

Notes on Prod. Ecs., 17-84

Mon, 2 P. Jeff F.

Econ. 162, F86, Study Aid #1

1. Graphs, Cartesian coordinates, labelling axes.
2. S-shaped TP function: explain why.
3. TP, MP, AP: geometric relationships.
Radius vector, meaning of its slope.
Tangent to TP, meaning of its slope.
4. Critical points on curves, and their relationships.
Max MP: point of inflection.
Max AP: where equals MP. Radius vector congruent with slope of TP.

Max TP: where $MP = 0$.

5. Given TP, derive AP and MP.

Graphically; numerically; algebraically (relation to calculus)

6. Given MP, derive AP & TP.
7. Given AP, derive MP & TP.
8. Folly of setting records. Examples.

Max MP; max TP; max AP.

9. Fallacy of fixed "requirements"; "duties"; "standards"; and other complements. *Energy crisis; water crisis; ex. of home insulation.*

10. Elasticity of production, and MP/AP.

11. MP as a system concept. Examples of open access, e.g. the fishery. Individual vs. social MP. *Dissipation of Rent. "Gresham's Law."*

12. Stages of production.

13. Why production still occurs in stages I and III: *e.g. of faulty instrs.*

14. Optimal combination of inputs: what to maximize; what to equalize.

Equivalence of maximizing and optimizing solutions

15. Measuring Return to Fixed Factor (RFF) *Relative scarcity of inputs, + relative costs. Incl.*
16. RFF vs. profit: functional vs. personal analysis. Value of functional analysis in personal affairs: *imputing returns.*

RFF vs. rent.

17. Maximizing vs. optimizing. Optimizing as maximizing RFF.

18. Variable complements. *MNP. Why $MNP = MP$ for small changes.*

19. Complements & substitutes (ousters) (usurpers)
(water, energy, goods, + inputs + long machines, steep, "corn", clearances - other (own) canned, wilted)
(Substs. raise AP of ~~water~~, but lower MP) - a defn.
(Substs. presupposes 3 inputs.)

~~MP of displacer takes form of reducing CC. Instead of subtracting acc, you add -ACC.~~

~~In I, Δw not only produces more than the others, but adds to what each of them was producing (row x). In III, Δw lowers P.~~ (column y)

is not max gain/unit, nor no. of units; but product of the
2 - (where their q's changes are =.)

"Sub-ec" starts w. ΠB . Fallacy of c.u. - Fallacy of $i=0$,
"full use" of dams as seen by B.R. + wtr. cons. fundamentalists.
(These are exceptional ^{over} reactions vs. ~~land-grabbing~~ ^{land-grabbing} behavior which is
more common).

Fallacy of share-cropping

to be fully useful in full analysis, & can be misleading.

e.g. of K substituting for land: hi bldgs; landfills; Tunnels (sub. for natural passes);
highways (sub. for location). (If l.v. are hi, K drawn into substituting for
land, breezes up)

- 20. Wage rates & i.r. indep. of AP, $MP = \frac{1}{\epsilon} AP$
- 18. MP as basis of setting pay, & c. input prices. Mutual det. Inputting.
- 19. Exhaustion of product.
- MP as basis of allocating res.
- 21. Equi-marginal principle. The mkt. equates MP, not AP.
- 20. Factor shares not same in diff. firms & opus. High AP/MP of W means low share for W.
- 21. TIT SAT A Q U B
- 23. (over) ~~Intensive & extensive margins.~~ Kinds of margins: ~~low yield land.~~ ~~hi-cost land. Quantity supply~~ ~~leaps from hi-cost land.~~
- 22. ~~On Mgmt. Adjustment to marginal cost/price: incidence~~ ~~effects: alloc. effects.~~ ~~Mgmt. and discrete adjustments.~~ ~~negot. of V.E.~~
- 21. Fallacy of prorating. (Utah v. Lewis; 70 cut backs; Ramsey on sales taxes) (Curtel prorates; Texas oil "allowables").
- 21. Fallacy of Seniority (rationing by priority)
- (14) Apples & Oranges: commensurability — the \$ as common measure. Commensurability, "numeraire". ~~and value thry, exchange rates, p.p.p., index nos., & other problems.~~
- 1, g. Measuring land by value, not area.
- Increasingly over time. What is the input of K? Value-added.
- (17a) ~~Is efficiency economical? Is economizing efficient?~~ ~~Optimizing as related to efficiency & productivity.~~
- Fallacy of partial efficiency. E.g. of fixations on energy, labor, foreign exchange, ^{export indus.} materials flow, etc.
- Opt's as ~~comp~~ overall efficiency. Opt's as finding rt. balance
- Common fixation to of 2 variables that change together. Opt's as a
- Fallacy of ^{under} ~~not~~ valuing ^{fixed} land input (usually land) ~~wght. trade off~~
- 21. Fallacy of Sharecropping.
- " " C.U.
- Fallacy of Taking AP as MP. "Freedom" of the Road, or (over)
- 20. " " Rep. Firm
- 22. " " universal marginality.

Extensive margin:

There is one for every use.

Land is mgt. for use B at same time when
mgt. for use A. A being less intensive.

(Like ~~major~~ ^{high} league team having but players to by league.)

range, public land, ATVs, dumping, hunting, smoking, burning,
skins, seas, ~~parking~~, ~~the~~ underground wtr., polluting, air/water, etc.
the "cowboy economy" psychology: ^{freedom as} ~~of~~ incontinence.

Handling more variables

a. Add K to fixed land; more product as cash flow; convert c.f. into ROR (depending on n .)

b. Add land, spread indiv. K , find max AP . Measure scale eff.

13

17b. Symmetry of role props.

Inverse

~~AP of Land~~ max when MP of $W = 0$

~~Inverse MP of FF~~

~~FF also has a MP, but it could vary. It, too, will be max otherwise product is overexhausted.~~

$$\frac{MP_F}{AP_F} = 1 - \frac{MP_W}{AP_W} \quad \text{but otherwise can raise overall AP. (A 10% } \Delta W \text{ is } < 10\% \Delta \text{ in all inputs.)}$$

$$\text{so } MP_F = AP_F - \frac{AP_F MP_W}{AP_W} = \frac{P}{F} - \frac{P/F \frac{\Delta P}{\Delta W}}{P/W}$$

$$= \frac{P}{F} - \frac{W}{F} \frac{\Delta P}{\Delta W} = AP_F - \frac{W}{F} MP_W$$

a. When $MP_W = 0$, $MP_F = AP_F$, so $AP_F = \text{max.}$

b. $MP_F = 0$, $MP_W = AP_W$, so $AP_W = \text{max}$

See #24, p. 8, "Residual Topics".

Temne & viction

How much intensity is enough?

Inst'l. bias

Nature's Territoriality limited to use; man's Temne often goes too far: max AB as goal; cartels; boundless possessiveness as an end in itself.

Whole vs. sum of parts. Dim. rets. to world pop?

No synergy - if good org. Fallacy of comp. Role of map to interpret world.

~~$MP = E \times AP$~~

4

Efficiency + capacity

Hamman I: Mk +, fair line

" II: Rationalizer

Land of hi effie. lent itself to labor-substs.; but reduced yield

Tendency toward = i. g.

~~Effects of higher costs: distr. + allocn.~~

~~Both lower rent + lower int.~~

~~Taxes same direct effect~~

~~→ Fallacy of custom pass-through: - all res. are unequal~~

~~Cushion-of-rent concept. "E. Surplus": Returns needed to keep labor + K "in the field"; but land is the field.~~

~~Firms vs. res.~~

~~Unpaid firms + unpaid res.~~

~~2 kinds of unpaid res: to lucky A; to all indy.~~

Net proceeds vs. profit.

~~Fallacy of reifying "The Firm".~~

5

~~Share cropping as land-wasting inst. bias.
(Royalty-bidding, same.)~~

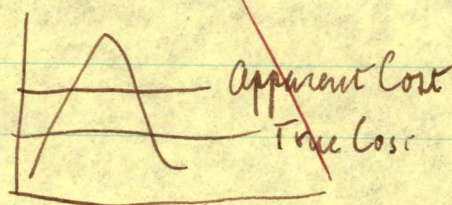
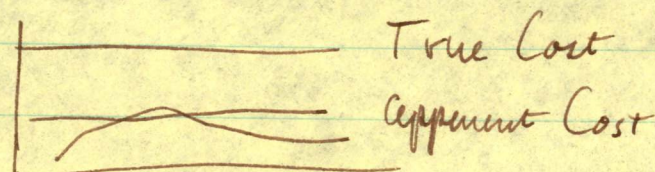
~~Taking AL as MP results in II B, subsec.
interim. — same as AC pricing. Give e.g. of
utilities here — promise to xlate into cost terms
later. Here, say utilities are req. to treat AL as
= MP, expand to II B.~~

~~More, AL based on avg. input in old \$~~

~~For. Serv. goes into submarginal lands.~~

~~Good Site I~~

~~Site VI~~



~~Costs as Perf. Standards~~

~~Peril of o' looking invisible costs, esp.
imputed rent.~~

~~Neg. prod. of mgr. who earn no ret. on
invisible inputs. Mgrs. to blame, not inputs.~~

Screaming at goats + swallowing camels.

Opt. intensity is indiff. w/in a broad range: flat curve of max. RTF . "Is of low quality".

But quantum leap to new use may be of hi quality.
(The ^{AKG} ~~AKG~~ Hagen fallacy re water savings.)

$$\text{Intensity} = \frac{\text{Non-land inputs}}{P} = \frac{W + K \cdot u}{P} \approx \frac{1}{uP}$$

(u = use-cost factor)

$$P - W = \text{net}$$

$$\frac{P - W}{P} = \frac{\text{net}}{\text{gross}} = 1 - \frac{W}{P} = 1 - \text{inty.}$$

Adding variables. Prodn. thg. gives you a framework to which you add vbles.

Intro: One vble, one P

2. Add a complx. ^{vble} input.

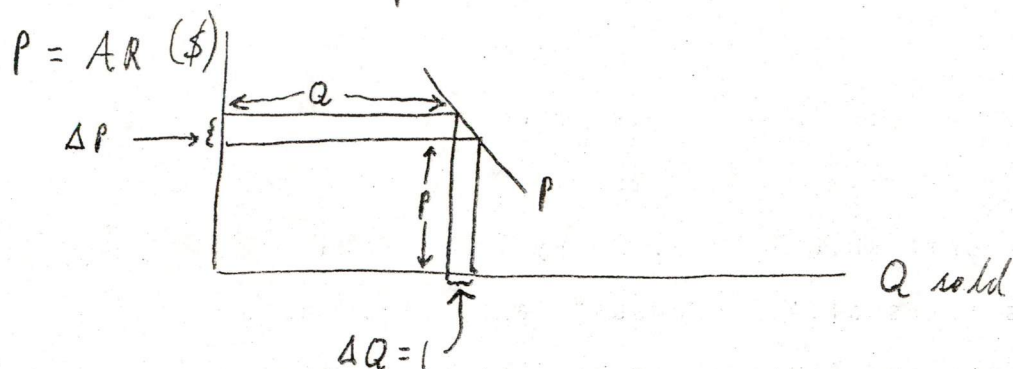
3. " " subtr. " "

4. Change the crop (unlike R. Hagen)

5. " " scale - add land

6. add a semi-fixed input - indivis. K .

1. Demand Theory, Relation of AR and MR. (AR $\equiv$ price)

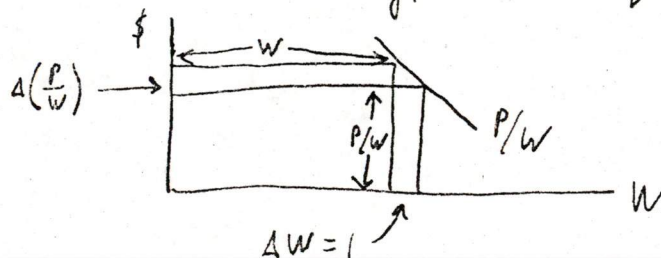


$$MR = P \cdot \Delta Q - Q \cdot \Delta P = P - Q \cdot \Delta P \quad (\text{letting } \Delta Q = 1)$$

$$\epsilon = \frac{P \cdot \Delta Q}{Q \cdot \Delta P} = \frac{1}{Q \cdot \Delta P} ; \therefore Q \cdot \Delta P = \frac{P}{\epsilon}$$

$$MR = P - \frac{P}{\epsilon}$$

2. Production Theory, Relation of AP and MP (here, P $\equiv$ Product)



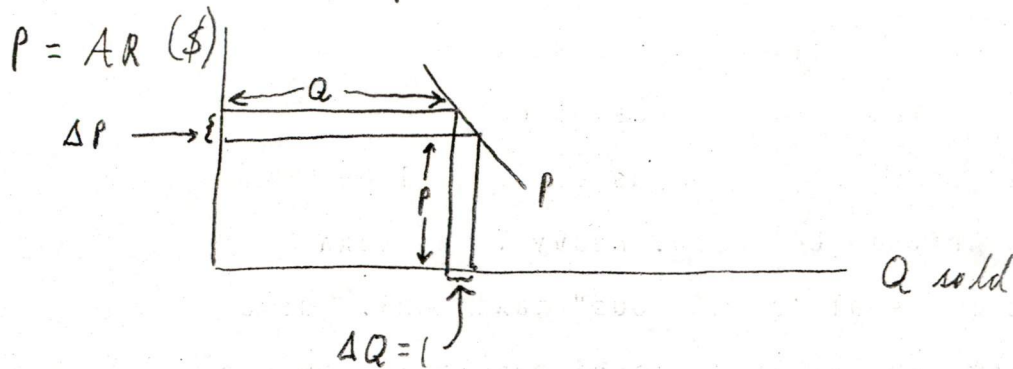
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$$\Delta \frac{P}{W} \approx \frac{d(\frac{P}{W})}{dW} = \frac{P}{W} \left(\frac{P'}{P} - \frac{1}{W} \right)$$

Substituting,

$$\Delta P = \frac{P}{W} + \frac{P}{W} \left(\frac{P'W}{P} - 1 \right) = \frac{P}{W} \epsilon$$

1. Demand Theory, Relation of AR and MR. ($AR \equiv \text{price}$)

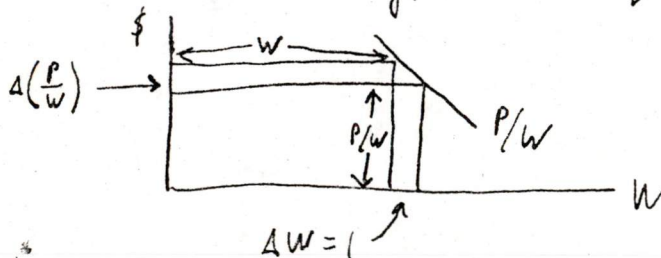


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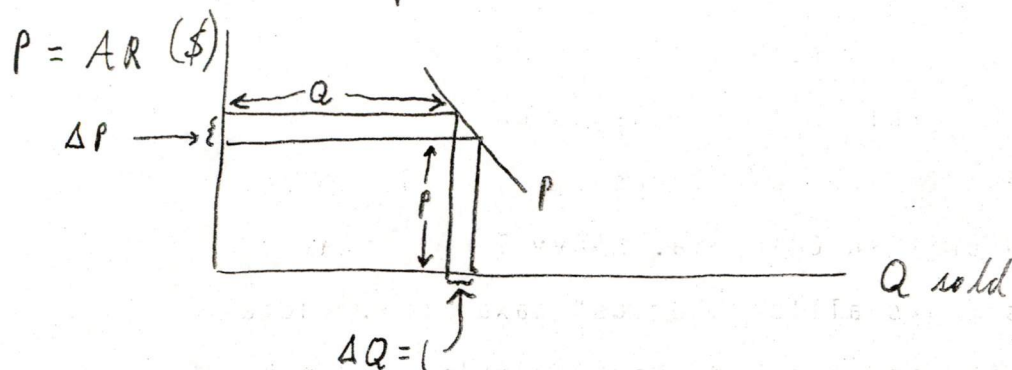
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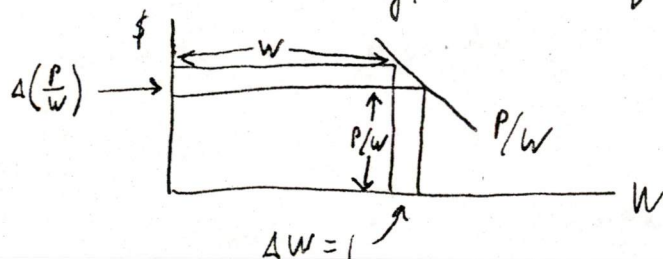


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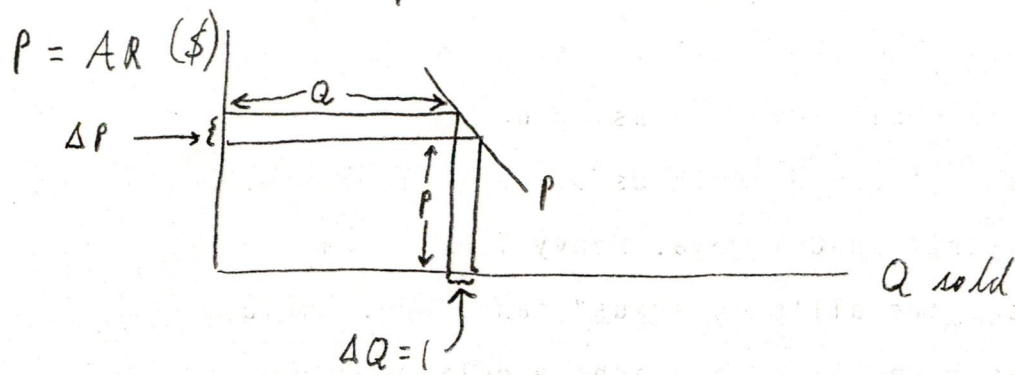
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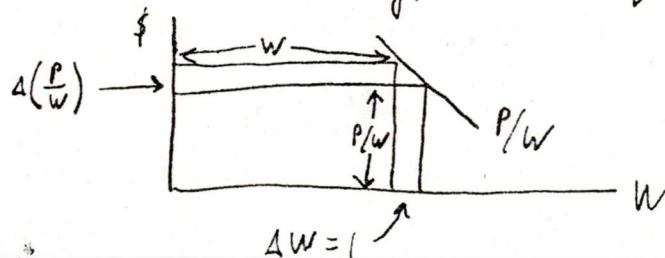


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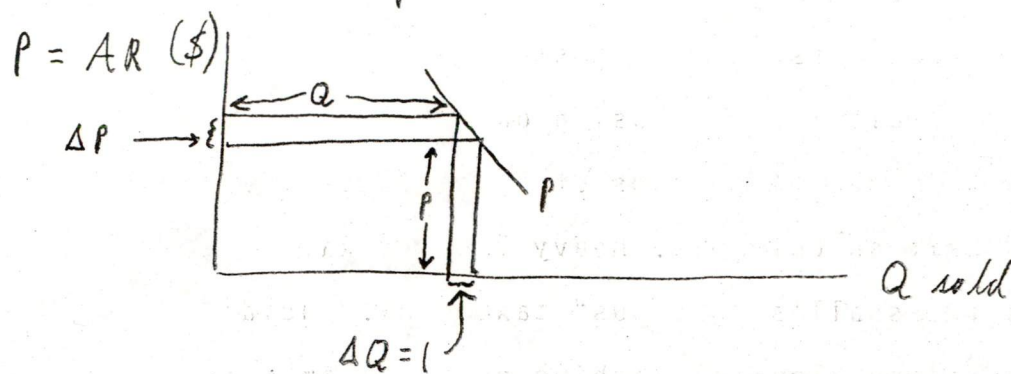
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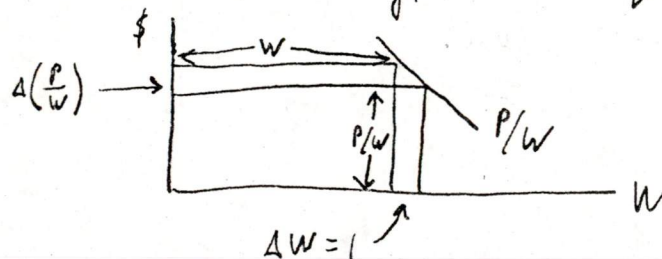


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Study Aid # 2

More basic points on producers, factor combos, etc.

24. "Input's returns":
25-28. MP is manager's basis for decisions:

- how much ~~the~~ ^{one} can pay for how much of input
- if MC is given, how much one can use
- "What will I lose if you leave me?"

AP ^{is for divisions} ~~is~~ hardly ever be used except for fluff, propaganda, & misleading.

26-28. Mutual det. of MP & MC

From ^{indiv's} buyer's standpoint MC is given & buyer adjusts. MC determines MP, or "wages det. productivity".

Whole system, input prices ~~are~~ det. by S & D, & demand is ΣMP . Collectively, det. is mutual.

Pop. common preaching: "prod. det. wages". As better to indivs. to work harder, improve mind & character, can't dispute. Is no subst. for understanding actual opn. of mkt.

Here AP, for not involved, but MP. AP is for divisions. (ref.)

Exhaustion of TP

23. ~~24.~~ $\frac{MP_A}{P/A} + \frac{MP_B}{P/B} = 1$

$$\underline{MP_A} \cdot A + MP_B \cdot B = P$$

24. Equivalence of residual & direct input of returns to F.F.

27
26

W.r. indep. of AP. Common w.r. caused by comp. + mobility, ~~not~~ w-in communicating mkt's.

Common means common "structure" of w.r.s.

I.r. also common level, K highly mobile around world (but not to borrowers w/o collateral).

28.

^{restricted ex}
~~peculiar~~ ~~mobility of land~~ - no common level, (Separate notes)
~~why land is taken as a factor~~ Cushman of next concept - pp. 4-5.

29 28.

MP/AP varies: among firms, ~~in~~ ⁱⁿ India, areas, opus, etc.

From max of 1 on input land down to very low values where assets / input = \$700,000 (as w. SOCAH)

$$MP = E \cdot AP$$

Factor shares vary.

Low E_w means low share to labor work effort.

30 28.

Low E means low prodn. response to changes in MC - e.g. then union, payroll tax, etc. on input or output; price controls, etc.

"If you can't tax a surplus, tax where a surplus is."

E.g. ~~if~~ before P-13 ed. tax I-T directly; now, indirectly, on u. of prodn. basis, i.e. ~~slv. tax~~.

31 30.

MP as basis of alloc'g res. among users.

= input price.

TITSTADT for TANSTAAFT: rule of good mgt.
Mkt equates MP, not AP.

So shd mgr., inside firm. Or a genl. in battle; or a coach in football.

32. Move TITSTAAHL ^{constant perimeter.}

Tendency toward symmetry in factor proportions.

Analogy of the square of TITSTAAHL with height & base unequal. - % changes are = (over)

Not an absolute rule but an easily observed clue. Fungibility of K & interchangeability of labor make it relevant betw. uses, too - all are "sisters under the skin" when subject to common measure.

33. Low E ~~for~~ implies steep MP curve.

Differential effects of different restrictions on output

a. Higher ^{MC} ~~input~~ cost of viable input

Low E uses only little less, & that little has low % effect on output. Demand for x is inelastic.

Thus can absorb higher wages, taxes.

(Effect of an x % ΔC -- effect on cost, budget vs. production)

b. Pro rate ^{input by} d %

Low E uses d % less. MP rises hi - absolute - ΔP greater

c. Effects on farming of increase pro rate
Make land the variable
Land-using firms ~~to~~ reduce output by higher %

Intensive farms have MP rise to higher level, lose more/acre.

$$\text{Max } x(1-x)$$

$$\text{Max } ab \quad \text{s.t.} \quad a+b=k$$

$$a(k-a)$$

$$x(k-x)$$

$$\frac{x'}{x} + \frac{(k-x)'}{k-x} = 0$$

$$\frac{x'}{x} = -\frac{x'}{k-x}$$

$$x = k-x$$

$$x = \frac{k}{2} = y$$

35. 1400 vs. outer fringe of the ext. margin
 34. Low ^{share} return to FF may release it to another, less intensive use - extensive margin, outer fringe.
 But hi ^{share} return to FF often indicates it is near the int. ready for xfr to a higher ~~use~~ use (higher gross yield/acre.) -- extensive margin, inner fringe.
 E.g. but grazing land goes to small grain; but wheat land to corn; but corn land to housing; but housing to commerce, etc.

34. Fallacies, errors & blunders.
 a) Fallacy of procating - result not = input.
 - ~~subinput~~ units ^{whole subinput, +} kept in use
 - subinput units enter input under control "price-umbrella".

35. b) Fallacy of seniority or priority.

36. c) Fallacy of molding costs - defer to cost analysis.

37. d) " " sharecropping and lease w. hi royalties, and other risk-sharing.

38. e) " " standards unrelated to costs -
 e.g. of "close utilization" in forestry;

f) Fallacy of the "Rep. Firm"

g) " " universal marginality, automatic pass-through.
 Need "cushion of use" concept.

Returns are needed to keep labor + K in the field; land is the field, always there.

Fallacies in utility reg. (to be handled under cost anal.)

h) a) Fallacy of guaranteed return on K. a-f effect + reg. bias.

i) b) Fallacy of "melting", has effect of forcing overexpansion treating AP as MP.

i) Fallacy of open access: "Freedom" as license to crowd.

of the Road, of the skies, seas, range, parking, open land (with ATVs + snow mobiles), fishing, hunting grounds, ^{parks + beaches} underground water pools, airwaves; to shoot, smoke, burn, dump, pollute, speed, hog, ~~amplify sound~~, block views, send junk mail, ^{below cost} amplify junk noise, raise billboards, etc.

j) Fallacy of idiosyncratic input prices + input res. (cf. #19)

k) 3 kinds of input res. ^{no use}: lower use; higher use.

36 Intensity ~~and~~ used. ^{against} by value of I-E not a case.

An acre is an acre to a surveyor, but an acre at the inner fringe is more land, eqy., than one at the outer. Intensity is the share of output imputable to W + K, is highest on last outer ^{ext} fringe, land of zero value.

Test: what happens ^{to residual rent if} value of output drops by 10%? ~~Which~~ Outer fringe loses more.

37 Dim. rets. to world pop? Fallacy of comp.

Synergy offsets

Std. neg. be concerned w. such a qu? \$ P + Water. Main study of successful corps. Shows successful negs. not only coach the team but develop a co. philosophy ~~which is~~ - co's role in the world. For this

to be any good they need a realistic & mature intep.
of the world.

MNP as performance standard.

38. It and half more vbles: MNP. Deduct cost
of comply. equipment, (e.g. MDs used labs.) Getting to
the "bottom line". ^{(39) MNP is also system concept. = MP for small changes.}

39. 39.
40.

~~K_{ray} the indep. vble~~ is called "Cash flow", ~~as step to~~
~~an everyday commensurate~~ a standard bus. term that
illustrates idea of MNP. ~~RRAT the fixed~~ "bottom
line". The proliferation of "bottom lines": net, net-net, and
triple-net.

41. 40, 39.

Converting c.f. to ROR. ^{- you have to subtract deprec. which depends on} The magic of ^{algebra} arithmetic,
+ hand calcs., + conversion factors, does it for us now -
- understanding comes w. Chap. -

43. Ecs. of scale: varying ^{all} ~~any~~ inputs together, but
not in lock-step: some are more "divisible" than
others. "Indivis" as exp. of scale.

44. Best analytical approach: use land, usually the FF,
as the indep. vble.

NP of land: QNP, MNP + NP. "Product net",
F. Quenay, + the origins of ecs.

45.

Tendency toward equal intensities?
(Labor is fluid; K is fungible.)

45.

42.

Substs. - the eternal triangle of cos.

When you have 3 inputs they may not all be complements. Workers need machines, but some machines can't so sure they need workers.

← ~~may~~ (Some K "subs. for" land, e.g. tall bldgs, sand fills, tunnels, ^{or types more} highway.
K subs. for W when it raises AP but lowers MP.

Examples: sheep, cattle, timber, farm machines, small grain culture,

MNP of ^{gusting} subst. ~~is~~ ^{inputs} is not reduced by its need for supporting inputs but is enhanced by its ~~substituting~~ ^{substituting} them. ^{instead of substituting... add...} It may ~~not~~ reduce gross P, if it reduces c. by more. ^{Human I + Human II.} Tendency to neglect intensive mgn., substitute extensive, e.g. U.S.F.S.; (over) E.g. Water left for pasture subst. for vines; machines displace labor, reduce yields. Energy used by machines, & wtr.

e.g. seeding rice by airplane:

The ousted input includes owner-input himself. May be long overextended - prefer a use making less demand on his time.

46.

Performance standards
Max ANP as standard

At mgn., $MNP > ANP$ as standard.

Cushion of rent allows slack to ignore performance standard. Social pressure reminder: assets & raiders.

land reform in LDCs; expropriation & imperialism;
oil industry; cartels; etc.

47. From pot-shot Pete to hungry Bird - ~~learning~~ as cumulative
dwt's skill by learning to handle more variables & adapt simple
basic rules to complex situations.

Summary of where we have come, (v. p. 8, notes)