



Ground Rent and the Allocation of Land Among Firms

By Dr. Mason Gaffney

Article citation:

Gaffney, Mason. "Ground Rent and the Allocation of Land Among Firms." 12 April 1961. Draft.

Fair Use Disclaimer

The Robert Schalkenbach Foundation, a non profit private foundation, is publishing this article, at no cost, pursuant to the Fair Use provisions of Section 107 of the Copyright Act which states that under certain circumstances, the fair use of a copyrighted material for purposes of criticism, comment, teaching, scholarship and research is not an infringement of copyright. If you have any concerns about the publication of this article, please contact us at info@schalkenbach.org.

The Robert Schalkenbach Foundation's Digital Collections and Archives is an extension of the Robert Schalkenbach Foundation's Engel Georgist Library. It collects, organizes, preserves, and provides free online access to researchers and the general public of Georgist literature including books, newspapers, pamphlets, scholarly articles and archival materials.

RSF is particularly proud to offer free online access to the works of the late Georgist scholar Mason Gaffney, made possible through the generosity of the Danica Foundation and with the consent of the Mason and Letitia Gaffney Trust.

Robert Schalkenbach Foundation: <https://schalkenbach.org/>

Engel Georgist Library: <https://www.librarycat.org/lib/EngelGeorgistLibrary>

RSF Digital Collections and Archives: <https://schalkenbach.starter1ua.preservica.com/>

"Ground Rent and the Allocation of Land among Firms." Rough draft of a paper to be presented by Mason Gaffney, University of Missouri, to Seminar at NCLTRC, Chicago, April 12, 1961

CONTENTS

I. Introduction

II. Some problems in defining and imputing ground rent

A. Ground rent as an income

~~A.1. Rent~~

B. Ground rent vs. the income of improvements

1. Improvements physically mixed with soil

2. "Permanent" improvements

3. Influence of offsite improvements and activity

4. ~~Distinguishing ground rent from the income of old improvements.~~~~Ground rent vs. the income of old improvements~~C. ~~Insulation of markets and the meanings of "opportunity cost"~~D. ~~Annualizing irregular time-distributions of rent~~~~Reconciling residual vs. direct imputation (criticize Stigler & Samuelson) (consult thesis)~~E.F. ~~Marginal vs. average ground rent~~F. ~~Ground rent and the opportunity cost of labor~~~~G. Subsidies~~
~~H. Reduction of agent costs~~

III. Differential capitalization and the allocation of land among owner-operators

IV. The function of tenancy

A.B.C.

V. Alternatives to tenancy: the effects of ad valorem ^{real estate} taxes on allocation of land

E. Residual vs. direct imputation of rent

G. Rent and the opportunity cost of labor

H. Sub-rents vs. whole unit rents

I. Deduction of agent costs

IV. ~~Short-circuiting the money markets~~

B. Land vs. other durable inputs

C. The inadequacy of tenancy

^{Draft:}
Rough, ~~unannotated~~ outline, "Ground rent and the allocation of land among firms."

I. Introduction

This paper deals with ground rent, not contract rent. There are several reasons for ^{singling out} ~~assembling~~ ground rent and treating it separately. It is ground rent, not contract rent, that ^{determines} ~~is determined~~ the allocation of land among firms, ^{It is ground rent that determines the allocation} and also between present ~~optimal allocation of land between present and future uses~~ and future uses. It is ground rent which endures, and extends in anticipation into the remote future, and is capitalized into land values so high relative to current income as to pose the financing problem which is the main root of tenancy. It is ground rent, and values derived from it, which ~~serve as a guide to land development~~ must provide the main rationale for public projects that open up new lands, and so guide the allocation of developmental ~~capital~~ resources. ^{timing of demolition and renewal.}

II. Some problems in defining ^{and imputing} ground rent

In basic conception, ground rent is a straightforward and uncomplicated idea: it is the net product of the ground, that is the gross product less the costs of making the ground productive. It was a concept that commended itself to our simple classic forebears and might lay some claim to having been the foundation of classical economics.

Yet as we all have learned to our sorrow, in its application the concept poses several perplexities which have even led some economists to throw up their hands and ~~abandon~~ it, at least as a ^{practical} ~~working~~ ~~good~~ tool for practical use. Likewise some economists have given up the idea of imputing products to labor, or other specific inputs. Yet if we cannot impute returns to specific inputs we have lost a good deal of the value of economic analysis -- for is not much of our thinking and policy recommendation premised on ^{attributing} ~~attributing~~ the ~~linking of~~ outputs to ^{specific} ~~certain~~ inputs? So I believe it is worth making the effort to clarify the concept and keep it in working order.

A. Ground rent as an income

Ground rent is an income, received in return for a flow of services from a resource that is not depleted by use. It does not include payments in return for depletion of virgin fertility, as this is not an income but a transfer payment. Of course ground rent is also net of depreciation and turnover of artificial fertility, and of all other inventories and improvements.

The income imputable to virgin fertility (as distinct from payments for depletion of it) constitutes a distinct sub-category of natural resource income which may require separate treatment.

✓ (To be expanded) ~~before April 12~~

B. Ground rent vs. the income of improvements

Several economists have ~~expressed~~ registered difficulties in distinguishing ground rent from income imputable to improvements. I believe it is possible to resolve most of these problems ~~to~~ and will suggest what seem to me workable solutions to several which come up frequently, proceeding in increasing order of sophistication.

1. Improvements physically mixed with soil

~~It is impossible to~~ The economic classification of an improvement is not dependent on its being ~~visible~~ aboveground. Underground tiles are economically quite comparable to fences or barns: they cost money; they increase output; ^{they require maintenance;} and they depreciate. ^{Easy} Visibility is helpful in appraising, but certainly not otherwise relevant to economic analysis.

The same is true of ~~chemical~~ soil amendments, except that these are more analogous to inventories of raw materials which remain about constant in quantity while the individual components turn over.

2. "Permanent" improvements

Some improvements depreciate so slowly that for practical purposes they may be regarded as permanent. Examples are filling in shallow underwater sites for urban use; or cutting a natural dike to drain a swamp. But the fact that the improvement and the site are now inseparable for all time does not prevent the economist from distinguishing the natural from the human contribution.

The human contribution can be no more than the cost of the operation, and later the cost of duplicating it. It can be less, if the costs exceeded the benefits, and/or if they exceeded available alternative costs, ^{or if the raw site, if available today, could be developed in a better way by some new method or for some higher use.} The rest of their combined values imputes ~~proper~~ to the site, and would in fact be its market value if it were still unimproved. Confusion may arise because the unimproved site would yield no income, which leads the unwary to conclude it has no value. Man's propensity ^{is} to understate his debt to Nature, and overestimate his own ~~share~~ contribution. ~~is~~ But the point is often clarified when he seeks to buy a raw "unproductive" site and learns the price. ~~that is the market recognizes what some economists do not~~

3. Influence of offsite improvements and activity

Physically, the thing we call the "ground" is distinguished from other things in that it is Nature's contribution as opposed to man's. Economically, however, man contributes to its value. External economies spill over from improvements and activities on neighboring sites, ~~and~~ ~~and~~, both private and public. The clearest ~~relations~~ ~~is~~ contribution is from developmental public works. Markets, affected by worldwide forces of supply and demand, also affect value.

So long as we can distinguish the contributions of the individual site-holder from those of society it is possible to distinguish the value and income of the ground from those of the individual. Only where the line between the individual and society becomes blurred, as sometimes it does, is ^{there} ~~their~~ ambiguity in the concept. An example would be when a ~~public~~ private utility, protected with a public franchise, develops a utility network to improve its own lands. In such instances it is necessary to fall back on ad hoc analysis of the terms of each situation in order to make meaningful distinctions. ^{It becomes essentially a problem in determining the size of the unit of land in which developmental (over)} These external human contributions ~~are less certain than~~

differ from natural ones in certainty of permanence. Roads may deteriorate, for example, and with them the land values to which they contribute. However this deterioration is by no means as certain as that of improvements on private land, for in general there is a presumption that the ^{right of way} ~~public agency~~ site dedicated to the public will be continuously maintained by the public.

~~42/282/202/212/212/212~~

4. Distinguishing ground rent from the income of old improvements

The unimproved value of land, as the Australians call it, is the value ^{land} ~~it~~ would have without the present improvements. Of course this does not mean a value based on use without any improvements. Unimproved value is rather what one would bid in anticipation of ~~using~~ improving the land anew; and ground rent is the anticipated annual ^{net} income on which such a bid would be based. *It is (own)*

We are accustomed to thinking of ground rent as determined residually, although economists now recognize this as simply a convention. In imputation between land and old improvements it is a poor convention. The old improvements usually have no ~~material~~ ^{appreciable} salvage value, that is to say no opportunity cost. But the land does. Its opportunity cost is its marginal productivity in its highest future use. It is necessary for old uses to impute that amount to the land to justify ^{their continued tenure} ~~keeping it in the old use~~.

It is the old improvements therefore which must be valued residually. Their historical cost is irrelevant; likewise any depreciation schedule based on it. Their only value is the excess of the joint yield of land and improvements over the opportunity cost of ~~land~~ the bare land. When this excess falls to zero the improvements are worthless. ~~and the cost of the improvements is a past mistake.~~ ^{an interesting corollary is that when land ripens into eligibility for urban use, (over)} Their historical cost may never have been recovered, but that is *spilt milk*. ~~a past mistake.~~ ^{It is a past mistake.} The full opportunity cost must be imputed to land, as to ~~any~~ every resource, to justify keeping it from its highest alternative use.

Corollary

None of this is to imply that land should never be valued residually. In determining the future value, for example, this may often be the most practical means. In general, that resource should be valued residually whose opportunity cost is most difficult to define. In respect to land and old improvements, it is land whose opportunity cost is easier to define.

The problem of putting a value on land in the infinite series of future uses -- what foresters call "soil expectation value" --- poses many interesting problems of its own, in mathematics and the treatment of divergent expectations. I will not get into any detail on this, other than to note that there is a good deal of it, some of which I have tried my hand at elsewhere. If anyone

~~these~~ should care to allege that more needs to be done I would have to agree. But I do believe this is the most promising approach to the question.

C. ~~B.~~ Insulation of markets and the meaning of "opportunity cost."

The "opportunity cost" of land may be at different levels depending on what problem one is analyzing. ~~Sometimes~~ There are barriers keeping land from what otherwise would be its highest use. If we accept those barriers as "given" in a particular analysis, then the ^{relevant} opportunity cost is ~~probably~~ the ~~the~~ highest use possible within ^{those} constraints. If we wish to evaluate a proposal to breach ~~some of~~ the barriers, then ^a the higher opportunity cost becomes relevant.

Such a barrier ^{might be, for example,} ~~would be~~ a poorly conceived zoning pattern. An analogous one, to which ^{the later part of this paper is devoted, is unequal} ~~access to~~ ^{credit,} ~~markets~~ which often prevent the highest opportunity cost, viewed as an annual ground rent, ^{from finding} ~~to find~~ expression in a commensurately high bid for the land title.

The highest ground rent, after all undesirable market barriers have been breached, is a concept which may be called the "latent" ground rent. Ideally this rent would be charged against all land uses so as to eliminate all ~~those~~ marginal extensions of landholding, ~~both~~ in space ~~and~~ as well as time, whose marginal product does not cover ~~it~~ ^{the cost}.

Generally, ~~as~~ a goal of social policy should be to ~~charge it~~ ^{see} that all land uses meet this test at the margins, both spatial and temporal. But in evaluating the management plans of individuals, within those constraints that must be accepted, land use is rather to be judged on the basis of those opportunity costs that make themselves felt to the individual.

D. ~~B.~~ Annualizing irregular time-distributions of rent
(^{To be expanded} ~~Note: This heading will be developed only if there is time.~~)

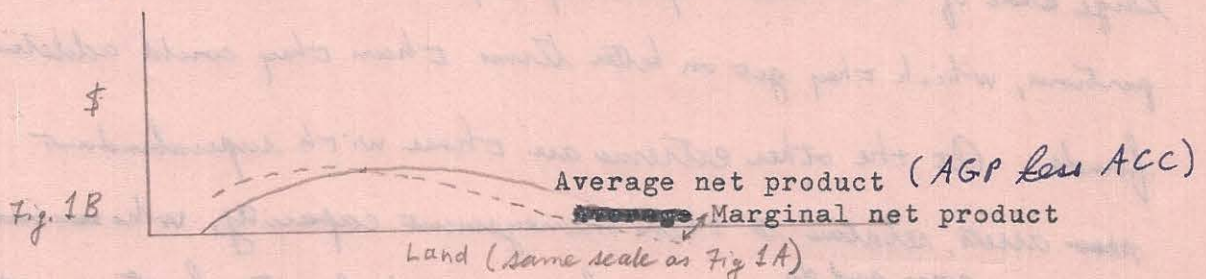
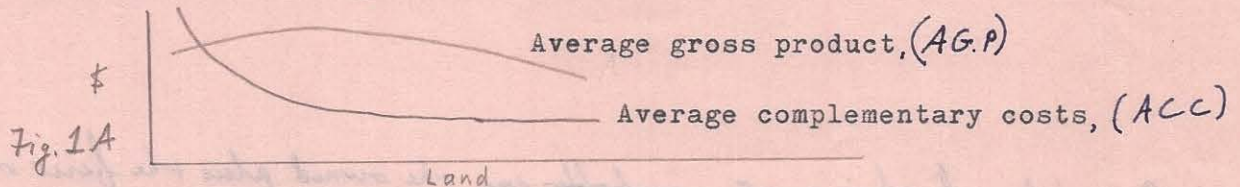
(~~Better do so in drafting for publication, as this will help with the "risk" business.~~)

E. ~~B.~~ Residual vs. direct imputation of rent

ground

F. ~~Fig.~~ M. Marginal vs. average rent

If we begin with fixed complements of labor and depreciable capital (i.e. other than land), and increase the land input, the average and marginal products of land rise and then fall in a pattern with which we are all familiar, the marginal curve intersecting the average curve at ~~its/~~ the latter's maximum. We can apply this analytical tool to ground rent by letting the complements increase along with the land, choosing that application of the complements which would be optimal for each acreage considered. ~~Then we would have~~ Subtracting the average complementary costs from the average gross product ~~at each acreage~~ leaves us with the average net product of the land, or ground rent. The curve will rise to a maximum and fall, just as does the simple average product curve, only of course with a ~~much~~ less steep gradient. The point is illustrated in Figures 1A and 1B, below.



Having the average net product curve, a marginal net product curve may be constructed to it, related just as in the simple case. This is the dash curve of Figure 1B. ~~It can also be constructed as marginal gross product less marginal complementary costs.~~ In long run equilibrium, ~~average and marginal net product would be equal.~~ ~~But this is not a practical possibility for particular farms.~~ ~~However, of course long run equilibrium is simply that remote will-o-the-wisp that economic forces pursue but seldom attain.~~ In particular, in times when the optimal scale of farming has changed rapidly, ~~as over the last twenty years, so that a complete replanting of rural spatial relations, it has to be undergone,~~ ^{necessitating a painful regrouping} the number of farms of optimal size is few. Divergence of average and marginal rent is the rule.

Added to this, even in periods of static technological optima, inadequate financial resources for land purchase holds many units in the stage of increasing return to land, where they manage to survive by inputting less than the ^{input cost} ~~cost~~ to a (over)

In ~~analyzing~~^{evaluating} the allocation of land among firms, it is the marginal rent that is relevant. When the optimal acreage has risen materially, as recently, so that many farms find themselves below that optimal size, the social opportunity cost of land in other holdings is to be reckoned at the marginal rent, which is higher than the average. It is possible for expanding farmers to pay more for marginal acres, either as rent or purchase price, than they could pay for the average acre of their farms. It will pay many less aggressive farmers to partition their holdings among their expansive neighbors at such high prices. This is part of the pulling and hauling involved in the ^{awkward} transition from one ^{average} optimal acreage to ^{another average} a ~~higher and~~ vaster one. But woe be unto that individual, or that ~~society~~ people, who mistake these high prices for those which the market can permanently sustain!

In the last twenty years our profession has ~~repeatedly~~^{repeatedly} directed its ~~cruelest~~ barbs against the farmer who remained too small, ~~and with some cause.~~ ^{altho much of his inertia might be rationalized as an effort to reconquer part of the unexhausted values of} By contrast, ~~however,~~ ^{old in-} we have been ~~very~~ ^{prominent} gentle indeed with ~~those~~ ^{him} who ~~were~~ ^{remained} too large. From reading the JFE ~~one would hardly gather that such a problem could exist.~~ It is also possible, however, to operate too many acres with too little management, labor, ~~and equipment~~ buildings and equipment, and move to the right of the optimal point of maximum average rent.

In this event the marginal net product or marginal rent of land is less than its average value. This means that such farms can dispense with land at small marginal reductions of output. Experience with acreage control programs, where many farmers with little difficulty maintained output after large acreage reductions, suggests that this situation is not so uncommon.

Tenancy is an institution whereby those who hold title to more land than they can impute much marginal rent to lend it to others with ~~so little~~ title to too little land to round out an optimal unit. The economic pressure leading to tenancy is the difference between the marginal rents, not the average ones, imputed by those with too much and too little land. The average rents, in fact, might be the same. ^{Average rent} ~~They~~ might even be higher on the larger ^{holding} farm, although this is unlikely, and it still be economical to lease land to a smaller one.

G. H. B. Rent and the opportunity cost of labor

(Note: to be written if time ^{will} ~~shall~~ allow) (To be expended)

H. A. Sub-rents vs. whole unit rents

III. ~~Differential capitalization and the allocation of land among owner-operators~~

?
one on

The ordinary meaning of rent is as applied to a whole economic unit, like a 160-acre farm. Within the unit, however, there ~~is~~ is an internal spatial organization which puts a higher premium on some space, e.g. in and around the farmstead, than on other, e.g. the back forty. In his use of land the farmer should therefore recognize sub-rents, and economize accordingly. And in ~~buying and so expanding and contracting his acreage~~ buying ~~land~~ or selling land to expand or contract his acreage he should price it by ~~it~~ how it fits into his scheme of things, not as a homogeneous input.

I. ~~the~~ Deduction of agent costs

When land is leased, ~~the relation between~~ tenant-landlord relations consume a good deal of attention, as the preceding paper shows. This is expensive, and if the landlord employs an agent will be measurable in ^{monetary} ~~an~~ excess of what the tenant pays over what the landlord receives. It is ~~perhaps~~ arbitrary whether we define ground rent as what the tenant pays, or the lesser amount that the landlord receives, net of agent costs.

In this study I will follow the latter definition: ground rent is what the landlord receives, net of agent costs. This definition has the advantage ~~of~~ that this is the ground rent on which an absentee landlord

III. Differential capitalization and the allocation of land among owner-operators

This group requires no demonstration that land ideally should move to the firm prepared to impute it the highest marginal rent, or net revenue product. That is the clear implication of all basic economic analysis, subject only to special reservations and quibbles that do not challenge the underlying principles of economizing.

Our institutions raise many specific barriers to this goal, items too numerous to detain us here. But one ~~of the many~~ barrier is so universal, so transcendent of specific ages and cultures, as to warrant our attention as a general problem of economic theory. That is the barrier between borrowers and lenders in the markets for money and credit.

Let us suppose, to make the point, that leasing land has been outlawed: operators must be owners, and owners operators. In this world of owner-operators land would move to the tenure of the highest bidder. But this bidder would not necessarily be he who would impute the land the maximum marginal rent. Capitalization rates are of co-equal ~~importance~~ weight in determining bids, and these rates vary among individuals.

Individuals differ widely in the relation of the assets they command to their capacity to manage them productively, so there is no tendency for marginal productivities of assets to be equal as among individuals. It is widely assumed in our profession that money and credit markets meliorate this condition, but at best our financial institutions leave a wide gap between the high interest rates they ask and the low ones they pay: necessarily so if they are to support themselves, and often a good deal more so because they are sheltered from competition.

But that is the best view of it. There is room for debate whether financial institutions on balance tend ~~to~~ at all in the direction of equating the financial strength of individuals, inasmuch as the overriding criterion of lending is collateral security. To a ~~large~~

high degree, therefore, financial institutions are media via which ~~the~~ money runs uphill, that is from depositors of moderate means, who need the liquidity that financial institutions can provide them, to borrowers with abundant collateral security. Thus financial power tends to cluster about established nuclei, rather than spread itself about equimarginally.

Land economists are familiar with this ~~phenomenon~~ phenomenon, and with the various rationalizations of it. Many ^{economists} ~~of them~~ are more sympathetic with those rationalizations than I, and if this paper ~~were~~ were to be twice as long, the additional half would deal with these issues. For ~~the present~~ brevity's sake I am declaring them beyond the scope of this paper, hoping that Section V, ~~will obviate a good~~ which discusses how we may short-circuit the money markets, will obviate the larger part of such a discussion anyway.

practise "Financial strength" is a concept of several dimensions. For expository brevity we may sum them up in i, the interest rate internal to the firm, and this paper will follow that practise henceforth. A low-i firm can bid land away from a high-i firm if the marginal rent of the land is the same to both. This in itself is not a serious diseconomy, but the low-i firm can now expand, and the other must contract, until a final equilibrium in which the marginal rent is materially lower to the low-i firm than to the other. At this point the marginal rents of the two firms will bear the same proportion as their interest rates. This is the problem of differential capitalization.

The problem is exacerbated when there prevails a general expectation that rents will rise in the future. Suppose, for a simple example, that rents are expected to rise ~~in~~ in a geometric progression of d% per year. The capitalization formula becomes

$$V = \frac{a_0}{i - d} \quad (1)$$

~~The~~ Subtracting d from i in the denominator adds leverage to i. In the simple capitalization formula it is co-equally important with a; but here it is more important.

Consider a numerical example. If the internal interest rates, i , of two firms are 8% and 4%, and constant future rents are expected, the two firms will adjust their marginal landholdings until the marginal rents bear the ratio of 8% to 4%, or two to one. But if they expect future rents to rise at 2% yearly the ~~ratio~~^{ratio} becomes $\frac{.08 - .02}{.04 - .02} = \frac{.06}{.02}$ or three to one.

Let us put it in terms of marginal cost. Assuming for the ~~moment~~^{present} no taxes, the marginal cost of holding title to land for one year equals ~~$V \times i$~~ $V \times i$, where V is land value and i is the firm's internal interest rate. Thus the marginal cost of holding title for one year varies directly with a firm's i . As the firm equates marginal cost with marginal net revenue product (marginal rent), the margins of return to which different firms extend their landholdings vary directly with i , the symbol which epitomizes their financial strength.

Now within this framework again let there prevail a general expectation that rents will rise in the future. The increased leverage of i may be demonstrated almost as simply as in our first example, and much more generally.

The rising expectations ^{reach back to the present and} manifest themselves in two ways immediately. One is a higher present land value, V ; the other is an annual increment to land value, dV , as the higher expectations of things to come move each year closer to the present. The higher land price, V , raises the marginal annual cost of holding title in proportion to the internal interest rate, i ; while the annual price increment, dV , may be regarded as a deduction from marginal cost (or an addition to marginal revenue, as one prefers).

Thus the anticipation of rising future rents has two ~~opposite~~ effects which are mutually offsetting. The anticipated price increment prompts all firms to expand their landholdings, while the higher land price already realized constrains them all to contract. But the joint forces will nonetheless have an important net effect because their impact is uneven as among different firms. Annual price increments

affect all firms similarly.¹ But the impact of higher land prices is proportional to the internal interest rates, $\underline{i}$, of different firms.

~~The leverage of any parameter is increased by subtracting a constant from it. The leverage of $\underline{i}$~~

The leverage of $\underline{i}$ is now increased in two ways. First, the base on which interest is reckoned has risen. Second, the annual increment to land value, $\underline{dV}$, a constant as among different firms, is to be subtracted from the interest cost, thus magnifying the relative effects of given differences in interest cost.

In symbolic form, the equation of marginal cost and marginal revenue in the land market requires basically that marginal rent (MR) equal interest cost, $\underline{Vi}$:

$$MR = Vi \quad (2)$$

But with rising rents expected we must change (2) by subtracting the annual price increment, $\underline{dV}$, from interest cost. ~~7777~~

$$MR = Vi - dV \quad (3)$$

~~7777~~

This may be called the "dynamic equilibrium condition" of the market for land titles.

The leverage of $\underline{i}$ is brought out most nakedly when we divide through by $\underline{V}$:

$$\frac{MR}{V} = i - \frac{dV}{V} \quad (3a)$$

The rightmost expression, dV/V , is the annual rise of land value expressed as a percentage. If the figure is say 2%, the constraining force of a 3% interest rate, $\underline{i}$, is cut down to 1%. The force of a 6% interest rate is cut down relatively less, to 4%. The ratio of the two constraints is cut from .06/.03, or two to one, down to

1. Under our present assumptions, that is. In practise expectations of increments vary with individuals, posing an additional problem not treated here. It is also probable that credit-weak individuals cannot put much value on increments until shortly before the date of actual cash realization.

.04/.01, or four to one.

The net result of rising expectations then is an increased leverage for interest differentials, tending towards greater disparities of marginal rents ^{between} ~~on~~ low-i and high-i landholdings. Holding land completely idle under new reclamation projects, or in suburban areas, is the extreme manifestation of this. Where price increments are rapid, they alone may be enough to offset the costs of holding title and justify (to the individual at least) holding land whose marginal revenue product is zero.

Is it not plausible that the same force, in milder form, has been working in the farm real estate market in the last twenty years? A recent study alleges that increments to farm land values have constituted half the net income of agriculture in recent years, but regardless of the exact figure these increments have clearly been a major force to reckon with.

Our profession has neglected to make this reckoning, with the result that our analysis of trends in land tenure gives undue, at times it seems exclusive emphasis to technological factors. For example, recent analysis of trends in farm size has ~~been~~ focussed on the rise of mean acreage per farm, ^{with} ~~and~~ technological forces receiving almost all the responsibility. Meantime we have shut our eyes to an equally striking acreage trend, that is the increasing dispersion of farm sizes around the mean, or the drift toward extreme contrasts between large and small farms. This is easiest measured in the Lorenz Concentration Ratio, an expression of the bend in a Lorenz curve. The Lorenz Concentration Ratio for the distribution of farm land among holdings of different sizes has been rising rapidly.

This aspect of recent trends would seem to defy and deny the technological imperative that is usually ~~invoked~~ to exorcise demons of doubt over the welfare implications of farm consolidations. ~~The rising Lorenz concentration ratio~~ For technological factors alone would tend to force farms toward mean optimal sizes. Instead they are becoming ever more disparate in size. This trend is more consistent with a thesis based on increased relative im-

portance of the problem of financing title to land that is expensive today and expected to be moreso tomorrow. This is not a thesis that can be demonstrated with experimental data borrowed from the Department of Agricultural Engineering. It is a job for fresh research by land economists, and one which we have neglected overlong.

But for the present paper we are primarily concerned with the conclusion that the allocation of land among owner-operators is powerfully influenced by capitalization rates which vary among individuals; and that these individual differences take on magnified importance in a rising market. These conclusions give us some insight into the economic forces leading towards tenancy, which we take up next.

IV.

IV. The function of tenancy

A. Short-circuiting the money markets

Tenancy is a means for transferring management control of land from those with surplus to those with shortage of both land and the financial strength to buy more. It accommodates the weakly financed who prefer to buy durable inputs as they do others, one year at a time, and avoid the financial burden of investing in a costly present claim on remote future values. It substitutes the borrowing of land for the borrowing of money.

Tenancy is thereby a means to meliorate the problem that would obtain in a world of owner-operators, the problem of widely/divergent marginal rents of land on large and small holdings: high rents on undersized, overstaffed holdings; and low ones on oversized, relatively undermanned holdings.

The function of tenancy, as often expressed, is to let landlords help tenants by bearing for them the financial burden of holding title. This interpretation strikes a change of nuance that is misleading. It seems to presume that the high price of land is an ineluctable burden imposed by Nature, a "given" with which man has no choice but to cope as best he can.

From the small individual viewpoint, it is true, the market level of land prices is fixed externally. But to transpose this viewpoint to a social analysis constitutes ~~simply~~ a splendid example of the fallacy of composition. Landlords collectively do not supply land. Nature and public works largely monopolize that function. Landlords collectively rather bid up the prices of titles to this land, above the reach of tenants. Thus they collectively create the need that as individuals they fulfill. ~~Individual function coupled with collective uselessness is the eternal ambivalence of the landlord class.~~ Individual usefulness coupled with collective dispensability is the eternal ambivalence, irony and tragedy of the landlord class. We are ill equipped to understand and cope with worldwide ~~land~~ reform movements, ^{like us} ~~and the~~ no more the resistance to them, without an appreciation of ~~the~~ both sides of this antinomy. To attribute tenancy solely to the financial weakness of tenants is

to hold, at least implicitly, an unforgiveably naive concept of the origin and determination of land values. Tenancy springs as much from the financial strength of landlords as from the weakness of tenants. It is the contrast of the two, not the absolute levels, ^{of either} which is essential. Any policy recommendation is doomed to frustration that ignores this basic relationship.

B. Land vs. other durable inputs

Why is leasing so much more common with land than with, for example, tractors? Because land is much more durable, so that its price-earnings ratio is much higher than for tractors --- say 20 as compared to three or so. But there is a difference of kind as well as degree, because tractors wear out while the ground is relatively permanent, and often even better than that, appreciating. So tractor prices must be reckoned low enough, normally, that imputable earnings will return both a yield and the initial outlay within the machine's brief life span. But land is priced so as never to return the initial outlay, ~~but~~ only a yield on it. Amortization of purchase must come from other funds.

For these and related reasons the ~~financial~~^{interest} burden of holding title to land is much heavier than the ~~financial~~^{interest} burden of financing less durable inputs. The financial cost of keeping a tractor is largely depreciation. In its later years especially, interest is negligible. The financial cost of holding land is almost all interest. Therefore the interest-elasticity of demand for land is much higher than for less durable investments. The spectrum of interest rates operates selectively. Low-i firms are pushed into land investments; high-i firms out of them. The contrast creates the need for tenancy of lands.

Permanent improvements like land-fill are, as far as (to be expanded)

C. The inadequacy of tenancy

While tenancy meliorates the differential capitalization problem by short-circuiting the money markets, it is at best a partial solution to the economizing problem thus posed. As landholdings grow larger than one man can handle, recourse to leasing

somewhat defers the advent of diminishing marginal returns to land, by virtue of decentralizing management. But the overpressed landlord cannot thus unburden himself of all participation in management, not if he wishes to secure much income from his land, and maintain its ~~xxx~~ physical condition. In fact, recourse to tenancy creates new management problems that do not exist before; the tenant-landlord relationships, and often the still more complex tenant-agent-landlord relationships. So while a landlord may put off the penalty of diminishing returns to scale of management, he cannot do so indefinitely.

If landlords generally were energetic about administering all their assets, and put little value on their own time and talent, they could collect rent from and oversee quite a few tenants without suffering seriously diminishing/marginal returns. No doubt there are those who do. But in general, landlords have many demands on their time, including the proper enjoyment of their rental incomes. The very reason for becoming and remaining a landlord is to secure a fairly certain income from surplus investable funds without having to make a career of administering them. Exhortation to landlords to dedicate more careful attention to rental contracts, therefore, is largely shouting into the wind. Administrative energy and talent are scarce and costly resources, not to be allocated to the details of landlord-tenant relations without recompense.

Tax theory recognizes an "excess burden" from indirect taxes, which cost taxpayers more than they gain the fisc. Rent theory needs to recognize an analogous excess burden in leasing. The tenant pays more than the landlord receives, the difference being imputable as "agent cost," either explicit or implicit. The tenant also suffers other costs that are not revenues to the landlord, as his short term lease precludes the long-term production planning that is essential to optimal improvement and use. These and related "excess burdens" of tenancy insure that leasing cannot entirely solve the problem posed by differential capitalization. A landlord cannot secure from leased land a net return as high as the marginal rent which his tenant could impute to the land were he, the tenant, ~~xxx~~ its owner-operator. And so a gap remains between the marginal rents

imputed to land on undersized and oversized owner-operations, a gap roughly commensurate with the excess burdens of tenancy. And the lands which are consigned to the perils of ~~the~~ operation by non-owners suffer under all the frustrations of the landlord-tenant relationship.

V. An alternative to tenancy: the effects of ad valorem real estate taxes on the allocation of land

It is widely recognized that leasing and lending are means to help move land assets from the tenure of those with more than they can manage effectively to the tenure of those with less. It is not so widely recognized, hence the more important to stress, that there is in our institutional baggage a third means to the same end. That is the ad valorem land tax component of the general property tax.

The ad valorem land tax is a fixed annual charge on land, based, assuming the assessor does his job, on the maximum latent rent, or opportunity cost, of each site, without regard to present use, user, or owner. It is, in the lawyers' expression, ad rem and not ad in personam, which is to say it is based solely on qualities of the land and not on qualities of individuals owning or operating it. ~~This is not a cost of holding title to land, it contrasts sharply to interest, since the latter charge varies among individuals and so creates the problems we have been discussing.~~ Regarding it as a cost of holding title to land, it contrasts sharply to interest, since the latter charge varies among individuals and so creates the problems we have been discussing.

There is a tendency to regard taxes as an additional burden heaped on top of others, adding to the total cost of holding title to land. From an individual and short run viewpoint this is true enough. But to transpose this attitude to social analysis of the effect of land taxes, as is oftentimes done by those who should know better, is again an egregious fallacy of composition betraying either callow innocence or temporary amnesia of the principles of tax capitalization. As ad valorem land tax rates rise, land values

~~****/p/~~

fall. The land tax burden is therefore not piled on top of the interest burden. Rather it tends to ~~dis~~place it as the prime cost of holding title to land.

The displacement of an interest charge that bears unequally by a tax charge that is ~~not~~ indifferent to individual credit ratings is going to have quite an impact on the allocation of land among firms. This substitution ~~will~~ makes it costlier for low-i landlords to hold land, and cheaper for high-i tenants, and for others with poor credit. It ~~will~~ reduces the capital barrier to landownership and displaces it with a more direct test of marginal productivity, to wit the willingness to pay an explicit annual charge. Thus it tends to reallocate land from the better financed to the land-hungry who impute to land a high marginal rent. ~~The point is illustrated numerically in Tables 1A and 1B.~~

The point is illustrated numerically in Tables 1A and 1B. Table 1A shows the effect on land price, V, of a constant annual ad valorem land tax of rate t, according to the formula

$$V = \frac{a}{i + t} \quad (4)$$

This is the standard textbook concept of tax capitalization. Table 1A shows the process of capitalization at several different interest rates. Note that capitalization proceeds faster at lower interest rates.

Table 1B shows the reallocation of land that occurs as tax rates rise. Whereas Table 1A assumes an annual marginal rent ("a" in formula #4) of \$1 for all parties, Table 1B assumes that Messrs. 2%, 4%, and 8% have, for the site in question, marginal rents of \$3, \$4, and \$5 respectively. With no taxes, Mr. 2% is easily the highest bidder, but as tax rates rise the bid shifts to Mr. 4% and finally to Mr. 8%

It follows from this analysis that society may short-circuit both the money markets and the leasing markets by heavy use of

Table 1A: Table of land values as determined by combined interest rates and tax rates, with annual net rent equal to \$1.

$$V = \frac{1}{i+t}$$

$t \downarrow$	$i \rightarrow$	.02	.04	.08
		Land Values in \$		
.00		50	25	~~12.50~~
.01		33	20	11.11
.02		25	17	~~10.00~~
.03		20	14	9.09
.04		17	~~12.50~~	8.33
.05		14	11.11	7.69
.10		8.33	7.14	5.56
.15		5.88	5.26	4.35
.20		4.55	4.17	3.57
1.00		.98	.96	.93

Table 1B: Bids for land as determined by combined interest rates, tax rates, and marginal imputable rents. The high bid is circled at each tax rate.

$t \downarrow$	$i \rightarrow$	.02	.04	.08
Rent $\rightarrow$		\$3	\$4	\$5
		Land Values in \$		
.00		(150)	100	62
.01		(100)	80	56
.02		(75)	68	50
.03		(60)	56	45
.04		(51)	50	42
.05		42	(44)	38
.10		25	(29)	28
.15		18	21	(22)
.20		14	17	(18)
1.00		2.94	3.84	(4.65)

ad valorem land taxation, squeezing most of the value from land titles and substituting tax costs for interest costs. This method has the advantage over leasing and lending of leading towards a complete equating of marginal rents among different firms, with no residual inter-firm barriers such as those that blemish the money and the rental markets.

It has a related but additional advantage of releasing for higher uses (over)
 The foregoing analysis applies of course only to so much of the general property tax as falls on land, [±] and that is assessed in practise as the law directs, on the latent productivity or opportunity cost of land. The part that falls on improvements (which includes that which is nominally levied on land but actually is increased when land is improved) has less wholesome effects, since the form and durability of improvements are alterable by the men who create and maintain them, and certainly will be altered with a view to avoiding taxes. The effect of such taxes on the character and quantity of improvements makes an interesting study. We are here concerned, however, solely with the effects on the allocation of land.

Taxes on improvements, as a rule, add more to the costs of those who use land more intensively, and so tend to dull the edge of the market's allocative incentives. The difference between high and low marginal rents imputed by more and less intensive users of land is diminished by these taxes. ^{*} (note, over)

Thus ad valorem taxes on real estate improvements add one more to the barriers obstructing an equimarginal allocation of land among firms. The overall effect of general property taxes as levied in most American jurisdictions today is therefore mixed. Taxes on the land component improve allocation; taxes on improvements worsen it. Whether the net effect is positive or not is not immediately obvious.

There is some reason to believe that the positive effects outweigh the negative, since the highest development of land is ~~associated with~~ ~~the absence of general property taxation~~ generally found in regions that rely heavily on property taxation. Some striking contrasts are to be made between for example the Anglo-Saxon colonial countries and the Spanish; between the Midwest and the Southeast of the United

also on truly permanent improvements like ^{some} land-fills. It would make good sense also to tax these, provided ^{as} they are truly indestructible, and ^{is} the incentive to produce ^{more of} them is retained by a policy of compensating the producers or their assignees before for the right to tax them.

States; between Denmark and England; and between the Irrigation Districts and the land and cattle baronies of our western states. ~~Analysis of~~ These contrasts suggest that property taxation is not the curse one would gather from the tenor of many references to it.

VI. Summary and conclusions.

~~A rehash.~~ To be expanded.

Finis