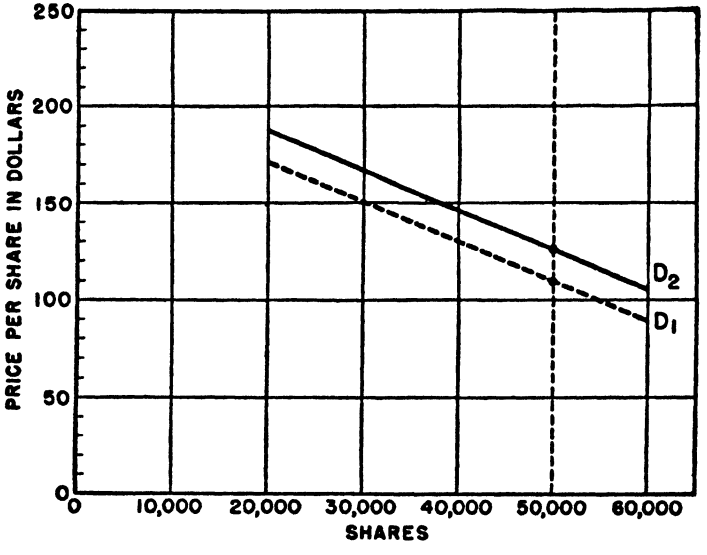

FIGURE 24. MARKET DEMAND FOR SHARES OF STOCK OF THE X.Y.Z. CORPORATION

Suppose, now, that the prospects of X.Y.Z. Corporation were to improve, perhaps as a consequence of an increase in the demand for its product or some technological development that promised to reduce its costs of operation. Such prospects would warrant an expectation of increased earnings in years to come, and therefore

a likelihood of increased dividends to its stockholders. With such anticipation of increased income, existing and potential stockholders would regard the ownership of X.Y.Z. stock as the equivalent of a larger number of dollars in current liquid funds than before. This would tend to cause a positive shift in the demand for the stock, which is represented by the second demand curve, D_2, in Figure 24. Assuming that there were no change in the total number of shares outstanding, the price at which the 50,000 shares would be held in preference to current funds would be increased to $125 per share.

Conversely, a deterioration in the prospects of the X.Y.Z. Corporation, as appraised by existing or potential investors, would result in a negative shift in demand, and the price of the stock would tend to fall.

It should be noted that changes or shifts in the demand for stock ownership will reflect not only changes in the appraisals of future income prospects for the enterprise, but also changes in liquidity preference on the part of the investors. A decline in the rate of liquidity preference would tend to increase the demand for ownership, whereas a rise in liquidity preference would tend to decrease the demand for ownership.

Rate of yield on market price

A change in the market price of a share of stock or a bond will cause an inverse change in the *yield* or ratio of income to market value, assuming that the income in terms of dollars does not change at the same time. Suppose that, when the stock of the X.Y.Z. Corporation was selling at $110, the current dividends declared amounted to $6.60 per share. Then the rate of yield, or rate of return calculated at market price, would be $6.60/$110, or 6 per cent. When the stock was selling at a price of $125, the annual dividend rate would have to be $7.50 per share to maintain a 6 per cent rate of yield on market value. If the dividend rate did not increase, but remained at $6.60 per year, then a rise in the market price of the stock to $125 would cut the rate of yield from 6 per cent to 5.28 per cent ($6.60/$125 = .0528).

A rise in the market price of stocks tends to reduce the rate of yield if the dividend rate remains unchanged. If dividends decline, the rate of yield will decline if stock prices do not decline correspondingly. If stock prices decline more than proportion-

ately to dividends, yields will increase. If stock prices decline less than proportionately to dividends, yields will decrease.

In the case of a bond, the amount of interest payable per year is usually fixed at a certain percentage of the face value or principal of the bond. Thus, a $1,000, 6 per cent bond requires the payment of $60 annually in interest. Although certain minor corrections are necessary if the maturity date of a bond is only a few years distant, the yield on a bond (as contrasted with the contractual interest rate) would be greater than 6 per cent if the bond were currently selling *below par,* that is, for less than $1,000. The yield would be less than 6 per cent if the bond were currently selling *above par.*

A calculation of the rates of yield on different types of securities provides a good indicator of the terms on which investors are currently willing to invest, that is, to hold property rights to income rather than the liquid funds that could be obtained by selling them out at prevailing market prices. This is essentially what is meant when it is said that a person has decided to liquidate his investment: he prefers to hold liquid funds rather than claims to income when the current (or prospective) yield on the securities is insufficient to offset his desire to hold liquid funds. Thus, the rate of yield may be taken as at least a rough indicator of the prevailing rate of liquidity preference at any given time.

Changes in relative prices of different issues and types of securities

That people's attitudes are subject to rapid and sometimes almost inexplicable changes is indicated by the sharp fluctuations in security prices (and in the prices of other kinds of property) that have occurred over the years. Judgments and decisions are seldom made in dispassionate isolation, but are inevitably swayed by the actions of other people and by the rumors, tips, and "sentiment" of the market. Periods of optimism and pessimism succeed each other and are reflected in sharp changes in the generally prevailing rate of liquidity preference. A rise in security prices may itself lead to a more optimistic appraisal of future income prospects and generate increased confidence. That, in turn, may tend to reduce the rate of liquidity preference and bring about a further shift in the demand for securities in a sort of cumulative process. Conversely, a fall in security prices may inspire more

pessimistic appraisals of income prospects and, at the same time, cause a sharp increase in liquidity preference rates, because owners fear that if they hold on, and are forced to sell out later, they may experience more serious capital losses than if they were to liquidate now. Thus, a downward cumulative process of falling prices, increased desire to liquidate, and further decline in prices, may be set in motion.

Great changes in the market prices and yields of securities are predominantly connected with changes in the general level of business activity which affect, or appear to be likely to affect, the profitability of enterprise. Such changes reflect the shifting preference of people as between the holding of liquid funds and the making of long-term commitments. There are also marked changes in the types of securities that people prefer to hold in times of changing business conditions.

When business activity is improving and general prosperity prevails, the earnings of business enterprises are for the most part good and income prospects are bright. Under such conditions, many people are eager to purchase (or hold) stocks, because they anticipate increases in dividend disbursements to stockholders. They are relatively less eager to purchase (or hold) bonds on which the incomes are contractually fixed. As a consequence, bond prices tend to decline in comparison with stock prices, as many investors seek to liquidate their holdings of bonds and transfer the proceeds to investment in stocks. The rise in stock prices, in response to the buying pressure, has the effect of reducing the rate of yield on stocks (that is, the ratio of current dividends to current stock prices). In a period of intense speculative activity in the securities market, it is possible for the current rate of yield on stocks to fall to very low levels, although such a situation can seldom be maintained for any great length of time. Such a period is likely to be brought to an end by a sudden collapse of stock prices, as it becomes increasingly apparent that future earnings are unlikely to rise enough to give a rate of yield in line with the normal range of liquidity preference rates.

In a period of declining business activity, and dimming prospects of business earnings and dividends, the reverse process tends to occur. Then, the more assured though more modest income of the bondholder appears much more enticing to many investors. They are inclined to try to liquidate their holdings of stock and to

transfer the proceeds to investment in bonds. Under the pressure of liquidation stock prices decline, while the rush to buy bonds tends to force their prices upward relative to those of stocks.

Such a shift of emphasis from bonds to stocks or vice versa is only one example of a shifting preference with respect to investment. Other types of property rights similarly vary in attractiveness in comparison with one another in periods of changing business conditions. The repercussions of such shifts, as well as of the scramble to get out of long-term investment entirely and into liquid holdings, are felt throughout the entire economic system.

Chapter 13

SUPPLY OF INVESTMENT FUNDS

New Issues of Securities and the Supply of Investment Funds

Terms on which new issues can be sold

From the standpoint of the individual investor, it is usually a matter of little concern whether the shares of stock or bonds that he buys are acquired from some other investor or are a part of a new offering to finance an expansion of real investment. He will be inclined to purchase newly offered stocks or bonds at prices that are in line with the prices of already outstanding issues with comparable prospects of income and security. Thus a corporation which proposes to offer a new issue of stock will be guided by the prices at which its already outstanding shares are being traded in the market. A firm contemplating a new issue of bonds must determine the size of the issue, the contractual rate of interest offered, and the offering price, in the light of the current market prices of comparable bonds and the rates of yield on such bonds.

If there is a probability that the new financing will improve the future earnings of an enterprise, the mere announcement of the new offering may increase the demand for its already outstanding shares as well as the salability of the new. If a firm were to put out a large issue of bonds, which would have the effect of increasing its fixed charges, owners of already outstanding stock might feel less confidence in its ability to maintain future dividends. If so, they would be less willing to hold stocks than before, and stock prices would decline. Thus, an intricate interaction is likely to arise as a consequence of the impact of a new financing program upon the market for already existing securities.

Personal savings and financial investment

It was explained in the preceding chapter that the decision of an individual to invest current funds at his disposal will result in the provision of additional funds for real investment only if they are used to buy newly issued securities or other property rights in newly constructed means of production. Otherwise, the transaction is merely a transfer of property ownership and cash holdings as between individuals.

The amount of current funds that can be devoted by individuals to the purchase of new securities and other new property rights will depend on the volume of personal savings, that is, the amounts of personal income that people do not choose to utilize for consumption expenditures. There is, however, no necessary correspondence between the amount that any individual may elect to save out of his income and the amount that he will choose to invest in securities, because liquidity considerations may lead him to hold a part or all of his current savings in the form of cash or bank balances. This means that only in a very broad limiting sense can it be said that the supply of investment funds by private investors is governed by the amount of savings or the incentives that people have for saving. Of more direct significance, in relation to the supply of investment funds, is the state of liquidity preference on the part of the investing public, and the relative optimism or pessimism of current appraisals of business prospects for the future.

Actually, the amount of personal savings, out of which new financial investment may be made, is itself largely dependent on the general level of production and income in the economy. The higher the general level of production and income, the larger is the aggregate amount of savings likely to be, and therefore the potential supply of funds to finance new real investment. But if these potential investment funds are to be converted into real investment, the potential investors must have a sufficient inducement to invest to overcome their preference for liquidity. Otherwise they will attempt to hold their savings in idle cash or bank balances, awaiting the appearance of better opportunities for financial investment.

Although this discussion has been framed largely in terms of personal savings and financial investment by individual private

investors, the situation is not greatly different in the case of such "institutional" investors as life insurance companies, savings banks, and investment trusts, through which the savings of countless individuals are brought together for purposes of investment. The current funds placed at the disposal of such agencies for investment tend to vary with the level of national production, employment, and income, and their problem is to find forms of income-yielding investment that will combine income with a minimum risk of capital loss should liquidation of a part of their holdings prove necessary at any time. Legal standards or specifications established by law limit to some extent the types of investment that may be selected, and thus tend to channel the financial investments of such institutions more narrowly than is true of private financial investment in general.

The situation of the life insurance companies presents certain unusual characteristics, in that the volume of current funds for investment is a reflection of the total number of policies in force and the gradually increasing life expectancy of the population. That is, the amount paid in each year in premiums is determined by the sales of policies over the past generation, and hence does not fluctuate greatly with changes in general business conditions, except as policyholders may find themselves compelled to lapse policies in periods of acute economic distress. At the same time, the gradually increasing life expectancy of policyholders means that the reserves of the life insurance companies have increased more than proportionately. Thus the funds available for investment by such companies have increased progressively, and have shown less variation, in response to changes in general business conditions, than have other sources of investment funds.

For savings to be translated into financial investment, either by private individual or institutional investment, the potential investors must have an incentive to part with liquidity; otherwise, they will seek to hold the funds in idle cash or bank balances awaiting the arrival of more favorable opportunities for investment. If they fail to find such opportunities, the accumulating idle balances will not be converted immediately into demands for additional investment goods with which to expand productive plant and equipment. Under such circumstances, business enterprises in general will not be able to dispose of all the goods and services that could be produced with the manpower and resources

available. Cutbacks in production will occur, and the amount of employment and total income for the economy as a whole will be reduced. The decline in total income will tend to reduce the savings of the community more than total consumption. This downward process will continue until the amount of savings that is made out of current income is in line with the current demands of business enterprise for funds to be utilized for real investment.

This analysis may be summarized by saying that the funds available for financial investment (that is, the savings of the community) come from the income resulting from economic activity and that, as the level of economic activity rises or falls, the volume of current savings increases or decreases very greatly. But savings constitute only a potential supply of investment funds. They are converted into actual supply of investment funds for use by enterprise only if the prospects of obtaining additional income through investment are sufficiently attractive to overcome liquidity preference. And income prospects, in turn, depend on the prospects of enterprise. If business prospects as appraised by business managements are poor, the offerings of new securities to prospective investors may fall short of the volume that would be necessary to absorb the total quantity of savings. But the holders of those savings tend to hold them idle rather than to spend them for purposes of consumption, because they still hope that opportunities for advantageous investment will crop up later. Any tendency for holdings of idle balances to increase will, however, touch off a process of curtailment of production and declining employment and income. People whose incomes are reduced will find that they are unable to maintain their savings as planned, and therefore the decline in income will force a reduction in savings, and in the supply of investment funds, until the supply is in alignment with the demands of business enterprise for funds with which to finance real investment.

Bank Credit as a Source of Investment Funds

The foregoing discussion was confined to the supply of investment funds by private investors through the exchange of savings out of income for holdings of new securities. But business firms that desire additional funds for real investment are not limited to

such funds as may be made available by private investors through the purchase of new securities. As a supplement to or as an alternative to the offering of new securities to the public, business enterprises may seek to obtain funds for additional real investment by borrowing from banks. Although traditionally most borrowing from banks was on a short-term basis, a greatly increased percentage of bank credit has come in recent years to take the form of longer-term loans to business and to government.

Creation of credit by the banking system

One very significant point stands out in connection with bank loans as a source of investment funds: the banking system of the country possesses the power of *creating* the liquid funds that are made available for investment. This is a power not possessed by any other group apart from the government itself.

When a commercial bank makes a loan to an individual or a business firm, it merely increases its deposit accounts (liabilities) by an amount corresponding to the amount of the loan, and at the same time it increases its own investments (assets) by the amount of the note or other obligation received from the borrower. To be sure, an individual bank may experience a drain on its reserves as the borrower draws against the newly created deposit, but that drain is largely offset, for the banking system as a whole, because sums drawn by a given borrower are redeposited by those to whom he makes payments. Bank reserves for many years have run considerably above the minimum percentages specified by law, and if an individual bank or the banking system as a whole should experience a drain on reserves which threatened to cut them below the legal minimum, additional reserve funds could be obtained by borrowing from the Federal Reserve Banks or by other methods that are outlined in a later section of this chapter.

This means that the banks as a whole are in position to increase, within very wide limits, the total quantity of liquid funds (represented by bank deposits) available for the financing of real investment, without involving any prior saving on the part of the community. An individual who decides to invest can do so only as a consequence of saving, that is, foregoing the alternative of expending funds on consumers' goods and services. The creation of bank credit, however, results in an increase in the quantity of liquid funds available for real investment without requiring any

reduction in current expenditures by the people of the community for current consumers' goods and services. Only if the economy as a whole is operating close to the level of full employment of labor and resources does this general statement fail to hold, as will be seen at a later point.

Limits to the expansion of bank credit

If it is true that the creation of bank credit can make additional funds available for financing current real investment, without necessitating any current saving at the expense of current consumption, a practical question arises: What limits are there to the expansion of the supply of investment funds through the creation of bank credit, as compared with the other sources of such funds? If saving, in the sense of earmarking funds for investment rather than expenditure for current consumption, is not necessary in the case of bank-created credit, this element of "cost" or "sacrifice" is not involved in the supply of current investment funds from that source. Hence, one of the factors that may help to explain the limits of supply of funds from other sources is lacking. Certain costs, of course, are involved in the making and administering of bank loans, but the cost of making bank loans to business enterprises has been estimated at no more than 2 per cent, whereas the interest rates charged on such transactions are commonly substantially higher. Is there any explanation of the failure of interest rates on bank loans to fall to a level closely corresponding to the administrative costs of handling different types of loans, or for the failure of bank loans to expand up to limits set by full-employment conditions?

To these questions there are no easy answers, and the answers themselves do not necessarily afford a justification of existing practice. One part of the answer is that interest rates on bank loans, like most other prices, are influenced by a variety of institutional circumstances, conventions, and quasi-monopolistic conditions. Interest rates, like many other prices, display a considerable degree of "stickiness" or inflexibility in the face of changing conditions over time. Interest rates on certain classes of loans remain virtually constant from year to year because they are the rates that everyone is used to. Moreover, banks, like many other enterprises, are influenced by the possibility that a reduction in price (in this case the interest rate) might result in an increase in the

total volume of loans that could be made, but not necessarily in the total expected profit. The anticipated profit would depend on the difference between total revenue received in the form of interest and the total cost of making and administering a larger total volume of loans. For example, if the interest rate on a certain type of loan were reduced from 4 per cent to 3 per cent, the total volume of loans would have to expand by one-third to bring in the same total revenue as could be obtained on a 4 per cent basis, and would have to expand still more to afford the same total dollar profit.

In considering interest rates on bank loans, it must be remembered that banks serve not just one group of potential borrowers but several, and that different rates of interest are commonly charged on different classes of loans. Comparatively high rates are common on personal loans to individuals to finance the purchase of automobiles and other consumers' durable goods. Lower rates may be charged on collateral loans to individual borrowers and business customers, and on mortgage loans to finance real estate transactions. Still lower rates prevail on loans to government, represented by the purchase of long-term government bonds or short-term government issues having maturities of less than a year. On the short-term government issues, the interest rate is commonly very low, running in the neighborhood of 1 per cent per year.

Studies of the structure of interest rates on bank loans indicate that the size of the loan is one of the major factors accounting for differences in interest rates. The cost of making and administering personal loans to individuals, in amounts ranging up to a few hundred dollars, often repayable on an instalment basis, will obviously bulk up larger than the cost of lending the same total amount in a few large blocks to large business customers.

Apart from the cost of making and administering loans, other deterrents to an indefinite expansion of bank loans do, of course, exist. As loans are expanded, bank reserves are reduced in proportion to legal requirements as provided by law, and banks may be forced to borrow from the Federal Reserve Banks to replenish their reserves. The interest payable on such rediscounts will provide some deterrent to indefinite expansion by increasing the cost of the loans to the banks. Although this type of limit on the expansion of bank credit was originally expected to be an important

device for controlling the total volume of bank credit, it has proved in practice to be much less significant than other forces influencing the volume of bank loans outstanding. On the whole, the reserves of the banking system of the country have been large enough, with a few exceptions, to permit a further expansion of loans without reducing the reserve percentages to the minimum legal requirements.

Concern over the security of the loans made (that is, over the assurance that repayment of loans will be made when due) provides a certain limit to the expansion of loans. For while there is possibly no limit to the sums that businessmen and individuals would be ready to borrow if interest rates were very low, and if repayment could be postponed for a very long period of time, there are definite limits to the amounts that they can borrow and utilize in ways that will permit repayment within definitely limited periods of time. The responsible bank official's appraisal of the borrower's ability to repay will influence his decision as to the making of a proposed loan and the amount of the loan to be granted. Furthermore, the estimate of the borrower's ability to make such repayment will reflect the prevailing state of business expectations. In periods of expanding business activity and general prosperity, there will be less risk of loss on loans, and hence a greater willingness to make loans, than in a period of declining activity and depression.

Thus, something akin to liquidity preference influences the decisions of responsible banking officials. The sum total of credit which the banks as a whole stand prepared to extend to the community tends to fluctuate with the general level of business activity, even though that credit is not itself dependent on savings and does not involve in itself any real cost of creation, apart from costs of administration and supervision.

The Special Case of Bank Credit Extended to Government

Bank loans to the federal government stand in a category by themselves for two reasons. First, there is virtually no risk of default in interest payment and in repayment of principal by the government. Hence there is no direct prudential limit to the amount of credit that could be placed at the disposal of the government. Second, bank loans to the government differ from loans

to other customers in that for all practical purposes the borrower (the government), rather than the banks, can determine how much credit is to be created and loaned to it. This follows because the federal government itself, through the operations of the Treasury and the Federal Reserve System, can at will increase (or decrease) the amount of reserves available to the banks, and hence the amount of credit that the banks can create.

During World War II, for example, the Federal Reserve Banks stood ready to purchase from the banks any quantity of government bonds that the banks wished to sell, at a virtually guaranteed price. This meant that the banks could safely purchase government bonds, paying for them by crediting the government's deposit accounts in the banks with the purchase price of the bonds. Against these deposits the government could draw as needed to make payments for war materials, or to government personnel, or for other purposes. If, as a consequence of such withdrawals from the government's deposit accounts, an individual bank found its reserves were being depleted, it could rebuild its reserves to the required legal level by selling to its Federal Reserve Bank a part of the bonds it had already bought. Since the bank's required reserves were only a fraction (say 20 per cent) of its deposit liabilities, it could increase its investments in government bonds, and hence its earning assets, by a multiple of those resold to the Federal Reserve Bank.

The volume of bank-created credit available to the government was therefore determined, not by reference to the amount of saving being made in the community, or by prudential considerations on the part of bank officials, but by the requirements for funds and the financial policy of the government itself. During the course of World War II, bank holdings of government bonds came for the first time to constitute the major element in the earning assets (loans and investments) of the banking system, far outstripping loans to individuals and private business enterprises.

Increasing importance of government debt in the entire structure of financial investment

The rise of government borrowing to a position overshadowing all other financial transactions of the community has brought about a veritable revolution in the banking system, and, indeed, in the financial mechanism of the entire economy. With very large

holdings of government bonds in the hands of the commercal banks—funds that could be converted into additional reserves by sale to the Federal Reserve Banks or on the open market—the banks could, if they desired, expand their loans to private industry in very large amount without incurring any limit attributable to lack of reserves. The issues of national monetary and economic policy that are presented by such a situation must, however, be considered in an even broader context than they are considered in this chapter.

One very real question that arises is whether there is economic justification for the payment of interest on loans made to the government by the banks, as compared with loans made by individuals. Inasmuch as the making of such loans to government is virtually free of risk of loss, and the basis for the creation of the credits involved is provided by the government itself through its operation of the Treasury and the Federal Reserve System, the payment of interest is not a necessary condition for the obtaining of the loan. No essentially different results would follow if the government were itself to create the additional means of payment by an outright printing of money. The chief objections to the latter procedure lie in the vague fears of the community that an open resort to the printing press is somehow dangerous and unsound, perhaps because it is "too easy" and "likely to lead to inflation," that is, rising money prices for goods and services. But the conditions under which rising money prices for goods and services are likely to follow an increase in the volume of means of payment are conditions of full employment. Under such conditions it makes little difference whether the increase in the means of payment results from the operation of the printing press or the more conventional operations of the banking system.

Chapter 14

SAVINGS, PROPERTY INCOMES, INVESTMENT, AND EMPLOYMENT

It has been seen, in previous chapters, that new real investment and an expansion of economic activities may be financed in a number of ways, including (1) the reinvestment of earnings by business enterprises, (2) the sale of new securities to the investing public, and (3) the creation of bank credit in the form of short-term or long-term borrowing from commercial banks. By the same token, an excess of governmental expenditures over current tax receipts may be covered by "deficit financing" through the sale of additional government securities to the general public or the banking system.

Where expansion is financed out of undistributed earnings of enterprise, the liquid funds so utilized constitute business savings as contrasted with private personal savings. When expansion is financed through the sale of new securities to the general public, financial investment by the general public results in the conversion of savings into real investment by business enterprise. The amount of real investment possible might therefore appear to be limited by the amount of liquid funds at the disposal of the potential investors, that is, by the aggregate amount of their savings. But as a practical matter, the amounts of such funds directly reflect the level of economic activity and income, and vary as the level of economic activity and income rises or falls. Also in an economy that, like the United States, has a relatively high level of productivity, the amounts that tend to be saved at high levels of economic activity and income may considerably exceed the amounts required to meet the real investment demands of en-

terprise. Thus, in reality, the limits to the expansion of economic activity have seldom been set by a lack of sufficient funds to carry through plans for industrial expansion. Except under conditions of full employment, the possibility of creating additional funds through the operation of the banking system has meant that means could be made available for expansion, either on the part of industry or government, or both, even if business savings and private personal savings should be insufficient to meet all current demands for funds.

If it be assumed that economic forces tend to push production and income up to full employment levels, then it would follow that the amount of expansion in economic activity from year to year would be governed by the amount of savings available for investment in the means of production required to turn out larger quantities of goods and services. On that basis, a critical importance would attach to the amount of saving as a factor governing the rate of expansion of economic activity in the community, and to the incentives that people had for saving a part of their current income rather than expending income on current consumption. Traditionally it has been assumed that the hope of obtaining a property income from invested savings is a primary incentive to saving, although by no means the only determinant of the amount of saving.[1] If the interest rate be regarded as representative of property incomes in general, then, to the extent that the prospect of obtaining a larger interest return would result in larger savings, and a prospect of a smaller return would result in diminished savings, the interest rate would assume a strategic role in fixing the rate at which economic expansion could occur. It is essentially on such a basis as this that the traditional emphasis on the virtue and economic merit of thrift was grounded.

But if an economy is not operating at full employment, and shows little tendency toward expansion as a consequence of forces generated within the system itself, then the situation is quite different. In that event, the limitations to expansion do not lie in the lack of resources with which to achieve a higher level of production and income. Rather they lie in a lack of profit opportunities sufficient to call into use even the full amounts of productive

[1] In the Soviet economy, real investment is dependent only to a slight degree on private personal saving, and even in the "private enterprise" economy, as already seen, the amount of saving is largely determined by forces beyond individual control.

resources already available for use. Under such circumstances, which correspond roughly to the situation in the United States during the decade of the 1930's, the crux of the economic problem is not to obtain sufficient savings to implement an expansion of production, employment, and income. Rather it is to find sufficient opportunities for real investment to absorb the savings that would tend to be made by individuals and business enterprises at a high level of economic activity and income.

Such a situation presents a sharp contrast to the traditional analysis of the relationships linking savings, property incomes, production, employment, and the level of income for the community as a whole. Inasmuch as current thinking is still much influenced by the traditional analysis, it is important to subject the latter to close investigation, to see in what respects it falls short as an explanation of the economic process. Such an appraisal is important not merely to make economic analysis itself a more appropriate explanation of the facts of modern economic experience. A more important reason is that if the traditional analysis is accepted as valid, the measures that would appear appropriate to cope with widespread unemployment would differ greatly from those advocated by adherents to the more recent economic analysis. If economic analysis is to be used as a guide on important matters of public policy, it is imperative that it be subjected to searching and critical examination.

The Traditional Analysis of Savings, Interest, Investment, and Employment

The traditional analysis was based essentially on a line of reasoning which is summed up in the "Law of Markets" as formulated by J. B. Say, a French economist of the early nineteenth century. The fundamental proposition in this "law" was that "supply creates its own demand," or, stated somewhat differently, that it is impossible for a general overproduction or "glut" of commodities and services to exist. The general argument may be summarized briefly as follows.

The fundamental reason for carrying on economic activity is to obtain the goods and services that people need to meet their desires. Presumably no one in his right mind would expend time, energy, and resources in producing goods and services that would

afford him insufficient satisfactions to compensate for the sacrifices required for production. It was assumed that human wants are indefinitely expansible, and always greater than could be satisfied by the manpower and physical resources available for production. Coaches-and-four and liveried retainers, or even a "chicken in every pot" for everyone, seemed far beyond the flight of even the most fervent imagination. Therefore, goods and services in general would always be scarce in comparison with the desires of people, and would always have a definite positive value to the people of the community, even though accident might occasionally result in a temporary excess of some particular commodity.

The fact of exchange was not believed to make any essential difference for the argument. Any person who specialized in the production of one commodity or service did so expecting to obtain, from its sale in the market, the means with which to purchase, in the market, goods and services that he himself desired. Only by providing some salable commodity or service could he obtain an income. With that income he became, in turn, a demander for products turned out by others. With what he paid for goods and services purchased from them, they in turn became demanders of still other goods and services. Thus, supply was conceived to be the counterpart of demand, and in the aggregate the goods and services supplied to the market were necessarily equal to, and the same as, the goods and services demanded.

With an inexhaustible reservoir of desires, far beyond the capacity of existing resources to satisfy, there would always be opportunities to dispose of additional goods (assuming that the character of people's desires was properly forecast), provided the additional means for their production could be created by building more factories, producing more machinery, and extending the use of fields, forests, and mines. But to free existing resources for diversion into the creation of additional real investment goods, it would be necessary to induce some people to refrain from current consumption of a part of current income, that is, to save. Otherwise the expansion of productive capacity would be impossible. Here, therefore, is to be found the basis of the traditional analysis of the relations between saving, investment, interest (as representative of property incomes in general), and the expansion of productive activity in the economy.

Specifically, so long as the physical means of production remain scarce, in comparison with the uses that can be made of them in producing goods and services that people want, a scarcity value will attach to the uses of such means of production. That use-value will in turn provide the basis of a property income to those who own the means of production, and will permit the payment of interest (or its equivalent) to people who are willing to make their savings available for real investment. There will be an incentive to people to save, as long as the return, in interest or its equivalent, is sufficient to compensate the savers for the necessary sacrifice of current consumption. According to this view, the process of expansion in production would continue until the prices that people in general were willing to pay for goods and services were just sufficient to cover the labor and other costs of production. Included as an element in cost would be the payment of interest, or its equivalent, at a rate that would just induce the amount of saving necessary to keep production rolling.

As the volume of production increased from year to year, the scarcity of the means of production might be reduced, relative to the desires of people for goods and services for which those means were used. If this happened, the *rate* of interest would tend to decline. But it would not decline to zero, because if it did, the owners of property presumably would have no incentive to keep up productive plant. The lower limit to which the rate of interest could decline would be reached when it provided merely a sufficient incentive to keep people from attempting to consume not merely their current income from other sources, but also to "eat up" their past savings as well, by withdrawing from industry more than the earnings on current operations. This could be done, for example, by failing to make full provision for depreciation, and depleting "capital" by using the funds so released to cover interest or dividend payments or other entrepreneurial withdrawals.

The prospect of being able to obtain an income through property ownership was thought of as the "price" or "reward" for saving, the effect of which was to reduce the relative scarcity of the means of production. The higher the rate of interest, the greater would be the incentive to save. The lower the rate of interest, the less the incentive to save would be. But so long as any scarcity of productive means remained, a positive value would attach to the

use of such means, and therefore a source of property incomes would exist.

In the traditional view, the interest rate was significant not only as a factor determining how fast and how far the expansion of production in general could go (by virtue of its function as an inducement to saving), but it was also thought of as a part of the general structure of prices. It therefore was a factor influencing the lines along which the productive activities of the economy would be directed.

Expanding industries would require additional funds to finance the expansion. To obtain such funds, they would have to compete with one another for the limited funds available by offering the best possible returns to prospective investors. If the products of one firm were in great demand, it would be in position to attract additional funds by offering higher returns to the investing public than could other firms whose products were not in such keen demand. Investment funds derived from savings would tend to flow into enterprises where prospects for future expansion were brightest, and not into others whose prospects, though perhaps good, were still less alluring.

In other words, the interest rate was conceived of as *allocating* or rationing a limited flow of savings for expansion purposes in ways that seemed economically most advantageous, considering the demands of the people of the economy for finished goods and services. As long as the total amount of savings at any given time was insufficient to meet all possible demands for real investment purposes, the interest rate would serve as a useful and indeed necessary device to ration the available savings among competing channels of investment.

Traditional analysis based on assumption of full employment

A major deficiency of the traditional analysis was that it was based on the assumption that *normally* the economy operates under conditions of full employment. It assumed that, except for temporary lapses, all existing physical means of production would be employed either in producing consumers' goods or in constructing plant facilities, machinery, and other things required for a further expansion of production. Savings out of current income would not reduce the demand for goods and services in the aggregate, because as they were invested they would be translated into

demands for labor, raw materials, and equipment to erect buildings and construct machinery.

As time went on, the rate of interest obtainable from investment might decline; but as long as savers realized that possibility, they would presumably readjust the amounts they sought to save, in comparison with the amounts they spent on consumption. And as the production of goods and services expanded, their prices would tend to be readjusted in comparison with the wage incomes of workers and the declining rate of interest and other property incomes, so that all goods and services that could be produced could still be purchased with the money incomes that people received, in one way or another, from productive activities.

The traditional analysis did not overlook the fact that the creation of bank credit could make funds available for the expansion of real investment without any direct saving on the part of the banks or their owners. But if the economy were already operating at full capacity, the creation of additional liquid funds or means of payment would simply result in the bidding up of the prices of those types of labor, raw materials, and equipment that could be used for the production either of consumers' goods or of investment goods. These increases in certain prices would force people whose incomes or means of payment were not increased to cut down on their current consumption, thus providing the "real" savings that corresponded with the increase in bank credit and the associated increase in real investment. Such savings are often referred to as *forced savings.* It may be noted parenthetically that in this case the people who cut down on consumption, and thus "saved," would not thereby become owners of claims to future property income. However, they might ultimately be compensated by a subsequent increase in real income as a consequence of a lowering of the prices of consumers' goods, as and when the volume of production was increased by virtue of the expansion of productive capacity.

The Problem of Chronic Unemployment

The body of traditional economic analysis, as outlined above, may appear reasonably appropriate for an economy operating under conditions of full employment, or for one whose current productive capacity is barely adequate to meet the minimal living

requirements of its people. But it fails to provide an adequate explanation of the experience of modern industrialized economies, including the United States, which have suffered prolonged periods of deep depression and unemployment, both of labor and of physical productive resources, such as prevailed during the 1930's. Nor does experience seem to lend confirmation to the traditional views as to the relations among saving, investment, and the interest rate —the latter being used as a symbol of property incomes in general.

Take first the view that saving, in the sense of foregoing present consumption, is necessary to permit the diversion of labor and other resources from the production of consumers' goods to the production of additional investment goods. That is clearly not the case if the point of departure is a situation in which a substantial part of the labor force and already existing productive facilities are idle. All that is then necessary, in order to create additional productive plant and facilities, is to put the idle resources to work. That need involve no curtailment of current consumption at all. What is required is the existence of some incentive to put the process of expansion in motion.

The difficulty is that few business enterprises, in such a period, can foresee any possibility of additional returns, to be gained by carrying out an expansion of their own undertakings, that are commensurate with the risks they would assume in seeking additional funds to finance the expansion. They may concede that if all the firms in the country were to increase production and employment simultaneously, the increased wages and other outpayments involved would increase consumers' purchases of goods and services in general. But still no one of them is in position to gamble on its own share in the possible increased aggregate demand. And inasmuch as the initiative in expansion has to be taken by individual firms, the tendency is for each one to wait and see what happens. The stimulus to expansion may therefore have to come from some outside source.

Or turn to the role of interest as a stimulus to saving, and the assumption that there is a direct relationship between the expected or anticipated rate of return on financial investment and the amounts that people are willing to save out of current income. As noted in preceding chapters, studies of saving in modern communities indicate that the bulk of current personal savings is made by

upper and middle income groups at comparatively little sacrifice of living standards, and that a considerable proportion of all saving is accomplished by corporate rather than individual decision. Likewise it can be argued, with some support from experience, that many people would tend to save more out of current incomes if interest rates were low than if they were high. If interest rates are low, a person who wishes to accumulate a certain life insurance estate, or an annuity of a certain size for his retirement, must and commonly does pay larger current premiums than would be needed if the rate of interest accumulation were high.

It also seems very clear, from the record of experience in the past few decades, that the total amount of saving in any given year is much more affected by the general level of economic activity and income than by the interest rate. In years of general business prosperity, incomes in all brackets tend to be higher than in years of low business activity. As people's incomes increase, they tend to save a larger part of those incomes than when incomes are low. Living standards tend to fluctuate less than incomes, and savings tend to take up the slack, without much reference to the interest rate.

It may be argued that if people had no expectation that their savings could be used in such a way as to add to their incomes in the future, some of them, at least, would give up the attempt to save and instead would consume their incomes "up to the hilt." But even so, the person who this year received a larger income than he had previously enjoyed might still feel a prudential urge to lay part of it aside, even though he had no assurance that next year, or five years later, or ten years later, he would find himself in command of a larger sum of liquid funds.

In any event, it is clear that the amounts that people will voluntarily seek to save out of current income are much more directly influenced by the ups and downs of general business activity and income than by the interest rate. That is the fact that is of major economic significance for the American economy of today, because those sums that are saved out of current income are not directly spent on consumption, and do not immediately constitute demands for goods and services. Even when invested, in the financial sense, they do not become converted into demands for current goods or services *until* they are invested in a real sense, largely by

business enterprise or, increasingly, by governmental agencies, in raw materials and the use of labor, to expand the productive capacity and activities of the economy.

But there is no necessary reason to suppose that the amounts people choose to save out of current income will be precisely the same as the amounts that business enterprises would wish to invest, in the light of current business prospects. If people at a given time should attempt to save out of current incomes larger amounts than are called for by the business community's plans for real investment, consumers' purchases of goods and services, plus business purchases for purposes of expansion, would tend to fall short of the total volume of goods and services that could be produced with the already available resources. This would tend to depress business prospects and induce a cutback in total production and employment, and therefore a reduction in the total amount paid out by business firms in the form of wages, rents, interest, and profits. It would mean, in effect, a reduction in the total amount of income received by the people of the community. As aggregate income declined, people would be in poorer position to save, because more of their incomes would be needed to maintain living standards. As incomes declined, savings would decline more than proportionately, until a level was reached at which the total amount of saving (both individual and corporate) was in line with the amounts required for real investment to maintain that level of economic activity. The minimum level to which economic activity could sink, except for short periods, would be one at which there was no net saving for the economy as a whole. At that point, total production would suffice merely to cover current consumption and the replacement of productive facilities worn out during the year. For the United States, however, that level of production and income would involve unemployment for millions of workers and for many billions of dollars' worth of productive equipment.

Finding outlets for savings, and incentives to expansion

One of the major economic problems of the modern economic community such as the United States has been to find outlets for savings in excess of the outlets provided by the demands of private enterprise for funds for real investment. As the wealth of the community increases, the opportunities for real investment that

remain unexploited may involve expectations of smaller, or more remote, or more problematical returns. There may be slighter chances of gains to be achieved from such investment, in comparison with the obligations that would have to be assumed to obtain additional funds from the investing public.

It may be argued that if this prospect were recognized by would-be investors they would either save less or would voluntarily accept lower and lower property incomes. In the latter case, the interest rate and comparable rates of property income would decline, in comparison with the marginal efficiency of capital, and therefore continued expansion would be possible. But under modern conditions the processes of private individual saving and financial investment are largely divorced from the processes of real investment, and, as has been seen, the volume of savings is influenced by factors that have only indirect connection with the business community's appraisals of the opportunities for *further* expansion in the future. And instead of accepting as inevitable a low return on the financial investment of their savings, those who save tend to prefer to hold savings in liquid forms (as cash or bank deposits) for considerable periods in hope that more favorable opportunities for investment may arise later. In other words, liquidity preference rates tend to remain higher than the marginal efficiency of capital, and hence the whole economic process bogs down.

Inasmuch as risk of possible capital loss constitutes one of the elements in liquidity preference, one way of breaking the impasse is to offer savers an outlet for savings in which the risk element is negligible, although the prospective rate of return may be correspondingly lower. Government securities present one avenue of comparatively riskless financial investment, and prospective investors may be willing to exchange liquid holdings for the ownership of such claims when other forms of investment are relatively unattractive. The sale of such securities then affords a means of mobilizing savings and putting them to use in financing activities that private business enterprises cannot or will not undertake, either because the prospective returns are too uncertain, or because there is no way of making the venture pay off in a private profit sense. For example, the proceeds of a government bond issue may be utilized to construct a highway, new school buildings, public recreational projects, a flood control system, an expansion of military installations, or the construction of naval craft. Any

one of these may be of obvious advantage to the community either in terms of additional services rendered or the promotion of security. But it would be difficult, if not impossible, for any private venture to organize the operation in such a way as to obtain a return on the investment that would enable it to raise the necessary funds by selling stock or bonds to the general investing public.

The view that government is in position to provide outlets for saving, to make good any deficiency in the demands of private enterprise for funds with which to finance real investment, is based on the point that governmental activities are undertaken, not on the expectation that they will result in a gain or profit to the government, but for purposes that are conceived to be of general social advantage. The test of the propriety or advantage of a governmental activity is not whether it can be made to pay, but what it can add to the well-being and security of the people of the community. Thus the opportunities for making advantageous use of funds through governmental channels do not expand or contract in response to changes in the general level of economic activity and in business expectations as do the opportunities for real investment by private enterprise. Furthermore, an expansion of governmental activities and expenditures may not only help to maintain outlets for investment funds and employment of labor and resources, but such an expansion may in fact result in a more than proportionate increase in the aggregate production and income of the economy. It has been estimated, on the basis of experience, that the over-all effect of an increase in governmental expenditures in a period of widespread unemployment may be to raise the general level of production and income by as much two or three times the amount of the increase in governmental expenditures. This does not mean, however, that an increase in real investment by private enterprise would not have a similar *multiplier effect.* But in a period of unemployment the opportunities for real investment as seen by private business firms are limited, and hence a basis for a large expansion of private real investment is lacking.

One problem faced in attempting to use an expansion of governmental expenditures as a means of raising the level of production, employment, and income in a period of depression is to find channels for such expenditures that will not cause a further deterioration of the incentives to private real investment. For example, a

decision on the part of the government to build a new hydroelectric power plant might involve a large increase in real investment in the area concerned, but it might also arouse fears of "government competition" in many business groups and perhaps put a damper on their own plans for possible expansion. In that event, an increase in real investment through governmental channels might be offset in part at least by a decrease in private plans for real investment. It is largely for this reason, and to escape the organized opposition to "government competition" with private enterprise, that governmental expenditures to promote employment have been largely directed toward public works of a noncompetitive character, including the construction of highways, schools, public buildings, recreational facilities, and, most important of all, military installations and equipment. The field of housing, in which is to be found a tremendous outlet for additional real investment that could contribute to the well-being of the people of the community, has been a battleground because it is a field in which an expansion of governmental activities might react adversely upon the business prospects for a large and very vocal group of already existing property owners.

If the difficulties of reaching and maintaining a high level of production, employment, and income appear to grow out of a discrepancy between the amounts that tend to be saved out of high levels of income, on the one hand, and the amounts needed to implement business plans for real investment on the other, the question arises whether the impasse could not be surmounted by reducing the amounts of saving and concurrently increasing total expenditures for consumption. This sounds a good bit like heresy and a repudiation of the traditional belief in the virtues of prudence and thrift. But the practice of thrift, like other types of behavior, can be overdone. Furthermore, what may be to the interest of any single individual may, or may not, be to the interest of the community as a whole.

It has been argued, particularly in labor circles, that increased wages for labor would tend to increase the share of the total national income received by those groups in the community most likely to expend additional income for purposes of consumption. If the problem is one of excess savings, a reduction in property incomes, falling chiefly on groups receiving larger incomes, would tend to reduce savings and so bring them more nearly into line

with the amounts called for by business plans for real investment. If so, the increase in wages would have beneficial rather than harmful results, from the standpoint of the economy as a whole.

One objection to such an approach is that the proportion of labor costs to total costs varies considerably from industry to industry, and therefore the impact of a general advance in wages would differ greatly from industry to industry. Although the increased labor income would increase aggregate expenditures for all kinds of goods and services, the increases in demand for the products of different industries would not necessarily correspond to, or offset, the effects of the wage increases. Thus, the effect of such a change on the plans of business enterprises for further real investment would be varied, and to a considerable extent unpredictable.

An alternative approach to the control of savings would call for the use of the income tax for that purpose. By taking a still larger slice out of the higher income brackets, which account for the bulk of savings, and reducing rates in the lower brackets, or relieving them entirely from such taxation, disposable income would be increased for those groups most likely to expend additional income on consumption. Many students of fiscal policy, however, believe that the possibilities of manipulating the structure of income tax rates in this direction have been pretty well explored, and that further changes of this sort alone would not suffice to cope with the basic difficulty.

Some students of the problem, however, have advocated the establishment of a flexible system of personal and corporate income tax rates, under which changes in tax rates could be initiated by executive authority, subject to review by Congress at periodic intervals. In the event of a threatened downturn in economic activity, tax rates could be cut immediately, within limits, thereby increasing the disposable income in the hands of individuals. This would tend to stimulate consumption, and therefore lend support to aggregate demand. Conversely, an increase in tax rates in a period of relatively full employment would reduce disposable incomes and put a damper on consumption. That would help to reduce the upward pressure on prices in a period when productive facilities were being strained to produce the goods and services that people wished to buy, and so would restrict the tendency toward inflation.

In general, the view that the way to achieve economic stability is to reduce savings to bring them into alignment with opportunities for real private investment may be thought of as a defeatist approach. It would imply that no way could be found to organize the economy in such a way as to convert manpower, technological knowledge, and resources into a further, or a more rapid, increase in the living standard of the people, whether that living standard be thought of in terms of goods and services bought and sold in the market place, or also in terms of public improvements and services.

Whatever one's views as to the most feasible line of attack, the fact remains that the major domestic economic question facing the United States in recent times has been how to achieve and maintain a high level of production, employment, and income. It is clear that, contrary to the traditional view, the economic system does not inherently tend toward full employment. Instead, it may continue to operate for long periods of time with millions of workers able and willing to work, but unable to find jobs, and with great aggregations of productive plant and equipment idle or operative only a few hours per week.

Such idleness means the irretrievable loss of potential output of goods and services that people would gladly consume if they could get the jobs and income necessary to enable them to buy. We have seen the phenomenon of poverty in the face of potential plenty, if not abundance. From such a paradoxical situation the United States escaped during the 1940's as a consequence of the drive for production unleashed by the demands of modern warfare. The problem of the decades to come is to find ways of making the demands of peacetime use equally effective in releasing the incentives to full production and employment, and thereby avoiding a future retrogression. In comparison with this problem, most of our other economic concerns are of the second or lower order, because the ability of our existing economic system to survive, both domestically and internationally, is likely to depend on our ability to solve this paramount problem.

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