

Ec. 162 Proba Ess.

~~Peri. Canad. not. for Arto Kraft~~

Optimality

1. Good football coach
Smart enough to understand the game
Dumb " " " think it is important
2. Not so rich as to be envied
" " poor " " " " damned
3. Any better, he wdnt have given it to me
" worse, it wd " killed me.

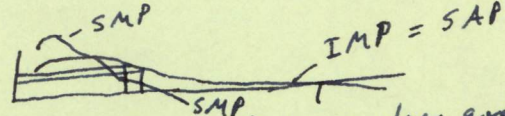
2. Meaning of MP

- Subtract other losses

- s.r. & l.r.

- MP & MNP

- is a time-rate. i.e., as mine wears out w. age, not dim. rets.
as produce faster, it's.
- open access.



a. Open range

b. Streets

c. Nature. Not so bad if all remain open.

3. Impulse, of using incl. anal.
more complex, but, incl. more does good, too.
Is unequal treatment that is bad.

a. Never let surplus core carry subopt. extensions. They must justify themselves.
b. Know what to pay for labor -- also resid. resource, yielding surplus
avoid onelette school confusion.

avoid anogation. Counterpart of dim. AP is rent.

4. Ever produce in stages 1 & 3?

5. Intensive and extensive mgrs. of prodn.

6. H.M.

MNP

same as MP at a point; then larger

Δg & $-\Delta g$ rets. to scale

Integrates anal. of scale & vble. propns. Divisibility vs. continuity.

Opt. scale -- max ANP $\frac{GR}{CL} = \frac{1}{1.8}$

Don't max. a GR. Nor large & small. Tendency to equal intensity

Asymmetry of large & small. Unequal impact of taxes & GR or CC.

Euler's theorem. $ANP = MP$

Apply to farming -- bid more for expansion.

Apply to cycle. Higher land prices, higher taxes, force intensification, in later stages.

Mon., 2-27-67.

1.

	Lo	SR
MP		
MNP		

2. Fallacies, related to max. AP

a. Arrogance -- imputing all output to one input

E.g. Marx, labor creates all value

Dry-hole argument

b. Fallacy of partial constraint

E.g. that risk stops you from adding labor, but not land.

Advert forward to idea that adequate capt. lets you improve land more intensively.

c. Fallacy of understating o.c.

E.g. but alt. use for 5th Ave & 34th is ptoses.

... .. Don Rysdale is pitching hay

(implicitly accepts the reserve clause, as no cost. _{shd.})

d. Fallacy of using B/C

~~3. Elms. of prodn.~~

3. Implications of unequal anal.

a. Dim. returns imputes rent, but in excess of product > non-land costs.

b. Wages indep. of TP

As Δ productivity is no criterion of Δ wages.

If Δ wages, they always = MP

Factor prices vary greatly, in fact, among indios, & among firms.

- c. Complxy. of land to labor

Effect of frontier

soil bank

" " capl? Depends on r.f.

- d. Land differs -- is a free input, supply.

Extensive & intensive

all capt. is homog. ^{when turn over} comes at a price

all labor has o.c. of leisure

- e. Opposition to irreg. anal. One-to school

i. Landowners

ii. Socialists

iii. Anti-rationalists

- ℓ. 2 contrasting fallacies

i. I desire no tenure, command congestion or rationing agent

ii Max AP

- g. A paper, ~~which results?~~ lower & upper?

Not nearly - H. G. on external ecs. also G. Marshall

who finds Δ productivity from coopn. of labor.

W. missen Miss

I missed this in class

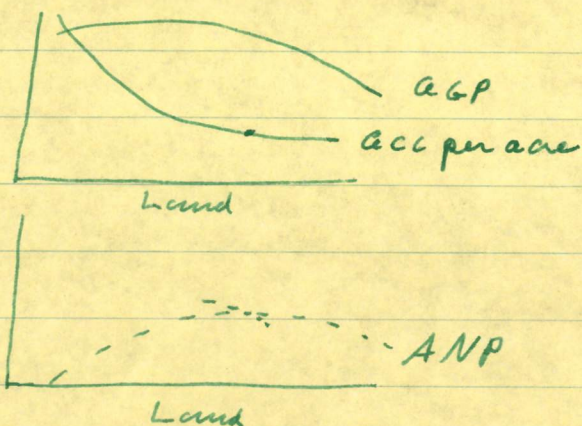
- h. Open access is a way of solving distrib. problems by socializing rent. But in process, destroys it.

Dim. rets is not a pure proportions effect. Also involves Δq scale.

That is why many have turned to indiff. curves, or isoquants.
But better to use MNP approach.

Resid. & direct imputation. Euler formula makes it obvious, they are same. But how do we know Euler is true?

My ACC method shows it.

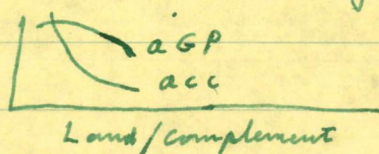


ACC is based on paying complements their MP. Then when reach max. rent, or const. returns to scale, land gets MP also.

When you're too small, some input must be paid less than its MP.

(I can use this in UBL stuff -- it communicates equity!)

Tendency to = intensity. In any one line of production,



e.g. corn.

Oct. 31, '77

Ad. 200

Distribu

1. "Ricardian" thy. Classical thy. was mostly distr. of wealth. Samuel makes absurd by strict construction - and by reject'g J.B. Clark, whom others accept.

Clark made all thies. the same. Resid. rent = MP of land.

Clark unscrambled ourlette's.

2. Justice, fairness. Productivity thy. Puritan ethic. Problem is, what do w. unearned incomes. (Princeton faced by them.)

3. Rent.

- a. Land yields it. Some is better, much is mediocre or unprod.
b. Rent comes w/o cost. Land is there anyway.
From viewpoint of society, no need for pvt. collection.
c. But serves to ration supply.
d. Residual - but also = MP of land.
e. Source of half the confusion in econ.
If understand rent, are halfway home.
Keep yr. eye on rent. Who gets, how detd., is it maxd., is it dissipated, how rationalized? How concealed? Etc.

3. a. Grades of land

- i.) Progressively resort to poorer (w. exceptions)
- ii.) Murphy buys all. returns unprod. Vt. Marble Co.
- iii.) Int. & ext. margins.
- iv.) ~~H. & P. in~~ Better land yields rent.
Not a cost, social, bus. wd. still be there if no income
- v.) Supra unprod. v. unprod. firms, (& regions)

f. Mississipi.

Price control - FPC

Roll-in - oil pricing

X - subsidy - highways.

Payments in kind

g. Distribution via tax -- costs goal.

4 ANP model. Forest Eng. bloc.

a. Euler. $\Sigma MP = AP$

Imputing vi. onelette school.

b. Tendency to = intensity, where indiv. K is same, i.e. in same ~~indiv~~ business.

c. Falling of shunning "low quality" input Δs .

d. L.T. (v. s.o.) means adding more vbls.

cf. total vs. partial diff. (B., p. 60)

Indiv. v. discount.

e. Max $P - C$, not P/C

Idea for Oct. 31, '77.

Ad. 200.

"Distrib."

1. ANP, etc. Distrib. Forest Eng. Bloc. Morals: see p. 2,

2. Tendency to = factor propus.

If $NP_1 = NP_2$, but $IQ_1 > IQ_2$, MNP of land differs.

3. Def. of eff'c. P/I

Only reaches 100% when no input has o.c. > imputed return here.

Resid. rent, max., is value of I .

By using AP as mere, one arrogates rent to others - usually input. E.g. of Potlatch.

4. Grades of land

a. We progressively descend to poorer

b. Murphy buys all. returns input. - V.E. Marble Co.

c. Int. & ext. input.

d. Hi AP means low cost

Low-cost yields rent.

If you count this as cost, all have same. But this is circular. If lower price, some stay, some leave.

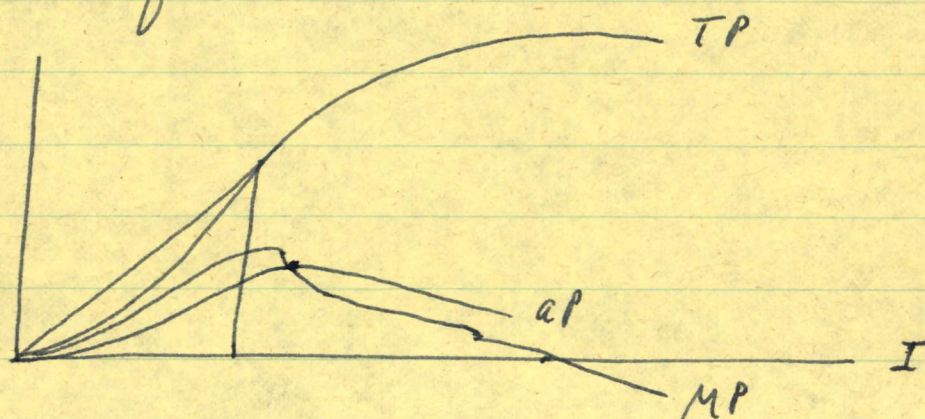
Supra input. vs. input. firms.

Ownership, not scale, makes them supra.

e. Labor & K are mobile, & revolving. Compete directly, homogenize.

B. Relations of marg., ave., & total quantities.
In produ. fn; demand curve; cost fn.

1. Produ. fn.



Important relations.

k. MP is "pooled," not related to one person or acre. Aggreg. v. indiv. MP.

l. Max. AP is inefficient

- $TP = \sum MP$
- $AP = MP$ at AP max
- $MP = 0$ at TP max
- $MP > AP$ before AP max
- Opt. mixes in Stage II
- AP of fixed factor is max. when $MP_I = 0$.
- $MP/AP = \text{elast. of produ. bes.}$

$$\frac{\frac{\Delta P / \Delta I}{P/I}}{\frac{\Delta P / P}{\Delta I / I}} = \frac{\Delta P / P}{\Delta I / I} = \frac{\% \Delta P}{\% \Delta I}$$

- $MP = \text{marg. cost of } I = AC_I$
 $AP - MP = \text{return to non-} I$
They are unrelated.

Ec. 162, Wed, 10-16-85

1. MP, effc., & optimize.

- a. Max. AP not effc., bcs. minimizes MP of other input.
Be suspicious of resource hoags w. hi output/man! Chevron & Signa.
- b. Is OK if other input is free.

Free land, cowboy ec.

Intl. variations. U.S. weakness for exporting
labor-savng machinery, "Ugly American".

Free wtr, approp. doctrine, use or lose.

c. In general, opt. by $MP = MC$

d. Show TP from MP & AP

Graphically

Numerically.

Be able to go both ways.

e. Show resid. return to fixed factor.

Is "net product". ($ANP = MNP$ in eq.)

Thurs., Nov. 29, '84
Ex. 162 A

1. "inputting" - how much is ~~an~~ a marginal input worth
(+ i.e. all inputs of that kind)?

Does the MP determine the wage? Not to individ.
firm. MC is detd. in larger mkt, so $MC \rightarrow MP$.
But overall, ΣMP reps. demand by all employees.
 $S + D$ interact to determine w.r.

Supply is then allocated among all firms
"equi-marginally". So a) the firm is effie + b) The
aggreg. use of work is effie.

2. ΣE_p add up to one.

$$\frac{P'/P}{x'/x} + \frac{P'/P}{y'/y} = 1$$

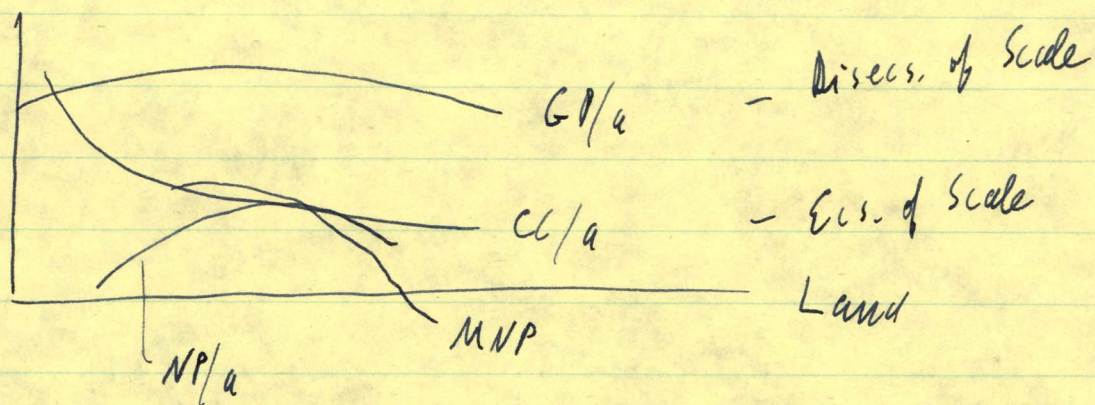
$$\frac{P'}{x'} \cdot x + \frac{P'}{y'} \cdot y = P$$

3. p. 6 $MP = MNP$

But $MNP = ANP$ at ~~eq~~ opt. scale. If it
were different, firms would change size.

Comp. \$ from other buyers, too.

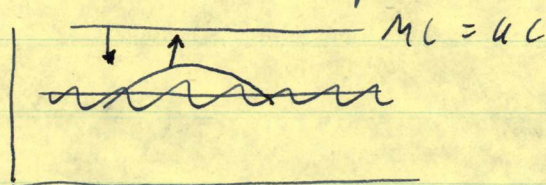
4. Scale & propus.



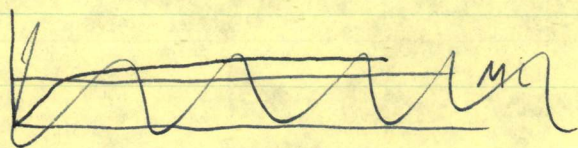
5. To incorp. time in this model.

- a. Use Disc. ~~AP~~ Products
- b. Annualize ACF

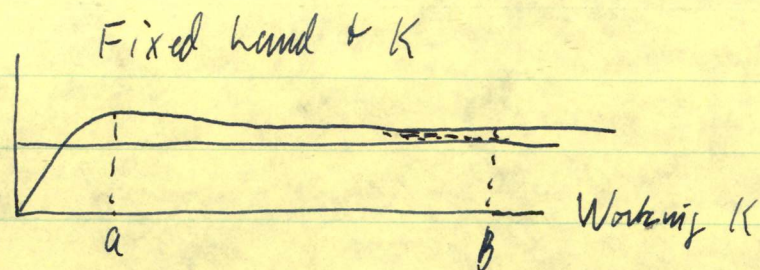
6. Why extensive margin has quantum leaps.



7. Why it is a Fallacy to min. risk by max'g GP



7.



Max AP ~~may~~ reduces return to fixed factor.

Use A has hi gain/w but low volume

Use B " low " " hi "

Bias in perception. Risk on working K is visible, every yr. you roll the dice.

But at A, suffer the invisible risk of imputing less to owned, fixed assets than their worth.

1. Elasticity vs. derivative,

$$\frac{dy}{dx} \text{ vs. } \frac{\frac{dy/dx}{y}}{\frac{dx/dx}{x}} \quad \text{or} \quad \frac{y_0}{x_0} \quad \text{or} \quad \frac{\frac{d(\ln y)}{dy}}{\frac{d(\ln x)}{dx}}$$

2. Es are exponents.

$$y = x^2$$

$$y' = 2x$$

$$\frac{y'}{y} = \frac{2x}{x^2} = \frac{2}{x}$$

$$\frac{y'/y}{x'/x} = x \frac{2}{x} = 2$$

More generally, $y = kx^n$

$$y' = knx^{n-1}$$

$$\frac{y'}{y} = n \frac{x^{n-1}}{x^n} = \cancel{nx^{n-1}}^{n-1} nx^{-1} = \frac{n}{x}$$

$$\frac{y'/y}{x'/x} = x \frac{y'}{y} = n$$

3. In log,

$$\ln y = 2 \ln x$$

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

generally,

$$y = kx^n$$

$$\ln y = \ln k + n \ln x$$

$$\frac{y'}{y} = 0 + n \frac{x'}{x}$$

$$\frac{\frac{y'}{y}}{\frac{x'}{x}} = n$$

4. E.g.

a. Area of square $A = B^2$

b. X-section of pipe.

$$A = \pi R^2$$

$$e = 2$$

c. "Law of the Cube"

$$\frac{V}{A} = \frac{B^3}{6B^2} = \frac{B}{6}$$

$$\frac{dV}{dS} = \frac{dV/dB}{dS/dB} = \frac{V'}{S'} = \frac{3B^2}{12B} = \frac{B}{4}$$

$$\frac{dV/dS}{V} = \frac{B/4}{B^3} = \frac{1}{4B^2}$$

$$E = \frac{\frac{dV/dS}{V}}{\frac{dS/dS}{S}} = \frac{\frac{1}{4B^2}}{1/6B^2} = \frac{6B^2}{4B^2} = \frac{6}{4} = 1.5$$

Easier: $V = B^3$, so $E = 3$
 $S = 6B^2$, so $E = 2$

So E of V w.r.t. $S = \frac{3}{2}$.

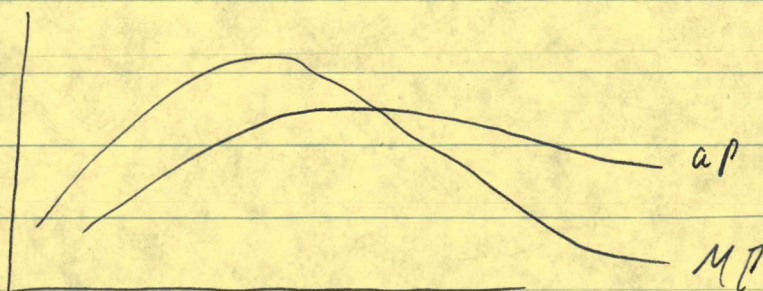
Same is true of most 3-D figures. Loss ecc. of scale by adding more variables.

d. W. Morton on Law of Cube.

e. Beware of Berkeley's Ghosts.

Base	B^2	B^3
10	100	1000
20	400	8000
30	900 900	27000
40	1600	64,000

3. E and stages of prodn. + eff. of scale.



$$E = \frac{MP}{AP}$$

Stage I

II

III

4. Cobb-Douglas fns.

$$P = K L^{\alpha} K^{\beta}$$

$$\ln P = \ln K + \alpha \ln L + \beta \ln K$$

$$\frac{d \ln P}{d L} = \alpha \frac{1}{L}$$

$$\frac{d \ln P}{d K} = \beta \frac{1}{K}$$

5. Other handy math.

$$a. \frac{d (L_i)^{\eta}}{d \eta} = \ln(L_i) \cdot (L_i)^{\eta} \approx i (L_i)^{\eta}$$

$$\frac{d \ln[(L_i)^{\eta}]}{d \eta} \approx \frac{i (L_i)^{\eta}}{(L_i)^{\eta}} = i$$

b. $\ln[(1+i)^n] = n \ln(1+i)$

$$\frac{d[n \ln(1+i)]}{dn} = \ln(1+i) \approx i$$

c. $\frac{d[n \ln(1+i)]}{di} = \frac{n \frac{d[\ln(1+i)]}{di}}{di} = n \frac{1}{1+i} \approx n$

d. For pure call, use

~~$$\frac{d[\ln e^{in}]}{dn} = i$$~~

$$\frac{d(\ln e^{in})}{di} = n$$

1. w/o calculus!

$$P = k A^{\alpha} B^{\beta}$$

$$E = \alpha + \beta = 1$$

$$P(1+p) = k A^{\alpha} (1+a)^{\alpha} B^{\beta} (1+b)^{\beta}$$

$$1+p = (1+a)^{\alpha} (1+b)^{\beta}$$

$$\ln(1+p) = \alpha \ln(1+a) + \beta \ln(1+b)$$

Formula for large values

w/o calc!

$$p \approx \alpha a + \beta b$$

2. Alternatively, w/o using logs!

$$\frac{dP}{dx} = \left[\alpha \frac{dA}{dx} B^{\beta} + \beta \frac{dB}{dx} A^{\alpha} \right] k$$

$$\frac{P'}{P} = \alpha \frac{A'}{A} + \beta \frac{B'}{B}$$

$$p = \alpha a + \beta b$$

3. Using logs + log derivatives.

$$\ln P = \ln k + \alpha \ln A + \beta \ln B$$

$$p = \alpha a + \beta b$$

- 2
4. The exponents, α & β are constants. They are not used as logs, (their bases are vbls). They are used as ratios of logs; hence as ϵ , or ratios of q changes, when the variables change.

5. For substa., let $P' + \therefore p = 0$

Then, $\alpha a = -\beta b$

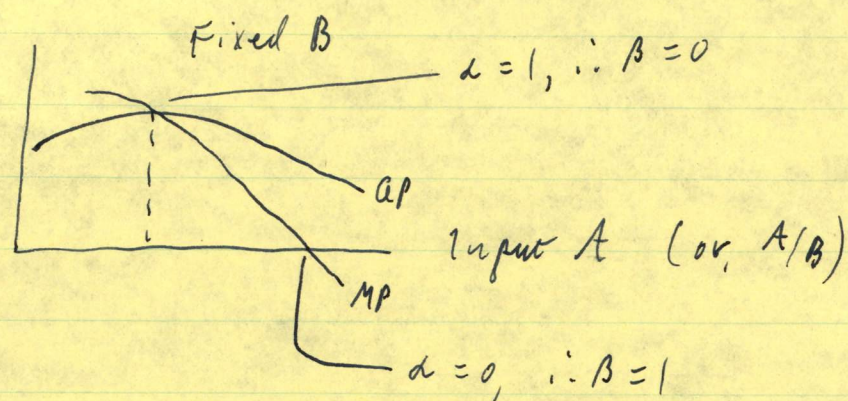
$$\frac{a}{b} = \frac{-\beta}{\alpha}$$

Or, if B is to A , can reduce A by:

$$a = -b \frac{\beta}{\alpha}$$

6. Now, what is CES prod. for?

7.



ϵ keeps changing! CES only holds if α and β remain fixed.

Ec. 162A, Tu, 4/22/83

1. MP as a system concept

11th acre

11th worker

11th computer terminal

Dissipn. of rent.

Tragedy of commons as e.g. a indiv. vs. collective MP.

2. MNP.

Add one eco. prof., 1 Teaching. + research + service.

Add one bio. prof. " " "

less cost of exp. plot, greenhouse, lab, energy etc.

DCF is the way we meet NP

AP is nothing to max; but ANP is ! Opt. scale.

(Highest & best use; not same as max. bldg.)

3. Fishing on Fraser.

E.g. of symmetry of princ. of vble. propos.

4. Practical ways to observe MP

Kannan

5. Use of K as indep vble.

a. Finding i .

$$p = a \frac{1 - (1+i)^{-n}}{i}$$

$$i = \frac{a}{p} [1 - (1+i)^{-n}]$$

$\swarrow$
 i

b. Use HP 38E

6. Margins, intensive + extensive (+ vertical)
Both margins adjust

7. In rent vs. in personam analysis.
Ambiguity of "profits"
E.g. of appraisal. Objective vs. Subjective.

8. Distrib. is extensive.

Skip 9. ~~At~~ E of produ. + E of supply

Skip 10. Efficiency

Skip 11. Substr. + displacement

12. Scale

Mgrd.

Adding dimensions.

1. Line: length = base, B . $E = 1$

2. Square: Area = B^2 $E = 2$

3. Cube Vol = B^3 $E = 3/2$

4. ~~#~~ Time

a. Vol. = $n B^3$ $n = \text{years.}$

b. Value = $B^3 \frac{1 - I^{-n}}{i}$ $E_n = ?$

5. Vol. of prodn.

Vol. = $x B^3$

$x = \text{no. of cubes.}$

Ec. 162

✓ Show them how to adapt to higher wages,
higher i , and higher l.v. This is something
negot. shd. know.

Show them how to avoid being bamboozled
by:

"Productivity" as used by J. Kendrick.

"Efficiency" as misused, e.g. pure energy "effic."

Give e.g. of low land productivity: Cities Service
stockpile of leaves, e.g.

Fri, 10/3/81 Ec. 162

13

What to stress re dim. rets.

Q1.

1. The input - ave. relationship.

A. Input effect as the ~~diff~~ net ^{effect} ~~gain (over loss)~~
~~result of~~ of a cause ~~and its~~ with gains + losses.

1) Add an 11th acre, spread labor + machines thinner.

2) Cold fishing boat
Commons.

B. Stages I, II, III.

Opt. combo. usually in II.

But important exceptions.

Stage I, Δ ave. returns

Water + sewer lines. Demand isn't there.

Stage III.

Commons

Approp. doctrine, applying wtr.

C. ~~Stage~~ I,Elast. of prodn. $\neq$ $P = \text{Product}$.

$$\frac{\Delta P/P}{\Delta F/F}$$

$F = \text{Factor}$, Maybe Feedstock
Farmer
Fertilizer
Field

$$\frac{\Delta P/\Delta F}{P/F} = \frac{MP}{AP}$$

Follow these steps

$$\text{I} \quad MP > AP$$

$$MP = AP$$

$$\text{II} \quad MP < AP, \quad (MP > 0)$$

$$\text{III} \quad MP < 0$$

$$\text{Let } P = X^a$$

$$\text{Then } \frac{dP}{dX} = a X^{a-1} = \frac{a X^a}{X} = a \frac{P}{X}$$

$$a = \frac{dP/dX}{P/X} = \frac{MP}{AP}$$

$\neq$ Do not look for parallel methodology between ϵ of prod.
+ ϵ of demand. Latter is $\frac{\Delta x/x}{\Delta y/y}$. ϵ of prodn. is

$$\frac{\Delta(xy)/xy}{\Delta x/x}$$

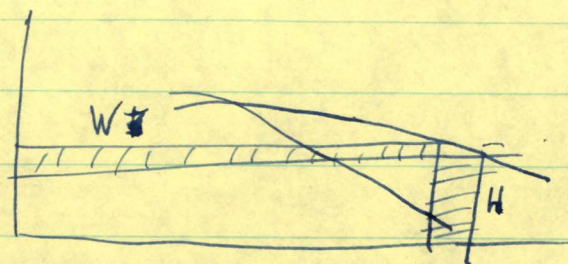
D. Inverse relationship of productivities.
 Folly of setting records.
 "Most corn yield"
 Highest bldg.

Misuse of, or misunderstanding of "highest & best use" of land.
 Stop where $VMP = MC$.

It's easy to see that $MP = 0$ for the variable input is folly. Not so easy to see that Max AP for vble. is equally folly. The So. Am. Fallacy has been to stress "productivity" $\equiv$ AP of labor.

"Relative" prices don't matter, finding opt. mix. Absolute price of vble. vs. absolute MP. M+M use "relative", another case (like = input. principle, "inversely proportional.") of making simple things hard.

Moral Eq. pts. rarely found by maxing AP.
 $MP = MC$.



1. Collective MP vs. indiv. MP
Common case.

2. E of prodn.

$$\frac{\frac{\Delta y}{y}}{\frac{\Delta x}{x}} = \frac{\frac{\Delta y}{\Delta x}}{y/x} = \frac{MP}{AP}$$

$$\Delta y = H - W$$

$$y = H \times W$$

$$\Delta x = 1$$

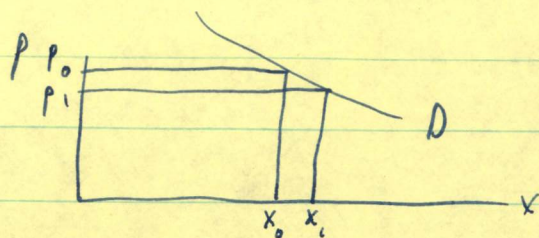
$$x = W$$

$$\frac{\frac{\Delta y}{\Delta x}}{y/x} = \frac{H - W}{\frac{H \times W}{W}} = \frac{H - W}{H} = 1 - \frac{W}{H}$$

3. MR + price.

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

3.



$$MR = P \left(1 - \frac{1}{\epsilon} \right) = \cancel{P \left(\frac{\epsilon - 1}{\epsilon} \right)}$$

$$MR = P_1 \cdot \Delta x - x_0 \cdot \Delta P$$

$$\Delta x = 1$$

$$\epsilon = \frac{\frac{\Delta x}{x}}{\frac{\Delta P}{P}} = \frac{P}{x \cdot \Delta P}$$

$$x \cdot \Delta P = P / \epsilon$$

RR.

$$\frac{MR}{P} = 1 - \frac{1}{\epsilon}$$

ϵ of demand is not analogous to ϵ of prodn.?

ϵ of prodn. is change in total output, or $\Delta(y_x)$.

ϵ of demand is " " " " g. sold, or Δx .

Mon., 10/5/81, Ec. 162

1. Complete Fri.
2. 2 ways to find TP, from AP + MP
∴ 2 ways to show return to fixed factor.

3. The full meaning of "inql. adjustments"
a. Inql. adjustments are not minor. It changes mix throughout the opn. A systems concept. (Or it should. This is one diff. between good inqs. & bad.

b. Intensive margin & extensive.
1) Land peculium, can have a zero inql. bcs. no natural cost.
E.g. in OCS, hi Arctic, deep gas.

2) Higher price, ~~costs~~ or lower cost, changes both margins.

c. Tendency of some texts, like M+M, to ignore resource base of all ec. life. e.g. p. 212, they have mining w/o a mine.

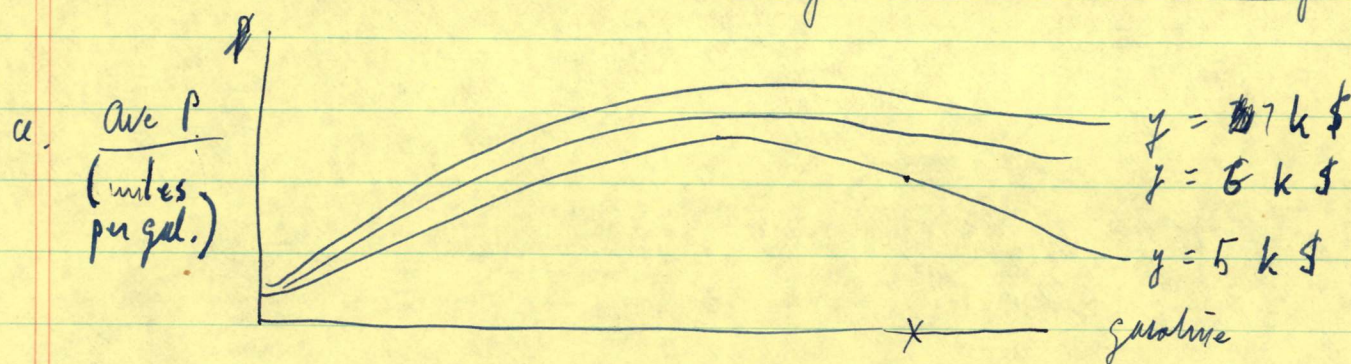
Tendency of some corps, some thing.
E.g. current Harvard study, many corps. don't even inventory their resource base.

"cowboy ec."

Reflect ancient age of no limits —
sawdust savages, beefsteak barbarians,
hardrock huns, pituine pirates, ...

M + M haven't caught up w. age of limits.
But we will.

4. More variables. End of analysis is to handle many vbls.



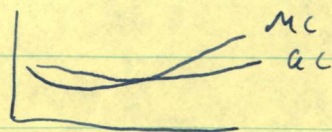
b. Ave Net Prod.

c. Ave. Disc. Net Prod.

after we learn the ropes, then we use algebra. And tables.
But is import. to visualize what you are doing.

Fri., 10/9/81

1. a. Fishing on Fraser?
b. Show TC when $MC \neq AC$



2. Productivity + Efficiency.
Productivity is an intimidating word.
Why is lower AP more efficient?
Effic. is $\frac{\text{output}}{\text{all inputs}}$

✓ Ec. measure of fixed input is max resid. return.
As long as you add more to output than
input, you Δ effic. -- (if effic. < 1 ... leave detail to
later.)

3. Equity + effic.

4. Distr. is exhaustive, Quick + dirty indicator.

5. Use of in rem vs. personal concepts.

6. MP/AP and elast. of supply, e.g. as affected by
 - Δ wages
 - severance tax.

Fri. Ask 2 qns. ~~A. Fishing on France~~
~~B. Show TC when AC changing.~~

1. What is efficiency?
Show why eq. gives lowest cost/unit.
Enter fixed input as cost, at unit equal to its highest net value.

- (3) 2. Equity & efficiency
Pressure to spread around the rent
- open access
 - morcellement; bowling alley lots. "French equity."
 - underpricing
 - extending utilities

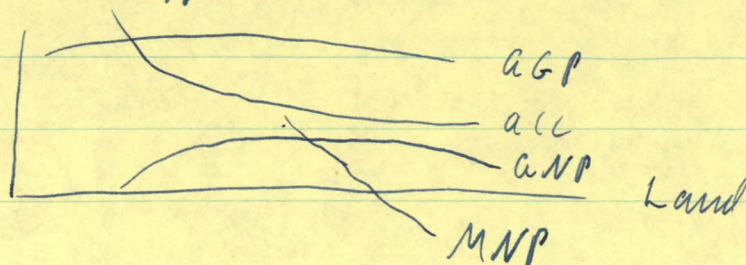
How to get back: tax & redistribute.
(e.g., proposed severance tax.)

2½. Factor distr.

3. Factor mix & distr.

a. Distr. is exhaustive, if all get MP

- i. e.g. when $AP_x = \max$, and $MP_y = 0$.
- ii. ANP approach.



Rent of land pushed up until $MC = MNP = ANP \max$.
But acc/AGP is on ass. that $MP = MC$.

~~4. Malthus.~~

- 3
- b. Δ pop, more share for prop. ty.
 - c. Δ cap, " " " land. Movers of cap. displaces labor, - i.e. turns slowly.

4. Malthus

Need to use land more intensively.

Lag in adapting to this need, "instl. resistance."

2d approach is to spread out.

Ech. they shd. go together; in fact, instas. tend to favor one over the other.

3d approach, ignore scarcity, manage demand, or more extreme, "triple revu." 4th " " ΔK . Permitted "supply-side ecs."

A true supply ecs. wd. stress min, land better.

5. Function of land rent.

- 3.
- For all factors at eq., $MNP = ANP$
- Residual return to any factor is its ANP

6. Ec. effic. vs. physical effic. (or waste)
Inplace of usg ec. units.

7. - of $2\frac{1}{2}$.

(5)

Profit is a personal concept. Depends on what you own. "Paper distr.," xfr profit.

There is an objective or in rem analysis, factorial, regardless of who owns. Tells you what things are worth, regardless of who owns them.

What is ec. input adding to output? What do you sell it for (o.c.)

Lifts the paper veil, looks at real values.

8. Rent change does not drive people away, but forces highest use. Joe's restaurant.

2 fns. of price: ~~it~~ elicit supply; ^{limit} ~~ration~~ demand.
Rent has only one.

9. Dim. rets. not a point, but a stage.
A "reach" of a curve.

10. ^{MP}
~~Dim. rets~~ is a "system" concept.

11. Wages indep. of AP

12. Fallacy of provokes.

13. Are wage Δ s passed thru in higher price?

If MP/AP is low, little redn. of supply.
Apply to revenue tax.

If $MP/AP = .25$, lose 10% of input, but
only 2.5% of output. Land of hi eff'n, low
capacity.

12 Scale

1. System concept

11 ~~to~~ ~~the~~ ~~the~~ Substr. "Displacement".

Means of input + become.

10 Efficiency. Folly of setting records. (but there is value in standards. Lost sheep)

6. Margins, intensive + extensive (+ vertical)

l.g. Both margins adj. int.

3. Fishing on Fraser. Symmetry of div. res.

8 Distrib. is exhaustive.

7. ~~the~~ In run vs. in personnel analysis. Ambiguity of "profits".
e.g. of appraisal.

9 E of prodn. + E of supply.

2. MNP (DCF idea)

15. Use of K as indep. vble.

4. Practical ways to find MB: wto. in Keweenaw.

Cost analysis.

MC pricing.

7. MP as system concept. Good mgn. change whole system.

a. Add 11th acre $9.5 \times 11 = \frac{9.5}{104.5}$

#	trees.	AP	TP	MP	MP ÷ 10
50	300	15,000			
60	280	16,800	1,800	180	
70	260	18,200	1,400	140	
80	240	19,200	1,000	100	

c. Fishing boats

d. Minn. law 1872
Preharvest capt.

Maldistrib. of pop. wd. result from open access.
Man has improved on nature, but has overdone it
w. control predators etc.

Thurs, 11-8

9. Extensive + Intensive Margins. { B.C. Gas Corp
a. Fallacy of rep. or typical firm. { B.C. mines
b. Intensive mgr includes shifting the ~~the~~ product. { old prospecting miner

Hierarchy of users.

E.g. Calif. agric. Small 20 of land grows fruit.

Avo. acreage quadrupled, 10 yrs.

+

- c. Instl. bias vs. intensive margin.

RARE III.

- d. Only land has an extensive mgr. -- a free
mgrl. supply.

- e. E.g. of intensive mgrs.

Trees / acre

Ht. of bldgs.

Quality of bldgs.

Shift product from grain to wheat: wheat to corn

Water conservation -- more effie. use.

Workers / 1000 s.f. of office

~~Product~~ Merchandise / 1000 st. of store

- 2
10. "Fallacy that rental is one
of ~~the~~ ^{an} ~~instruments~~ of low quality"

Facing difficulties at both margins.
Bcs. rent attracts loans.

Bcs. normally an enterp. owns land, it is
collateral.

Likewise for any shifts to more int. use.
Banker is more secure w. underuse.

Hi use appears risky.

But if rent land & use yr. own labor, it
is the reverse.

Hence, a fallacy.

11. Opt. intensity.
a. Not where TP etc.
 $MC = MP$
Max rent.

b. Int. & distrib.
Wages indep. of AP.

Tu., Nov. 15, '83

A. Interaction of powers + elasticities
where $P = \text{fn. of } 2 \text{ variables.}$

$$1. P = k A^d B^B$$

By product rule, $p = \cancel{\text{cancel}} \eta_{\% \Delta(A^d)} + \eta_{\% \Delta(B^B)}$

But ~~$a = dA$~~ $\eta_{\% \Delta(A^d)} = \cancel{dA} = d a$
 ~~$b = \beta B$~~

~~$p = (d + \beta)(a + b)$~~ $p = d a + \beta b$, the sum of
the $\eta_{\% \Delta}$ of A^d and B^B

~~Thus if $A'/A = a = .01$~~
 ~~$b = .01$~~

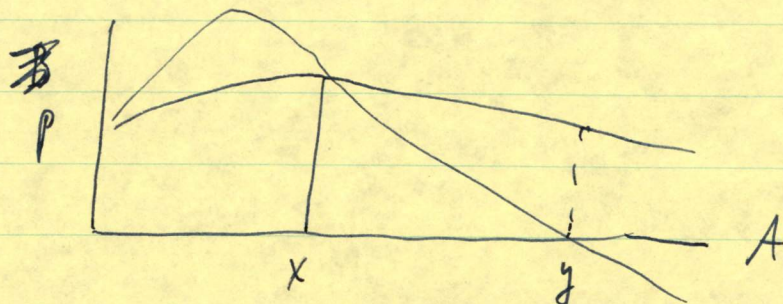
~~$p = (d + \beta) \cdot .02$~~

~~Thus if $a = .01$, $p = d a$~~

a). If $d + \beta > 1$, ~~Ag~~ returns.

b) $d + \beta = 1$, const. returns.

Under const. returns, α & β are complements.
~~2nd~~ Central principle of prodn. eqs. follows.



At $A = y$, $MP = 0$, $\therefore \alpha = 0$

But $\therefore \beta = 1$

$\therefore$ CP B = max.

Easy to see. But now at $A = x$,

$$\alpha = 1$$

$$\therefore \beta = 0$$

$$\therefore MP \text{ of } B = 0$$

a.s. 162, Jan. 17, '78

4. The Intensive margin. Dim. rets. Intro. input, and.
Ref. pp. 163-84.

As pop. grows, change mix. More variable inputs to same land. Intensive margin.

E.g. Trees / acre.

Phone calls per wire

Floors / bldg.

Cattle / acre

Boats / ~~shore~~ fish grounds (S.F. Bay recently)

Dam hr. / damsite

Cars / highway

Water / acre (fertilizer, pesticide, etc.)

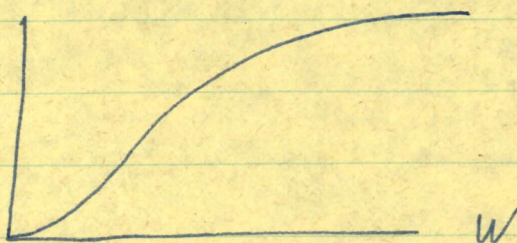
Men / factory.

Wells / oil deposit.

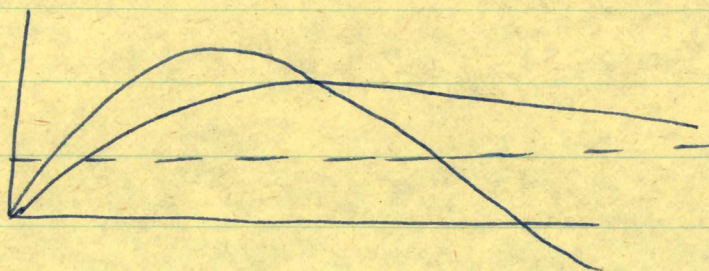
Thy. transends tech. All show same pattern.

We use same tools for analyzing.

Take labor in row crop prodn.



To analyse curve, ^{first} derive λ & mean.



Beginning of all ec. analysis
Points to know.

1. Need wage rate, to know opt.
2. $MP = MC$ is opt.
3. Not max TP
4. Not max AP
5. Not max MP
6. Max resid. return to land. 2 ways of showing this, shade in.
7. Landowner changing rent forces this. Doesn't drive people away, but revenue. Join restaurant.
8. Dim. rets not a point, but a stage

9. Dim. input, rets. means little.
Dim. conc. rets. is stage of dim. rets.

10. I, II, III

11. MP is systems ^{or collective} concept.

Why didn't new man produce same as cow did?
" " " head cut again " " " etc.

12. Indiv. vs. collective MP. Indiv. MP = Collective AP.

Free entry problem -- need for exclusion.

Free entry dissipates rent

X 13. Max ~~at~~ AP level ~~on~~ when MP labor = 0.
(& v.v. - see #25)

14. ~~Old~~ Prodn. occurs in II

Exceptions. Approp. rts. Damage - effic. of pollutants.

Open-access

Jan. 26 X

15. When opt. to max. AP

16. $TP = \sum MP$. Or cum. MP.

17. $MP > AP$ until AP max

✓

18. Deals w. proportions, not scale, 1's partial coord.
(even tho a systems concept.) ~~that~~ Progress is adding more variables

1. letting fixed inputs vary, too.

19. Wages indep. of AP

✓
(End here, go to next sheet)

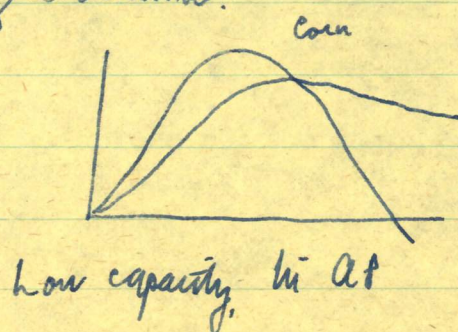
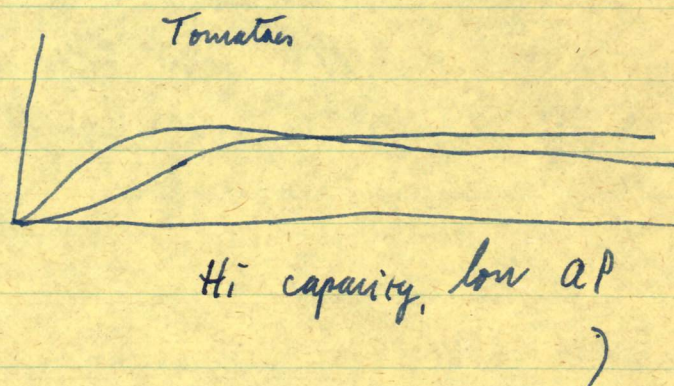
✓
20. $MP/AP = \text{elast. of prodn.} \cdot \frac{\Delta P/\Delta w}{P/w} = \frac{\Delta P/P}{\Delta w/w}$

21. allow for changing form (not Q) of fixed input.
You have free choice to assume any degree of change --
ea. assum. results in different curve.

✓
22. A low labor share goes w. a low ^{labor-} elast. of prodn.
(Low $\# MP/AP$).
Refer

i.e. on rich land w. low capacity for labor
(alluvium in corn), 10% more labor means 2% more corn.

(This has a lot to do w. what use of land is chosen.
The uses of low capacity & hi "effic." are this way.
These take a hi "rent margin" [analogy to profit margin] per
man, and make rent on this hi margin rather than
high volume.



Refer.

$$23. \text{Intensity} = \frac{\text{Input of workers} \times \text{wage rate}}{\text{Output}} = \frac{\text{Wage rate}}{AP}$$

a hi AP means low intensity of use.
relative to wage rate

So, hi AP raises suspicion that land (&K) are undermanned, either by:

a. Using much land/man for given crop, or

b. Choosing cheap crop on dear land.

✓

24. Inst'l. bias affects land use

Hi labor cost causes shift away from hi-capacity uses. Not just small input. changes.

E.g. payroll tax, even tho only on first 1700, makes adding worker cost more.

25. Stage I, MP of fixed input < 0.

~~B&P~~ B & P p. 175, doesn't really prove it, just asserts it. Ferguson is better, wait for it.

But note, moving to left of max AP labor, reduce output per man -- & men are held const. This is adequate proof for now.