

27

Factor Prices and the Theory of Rent

*The price of pig,
Is something big;
Because its corn, you'll understand,
Is high-priced, too;
Because it grew
Upon the high-priced farming land.
If you'd know why
That land is high,
Consider this: its price is big
Because it pays
Thereon to raise
The costly corn, the high-priced pig.*

H. J. DAVENPORT

This chapter discusses some general principles governing the determination of factor prices in competitive markets. As in markets for commodities, equilibrium prices emerge from the interaction of supply and demand. In the previous chapter we encountered some of the processes which lie behind the demand for factors. We now carry our argument further by completing our analysis of competitive demand and by adding supply to the analysis.

Our discussion in this chapter includes an explanation of the theory of economic rent. This is relevant to the pricing of the services of land. However, we shall see that the theory of rent is applicable to other factors as well. Wages, interest and profits may all contain elements of rent. In other words, the meaning which economists attach to the word "rent" is not identical with the layman's meaning. To avoid confusion we shall use the term *rental* to denote the landowner's reward for the use of his land and, in using the term *rent*, adhere to the economist's usage.

Aggregate Market Demand Curves for Inputs

We saw in Chapter 26 how a businessman, wishing to maximise his profits, simultaneously takes two decisions. First, he chooses his scale of output. Secondly, he selects the combination of inputs used to produce that output. We found that we could derive the

firm's demand curve for any one factor of production by holding constant the prices of other factors and then identifying the quantity of the factor which would yield a marginal revenue product just equal to the factor's price. Thus a small tenant farmer, able to choose the amount of land that he leases, will select an area such that the marginal revenue product of the last hectare is just equal to the rental per hectare that he must pay for the lease of the land.¹ A lower market rental will induce him to lease a greater area of land. Therefore we can say that his demand curve for land is downward-sloping.

It is tempting, perhaps, to suppose that we could derive a total (or aggregate) demand curve for wheat-growing land by adding together the demand curves of the individual wheat farmers. This, however, is an example of the logical error known as the fallacy of composition, which we met in Chapter 1. There are two reasons why a reduction in the market rental of wheat land will *not* have exactly the effects which we should expect if we considered only the separate demand curves of individual farmers. First, for the individual farmer the price of wheat is given. The reason is that his output is too small a part of the total output for any alteration in the quantity that he produces to have any effect on the price. The same is not true of all farmers taken together. Secondly, the individual farmer cannot influence the prices of other inputs such as agricultural labour, fertiliser and farm machinery. But if all farmers are seeking to expand their production, the prices of these other inputs may rise.

This is certainly not to say that the influences underlying the production functions of particular firms—the influences which we discussed at length in Chapter 26—have no bearing on the aggregate demand curve for a given factor of production. On the contrary, the operation of the law of diminishing returns within firms is *one* reason to expect the demand curve for the factor to be downward-sloping (showing that the demand is not infinitely elastic). The consequence of allowing for the additional influences mentioned in the previous paragraph is to make the aggregate demand for the factor still *less* elastic than the aggregation of individual demand curves would suggest. When the market rental of land falls, the expansion of wheat production and the extra quantity of land demanded will be limited both by the fall in the price of wheat and by the increases in the prices of other inputs.²

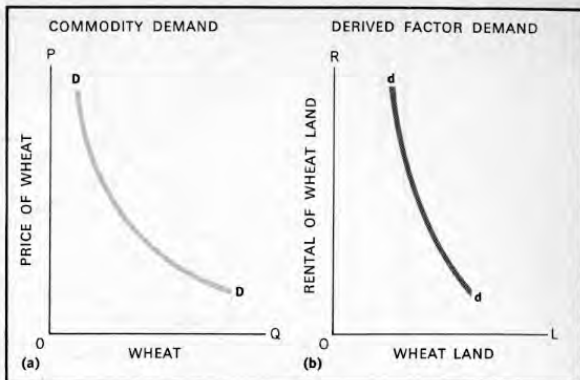
¹ Under perfect competition the individual farmer cannot affect the market price of wheat. Consequently, marginal revenue and price are identical. It follows that marginal revenue product will be the same as the marginal physical product multiplied by the price. For this special perfectly competitive case, economists often use the term "value of the marginal product" instead of "marginal revenue product". Thus we can say that under perfect competition the profit-maximising firm will employ the quantity of a particular factor at which its price is equal to the value of its marginal product.

² The determinants of the elasticity of demand for a factor of production were first analysed systematically by Alfred Marshall. We saw in the previous chapter that the demand for a factor of production can be described as a "derived demand." Marshall argued that the elasticity of derived demand would be less (a) the less elastic was the demand for the product, (b) the less important was the factor as a component of total costs ("the importance of being unimportant"), (c) the less the technical possibility of substituting other factors, and (d) the less the elasticity of supply of other factors. The demand for the services of qualified electricians tends to be inelastic on all four counts: the demand for new structures has low elasticity; the expense of electricians' services is a small component of total costs; they are indispensable; and other labour, such as carpenters and bricklayers, is inelastically supplied. Hence relatively large changes in electricians' wages have little effect on the number of electricians employed in construction.

Figure 27-1 emphasises the important point that the demand for the services of a factor of production, such as wheat-growing land, is a derived demand. As we saw in Chapter 26, this means that there is a close relation between the demand for the final product and the demand for a factor employed in producing it.

FIG. 27-1 The demand for factors is derived from the demand for the goods which they produce

The curve in (b), showing the derived demand for wheat-growing land, is closely related to the curve in (a), showing the demand for wheat. If the commodity demand curve moves upward, so too will the derived demand curve; and if the commodity demand curve becomes less elastic, so too does the derived demand curve.



The Interaction of Supply and Demand

Before we can determine an equilibrium price for the factor, we must introduce a supply curve.

What is the likely shape of the supply curve? There are some factors, such as land, whose supplies are virtually fixed, whatever their prices. For these inputs the supply curves are vertical lines. We shall give more attention to their prices shortly. Some other inputs have positive elasticity of supply, i.e., the quantities supplied increase as their prices rise. The supply of such an input is represented by a supply curve sloping upward to the right (or forward-sloping). The supply of tractors to farmers may well be of this nature: the rising slope of the supply curve would be the outcome of increasing marginal costs of production in the manufacture of tractors as tractor production is increased. On the other hand, it is often argued that the supply curve of labour slopes backward—at least over part of its range—because higher wages induce workers to take more leisure. Over the backward-sloping portion of the curve, the elasticity of supply is negative.

In Figure 27-2 we bring together a supply curve, ss , and a demand curve, dd . The particular supply curve shown has the shape suggested in the previous paragraph as being possibly applicable to the supply of labour: it slopes forward over one part of its range and backward over another.³ It is implicit in what we have said already that the ss

³ It may occur to the reader that a supply curve with this shape could intersect the demand curve at *two* points. If the ss curve in Figure 27-2 had been made to bend back so sharply as to intersect the dd curve not only at E but at a higher point, F , as well, the diagram would have suggested that there were two

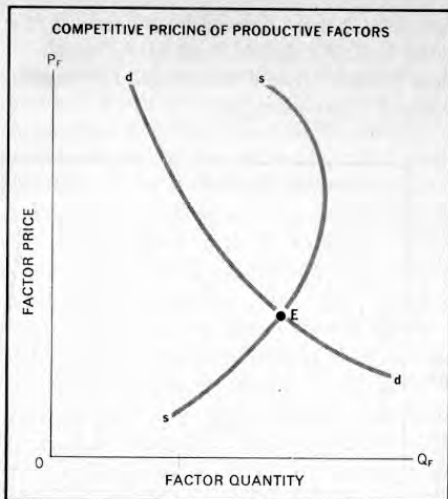


FIG. 27-2 The derived-demand and factor-supply curves jointly determine factor prices

In competitive factor markets, as in competitive commodity markets, the equilibrium prices are determined by the intersection of demand and supply curves. At any point other than E , there will be either an excess demand for or an excess supply of the factor.

curve can take other shapes. The essential point to be grasped is a simple one:

Where the derived-demand curve intersects the factor supply curve, the equilibrium factor price is set. If the demand curve for the factor shifts upwards, its market price will tend to rise; on the other hand, if the supply of any factor increases, so that the supply curve shifts rightward, then the factor price will tend to fall.

In a competitive market economy, therefore, factor prices and the distribution of income are not determined at random. There are forces of supply and demand operating to create high returns to scarce factors that are useful in producing goods and services wanted by people with purchasing power. But the price will drop if more of any factor becomes available, if other close substitutes for it are found, or if people stop wanting the goods that this factor is best suited to make. Competition gives, and competition takes.

The Prices of Factors in Fixed Supply

It is a peculiarity of land that its total supply (unlike the supply of most factors of production) is fixed by nature and cannot be augmented in response to a higher price for it or diminished in response to lower land rentals. Actually, this is not wholly true, for land can sometimes be created by drainage, and the fertility of existing land can be depleted by overcropping.

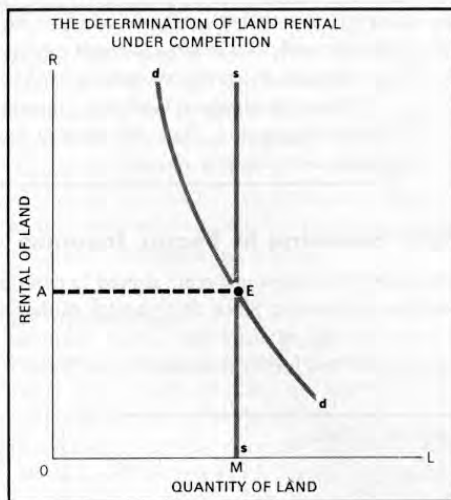
equilibrium points. The point F would be one of *unstable* equilibrium, whereas E is one of *stable* equilibrium. Unstable equilibrium means that departures from equilibrium cause prices to move further away from the equilibrium level, whereas stable equilibrium means that they return to it.

We avoid these complications by allowing in our main exposition for only one intersection of the dd and ss curves.

Nevertheless, we can accept the complete fixity of supply as the characteristic feature of land. By tradition, we may confine our discussion to the "original and inexhaustible gift of nature" whose total supply is by definition *completely inelastic*. It was the return to such a factor that the classical economists of the last century called "rent".

FIG. 27-3 For a fixed supply of land, the equilibrium rental depends upon demand

Complete inelasticity of supply, represented by the vertical ss curve, is associated with pure economic rent. The rectangle $OAEM$, which represents the total rentals paid to landowners, also measures the amount of economic rent. Similar reasoning can be applied to the pricing of *any* factor for which the elasticity of supply is zero.



In Figure 27-3 the supply curve for land, ss , is shown as completely inelastic because of the fixity of its supply. The demand and supply curves intersect at the equilibrium point E . It is toward this factor price that the rental of land must tend. If rental rose above the equilibrium level, the amount of land demanded by users would be less than the amount supplied. Some landowners, unable to let their land, would offer it for less and thus bid down its rental. By similar reasoning, the rental could not long remain below the equilibrium level. If it did, the bidding of unsatisfied users would force the factor price up toward the equilibrium level. Only at a competitive price, where the total amount of land demanded exactly equals the total supply, will there be equilibrium. It is in this sense that supply and demand determine *any* factor price. Thus the fixity of supply of a factor such as land by no means excludes it from the operation of the forces of competitive pricing.

A farmer who leases land does so, of course, because its productivity is worth paying for. This productivity is not absolute. We may ask, for example, what would happen if the price of wheat were to fall because people consumed less bread. The answer is that the derived demand curve for wheat-growing land would shift downward and to the left. What would happen to the rentals received by landowners? After a time, these

must sink to a lower equilibrium. In a technical sense, the land is not less productive. But the demand-and-supply relation has changed.

A factor of production such as wheat-growing land is said to earn a “pure economic rent” when (1) its total supply is regarded as perfectly inelastic and (2) it *has no other uses*, such as the production of barley or hay. The English classical economist, David Ricardo, noted in 1815 that the case of such an inelastically supplied factor could be described as follows:

It is not true that the price of wheat is high because the price of wheat land is high. Actually the reverse is more nearly the truth: the price of wheat land is high because the price of wheat is high.

The total supply of land being inelastic, it is available for whatever is given to it by competition. Thus the value of the land is derived from the value of the product, and not vice versa.⁴

Rent Elements in Factor Incomes

The term “pure economic rent” is used to describe payments to a factor whose supply is completely inelastic. Since the quantity of the factor supplied would be the same even if there were no payment for it, pure economic rent is a form of income which is not necessary to call forth the services of the factor.

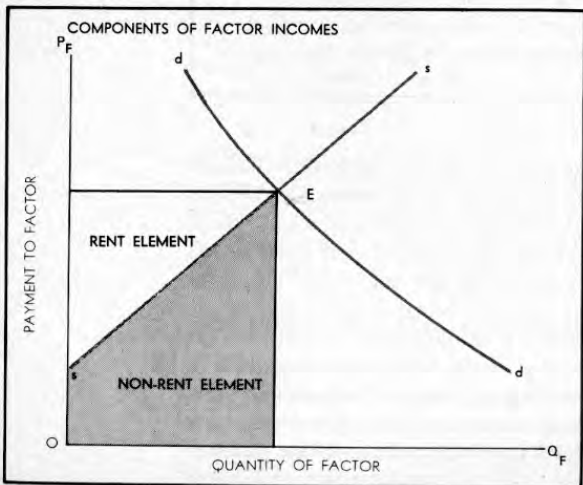


FIG. 27-4 Many factor incomes, though not pure rent, contain rent elements

Whenever the same price is paid for every unit of a factor with an upward-sloping supply curve, part of the total payment to the factor is a kind of economic rent. This part is represented by the area of the triangle above the supply curve.

⁴ Land is not the only factor whose return may be considered as pure economic rent. In the short run, the supply of a machine or plant may be entirely fixed; thus a hydro-electric plant takes a long time to build and still longer to wear out. The return to any factor in *temporarily* fixed supply is sometimes called a “quasi-rent”—“quasi,” because in the long run, its supply need not be fixed.

Most factors are in neither completely inelastic nor completely elastic supply. Usually a reduction in the price paid for a factor causes some reduction in the quantity available but does not cause the quantity to fall to zero. In this case, the amount paid for the factor is a mixture of rent and non-rent elements.

Figure 27-4 shows the determination of price of a factor (for example, a particular kind of skilled labour) for which the supply curve is upward-sloping. Total payments to this factor are measured by the area of the rectangle. But the market price represents the amount required to secure the services of the *last* unit of the factor. For all other units, smaller amounts would be sufficient, and the excess of the amount paid over the amount required is really a form of economic rent. Thus, in the diagram, the triangular area above the supply curve denotes the rent element in the total income of the factor, whereas the area below the curve, the non-rent area, shows the amount which would be required if each small unit of the factor were paid only enough to secure its services.⁵

Most factor incomes are likely to include an element which is not strictly necessary to secure the existing supply of the factors. We can now see that pure economic rent is a special case of this more general situation. It is the case where, because of the inelasticity of supply, the rent element constitutes the whole of the factor's rewards.

Rents and Costs: A Matter of Viewpoint

It is sometimes said that rent does not enter into the cost of production. Since rent is a return to a factor of production which would still be available if the rent were not paid, it is argued that the price of the product determines rent, rather than the reverse.

While recognising the force of this argument, we must again be careful to avoid committing a "fallacy of composition". What is rent for the whole society may well be a cost to particular users of the factor.

Suppose that land is specialised and can be used only for the production of wheat. Then the supply of land to the wheat industry will be completely inelastic and, from the industry's viewpoint, the payments made to the landowners are economic rent. But to any small wheat-farmer the supply of land may be quite elastic: either he pays the market rental or the landlord will let the land to someone else. To the individual farmer, the rental is as much a cost as any other payment.

Now suppose that the land can be used for a variety of purposes: for wheat

⁵ This use of the supply curve to separate rent and non-rent elements in factor incomes assumes that if each unit of the factor is paid only the amount necessary to secure its services, the price at which the other units are available is not affected. This may be unrealistic. For example, if labourers are paid \$1.01 for their first hour of work, \$1.02 for the second hour, and so on up to \$1.40 for the fortieth hour, their total income for 40 hours is \$48; but if they are paid \$1.40 for each hour, they receive a total of \$56. In the former case a labourer's need for extra income is such that he may work a 41st hour for, say, \$1.50; but in the other case the labourer is in less need of extra income and may require \$1.75 to induce him to do an extra hour's work. The conventional supply curve measures the quantities supplied at various prices provided that every unit is paid the same amount. It does *not* measure the quantities which would be supplied if each unit were paid only the amount necessary to secure its services. This means that the method used in Figure 27-4 to identify rent elements in incomes may understate the rent component.

growing, wool growing, cattle grazing, vineyards and so on. Then to any one industry, such as wheat growing, some payment for land is necessary to prevent its being used by other industries. If the industry is a very small one, the supply of land to it may be completely elastic, in which case all of the payment for land is a cost and none is economic rent. For a larger industry the supply curve of land is likely to be upward-sloping, and the payments combine rent and non-rent elements as in Figure 27-4.

Thus whether payments for the use of factors constitute rents or costs depends upon the viewpoint: whether it is that of a small firm or that of a small industry, or that of a large industry or the whole economy. What is price-determined rent for the whole community or an industry may be price-determining cost in particular uses.⁶

Implicit and Explicit Returns

To digress slightly, we should note that even if the farmer owns his own land, rental on the land remains as one of his costs of production. After paying all other costs, and allowing for wages to himself as great as those which he could earn elsewhere, he needs to have left an amount at least equal to the market rental value of his land. Otherwise he will find it better to lease out his farm on the open market and to hire out his own labour to someone else.

The rental notionally paid by the farmer to himself can be described as “implicit” rather than “explicit” rental. Implicit rentals are as much a part of long-run competitive costs as are any other costs. The same is true of implicit wages or implicit interest earned on factors used by those supplying them rather than sold on the market. The essential feature of such implicit payments is that they are *opportunity costs* of production; and we saw in Chapter 23 that, in the context of economic theory, the true costs of any decision are the opportunity costs associated with it.

Taxation of Land Surplus

Of the personal and family fortunes which have been made during the transition of countries such as Australia, the United States, Canada and New Zealand from places untouched by civilisation to nations with modern economic and social systems, many have been due to the ownership of land. As the demand for land for various purposes grew, its rental value increased enormously. This has happened both to agricultural and grazing land and even more spectacularly to town and city land.

As the rental payments increased, many people began to question the right of the lucky landowners to receive such “unearned increments”. The American Henry George, author of a famous book called *Progress and Poverty*, was one of these. He founded a political movement (still active in Australia) known as the “single-tax movement”. Adherents of his movement believe that all existing taxes should be replaced by a single tax on the “unearned” income inherent in the rental value of land.

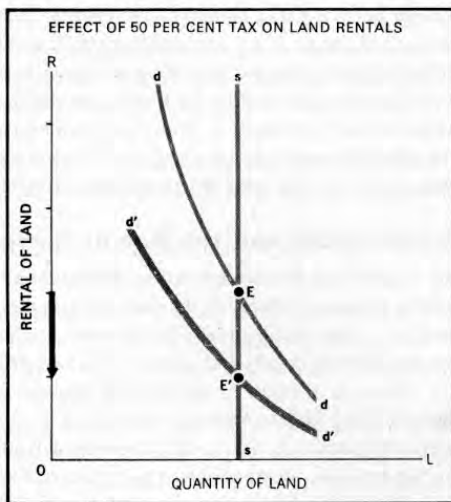
⁶ The verse quoted at the beginning of the chapter hints at this conclusion.

This is not the place to attempt any assessment of the merits and demerits of George's political creed. But one important principle of distribution and taxation can be illustrated by his doctrine:

Pure rent is in the nature of a "surplus" which can be taxed *without affecting production incentives*.

FIG. 27-5 A tax on land is shifted back on to the landowners

The land tax leaves the rentals paid by users unchanged at E , but reduces the rentals retained by landowners to E' . In this way part of the pure economic rent which would otherwise accrue to landowners is transferred to the government. This is the rationale for Henry George's single-tax movement.



To make this clear, let us suppose that the market rental of land is at the equilibrium level defined by the point E in Figure 27-5. What will be the effect if the government now imposes a tax of 50 per cent on all land rentals? The tax does *not* apply to buildings or other improvements. (If it did, the amount of building and improvement would be affected.) It falls only upon that part of total rentals which can be attributed to the naturally fixed supply of agricultural and urban land.

There is no shift in the total demand curve for land: firms are still willing to pay the same amounts as before for the same areas of land. Since neither the demand curve nor the supply curve is altered, the equilibrium rental must be the same as before. At any higher rental, some land would find no tenants. Hence, competitive rentals could not be raised permanently.

Of course, what the farmer pays and what the landlord receives are now two quite different things. As far as landlords are concerned, once the government takes its 50 per cent, the effect is the same as if the net demand to the owners had shifted down from dd to $d'd'$. Landowners' equilibrium return *after taxes* is now only as high as E' , or only half as high as E . The whole of the tax has been shifted on to the owners of the factor in inelastic supply. The landowners may resent this, but under competition there is nothing they can do about it, since they cannot alter the total supply. For any com-

petitive landlord, the best course is to let his land for the new rental, although it is less than the old. Half a loaf is better than none.

Whether or not it is fair to take away part of the return of those who own land is quite another question. Many people may feel that such owners are not less deserving than are investors who have put their money into other things; others will feel that no one should have the right to benefit from nature's windfall gifts of oil, minerals or soil fertility. But these are political questions that are not to be discussed at this stage. The relevant point is that a similar 50 per cent tax put upon a different factor of production whose total supply is *not* completely inelastic would certainly produce definite effects on the factor-prices charged in a competitive market. Such a tax would change the pattern of production; and part of the burden would be shifted *forward* on to the users of the factor and on to consumers. Thus, if a given hectare of land were to be taxed at one rate when used for wheat-growing and at another when used for growing barley, the price of wheat relative to the price of barley would certainly be affected.

Factor Prices and the Use of Scarce Resources

The competitive market, as well as determining the rewards of those who supply productive services, influences the use of resources in ways which reflect their scarcity relative to their possible uses. In this sense, it contributes to an *efficient* solution of the problem of How goods and services are to be produced.

Thus, as a result of supply and demand in markets for goods and factors, in Australia and North America where land is plentiful and labour is scarce, we find extensive agriculture, i.e., small amounts of labour cultivating large tracts of land. In Europe and Asia, where people are plentiful relative to land, we find intensive agriculture.

Market pricing performs a *signalling* function which helps to achieve results of this kind. In sparsely settled countries, labour tends to be dear relative to land. Farmers take this into account in arriving at their least-cost combinations. Conversely, in more densely populated countries, labour tends to be cheap relative to land and this too is reflected in the least-cost combinations. Moreover, in dear-labour countries, we find that vegetables which require much effort and care are priced relatively higher than those which lend themselves to extensive methods. The resulting commodity prices mean that in these countries the goods with low labour content tend to be substituted in people's diets for the more expensive labour-intensive foods. The opposite results tend to occur in countries with plentiful labour. Of course, real-world examples do not correspond fully to the idealised assumptions which must be fulfilled before we have a perfectly competitive market, but in many cases the competitive model does give us insights into the functioning of the real world.

Scarce resources must somehow be allocated between competing uses even when they are what the classical economists called "free gifts of nature". The classical economists were thinking chiefly of land, but there are other examples. In Australia a problem of scarcity has arisen with respect to frequency space for radio transmission. The heavy use made of the amplitude modulation (AM) band, in which ordinary radio stations have operated, has caused some television transmission to be assigned to the very-high-frequency (VHF) band, where in other countries frequency modulation (FM) radio

transmission occurs. This has led, in turn, to a decision that in Australia FM will be assigned to the ultra-high-frequency (UHF) band. UHF transmission involves technical problems which are costly to overcome and it also brings FM radio into possible competition for space with taxis and similar commercial users. The task of allocating frequency space has fallen upon the Post Office and the Australian Broadcasting Control Board. These authorities have used a variety of criteria, including their judgments of public need, in making their decisions. For example, they have weighed the needs of "commerce" against those of "culture"—almost always in a context where the demand for space exceeds the supply. An alternative policy would be simply to lease out frequency space to the highest tenderers, with the resulting rentals (and economic rents) accruing to the Government. This is not necessarily the *right* policy, but it would have two notable effects:

1. Many of the administrative problems of the existing policy would disappear.
2. The economic rents which at present accrue to the recipients of broadcasting licences would go to the Government.

Some other examples of allocative problems which might be resolved by charges, even if the charges were pure rents to the recipients, are as follows:

1. There is a danger that unrestrained fishing will cause some species of fish to be decimated or even extinguished. A system of rents for commercial fishing licences (which might have to be administered by an international agency) might benefit most people, including (in the long run) the fishermen themselves.
2. Our roads are crowded at certain times and relatively uncongested at others. The levying of tolls is unusual, and it would be difficult to impose tolls varying with the pressure of traffic. But such tolls, if they were practicable, would be a means of inducing people to re-arrange their affairs so as to avoid driving at times of greatest congestion.
3. Parking space is a scarce resource in some areas. The imposition of high charges for parking would discourage people with only trivial business to do from occupying parking space, leaving it more readily available for other people with more urgent needs. Thus rent does have a function, even if part or all of it is later taxed away.

Land Use in New Countries: The Wakefieldian Problem

Can those who use productive factors, such as labour and land, be relied upon to choose least-cost combinations? Economists' models commonly assume that they can; but if this is wrong the argument that the competitive market ensures an efficient use of resources is weakened.

When European settlement occurred in countries such as Australia and New Zealand, their economies combined minute amounts of labour and vast amounts of land. It was therefore to be expected that, in comparison with Europe, labour would be spread thinly over the land. Land was virtually a free resource, and in selecting least-cost combinations, the only factor to deter farmers from using vast amounts of land was the inefficiencies which might arise if labour became too dispersed.

Edward Gibbon Wakefield, founder of the movement for "systematic colonisation", believed that in new countries there was a tendency to use too much land. He first published his ideas in 1829 in *A Letter from Sydney*, written, despite its title, in Newgate

Prison, where Wakefield served a sentence for abducting an heiress. His ideas had a strong influence on the policies of the British Government for both Australia and New Zealand and were the basis of the scheme developed by Robert Torrens and others for colonising South Australia.

Wakefield thought that the colonies were being injured by the desire, which most men harboured, to own land. Because of this, they were refusing opportunities to work at high wages for established farmers and instead were eking out meagre existences on their own farms. Wakefield was really saying that the ratio of land occupied to labour employed on it exceeded the least-cost combination, although he did not use the term. Labour was so dispersed that each farmer had to carry out all of the tasks to be done on his farm, losing the advantages of co-operation with other workers and of specialised attention to different tasks.

What was the remedy? If the *natural* abundance of land led to an inefficient use of it, the solution was to create an *artificial* scarcity. Hence, Wakefield proposed that the government should no longer make land easily available to new settlers, but should sell it at a "sufficient price". This would force labourers to work for some years for existing farmers while they saved enough to buy their own land. The use of the land revenue to finance immigration would further alleviate the labour shortage.

In short, Wakefield believed that the institution of land ownership and its psychological attractions prevented the free market from achieving a least-cost use of resources and justified government interference. The accuracy of his diagnosis is a matter for debate. His lack of familiarity with Australian climatic conditions probably caused him to underestimate the efficiency of allowing sheep to run on large tracts of land. The more intensive cultivation which he preferred might have been inefficient in Australian conditions.⁷

Rentals and Resource Allocation

David Ricardo and Henry George wrote about land as an unaugmentable and indestructible gift of nature. Actually, much of the land we use *has* been augmented by man: it has been drained, filled and fertilised. These efforts to increase productive capacity are just as much acts of investment as the erection of buildings and the installation of machines. Equally important, nature's gift *can* be destroyed. There are now deserts where green acres once flourished. There are used-up mines, deforested timber lands, and eroded and depleted topsoils. Part of the rental element in the sale of copper ore from Mt. Isa is a return of capital for this exhaustible resource. Throughout the world the search continues for raw materials to feed the machines of the countries whose natural resources have already been depleted.

Charging rentals for the use of scarce and exhaustible resources may slow down their depletion. The pursuit of self-interest in a freely competitive system, leading to the rapid using-up of these resources, may have significant "external" effects, i.e., effects which are felt by people not directly involved in the resource-using decisions. Unsignificantly

⁷ This summary of Wakefield's views deals only with his economic arguments. He also advanced social and political arguments for his proposals.

and dangerous slag heaps may be created. An initial burst of activity, followed by reductions as the resource is depleted, may cause regional unemployment. Deforestation may cause floods and soil erosion. And further generations may find that their resource needs are difficult to meet because of the careless use of resources by their forebears. Awareness of these external effects may well lead governments to think it appropriate to impose charges on users of scarce resources, even if those resources are supplied by nature.

RESOURCE USE AND POLLUTION Civilisation pollutes the atmosphere, rivers, lakes and even seas. Urbanisation and irrigation deplete water reservoirs and depress the level of the water table below ground. Fresh water becomes scarce and regional disputes (such as the dispute about the proposal to dam the River Murray at Chowilla in South Australia) arise over its distribution. This is one reason why huge conservation projects are undertaken by central governments. Examples include the Snowy River Scheme in Australia, the Tennessee Valley Authority (TVA) in the United States, the Aswan High Dam on the Nile and the Volta project in Ghana. At a less spectacular level, the Government of South Australia has been forced to regulate the use of underground water by market gardeners north of Adelaide, for the efforts of many individual market gardeners to maximise their own production have caused the water table to fall to dangerously low levels.⁸

The systems of land tenancy in underdeveloped nations tend to keep those societies inside their production-possibility frontiers and even depress those frontiers. Absentee landlords will not put money into the land, tenants on short and uncertain tenure have every incentive to “mine” the land and to refuse to make needed long-term improvements; credit is lacking for productive investment; and peasants who pay 40 per cent interest to money-lenders in order to tide them over until the new harvest alleviates starvation can hardly be expected to make capital investment in the land or even maintain it.

Most governments put some limits on freedom to use land. They make zoning restrictions and draw up regional and urban plans. They acquire land compulsorily at publicly determined prices. They maintain parklands—examples of what economists describe as “public goods”—to create “external economies” and common consumption benefits. In some countries, limitations are put on the windfall capital gains that can be secured by those lucky enough to own farmland where a new city is to be located or those clever enough to speculate successfully on future developments. Finally, development plans in underdeveloped countries commonly give a high priority to the reform of the land tenure system.

Conclusions

The same general principles determining land rentals also determine the prices of all inputs: capital goods, natural resources or labour. Thus the rentals of mechanical

⁸ The Government *might* have levied charges for water use sufficient to limit it to safe levels. But to do so would be to reduce the incomes of market gardeners still further. This is an example of the *distributive* consequences of levying economic rent being unacceptable.

harvesters or of trucks are determined in essentially the same way. We might even go so far as to say that wages are the rentals paid for the use of a man's personal services for a day or a week or a year. This may seem a strange use of terms, but on second thought, one recognises that every agreement to hire labour is really for some limited period of time. By outright purchase, we might avoid ever renting any kind of land. But in our society, labour is one of the few productive factors that cannot legally be bought outright. Labour can only be rented, and the wage rate is really a rental.

The next chapter deals with the peculiar problems of wages and labour markets. Chapter 29 will analyse the problems of capital and interest, which are important in determining the supply of durable goods available for rental and use.

SUMMARY

1. The profit-maximisation behaviour of the individual businessman, outlined in Chapter 26, influences the aggregate market demand curve for the services of a factor of production. However, the aggregate demand curve is not simply the sum of individual demand curves. This is because the effects of different levels of production on the prices of the product and of other inputs cannot be ignored when we are considering aggregate demand for factors.
2. The equilibrium price of any factor is determined by the intersection of the demand and supply curves for the factor. Depending upon the nature of the factor, the supply curve may be forward-sloping, backward-sloping or vertical.
3. The vertical supply curve, which has usually been ascribed to land, represents an important special case. In such a case, the reward paid for the service of the factor is described by economists as pure *rent*. Competition still determines an equilibrium price, but the price is a component of costs which is *price-determined* rather than *price-determining*.
4. When the supply curve for a factor slopes upward (i.e., the elasticity of supply is positive but not infinite), we can regard the total reward of the factor as containing an element of economic rent. This rent element represents the proportion of the total reward which is not strictly necessary to secure the given quantity of the factor.
5. The fact that the supply of a factor is fixed for the whole economy does not mean that it is fixed for an individual firm or industry. To the firm or industry its supply may be highly elastic and its price represents its opportunity cost in other uses. Thus the classification of a factor's reward as rent or cost may depend upon the viewpoint from which the classification is made.
6. The principles of competitive pricing of factors of production are fully applicable to the use of factors by their owners. The opportunity cost of a factor used by its owner is the reward that the owner would receive if the services of the factor were sold on an open market. This notional reward to the factor's owner is sometimes described as an implicit return, whereas actual market payments for factor services are explicit returns.

7. Pure rent (i.e., the rewards of a factor in fixed supply) can be taxed without affecting the quantity of the factor supplied or productive incentives. This fact helps to explain the emergence of proposals for heavy taxation of land ownership.

8. The competitive market assigns prices to factors which reflect their scarcity relative to the uses to which they can be put. Market prices can serve to allocate scarce resources even when they are in fixed supply. In the case of fixed supplies, the prices constitute pure rents. The government may wish to determine the distribution of these rents.

9. The efficiency of the competitive market depends on the assumption that users of resources combine them in least-cost ways. Edward Gibbon Wakefield's analysis of land use in new countries suggests one reason why least-combinations may not be achieved: the preference of men for owning and cultivating their own land over working for wages.

10. Because the use of land and other natural resources is sometimes associated with "external diseconomies", and because existing users may disregard the interests of future generations, governments frequently find it necessary to modify private decisions. One way of doing so is to impose charges for the use of resources. Such charges are economic rents paid to the government. For various reasons, including the effects of charges on people's incomes, the government may prefer to rely on legal controls.

Some systems of land tenure mean that the tenants have no incentive to maintain or improve the productivity of the land. The resulting problems are important obstacles to increased agricultural productivity in many underdeveloped countries.

CONCEPTS FOR REVIEW

derived demand

fallacy of composition

elasticity of supply

pure rent

rent elements in rewards of factors in

variable supply

price-determined expense versus

price-determining expense

factor rewards as both rents and costs

implicit and explicit returns

factor prices as signalling

devices

How, For Whom and rents

rent and resource conservation

QUESTIONS FOR DISCUSSION

1. Define the "pure rent" case. Explain the sense in which the price of such a factor is "price-determined" rather than "price-determining". Show that, despite this, an increase in supply of the rent-earning factor will depress its return and lower the prices of goods which it helps to produce.

2. Use a diagram to show the effect of taxing pure rent. Suggest examples other than land rentals to which this might apply.

3. Explain carefully why a factor of production whose supply is inelastic for the total economy may have a high elasticity of supply to a particular industry. Illustrate your answer with diagrams and use them to show how the elasticity of supply affects the distinction between rent and costs.
4. Is the toll charged for the use of Sydney Harbour Bridge an example of pure economic rent? How could the toll be used to reduce peak-hour congestion on the Bridge? Is it likely that this policy would meet with general approval? If not, why not? Would it nevertheless be the right economic policy?
5. Does the discussion of resource allocation in this chapter suggest that governments concerned about the pollution of inland and coastal waters have any alternative but to ban the discharge of industrial waste into these waters?