

## **The Science of Economics**

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### **1. The meaning of land**

**"Economic land" consists of everything except human beings and the wealth that they have produced. We will call it "land" for short.** Land of economic value consists of

- natural resources, including underground minerals, metals, and oil;
- wildlife, including forests;
- the genetic variety of life;
- oceans, lakes, and rivers;
- the atmosphere;
- the electro-magnetic spectrum (for transmitting radio and television); and
- the three-dimensional surface area of the earth as sites for living and working.

**Land other than natural resources has no value, otherwise it would be in the category of produced "wealth." Hence, "land" will refer to natural resources unless otherwise stated.**

**By definition, an item is economically scarce if there is not enough to provide as much as everyone wants at a zero price.** As the first universal proposition of economic theory states, some land is scarce. Of these types of natural resources, the most familiar in every-day life is the surface area of the earth, land that we live and work in. This land obtains a market value due to its usefulness over time and the scarcity of land of good qualities. This value is called "land rent."

### **2. Rent**

The word "rent" has several meanings.

- First, in everyday language the "rent" of an office, house, factory, or shop means a payment for the use of property, which includes the use of land as well as produced wealth, such as buildings, cars, and computers.
- In classical economics, "rent" had a special meaning as the amount that one pays solely for the use of land. Thus, when we speak of the "rent of land" or the "rental value of land", in economics we exclude improvements such as buildings and canals.
- The term "rent" later became generalized in two directions. First, "rent" came to mean any payment that is more than necessary to put some resource into production. This is called "economic rent." For example, if a baseball star would be earning \$50,000 per year in his next best profession, but is earning \$600,000 per year playing baseball, the \$550,000 difference is called "economic rent" because the player would gladly play ball for just a bit over \$50,001.

This meaning of rent became used also to refer to the "economic rents" received by those seeking privileges and transfer payments from the government without really earning it; they are economic rent because the funds do not put any service into production. The attempt to get such loot is called "rent seeking" (better called "transfer seeking") in the literature dealing with this, a body of theory called "public choice."

We can see that land rent is a type of economic rent, since the land is there from nature, so no funds are needed to produce the land. **To simplify the language, "rent" here will refer to economic land rent unless otherwise specified. The term "rental" will refer to the actual payments of tenants to landlords, which may be more or less than the economic rent of the land.**

An illustration of the distinction between land rent and payments for property in general would be payment for the use of two different farms. The first farm comes with good buildings, drainage, ditches, and fencing. In this case the amount paid would be the rental value of the land plus a payment for the man-made improvements. The second farm does not come with these improvements, but is nonetheless situated on land which has the potential to produce the same output. Clearly the total figure paid for the first farm will exceed that paid for the second. This is because in the former case, one is paying for capital goods included with the farm as well. The rental value of the land, however, is the same in both cases, since the two farms have equal potential productive capacity.

The same principle would apply to two urban land sites, both located in the same area of a city but possessing different man-made improvements. The rental value of the land would be the same, since the location can potentially produce the same rewards. But with one site barren and the other possessing office buildings, the total figure paid for the latter will be significantly higher as, once again, the occupying tenant is also paying for the capital located upon the site.

The word "rent" in economics differs from the ordinary usage in another way.

- In ordinary language, we say someone rents something only when a payment changes hands. You rent a house from someone when you pay the landlord a check every month.
- But in economics, "rent" exists regardless of whether there are explicit payments. For example, suppose your parents let you live for free in a house they own. If they didn't let you live there, they could "rent" it out for \$500 per month. Suppose further more that \$200 of this amount is due to the land value, while the other \$300 is due to the improvements, such as the building. Then they are losing \$200 per month from the land rent which they could have collected. This \$200 is rent even though no payments change hands.

In effect, you the resident are collecting it, since you would otherwise be paying it if someone else owned it. So the amount of rent that a landowner could get on the market is economic rent whether or not the owner collects it in payments. If you own and work your own farm, the amount that you could have rented the land for is economic rent.

The value of land can be expressed in one of two ways:

- (1) the amount of rent offered for a fixed term of use, e.g., a week, month, or year; or
- (2) the transfer price when one obtains title for either a "leasehold" (possession of land for a fixed term such as 99 years) or a "freehold" (indefinite possession).

As stated by Henry George (1879, p. 166),

*"Rent is also expressed in a selling price. When land is purchased, the payment which is made for the ownership, or right to perpetual use, is rent commuted or capitalized. If I buy land for a small price and hold it until I can sell it for a large price, I have become rich, not by wages for my labor or by interest upon my capital, but by the increase in rent."*

In the simplest case, with no taxes, no collection of the rent by a community beyond the title holder, no price appreciation, and no inflation, the sale price tends to equal to the rent divided by the interest rate:  $p = r / i$ . This is because  $r = p * i$  (rent equals the principal or price of land times the interest rate), since the same funds ( $p$ ) if loaned out at interest rate  $i$  would yield the annual amount  $r$ . If the money is inflating, then we need to subtract out inflation from the interest rates being paid in order to get the "real" interest rate  $i$ . If there is a tax on the land, or the collection of the land rent by a community, then the collection rate is added to the interest rate, since the rent must pay for both the collection and the net yield to the title holder:  $r = p * (i + c)$ , where  $c$  is the collection rate, the percentage of land value being collected, such as 5% of  $p$ . Therefore,  $p = r / (i + c)$ . Hence, as  $i$  or  $c$  or both increase, the price of land decreases. If rent increases, then of course the price increases.

### 3. How does rent arise?

The value of land is due to a variety of sources. **We can divide land into three types: 1) fixed material resources, 2) renewable resources, and 3) space.**

- Fixed material resources include minerals, oil, metals in the ground, and air.
- Renewable resources include wildlife, the fertility of the soil, sunlight, and fresh water. The value of material land is due to its scarcity relative to subjective human desires for these items. Oil and minerals are land as long as they are in their natural state; once people apply effort to extracting them or even exploring for them, then the value added is a capital good.
- Space as the surface area of the earth is not scarce, since one may go to the oceans or deserts and freely use all the space one desires. Space obtains value because for a particular use, in a given location, it is scarce; more space for that use cannot be obtained for free. For space, as recognized by Henry George (p. 166), "rent or land value does not arise from the productiveness or utility of land... but upon its capacity as compared with that of land that can be had for nothing."

#### 4. The Determination of Rent

Suppose a new island arose in the middle of the Atlantic Ocean. It has many thousands of hectares and acres of fertile land. An international agreement allows anyone to settle on the land and claim lots of 100 acres or 40 hectares. To keep our model from being needlessly complicated, there will be only one crop: corn. The unit of output is bushels per acre per time unit. We will fix the time unit so that the best land grows 10 bushels in that amount of time. Also, to simplify at first, we will ignore capital goods and merge them with labor. Later, we will separate out capital goods. For now, there is only the original factors of production, land and labor.

The foundational principles which were set forth in Chapter 1 can now be applied. Principle #2 states that resources vary in quality. We will let the land be divided into areas which grow 9, 8, 7, 6, 5, 4, 3, 2, 1 and zero bushels, depending on the sunlight, rain, soil, and elevation of various areas.

Now the first family arrives. In our model, there is only one farm worker per family, and all workers have the same ability and put forth the same work effort. Where, then, will the first family settle? Principle #12 states that people economize; they seek to produce a given amount with the least effort, or produce as much as possible with a given amount of effort. With land of different quality, the most will be produced with a given amount of effort on the best, most productive land. Naturally, the first family will settle on the 10-bushel land. Other settlers will also settle on that best land.

Since the best land is available for free, no one can charge a rent for the land that he possesses. So rent is zero. And since we are ignoring capital, all the production goes to wages. Since production on the best land is 10, wages are equal to 10.

Once the 10-bushel land has been settled, newcomers will go to the next best land, where they can grow 9 bushels. Wages on that land are therefore 9. But what about wages in the 10-land?

Suppose one of the owners of a 10-farm wishes to retire, and hires someone to work the farm. He offers a wage of 8. No one from the 9 land will take up the offer, since they can get 9 working on their own farms. If he were to offer 9.5, everyone from the 9 land would want to get hired since that is more than what they can get on their own farms. So competition will set the wage offered at just 9, where someone is indifferent between working in the 10 or the 9 land. Wages everywhere are 9. Note that, as discussed in Chapter 2, this is the principle of how wages are determined: they are set where the best land is available without rent, since any wage offer below this will not be accepted and any above this will have many competitive takers who will drive down the wage.

But what about that extra bushel on the 10 land after the wage of 9 has been paid. Since this is not wages, it must be a return to the other factor, land. The 1 bushel left over is rent. The 10 land has acquired a rent of 1 when cultivation moved to the 9 land.

The boundary where people are settling on the best free land is called the "**margin of cultivation.**" More generally, for land of all uses, the boundary is called the "**margin of production.**" The term "margin" means the edge of consumption or production, where the last unit of a resource or the last item of consumption is being used. The margin of cultivation is the very next acre or hectare of land that would be occupied for farming.

Suppose now that after that one farmer hired on the 10 land, the owner decides to hire a second farmer on the same land, since that would increase output even more. He pays the second one 9 bushels and sees that the yield is now 18.5. The second farmer only added 8.5 bushels to output. The marginal product of labor is 8.5, while the wage is 9, so the second worker is dismissed. As noted in Chapter 2, labor will only be hired in a competitive economy if the marginal product is higher or at least equal to the prevailing wage.

When all the 9-bushel land is taken, the margin of cultivation moves to the 8-bushel land. Wages are now 8. Hence, rent on the 9-bushel land is now 1, and rent on the 10-bushel land has gone up to 2. Now that wages have been reduced to 8, the owner of that 10-bushel farm can hire that extra worker. The marginal product is 8.5, leaving the owner 1.5 bushels as rent. So all the owners of the 10-bushel land hire two workers (those working their own farms hire themselves and another), increasing their rent to 2.5. Land in the 10-bushel area rents for 2.5, since that is what can be obtained by hiring the optimal number of workers for the maximum possible rent. The population density on the 10 land will now be twice that of the other lands.

**We can now derive the determination of rent in general. Rent in a certain location is the highest product of land above what can be produced at the margin of production, where rent is zero, after paying for the factors of production other than land. This is called "differential rent" because the rent at a location arises from the differential or extra product it yields (minus costs for labor and capital goods) compared to land at the margin. All land rent is thus differential rent.**

This differential rent is also the marginal product of land, the extra amount of product obtained from using an extra amount of land, keeping other factors constant. Hence if with two workers one gets a tiny additional amount of 10 land, it too will yield a proportional equivalent of 2.5 (18.5 minus wages of 16) per acre too, and the marginal product after subtracting wages will be 2.5 per acre. So the marginal product of land is the same as the differential rent.

More settlers arrive; the 8-bushel land gets filled, and the 7-bushel land is settled. Wages fall to 7. Rent on the 8 land is now 1. Rent on the 9 land rises to 2. But those owners too now hire a second worker, since the product of the second worker on the 9-land is 7.5, which increases the total product to 16.5, which after paying 14 for wages, leaves 2.5 in rent.

In the 10 land, a third worker will have a marginal product of 7 and rent is now 4.5 (3 from the product of the first, plus 1.5 from the product of the second worker). Owners will be indifferent to hiring a third worker; some may and some may not, depending on whim or chance.

When the margin of cultivation moves to 6, the 7-bushel land gets a rent of 1 and the 8-bushel land rent rises to 2 if there is one worker. Keeping the marginal product of the second worker at

1.5 less than the first, second workers are hired on the 8-bushel land, since their marginal product is 6.5, raising the total rent there to 2.5.

Rent on the 9-bushel land rises by one bushel to 3.5 (a third worker's product is 6, just equal to the wage). In the 10 land, total product with three workers is  $10 + 8.5 + 7$ , totalling 25.5, with wages  $3 \times 6 = 18$ , leaving 7.5 for rent.

Can you see the pattern that develops? As the margin of cultivation moves to ever less productive land, wages go down and rent goes up. The owners of the best land obtain higher and higher incomes due to the increase in population and the decrease in the marginal productivity of land. Incomes thus become more and more unequal. **As settlement proceeds further, wages will be driven down to the subsistence level, where workers are just able to survive - a level in fact being earned by many of the poor around the world, including in developed countries.**

## 5. Land speculation

In the above model, we assume that each farmer gets a lot for actual use. But there is another motive for getting land. Folks will notice that the rent is going up and up on the older lands as the margin moves to newer land that is less productive. So some sharpies will obtain land not just for use but to get the increase in the rent in the future.

Suppose, for example, that the 8-bushel land is being settled. The sharpies will try to claim as much of the 8 land as possible, since it is free now but will have a rent when the margin moves to 7. So those wanting some 8 land for farming will find that the 8 land will be all claimed very quickly. When production moves to the 7 land, farmers can either rent land in the 8 region or claim 7 land. They will prefer to claim 7 land in the hopes of getting rent when the margin moves to 6, so much of the 8 land will remain vacant for a while. Eventually, the sites in 8 land get rented, but there is now a rush to occupy 7 land, and then 6 land, and so on, leaving much of it vacant as the margin quickly moves to ever less productive land.

*So the effect of land speculation is to move the margin out much more rapidly, reducing wages and increasing rents that much sooner. Land speculation also increases the price of land for current use, since the price reflects the expected future usage.*

## 6. The effect of capital goods

Capital goods will be examined in the next chapter, but let's fill out our model briefly by including them now. Let's start again in the 10 land.

Suppose that farmers were somehow growing the corn with their bare hands, but now someone invents some tools that enable them to double production. These tools, however, only last one

month. If half the farmers spend a month making the tools instead of farming, the farmers as a whole are no better off, since only half the workers are now farming, so at twice the crop per worker, the total yield is the same. Hence, the time needed to make the tools must more than offset the greater productivity from the tools.

Suppose instead that the tools double the monthly output per farmer and last three months. A farmer could make tools one month and use them for three months. The total product would be 60 for the four months, for a monthly average of 15. So the marginal product of the tools, the capital goods, would be 5 per month. Some of the workers might become full-time tool makers. They would trade their tools for 15 bushels of corn every month. They therefore earn a wage of 15, and the farmers also earn 15 per month, after growing 20 bushels and paying 5 to the tool maker every month (for a total of 15 for three months).

We can see that the capital goods have increased productivity by 10, but only 5 is paid to the tool maker, so wages have increased by 50%. The increase in productivity is split between wages and the yield from making capital goods. (We ignore interest rates, which would only slightly affect the calculations). This is because, at the margin (where some workers are indifferent between farming and tool making), wages are equalized, so the return to making capital goods will tend to equal that of farming, assuming the quality of labor is the same.

With the tools doubling productivity in lands of all qualities, we can see that adding capital goods complicates the model but does not alter its essential principles. After the 10-bushel (now 20 bushel) land is used up, the margin will still move to the 9-bushel land (now doubled to 18). The now 20-bushel land will then acquire a rent, while wages will drop in the 18-bushel land as well as in the 20-bushel land from 15 to 13.5 (9 plus 4.5) or even lower if the tool makers also have to use land and pay rent. Even if we suppose that tool makers do not pay rent (living with farmers, for example), the rent on the 20 bushel land is now 2, having doubled while wages have only increased by 50% (since the other 50% is paid to the tool maker). So the effect of the capital goods is to increase rent in proportion to the increased productivity, while (in this example) only increasing wages by half the increased productivity. In general, the proportional increase in rent will tend to be higher than that of wages.

Wages will be higher because of the capital goods, but still diminish, along with the yield from making capital goods, as the margin is moved to less productive land. And if the capital goods enable one to use land that previously was unproductive, the margin might be extended to the level where wages are no higher than they were without the capital goods.

So the accumulation of capital goods and technical progress, including a more efficient division of labor, can increase wages, offsetting the effect of the diminishing marginal product of labor, but if the margin of productivity then moves again to less productive land, the benefit of this increased product will again end up going to rent rather than wages or the owners of capital.

## **7. Urban rent**

The Austrian economist Friedrich von Wieser (1927 [1967], p. 340), an early theorist of urban rent, stated that "**Urban rent is that part of the rental which is paid as a premium for the advantages of the better location.**" Urban rent arises with the presence of a population and its economic activities. In sparsely occupied places where people eke out a bare subsistence - such as nomadic tribes in a desert - land as space generates little or no rent. Where communities have settled, their activities generate a rent for space which at first had none.

That people and their collective activities give rise to rent can be seen by looking at any densely populated city. Equally, one can look at those places that have "gone back" to their uninhabited or primitive state. Ghost towns in the American West, for example, which have collapsed through lack of industry or have been over-exploited, "mined out". When the town prospered, land titles had a rental value. Now, with the disappearance of the population, these land titles have become valueless. Rental value of land will clearly arise and collapse with that of populations and their activity.

Henry George (1879) theorized that the greatest effect on rent was the presence of communities rather than the extension of the margin of production to inferior land. He illustrated this effect with a story about the "**unbounded savannah,**" a field "stretching off in unbroken sameness of grass and flower..." (p. 235). Along comes a first immigrant family. Nature is rich with resources, but this single family has to provide for all its needs, so though they have enough to eat, they have little wealth.

**Another family comes along, and though the land is the same everywhere, "there is one place that is clearly better for him than any other place, and that is where there is already a settler and he may have a neighbor"** (p. 236). The two families may now cooperate to produce wealth previously too difficult for one. (Although if the first family likes solitude or has a lifestyle (such as nudism or loud music) that the second does not like, then the second one might settle just far enough away for privacy but close enough for cooperation when needed.)

As more settlers arrive, they tend to locate near each other. They may form several communities with different values and lifestyles, but there will tend to be one major settlement where many services have become available, and those smaller outer communities also join in to form one greater community. "Labor has now an effectiveness which, in the solitary state, it could not approach" (p. 237). They can cooperate to accomplish large tasks, and can also create a division of labor for specialized work such as teaching. "Satisfactions become possible that in the solitary state were impossible."

Now, says George, go to our first settler and offer him the full value of all his improvements. "He would laugh at you. His land yields no more wheat or potatoes than before, but it does yield far more of all the necessaries and comforts of life..."

The presence of other settlers - the increase of population - has added to the productiveness, in these things, of labor bestowed upon it, and this added productiveness gives it a superiority over land of equal natural quality where there are as yet no settlers" (pp. 238-9).



Let the population continue increasing, and now the town has grown into a great city. The "division of labor becomes extremely minute, wonderfully multiplying efficiency... Hither run all roads, hither set all currents, through all the vast regions round about. Here, if you have anything to sell, is the market; here, if you have anything to buy, is the largest and choicest stock" (p. 240). Here are the great libraries, specialists, and center of commerce and government.

"So enormous are the advantages which this land now offers for the application of labor, that instead of one man with a span of horses scratching over acres, you may count in places thousands of workers to the acre, working tier upon tier... All these advantages attach to the land, ... for here is the center of population - the focus of exchanges, the market place and workshop of the highest forms of industry. The productive powers which density of population has attached to this land are equivalent to the multiplication of its original fertility by the hundredfold and the thousandfold. And rent, which measures the difference between this added productivity and that of the least productive land in use, has increased accordingly" (p. 241).

The increasing rent that is generated by an increasing population and the growth of communities thus comes about "not so much from the necessities of increased population compelling the resort to inferior land, as from the increased productiveness which increased population gives to the lands already in use (p. 242).

## **8. Rent as surplus, and why land is different from labor**

**Sir William Petty** (1623-1687), an English economist, was among the first in Europe to examine the nature of rent. Petty regarded the rent of land as a surplus arising after the labor costs of production have been met.

**Adam Smith** (1723-1790) presented the theory in similar terms. Rent, according to Smith, was a surplus which arose after the basic costs of production had been met. Thus, improvements in the efficiency of production, which reduced costs, raised the surplus income, and subsequently translated into higher rent:

"All those improvements in the productive powers of labour, which tend to directly reduce the real price of manufactures, tend indirectly to raise the real rent of land... Every increase in the real wealth of society, every increase in the quality of useful labour employed within it, tends indirectly to raise the real rent of land" (1776 (Book I, Chapter XI, Conclusions), pp. 275-6).

A more complete explanation of how rent is measured was developed by **David Ricardo** (1772-1823). In 1817, he published the *Principles of Political Economy and Taxation*, in which he developed what has since been termed "**The Law of Rent**". The law states: the rent of land is determined by the excess of its produce over that which the same application of labor and capital goods can secure from the least productive land in use. As we have seen above, this law needs to be qualified to take into account the intensive margin of land, where one lot is being worked with more and more labor. Because more labor is used by the more productive land, lands do not all

have the same application of labor and capital goods; land rent will be even higher in the more productive land due to its greater intensity of use, as we have seen in the above model.

## 9. Generalization to all land

The agricultural model used above can be generalized to land for all uses. For example, a grocery store in a sparsely settled area will have much less sales volume than one in the center of a large town. One would then expect much of this volume to be distributed to the owner of the site as rent, and indeed, rent in urban centers is much higher than in the rural boondocks. Offices in the center of metropolitan areas pay much higher rent than those in smaller towns. Generally, productivity of any sort generates higher rents relative to lower productivity. The law of rent applies to all land.

An important aspect of productivity is the availability of transportation, both of roads and of vehicles such as trains. This can best be understood by reference to a historical example. During the colonization of Australia and New Zealand, the first settlers to arrive naturally took up the most desirable sites. These sites were nonetheless looked upon by the British Colonial Office as marginal land which commanded little rent. The land was therefore sold for a low price. As further settlers arrived, they occupied less desirable sites. Eventually, the originally occupied sites, which previously had no value, were now prime sites in the centre of towns and cities.

Those late arrivals settling on the new margin - remote sites far away from the center of town - faced increasing costs for transport to bring their produce to town. To have occupied sites closer to their markets, they would have had to bid a higher rent. The sites closer to town have lower transport costs and therefore higher profits per bushel of output, hence are more productive in terms of revenues minus all costs. This extra productivity induces the higher rent closer to town.

The theorist who developed the economics of location, including transportation, was **Johann Heinrich von Thünen** (1783-1850). In his work *The Isolated State* (1826), he explained that there was a relationship between transportation costs and the rental value of land. A farmer working on the periphery of a market area has the furthest to travel, therefore his land would have a low or zero rent. But suppose the roads leading to this marginal land were improved by the government. The reduction in transport costs results in a higher income per bushel of crop. (Similarly, improvements such as refrigeration further reduce the cost of transporting produce.) As we have seen in the above model, such increases in productivity increases the rent for the land affected. So much of the productivity due to the physical infrastructure - roads, trains, busses, communications - ends up as increased land rent. Thus the margin will define the outer area of usefulness of land for any particular purpose - the point beyond which an activity cannot afford to locate. Firms and industries will thus seek to locate intra-marginally (within that area). Rent will be based on the type of activity and the rewards which that activity stands to gain by locating in intra-marginal land.

**Typically, financial firms, such as banks, have sought to locate in the center of town.** A close proximity to commerce, government, and customers was needed before the advent of tele-

communications. Despite modern communications for both voice and data, including money, financial firms still seek to locate themselves within the center. Clearly, there still exists a point for banks beyond which it would not be profitable to locate their main offices and service centers, otherwise we would have banks locating in the mountains where rents are close to zero. Thus, the boundary beyond which it would be economically unattractive to locate a bank will be the margin of much of financial enterprise.

Rents in financial centers are among the highest. This is because of the extremely high rewards which banks, insurance headquarters, brokerage firms, etc., stand to gain through their location on these sites as opposed to locating on marginal sites.

**The same principle applies to the location of commercial office blocks within a city.** A firm will wish to locate its offices on a site which has easy access to the services on which it depends, such as transportation (subways, busses) for its customers and workers, and it might also need access to centrally located financial or governmental agencies. There will be a location beyond which the office cannot afford to locate itself - where the costs of getting its staff to work and of not being closer to complementary services becomes too high. Turning now to industrial activities, these too will have a margin beyond which it is unprofitable for them to locate. Some industries will be attracted to what **William Vickrey** (1990) calls "**economies of density of demand**" as well as by transportation, such as access to a major highway. Thus, the rent of this land too is determined by the increased rewards which the industry stands to gain through its location.

Housing also has a margin. If a family chooses to locate in the countryside, beyond the denser residential developments, it might find that commuting costs (including time), longer access to facilities and lack of public amenities make its location economically unattractive. Rent is therefore lower, other things being equal, at the edge of town than nearer to the center, although of course negative factors such as crime and noise and crowding will decrease the desirability and thus the rent in parts of town that are run down, even if near the center. With cars and long-distance commuting trains and busses, people can live far from city centers, but still, one would not normally live hundreds of miles and kilometers from a city center; there is some limit to commuting times. And rent in the more desirable neighborhoods near the center of a city will fetch that much more rent than sites yonder.

Hence, each activity has some margin beyond which it will be unprofitable to locate. Generally, a city's economic activity takes place within the margins of the various functions. The corresponding rents are based on the rewards of intra-marginal location for an activity.

## **10. The supply and demand for land and rent**

The quantity of fixed natural resources diminishes with increasing extraction, though the supply of known reserves of the resource increases when new sources are discovered. The supply of renewable resources is variable, making conservation and renewal essential if the supply is not to become extinct.

The surface space of the earth, however, is constant. Land area within any boundary is fixed in two ways: no space can be imported, and new space cannot be manufactured. Hence, for any particular region (given some boundary line), the amount of space is fixed. In a graph where the quantity of land is measured along the horizontal axis and the rent of land is on the vertical axis, the quantity of land is a vertical line at the amount (acreage, area) determined by the boundary. The supply of land for a particular use, or the supply of lots offered for sale, can vary with price and be upward sloping, but the quantity of surface sites within some area cannot be expanded or contracted.

The demand curve for a particular plot of land is the amount wanted at various prices. The demand curve slopes downwards, as greater amounts of land, like any product, are wanted at lower prices. So the diagonally downward sloping demand curve cuts through the vertical supply curve at some point, determining the price of land. At the point where the curves intersect, of course, this demand is equal to the marginal product of land, the rent determined by its differential with respect to free land, or its capitalized value as the price of land.

If the demand for land in that area increases (more is wanted at each price), then the price of land will rise. But the supply will not be affected, since it is fixed. Also, if all or part of the rent is collected by a community, the supply of land will still not be affected. If the tax is higher than the rent, then people will no longer want to own land, and the tax will decrease the value of the capital goods tied to the land. So long as the amount of rent collected is not greater than the rent, it has no effect on the demand for the land and thus neither reduces nor increases the rental paid by the tenant. If the landlord is already charging as much rent as possible, the entire collected rent is borne by the landlord, and none of it can be passed onto the tenant.

## 11. Monopoly power in land

At a speech given in Edinburgh, Scotland, in July, 1909, **Winston Churchill** observed "it is quite true that the land monopoly is not the only monopoly which exists, but it is by far the greatest of monopolies - it is a perpetual monopoly, and it is the mother of all other forms of monopoly" (Churchill, 1917).

Some, however, question the use of the term "land monopoly". Grounds for discontent have traditionally centered on the conventional definition of a monopoly as exclusive purchase or sale of some commodity, implying also that there are no close substitutes of the commodity being held by others. Based on this definition, how then can we speak logically of a land monopoly? For, in many countries, thousands if not millions of people possess and sell land.

**To make sense of the term "land monopoly" we must consider the nature of a plot of land. When one seeks to purchase a land site, location is most often the decisive factor. Since land in a specific location is unique, each plot has a locational micro-monopoly, and occasionally there may be no close substitutes.** When the area is expanded to a neighborhood rather than one particular plot, the neighborhood itself may have unique properties giving it a monopoly

with respect to the city or region it is located in. For example, it could be much less profitable for a bank to locate anywhere but in the financial sector of a city.

**But there is another meaning of the term "monopoly" having to do with entry and exit into an industry. In a competitive industry, firms can enter not just to increase the number of firms but to increase the production of the output.** Moreover, the product can also be imported when profits are above normal. Increased supplies reduce the profits in the industry to normal returns. But when the stock of the product is fixed, when the expansion of output is impossible, then this competitive condition does not exist, and in that sense, there is a monopoly of the product among those firms who share in the fixed stock (Foldvary, 1993). In such a monopoly, profits can remain super-normal indefinitely (the profit often consists in the rise in value of the asset). Economic land is such a market, since within any given boundary line, it is fixed in supply.

**The nature of land as a monopoly is furthered by the fact that it keeps indefinitely. Land as a locational site doesn't spoil or rot.** When an area is developing and the price of land is rising, the title holder profits simply by owning the site even if it is not rented out. It may be more profitable to avoid building at present and wait until the other sites are developed, when the real estate can then be sold at higher price. *Keeping land out of use or in inefficient current use (such as parking lots in a city center) is detrimental to current production. It is not a pure market phenomenon, but the result of the absence of the collection of the land rent by the community.* It does not "provide" land for future use, since that land will be there anyway; sites will be converted to more productive uses when the current demand and profitability so determines. If a profit-maximizing private agent owned all the land in a city and leased it out, she would surely charge the full economic rent on each site, and there would be no current suboptimal use of land. It is not the pure market but the fractionated titles and nonpayment of rent that keeps sites out of optimal current use.

## 12. Urban sprawl

Urban sprawl is an excessive urbanization of the countryside surrounding a city relative to that which would occur in a pure market economy. A pure market economy, with land rents collected and no zoning laws restricting the efficient use of land, would result in compact cities where density gradually decreased to the edges instead of helter-skelter hodge-podge developments.

Sprawl damages the surrounding agricultural and natural land, decreases the efficiency of cities and leads to a considerable waste of infrastructure such as streets, highways, pipes, and lights. Much of the inefficiency consists of longer commuting times, more costlier transportation for agricultural and urban goods, and wasted fuel. Though the loss of good crop land through urban sprawl is a needless waste, the damage goes further. It induces farmers to move further afield, destroying wildlife habitats. Sprawl also tends to be ugly.

Zoning laws often mandate minimum densities, requiring plots to have minimum sizes. Changes in zoning have been required in planned communities in which homes are clustered together,

leaving more room for shared open space (Foldvary, 1994). City laws also often restrict the number of people able to live in a residence if they are not related by family, and restrict the ability to rent out rooms. Laws also prohibit enterprise at home as well as mixed use of land.

Also contributing to urban sprawl is the subsidy of the public works serving the outer edges. The streets, freeways, water and sewer pipes, lighting, security, fire service, parks, schools, and other goods and services are provided at the expense of the taxpayers of the entire city or county, often with the aid of higher levels of governments, so that these are subsidies which the users of suburban land consider free. Not having to pay its cost increases the usage and demand for these goods.

**Taxation is a major contributor to urban sprawl. Vertical use of space is penalized by the taxation of buildings, while the horizontal use of space is subsidized. The remedy is the elimination of property taxes on improvements such as buildings and the funding of civic services from CCR - the community collection of rent.** In most cities, the high value land in the center is used inefficiently due to the secondary use of land as speculation. Land owners of central sites often have no incentive to redevelop their old buildings and can even leave central sites vacant. New development is displaced outward.

### 13. Farm subsidies

**David Ricardo** showed that if the state artificially raises the value of a product, such as corn, the value of the land that produces the good will rise. Ricardo wrote about the **Corn Laws** passed in England in the first decade of the 19th century. He showed that if you tax imported wheat (i.e. "corn") to raise its price to protect the British farmer, the rent of the corn land will go up. Rent will continue to rise until it has effectively wiped out the benefits to the farmer renting that land.

The Lloyds Bank Economic Bulletin (1992) reported that of the money spent under the EEC's common agricultural policy, "around half is transferred to the land-owners and the rest is lost in inefficiency. Poor farmers and farm laborers appear to gain little." In Great Britain, it has been calculated (Body, p. 209) that the total spent on agricultural subsidies since WWII is equal to the value by which farm lands have risen!

### 14. Conclusion

As the factor of production that is not produced by human effort, land plays an important role, different from that of labor and capital, in the production and distribution of goods. In particular, as we will see, the fact that land is in fixed supply and cannot be moved makes its rent the ideal source of revenue for public or collective goods. The capitalization of public goods into land rent makes that rent the efficient and equitable source for those goods. The fact that land is here from nature implies that using land rent for public revenues does not reduce production or productivity.

