

642] Opt. size: cc. of scale;
spurious cc. of scale; L
theoretical analysis

If social int. calls for
group's things closer than
individ.s will, ec. of scale is
direct control over group's.

Every ec. of scale is a denial
of mkt, is subst. direct control
for mkt. If mkt's absol. perfect,
no ec. of scale larger than capac. of
one human.

"Pure scale" etc - nonsense.

Bes can't add raw materials & wks in limited space.

E.g. wth supply. Is no homogeneous land input to add as grow bigger.
So exhaust sites within city hinterland.

Thoughts on opt farm size.

Where character of land and optimal utilization is such that land value is larger share of total investment, then financial power becomes dominant element in determining size.

Where land is flat, and output uniform, then large scale operation becomes more feasible. There is a contrary principle, that more productive land, with more gross output per acre, lends self to smaller farms because the limitations of mgmt etc become acuter in step with gross output. But this is perhaps often submerged. Esp where grain is involved, or cotton, low turnover crops -- feeding would be opposite.

So where optimal opg unit becomes larger in \$, and a higher % land, with its no-turnover feature, and gets beyond fncl ability of ~~most~~ any but those who are too rich to want to be farmers, working ones, then you get tncy or giant farming.

With lvt, fncl burden of these farms would not be very great, bcs they are mostly land, and that would be free. Thus smaller farmers could establish a foothold on good lands -- and they might then very well demonstrate that the best use was diversified, high turnover high output crops.

Thus far no one has really looked into economies and diseconomies of large scale farms. ~~The economies of large scale farms~~ You can find additional economies at almost any size, probably, and diseconomies, but merely to list these proves nothing. Job of balancing them is the trick.

Large farms have advantage of utilizing foreign labor, from another culture, and in relation to small farms this is a special privilege because the small ones rely on owner-operator labor largely, at American standards. Large farms also have tax advantages, -- including fact that you don't pay social security on machines, nor wetbacks, nor is there income tax there; and they have federal subsidies, taking natural risks out of it. Etc. Add all these up and you may get part of explanation of large farms. But remember corps also have tax disadvantages; income tax cuts big fellows; etc.

Economies of Scale - ~~to~~ to individ. firm, whether to society or not.

Red checks mean advantage of bargaining, disappears in perfect market **Every One!!!**

- ✓ 1. Obviate contractual relations among components, replace with hierarchical. Obviate taxes on exchange; legal costs; bargaining
- ✓ 2. Integrate spatial relations of components. Capture offsite benefits. Cut xptn costs.
- ✓ 3. Exchange info freely, pool it
- ✓ 4. Use large, costly units to full capacity; & specialized humans; w/o inter-firm problems. Romney of Am. Motors (Nash-Hudson) said use of common tool's for more than one make of car was "perhaps the biggest single mfg & tool's advantage" of big 3 (p 15) (s 477)
- ✓ 5. Obviate duplication in test's: prov's grounds
- ✓ (?) 6. Set up own dealers, (but big co.s split up dealers by make, somewhat)
Have dealers all over (parts depots enough, local indep. garages cd. service ok)
- ✓ 7. Pool advertiz'g (again, most advertiz'g is separate)
advertize for dealers - e.g. sales gimmicks dealers use are nationwide.
- ✓ 8. Raise M cheaper
- ✓ 9. Take stat. view of risks, average out higher returns.
- (4) ✓ 10. Buy & sell in bulk, cut down unit costs. (also by mnpy power)
- ✓ 11. Develop versatile top mgmt org. whose skills can apply to numerous technologies: org, adm, sales, ac't'g, fina, p.r.
There are many principles of abiding & nigh-universal validity, apply to any industry.
also in engg, styling?

- ✓ 12. Influence govt. Become focus of conservative groups, e.g. CP&L, Ford, etc. Get defense contracts.
- ✓ 13. Protect self vs mny victimiz-n, by vertical integr-n. Or other loss of supplier. (In a sense big car co.s have "bought" their distrib., which Freese says is r.e. inv. in large part, by occasional borrowing)
- ✓ 14. Develop allies & satellites to help with new products. E.g. G.M. sold busses & diesel loco. to rr. which favored it bec it was a good customer (s 477, p. 11) "Reciprocity": Bankers, in whose banks G.M. had acc'ts, on boards of rr, favored G.M. G.M.A.C. is only org. allowed to lease G.M. cars. (p. 11)
- ✓ 15. Have org. set up, all ready to go, to distribute, fuse, merge, etc; new product. Just expend the org. a little, lo M.C. E.g. Howard Johnson selling candies.
- (3) ✓ 16. Coordinate expansion & contraction plans of complements
- ✓ 17. Limit entry by hi cap. req, control of many lines of the bus. E.g. when Chrysler acquired Briggs, which made bodies, Packard had to start making her own - she evidently leased part of Briggs from Chrysler. p. 23, s 477)
- ✓ 18. Invest in customers & suppliers (why? Milk other stockholders?)
- ✓ 19. Mkt. research, e.g. to judge dealer's penetration of local mkt.
- ✓ 20. Checking up, review - one part of org. acts as gadfly to others, keeps abreast of newest techniques in its field.
- ✓ 21. Program, schedule activities very closely, cut down inventories. (Also, make others adjust to them, throw burden of flexibility onto others) (e.g. G.M. maintains steady flow of cars, they leave immed. Often at much higher xptn cost than if stored until cheaper xptn available. But send on hi cost xptn, pass cost to customer) s 477, p. 89)
- ✓ 22. Impersonal hierarchy allows for more rational personnel selection & promotion. Wider field to draw from. Less nepotism - than e.g. in family bus, where this is taken for granted.

Ex. of scale, 3

- ✓ 23. Mpy, sharp practises, & also good, efficient, tho in short run "hard" practises can all be rationalized as "duty to stockholders." Indeed, courts may require them, as in Dodge-Ford suit.
- ✓ 24. Put skill of top genii into hands of all
- ✓ 25. Control politics. E.g. Ford blocked house project for Willow run bomber plant in war to keep Demo. out of Washtenaw Cty. (s. 505, p. 112)
- ✓ 26. Mold consumer tastes. Set trends. Offset & squelch trends of competitors. (Romney of Am. Motors emphasizes, p. 16, s. 477)
- ✓ 27. Finance your customers (GMAC) & suppliers. (or buy them outright) Thus assure mkt, & supply. (Thus du Pont assured mkt by acquiring GM. p. 27, s. 477)
- ✓ 28. GM offers free advice of its "highly skilled xptn experts" to bus customers.
- ✓ 29. ~~Mpy~~ Mpy & mpsny bgn'g power

Some 'undue' concentration may help tech. progress find economies to scale.

Suppose blast furnace, small opt size. If all firms then small, & someone has idea for larger furnace, who can build it? But if one firm has several blasts, already have cap. concentration, for such experiment.

On other hand, if are no small firms, get less experimenting with small

scale economies.

So should have wide range of firms, sizes. British were uniformly small, limited.

LVT makes it easier to expand, where technology dictates it, because land has no cap. value, so a larger no. of individual cap. holding units can reach the new opt. size

Opt. size

Re ~~changing~~ question of whether sum of mps equal tp. Where you are getting constant returns to scale, (which I have always implicitly assumed in the past), you add a factor, it raises mps of its complements, lowers those of its substitutes, and the sum of mps still equals tp. But when you are getting increasing returns to scale, each factor has more complements than substitutes, it raises, say, all other mps -- it definitely adds more to production than its share of tp. (when you reduce to infinitesimal increments, I guess this doesn't disappear, as the other kind of excess of productive contribution over marginal would. For the

7

other kind is due to falling mp of the factor being added; while the scale kind is due to increasing mps all around, including its own. Figure it out some day)

Bober, M.M.

Theoretical aspects of
the scale of production.

Econ. Soc. & the Modern
World 1935, pp. 73-91

The principle of
continuous variation

Larger corps mean more mobility, less family control.

"A college degree has become more important than great wealth, & easier to obtain."

Newcomer, Mabel, the
big bus. exec.

Same pt. made by Warner,
W. Lloyd, & Abegglen, James C.

Big bus leaders in Am.

3 wks to hatch eggs
2 chickens, don't speed
up.

Stigler thought he solved
problem of indivisibility
w. cars of graded size.

But that was continuity
not indivis. The smallest
& largest cars still
are off opt. scale.

It's doubtless true, in big enterprises the stockholder has little to say about policy, & about whether directors are absconding with funds, etc. This just is another limit on efficiency of large scale enterprise.

Some socialists who moan about this will turn around & tell you, a) In socialism no such problems of absconding; b) Large scale enterprise is more efficient.

I say opt. size is that which yields max net rent/acre. — given existing costs. & assuming perf. mkt's for labor & machines.

Someone says, what if land costs less? Ans: it can't cost less, to society.

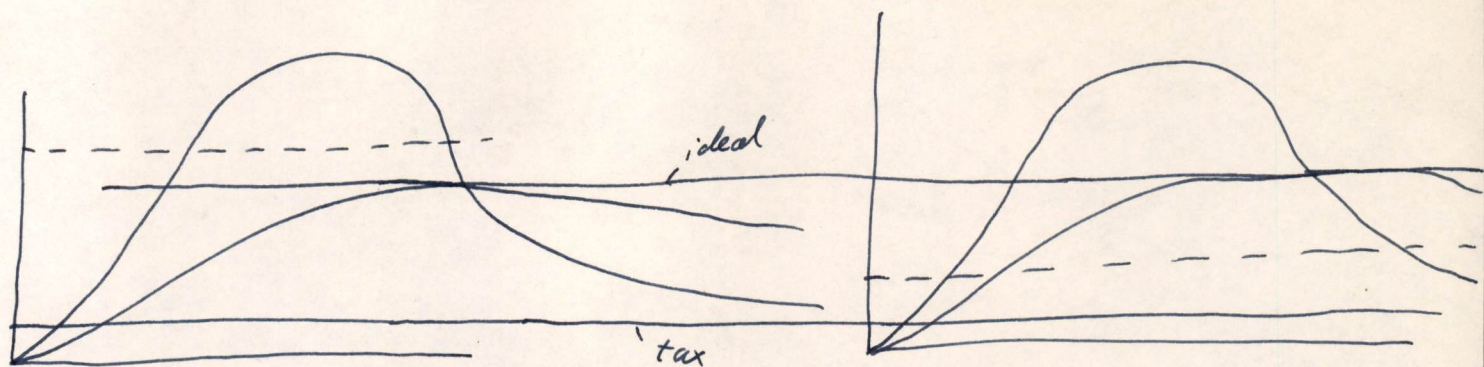
That is its social cost, alternative cost. (& we are speaking of opt. to society)
Cost to individ. can be less, but not to society. That is our problem.

But what if have a limitless frontier? Then wages rise. & all sizes other than the opt. yield negative net rent per acre. Remains true, opt. size is that yielding max. net rent/acre — in given conditions.

Does opt. size depend on land price? ~~that immediately~~ Is a mutual interdependence. If land p falls, for some capricious reason, will be pulled back up. If ~~that doesn't stick~~ new land supply, will pull up wages, lower real social cost of land, opt. size will rise — more land.

~~(If wage contract?)~~

VI



as land costs too-small more than its ave. net product, how stay in bus?

a. His cost is lower for little cap, rises.

b. He subsidizes the losses out of his love of being an indep.; changes little for labor. Loves machines for own sake, changes off some expense to that.

Critic: why not re-draw MRP of land, ~~Hayek~~ in view of lower labor costs.

We could. Then wd have 2 problems: misallocated land, & labor. Simpler to roll into one, as spring from same thing.

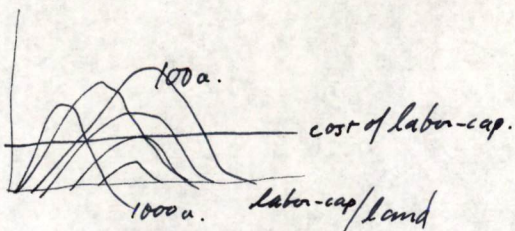
Has taken long time to get thru this. Had to skim over many matters, might doubt. Take this as a hypothesis - mine, which I give you - of why firms can differ from opt size.

b. If very large, Land cost may fall as expand

i. Tax favors

ii. Lower mn. Tho that may precede & cause expansion, not result from it.

Contrast cost to indiv; & to society.



There is one opt. size, abstractly from diff. among indiv.s., for given kind of land.

How can firms persist at other sizes? By charging lower costs than others for some factor, due to mkt. barriers.

a. Labor - often make do thus, - this applies only to too-small. If too large, have abundant labor opps. at hand

b. Land - those w. low i.r., account less than alternative use MP as cost. ^{also pay lower tax/acre} Usually too-large.

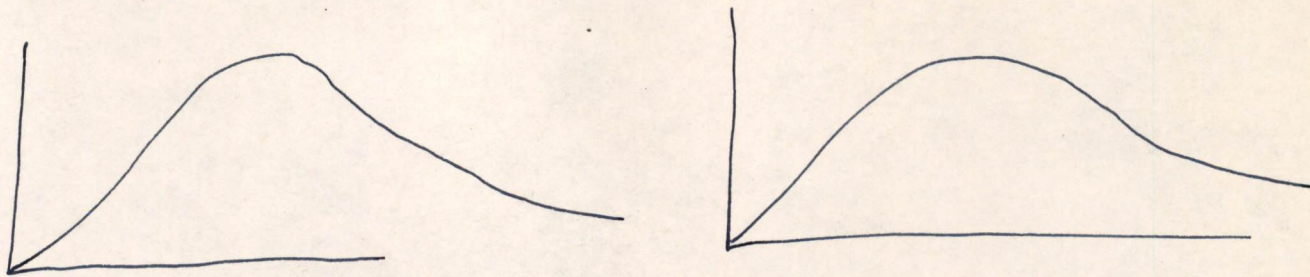
Also, some small - then why don't expand? Credit rationing. They have small funds of own, no alternatives have buying own land, do so, up to limit of funds, accept very low return. But can't go beyond, can't, or won't, borrow.

c. Cap. - some can get at lower i.r. Less imp., bcs sh't tm cap mkt's closer than long; & i.r. not so imp. a part of cap cost; & cap less than land as income creator, cost.

Since the very diff. imputed wages are due, to some degree, to the unequal land holding, we should not accept them entirely as due to labor mkt barriers. & note that an additional benefit of moving land to smaller holder is Δ his labor opp.

Exam: take a page from Heady on opt size, ask to analyze it. For what I say may seem very simple & obvious, until meet it in garbled form.

How come about?



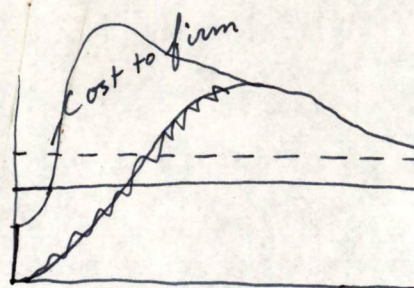
MP of land, added to 2 opt. teams of labor-cap.

As land price falls, is not more ec. to add land to same firm; but form new firms, use land at higher MP.

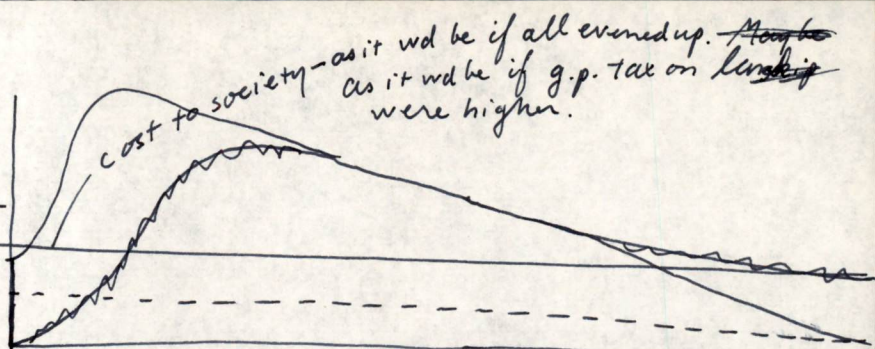
as long as you can do that, rent can't fall.

But that will raise wages, thus lower ~~opt.~~ rent from opt. firm.

Then is ec. for individual firm to expand land, until $MP = \text{rent}$.



MNP of land

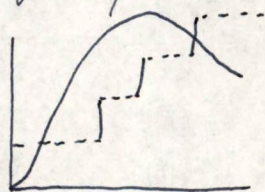


MNP of land

(Choose land, bcs is most divisible. Labor & cap. have min. opt. sizes, technical; but land, chop up any size - as far as technical problems go - not legal)

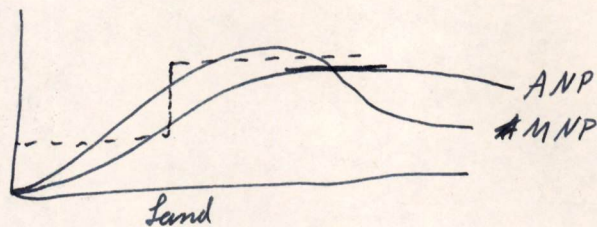
But actually, MNP of land is higher, in smaller farm, bcs assoc. factors are cheaper. Operator's labor, bcs has too little land for him; machines, bcs he is overstocked on them, relative to land. But no, that is already subsumed in curve. Well, the technical part of it is. The low imputed wage, however, means higher MP of land to small - higher all along line. Except that, as get larger, imputed wage probly rises. We may subsume that in curve, or not, as we please - as ea. curve is individual, in any event, will differ, so ce n' import.

With credit rationing, peculiar behavior of land cost as expand.
a. If very small, poor credit, but some small savings, land cost rises.



Might even have land in Δ g returns, mgnd. & very def. have it in Δ g ave. returns - ~~which ce. thy tells us is never ce.~~ - labor & cap are in ~~abs. dim. ret?~~ - i.e., by add'g 1 more acre, Δ ave net inc. from others. - by spread'g overhead. When have much overhead to spread, add'g 1 acre, MNP is ~~very high~~ ^{very high} ~~but only, varies less than if others were fixed - is flatter than MP.~~ as ~~MP~~ bcs assoc. new costs are almost nil. Hence MNP of land is very high ~~at~~ when unit is small. & falls rapidly as add land. Double acreage, cut fixed costs/acre almost in $\frac{1}{2}$. Double gain, by $\frac{1}{4}$; $\frac{1}{8}$; $\frac{1}{16}$... after a moderate size, spread'g overhead can do little.

The optimum size: Max. anp of land. — in view of other costs.



That should be the cost of land, annual cost per acre.

If land costs more than that to individual (at mgn) he restricts size.

Suppose land is available cheaper. ^{to everybody.} Then it wd pay to expand, ~~lower~~ ~~ANP~~ each firm wd. use more land. But that raises labor cost, lowers ANP & MNP curves — get a new opt. combo, using less labor/acre. A new opt. size — more land, less labor. — max. is lower, & to the right. (Or, if it doesn't raise labor costs, then it doesn't pay to expand old firms, but to form new ones, at max. ANP)

But if land available cheaper to 1 firm, won't Δ gnrl wages. He expands beyond opt. size, which yields max ANP or rent per acre.

So there is, for any individ. at any time, an opt. size — gets most rent/acre, net, after all costs, at given levels. & that is indep. of what land costs him — tho not of gnrl availability of land, for that affects

Is there an "optimum team of men & equipment" w/o reference to l.v.?

There is an opt. tractor, that delivers max. traction per unit of cost.

But that is too simple. As l.v. Δ , & must ee-ge on land, you need a tractor better suited for close, intensive work.

So there is an opt. team for every level of land cost.

It is not correct to say the too-small farmer crowds an "opt. team" onto too little land, or takes a team smaller than opt. & fits it to land. For he makes the opt. adjustment in view of land cost to him.

As land cost to individ. rises, he uses less & less. Until 2 things combine to put him out of business:

a. Costs/acre rise more than income/acre.

b. Int. cost/acre rises.

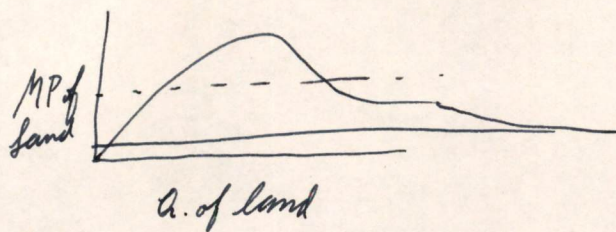
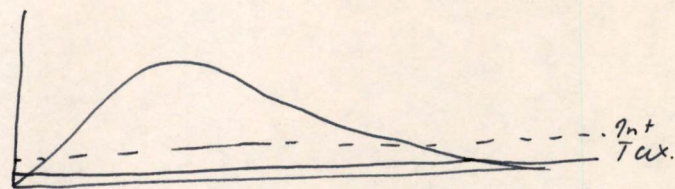
& assuming the given costs of labor & cap.

The opt. team is that which wd. produce the most net inc./acre, given an opt. acreage. That is the opt., regardless of cost of land. ~~per acre.~~ AP of land a max. — at the given cost of labor.

As demand for land's product's rise, that opt. will probly become smaller. But that is another question. We are talking about the opt. team under exist'g conditions.

If relative values of labor, cap & land change, the opt. changes — why?

Introduce tax along w. int. cost.



cost of holding land is tax + int. Tax not a disturbing element, but opposite.

Is same for each. Int. differs.

Exposition: show int. cost first.

Then, " To be more exact, shd include another annual cost of holding title: taxes on landholding. Same to each.

Leg. re opt. size

"Indeed, if one reflects upon the persistence of small and medium-sized companies, in the industries dominated by big businesses, it is apparent that there can be no great advantages to size. If size were a great advantage, the smaller companies would soon lose the unequal race and disappear."

Stigler, G.J., "The Case Against Big Business", Fortune, May 1952

Leg.:

McConnell, J.L., "Corporate earnings by size of firm", Survey of Current Business, May 1945;

Nat. Bureau of Ec Research, "Cost Behavior and Price Policy", 1943)

American Tobacco vs. U.S., 328 U.S. 781

FTC v Cement Institute, 333 U.S. 683

U.S. v GE, 82 F. Supp. 753

Bone Committee, Hearings. *(Homer Bone was s.t. sympathizer)*

Above, Stigler cites approvingly. Court cases and Bone hrgs show mnpy practises.

McConnell & Nat. Bur. show medium firms as efficient as large.

Joel Dean's studies show const MC over range, but that very diff. from const. AC --- for are still original fixed costs to meet, to const MC mean falling AC. Until some new cost of scale arises, to push MC up.

As unlikely to get flat AC curve, save by chome balancing of up & down forces.

Money
desires
—
Δ opt size

Wilcox Walter W. 'The Ec of Small Farms in Wisc' JFE
458 - 75, May '46

If desires change so products bought with cash are more valued than home garden, rural life. Then small farms become less ec.

Anyway, better mkt means more satisfying 'artificial' life, less drive toward small farm retreat. Δ opt size. Eng vs France.

Weeks, D., "A Suggested Approach to the Farm Land Valuation Problem". Typed. ND. Gammari Lib.

✓ p. 15 "... the effect upon gross income of an additional
C acre is much greater on a small fm than on a large one."
This follows from reasoning similar to mine in ch. 3 --- if have 10a,
1 more a. is much more imp't than if have 40.

This paper is terrific — mgnt analysis, pretty keen. I am
just pursuing his tack, here.

p. 18, Δ inc. from mgnt acre must = ~~MAA~~ "its annual cost".

But he doesn't get into what annual cost is.

p. 28, Fig. 1, "Relation of size of fm to sell'g p per acre" — but
no data. Get them.

But cheap labor
makes large factories
possible, just as large
farms. If labor has
alternatives in self empl.,
won't work for big so cheap.
This an imp. factor in
opt size.

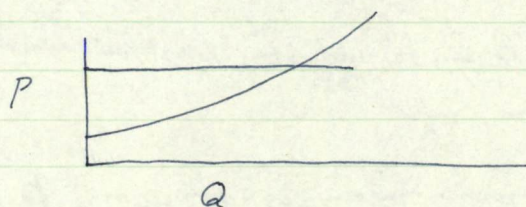
i.e., at any price the marginal firm has no rents, produces at minimum a.c. The others are getting rents, & are at min. a.c. if the rents are included in a.c.

We know that to include rents in fixed costs raises fixed costs, but doesn't affect mc. We know it shifts a.c. curve up & to right. (either longer or short, in this case long). We know mc must still cut ac at min. So it follows obviously it is correct to draw curve with rents as we have drawn it.

Hence, supply curve at any price shows min. a.c. of each firm, if rents are included.

This poses an interesting question: what is really the 'optimum size' in such a case? Should rents be included in calculation? I'd say yes, for the social value of the resource in this case is found by including rent.

Cost curves drawn from viewpoint that rent is cause of price, not result.



Long run industry supply

Those who would be in at lower P get some return like rent. But they might have paid for land assuming current P , so, tho they would be in at lower P , they have paid for the rent they collect. So in one sense they are low cost producers, in another, marginal.

& in a 3d sense: they may be collecting much land rent, but still be mgnl to industry, due to alternatives.

2 senses of 'mgnl': whether you're just meeting 'costs' (& 2 senses of costs, one including rent, one not); & whether you'll ship out. If you buy land in boom, pay too much, in bust you are submarginal with respect to historical costs, but inframgnl re current o.c., stay in.

& could ~~indeed~~ have 2 senses of rent, or 3. a, Year's apportionment of historical purchase price; b, Opp. cost c, Current ec. rent

Those analyses which have all firms reduced to no 'profits' at min. ATUC, by comp, are assuming land evaluated at current rent, as det. by current P . For if used historical P , all would differ, probly. & if used o.c., all differ. But use Ricardian Aing costs to evaluate land, ok.

~~Figure out what long run, & industry, mc mean.~~
~~March 15, ordered Woodruff to sell 5 at 12. Check paper.~~

Bain, March 17.

Dean

Ellis-Bellmer article. external ec & dis ec.

Stig ch. 9, Chamb. ch. 2

Should read Lerner on Ec of Control sometime, for welfare evaluation in gen. eq.

→ Long run industry supply curve is locus of minima of ac curves of
all firms in industry (incl. rent). ^{over} ~~(the minimum for the firm's output, not of the industry)~~

→ In strict Ricardian case is ^{& only then} industry mc curve too, being sum of
firm mc curves - one strictly fixed factor, others not fixed. No entry
of rent factor possible, makes difference. Means no new firms

Take Viner article, figure it all out. There are a couple of slips.

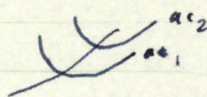
? - This is all assuming part. comp etc, so for each firm $mc = ac$, long run,
(& short run too, by envelope argument)

Character of supply of factors to industry must be considered. - will determine
industry's response.

"X for costs", Bain dislikes term, means cost of getting factor from other
industry (rent? or export etc?)

If tech. changes as industry expands lowers costs, it is irreconcilable,
shouldn't be drawn as one supply curve.

With Δ demand, & no possibility of Δ firms, ac curves move
up if you include rent in ac; or, if you don't, where $mc = price$.
(you get them producing at ~~long run~~ min. in one case, not in other,
which is right?)



It is min. as long as limited factor can
collect rent, however long that is.

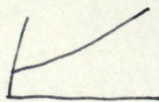
As demand increases the opt. pt. of production is more
for each firm, (if none, or not enough, can enter). (if 'not enough' can
enter, ~~and~~ means some factor is less elastic in supply than others,
purely inelastic is extreme)

Opt size
file.

Industry Supply Curves

Figure out further, if test questions ever touch on it. Otherwise, file under rent theory, finish later.

Long run ind supply curve.



Obtained by summing what each firm wd produce at the price. Inframarginal firms with Δp in as ΔP , but still be at min AC, because of rise in value of limited resource. If no such rise, opt size stays same, just get more firms, same output each. But in such case, supply is completely elastic. (unless all resources are limited ... but then all are Ricardian)

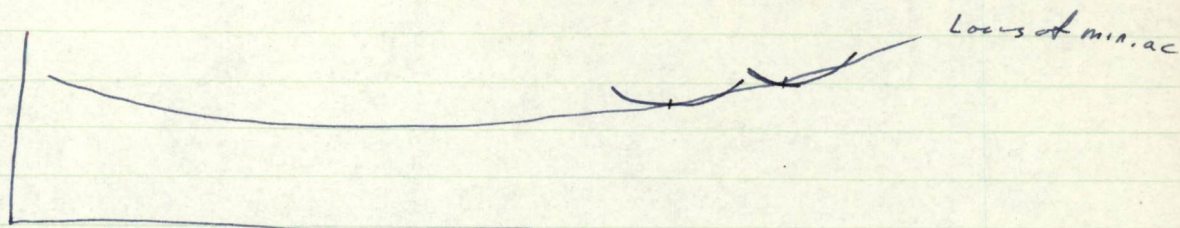
How cf. with ind. MC curve? ~~It~~ Rather, social MC curve. (to exclude intramarg. rents from MC) If limited factor is strictly limited, are no new firms, this is sum of MC of firms, is industry MC. (unless they bid up prices of factors, then industry MC exceeds Σ individual firm MC)

Even if new firms enter, long run ind. supply curve still shows MC. Bain wrong (or my notes on him wrong)

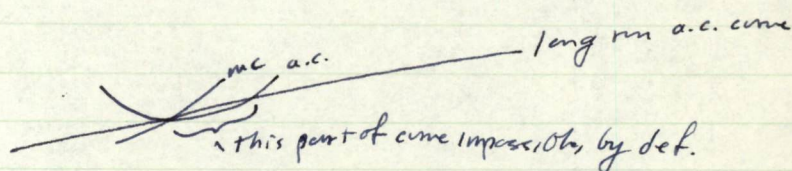
p. 54: "Costs decline as the scale of operations increase, primarily because of the use of larger and more specialized machinery and buildings. A farmer with 200 acres of cropland to prepare and cultivate finds it profitable to buy and operate a larger tractor and more specialized equipment than is economical for a farmer with 50 to 100 acres of cropland. Labor and power costs per acre, or per unit of output, are lowered by the use of this larger scale machinery." (use this as standard statement of why get ec to scale)

5168

Long run mc



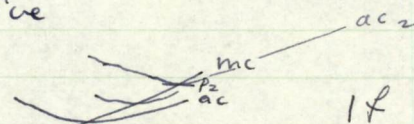
Why must it be envelope?



Because if you use a given plant, which is at min. ac, a little more, ac rise less than if you built a slightly larger plant, because long run curve is not at minimum.

Firms produce where short run $mc = \text{price}$

(Ric. case, long run $mc = \text{short run}$)



If

price rises to P_2 , no more firms can enter, & also mc won't change. (ass. vble factors ~~some eff.~~, some price) Each firm produces more. Its fixed costs rise, the vble don't change. This raises a.c. Also proves it right, for higher fixed cost means ~~lower~~ higher a.c. for smaller amounts.

This analysis holds for all cases when a factor is fixed, including short runs. The factor to whom the higher price is imputed is more of a factor, ec-ly. & production always occurs where ac is min, for a given firm. But that firm will stay in business, as prices fall, until its micro-ec. ^{short run} costs are zero.)

Long run mc might mean 2 things: The Δ to tc when ~~out~~ capacity is increased by so many product units per time period - as mc of kw, not kw-hrs, latter having short run mc; or Δ tc to produce Δ product, the value of cap. remaining after 1 product comes out being subtracted from Δ tc.

It must mean the ~~rate of~~ rate of cost. Short run mc might be interp some: Instead of the Δ to tc ass. with given Δ tp,

could be Δ to rate of ~~vc~~ vc ass. with Δ rate of tp .

Long run mc would then be Δ to rate of all costs, vble & fixed, ass. with Δ prod. thru Δ scale. 'All would be vble' in a sense, but in sense that they were uniquely associated with a given Δtp they aren't. But by considering rate of tc we can slip in the allocation of a small part of ^{fixed} ~~capital~~ costs to present product.

✓ So long run mc means Δ to ^{rate of} ~~tc~~ tc ^{due to} producing at ~~prod~~ a larger scale, a larger amount. This is the 2d thing I said mc might mean, said better. Is also the first - they are the same. & once we understand this, we can say they mc of producing one more unit, knowing we mean the Δ to ~~tc~~ ^{long run} tc of producing it. Δ to a.c. is same as Δ to tc , when you are just talking of one unit. When we define mc as Δ to tc we are thinking of adding one unit. Is Δ to ac when we think of everything that is produced. - & we must, for we don't mean cost of producing just one more unit by Δ scale, that would be prohibitive.

✓ Note: long run mc must always be lower than short run. ~~It is~~ You can always do better by shifting all factors than just one, or at least as well, since shifts of the one are included in the possibilities.

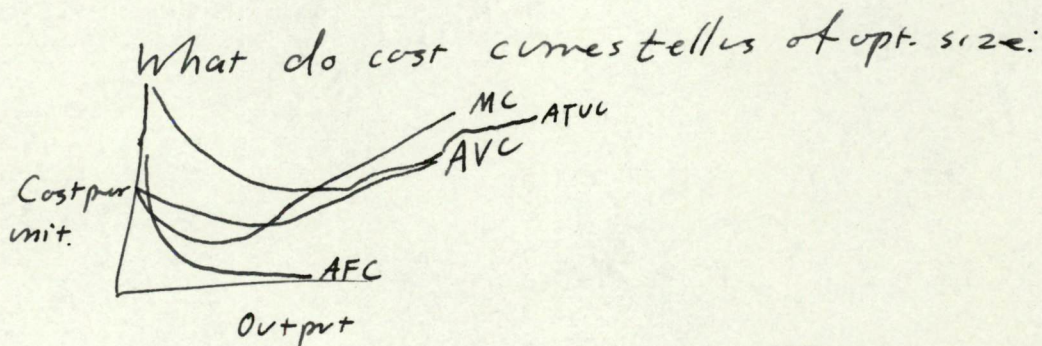
The long run mc curve passes thru min. pts of all short run curves, by def, for they represent optimum combinations? Not nec. Only requirement is that it be less steep than ~~any~~ short run mc curve whenever they cross. This is corollary to long run being envelope of short, ac curves.

Note: even short run mc curve nec. represents a rate of production. Not saying that to produce another unit always rises mc , but just another unit within a time period. Otherwise would go up the curve as time passed!

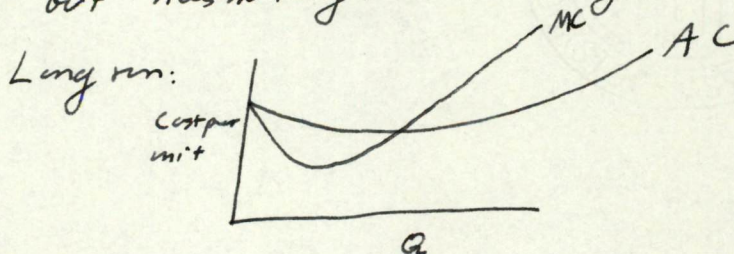
✓ So long run mc does mean something: same as ~~for~~ short run mc : Δ to cost per product, or ac , caused by increasing rate of production. Anyone would consider long run mc when deciding on scale of plant.

Monop. As
opt size

When a monop formed, value or 'cost' of monop. factor rises. This is opt. size. Hence cartelized firms, far from reducing size, are under pressure to Δ it. But, if each firm has a quota, may adjust to that. But, if each firm simply required to hold a high price, tendency to merge firms? Except the high cost of the limiting factor is part fiction, for some is being held idle by each plant? Maybe, but if monop formed by, not cartelizing but is just Δ rent due to e.g. tariff, is same as previously attributed to int. Economize on land more, more produced from each land unit. But doesn't mean each firm gets bigger. Maybe each firm uses less land.



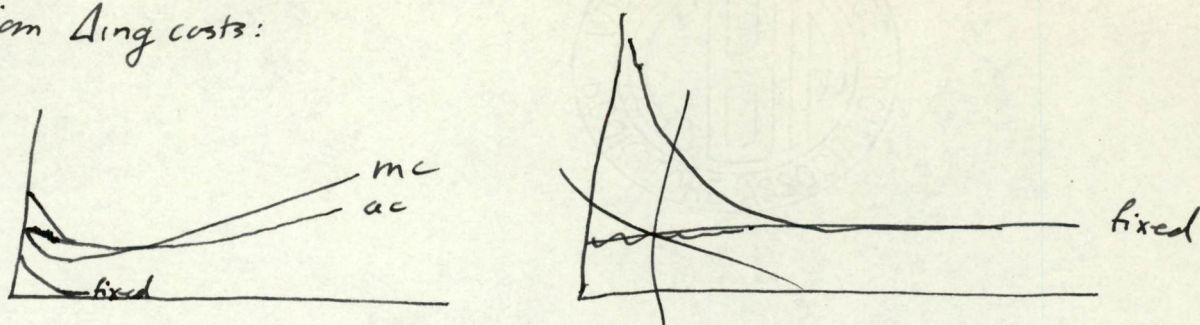
Is shrt. run. In long, no distinction of fixed & vble cost. In short, is arbitrary. The higher are fixed costs, the larger is opt. size, but has no long run meaning.



If a limited factor becomes more costly, it moves the MC curve - hence inapplicability of Viner's Ricardian pt. to opt. size questions. & brings Viner into question entirely. He says MC won't change, but this is not true of indiv. firm determining its size, long run. So long run MC do change, to firm. If just one firm were involved, & no

question of changing amt of limited resource used by each firm,
he would be right.

Riccardian Δ ing costs:



A fixed factor. It does not enter into mc. Demand Δ s. The 'cost' of this factor Δ s. (This inconsistent with mc theory in general, where they get all firms down to same min. ac? No, is consistent, for only by counting rents as cost do firms on better land ^{or land with lower ac.} get ac up to many firms. But implies firms on better land will have larger opt. size? No, only implies that if demand rises, opt. size rises, for all. - which is right, since the limited resource should be more intensively used now. & shows the primitive theory of how all firms come to same opt. size ac does not mean they come to same opt. size. The meaning of 'cost' was never made clear in elem. ec. -- nor even yet, save when I figure it out.)

Effect of
but on
opt size

The greater the pressure to economize on land, the more it will be used. Changing to 1st will Δ cost of land to those with low mrs. They will Δ size in sense they use land more. In this sense, opt. size Δ d --- the opt. size of what to use on given land. But as people will tend to use less land, the no. of individual firms is increased, &/or margin raised. This is not an additional force to those discussed in my paper, but another way of looking at it.

Remember that envelope problem, re short run cost curves, & their envelope which is long run cost curve. To get lowest AC for any output to left of min., build a plant slightly larger than that whose min. AC is at that point. For the larger plant will have lower AC in general, and, given this situation, you are obviously better off to take advantage of SOME at least of this form of economy, rather than depend entirely on minimizing short run AC. Thus the geometrical necessity is also logical.

To right of minimum, contrariwise, you are better off to make plant smaller than that whose min. short run, is at desired output.

Stigler stresses this. But again, his proof is that it is "geometrically impossible". (to touch min. of each curve with envelope)

On p. 141 he states that sum of mps only equals tp at min. pt. on long run ac cost curves, i.e. at constant returns to scale. Where there are increasing returns to scale, i.e. to left of min., sum of mps exceeds tp. (it follows that factor rewards are then slightly less than mp in this region)

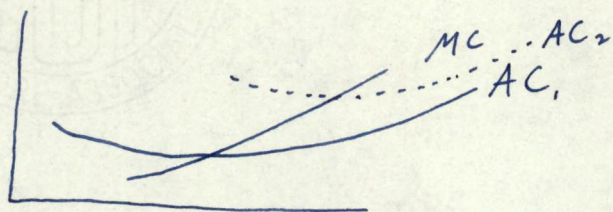
I guess this is all right. Recall that the proof that sum of mp eq. tp used assumption that addition of extra unit of land did not increase mp of other factors -- not just for infinitesimal units, but for all the land. I thought of this at the time as meaning no monopoly or related idea. But it would also mean no change due to changing scale? No, for increasing returns to scale would just mean the mp of the land would be greater than otherwise. -- Ah, but it would also mean the mp of other units of land was increased. We can get away from increasing mp of other units of other factors -- but not of other units of land. Thus the increment to tp of all, summed, exceeds tp. Conversely, going up, increments to tp summed up are less than tp.

But this is, after all, only a matter of words. For, again, in figuring increment to tp, we take a net figure, and deduct any harm done elsewhere, and add any good done. And this business of scale should not flub up works any more than the fact that every factor adds more to production than it is paid, due to complementing other factors more than it substitutes for them. -- ah, but then is it not the essence of ~~increasing~~ increasing costs to scale that incremental factors substitute for other factors more than they complement them, in the firm. This seems paradoxical, but is not when you consider that the substitution is to the limiting factor, say management, and by establishing a relationship with the management it adds nothing to productivity, this particular form of relationship is pure waste.

So I can revise my earlier general principle that all factors add more to production than they are paid. This is only true to left of min. long run a.c. But, as no one would ever employ factors knowingly to right of that pt., and when they do so unknowingly their investment demand makes it really to left, this never comes up. And general principle remains true.

Fact that factors add more than mp doesn't destroy theory. For if they are infinitesimal they don't -- and they are paid on basis of lowest mp they themselves create.

Essence of Viner on 'Ricardian Δ ing costs.'



For industry as a whole.

MC is long run. (& short run too, by Viner)

Starting from eq. #1, get Δ demand. Prod. Δ s out MC curve, & $mc > ac$.

It should now be possible to start new plants; but one absolutely limited resource prevents this. & no point in chopping plants up into smaller sizes because the cause of Δmc is not so much that units getting too large (tho that is a small part of it, & could bring down a little by reorg. But skip it now), but that the ratio ~~part~~ of vble. to the fixed, limited, resource, is higher. The yield imputed to the limited res. rises, its 'cost'. This being a fixed cost, AC rises. And thus product is distrib.

Thus Δ demand Δ s opt. size ... leads to monop? Much to embroider here, some day.

$$\text{If } MP = AP, \quad \Sigma MP = TP.$$

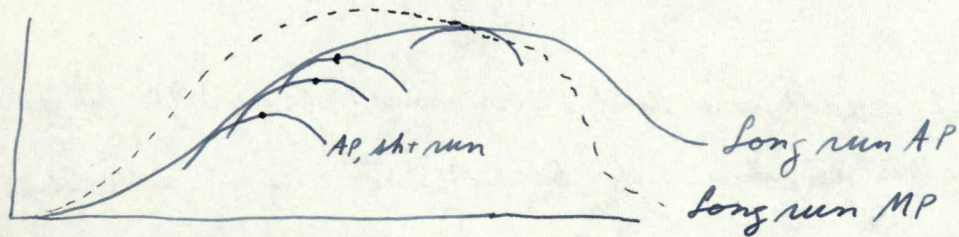
In any shrt run, $MP = AP$, for move to top of shrt run AP curve immmed.

Stigler said: add some land, labor moves to it, no ΔMP , but $tp \Delta s$ by excess of tp over Σw ages. So land MP det. as $\Delta TP = \text{residual det.}$

So Fellner wrong.

& maybe Brems -- for isn't Stigler's proof good with Δr to scale? No, it abstracts from scale. But does show Fellner wrong: MP same as residual det., not just tautology.

Long run cost, or MP, curve, doesn't represent present MP, ~~but~~
 is not MP referred to by productivity thy of dist, which is immediate
 MP.



You never would produce on long run AP curve (have at apex)
 Because, having a plant of that scale, would move immediately to max AP for
 that plant -- if competitive. Hence never faced with problem of

$$\Sigma MP > \Sigma AP.$$

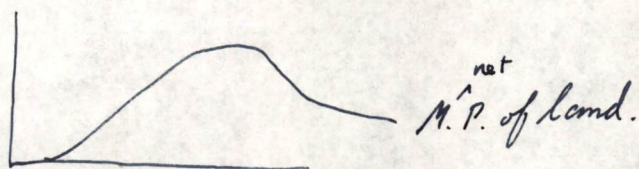
✓ If you decided to produce at some Q , regardless, would be mnp calc.
 & no comp. would force you to pay MP; no problem.

✓ Might explain temporary high wages in construction booms, when
 economies to scale appear, or cap becomes available to exploit them,
 very high MP, but temporary, on long run scale MP curve.

Also, question validity of envelope cost curve, since is most unlikely
 that any firm would produce on it, with $MP > AP$. [Except a minpst, who had
 chosen to produce a certain Q , & was looking for cheapest way to produce it.]

over

contrast MP of land to large & small



2 firms, same basic technical & managerial possibilities.

Mgnl net product of land. — thus more size in terms of land, assuming opt. complements of other factors — opt. by equingnl principle.

(For theorists: other way we cd. show same thing.

a. Curve of MP of composite of all factors, combined by equingnl.

b. " " " " mgnl net product of any 1 factor — the others being combined w. it by equingnl princ.

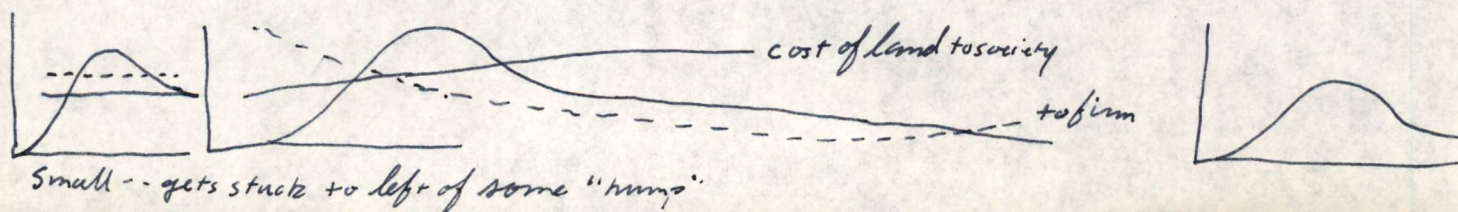
c. Indiff. curve approach. Showing best combo for ea. scale, & finally best scale. — That is simply making the equingnl combo. very explicit on graph

)

As expand firm, cost of land to firm falls. To society, stays same.

Show by 2 horiz. lines.

Thus land misalloc., by equingnl. Too large, too small.



To show:

What makes a farm get big are economies in fixing land purchase.

As you expand, ~~an~~ past opt. size mp of land falls, but cost per unit of land falls even more. (Msig cost as cost to indiv.; not cost to society, or opp. cost.)

MP of labor falls, cost per man does not. May rise, as becomes less pleasant work. (may fall, w. large corp, desire to hang on)

MP of machines falls; cost falls, not so much.

Can show graphically, if wish.

~~Discuss specific diseconomies to scale.~~

- ~~1. Get highly specialized machines, run hi risks.~~
- ~~2. Hi xptn-on-fm costs. (unless split into 2 nuclei)~~
- ~~3. Hired labor, supervision costs. & they demand more pay than o-op, get less pleasure from work, can't have wives, families, etc.~~

Early, reach limits of what 1 man can manage; limits of ec.s to scale, beginnings of disec.s to scale.

Early, is problems of mgg active factors - labor & cap - that ~~are~~ bring limits of scale. (Incl. w "cap; mgg land to prevent erosion) (thus explaining paradox of low mr who dis-conserves. Conserv. is an inv. for future, about as much as a bldg. - low mr stresses inv.s even farther future than that.) ^(less cap/acre & less cons-n/acre are same thing. land intensive mgg is land exploitive) If add a few more acres, spread labor & equipmt thinner, don't add much to mgmt problems (until abs. dim. returns to land); not as much as if add labor & cap to fixed land. ^(means, incid, less cons-n per acre)

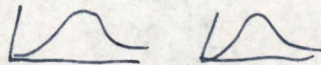
So, as you add land, mgmt net product falls, not so much bcs of extra mgmt problems, but bcs if you added labor & cap. in same Δ , wd get mgmt problem. & So MP land falls bcs get less & less labor & cap unit. Indiff. curves might show that clearly.

VI. So, if big are too big, seems plausible they are too big first in terms of land - rest follows after.

Seems plausible - it is cap. & labor ^{incl. cons.} that call for mgmt, is limit on opt size. Mere land hold'g, esp. for exploitive use, large opt. size.

Again, very small, are cap. intensive, & labor intensive - those are items of ~~opt~~ min. opt. size.

Analyze land alloc. as betw. large & small.

Cd. draw MP of land.  But unfair, for can Δ other factors, can't assume fixed.

So draw MNP - as described in great detail & repetition on ff. pp.

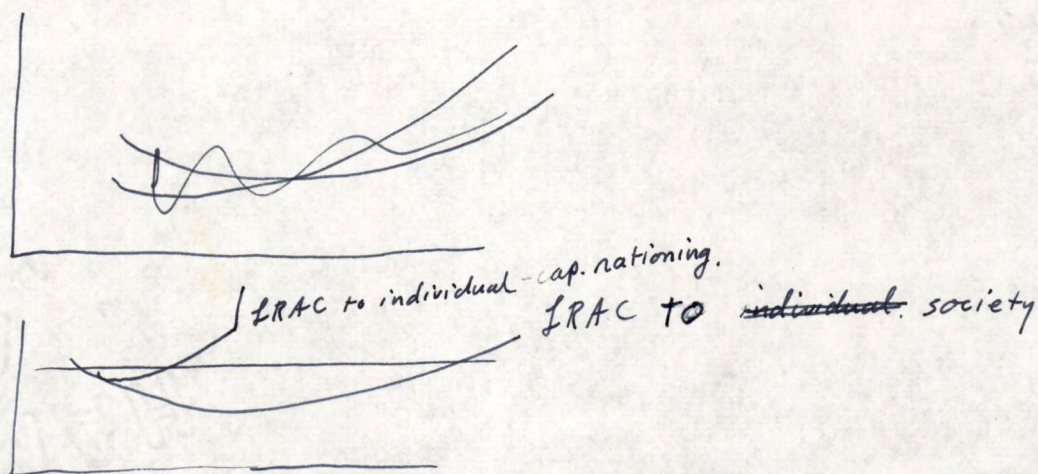
How find opt. size, as practical matter?

Max. returns on inv.? No, historical cost has no present mgmt.

Gett'g most inc. from land best msr. - (insofar as msr. bl. Value owner is labor by margin to which works, roughly. Add invisible inc. to o-op, resid.)

Cd also assume a cost for land, o.c., figure residual for mgmt. But bett I'm more familiar w this method, so use - & it has advantages: ~~how know one~~. labor mkt more fluid. Main gn is, is land in best use. But admit, 2 related. This just easiest approach.

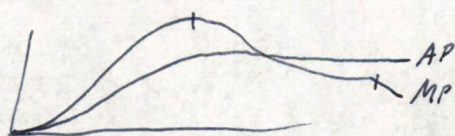
Another approach to opt. size! Minimize cost per unit of output



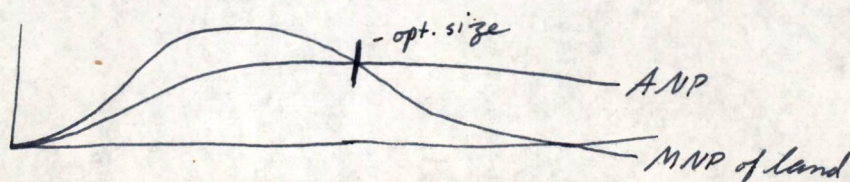
(Why don't prices fall to min. LRAC? Bes not all firms are identical. Our curves show just 1 firm.)

Ea. firm always at opt. size, so far as its own costs are concerned. But if its costs are not social costs, then not. & therein is whole crux of my argument, whatever graphs we use.

These pure scale curves are good, in showing opt. size as a critical pt. on curve. Also, w/o complex ref. to Euler's theorem, can see MP of factors higher than AP, to left of max AP. - is clear how should shift them, even tho net rent same on too large & too small.



Now apply same analysis as if labor free good. Can do that usg MNP of Land? MNP curve shows excess of MP over assoc. costs. Area under it is inc. of Land. Opt. size is where that a max. ave. This is same pt. as max. AP for all factors, on conventional graph.



If below opt. size, ANP of land less than max; likewise if above.
But MNP line tells us how to shift ~~area~~ land.

Why single out land? Bes that is the factor whose ~~cost~~ ~~ind~~ cost is diff. to
individs. than to society; I wish to focus on it, for expository clarity. You
~~Yst~~ cd. focus on any factor, e.g. labor, reach same conclusions — but
wd. have to fill in more w. literary description, graph itself wd. be less
useful.

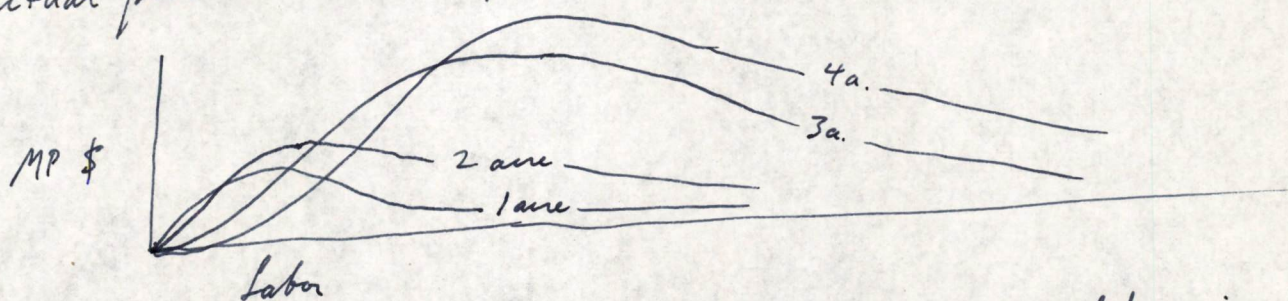
Land free, ^{hence in no sense "fixed", as we originally assumed,} why not move to max. MP? Bcs you'd have men spread out so thin they'd have a lower ap, hence lower tp. Draw them together to max. ap

So wd. produce at max AP — whatever wage was. If wage below max ap, still wd'n't crowd more men onto same land, move out to more land, keep ap at max.

But when land has a price, can't expand & contract w/o any thought for land cost. So when reach max a.p. of labor, keep ~~going~~ add'g labor, until get down to wage.

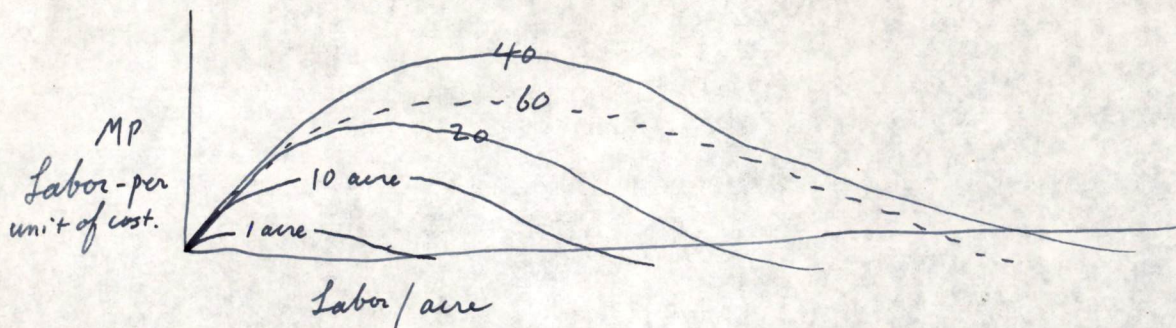
Now we just have worked w. 2 extreme ass.s: Land fixed, invariable. & Land free, infinitely variable at no cost.

Actual problems more complex, in between.



Cd. represent on 3D. But no.s simpler. — thus can add several dimensions. e.g. MP of labor with 4a, 2 a-ft water, 10 lb. seed, etc. Whole problem of finding best combo. of resources, & opt. size, both.

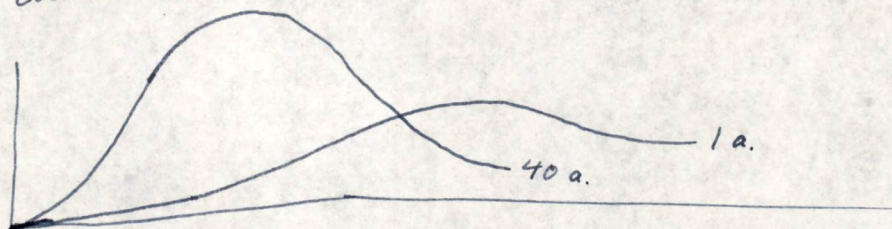
Cumbersome to picture whole thing. We resolve w. equimarginal principle — we add resources until satisfy that principle: last \$ spent for ea. factor of production brings same return as last \$ spent for every other. Then we have ideal proportions. To get ideal scale, let that "same return" be just \$1. (after we are in dim. returns to scale)



At 40 acres, is best size - after that, get less production, ~~from same~~ ~~acres~~ per man & per acre.

Wage line tells you how many men to hire per acre.

(Note, incidentally, at opt. you hire more men per acre than any other size. Is that right? Not nec - we could draw curves of MP to cross each other. & should do it so - with 1 acre, ~~you~~ problem is you must hire 1 man, underuse him - & you end up applying more labor/acre. You don't run into dim. returns, ~~for a longer time~~ when small, ~~for~~ until more dense/acre than when big. Where you lose out is in a low MP of labor per unit of cost at the start. So:



But don't give this. Just keep up sleeve.)

Better, explain sayg he'd spend half ~~his time~~ an hr gett'g ready to plow, $\frac{1}{2}$ an hr plow'g, another $\frac{1}{2}$ hr putt'g equipmt away - thus a low MP per unit of labor. - he applies much labor to no avail, has applied much/acre before starts pay'g off.



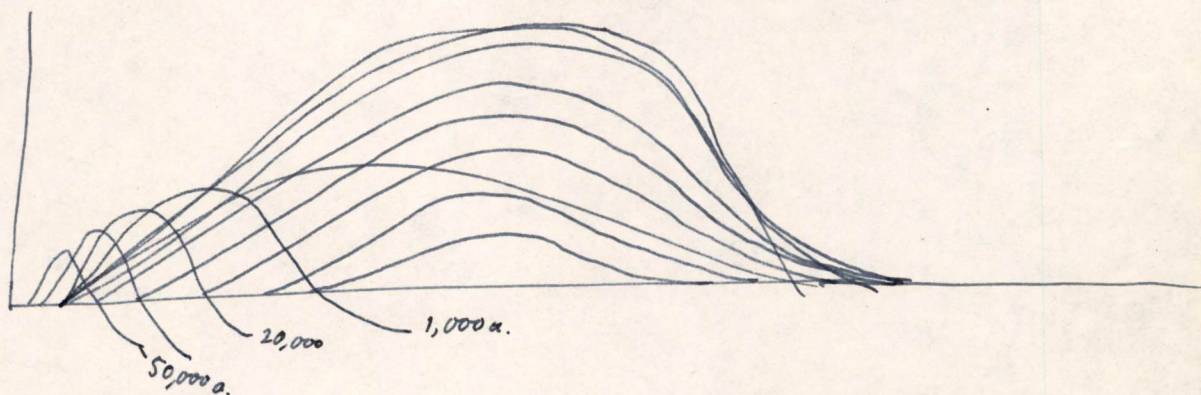
Use for Ag. course.

At that density where it starts paying off, he will keep on working. - his MP may be higher at that density than larger farm

Thus we ~~explain~~ subsume "fixed costs", in MP analysis, as a long interval of low MP. It might be zero. In fact, all MP curves should have a beginning zero stretch. - original costs for which no return at all



A big advantage of larger units is MP rises sooner. Up to a pt it comes down slower, no doubt, too, & thus better all ways. Then it starts falling sooner, past a pt, & reach opt. size. Then size ceases to bring advantage on left, & brings disadvantage on right.



The opt. size is that yielding most income to land per acre - excess ~~of~~ over wages.

(Fact that 1 acre farm must be there, regardless, we subsume as a cost - put it on left, not right. It is part of outlay that brings no return, but must be spent just to get man there. // Also subsume on left, work he does at very low mp, just bcs he is there? No, that goes on right, is bcs he gets lower wage? or is cost very low bcs he enjoys it? -- If he does - probly doesn't, so don't. Low wage ???

Ex. of scale.

To build skyscraper, need
bigger site.

It is on valuable land it
pays to skyscraper.

Ec. of scale

Have suppliers
make things exactly
to your needs, e.g.
waist-hi work
tables at Ford.

Small fellow must
buy good designs,
adapt to them.

Wash-Raleigh

Via US 1:

54

56

23

61

17

13

21

16

267

Via US 29

7

18

10

24

28

16

25

22

16

56

6

21

22

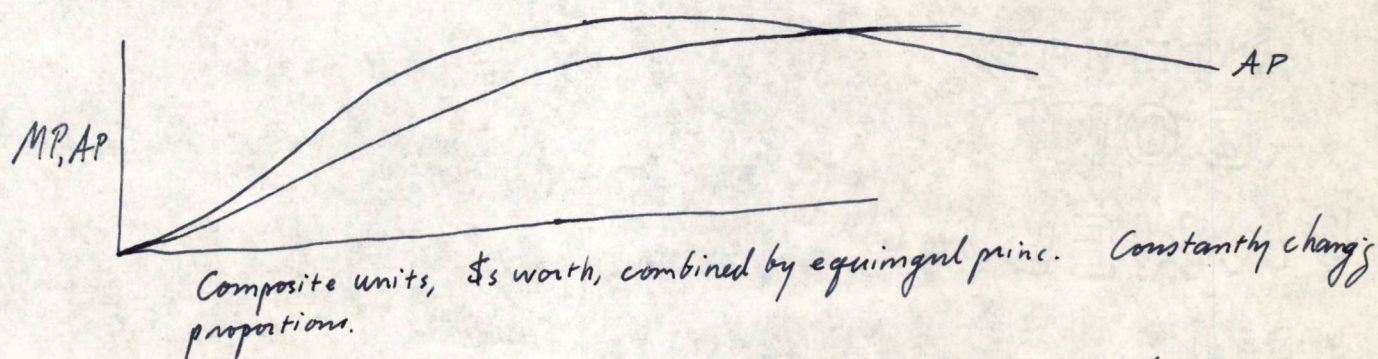
40

311

Mkt research as ec. of
scale -

Chi. Trib., as advertising
medium, provides this
for small advertisers.

Now draw single, simple line: MP per unit of cost, when the costs are made according to equingul principle. (Representing ~~a wavy~~ ^{roughly} the line on a wavy plane midway between xy & zy planes, showing output at best combinations of land & labor. But including all factors.)



Firm produces at max. AP. If factors cheaper, even so, build another firm of opt. size. (Or, if mnp, keep out others, may expand. Or put higher fixed cost value on unique thing making this firm, push max. AP to right by Δ fixed cost)

This anticipates cost analysis.

Distinguish scale & prop. ~~relationships~~ relationships.

Columbia Basin Joint Investigations Project 16, & 15, control
& acquisition of lands, get 'em. *Not yet published*

Problem 6: Farm size.

D2 Their considerations on what is optimum size seem to run
solely in terms of what will support a family. & not what will
get maximum revenue from land.p.8 , explicitly stated. Definitely
a family farm concept. This of course will establish types of
use that will be costly to change.

They propose, incidentally, to give especial help to the
very poor settlers, w/o cap. (So what is the use of having cap.?)

Propose , p. 9, that units should be of a size adapted to
ultimate needs of settler, will tide him over intermediate pd.
Problem 14 studies this more. Here is a very interesting
thought . Brodez.

Leg.

Optsize

Walker, A L, & Lenton, J L,

'A Prelim. Study of 127 NM ranches
in 1925', NM Bull 159, 1927

E.O. Wooten, The Relation of
Land Tenure to the use of the
Arid Grazing lands

USDA Bull 1001 (p 27)

E.O. Wooten, Factors Affecting
Range Mgmt in NM, USDA bul
211, 1915

8. Foreign ~~sources~~. Look for biblios, & periodical indices, Eng, Fr, Gm, Sp.

9. Systematize ideas on ec. & disec. of scale. cf. biologists, on being the right size. Call Bob Bowman.

~~10. Fms ranked by output, are large more labor-intensive? Yes, 1900.~~

11. Look thru ~~The Ag. Index.~~

~~W~~ Ishigame, T., "Size of Farm Observed thru the law of decreasing returns"

Kyushu Imper. U. Dept Agr. J. 3:179-250, illus. Feb. 25, 1933

107.6 K995

~~K901~~

519

K9

~~(W)~~ Very involved graphs,
3-D. Might go over
carefully sometime
for good techniques?

~~JFE 31:588-91~~

~~HD101~~

~~F85~~

~~Sign.~~

~~NY Agr. Col. Farm Ec, 179:4650-1 280.8 c 812~~

~~→~~ See Hannan's Landownership Biblio,

pp 112-20, on size of fm.

Florence, P. Sargant. **The Logic of British and American Industry: A Realistic Analysis of Economic Structure and Government.** xiv, 368 p., tables, charts, diags., index. 5 $\frac{3}{4}$ x 9 in. \$5.00. *North Carolina, Jan. 11*

A comparative study of British and American industry from the points of view of the degree of industrial integration, the efficiency of various sizes of units, the extent of concentration of control, the nature of incentives to invest, labor relations, and the selection of industrial leadership.

The Economic Impact on

6 x 9 in. \$7.50.

Princeton, Sept. 21

This book makes available for the first time interrelated statistics on the role of the capital market in financing American enterprise. It is presented in a form that will be useful to investors, government agencies, and students generally. The focus throughout is on broad trends.

Johnston, B. F., with Mosaburo Hosoda and Yoshio Kusumi. **Japanese Food Management in World War II.** With preface by M. K. Bennett. (One of a group of studies on food, agriculture, and World War II.) A publication of the Food Research Inst

Distinguishes "pure scale relationships" from "proportionality/
relationships." And, as a reader, this strikes me meaningfully,
so I can use similar terms more freely. I would say pure scale
changes, and ratio changes.

5124

Most of my observations on factors affecting scale are not
especially original. So I might reduce them to a mere outline, and
use my space for more original parts of the work. e.g. he mentions
travel, custom work, coops.etc. My contribution is contrast of
landownership & opn unit. Work on that point. *(He says nothing of specialization vs
disintgrtn)*

chap. 3

Distinguishes "pure scale relationships" from "proportionality/relationships." And, as a reader, this strikes me meaningfully, so I can use similar terms more freely. I would say pure scale changes, and ratio changes.

5124

Chap 3

Most of my observations on factors affecting scale are not especially original. So I might reduce them to a mere outline, and use my space for more original parts of the work. e.g. he mentions travel, custom work, coops.etc. My contribution is contrast of landownership & opn unit. Work on that point. (He says nothing of specialization vs disintgrtn)

Most effective use of
by-products I ever saw was
Navajo sheep slaughter.



THE INDEPENDENT BANKER

"On his way back, I'm gonna explain to him that a bank loan to put in a water system would make things a lot easier".

back wage pay due:

1. Employees may bring suit to recover back pay and liquidated damages equal in amount to the wages withheld, plus attorney's fees and court costs.

2. On the written request of employees, the Secretary of Labor may bring suit against employers to recover back wages. However, employees who consent to suit by the Secretary on their behalf, cannot recover statutory liquidated damages.

3. The divisions' administrator may supervise the payment of back wages for employees, under certain circumstances. The employee may not bring suit if he agreed to let the administrator supervise the back-wage payments and has been paid in full.

Bessie Ballentine of
NCAOU says mfrs helped
dealers by showing them
how to keep good acc'ts.
So ec-y of scale may well
be there.

But now they get
monthly fuel rep'ts from
dealers. And when one
is in trouble they give him
more trouble, to get rid
of him.

Probbly the greatest economy of
scale is being able to collect
increments to l.v. you create
yourself.

L.v.T. lets public collect,
from rich & poor alike, thus
evens things out.

(several copies)

Ford acquired DT&I to get direct access to coal fields. It had not paid dividend for 50 years. Tracks & stock worn out. It went south to Ohio river. But couldn't get fair division of spoils from bigger roads, because it ~~had~~ "controlled no traffic". I judge other roads went along its tracks for a way, but DTI couldn't force them to pay much.
s478, p. 99

Ford bought it for 5m\$. "All they have so far as I can see is a right of way to the Ohio River." said Henry.

Now Ford forced other carriers to pay much more rates, implied threat to divert his huge shipments elsewhere.

He found new locomotives overpriced, so repaired old ones for much less -- something I suspect his auto plants let him do.

p. 100, s 478

p. 107 Ford bought mines, r.r., and cars, to assure himself coal supply, steady, and he still didn't have it. So he sold. It was taking up too much time that could be better spent.

p. 108 He sold it for 36m\$ to Penn.

p. 163 Ford's airplane adventures never made money

Dis-
Eco to scale

Bain, March 8

~~Finish first draft of Ellis~~
~~paper, let it rest.~~

~~For the L. James Ec 40 notes are planned.~~
~~Ask Bain about it.~~ Talk to him re my theories, as
retrospect.

→ Euler's theorem

Homogeneous function of 1st degree, $\sum mp = tp.$ Nicholl discussed
conditions under which this was & wasn't true: i.e., at bottom of U shaped
cost curve, is true, because there homog. prod function 1st degree.