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CHAPTER III

Large Holdings and Small

I. Introduction

In Chapter II, for want of a better standard, we measured tenant farms up against owner-operated farms and found evidence suggesting that the marginal productivity of land tends to be lower on tenant farms. But that by no means implies that land is allocated among owner-operated farms according to the equimarginal ideal. These have measured up well only in the aggregate, and by invidious comparison with tenant farms. In this chapter we pursue further our evaluation of how the land market performs, by inquiring how economically it allots land titles as among different owner-operators.

As a standard of good economy we take, as before, the traditional equimarginal principle. According to the equimarginal principle the market allocates land ideally among different farms if the marginal product of an acre of land (of given quality) would be the same, to whichever farm it was added, or from whichever subtracted. Thus there would be no possible gain in shifting land from one farm to another. The land market is working well insofar as it approaches this ideal condition.

In practice, the market does not seem to approach very

near this ideal. The marginal product of an acre of land seems to vary greatly from farm to farm.

That is what one would expect from our analysis of the conditions that lead farm operators to become tenants. We have characterized the land market as a "tie-in sale". Some buy land primarily because they have funds seeking an investment in a claim to remote future incomes; others buy primarily for present use, and find it onerous to finance the title. Naturally these latter must economize on land very closely and limit their holdings to what will justify the high cost by adding a great deal to output. By contrast the former, the investors, are land-surfeited. Buying land chiefly as an investment for the remote future, they may lay field to field without much thought for the present. For them, the marginal product may be much lower.

Tenancy, you will recall, is a device that lets the land-surfeited investor transfer present use of land to land-starved operators. Thus in some degree it tends to equalize marginal products as between the groups. Indeed, if tenancy were a costless, frictionless relationship it could be the vehicle for creating a near-perfect land market. The land-surfeited would lease enough of their holdings to the land-starved to equalize the marginal products of land on their different operations. But, being what it is, tenancy only begins to solve the problem (as well as constituting a problem in itself); and so the market still leaves the marginal product

of land much higher on some owner-operations than on others.

This tie-in sale analogy not only suggests that the marginal product of land will be lower on some farms than others; it also suggests, in a general way, which farms those will be. The analogy implies that farms will come to differ markedly in size; and that land's marginal product will vary inversely with farm size, being generally higher on smaller holdings than on larger. For if an investor has more land than he can manage well the most frequent cause is probably that he has a great deal of land to manage. To be sure it may also be because he is incompetent, or pre-occupied with another profession, or with rest, recreation or revelry. But these are failings to which in general large holders are subject as much as, perhaps more than small holders. So in general, after due allowance for individual differences, the analogy clearly implies that the marginal product of land will tend to be higher on smaller holdings.

No one will care to deny, certainly, that the first implication is a fact. In 1950, the largest 2.3% of farm operations--measuring "size" by acreage--had 42.6% of the acreage, an average of 4,085 acres; while the smallest 36.5% had only 3.8% of the acreage, an average of 21.3 acres.[1] Or, measuring size by gross sales, the largest 1.9% sold 26.0% of the total, an average of $56,000; while the smallest 31.0% sold only 2.6%, an average of $432.[2]

Some idea of the great concentration is afforded by

comparing it with income concentration. Rather than present all the figures, we have computed "Lorenz concentration ratios" (henceforward "LCR") for income and for farm size. LCR is a measure of concentration which ranges from zero, when the distribution is completely equal, to one, when one farmer or one income recipient has all the land or all the income. It is explained in detail on page 179, below. Farm operations prove much more concentrated than income.

TABLE 1

Lorenz Concentration Ratios[3]

U.S. farm acreage (1950).....	.70	U.S. National Income (1952)	.40
U.S. farm gross sales (1950)	.68	Income of farm operator families (1946)	.42

But the contrast in farm sizes, great as it is, does not prove our contention that the marginal product of land tends to be higher on smaller farms than large. It is consistent with our tie-in sale explanation of how such a difference might come about, but does not prove it actually has come about. Possibly farm sizes differ for perfectly sound economic reasons, such as differences in land types, in managers' capacities, and so on. It is even conceivable that the marginal product of land is higher on larger farms, due to their greater capital and to economies of scale -- that is certainly a common opinion which deserves some acknowledgement.

There are, however, at least five basic indications that the marginal product of an acre of land tends to be higher on smaller farms. Taken separately, each of these five is very hard to reconcile with the idea of a perfect land market. Taken together they blend into a fuller portrait of a market in which the things traded--land titles--are indivisible in time, in which large investors tend to add land to their farms until the last acre increases output much less than it would on some smaller farm.

The five indications are these:

A. The range of farm sizes is very great, whether we measure size by area, land value or gross sales. While there are marked regional contrasts of farm size, it is not always the poorer lands that have the larger farms. The fact that some farmers have such an abundance of land in contrast to others who have so little suggests that an additional acre would be worth more to the smaller farmers.

B. The intensity of land use varies strikingly from farm to farm, and that not at random, but inversely with size, whether size be measured by acreage, land value, real estate value or gross sales. According to the principle of diminishing returns, that implies that the marginal product of land is higher on the smaller farms where it is more scarce relative to its complements.

C. Analysis of economies of large-scale operation suggests that the marginal product of an acre is higher when it attaches

to a small farm, with too little land to achieve those economies, than when it attaches to a larger one that has already achieved them.

D. Operating units, when divorced from ownership units, tend toward medium sizes. Ownership units, when divorced from operating units, tend toward extremes of large and small.

These facts suggest that when operating and ownership units are joined, as in an owner-operated farm, economies in financing ownership tend to pull owner-operations away from optimal operating scales, making some larger and others smaller; and hence that the marginal product of land is higher on smaller owner-operations, which are below optimum scale, than on larger ones, which are above it.

E. Finally, there is considerable direct evidence that the marginal product of an acre is lower on larger than on smaller owner-operations.

These five evidences, considered together, I believe are nearly impossible to reconcile with the idea that the market allocates land according to the equimarginal ideal. The contrast of size between the large and small farms is truly great, in terms of value as well as area. The larger owner-operations are much less intensively manned and equipped than smaller ones, and they are larger than what most analysts, as well as most tenant farm operators, consider optimum operating scales, in contrast to many small farms which are definitely

below the optimum.

These facts all mesh into one simple and consistent pattern, a pattern we describe formally in Chapter IV but which we have already foreshadowed by comparing the land market to a "tie-in sale". Facts and analogy both imply that the marginal product of land is generally higher on smaller than on larger farms.

But before presuming too much of the skeptical reader, let us establish that these five evidences are indeed true. We will consider them in order. In the following pages, we do not present out data in the form of experimental notes, nor take the reader up all the blind alleys we have blundered into, as in some realms of science is perhaps proper. We can only hope the reader will trust our word that we have stumbled, groped, doubted, tried and erred, reversed ideas, experimented, disproved our own preconceptions, sought contradictions, withheld judgment and generally suffered the mental anguish that becomes the true scientist.

The present chapter is designed to present the reader only the fruits of our labors, without all the agony -- he will doubtless say it is sufficiently tedious as is.

Being such, the style is frankly expository. Having come after long study to conclude that the land market is disturbed, in such wise that the marginal product of land is higher generally on small farms, the author has set out to demonstrate that to the reader as expeditiously and conclusively

as he can, not as the lawyer who is pledged to serve his client first, and serve truth only as truth may serve him; but rather as the geometer, who apprehends that a thing may be so, then sets out to demonstrate it as conclusively as he can.

II. Five indications that the marginal productivity of land tends to be lower on larger farms.

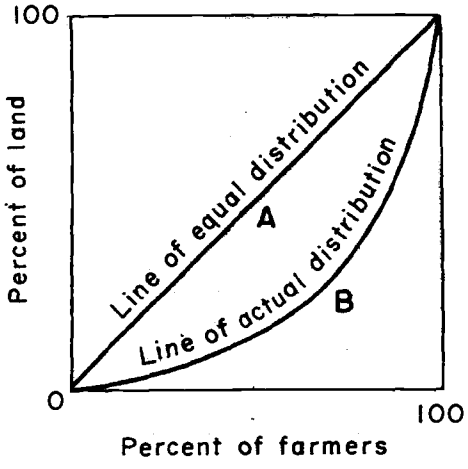
A. The range of farm sizes is immense, whether "size" be measured in acres or value.

1. Farm landholdings have become as concentrated in the United States as in many "backward nations".

Students of international affairs have long been aware, and in recent times more acutely so, that farm land in many foreign countries is inordinately concentrated, that the contrast between the few large and the many small farms is prodigious, and has proceeded far beyond anything that productive operating economies might dictate. And in this impression they are doubtless correct. But the idea is also current that in the United States, this last best hope of earth, conditions are entirely different, and vastly superior, so that one never mentions American land problems and foreign ones in the same breath.

If we go by Census data, however, the difference is not so great. Indeed, it is no longer always in favor of the United States, so concentrated has American farm land become in the last few decades.

As a convenient, unitary measure of concentration I propose to use the Lorenz Concentration Ratio (henceforward LCR).[4] That is, in figure 1, the ratio of area A to the area (A plus B).



"A" is known as the area of concentration. It is the area between the line of equal distribution and the Lorenz curve which shows the actual distribution. A plus B is the area of maximum possible concentration. LCR can conceivably vary between a lower limit of zero, when every farm has the same amount of land, to an upper limit of almost one, when one farm has almost all the land and all the other almost none.

According to the 1950 census, for U.S. farms grouped by acreage, LCR equals .70. Of a number of foreign countries for which data are readily accessible, Egypt, Brazil, Venezuela, and Chile are more concentrated, while Denmark, Sweden, Germany,

and Rumania are less concentrated. Table 2 gives the concentration ratios in ascending order.

TABLE 2

Lorenz Concentration Ratios
for Distribution of Farm Acreage[5]

Denmark, 1951	.47
Sweden, 1919	.54
Germany, "pre-1914"	.55
Rumania, 1941	.56
United States, 1950	.70
Egypt, 1940 (ownership units, Nile Valley only)	.75
Brazil, 1940	.80
Venezuela, 1936	.85
Chile, 1951	.93

As to Egypt, the data are for land holdings, not farm operations, and as we will see the concentration of farm operations is often less than that of farm land holdings by something like five points, the concentration of farm operations in the United States is quite comparable to that in the Nile Valley, at least numerically, and insofar as one may compare two such different areas. And of course concentration in the United States is evidently much greater than in Denmark, Sweden, Germany and Rumania.

To some extent, perhaps, the high concentration shown in the United States data relative to foreign data is due to our country's great size and consequent diversity, with Nevada ranches and eastern suburban truck farms in the same set of

figures. Taking the state of Iowa, an extraordinarily uniform area, LCR equals only .35.[6] But on the other hand, California, which resembles Chile very closely in the kind and diversity of its natural endowment, has an LCR of .86,[7] more than for the entire diverse United States, and too close for comfort to Chile, whose lands are reputed to be as concentrated as any in Latin America. We should not be hasty to conclude, therefore, that the high concentration of farm acreage in the United States is due solely to the unusual size and diversity of the country. From the lowest to the highest, average land values per acre in major United States regions in 1940 ranged only from $7.45 in the Mountain region to $41 in the Pacific region.[8] There was far greater diversity within each major region than among them.

As it is not our present purpose to settle that matter, we leave it moot. The present point is this. It is certain that American farm land has now become so concentrated as compared with foreign countries that the difference, if any, in favor of the United States is only one of degree. The concentration of American farm land has become of the same order as that in some of the backward nations where so many of our travelling economists and State Department representatives have named land concentration as a chief obstacle to economic, not to mention political, development.

2. Farm land holdings are probably at least as concentrated by value as by area.

We have seen that the concentration of farm land, where "land" is measured by acreage, is very high. It is natural to believe, and many people do believe that this concentration is only specious, due to the very different values of different lands, and would disappear if land were measured by value rather than acreage. And it is true that the average value of land per acre falls with size of farm, for the United States as a whole. But it does not follow from that that if we measured concentration by value rather than acreage it would be less. For of course not all those farms which appear among the largest, say, one per cent when farms are ranked by acreage, will be there when they are ranked by value. But many farms in lower acreage groups will move into the top value groups. So it is still quite possible that concentration is as great by value as by acreage.

That, of course is simply an obvious and elementary statistical possibility. But is it a fact? Unfortunately the U.S. Census does not now, nor has it to my knowledge ever published data on U.S. farms grouped by value of land, or by any combination of assets including land (although it does collect data which it could group that way). We must therefore proceed by indirection. Of the many questions we might ask to test the case, there are data available to answer at least five:

a. Does land value per farm rise appreciably with acreage per farm?

b. Are there many regions within which acreage values are higher on larger than on smaller farms?

c. Are there many poor-land regions where farms are smaller than in many rich-land regions?

d. Are there any data comparing concentration of land value and land acreage over substantial areas? Do they show value more concentrated than acreage?

e. Are there data on the concentration of farm output? Is that at all as concentrated as acreage?

To all these questions the answer is "yes". Taken as a whole, the following data seem to warrant concluding that United States farm land is at least nearly as concentrated by value as by acreage.

a. Does land value per farm rise appreciably with acreage per farm?

Between the most and the least valuable farm land there is a vast range, from thousands of dollars an acre down to marginal land worth nothing. But between the smallest and the largest groups of farms there is no such range. For 1940 (last year for which the census separates land from building values), acreage values of land and improvements (other than buildings) ranged from $155.90 for 3-9 acre farms down to $4.79 for farms of 10,000 acres and over.[9] As the 3-9 acre group contained many rurban and even suburban places, and others where improvements other than buildings (e.g. fruit trees) made up a high percentage of the total value, it is

probably more accurate to begin the comparison with the 20-49 acre group, for which the average acreage value was $41.56. But in either case the range of values is much less than from the best to the worst land. Clearly the vast range of farm acreages results from more than the familiar fact that it takes more acres of sagebrush than of celery bottoms to support a family.

The value of land per farm increased greatly with acreage. The 27,235 acres in the average farm over 10,000 acres were worth $130,000, or 150 times more than the $868 in the average 3-9 acre farm, and 34 times more than the $3,811 in the average American farm.[10]

Now let us grant that many of the farms over 10,000 acres are on the poorest land and are, in terms of value, only small farms. It then follows that some of the other farms over 10,000 acres must be very valuable, to raise the group average 34 times over the national average; and some of them must contain good land, to bring the group's value per acre up to $4.79, well above the vanishing point, and 22% as high as the national average acreage value of $21.90.

b. Are there many regions within which acreage values are higher on larger than on smaller farms?

i. Data by states

There were in 1940 at least nine states in which the acre values of land and improvements (other than buildings) were higher for all farms over 1,000 acres than for all farms, as follows in table 3:

TABLE 3

Average Values Per Acre,
Land and Improvements
(other than buildings), 1940.[11]

State	All Farms	All over 1,000 acres
Massachusetts	$47	$49
New York	24	34
New Jersey	58	74
Pennsylvania	25	51
Ohio	37	58
Delaware	30	70
Kentucky	26	37
Mississippi	18	21
Arkansas	19	26

In addition there were several states where farms over 1,000 acres had average acreage values almost as high as all farms. Indeed, the only states where it was markedly otherwise were Florida and states west of the 100th meridian. In the eastern and central states value per acre did not generally fall much or at all with acres per farm.[12]

Now of course, in a state where average values per acre are about the same for different size groups, concentration of land value is not merely as great as concentration of land area; it is surely somewhat greater. For it is at least as great, even when the farms are grouped by acreage, by which groupings some low value farms on cheap land find their way

into the top groups, and some high value farms on smaller acreages of dear land find their way into lower groups. When they are regrouped by value instead of acreage the concentration of value will be notably greater.

By the same reasoning, even in states where average acre values are considerably lower in the larger acreage groups, concentration may be greater by value than by acreage. Of course there is no knowing without actually regrouping the original data, farm by farm, by value instead of acreage. That feat lies only within the power of the Census directors, or Congress. But from the data available it is plausible that within most of the eastern states concentration is greater by value than by acreage.

ii. A possible amendment to Census data on southern plantations.

In some areas, notably the southeast, the Census enumerates as separate farms small areas assigned to tenants on large plantations. These are generally on valuable land. There is some dispute as to whether these small tracts are really independent "farms" or parts of larger integrated operating units (there is no dispute but what they are parts of very large title-holding units). The truth probably is they are a little of both. At any rate, it is of passing interest to note that if one takes, as the Census does, the small cropper acreage as the "farm", the resulting data show lower acreage values in larger "farms". For the title-holder generally leases

out the better lands in small units, and keeps a large acreage of somewhat less valuable land for his own demesne, or "home farm". In 1910, the year when the Census gave data on southern plantations, acre values were $16.27 for the landlord's demesne and $22.71 for his tenant farms. But if the Census were to take the "plantation", the title-holding unit, as the "farm", the resulting data would show higher acre values in larger farms (table 4):

TABLE 4

All Tenant Plantations,
325 Selected Counties in
11 Southern States, 1910.[13]

No. of Tenants	5-9	10-19	20-49	50 & over
Average Acres per Plantation	495	953	1,688	3,535
Average Value per Acre (of both tenant and landlord operations)	$18.84	$19.64	$21.13	$24.33

From these data it follows that if the Census chiefs regrouped data on farm size with the plantation, rather than the cropper's 40 acres or 50 as the "farm" unit, they would find: (a) A higher per cent of the acreage in the few largest "farms"; and (b) A higher average acre value in the larger "farms", and a lower one in smaller "farms", than present

data show.

That is not to say the Census should take the plantation as the operating unit, without qualification. It is a complex situation. We simply conclude that present Census data, taking the cropper unit as the "farm", should be taken with a certain qualification in light of the fact that the cropper units are not completely independent "farms" in the usual sense of the word; and such qualification would increase concentration by acreage, and also increase acre values of larger farms relative to smaller farms.

iii. Data on different types of corn belt farms.

When corn belt farms are grouped by type, the following contrasts appear (Table 5):

TABLE 5

Averages for all Commercial Family-Operated Farms, 1944[14]

Type of Farm	Average Acreage Per Farm	Average Value Per Acre (Land and Buildings)
Cash grain	230	$152
Hog-beef fattening	210	104
Hog-beef raising	177	63
Hog-dairy	140	100

The cash-grain farms are larger in acres and have a higher value per acre. The contrast in land values alone is doubtless greater than the data, which are on land and buildings, show. For cash grain farms, without livestock, need fewer buildings per acre than the others.

These data are by no means comprehensive or conclusive. They show only that, for a large number of farms in the most productive farm region, higher acre values go with larger acreages. They are typical of a great deal of similar fragmentary data that one might accumulate.

iv. England in 1895

Data for England in 1895 happen to be easily accessible in Levy's "Large and Small Holdings".[15] Judging land value by the percentage of arable to total area, it increased vastly with size of holding, as follows in Table 6: (The English "holding" is the ownership rather than the operating unit. Hence these figures are not strictly comparable to American data.)

TABLE 6

Per Cent of Arable to Total Area in Farms in Various Size Holdings, England, 1895.[16]

Acres	Per Cent of Arable to Total Land in Farms
1-5	26.9%
5-20	24.7
20-50	33.3
50-100	42.5
100-300	47.9
300-500	53.1
500-1,000	58.1
1,000- & over	53.9

In sum, then, there are indeed substantial areas over which acre values increase with farm acreage.

c. Are there many poor-land regions where farms are smaller than in many rich-land regions?

There are many such regions, and many scholars have directed attention to them. Ackerman and Harris, in their "Family Farm Policy," write:

> In many areas, however, particularly in the hill sections of this country and in other poor agricultural land areas, untold thousands of farm families seek to derive a meager subsistence from inadequate units. .... This situation is appalling even when the number of part time farms is discounted. 17

They list three such poor-land areas as most outstanding:[18]

> "the intermountain region centering in Utah and southeastern Idaho";
>
> "the Ozark highlands of Missouri and Arkansas";
>
> "the southern Appalachian area and adjoining areas".

As to the first of these areas, Lowry Nelson has gathered much socio-economic data from it. Of Ephraim, Utah, which he takes to typify many poor-land areas in the Mormon country, he writes:

> Even when large areas of grazing land are included in the total acreage, the average holding was less than 150 acres, which is not high enough for optimum results. In fact, it is difficult to see how Ephraim farms could operate economically with these small average holdings. 60% of the farms had less than 50 acres of irrigated land. Nearly 80% had less than 75 acres. This would

> not be serious if the farmers had an intensive system of agriculture, but the fact is that they had a very extensive system. Except for a relatively small acreage of canning peas, the farmers grew alfalfa, wild hay, wheat and oats as the main crops. 19

As to the second area, the Ozarks, in 1935 Hammar and Muntzell computed the number of acres per male worker over ten years old for areas of Missouri ranging from the best to the worst lands. On the best, they found 88 acres per worker; on the worst, only 51.[20]

As to the third, the southern Appalachian region, the pattern of large plantations in the lowlands and smaller diversified farms in the Piedmont and uplands is basic to southern life and culture, and rarely escapes mention in any history. W. J. Cash writes:

> The weaker elements which, having failed in the competition of the cotton frontier, or having perhaps never entered it, were driven back inexorably by the plantation's tendency to hog the good cotton lands into a limited number of large units, to the lands that had been adjudged as of little or no value for the growing of the staple. 21

Of ante-bellum Virginia and Maryland the historian Craven said:

> The small diversified farmer differed from the great owner only in the size of his undertakings and in the size of capital invested. He was, as a rule, on poorer land and his task of improvement was heavier. 22

And in 1936, A. F. Raper concluded from his studies of Greene and Macon Counties in Georgia:

> With occasional exceptions, the large holdings have always been found on the most fertile soil. 23

Other interesting southern regional contrasts were brought out in T. J. Woofter's well known 1936 study of large southern cotton plantations.[24] Several regions, such as the Upper Piedmont and the Muscle Shoals, had smaller plantations and also lower acre values than several other regions, such as the Arkansas and the Red River bottom lands. The greatest contrast was between the Upper Piedmont and the Red River (Table 7):

TABLE 7

Acre Values and Plantation Sizes for a Sample of Large Plantations, 1936.[25]

Region	Average Plantation Acreage	Average Acre Value in Plantations
Upper Piedmont	437	$21
Red River	901	54

Probably the most telling contrast of all is that which Carter Goodrich has pointed up between twenty rural, non-mining counties of eastern Kentucky and the state of Iowa. In the Kentucky counties, in 1930, the average farm contained 76.7 acres, while the average Iowa farm contained 158.3 acres. Yet the Iowa land and buildings were worth $124 an acre, compared to a mere $21 in the twenty Kentucky counties.[26]

Aside from these outstanding areas there are many others between which the contrast is more subtle, but nonetheless substantial. Southern Illinois and Indiana, for example, are

well known locally as areas of smaller farms and poorer soils than the central parts of those states, a fact which evoked some comment in the Census of 1910.[27] Stanley Hamilton and Daryl Parker of the Rural Life Association have focussed attention, too, on the contrast between Benton and Elkhart counties, Indiana. In Benton, on the Illinois border, land and buildings in 1950 were worth on the average $209 an acre, and the farms averaged 224 acres. In Elkhart, on the Michigan line, values averaged $160 an acre, and farms averaged 87 acres.[28]

It lends some generality to these observations to note similar contrasts between similarly contrasting regions in foreign countries.

In Rumania, according to Roberts,

> Agricultural population was densest in the poor mountainous areas ....; the land is poor and much of it unsuitable for cultivation; the pressure of population has forced the multiplication of dwarf holdings; 29

Table 8 gives data on the regions of Rumania, listed in order of the percentage of agricultural surface which is arable. (See page 194.)

The contrast of farm sizes is even greater than the contrast of population densities, because in the better areas like Dobrogea much of the agricultural population are hired workers.

Raymond Crist often writes of a similar pattern in Venezuela.[30] Leslie Gay, having digested many such studies

TABLE 8

Population and Quality of Land,

by Regions, Rumania, 1941.[31]

Province	Agricultural Population Per 100 Hectares of Agricultural Surface	Per Cent of Agricultural Surface Which is Arable
Moldavian Carpathians	113	74%
Muntenian and Oltenian Carpathians	121	76
Bucovina	108	86
Plain of Siret and Pruth	88	89
Transylvanian Plateau	98	91
Danube Plain	90	92
Western Transylvania	84	94
Dobrogea	49	97

of particular South American countries, ventures to generalize the pattern for the whole continent. He writes "...the best lands are concentrated in the hands of a few owners. From this it follows that the majority of properties are extremely small and located on marginal or sub-marginal land."[32] Only the "areas of Latin America which had no mineral wealth, no large Indian population and little arable land were ignored by the Spaniards, and the small native owner or communal Indian farms continued."[33]

Another such contrast, of which Doreen Warriner has appraised the Anglo-Saxon world, is that between the teeming hills of Lebanon and the rich but fruitless plains of Syria.[34]

In the Philippines one area especially noted for poor land and dwarf farms is Ilocos Province (Norte and Sur), in northwest Luzon.[35] The rural population in 1948 was about 4.67 persons per hectare of farm area, with most persons on independent farms. Near Manila, by contrast, in flat, fertile Bulacan province, there were 3.89 persons per hectare of farm area, many of them hired workers on large farms.[36]

In Sweden, according to Rudolf Freund,

> Assuming that the relative amount of tillable land indicates the quality of all land contained in a farm, we have to infer that the smaller Swedish farms are more likely to be found on poor land than on good; conversely, the full-fledged family farms and the estates seem to operate on better quality soils.
>
> All this suggests that Sweden's agriculture is burdened with an oversupply of labor crowded into too many farming units of insufficient size; this seems particularly true for the poorer sections of

> the country. ....this phenomenon is quite familiar to students of agriculture on both sides of the Atlantic Ocean...." 37

(Note that his statement applies to tillable land only. Poor pasture and woodland was often held in large units.)

In sum, there are hill people in humid and even some arid regions in the United States, and around the world, as to whose plight Al Capp's famous caricature of Dogpatch, Kentucky is not entirely misleading. Their farms are small, their land is poor, and their numbers legion.

d. Are there any data comparing concentration of land value with concentration of acreage, over substantial areas? Do they show value more concentrated than acreage?

The only such data I find for the United States concern the ownership of rented farms in 1900 -- and there is also a rather unsatisfactory sample study of the same subject for 1920. Both studies show higher concentration by land value than land area (Table 9):

TABLE 9

Lorenz Concentration Ratios,
Distribution of Ownership of Rented Farms,
United States, 1900 and 1920. 38

	1900	1920
By acreage	.53	.47
By land value	.62	.58

(Caution: The data do not indicate that concentration decreased from 1900 to 1920. The 1920 sample was collected in such a way as to understate concentration by (a), excluding lands held outside certain sample counties and, (b), failing to attribute separate tracts of one owner to just the one owner. The 1900 data had neither of these defects, and therefore show more concentration. As a matter of fact, it is likely that concentration increased from 1900 to 1920. Cf. Section III, below.)

Note that these data are for title-holding units, and not, like other Census data, for operating units. They do not therefore prove beyond a doubt that farm operations were or are more concentrated by value than by acreage. They merely establish a presumption that that is so, in the absence of contrary or qualifying evidence.

In fact, however, we must qualify the evidence, before inferring anything from it about the value-concentration of operating units. For very large title-holding units are more apt than very large operating units to be on good land.

We have already seen that was true of southern plantations in 1910 (above, pp. 187-188 in this chapter). As to the 1900 data just presented, it is also true that acreage values fell less from small to large rented farm holdings than from small to large operating units (Table 10):

TABLE 10

Average Land Values Per Acre,

By Acreage of Farm, 1900.[39]

(Computed from Census of 1900)

Acreage in Unit	Rented Farms, Title-Holding Units	Per Cent of $32.36	All Farms, Operating Units	Per Cent of $23.25
Less than 100	$32.36	100.0%	$23.25	100.0%
100-499	27.32	84.4	18.58	79.9
500-999	19.99	61.8	11.84	50.9
1,000 and over	11.61	35.6	4.86	20.9

In other words the value per acre of the largest title-holding units was much nearer the smallest than was true for operating units. Clearly the chances that all farms are more concentrated by value than by acreage are not as good as the chances that landlord holdings are.

We do not conclude, therefore, that concentration of farm operations is necessarily greater by value than by acreage. But we do observe that landlord holdings were more concentrated by value than by acreage in the only years they were studied, even though acre values fell markedly with farm size. We observe

that, for operating units, acre values fall more with size, but only moderately more. We conclude, therefore, that farm operations are probably at least nearly as concentrated by value as by acreage.

In addition to these fragmentary American data, to my knowledge one foreign country, Denmark, published complete data on the concentration of all farms, by both area and value. There, in 1953 concentration was definitely greater by value than by area--.52 as opposed to .47.[40] On the other hand, incomplete data from Spain suggest that there it may be the opposite, but not markedly so, and perhaps not so at all if the figures were for land values free of improvements.[41]

e. Are there any data on concentration of farm output? Is output at all as concentrated as acreage?

There are such data, for 1950. For gross farm sales, LCR equals .68,[42] not a great deal less than for acreage, which is .70.

Later in this chapter it is shown that the ratio of gross sales to land value tends to be much less on larger than on smaller holdings, due to the much greater ratio of men and capital to land value on smaller holdings. The difference of ratios is the more important where gross sales is the measure because the contribution of capital is not only that element of output corresponding to the interest cost, but also the generally much larger element corresponding to the depreciation

or turnover cost. None of these costs, nor any labor cost either, is deducted in computing gross sales. The gross sales measure therefore greatly magnifies small landholdings relative to large.

On the other hand, the gross sales figure takes no account of home consumed output, nor of non-pecuniary satisfactions, both of which are more characteristic of smaller farms.

On balance, however, the gross sales criterion of size would probably magnify the smaller farms, for the reasons first mentioned. And so it seems likely that an LCR of .68 for gross sales indicates a higher LCR for land values.

To sum up, we have established five points:

a. Acre values fall much less from the smallest to the largest holdings than from the best to the worst lands;

b. In many states acre values increase with farm size;

c. There are many poor land areas of small farms compared to many richer land areas of larger farms;

d. Landlords' holdings of rented farms in 1900 and 1920 were more concentrated by value than acreage, even though acre values fell with size almost as much as they fell with size for all farm operations.

e. Gross farm sales in 1950 were almost as concentrated as acreage.

Taken together, these facts establish as reasonably certain that farm operations are about as concentrated by

land value as by acreage; that the apparent great contrast between the many dwarf and the few giant farms is not a mirage, but a true picture of American agriculture.

In concluding, one further fact is important. Owner-operations, about which we are presently most interested, are appreciably more concentrated than all farms taken together. For tenant farms, as we will see in point D, below, tend toward medium sizes, in contrast to owner-operations which tend more toward extremes of large and small. The actual contrast of the large and small owner-operations, therefore, is greater than any of our data show.

B. Larger farms tend to be much less intensively manned, improved, and equipped per dollar of land value. According to the principle of diminishing returns, that implies that the marginal product of land is higher on the smaller farms where it is more scarce relative to its complements.

1. Facts.

Our characterization of the land market as like a tie-in sale has led us to expect a lower marginal product of land in large than small holdings. The reasoning is that affluent persons, buying land titles primarily as an investment for the future, tend to accumulate more land than they can or will manage very intensively in the present; while on the other extreme, impecunious young entrepreneurs try to substitute labor and shorter lived (hence easier financed) capital for land as much as feasible. Hence the small holders generally

use smaller proportions of land to labor and capital than larger holders.

Let us emphasize this by no means implies that every larger holder uses land less intensively. There are men of extraordinary stamina and skill for whom 1,000 good acres are still too few to exercise their genius. On the other hand there are heiresses, dabblers and idlers with very small holdings that are still too much for them. Let no one suspect we are paving the way to advocate fiat acreage limitations, as though everyone were or should be cast in the same mold. But in statistical aggregates exceptionally industrious large holders are offset by exceptionally slothful ones, and all swallowed up in the group average; and so for the small holders. And a clear general pattern emerges: larger holdings in general are less intensively used.

If that is indeed the pattern it should manifest itself in farm income's being less concentrated than farm land. For if the smaller farmers use more labor and capital per dollar of land value they will obviously receive a higher share of farm income than they have of farm land, and vice versa for the larger farmers.

The fact is, the income of farm operator families is much less concentrated than the land in their farms. For farm area in 1945 LCR was .70, and concentration by value was surely not much, if any less. But for farm operator income in 1946, LCR was only .42.[43] That means, for example,

that the smallest 36.5% of the farms by area had only 3.8% of the land area; while by contrast the lowest 39.4% of the farms by income had 16.8% of the income. On the large side, the largest 5.7% of the farms by area had 53.5% of the land area; while the highest 6.6% of the farm operator families by income had only 25% of the income.

Part of those differences, to be sure, are due to the fact that larger farmers hire more of their labor done; and so an appreciable part of the income of the larger farms is not included as part of the income of the operator families of those farms. On the other hand, smaller farmers are inclined to hire more of their machine work; but even so, we cannot take these data as conclusive in themselves, although they are presumptive, and certainly spur us to look further. Fortunately there are ample direct data to establish that the proportion of land to labor and capital increases greatly with farm size. We will consider first labor and then capital.

a. Labor per dollar of land falls as size of farm rises.

It will surprise few people to learn that smaller farms use higher proportions of labor to land than do large farms. But the degree of contrast that now obtains in American agriculture must impress the most sophisticated connoisseur of statistics. We will present data grouped, first, by acreage; second, by gross sales; and, third, by region.

i. Labor per acre falls as farm acreage increases,

even in areas where value per acre does not fall.

That labor per acre falls as farm acreage increases has meaning only if acre values do not fall, or at least not as much. We cannot be certain that values per acre did not fall with farm size in the scattered sample area which J. A. Baker used in his 1939 Corn Belt study. However, he found that, for owner-operated farms, the number of persons per 100 acres fell from 15.0 for farms under 50 acres to 1.3 for farms over 370 acres.[44] And the per cent of land in pasture fell from 47% to 35% which even suggests -- but does not prove -- that the smaller farms were of less value per acre.[45]

A 1946 study in northwest Illinois produced the following (Table 11):

TABLE 11

Labor Cost Per Acre, By Size of Farm,

For 238 Accounting Farms in Northwest Illinois, 1946[46]

Acres per Farm	Annual Labor Cost Per Crop Acre (including operator and family)
Less than 121	$25.70
121-200	19.83
201-280	17.05
281-360	14.57

Another area where acre values rise with farm acreage is England (above, p. 189). It would therefore be significant

to find there less labor per acre on larger farms. In 1908 the Land Enquiry Committee collected these figures for all English farms (Table 12):

TABLE 12

Farm Size and Labor Force, England, 1908[47]

Size of Holding	Number of Males Permanently Employed Per 100 Acres
1 to 5 acres	8.0
5 to 50 acres	4.3
50 to 300 acres	2.5
Over 300 acres	2.3

ii. Labor per acre falls as gross sales rise.

To those foregoing data, grouped by acreage, some may protest. The proportion of labor to land will naturally vary moderately from farm to farm for perfectly sound economic reasons, if no others. Those wise in the ways of statistics will observe that, when we take, as the sole criterion of farm size, land alone, either by acreage or value, then of course the farms of those managers who have substituted land for labor will appear in larger size groups, and have less labor per acre. But if we had chosen labor as the criterion of farm size, those managers who had substituted labor for land would appear in the larger size groups; and they would have more labor per acre. Or, in the conventional

statistical terminology, the regression of land on labor (where correlation is positive and labor is on the ordinate) is steeper than the regression of labor on land.

Unfortunately there are no data on farms grouped by numbers of laborers. But those still wiser in the ways of statistics will reply that when the relationship is as regular as in our data the regression of land on labor would not be much steeper than the regression of labor on land. And, as the proportion of labor to land falls greatly as acreage increases, there is no chance that the proportion would rise with size if labor were the criterion of size.

However, lest any reader suspect us of proving a point by sheer statistical prestidigitation, let us look at some data grouped neither by land nor labor, but by gross sales. Gross sales is a measure of size which, with all its faults, is at least neutral as between labor and land -- both contribute to gross sales. When farms are ranked by gross sales, as in the 1950 Census, the larger ones are strikingly more land-intensive. (Table 13) See page 207.

iii. Regions of poor land and small farms have more labor per acre than many regions of richer land and larger farms.

The matter often wears a regional aspect. Generally, the previously mentioned regions of small farms on poor soil are regions of dense rural population. Many observers have marked the seeming maldistribution of people relative to

TABLE 13

PROPORTIONS OF LABOR TO ACREAGE ON FARMS RANKED BY GROSS SALES, 1950.[48]

Class of Farm	I	II	III	IV	V	VI	Other
Definition	$25,000 or more	$10,000-24,999	$5,000-9,999	$2,500-4,999	$1,200-2,499	$250-1,199	(Part time residential abnormal)
Per cent of land in farms	21.6	18.6	18.5	14.5	9.5	5.2	11.9
Per cent of all farm labor	7	11	17	18	16	11	21
Index of labor-land ratio, based on Class I equals 1.0	1.0	1.8	2.8	3.8	5.2	6.6	5.5

resources. T. N. Carver has dubbed it the problem of "our congested frontier". More accurately, perhaps, it is a problem of congested marginal lands in all regions, backwaters as well as frontiers.

Carter Goodrich computed that in twenty non-mining counties of eastern Kentucky, as compared to Iowa (in 1930), there were 2.5 times as many people per farm acre, and 14.9 times as many per $1,000 of farm real estate value.[49] Of course the Kentucky farms were much smaller (above, pp. 191-192).

Stanley Hamilton's 1950 contrast of Elkhart and Benton counties shows in Benton, with its larger farms, 2.8 times as many acres per head of rural population, and 3.6 times as many dollars of real estate values.[50]

In the hills of southeastern Oklahoma the soil is poor, the population dense and the farms small relative to northwestern Oklahoma, according to a 1938 study of the Oklahoma tax commission.[51]

In many foreign lands, too, one finds a similar pattern. To mention some examples:

Rural population per 100 acres of farmland is 48 in Greece and 42 in Yugoslavia, both mountainous countries of poor soil, compared to 24 for Hungary, with its flat and fertile plain.[52]

In Indo-China, the recent unpleasantness has brought

for a brief moment to world attention that Cochin-China (around Saigon) is a very rich land and, relative to the Red River delta (around Hanoi), thinly peopled. And the Red River delta is an area of smaller farms than Cochin-China.[53]

In Germany the larger Junker east Elbian estates have long supported fewer people per acre than the small farms of south and west Germany.[54]

And finally, as we have seen, in Rumania small Carpathian farms support more people per acre than the plains; minifundia in the Lebanese hills support more people per acre than the latifundia on the Syrian plains; and the minute farms of Ilocos teem with Filipinos compared to the large estates near Manila. (above, pp. 193-195).

b. Capital intensity also falls as farm size rises.

i. Farms ranked by acreage, and capital intensity measured by ratio of capital to land value.

If it surprises few readers to learn that larger farms use little labor per acre and per dollar of land value, it may surprise quite a few to learn that they also use less capital: buildings, livestock, implements and machinery. To be sure, the better advised advocates of large farms know it, and commend large farms for it on the grounds that they produce more per dollar of capital -- an argument we consider presently. But many otherwise well-informed persons feel differently. It is probably the fact that larger farms use more capital per farm, and are owned and operated by men with greater total

means and better credit ratings -- men often loosely called "capitalists" -- that leads these persons to believe larger farms are capital intensive. Whatever the reason, the error dies hard. In 1952, for example, the Commonwealth Club of San Francisco, a group of business and professional men who meet to study vital public issues, polled themselves on the question "Does high capital requirement per acre encourage large or small farms?" They voted 48-24 for large.[55]

But nothing is so easy to demonstrate as that larger farms use less capital per acre and per dollar of land value than smaller ones. From 1900 to 1940 the United States Census published data on land and building values by size of farm. In 1940, for farms under 3 acres, farm buildings were 222.2 per cent of land value. The percentage fell steadily to 13.6 per cent for farms of 1,000 acres and over -- a phenomenal contrast, which would doubtless be even greater were the "land" value data for bare land without improvements other than buildings. Implements and machinery fell, not so steadily nor so much, from 26.4 per cent to 7.7 per cent of land value. (They would probably fall more were full account taken of custom work, but it is not clear just how the Census deals with this problem.) See Table 14, p. 211.

The same fact manifests itself in a contrast between the capital intensity of different tenure groups. The larger the average acreage for the tenure group, the less capital intensive its operations (Table 15):

TABLE 14

Land, Buildings, and Implements and Machinery;

Average Values Per Acre; by Size of Farm, 1940.[56]

Size Group	Land	Buildings	I & M	As %s of Land Value Bldgs	I & M
Total, U.S.	$ 21.90	$ 9.81	$ 2.88	44.8%	13.1%
Under 3	728.00	1,618.00	192.00	222.2	26.4
3-9	156.00	225.00	22.00	144.2	14.1
10-19	79.00	69.00	8.85	87.3	11.2
20-49	41.00	28.00	5.00	68.3	12.2
50-99	30.00	19.00	4.59	63.3	15.3
100-174	29.00	15.00	4.54	51.7	15.7
175-259	30.00	13.00	4.36	43.3	14.5
260-499	26.66	8.34	3.44	31.3	12.9
500-999	18.50	4.50	2.28	24.3	12.3
1,000 & over	8.29	1.13	0.64	13.6	7.7

TABLE 15

Capital Intensity and Average Acreage per Farm for Different Tenure Groups, 1940.[57]

Tenure Group	Average Farm size (acres)	Values Per Acre ($)			Values Per Acre, Ratios to Land Value	
		Land	Bldgs.	Impl. and Mach.	Bldgs. + Land	Impl. & Mach. + Land
Full Owners	124	$24.08	$15.95	$4.52	66.2%	18.8%
Tenants	132	25.39	9.20	3.78	36.2	14.9
Part Owners	488	15.60	4.75	2.21	30.4	14.2
Managers	1830	16.55	5.13	1.49	31.0	9.0

In the specific area that concerned the Commonwealth Club voters, the Southern San Joaquin Valley, Karl Lee concluded from AAA data on intensity:

> The intensity of land use for the various types of farms generally decreased as the size of farm increased. ....
>
> The variation in intensity is not explained by variations in quality of land because there was considerable variation in intensity of land use on farms of the same type and on the same land class but of varying size. [58]

Another outstanding slip was that of Hermann Levy, who wrote of "Large and Small Holdings" in England in 1911. Said Levy: "In a word, it was the intensive application of capital which made the large farm the pattern of arable farming"[59] Levy also provides his own refutation, in these data (Table 16):

TABLE 16

Horses Kept per 100 Acres,

And Per Cent of Arable Land,

By Acres in Farms, England, 1885.[60]

Size of Holding (Acres)	Horses Kept Per 1,000 Acres	Per Cent of Land in Holdings Which is Arable
1-5	7.4	26.9%
5-20	5.6	24.7
20-50	5.3	33.3
50-100	4.9	42.5
100-300	4.3	47.9
300-500	3.8	53.1
500-1,000	2.3	58.1
1,000 & over	2.6	53.9

In that age, of course, horses were a very important component of the farmer's capital, and surely in rough proportion to the implements they drew and the structures that sheltered them. As to farm buildings, the English Land Enquiry Committee of 1913-1914 reported: "A small holding of twenty to thirty acres entails an expenditure of two, three or even four times as much per acre for improvements in the way of buildings, as a large farm ...."[61]

ii. Farms ranked by gross sales.

Lest any reader suspect that the conclusions might differ if something other than land were the criterion of size, let us look at 1950 Census tabulations which take gross sales as the criterion (Table 17):

TABLE 17

Per Cent of Acreage, and of Various Capital Items, In Farms Ranked By Gross Sales.[62]

Class of Farm[1]	I*	II	III	IV	V	VI	Other**
% of land	21.6	18.6	18.5	14.5	9.5	5.2	12
% of tractors	7.7	18.4	25.4	20.9	12.4	4.4	10.8
% of autos	4.8	11.6	18.4	18.6	14.5	7.3	24.7
% of motor trucks	8.9	16.1	19.8	17.2	13.2	6.7	17.9
% of cattle and calves	17.1	20.3	23.2	17.5	10.3	4.6	7.1
% of hogs and pigs	8.0	24.3	24.4	17.8	9.9	4.7	6.9
% of chickens over 4 months	6.0	16.0	23.3	19.8	13.5	7.5	13.8

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[1]For definitions of classes, see Table 13, above.

*Largest class.

**Smallest class. For class definition, see Table 13, above, p. 207.

It is altogether remarkable that these data should show the larger class farms so much more land intensive than smaller class farms; for gross sales, as a criterion of size, is strongly biassed against such a result. That is because gross sales, as opposed to net value added on site, deducts nothing for turnover or depreciation. And capital turns over and depreciates, while land does not.[63] The more capital-intensive the farm, therefore, the greater the ratio of gross sales to net value added on site. While on the other extreme a farm with no capital, but only land and labor, would have gross sales only as great as net value added on site. Thus gross sales, as a criterion of farm size, shifts capital-intensive farms into larger size groups than land-intensive farms of the same, or even considerably greater net output.

iii. Farms ranked by value of real estate.

Another measure of farm size that is neutral, at least as between land and buildings, is of course land and buildings taken together, or "real estate" value. I have discovered only one such study, although there are doubtless others. It is for 333 sample farms in the Willamette Valley of Oregon in 1938. The study shows the larger farms to be considerably more land intensive (Table 18).

TABLE 18

Capital Intensity of 333 Willamette Valley Farms, Ranked by Value of Real Estate, 1938.[64]

Investment in Real Estate	Per Cent of All Assets That Is: Land	Buildings	Other
Under $5,000	57%	25%	18%
5,000-7,500	60	24	16
7,500-10,000	60	24	16
10,000-15,000	64	20	16
15,000-20,000	69	15	16
over 20,000	69	17	14

As we have mentioned several times before, if the data were for bare land without any improvements at all, the smaller farms would prove to be even less land intensive relative to larger ones.

iv. Regional contrasts.

If it is the southern Appalachians which have the most people per dollar of land value, it is the northern Appalachians, the lands of thrift, which have the most capital.

We will simply repeat the figures already cited comparing New England and the West North Central states in 1930. In New England, land values were 44% of the total value of land and buildings; in the West North Central states, 77%.[65]

As to implements and machinery, Bachman and Jones have

presented data to make a parallel contrast between the North Eastern States and the Corn Belt States (Table 19):

TABLE 19

Implements and Machinery Per Farm
And Per Acre By Region.[66]

Region	Acres Per Farm	I & M Per Farm	I & M Per Acre	Operator Income Per Farm	Operator Income Per Acre
North East	129	$1,874	$14.53	$2,495	$19.34
Corn Belt	163	1,443	8.85	3,410	20.92

The corn belt farmers, with much less implements and machinery per acre, managed to get slightly more income per acre -- due, of course, to their better land.

We take it as a fact, then, that the proportions of labor and capital to land vary enormously from farm to farm, and the larger landholdings are in general less intensively equipped and improved.

In conclusion, one further remark is pertinent. Great as is the contrast of intensity among farms ranked by size, still greater would be the contrast if the Census would rank them by intensity itself. For some large farms are used intensively, and some small farms are not, which of course reduces the contrast of intensity when the data are grouped by size. But between the most and the least intensive, say, tenths of all farms, the contrast must be awesome.

2. Implications of the facts.

Now we have established that larger farms are much less intensively manned and improved, and somewhat less intensively equipped than smaller ones, the question is, what does that prove about the marginal productivity of land on different farms? "Prove" is perhaps too strong a word. But the facts are at least prima facie evidence that the marginal product of land tends to be higher on smaller farms than on larger.

That is simply one of the most basic principles of economics. Resources tend to be more valuable where they are scarce relative to their complements. Call it the principle of diminishing returns, or the law of variable proportions, or observe that land rent is higher where labor and capital are cheaper and more abundant, as you will, the same answer emerges: laying field to field is carrying coals to Newcastle, seeming to violate the great Economists as much as the Hebrew Prophets.[67]

Let us put it in terms of the law of variable proportions. Where there are many acres per man, there one additional man can add as much to output as many additional acres, and men are cherished while acres are lavished. By contrast, where there are few acres per man, additional men add little to output while additional acres add a great deal. Or, in the briefer modern phrasing, isoquants are convex to the origin, and the marginal rate at which land substitutes

for labor is higher where land is abundant relative to labor.

Thus, could an acre of Iowa be wafted to Japan, it would shortly be swarming with Japanese, preparing, cultivating, hoeing, spading, grafting and pruning in the meticulous Japanese way, while the bereft Iowan need only shrug his shoulders and apply himself imperceptibly more intensively to 339 acres than he did to 340. He might even find, as so many Iowans did in the era of AAA acreage allotments, that he had been overextended and could produce more from the smaller acreage (below, Point E). At any rate, Japanese output would rise more than Iowan output fell.

But to effect this more perfect union of man and nature there is no need to waft any land about, nor to invoke the Japanese; but only to transfer land titles from land-surfeited to land-starved American farmers. And that the market does not do. Instead, it gathers much of the best land into large holdings, and keeps it there, where it languishes without the attention of nearly as much labor and capital per acre as the many very small farmers lavish on the few acres in their care.

That is why we say there is a <u>prima facie</u> presumption that the marginal product of land is generally lower on larger farms, on the basis of a most basic economic principle. This is all so very obvious and elementary, that I would apologize to waste words on it, were it not that so few modern

writers acknowledge it at all.

To this presumption of elementary economics Conrad Hammar has addressed an interesting rebuttal.[68] Noting how much higher was the man-land ratio on marginal lands than better lands over much of the Mississippi Valley, he suggested that the marginal lands may have greater "capacity" than the better lands to absorb labor; that nature in central Illinois has done the work that man must do in the Ozarks, and so there is less need of man in Illinois.

The first man added to 160 acres in Illinois, he reasoned, would certainly produce far more than the first man in the Ozarks. But the fifth man added in Illinois might be superfluous and add little, while in the Ozarks the fifth man might still add something to output, enough to justify his efforts.

Hammar advanced this idea modestly and tentatively. As a qualification to the more general presumption that ideal man-land proportions would be roughly equivalent it clearly has an element of truth, in regard to particular lands -- although one may adduce equally plausible reasons for expecting better lands to have greater capacity. But without getting into that, to suggest seriously that congested marginal lands in fact have an absorptive capacity proportional to their dense populations is to ignore some notorious facts.

In the first place, the history of migration of rural population suggests quite other reasons for the present

distribution. Saloutos and Hicks mention high land prices:

> It was because of these prices that so many farmers sold out to their neighbors or to speculators and invested in farms located in newer areas where the prices were not so high. This movement of population did not lessen the nation's total farm population, but it did lessen the number of farmers in regions where land prices were excessively high. 69

From another point of vantage, Goodrich, Allin and Hayes observed that rural population moved into poor, already crowded areas because ".... it was here that they were most likely to find cheap land or abandoned shacks available for 'squatting'."[70]

Gale Johnson has put the case exactly (if I may take the liberty of replacing his word "capital" with "land", in a context where he clearly uses "capital" to refer primarily to land. This rather confusing usage seems to have evolved by metonymy, "capital" referring to "total assets", hence to "ability to buy land titles", and hence to land itself.)

> The substitution of labor for (land) in the (land) poor areas has apparently reached the point at which it takes a very large amount of labor to replace a small amount of (land). Thus addition of more labor in the (land) poor areas would increase output only slightly, while large deductions from the labor force will not markedly reduce output even if (land) remains constant. 71

Documenting this assertion, the 1951 Joint Committee Report on Underemployment of Rural Families estimates that "as many as two million of our six million farm families may have been seriously underemployed in the period 1945-1950"[72] -- a period, recall, of high farm prosperity. The cause was lack of land to complement their labor. The Joint Committee

Report cites this description of the Quicksand area of eastern Kentucky to exemplify the problem:

> In 1940, the average worker was unemployed about 100 working days on which the weather was suitable for outdoor labor. This large under-employment on farms results from the very unequal spread of farm labor requirements over the year and from the fact that the worker continues to apply his labor to the land only up to that point where his marginal product has a value to him at least as great as the value of leisure. On land of such poor quality, this point is reached long before the worker has used all his available time. As a consequence, much time is spent in leisure. Front porches are frequently occupied at hours of the day when in other regions they would be deserted for the fields. This does not mean that the people of the area are lazy or uncommonly leisure-loving. On the contrary, they continue their work upon resources far beyond the point which most workers would regard as too unrewarding for the effort.

The returns to labor they estimated at five cents to ten cents an hour![73]

> In farming, units are limited to small size by the existence of high peaks of labor demand, so that the family is able to produce only a small acreage of crops and a few livestock, principally for home needs. Labor peaks are heightened by the necessity for using poor land and by the high labor-intensity of the practices followed; nor is it usually economical to hire additional labor, even at the low wage rates that prevail locally, to lighten the family's work burden at the peaks, so poor is the quality of the additional land that would be brought into use under such a system.[74]

Another manifestation of how little capacity the populous marginal lands have to absorb their labor is the fact that their residents generally spend a fair proportion of their time eking out a living off the farm. The rural population of Iowa, with a very large complement of land per man, is

the most stable in the country, despite high tenancy.[75] In contrast, it is well known that small American farmers from poor lands often descend on to the plains to work for their larger-landed cousins, or in the mill or the war plant or domestic service.[76] The Economist's description of the "crofters" of northwest Scotland typifies many land-starved small farmers around the world.

> The crofter is a man of many skills, who traditionally has earned his living by combining farming with fishing or some rural craft such as weaving. Many crofters leave their homes for long periods to serve in the merchant marine; relatively few are able to live by farming alone. 77

In short, there subsist on these small farms, preserved half-dormant in a kind of ambulatory hibernation, vast reserves of underemployed workers, sallying forth when opportunity beckons, and homing when evil days betide. With time on their hands, these people stand ready to put an additional acre to much better use than do those already preoccupied managing hundreds of others as well as enjoying the rich fruits thereof in manner becoming great landholders. For obviously few very affluent large owner-operators will apply their entrepreneurial talents to such low margins, and thus raise the productivity of land to such high margins, as these underemployed.

Of course the small holder can hire himself out to the large holder, as indeed many of them do. But the relationship of master and man, like that of landlord and tenant, is a costly one for both parties, most especially when the

master has many men and supervises them only through hired overseers. Of course few men perform under such conditions with the same zeal, not to mention intelligence, reliability, enterprise, conscience and pleasure as on their own paternal acres -- and then there is still the overseer to pay, and watch. For the worker there are high transportation costs, insecurity, wretched housing and schooling for his family, and often enough exclusion from community and even his own family life, and relegation to a second class citizenship that self-respecting men find hard to endure. To compensate for these tribulations the hired worker must be paid in money per hour of actual labor a good deal more than the value of what he can scratch from under his own vine and fig tree.

And so the practice of hiring labor from small farms to work on large ones does not solve the maldistribution of labor relative to land any more than tenancy does, and great variations in intensity persist as we have seen. Wilcox and Cochrane observe:

> Rather than run the risks of being without hired help when they are needed, many farmers prefer to adjust their size of business to the amount they can handle with their own labor and that of other members of the family.

Also:

> Farm women increasingly object to opening their homes to hired farm workers. 78

Those are certainly familiar facts. And what can they mean but that on larger farms, whose owner-operators need to hire help, labor is pressing, not so much against

the limits of land, as against the limits of management and human relations? Doreen Warriner, in her contrast of Lebanon and Syria, makes the point quite explicit:

> In Lebanon, however, with its steep hillsides under intensive cultivation, there is a definite pressure on land resources. The limits of intensification appear to have been reached, and a large part of the village population supplements its income by work in the towns, and by remittances from abroad. If the land tenure system in Syria were less oppressive, room might be found on the land for settlers from the Lebanon, but as things are, the standard of living and status of the Lebanese peasant is higher; compared with the Syrian peasant he is a free man, and there is no inducement to leave the Mountain for the underpopulated plains of central or Northern Syria. 79

To sum it up, there are at least three reasons why large landholders do not apply labor to such low margins as small:

a. They have more land over which to spread their own labor, and more spending money to seduce them from labor of any kind.

b. They must pay more money per hour of hired labor than the hired man will require to keep him on his own land.

c. They wish to minimize risks and unpleasantness and managerial costs involved in hiring labor.

There is no reason to say, therefore, that the lands on which small holdings persist have much greater absorptive capacity than lands in larger holdings. As to capital, we might adduce parallel observations as for labor. The critics of small holdings have already done this for us, for they are

the first to point out that much of the small-holder's equipment stands idle a good part of the time, and not for lack of labor, but of land to complement it.

Finally, the conclusion is buttressed by the fact that there are areas where large holdings, sparsely manned, equipped and improved, lie intermingled with small intensive farms on similar land.[80]

We can conclude quite firmly, then, that small holdings are generally more intensive, not only absolutely, but also relative to their absorptive capacity. And the presumption remains that the marginal product of an acre added to a small-holding, supersaturated with labor and capital, would be higher than it is in a large holding, undermanned, under-improved and underequipped. Let us repeat, from the introduction, this does not imply that the smaller farms are more efficient overall. Such a conclusion would have no bearing on the present study. The conclusion is simply this: an acre transferred from an extensive large farm to an intensive small farm would increase output more on the intensive farm than it reduced it by leaving the extensive one.

C. The smaller the farm, as a rule the more economies of scale it has to gain by adding land.

1. Smaller farms tend to gain economies of scale at a faster rate per additional acre.

There is also a second presumption from elementary economics which suggests that the marginal product of land

is higher on smaller farms. When a firm is below the optimum scale, and average output per unit of input is rising, the marginal output per unit of input is higher than the average; while for a firm that has passed the maximum average, the marginal is below the average.

Breaking down "inputs" into component factors of production, it is clear that this reasoning applies with particular force to the land factor. We have seen, in fact, that the marginal products of labor and capital on small farms are very low, because they are inadequately complemented with land. Land, therefore, is clearly the limiting factor whose lack prevents small farms from realizing the savings of larger scale operation. More land on smaller farms will not only complement the land-starved labor and capital already there; it will also enable small farmers to use larger scale equipment, and specialize their labor more, and thus realize new savings.

Surprisingly, this rather obvious inference from elementary economics is little heeded by modern agricultural economists. It will be well, therefore, to lay it out carefully.

The advantage of larger operations over smaller ones is often expressed this way: that some inputs are imperfectly divisible below certain sizes. On ten acres a tractor designed for 100 is largely wasted, while a tractor designed for 10 will cost more than 1/10 as much -- and hence more per acre -- than the larger tractor spread over 100 acres. By more intensive

application the smaller farmer produces more per acre, but not enough more, below some acreage, to compensate for his higher costs per acre. Thus on very small acreages these imperfectly divisible items like tractors are insufficiently complemented with land, while the land is burdened with more costs than its output can requite. The diseconomies of small-scale operation, then, are closely akin to the diseconomies of unbalanced proportions.

Generally the least divisible inputs are the farmer and his family themselves, and particular items of capital such as tractors, barns, the home, fences, farm roads, special machinery and so on. Land, by contrast, comes in no minimum bundle.[81] An acre is the same acre, its natural forces unaltered, whether a complete farm or a thousandth of one.[82]

Impecunious farmers, we have seen, generally adjust to their circumstances by cutting down on land especially -- which one can understand, since they cannot cut down so far on the less divisible items, nor, as we will see, are the others so arduous for the small farmer to finance. Thus they find themselves with high fixed costs of labor and capital per acre, a position in which additional acres will do them a great deal of good.

Additional acres help the small farmer by giving him more land (and hence more output) over which to spread the cost of his labor and equipment. That is a commonplace. And yet the obvious corollary is rarely emphasized: as David Weeks

wrote, "... the effect upon gross income of an additional acre is much greater on a small farm than on a large one."[83] Add one acre to a ten-acre place and you increase the land complement by ten per cent, thus appreciably increasing the use of underused men and machines, as well as the farmer's ability to avail himself of the savings of larger scale inputs. But add that same acre to a one hundred-acre place, and you increase the land complement by only one per cent -- and that at an acreage where imperfectly divisible inputs are already more fully utilized, are already nearer their optimum sizes, where the new acre is probably much more distant from the farmstead, and where various other dis-economies of large scale operation are beginning to make themselves felt. So at that acreage not even a ten-acre, or ten per cent increase of the land complement would permit new savings per acre as great as ten per cent will bring for the ten-acre farm.

It has seemed natural to many people that economies of large scale operation explained the growth of giant farms. After all, as they are the large ones, is it not their growth that spells the triumph of doing things in a big way? But a little careful thought seems to point the other way. It is exactly the smallest farmers who have the most economies of scale to win by growing, and the large with the least to lose by shrinking.

Let us lay this matter out graphically, using the analytical technique which was developed in the introduction for the purpose of marshalling available data to reveal as much as

they have to tell about the marginal productivity of land. The technique involved the concept of marginal NET productivity, and a schedule of its variation over a range of acreage, the schedule being developed from available data on complementary costs and gross output per acre.

The marginal NET product of an acre, recall, is the increased gross product minus the increased complementary costs that result from adding it to an enterprise. And a schedule of marginal NET productivity depicts the variation of this quantity as land and complements are both added continuously over a range of acres -- each consecutive acre being added to a base augmented not only by the preceding acre, but also its complements. As demonstrated in the introduction, any point on a schedule of marginal net productivity represents also the marginal productivity at that point. And either concept may be used in conjunction with the equimarginal criterion to judge the performance of the land market.

Figure 2a shows typical schedules of gross output per acre and complementary costs per acre over a range of farm acreages. The characteristic shapes of these schedules represent the findings of many studies of farm costs. They may be taken as indicating conditions on actual existing farms of the various acreages or, alternately, a typical range of alternatives facing an entrepreneur planning a farm enterprise. As expounded in the Introduction, complementary costs per acre tend to be very high on very small acreages, due to the

imperfect divisibility of many complementary inputs. Costs per acre fall rapidly at first, but ever less rapidly, as the farmer acquires more and more land over which to spread the cost of these imperfectly divisible inputs. Ultimately complementary costs per acre may even rise, as he exploits economies of large scale operation to the full and encounters more and more diseconomies.

Gross output per acre may rise moderately at first, as additional acres permit of vital equipment that a microscopic gardener would have to forego entirely. But it soon begins to fall as the farmer spreads himself and his capital and enterprise thinner over more and more acres.

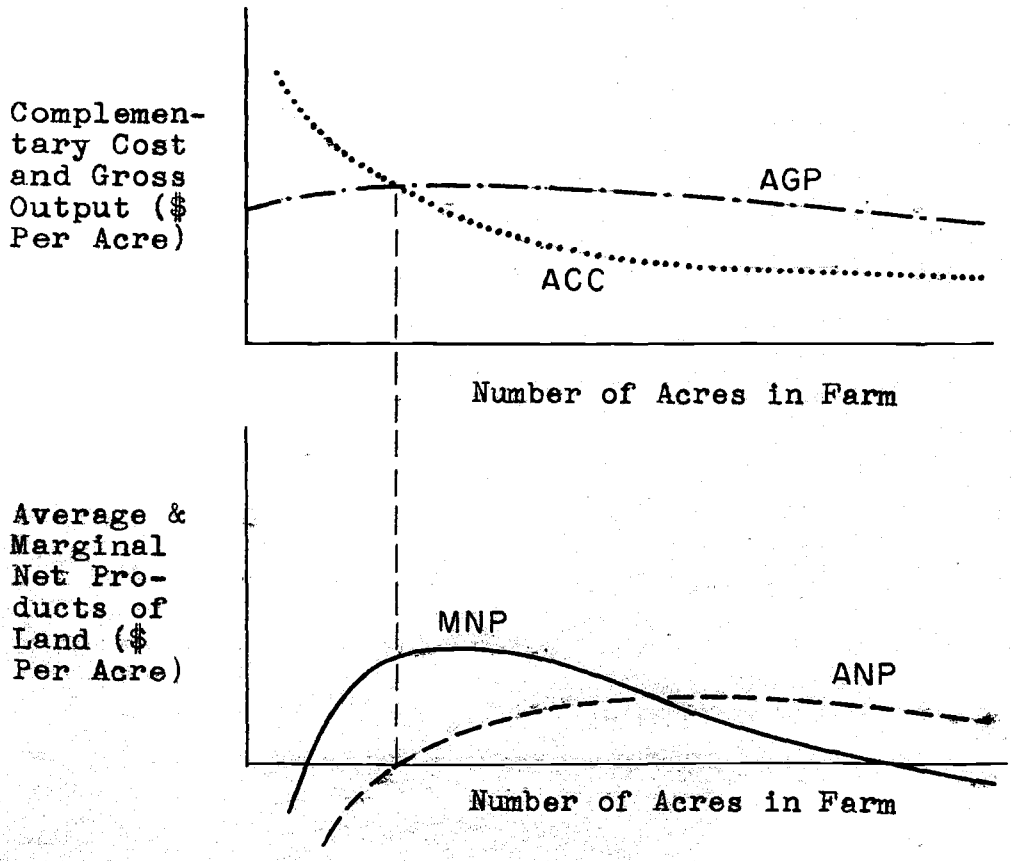

Figure 2: Marginal and average net products of land, as related to cost and output per acre.

The schedules of average and marginal net productivity of land, in Figure 2b derive directly from the two curves of Figure 2a -- they are, in fact, simply alternative ways of expressing the same information. The derivation is a simple matter. The average net product (ANP) is simply average gross product (AGP) minus average complementary costs (ACC). The marginal net product (MNP) is then drawn in according to the well-known relationship of marginal to average curves: while the average is rising, the marginal is above it; and while the average is falling, the marginal is below it. An algebraic derivation is in the notes.[84] Alternatively, the marginal net product (MNP) may be derived, as in the Introduction (Figures 1 to 3), as the difference of marginal gross product (MGP) and marginal complementary costs (MCC), which in turn derive from average gross product (AGP) and average complementary costs (ACC). In some ways this latter method affords a clearer insight into the essential reasoning involved, and at this point I would urge the reader who feels any doubts to review the relevant pages of the Introduction.

For the convenience of having a point of reference let us define the acreage at which average net product is a maximum as the "ultimate optimal acreage". This is sufficiently analogous to the usual concept of a "long run optimal scale" so as to need no special explanation here -- and we have explained in the Introduction our reasons for eschewing the phrase "long run". Now note the crucial point: for

farms somewhat less than the optimal acreage, the MARGINAL net product of land is very high, because an additional acre will lower costs per acre a good deal while it will reduce output per acre little if at all. Or, in terms of marginals, because the marginal complementary costs are very low, while the marginal gross product is still fairly high. By contrast, for farms larger than the optimum the marginal net product of land sinks down below the average net product (or land rent), even reaching zero while average net product is still quite a respectable figure. This is because output per acre falls while costs per acre cease to fall so rapidly. Or, in terms of marginals, it is because marginal gross product falls substantially while marginal complementary costs rise substantially.

Let us emphasize, once again, there is no implication here that smaller farms tend to be more efficient than larger ones. They may or may not be -- that is not the present question. Nor is there any denial that the marginal productivities of other inputs tend to vary inversely with the marginal productivity of land. On the contrary: this analysis points to that as a corollary. As shown in the Introduction, the marginal productivity of land depends inversely on the marginal productivities of complementary inputs. The present point is simply that aggregate output would rise if some land were transferred from large, lightly used farms to small, intensive farms.

Thus when we introduce the question of economies of

large-scale operation, it does not overturn the presumption from the law of diminishing returns that the marginal product of land tends to be higher on smaller farms. We bring the marginal product concept into the analysis of economies to scale simply by refining it slightly, as in Figure 2 into marginal NET product: the increased gross output from an additional acre minus the increased complementary costs. Then it is clear that the scale effects reinforce the proportion effects. Economies of large scale operation, in the first place, are in large measure simply economies of better proportioning, which large scale allows. And they are something else besides. Adding land to a small, land-starved farm not only puts the small farmer's under-employed labor and capital to fuller use; it also lets him buy larger and more specialized equipment. The smaller the farm, the greater are both these advantages, hence the higher the marginal net product of land.

2. A critical discussion of divergent viewpoints.

Elementary as that interpretation may seem, many of those who write on this subject pay it no heed, and we cannot take it as accepted doctrine. Prudence dictates that we consider why many other students are not moved to emphasize this same conclusion.

a. The proclivity to treat land as of no value.

Occasional visiting Europeans and Asiatics have remarked how in their countries farmers strive for the most

output per acre, while Americans strive for the most per man. No doubt these itinerant epigrammatists sacrifice something of the whole truth for the bon mot, for in fact the difference is of degree, not kind. But something akin to what they describe as the American farmer's absolute prodigality of land seems indeed to grip many American farm economists.

It recurrently astonishes me to discover, and then rediscover how many otherwise competent American economists, in writing of farm size, will suffer a brief amnesia of elementary principles and write as though maximum output per man (or per machine, or per man-plus-machine), or, what is something of the same idea, minimum costs per acre, were the necessary and sufficient criteria of efficient farming, and vouchsafe never a word about output per acre, or how well the farms economize on land.

Bachman and Jones, for example, speak of "significant gains in efficiency" from enlarging farms, and they measure "efficiency" solely in "output per hour of man labor."[85]

E. O. Heady, if I divine him rightly, purports that land of itself has no value. He writes:

> ...the greatest cost economies associated with units of different sizes are to be found in crop production where power units and machine combinations of high capacities can be substituted for labor and fixed costs can be spread over a large acreage. The relative advantage of the large unit depends, of course, on the cost of labor as compared to the cost of capital in the form of high-capacity machinery.[86]

Evidently he means that the cost of land has nothing to do with

the relative advantage of land-intensive farming. He seems to assume, in that and other passages, (pp. 364, 372, and 376) either that output per acre remains constant as costs per acre fall, or else is of no consequence. Perhaps it is the latter, for he later asserts:

> While it is true that aggregate efficiency is directly concerned only with labor and capital productivity and only indirectly to (sic) land productivity, determination of the return of land becomes of interest .... not because we are concerned with land or the return to land for any particular reason but because the imputational process requires that all factors be considered together. 87

Again, Roland Renne has written:

> ... the economic unit will be of that size which utilizes most efficiently the entire family labor available for work. Such a size of unit would enable the farm family to produce the largest possible amount of goods which it will need for its living. 88

Something of the same attitude seems to blemish even the otherwise admirable writings of Th. Schultz who, in a famous article[89] compares the desirability of small owner-operated farms and larger tenant farms entirely in terms of income per family, and seems to assume that lower income per family on the smaller farms necessarily implies lower national income, without considering that with smaller farms there can be more farms, and more income per acre. In the same article he states that farmers who own the farms they operate and are free from debt "are of no concern in whatever steps society may take to facilitate tenure reforms. Surely these operators have arrived at the desired goal." Am I

just reading into that the implication that a farmer can never have too much land, but only too little? Schultz has even written a chapter on "Gauging the Economic Efficiency of Agriculture" from this standpoint, comparing "efficiency" in different regions in these words: "The West emerges as the most efficient, having an output per man-equivalent 2.5 times as large as that of the South."[90]

Wilcox and Cochrane write:

> It (a family farm) may be either a highly mechanized, highly efficient unit producing a large volume of products per worker, or it may be a small, unmechanized unit utilizing one horse, or one mule tools, and large amounts of hand labor. 91

The juxtaposition of "efficient", and "large volume of products per worker" is not merely accidental, for they have concluded that "There are sound economic reasons why we should permit and encourage these trends toward larger farming units to continue at an accelerated rate."[92] Inasmuch as that means transferring land from small to large holdings, one might expect the sound economic reasons to concern the marginal productivity of land. But their conclusion stems mainly from this, that "Labor and power costs per acre, or per unit of output, are lowered by the use of this larger scale machinery."[93]

I sincerely hope that these authors do not mean what they appear to mean; and if so I gladly apologize. These are substantial men, on whose witness I must myself often call

in these chapters.

But, while I confess that I find few unequivocal statements of this solecism, one can hardly expect plain talk about an idea which to state clearly and wholely is to be absurd. And it does appear that the viewpoint dimly seen behind those passages is one from which they judge. For when they turn to expose "inefficiency" in American farming, it is mainly the small farmer, with high costs per acre, on whom their umbrage descends.[94]

Yet what have they done but take underuse of land as the criterion of efficiency? If minimum cost per acre is the sole criterion, the most "efficient" farm is one not used at all. If maximum output per man is the criterion, the most "efficient" farm is one on which the marginal product of land is zero. To clarify that matter, let us ressurect from its limbo a venerable principle of elementary economics.[95]

As one adds more and more land to a fixed complement of men, output per man rises until finally the last acre adds nothing -- i.e. the marginal product of land equals zero. Then output per man is at its maximum. Conversely, where land is very crowded, and the marginal product of labor approaches zero, the average product of land approaches its maximum, and its marginal product becomes quite high. Graphically:

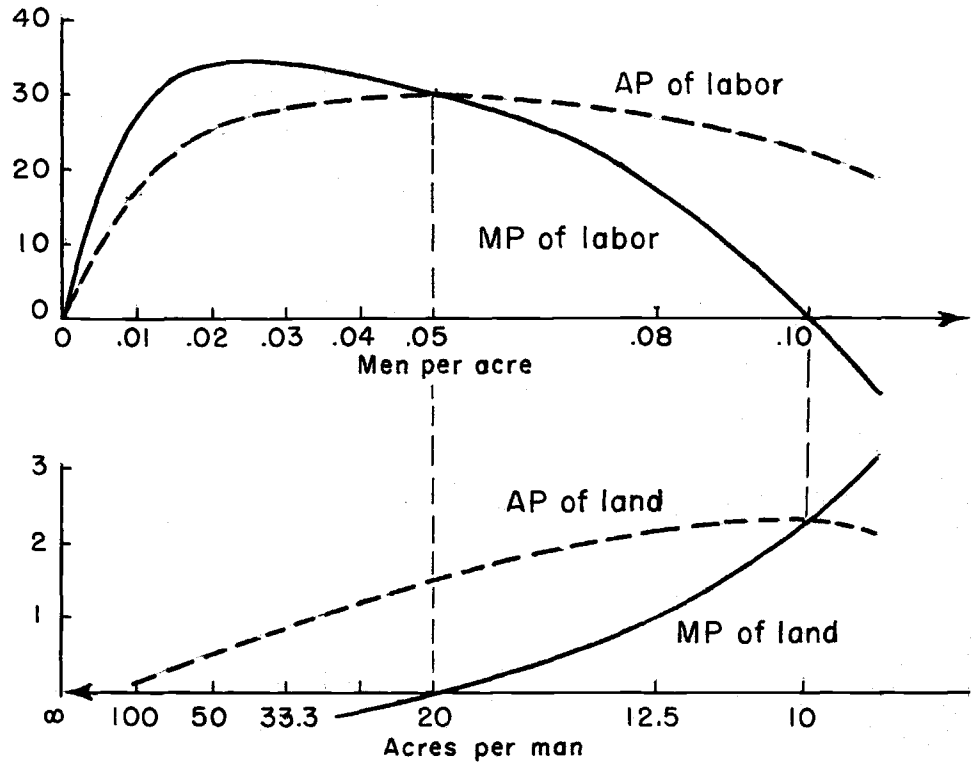

Figure 3

Necessary Relations Between Marginal
And Average Products of Labor and Land.

The points connected with dots correspond to each other, e.g. 20 acres per man to 1/20 of a man per acre.

Thus high output per man (high average product of labor) is no evidence of efficient land use, but exactly the opposite. The high output per man, which some economists adduce to show the "efficiency" of large farms, and advocate their growth, is itself the strongest argument against it.

By parallel reasoning, the same is true of high output per machine, or, what amounts to the same thing, low machine costs per acre, or per unit of output. The only situation in which maximizing output per machine is good economy would be where land was absolutely free, with no alternative use. In light of the fact that in 1940 the value of American farm land exclusive of buildings was seven and a half times the value of all farm implements and machinery,[96] the doctrine of ranging each machine to the absolute limit, and the land be damned, seems like extraordinarily poor economics.

b. Undervaluation of lands.

A variation of the treatment of land as of no value is to put a low value on it, divide this into net income and point to the high percentage returns "on the investment". Thus the managers of a corporation or the trustees of an estate may exaggerate their efficiency for the benefit of whomsoever may be interested. The practice is also of some utility in keeping down property and inheritance taxes and may have various other motivations. E. A. Stokdyk has written of how common

this kind of accounting is among corporate farmers,[97] and of course it is familiar and transparent to all who have applied the opportunity cost concept to business accounts. An interesting example is the Kern County Land Company, which carries its land on the books, according to the annual stockholders' reports, at its sale price as of 1890.

It is sometimes stated that larger farms earn higher returns "on the investment". But the writer has found no study of this point in which the word "investment" was defined meaningfully, if at all, and the means of ascertaining it specified. It is obvious, however, that to say one farm earns higher returns than another on money invested in land titles is to say it puts the land to more productive use. As that is the matter we are investigating directly; and as known data on "returns on investment" are of almost no value, we will not let this matter detain us.

c. The possibility that the marginal product of land is higher on larger farms, despite their less intensity, due to prodigious economies of large scale operation.

The above reasoning is based on proportions. Now consider the possibility that the advantages of large-scale operation are so prodigious as to override all considerations of proportions, so that on larger farms the marginal product of land is higher than on smaller, despite the lesser labor-capital complement per acre. In terms of figure 2 (p. 231) that would mean the larger farms are near to the maximum average

net product of land, and the small far below it.

i. Limits to economies of scale

Such a belief receives scant support from those who have studied the elements from which economies of large scale operation derive -- and they include several of those we have just cited. According to the studies, costs per acre cease to fall appreciably before farms attain more than moderate acreages, acreages smaller than those in which much farm land is held. To be sure, none of these studies is really conclusive, as they do not specify what they assume about output per acre -- and naturally cost per acre will fall much slower if output per acre must remain constant than if it may drop. But, as most of those to be cited have shown little concern for output per acre, it is safe to assume that they are tolerating some decline. Their estimates of acreages at which economies of scale are "fully realized" are at least not likely to err on the small side.

Bachman and Jones cite an unpublished study of O. J. Scoville's about corn-livestock farms in eastern Nebraska to the effect that:

> Although the rate of decline of costs is high with small acreages, a full-sized family-operated farm is large enough to permit reasonably efficient utilization of equipment. Decreases in machinery costs per acre become relatively insignificant for farms that are larger than a two-man unit. 98

They also cite the conclusion of a 1947 House Committee on Agriculture study that 200 acres are ample to complement a cotton picker, the largest input in cotton. "In other

situations the units of machinery are small relative to common sizes of farms."[99]

Heady cites Iowa Agricultural Experiment Station project 1135, a study of cash grain production costs in which the investigators found that costs per acre levelled off around 80 acres, and from 80 to 280 acres fell only from $29.47 to $26.19 -- assuming, in each case, equipment adapted to the particular acreage.[100]

Wilcox and Cochrane cite Wilcox and Rauchenstein's conclusion that dairy herds larger than 30 cows achieve few economies of large scale operation. Beyond 100 cows:

> Extra time required in moving the feed and milk greater distances in the large barns, in taking the cows greater distances to and from pastures, and in hauling crops and manure greater distances to and from fields offset time savings at other jobs, such as washing milkers and cans and throwing down silage. 101

J. Karl Lee calculated that, for farms on the valley floor areas of five counties around Fresno, California, most economies of scale were realized for farm machinery at 100 acres, for tractors at 100 or slightly more, for power cost mostly at 100 and entirely at 500, for pumps and power at 160-170.[102]

There are limits, after all, to the advantages of large machinery. Some of the limiting factors are the following.

1. A larger machine gives more uniform treatment to the ground its wide swath covers. But the ground is non-uniform,

and would respond to treatment adapted to its variations.

2. Larger machines become cumbersome and ponderous. Their large wheels require more space between crop rows, and their wide girth calls for more turning space at field ends. The strength of structural members tends to increase with their cross sections, while weight tends to increase with volume, and so machines tend to gain in weight out of proportion to strength and function. This weight packs down soil under the wheels, and may require costlier farm roadbeds, passages and bridges. On rough and sloping terrain and through narrow apertures the larger machines are harder to maneuver. When rapid changes of weather or other conditions call for quick responses, the larger machines tend to be slower to answer the call. Many odd jobs are not individually important enough to warrant activating and moving a large rig and so are neglected; odd hours, too, are not so apt to warrant its services, and so are lost.

3. A feature of larger machines is often their higher degree of specialization. This may often become disadvantageous in free markets where rapid changes in consumer tastes, technology, foreign supplies and complementary costs call for continuous flexibility and adaptation.

For reasons such as those there are limits to the advantages of large machinery. And as these limits are approached, diseconomies other than those inherent in large machinery accumulate. Some of the more important ones are these.

1. Transportation costs.

Farm operations radiate from the farmstead nucleus, the central depot for distribution of inputs and collection of output. The vaster the reaches of a farm, the costlier the movements to and fro. W. I. Myers in his classic Economic Study of Farm Layout pointed to field after field in New York that was underused because so far from the owner's farmstead -- although often near to a neighbor's. He noted in a rather broad survey that such lands tended to be kept in less intensive crops that required fewer trips to the farmstead but yielded lower incomes. Some were never manured. The loss of production varied with distance. In an example he estimated the loss at 35 to 40 per cent of net income.[103]

Note that this diseconomy derives, not from the largeness of the enterprise in general, but the vastness of its lands. Were output increased by more intensive application of labor and capital to lands near the farmstead there would be no increase of distances to travel. This is a weakness, therefore, not just of large farms in general, but in particular of farms that are large in respect to their landholdings.

2. Labor problems.

Large farmers must depend of course on hired labor, whose immediate motivation is not to help the farm owner, but themselves. To convert the one urge into the other requires supervision by competent and responsible, hence expensive overseers. Where men are scattered over hundreds of acres

the problem of communication alone is formidable, and of effective supervision immense. An American critic of Russian farm organization has quipped that the Comrades need fewer self-propelled machines and more self-propelled farmers.[104] The same might be said of some large American farms. Some transient laborers will break down vines and trees to spare themselves trouble harvesting or pruning; load green fruit to increase their output at the weighing station;[105] and in a variety of ways, wherein they will not be caught, exploit the owner with a disregard as callous as he often shows for them. Another enemy of output is boredom, when crews work at dull repetitive tasks. Balchin's experiments with hoeing suggest that this is a most important factor.[106]

The need to oversee the men creates an additional problem of inertia. To economize on overseers it is necessary that migrant workers go in crews of several. To activate such a crew requires some doing, so that many odd jobs an individual could jump to are neglected, and there is some lag in response to favorable weather conditions. The crew as a unit moves no faster than its slowest member. Crew members generally work individually, even though in a gang, so that, while the crew suffers the disadvantages of the group versus the individual it achieves thereby no particular gains of cooperative effort, save such camaraderie as may be enjoyed under the eye of the overseer.

An often remarked risk of transient labor is its undependability of supply in critical peak seasons. Many

employers quail before the risk of not finding hands during good harvest weather, with fortunes standing ripe in the fields.[107] W. W. Carmean, a farm employer, wrote recently in the San Francisco Chronicle of his problem of having ". . . a field in the process of being picked when another job came along which attracted the crew and the crop was therefore lost."[108] Costs of recruiting and training this shifting work force are also a formidable item to reckon with. The manager of an early Red River bonanza farm, no doubt exaggerating his troubles, complained that he generally had three teams of labor at once: one coming, one working, and one going.[109]

3. Management problems.

The large farm organization entails some bureaucratic overhead costs, with an appreciable part of its staff engaged in watching and ordering the rest. There is in this bureaucracy considerable inertia, considerable development of tenuous petty vested interests in things as they are, with consequent resistance to change. The power of minor functionaries to maintain themselves against unwelcome changes becomes the greater as a farm grows and the top manager becomes harder taxed. For, as J. D. Black wrote, "as a manager brings more and more management to bear on an enterprise, he must exert himself more and more to do it. The first managerial effort comes forth easily; the last, only at great sacrifice of comfort and leisure."[110] This problem is the more acute when the top manager, as is not infrequently the case, has outside

interests to take up his time. A 1940 study of southern plantations disclosed that 28 per cent of the operators had a second occupation to which they devoted more than one-quarter of their time.[111] According to the English student, R. G. Stapledon, a major fault of large landowners, preoccupied with other interests, is to neglect "tiresome details connected with outlying farms, the encroachment of bracken, and the rapid deterioration of neglected acres."[112]

4. Trespass, vandalism and theft.

Vast, unmanned landholdings tempt the frustrated hunter, landseeker or thief into lawbreaking. The King Ranch is regularly invaded by hungry Mexicans who sup there on mesquite beans and the fruit of the prickly pear;[113] and, like so many large landholdings, it must be opened to hunters to win their support in local politics. Theft of crops is a problem that grows with distance from the farmstead, and cattle rustling by no means died with the wild west. A theft of several thousand head from some large ranches near Paso Robles, California, was consummated on October 30, 1955.[114] In England the "poacher" has become a classic figure in literature.

These, and other problems become of moment even before positive economies of large scale farming are fully realized. Before long the principle "if some is good then more is better" gives way to a principle of moderation. At some medium acreage the balance is struck, and beyond it there is no net saving in expanding.

ii. Falling gross outputs per dollar of land

But have we given full weight to all the economies, perhaps intricate and not immediately obvious to the untutored eye, that may materialize when several men work together? Is it not still possible that the marginal product of land is higher or equal on larger farms, even when they use fewer men and less capital per acre, because men and capital are so much more effective in larger teams? It is conceivable, yes. But it is not generally so in farming. That we can ascertain by testing its implications against known facts.

Let me direct your eye once again to Figure 3, p. 239. There we have abstracted from matters of scale, and focussed on matters of proportion, by plotting land per man, rather than just land (for some particular number of men) on the abscissa. But we can also represent different scales of operation on the same axes, by drawing more than one marginal productivity (and corresponding average productivity) curve, each curve on the assumption of a different complement of men, hence of a different scale of operations.

Now let us represent two different farms as they would be if the marginal product of land were the same on the larger, less intensive one. As it would be equal, even when there was more land per man on the larger farm, it must be higher when there is the same ratio. For any given land per man ratio, therefore, the marginal productivity curve for the

large farm must be above that for the small, as in Figure 4

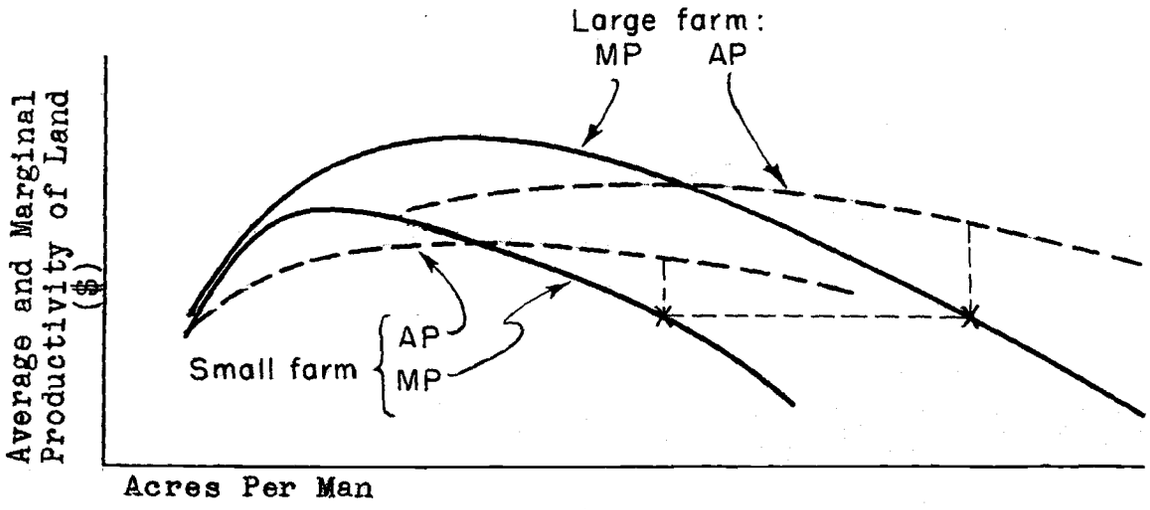

Figure 4

Hypothetical marginal productivity and corresponding average productivity of land as they would be if the marginal product of land were higher on larger, less intensive farms than on smaller, more intensive ones.

Now it is obvious from Figure 4 that if both farmers apply land to the same margin (as represented by the horizontal line), the average productivity of land, i.e. gross output per acre, must be much higher on the larger, less intensive farm.

Now here is something we can measure, gross output per acre. And one fact that few will dispute is that smaller,

more intensive farms, whatever their other demerits, do tend to produce, from a given grade of land, and often even from worse land, greater outputs per acre. In J. S. Mill's Political Economy is this citation:

> It is not pretended by our agricultural writers that our large farmers, ...approach to the garden-like cultivation, attention to manures, drainage, and clean state of the land, or in productiveness from a small space of soil not originally rich, which distinguishes the small farmers (of Flanders). 115

Mill appealed to "the immense amount of gross produce which.... English laborers generally obtain from their little allotments; a produce beyond comparison greater than a large farmer extracts....from the same piece of land."[116] There is abundant, if scattered evidence of the same trend today. Let us glance over some of it.

Karl Lee, whose studies in the San Joaquin Valley we have seen showing the savings of large scale operation tapering off after about 100 acres, found in the same study that the greatest output per acre came from farms considerably below 100 acres, and increased steadily as farm size decreased,[117] and within this area the quality of land did not decline so rapidly with farm size.[118]

Heady, McKee and Haver found in their recent studies of economies of scale of farm operations that output per acre tended to fall with size of farm, to such an extent that costs per unit of output began to rise, even while costs per acre were still falling, in result of which "the characteristic

U-shaped average total cost curve is obtained."[119]

Chester McCorkle's 1949 sample of 400 cotton-potato farms in the southern San Joaquin Valley revealed acre yields falling gently with size of farm.[120] The gentleness of the fall was no doubt due to the nature of the sample, which included only farms specializing in one crop combination. Higher acre yields from smaller farms are generally associated with more intensive types of crops.

Data on typical acre outputs and typical farm sizes for farms classed by type of crop generally show a rough correlation of small size with high output. Two such sets of data are provided in the testimony of M. C. Hermann before a subcommittee of the Senate Committee on Public Lands in 1947;[121] and in G. A. Carpenter's study of "Farm Size in California".[122]

Hamilton's contrast of Benton and Elkhart counties, Indiana, previously cited, brings out that gross sales per acre were about the same in the two counties, although the value of land and buildings per acre was $209 in Benton, the county of large farms, compared to $161 in Elkhart, the county of small farms.[123] The difference in bare land values per acre was even greater by the 1940 Census.[124]

Bachman and Jones present data on all "commercial family-operated farms" in the Corn Belt, 1944, classified by type of product. Comparing cash-grain farms with various kinds of livestock farms, the cash-grain farms are larger in acres, on land of higher value per acre, and produce much less gross

output per dollar of real estate value.[125]

E. A. Stokdyk in 1928 tabulated data on income from corporate farms -- which of course average much larger than other farms -- from 1919-1926, and compared it to the income the corporations should have earned to be comparable to the individual farms. The corporations showed up very poorly in all the years but one.[126]

Comparisons of Japanese-American farmers with their neighbors on the West Coast have uniformly indicated that their farms tended to be smaller, and to gross more per acre due to high skill and more intensive work.[127] High gross output per acre is probably typical of immigrant farmers of most nationalities. The Japanese are singled out because their identifiability and the stresses of World War II have caused the collection of much data on their farming. Of course their individual practices also vary widely.

It is not unheard of for Japanese to gross in a year as much as or more than their land and buildings are worth. One might contrast this performance with that of southern plantations in 1940 which grossed $29 an acre from real estate then valued at $79 an acre;[128] or with the King Ranch, which in 1933 -- a bad year, to be sure -- grossed $700,000 from lands very conservatively valued at $9,000,000 (without oil) with improvements of $4,000,000;[129] or with the Kern County Land Company, whose gross revenue from cattle in 1939 was around $1,500,000, which would be a small gross from the 138,000 acres in Kern

County which company President Pigott says are suitable for farming, not to mention the other million or more acres of company land, part of which was valued in 1890 at $10,000,000.[130]

Black, Clawson, Sayre and Wilcox in their Farm Management plot "net farm income" against "farm investment, in scatter form, for accounting dairy farms in Wisconsin, 1937-1941.[131] They point to extreme contrasts in what individuals earn on their investments. For the present discussion the significant feature is one they do not emphasize, their trend line to the scatter. This line shows net farm income failing to keep pace with farm investment. The ratio of net farm income to farm investment varies from 13% on the extreme left, representing $7,000 investment, to 7% on the extreme right for $40,000 investment.

These figures are not conclusive evidence that output per acre fell with farm investment, inasmuch as larger farms hiring more of their labor, must deduct a higher percentage of their labor costs than smaller ones to arrive at "net farm income", which is not net of implicit wages. But on the other hand, the larger the farm, the higher the percentage of "farm investment" is land value; the less is the difference of net and gross output; and the higher percentage of output is sold, hence counted in farm income. On balance therefore these data are probably significant.

Outside the United States the pattern of larger acre outputs on smaller farms has been observed and recorded in

Spain by Pascual Carrion;[132] in Denmark by Harald Gronborg;[133] and in France by Lucien Brasse-Brossard.[134] The first two present nationwide Census data.

Aside from these foreign sources, none of the above has the authoritative generality of Census reports. One would expect the voluminous United States Census, which provides considerable data on farms classed by acreage, to offer some data on the output of farms so classed. But it does not, and has not, except in the year 1900.

Lacking more recent data we have no choice but present these as the most general information available on the subject in the United States. In 1900 gross output divided by land value ranged from $1.05 for farms under three acres to $.26 for farms 1,000 acres and over. Between the extremes the trend was downwards, with minor exceptions.[135] For their times, at least, these figures seem quite conclusive.

These data would perhaps not be adequate to demonstrate that output per dollar of land is generally higher on smaller farms. But here the question is only, does output per unit of land tend to be much higher on larger, less intensive farms? There is hardly a shred of doubt that it does not. Summing it up, larger, less intensive farms can have higher marginal product of land only if they have appreciably larger average outputs per acre; and in general not that, but more likely the opposite is true.

d. Consolidation versus expansion.

i. Inter-regional migration.

The burden of our remarks thus far has been that a well-working land market would tend to shift land from larger, land-surfeited farms to smaller, land-starved farms where its marginal product is higher. But a large body of professional opinion, while ready to concede that the marginal product of land may be higher on smaller farms, would still not shift land to them. Emphasizing matters of scale to the exclusion of matters of proportion, many writers recommend that small farms achieve greater economies of large scale operation only by consolidating with other small farms; and presumably therefore believe that a perfect market would effect this result.

In several respects this opinion is compatible with ours. In the first place, if small farms generally are to grow by acquiring land from large farms, as we recommend, there are particular regions, where <u>all</u> the farms are small, within which the farms can grow only by consolidating.

We have thus far spoken for simplicity of "adding land to farms" as though the farmstead nuclei could all remain rooted, and the farmers need only move a boundary fence. And in many areas, where large and small farms intermingle, that is substantially what would happen. But where one region has all small farms, and another all large, "shifting land from large to small farms" entails moving population and capital from one

region to another. As the Baconian proverb has it, if the Mountain will not move to Mohammed, then Mohammed must move to the Mountain -- except in this case he will generally move from the mountains. And in geographical terms, transferring land from large to small farms will mean migration, with subdivision in the underpopulated regions and consolidation in the congested ones.

ii. Viability of small farm units.

Some writers doubtless have some adjustment such as the above in mind when they recommend consolidating small farms, and with that we have no quarrel. But others have yet another idea: that the large farms are at the optimum scale, and the small distinctly below it. It is well, they feel, that the larger farms maintain themselves intact. The small farms' growth has been arrested in the stage of increasing returns to scale, at a point where the marginal net product of land is higher than for the optimum farm, but the average net product of land is lower. So the high marginal net product of land on smaller farms indicates that the small ones should expand; and NOT that the large ones should shrink-- else all farms would be below the optimum scale. The small farms should grow only at the expense of other small farms. A perfect market would force up the cost of land until no one could afford to hold it without achieving the maximum average net product per acre, and that would force the small farms to consolidate.

These "consolidators", as we may call them, quite agree with us that the land market is functioning poorly. If pressed, they would probably agree, too, and at any rate they can very safely agree, that the marginal product of land is higher on smaller farms. They differ only over the small farmer's economic right to exist as an independent entrepreneurial unit. But as this is a matter of some practical moment, and as heresy is always more disturbing than outright infidelity, it behooves us to evaluate their idea carefully.

Before entertaining it very seriously, we had better look to this question: if small holders indeed earn much less net income per acre to impute to land, how do they manage to hang onto it at all in the present market?

Now we can explain the opposite. We can explain how and why larger holders hang onto lands from which they take a small net income. We have already done so, tentatively, by likening the land market to a "tie-in sale" (and we develop the same idea more formally in Chapter IV, et. seq). The affluent investor may buy land primarily as an investment for the remote future, without much thought for its present use.

In the present context, we can put the same idea in another way, so the relation to marginal productivity is clear.[136] The annual cost of holding title to land consists of (a), The price of the title times the holder's internal interest rate, and, (b), Annual ad valorem taxes on the land. The individual adds land to his farm as long as the annual

marginal product exceeds these annual costs.

For large holders, both these costs are usually lower than for small holders. Interest rates are lower because larger holders generally have more funds of their own to play with, and can borrow much easier than small holders. Taxes are generally lower because of the nigh-universal tendency to underassess large holdings, as documented in Chapter V, Section VII, c, 3.

So it is easy to explain why large holders will keep land from which they draw little net income. The annual costs of holding title are for them very low. But how explain the small holder, against whom the banker and the tax-assessor both discriminate? How can he borrow at high interest, pay high discriminatory taxes, and still keep the land? By hook or crook, he must impute a high net product to it.

For the small farm, that means one of two things. Either, (a), it is not below optimum size; or, (b), technological factors set no very definite optimum, and the small farmer somehow compensates for any disabilities of his smallness.

As to (a), the studies we have cited required no impressively high acreages to realize economies of large operation. They all suggest that farms much smaller than the largest are optimal, and leave plenty of land in large holdings for small farmers to acquire before merging with one another.

As to (b), it is doubtless true that many of the smallest American farms are smaller than what a cold-blooded

technical computation of costs and benefits of large machinery would establish as an optimum size. But these technological optima are generally not at all critical, especially when one considers the wide range of farm machinery sizes available, the possibilities of custom work, cooperative ownership, district functions, part time farming, and so on.

That leaves wide scope for the personal qualities of the manager to determine the net products of land. His willingness to work for low imputed wages due to lack of alternatives and/or positive pleasure derived from captaining his own enterprise; his skill with equipment and men, his wife's morale, his children's age and ability: those are all important factors determining the basic economic viability of an independent farm.

Many farmers with less than enough land to complement an optimum team of men and equipment contrive to stay in business anyway, either by using their time to remarkably good effect, or, more commonly, by the simple if not always comfortable stratagem of accounting if need be very low wages for their time, paying the mortgage, so to speak, out of their hides. Thus they impute annual net products to their small acres equal or higher than larger farmers will because few if any larger farmers have any need, and certainly no desire, to work for so little.

In terms of Figure 2, page 231 that means the small farmer with too little land to achieve the maximum average

net product (ANP) of land can widen the spread between cost and output per acre by supplying his labor cheaply. Thus he raises the entire ANP curve. And, although his farm will probably remain below what is for him as an individual the optimum scale, still he imputes enough to the land to warrant his keeping it from all comers.

That is not to say the present conditions are ideal, where many small farmers waste their labor working to low margins. On the contrary, as the small farmer, by accepting a lower wage return, and working the land to lower margins, increases the average net product of land, he also increases the marginal, which, as he was already in the stage of increasing returns to land, was already higher than on optimal or larger farms. The disparity, the departure from the equimarginal ideal, increases.

But it is to say that the small farmer has established his economic raison d'etre, his right to exist as an independent entrepreneur, even in a hostile world. For he survives for a sound economic reason: he does not consider alternative employments, say as a hired farm or domestic or factory hand, as attractive as being an independent farmer with some security, stability, breathing space, and place in the community. For that he will sacrifice considerable money income; and certainly the choice is his to make. As millions have made it, even in a hostile market, I would not expect them to change it in a more perfect, hence more friendly one.

So henceforth we will accept as given the independent existence of these small units, and focus on decisions at the margins. And there, it is clear, the most economical adjustment for small farmers is not to cannibalize each other, but to nibble off parts of larger holdings.

iii. Consolidation and the "excess" farm population.

A second weakness of consolidation is that it would in itself do nothing to equalize intensities among the farms. At present, of course, the small farms are much more intensive. Are the consolidators suggesting that the small intensive farms cluster into larger units of the same high intensity? When that was accomplished, they would have as much land per farm as their neighbors, but much more labor and capital. Surely, then, good economy would call for some shift of land to them, some invasion of the larger farms.

But the consolidators generally have a different answer. They would consolidate the lands of small farmers, but not the people, nor the capital. The excess they dispose of by trundling them off to the city to the margins of some other occupation, saying "there are too many farmers already". Consolidation, thus interpreted, may be an adjunct to the philosophy of monopoly practices in agriculture.

But where are these people to go? They have already evinced their preference for agriculture over alternatives, and as they are on the whole an extremely mobile people, many of them part time farmers, it cannot be said they are unaware

of alternatives. It seems a bit premature to despair of their making a living in agriculture, when agriculture resources are still so poorly allocated. For the reason that so many farm families are poor is not so much because farm prices are low. They are, in fact, high enough now to be capitalized into almost the highest farm land values in history. It is rather because they lack enough good land to produce much of those high-priced products at any price. And that is a problem these marginal men will encounter in whatever industry they try to enter.

If that opinion appears out of temper with the times, that is, I submit, but evidence of how far from the common sense of economics the advocates of monopoly practices in agriculture have led us, and how far the goal of maximizing the value of titles to farm land has taken precedence over more legitimate ends of social organization, such as opening productive job and investment opportunities, to help produce food and conserve on natural resources in a nation and world where the four horsemen still ride. Certainly one reason why many farm economists do not share our enthusiasm for transferring land from land-surfeited to land-starved farmers is not that they doubt it would increase output, but precisely because it would. Imbued with the spirit of acreage cutbacks and marketing agreements, they naturally look with jaundiced eyes on such dangerous notions as facilitating the union of complementary resources, that they may produce more farm

products than before. To lock up vast acreages undermanned on the one hand, and on the other to keep many farm people idling along at half-throttle for want of land to complement their labor, is quite in line with the philosophy of low output and high price. To consolidate the small farmers off to the city, where they must buy the food they now grow, is better yet.

Our philosophy, as outlined in the introduction, is rather one of facilitating output and income payments in all industries, whereby no industry need suffer lower relative prices, and all can benefit from greater volume. As to aggregate demand, we pointed out that perfecting the land market would be tantamount to opening a new frontier, increasing investment opportunities to balance any increased savings, and raising wages to increase consumption demand. Those who always oppose new frontiers, of course, may oppose this idea; but many even of them will concur, more or less in the measure that they see their interest lies in teaming with a healthy American economy, rather than strangling a sick one. As to farmers in particular, they have everything to gain by increasing the purchasing power of wage earners, whose elastic appetites in World War II so convincingly shattered the fallacy that farmers necessarily receive a smaller share of a higher national income.

From this point of view there will be little talk of "getting surplus labor out of agriculture" -- except as other

industries can offer better opportunities, but then the talk will be not the negative "get them out", but the positive "let them in". From this view, consolidation will be judged on its merits in putting limited resources to the best use, rather than in raising food prices and forcing down wages. Thus judged, consolidation has little to commend it.

3. A last word, to preclude an inevitable misinterpretation.

In concluding, let us have it very clear, we do not say a perfect market would completely equalize farm sizes, even in terms of value, nor would it equalize intensities on all farms. No market is perfect that does not allow for the individuality of different men and different lands. We only say a perfect market would tend to make farm sizes and use intensities more equal than now. And we base this conclusion not on equal size or intensity as a norm, but solely on equal marginal productivity as a norm. This last we do insist on quite strictly. But other kinds of equality we only favor insofar as the equimarginal principle leads toward them.

D. Economies in financing ownership, at odds with operating economies, draw some owner-operations above and others below optimal operating sizes.

1. Tenant operations, their size little influenced by title-financing economies, tend toward medium sizes.

There is yet another reason for believing that the largest owner operations are above optimum operating scales, and the smallest below them -- and hence that the marginal

product of land is higher on smaller owner-operated farms. The reason is that tenant operations, whose scale is uninfluenced by the entrepreneur's greater or lesser ability to finance land titles, tend toward medium sizes, in contrast to owner-operations, which tend more toward extremes of large and small (Table 20):

TABLE 20

Per Cent of Farms in Different Size Groups Which are Tenant Farms.[137]

Size Group (Acres)	Percentage of Group Which Are Pure Tenant Farms
0-3	24.0
3-9	24.6
10-29	42.7
30-49	35.3
50-69	29.1
70-99	25.6
100-139	27.4
140-179	34.6
180-219	32.3
220-259	34.9
260-379	33.8
380-499	29.8
500-699	26.3
700-999	21.3
1,000-4,999	14.5
5,000-9,999	10.5
10,000 and over	9.2

(These figures are only intended to be suggestive. They are not a full picture, as they do not cover part-owners, nor part-landlords.)

Why, again, does that indicate that owner-operations tend to extremes larger and smaller than medium optimal operating scales? The reasoning is sufficiently roundabout to warrant some elaboration.

An owner-operation, as the name implies, has a kind of dual personality, being at once an operating unit and a title-holding unit, the two lying congruent, bonded together in an uneasy union by the compelling fact that the alternative to owner-operation is tenancy, with all its disadvantages for both owner and operator. Since tenant operations -- which are operating units only, and not ownership units at all-- since tenant operations tend toward medium sizes, it is plausible that operating economies, by themselves, prescribe medium farm sizes; and what pulls owner-operations away from medium sizes is the title-holding unit, or shall we say the factors that influence the size of the title-holding unit? Thus some owner-operations are dwarfed below optimal operating scales by the owners' poverty; others are distended beyond any optimum by the owners' positive desire to invest superfluous funds in land titles. To preserve the advantages of owner-operation, entrepreneurs may conform their operations to the Procrustean beds of their finances over an immense range, rather than consign themselves (if they are small) or their

lands (if they are large) to the perils and frustrations of tenancy.[138]

2. Title-holding units tend toward extremes of large and small.

That plausible interpretation would be more plausible if we had some facts on how ownership units behave independently from operating units. And those we have. For the bond that joins ownership to operation, strong as it is, has its breaking point. Let the two units pull hard enough against each other and the bond snaps, ownership and management parting company to go their separate ways. We need only observe the separate ways they take to know how they must influence one another when joined. And it is quite apparent from available data -- imperfect though they are -- that ownership units, freed from operating units, tend toward extremes of large and small, particularly of large; while tenant operating units, as we have already observed, tend toward medium sizes.

a. Splitting of large holdings into smaller operations.

i. Southern Plantations.

Some notion of how the title holding unit may stretch the owner-operating unit is afforded by some special data, which we have already met: the 1910 special Census enumeration of southern plantations (above, pp. 186-188). It shows that the more tenants a landlord had, the more acres also he kept in his home-farm to operate himself (Table 21). Nor was that due to lower acreage values, for these increased with number of tenants per plantation, as we have seen.

TABLE 21

Size of Landlord's "Home Farm"

By Number of Tenants per Plantation,

11 Southern States, 1910.[139]

Average Acres in:	Number of Tenants 5-9	10-19	20-49	50 and over
Plantation	495 acres	953	1,688	3,535
Landlord Farm	227	438	785	1,375
Tenant Farms	42	40	32	30
Average value of Land Per Acre ($)	18.84	19.64	21.13	24.33

Even the smaller landlords had more land than they wished to operate themselves. But the larger ones, on better land, and with smaller tenant operations, still kept almost half their holdings in the "home farm". Much of this home farm, according to the Census' author, was used only very casually. Much of the "unimproved" land on the home farms was "capable of cultivation". "The opportunity for future agricultural development on many of these plantations is large." So casual, indeed, was the attitude that the Census reported:

> It is possible that in some cases the landlords failed to report their entire holdings, some of the unimproved tracts perhaps not being looked upon as constituting farms at all. 140

T. J. Woofter, analyzing the same plantation area a generation later, reported there were only about half as many men per 100 acres on the home farms as on the tenant farms of the plantations.[141] Woofter wrote:

> Each plantation has a reserve of idle land which can be brought into cultivation or left idle according to price prospects. .... After the landlord has determined the number of families he can finance and the acreage which he can conveniently and economically plant to cotton, he allows the balance of his land to grow up to woods and so-called pasture if it is not too severely eroded. A considerable part of the idle land and some of the woods and pasture could, if necessary, be converted to additional crop acreage. [142]

Evidently it must have been the title-holding unit -- i.e., the landlord's ability and desire to agglomerate land titles as investments -- and not operating economies that stretched those home farm operating units out to such sizes.

As there is some doubt whether these particular tenant units, or "cropper" farms, were entirely independent farms in the usual sense of the word, the data are not so overwhelming as they would otherwise appear. They are conclusive only in the measure that the cropper units are in fact independent operating units -- a measure we do not here try to take. There is no doubt, however, but what the cropper units were to some degree independent operating units, hence that there was some sort of tendency to split the larger holdings into many operating units; and the larger the holding, the more the splitting. It also seems clear that the great size of the "home farm" must be due to something other than a pressing

need for land, inasmuch as the home farms are so lightly used.

ii. Holdings of rented farms in the United States.

For the United States, as a whole, alas, there are no comprehensive data on title-holding units separate from operating units more recent than 1900. The United States Census provides admirable detail on our peanut crop, plumbing facilities, and other minutiae, cross-classified by regions and color. But as to who holds title to the basic natural resources of the country, and in what quantities, it has long been silent. Even the 1900 data leave much to be desired. They are, however, well worth a look.

The 1900 Census ranks holdings of rented farms according to value; according to acreage; and according to the number of rented farms in the holding. For each size group of holdings so ranked it shows the per cent of title-holders whose holdings fall in that group, and the per cent of rented farms which they hold, with these results: (Table 22). See page 272.

Evidently, from (i) and (ii), as the value and acreage of holdings increase, the number of separate operating units into which they are split increases mightily, since the per cent of holders falls off so much faster than the per cent of rented farms. From (iii) we see that 50% of all rented farms were held by those with more than one rented farm; 12% by those with 10 or more. Clearly some of these title-holding units tended to great extremes on the large side. To be operated, these clumsy colossi had to be split among

TABLE 22

Rented Farms, Number of Holders and Number of Rented Farms, By Size Groups Variously Defined, 1900.[143]

(i) By Land Value of Holding	Per Cent of Owners of Rented Farms	Per Cent of Rented Farms
Under $1,000	38.8%	30.9%
1,000-1,999	15.8	15.6
2,000-4,999	24.1	23.8
5,000-9,999	13.2	14.5
10,000-24,999	6.9	10.3
25,000 and over	1.2	4.9

(ii) By Acreage of Holding	Per Cent of Owners of Rented Farms	Per Cent of Rented Farms
Under 100 acres	55.4	41.9
100-199	26.4	23.7
200-499	14.8	20.2
500-999	2.5	7.6
1,000-2,499	0.7	4.6
2,500 and over	0.2	2.0

(iii) By Number of Rented Farms in Holding	Per Cent of Owners of Rented Farms	Per Cent of Rented Farms
1	80.0	50.0
2	11.4	14.8
3 and under 5	5.4	11.6
5 and under 10	2.3	9.7
10 and under 20	0.7	6.0
20 and over	0.2	5.9

many smaller tenant units.

iii. Splitting of large holdings around Fresno.

A more recent study, one that has the advantage over the 1900 study of including the owner-operated portions of landlord holdings as well as the leased portions, is that of Wilson and Clawson in the valley floor areas of Kern, Madera and Tulare Counties, California. They give data from which one can compute what per cent of holdings of various sizes are split into two or more operating units. Splitting increases rapidly with size of holding (Table 23). While the holdings are ranked by acreage, rather than value, the area is one within which the quality of land in larger holdings is on the average not of much worse quality than that in smaller holdings, if we judge it by the per cent which is cropland.[144]

TABLE 23

Splitting of Title-Holding Units Ranked by Acreage, Valley Floor of Kern, Madera, and Tulare Counties, California. 145

Acres of all Land per Ownership Unit	No. of such Ownership Units	No. split into 2 or More Operating Units	Per Cent So Split
80 or less	9,559	177	1.9%
80-160	1,708	135	7.9
160-320	928	125	13.5
320-480	271	60	22.1
480-640	146	30	20.5
640-1280	208	69	33.2
1280-1920	51	23	45.1
1920-2560	22	12	54.5
2560-5120	23	10	43.5
5120-& over	25	16	64.0

iv. Diseconomies of administering chains of rented farms.

In some instances, particularly in some of the southern plantations, with their peculiar sociological structure, these large title-holding units may be more than mere financial operations, and contribute something to management. But as a general matter one may say that the large holdings are agglomerated as investments, and not to achieve operating economies.

And often they are agglomerated in the face of great diseconomies, that arise from the more complete separation of ownership from management that occurs when one landlord owns more than he can count. For close and friendly personal contacts between landlord and tenant are a magic that often prevents the tenancy relationship from wreaking its worst havoc. But as a landlord acquires more tenants, the gulf between them widens. The unfortunate results can be seen and counted. H. A. Turner computed the number of tenant farms in the North Central States which were "decreasing in fertility", and tabulated them by the number of tenant farms per landlord, with these results (Table 24):

TABLE 24

Per Cent of Rented Farms Decreasing in Fertility, By Number of Rented Farms Owned, North Central States, 1920.[146]

Rented Farms per Landlord	Per Cent Decreasing In Fertility
1	15%
2-4	20%
5 and over	37%

Turner also reported a similar pattern for the whole country, noting that it held for the south more than the north. This opinion was based on the replies of landlords to a census questionnaire.[147]

It is safe to say, then, that it is not usually operating economies that bring many tenant farms under one hand. Often enough the different tenant farms are scattered in small pieces over a wide area, and have no conceivable operating relationship;[148] and, as Doreen Warriner wrote of Syria and Iraq; "land ownership is a credit operation, nothing more."[149]

b. Lorenz data on concentration of ownership and operation.

The foregoing data create quite a strong presumption that title-holdings tend toward extremes of large and small, while operating units tend toward medium sizes. Still they leave elements of doubt. For one thing, they do not include, as we mentioned, the owned portions of part-owner operations --

i.e. of those operators who rent in some of their land and own the rest. More important, the criterion of size has been the title-holding unit alone. The fact that the largest title-holding units are split into many operating units does not preclude the possibility that the largest tenant farms are just as large, and are composed of just as many title-holding units.

To be sure, it should be obvious to anyone at all familiar with the facts that there are no such tenant farms. Where is the integrated tenant operation that covers 1,900,000 acres, the holding of the Kern County Land Company? Or where is, or ever was the tenant who numbered his landlords in the thousands, as the Bank of America, and California Lands did their tenants not so long ago? In 1934, AAA data relative to the corn-hog programs showed 25 multiple holders who had 1,000 or more tenant farms. Among them these 25 had 70,400 tenants and about 14 million acres.[150] Probably it was partly the troubles of the times that swelled those figures so high; but when were tenant operations ever so swollen? There is little doubt in fact that tenants with more than one landlord are generally medium-sized, relative to the largest title-holdings; and the fact that they have more than one landlord merely corroborates the thesis that title-holding units tend to extremes of small as well as large, and operating units to medium sizes.

However, formally, it would be reassuring to have some comprehensive data to prove the point, rather than depend on

the infinite mass of fragmentary fact and opinion that one might present. Ideal to test the question would be data on the concentration of all title-holding units, ranked by size of holding, to compare with data on the concentration of all operating units, ranked by size of operating unit. But such data are hard to come by. Most countries, like us, enumerate only operating units; a few, like England and Egypt, only title-holding units; and some, like Iran, nothing at all. It is, therefore, indeed a red-letter day for the student of land tenure when he finds parallel data on the concentration of title-holding units and operating units.

This student has, in fact, found only two such parallel series, one for Sweden in 1919, the other for Rumania in 1941. Both of them show that title-holding units tended to extremes, appreciably more so than operating units, as manifested in the Lorenz Concentration Ratios (LCR) being higher for the title-holding units.[151] (Table 25)

TABLE 25

Lorenz Concentration Ratios (LCR) for Title-Holding Units Compared to Operating Units.[152]

LCR	Title-Holding Units	Operating Units
Sweden, 1919	.60	.55
Rumania, 1941	.59	.56

These concentration ratios are based on acreage, not value of land. Were they based on value, the contrast would without doubt be considerably greater. For value per acre tends to fall with acreage per unit much more for operating units than for title-holding units. That we have already seen for the United States (above, p. 198). And rationally it must be so. For where investment is the primary motive behind land purchase, the individual with the funds to buy more acreage also has the funds to buy better land. But where operation is the primary motive, of course optimal operating scales tend to be larger on poorer land.

Lacking data on other countries, we can still be sure that the pattern of Sweden and Rumania is oft repeated. This, that Antonin Basch wrote of Czechoslovakia, has a very familiar ring:

> In general it might be said that there existed vast estates on one side and very small farms on the other. This situation of land-ownership led to a growing number of tenancies, both large and small. 153

In other words tenancy is, as is obvious on the face of it, a device for transferring the use of land from those who have too much to operate to those who have too little; in general, from large landholders to small. Thus it naturally develops that land operations tend more to medium sizes than do title-holdings.

For the United States, the best we can offer are some data from a sample study of farm landholdings in 1946.[154]

There is ample cause to believe that the sample does not represent the whole universe to a high degree of accuracy. Nevertheless it shows a rough trend that is quite significant. Cross classifying landholders by size of holding and by occupation, the sample shows that the holdings of active farmers tend toward medium and small sizes compared to those of retired farmers, which tend toward large sizes. The holdings of business and professional men particularly tended toward extremes, of both large and small.

In other words, the more likely was the holder to be an investor first and a farmer second, the more likely was his holding to be very large (or, to a lesser extent, very small). (Table 26):

TABLE 26

Per Cent of Male Farm Landholders by Occupations,

And by Size of Holding (Whether Operated or Leased).

Based on a Sample.[155]

Acres	Farmer	Retired Farmer	Business-Professional	Clerical-Laborer
10	3%	2%	10%	23%
10-29	9	5	12	24
30-69	19	14	15	21
70-139	29	30	19	18
140-219	18	20	14	7
220-499	14	19	17	4
500-999	5	6	7	2
1,000-1,499	1	2	2	0.5
1,500 or over	2	2	4	1
Total	100%	100%	100%	100%

Now may we consider it proven that title-holding units tend toward extremes, and operating units toward medium sizes? "Proof" is of course always a matter of degrees of certainty. Our first conclusion must regretfully be that the data necessary to establish the highest degree of certainty are lacking. We hope the United States Census will begin to gather the necessary data as soon as possible. (It could even collect such data for years past, from county assessors' and title company records.) Secondly, as far as the author is concerned, in a wide and continuing search for relevant data he has found a good deal more fragmentary evidence than presented here to support the idea that title-holding units are more concentrated than operating units; he has good theoretical reasons, which appear in Chapter VI, to believe that it would be so; and he has found little specious evidence, and no substantial evidence to the contrary. He is therefore quite certain of his conclusion. The reader, of course, will draw his own, from the data here presented and such other facts as are known to him.

c. The more a holding partakes the character of a pure investment, with the holder divorced from operations, the larger it is apt to be.

In concluding, one important matter of emphasis should be brought out. We have spoken of title-holding units tending toward extremes of large and small, as though there were a perfect symmetry of the two. Actually, title-holding units, divorced from operations, tend to extremes on the large side

more than the small. For the reason that many owner-operations are so small is not that the owner has any strong motive to invest in land for its own sake. He wants the land to complement his enterprise. When he gives up the struggle and becomes a tenant, the small title-holding unit is not so likely to survive.

Accordingly, the average title-holding unit is generally larger than the average operating unit. Estimates vary, and there are no complete American data on title-holding units. But there seem to be somewhere between one and a half to two operators of rented farms for every landlord.[156]

One can safely generalize that the more a holding partakes of the character of pure investment, and the farther removed is the title-holder from any contact with actual operations, the larger it tends to be.

One evidence of that is the general tendency for absentee holdings of rented farms to be larger than resident landlords' holdings. For example, Turner found in 1920 that North Central state landlords residing in the same county with their tenanted holdings averaged 167 acres; out of state landlords, 239 acres.[157] Turner's data were from samples. The 1900 Census, with its complete enumeration of landlords of rented farms, is more accurate. It showed, for the whole United States, that in-county landlords averaged 85 acres; out-of-county but in-state landlords averaged 126 acres; and out of state landlords averaged 159 acres (clearly the average holding was much smaller

in 1900 than 1920).[158] Finally, foreign resident landlords had the largest holdings of all. Here is how their size distribution compared with American landlords (Table 27):

TABLE 27

Percentages of American and Foreign-Resident Landlords Having Holdings of Different Sizes, 1900.[159]

Per Cent of Landlords Having	United States Residents	Foreign Residents
Less than 100 acres	16.6	6.8
100-199	25.2	15.0
200-499	29.0	23.0
500-999	11.3	12.4
1,000-2,499	7.4	14.7
2,500 and over	10.5	28.1
Total	100.0	100.0

The foreign residents' land was also of greater value per acre, and the value per acre decreased less with size of holding. Add to that the fact that the foreign residents undoubtedly had other holdings in their own and other countries, and the picture is complete.

Other evidence that pure financial holdings tend to be larger than those with operating attributes is in the

colossal holdings of financial institutions. These institutions of course acquire farms entirely for financial reasons, and with no desire to operate them. In the 'thirties, due to the many foreclosures, and relaxation of laws requiring financial institutions to dispose of foreclosed real estate quickly, banks and insurance companies acquired vast empires of tenant farms. AAA data relative to the corn-hog program showed that 111 insurance companies in 1935 held 67,302 tenant farms -- and that was in only one branch of agriculture.[160] It is often said that this was forced on them, that they wanted to dispose of these "frozen assets" but simply could not. It is true they did not aggressively move out to buy up these farms. But it is also true that there is always a market at a price; and they consciously chose to retain those farms rather than sell them for what they would bring at the time, because they thought they could do better later. In short they held them, once acquired, as speculative investments, which they could afford to do because of their greater financial strength. All of which serves to corroborate the point that where lands are held primarily as investments, holdings tend to be very large.

E. A. Stokdyk observed of corporate farms in general that many served best to hold land for the increase of value, or to liquidate foreclosed lands, and that when it came time to earn income from actual operation of the land, smaller units became more economical.[161]

Finally, there is a group of landholders who concern themselves even less over operating economies than foreign landlords or financial institutions. Those are the holders who do not use their lands at all, but hold them idle for future resale. As there are no operations, there is no concern with operating economies. And there are the largest holdings. Their vastness is legendary.

The legend is well documented. The works of Shaw Livermore and of Paul W. Gates, to name only two of the most outstanding scholars in the field, leave little doubt of the matter. Where other men dealt in hundreds of acres, the western speculators dealt in the hundreds of thousands, from the first frontier to the last. Where land was only to be held, and not operated, the great bankers, the richest men of Europe and the eastern cities had no rivals in bidding for title. They generally pooled their assets, attracted hordes of smaller investors to join them, and put together the most gigantic holdings the country has ever known. And there should be nothing surprising about that. For when a thing needs only to be financed or otherwise acquired, and not operated, or even supervised, there is hardly an upper limit to the advantages of raising money and influencing legislators on a large scale.[162]

To sum up: when the bond snaps which has joined title-holding units to operating units, and they go their separate ways, it becomes evident how they must each separately influence

the size of owner-operations, which they determine jointly. Title-holding units, alone, tend to extremes of large and, to a lesser degree, small. Operating units, by contrast, tend toward medium sizes. From that it follows that difficulties of title-financing restrict some owner-operations within acreages too small to realize optimal economies of large-scale operation; and the desire to invest in land titles distends others beyond any optimum. Thus it comes about that the marginal product of land is higher on smaller than on larger owner-operated farms.

E. Direct evidence of contrasting marginal productivities.

1. Some marked Contrasts.

Where a landholder has so much more land than he can operate effectively that the marginal product of land approaches zero before he has expanded his operation to his outer boundaries, it is to be expected that he will put only part of the land to an intensive use, and keep the rest in pasture or fallow. Evidently that is what many of our larger landholders do, according to these 1940 Census data (Table 28): (see p. 286)

Myers, in a 1920 sample study of 53 New York farms found a great deal of rich, tillable land being used for pasture or woodlots -- low income yielding uses -- while many poor, barren hillsides were cleared and plowed. "On the smaller farms," he wrote, "land is generally too scarce to be used for forestry purposes".[164]

TABLE 28

Land Available for Crops and Land Used for Crops, By Acreage in Holding, 1940.[163]

Acreage In Farm	Land Used For Crops (Million Acres)	Land Available For Crops (Million Acres)	Per Cent of Land Available for Crops Which is Used For Crops (Computed)
Under 3	.021,573	.024,695	87.4%
3-9	1.353	1.891	71.4
10-29	11.21	14.19	79.0
30-49	14.95	20.53	72.8
50-69	13.44	19.61	68.5
70-99	28.3	41.59	68.0
100-139	33.9	50.59	67.0
140-179	45.8	65.00	70.5
180-219	23.8	34.86	68.3
220-259	23.0	32.60	70.6
260-379	45.1	65.57	68.8
380-499	25.1	37.51	66.8
500-699	22.0	35.26	62.4
700-999	17.2	29.59	58.1
1,000-4,999	30.6	63.15	48.5
5,000-9,999	3.160	8.790	35.9
10,000 & over	2.775	9.343	29.7

TABLE 28 (continued)

Definition of Terms:

"Land used for crops" -- cropland harvested and crop failure.

"Land available for crops" -- cropland harvested and crop failure plus idle or fallow cropland plus plowable pasture.

(Of these last two, by far the larger item is plowable pasture. "Fallow cropland," the smaller item, is not necessarily "underused," but may be part of a dry-farming rotation.)

We have already cited the 1936 Woofter and 1910 Census studies of southern plantations, with their free use of good land for low- or non-yielding pasture and woodland (pp. 268-271 above). Contrasting these uses with the plowing of steep hillsides by mountaineers in the southern Appalachians, one can hardly avoid concluding that the marginal productivity of the unused plantation lands would have been higher in the hands of those under greater constraint to economize on land. Black, Clawson, Sayre and Wilcox, in their Farm Management, have pointed to many "farmers who are operating farms too small for their capacity; . . ." For many such a farmer, they write,

> . . . the chances are that he will do well to increase the size of his undertaking. Thousands of farmers, younger farmers, especially, can be found fitting this description in the sections with crowded populations on poor land, as in the southern Appalachians, or even on good lands as in the Black Prairie of Texas. [165]

One of the farms over 10,000 acres that must have figured in the Census data is the Kern County Land Company. This company, controls most of the water from the Kern River and has thousands upon thousands of acres of good irrigable land around Bakersfield, in California's productive San Joaquin Valley. But up to 1941 it had barely begun to develop these resources.[166] President Pigott of the big land company himself estimated the company's holdings of land "reasonably suitable for farming" at 138,000 acres in Kern County alone -- Bureau of Reclamation land classification staff men put the figure

somewhat higher -- and claimed to have available plenty of water, at costs "very much" lower than those charged by a heavily subsidized Federal project.[167]

Fortune's 1933 article on Texas' vast King Ranch brought out that it contained, among its 1,250,000 acres, 90,000 acres of choice black land, the richest in Texas. Of these 90,000 acres, 80,000 were in 1933 unimproved, ungrubbed and uncultivated. The ruler of this empire, considered a man of Napoleonic ambition and energy, had recently found in a pasture the ruins of an entire village whose presence on the ranch no one had previously even suspected. In eight years preceding 1933 he had invested $1.60 an acre in improvements. This was considered a vigorous improvement campaign compared with what had preceded it. By virtue of the improvements the ranch's carrying capacity had been doubled, suggesting that the application of capital to this land had by no means been carried to the point where additional improvements brought small increases. Gross receipts were about 56¢ an acre, net receipts about half that.[168]

Another Fortune report, on the large El Solyo Ranch near Patterson, California, pictured a management overwhelmed with the problems of handling many acres of intensive crops. The problem was "solved" by such methods as bulldozing over a peach orchard that grossed $500 an acre to plant barley grossing $50, and firing a large part of the work force.[169]

A glance through Walker's Manual of Pacific Coast

Securities at accounts of large corporate farms such as the Sutter Basin Corporation, River Farms Company of California, Tejon Ranch, and the Sutter Buttes Land Company, reveals a marked emphasis on non-intensive crops, low outputs per acre, and high ratios of net to gross output. An outstanding exception evidently is the 22,000 acre Di Giorgio Farms, with thousands of acres in vines and tree fruits, high gross output per acre, and a low ratio of net to gross output. This much publicized operation attests to the vigor and genius of Joseph Di Giorgio, but hardly to the typical development of large land holdings.

The California commission of Immigration and Housing in 1919 summed up an extensive survey of large land holdings in southern California in these words:

> It further appears that a considerable part of the land in these large holdings lies idle, that another considerable part of it is not devoted to its best use, and that much of that part of it which is for sale is priced far above its productive value and offered under conditions which make its purchase by the average landseeker hazardous and by the poor man impossible. 170

Many of the holdings referred to remain intact, and it would be interesting to know what a similar survey today would disclose. Lacking that we can at least infer from this oft-cited study that, as of 1919, the land market was not approaching the equimarginal ideal.

Some foreign parallels are described in the notes.[171]

Now contrast the need for additional land on these giant holdings with the need on the tiny farms that Theodore Schultz had in mind when he wrote:

> We take it to be a fact that in the United States there are many farms, probably fully a third of them, which are far below the optimum in the quantity of inputs committed to farming and which employ too few capital inputs relative to the labor that is used. The scale effects in the case of these farms indicates strongly the possibility of achieving increasing returns from farm enlargement. The existing combination of factors means that the returns to labor are relatively low while those to capital are relatively high. 172

(Like Johnson, previously cited, Schultz evidently uses "capital" metonymically to mean or include "land".)

2. AAA acreage cutbacks.

Another evidence of the remarkably low marginal productivity of land in large segments of American agriculture was provided by the AAA experience with acreage cutbacks. It is not often that we find in practice perfect examples of the theoretical concept of subtracting a few acres from a farm. But the AAA program did just that. It subtracted acreage, pure land alone, and not labor nor capital (for of course no farmer subtracted the land on which his buildings stood, nor did he cut back on his rolling stock). And it did this mainly on the larger, land-intensive farms, inasmuch as the AAA program supported mainly the crops which larger, land-intensive farmers produce. The result of these acreage cutbacks, as is well known, was to reduce output little or none. The farmers simply adopted more intensive techniques,

applied more labor and capital per acre to a smaller acreage, and produced as much as ever. Schultz writes:

> The over-all conclusion is: in most types of farming there has been sufficient flexibility because of substitution to offset the anticipated reduction in production of any moderate cut in acreage. As a consequence the crop production features of the AAA have been quite ineffective. It is only when drastic cuts in acres were enforced that any substantial change in production has occurred.
>
> . . . .
>
> The economist might well ask at this point whether or not the AAA has forced uneconomic use of resources upon farmers in spite of the substitution which they found possible. The answer is an unexpected one. It did quite the opposite. The cotton, corn and wheat farmers were not using farm practices which gave them optimum results. There was much lag in adoption of the best-known farming techniques which had been developed, and since the AAA programs had the effect of hastening the adoption of precisely these better techniques, they have actually occasioned, on a good majority of the farms, what is in essence increasing returns by forcing a recombination of the factors and an introduction of newer and better farming practises. 173

Increasing returns from restricting acreage! That is not what one usually has in mind when he speaks of "increasing returns". It is, in fact, the exact opposite. Taken literally, it would mean that the marginal product of land on many farms is negative. At any rate it suggests that the marginal product of land on many American farms is very low.

We lack the present resources to pursue this matter further, and will merely refer the reader to Schultz' statistics and interpretation.[174] There is there some hint that acreage cutbacks restricted output the least in regions

of large, land-intensive farms, such as the central corn belt, and the delta cotton area. We venture to predict that a thorough study of the question would show that acreage cut-backs restricted output much more on small, intensive farms, where land is a limiting factor, than on the large spreads where valuable land is treated somewhat like a free good.

3. Outlying Fields.

We have mentioned Myers' Economic Study of Farm Layout, and the importance of transportation costs between the farmstead and outlying fields. Myers was quite struck with the number of outlying fields, forced into low producing uses by their distance from the owner's farmstead, which were nearer to some other farmstead. "Frequently such fields too distant to be farmed economically by their owner, are directly across the road from a neighbor's house."[175] He commented that many such fields in his observation -- and his was an empirical study including many individual instances -- would be worth a good deal more to the nearer farmer than to the present owner. He recommended that many of them be transferred.

F. Summary of Section II.

To sum up the chapter thus far, we have established five points:

A. The range of farm sizes is immense, whether "size" be measured in value or acreage;

B. larger farms tend to be less intensively manned, improved and equipped per dollar of land value;

C. the marginal product of land must be high, as a rule, on a farm with too little land to achieve economies of large-scale operation than on a farm with more than enough;

D. operating units, where divorced ownership units, tend toward medium sizes, in contrast to ownership units, which tend toward extremes;

E. there is some direct evidence of contrasting marginal productivities among different sized farms.

These facts do not prove absolutely that the marginal product of land tends to be lower on larger farms. Absolute proof is rarely possible in economic discussions other than purely theoretical, and often not there. But taken singly these are all consistent with the hypothesis that the marginal productivity of land tends to be lower on larger farms. Taken together they are hard to reconcile with any other conclusion.

III. The trend of concentration of farm land in the United States.

A. The increase of concentration after 1910.

Many there are who regard the matters we are discussing as of historical interest only. It is true, they concede, that the cattle barons, the railroad and Spanish land grants, bonanza farming, the great land office frauds and so on created great latifundia: but that day is passing. Decades of subdivision, improvement and intensification create a modern pattern greatly improved over the inequitable heritage of the past. After all, are not even the heirs of Henry Miller, the

million-acre cattle king, down to their last 20,000 acres? Before checking with Census figures, the writer was inclined to accept ideas like those.

Now let us look at the facts.

The concentration of American farm acreage, as indicated by the Lorenz Concentration Ratio (LCR), increased from .58 in 1900 to .70 in 1950:

TABLE 29

LCR for Acreage in Farm Operations, United States, 1900-1950.[176]

1900	.58
1910	.57
1920	.60
1925	.62
1930	.63
1935	.65
1940	.67
1945	.70
1950	.70

That means, for example, that in 1900 the largest 2.6% of the farms had 31.7% of the land; in 1950, the largest 2.3% had 42.6% of the land.

Preliminary releases from the Census of Agriculture taken in 1954 indicate, as we go to the typist, that LCR increased at an accelerated rate from 1950 to 1954.[177]

If we measure farm size by gross sales, LCR increased from .50 in 1900 to .68 in 1950.[178]

Some idea of how great a change that is can be determined by comparing it to a more familiar change; the recent decline of national income concentration. In 1935-1936, United States National Income LCR was .43; in 1953, .40.[179] That decline of 3 points has been often referred to as "the revolution in income distribution". If that is a revolution, the 12 point increase in concentration of farm land represents a major overturn.

Nor do those LCR figures reveal the entire extent of the change. There are several other factors to consider.

1. The <u>average</u> farm size has increased.

That is a matter the LCR does not take into account, for it is based entirely on percentages, and might in fact rise when new farms were created, if the new farms were all very small. But it is also important to note that in 1900, when United States population was 76 million, the average farm was 146.2 acres. In 1950, when population was 151 million, or twice as much, size of farm had not fallen to permit of more intensive farming; rather it had risen to 215.6 acres.[180]

2. Concentration by <u>value</u> must have increased a good deal more than concentration by <u>acreage</u>. Because the value per acre of larger farms increased a good deal faster than the value per acre of smaller ones. In Table 30 we compare acre values of all farms to acre values of farms over 1,000

acres, from 1900 to 1950. Up to 1940 the Census gives land values free of building values. After that we must depend on the values of land and buildings combined. To preserve the continuity we present the land plus buildings data also from 1900.

TABLE 30

Acre Values of All Farms, and All Farms Over 1,000 Acres, and Their Ratio, 1900-1950.[181]

(a) Land Alone	1900	1910	1920	1930	1940	1945	1950
1. Farms over 1,000 acres	4.86	12.92	18.95	12.76	8.29	n.d.	n.d.
2. All farms	15.59	32.40	57.36	35.39	21.90	n.d.	n.d.
Ratio, $\frac{\#1}{\#2}$	.31	.40	.33	.36	.38	--	--
(b) Land and Buildings							
1. Farms over 1,000 acres	5.18	13.92	20.53	14.30	9.42	12.46	24.23
2. All farms	19.81	39.60	69.38	48.51	31.71	40.63	66.75
Ratio $\frac{\#1}{\#2}$	.26	.35	.30	.29	.30	.31	.36

Except for 1910, which departed erratically from trend, the acre values of farms over 1,000 acres have gained steadily on all farms.

3. Finally, in this period land under lease probably increased, although one cannot be certain from Census data,

which do not separate the owned and leased portions of "part-owner" farms in earlier years. Tenant farms, as we have seen, tend toward medium sizes, and thus tend to lower LCR, which measures the extent to which farms tend to extremes of large and small. Owner-operated farms, exclusive of tenant farms -- the subject of this chapter -- probably therefore have increased their LCR by more than the increase in the figures cited, which include tenant farms.

B. The drift away from medium sizes.

Many economists explain these trends largely in terms of mechanization and consequent consolidation. And no one can deny that mechanization has proceeded rapidly, and influenced the trend enormously. That is obvious from, if nothing else, the rapid increase of LCR in two great wars, when mechanization made its most rapid strides.

But to take mechanization as the sole, or even the primary cause of increasing concentration seems to me a great error. That hypothesis does not fit all the facts.

Let us recall what "concentration", as measured by LCR, means. A high LCR means that a small per cent of the farms have a large per cent of the land. When LCR rises that can mean the largest farms are growing in <u>area</u>; but it can also mean that the smallest farms are growing in <u>number</u>. In the United States, since 1900, both have happened.

If mechanization were the prime mover of the trend, one would naturally expect LCR to decline, as the very smallest

farms become fewer, being consolidated into medium farms; and the very largest farms were subdivided for more intensive use which mechanization makes possible; or at any rate remained the same.

But what has happened, rather, is that farms have been drifting away from medium sizes toward the extremes, of small as well as large. From Census data it seems most plausible that the farms which are growing larger are not the small ones, but the ones that were already large. The small ones seem to be getting smaller.

Let us compare 1950 with an earlier year, and mark the changes in each size group. 1910 was the year of lowest concentration (LCR having declined slightly from 1900 to 1910 due mainly to a pronounced subdivision of farms over 1,000 acres that occurred in that remarkable decade). Ideally we would compare 1950 to 1910, after which year the drift from medium sizes begins. But alas, Census data for 1910 are not broken down into such small acreage groups as later years. Hence we choose 1920 instead (Table 31); (see page 299).

Since 1920, the number of farms has declined in the medium size brackets, but increased in both the very large and the very small. Under 10 acres, the number has increased, and the lower the acreage bracket, the greater the percentage increase. Over 260 acres they have increased, and the higher the average bracket, the greater the percentage increase. In the medium sizes, the 50-99 acre group has lost the most,

TABLE 31

Number of Farms, Acres, and Acres per Farm, by Size Brackets, 1920 and 1950.[182]

Number of Acres in Farm	Number of Farms (thousands) 1920	Number of Farms (thousands) 1950	Acres (thousands) 1920	Acres (thousands) 1950	Acres Per Farm 1920	Acres Per Farm 1950	Acres Per Farm 1950 *1920
Under 3	20	77*	34	n.d.**	1.7	n.d.***	.82
3-9	268	408*	1,567	n.d.**	5.8	n.d.***	.93
(all under 10)	(289)	(485)	(1,600)	(2,430)	(5.5)	(5.1)	(.93)
10-49	2,011	1,478	55,553	39,336	27.6	26.6	.96
50-99	1,475	1,048	105,631	75,628	71.6	72.3	1.01
100-179 (100-174 for 1920)	1,450	1,103	194,681	149,942	134.3	135.9	1.01
180-259 (175-259 for 1920)	531	487	112,563	105,388	212.1	215.0	1.01
260-499	476	478	164,244	166,584	345.3	348.8	1.01
500-999	150	182	100,976	125,981	674.0	685.0	1.02
1,000 and over	67	121	220,636	494,501	3,273.3	4,084.7	1.25
Total	6,448	5,400	955,884	1,159,789	148.2	215.6	1.45

* 1945 - 99
1945 - 496

** 1945 - 141
1945 - 2,664

*** 1945 - 1.4
1945 - 5.4

(1950 data on the acreage of farms under 10 acres were not broken down at the 3-acre division, and so 1945 data were substituted in computing the final ratio.)

percentagewise. It is the dead center -- below and above it all decreases become progressively less and then increases progressively greater.

It might be thought that, as the number of the larger farms increased, their average acreage fell. The opposite is true. In the middle brackets the average acreage in each bracket remained the same. In the upper brackets, most notably over 1,000 acres, the average acres per farm increased. In the lowest brackets, the average decreased: and the lower the bracket, the greater the percentage decrease.[183] Thus within the lowest brackets the average farm is becoming smaller, is moving toward the bottom of the bracket. Within the largest, they are moving toward the top of the brackets.

Here, then, is a picture, not of consolidation alone, although that is an element; but also of the largest farms growing, and largely at the expense of medium farms, whence came much of the 300 million acres or so increase in the acreage of farms over 500 acres. It is a picture of some medium farms growing larger, and some growing smaller, and some going out of business. But it is not a picture, such as the mechanization hypothesis requires, of the smallest farms being consolidated into optimal medium sized farms. It is a picture of the decline of the American yeoman, the 160 acre homestead farmer, and the growth of a widening gulf between large and small farmers. It is more consistent with the hypothesis that title-holding units, tending toward extremes of large and small, are

gradually drawing American agriculture away from the pattern of medium operating sizes established in the 19th and early 20th centuries by the Homestead Act, the low value of farm land, and relatively high taxes on land holdings. (That brief explanation we here only suggest, without trying to prove.)

The upshot is this. If it is true, as the data of this study indicate, that the marginal product of land is generally higher on smaller farms, then most certainly the progress of the market in recent decades has not been to shift land toward its highest and best use, according to the equimarginal principle, but the opposite. There is no tendency for the market, over time, to work out its imperfections -- they are not due to mere friction. The longer the market forces have had to work, the farther they have taken farm operations from the equimarginal ideal.

What the facts establish, at least in the mind of the author, is some pervasive disturbance in the land market,[184] which now manifests itself spectacularly in great idle holdings, now morbidly in cropper tenancy, but quite beyond those problems, pervades every land transaction, and may keep most American acres from their most productive uses. To measure the losses would be superhuman. But if the disturbance is indeed all-pervading, they must be immense.

IV. Conclusion to Part I.

Now we reach the end of a survey of three major land problems: unused land, tenanted land, and land operated in non-optimal holdings. These were presented in order of their obviousity, this being also the order in which they came originally to the author's attention. Each at time of discovery seemed to be a distinct problem. But there is a basic unity to them. Each represents a failure of the market to allocate land equimarginally.

This unity is a matter not just of exposition, but of the nature of things. In the ensuing chapters we undertake to explain these three problems as common effects of a single basic cause, or set of causes. And in Chapter VI we revert to the marginal analysis to explain all three within the compass of a single graph.

Meantime, let us assess the results of Part I. Have we "proven" that the market fails to allocate land equimarginally? Probably in actual affairs there is no proof that is absolute in the sense of logic or mathematics. And certainly regarding the matters here treated, with data drawn from sources of varying reliability and often subject to alternative interpretations, it would be presumptuous to claim anything approaching rigorous, irrefutable proof. That we leave for the theoretical reasoning of Part II, which does involve "proof" in the sense of logical necessity. As to Part I, all we would conclude from it is this: the facts

seem consistent with, and would not contradict a hypothesis that the market fails to allocate land equimarginally among different enterprises. Holders of unused land outbid others who would put the land to productive use. Absentee landlords outbid tenant operators for land the latter operate, thus injecting into land management the many unrequited costs and frustrations of the landlord-tenant relationship. And large landholders outbid small ones for lands at the margins between them, even though it seems these lands would add more to net output on the smaller, more intensive farms.