

Ad. Zoo, Fall, '71: Planning

Adm. 200 Topics

A How ecs. can contrib. to inguit. in fields dominated by Tech. specialists. Role of theory. Transcendentalism. — "theory transcends technology," like math.

B. Prodn ecs.

Proportions. Elast. of prodn. Efficiency. Asymmetry & mutuality. Exclusion.

Scale. Opt. scale, & elast. of prodn. S.r. vs. long run, = more vbls.

Distribution. 3 inputs, complements & substs. Euler's. Imputation, vs-

Cost analysis ^{input} _{output} cost & price. Cross-subsidy; & internal x-subs. of

being too ~~diff~~ large.

AFC is made visible. But it remains a residual, hence floats up & down w. price.

C. Finance

L. r. & s. r.

MC pricing when $MC < AC$, 6/10 rule. RIMS! direct replacement problem.

Math. of force. Time as well as space in our analysis.

Forcing: mining.

D Demand analysis. No "requirements". Substs. effect. Elast., & MR. Surplus & shortage. Rationale of price system. Dual fn. of price. Tax shifting (partial analysis.) Min. wage & unempl.

E Supply & demand.

The market mechanism, pervasive effects of price vs. special. limited & often perverse effects of rules, e.g. clown w. extractive indy. Role of price

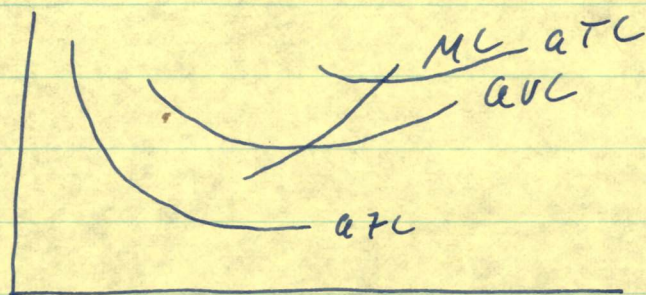
F Market structures. in saving on K. Inc. elast. & regm. fall.

Compu. Muffy, discrim. Muffy, oligop, Monop. Compu, Cartels, regulated muffy.

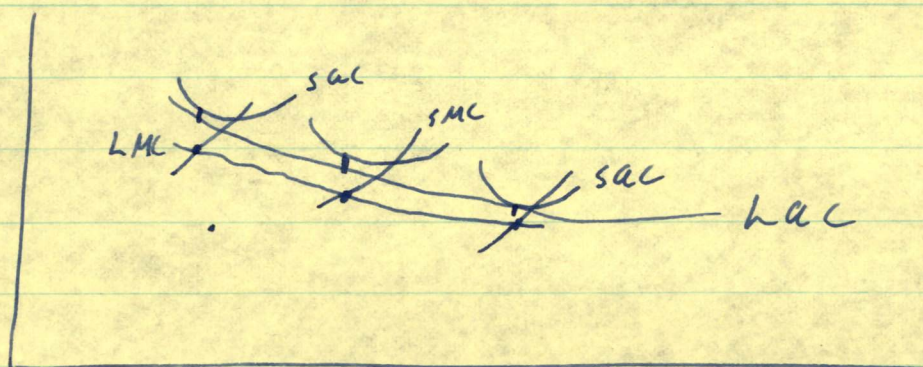
G Concentration and market power. Concn. & mkt. power. Regressive used labor; also of credit. Increasing concn. Roles of govt, aid, & credit. Barriers to entry.

H Public Sector decision making.

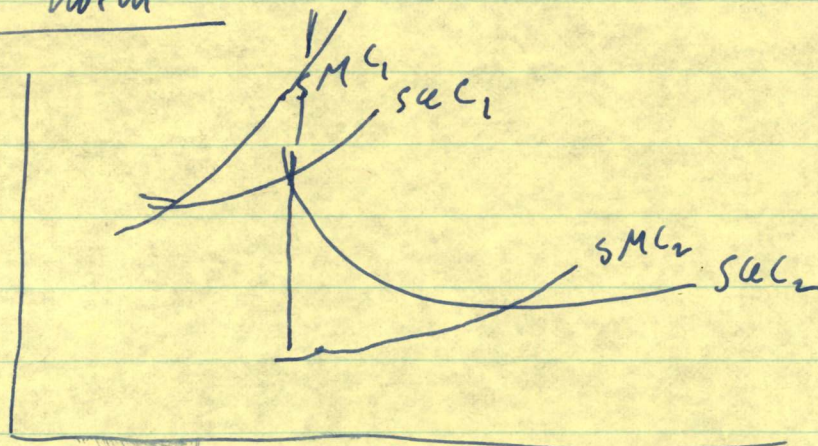
Theory of Cost



Expansion



$P = MC$ as norm



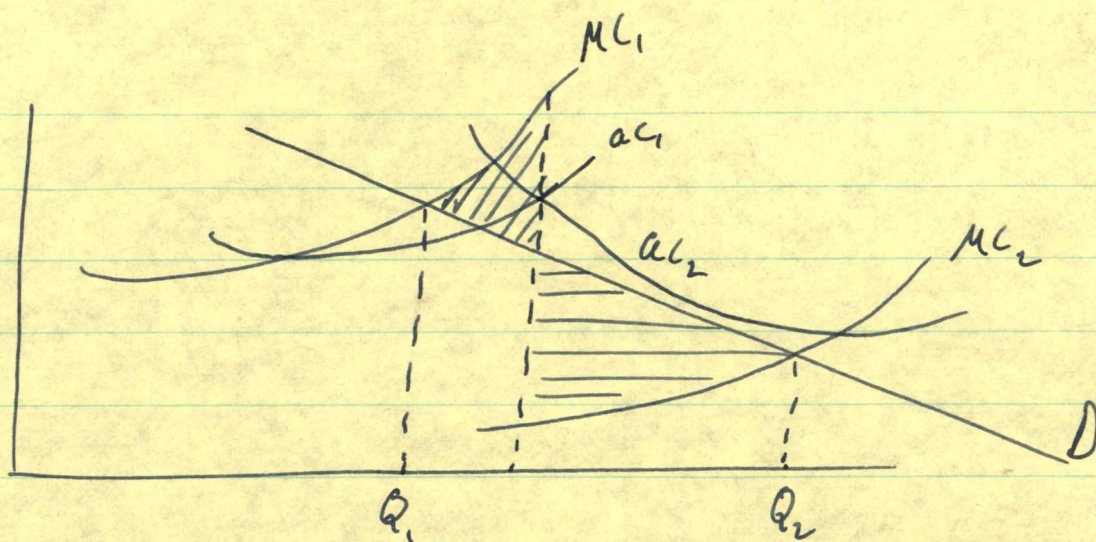
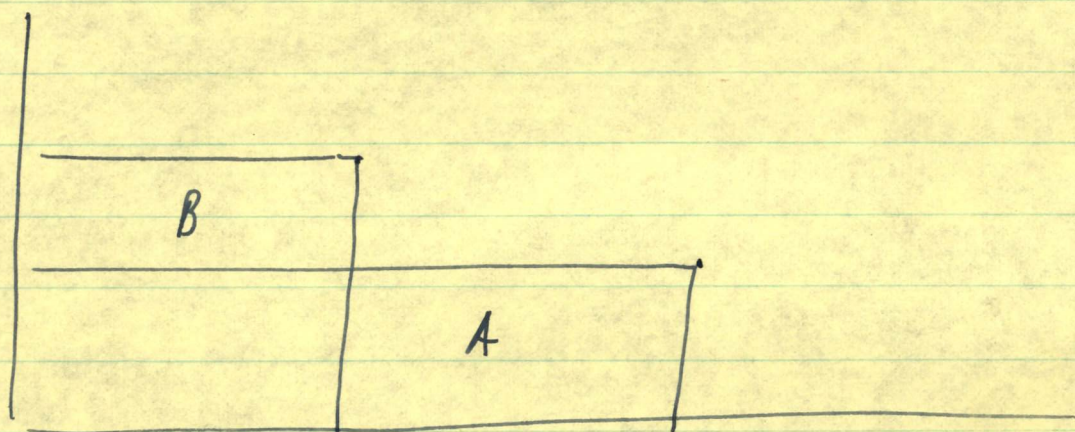
Blow-up

e) Disaggregating Δg & $-\Delta g$ parts of joint opn.
Water supply, power, etc.

f) Surrogate approaches - lifetime rates; density discounts; etc.

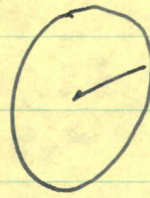
g.) Replacement problem. going from smaller to larger plant.

Can't learn all, settle for these, get the idea.



Admin. 200

The 6/10 rule.

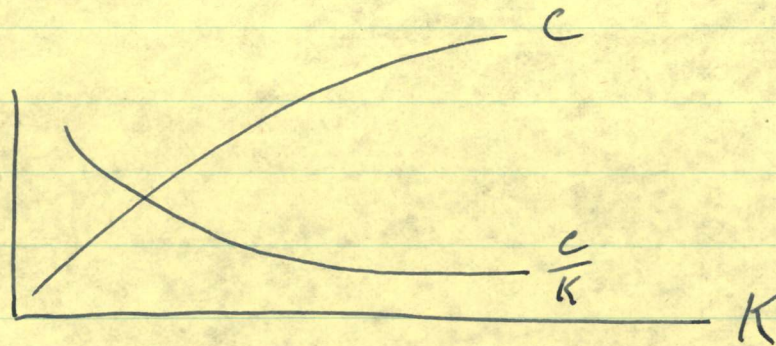


Capacity, $K = \pi r^2$

$$r = \left(\frac{K}{\pi}\right)^{\frac{1}{2}}$$

$$\text{Cost, } C = 2\pi r = 2\pi \left(\frac{K}{\pi}\right)^{\frac{1}{2}} = 2\sqrt{\pi} K^{\frac{1}{2}}$$

$$\frac{C}{K} = 2\sqrt{\pi} K^{-\frac{1}{2}}$$



$$\frac{dC}{dK} = 2\sqrt{\pi} \cdot \frac{1}{2} K^{-\frac{1}{2}} = \sqrt{\pi} K^{-\frac{1}{2}} = \frac{1}{2} \frac{C}{K}$$

$$\text{So } MC = \frac{1}{2} AC$$

This is the 5/10 rule. Now, modify for 6/10.
Add Engineer's fudge factor

For a 6/10 rule

$$C = \theta K^{.6}$$

$\theta = \text{a const.}$

$$\frac{C}{K} = \theta K^{(.6-1)} = \theta K^{-.4}$$

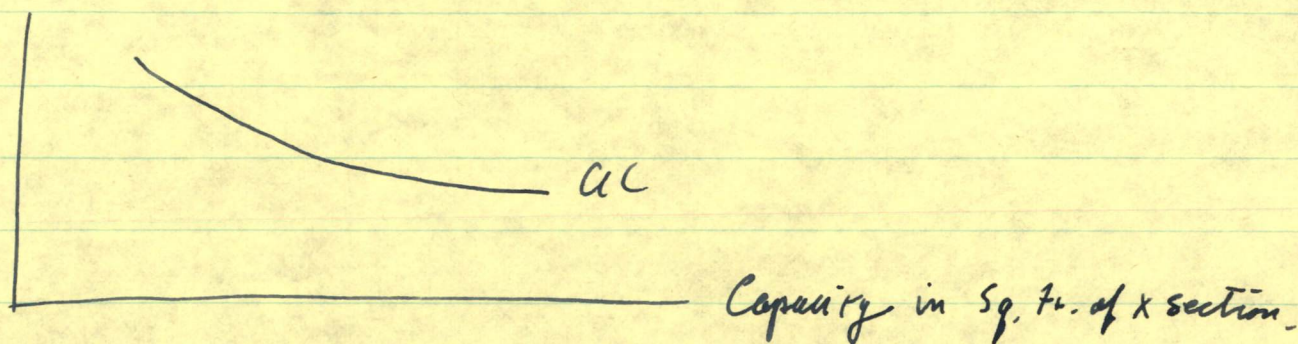
$$\frac{dC}{dK} = \theta \frac{6}{10} K^{-\frac{4}{10}}$$

$$\frac{\frac{dC}{dK}}{\frac{C}{K}} = \frac{\theta \frac{6}{10} K^{-\frac{4}{10}}}{\theta K^{-\frac{4}{10}}} = \frac{6}{10}$$

So MC = 60% of AC

Column.
200

The 6/10 rule



$$\text{Capacity} = K$$

$$\text{Cost} = C$$

$$C = K \cdot r^{.6} \quad (r = \text{a const.})$$

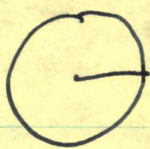
$$ac = \frac{C}{K} = \frac{K r^{.6}}{K} = r^{.6} \quad ?$$

$$\text{Say } K = \beta A = \pi r^2 \cdot \beta \quad \beta = \text{a const.}$$

$$\text{Cost} = r 2\pi r$$

$$\frac{C}{K} = \frac{r 2\pi r}{\beta \pi r^2} = \frac{r 2}{\beta r} = \left(\frac{2r}{\beta}\right) \frac{1}{r}$$

$$C = K () \frac{1}{r} =$$



$$2\pi r = \text{circ.} = s$$

$$\pi r^2 = \text{area} = A$$

$$\frac{A}{s} = \frac{\pi r^2}{2\pi r} = \frac{r}{2}$$

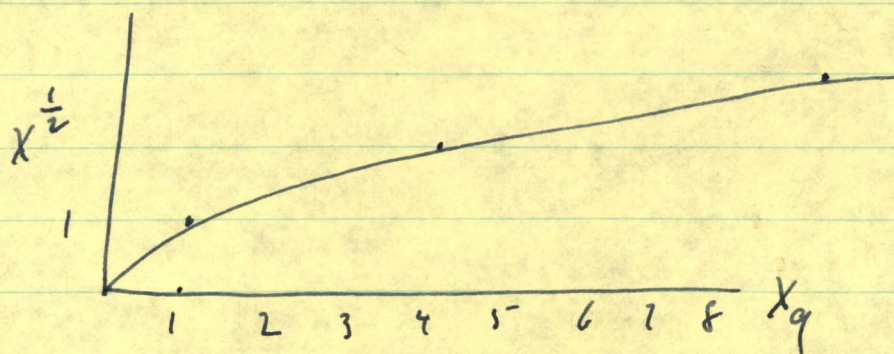
$$\frac{dA}{ds} = \frac{1}{2} \frac{dr}{ds} = \frac{1}{2} \frac{dr}{d(2\pi r)} = \frac{1}{4\pi}$$

$$(\pi r^2)^{\frac{1}{2}} = A^{\frac{1}{2}}$$

$$(9 \cdot 9)^{\frac{1}{2}} = 9^{\frac{1}{2}} \cdot 9^{\frac{1}{2}} = 3 \cdot 3 = 9$$

$$(9^2)^{\frac{1}{2}} = 9$$

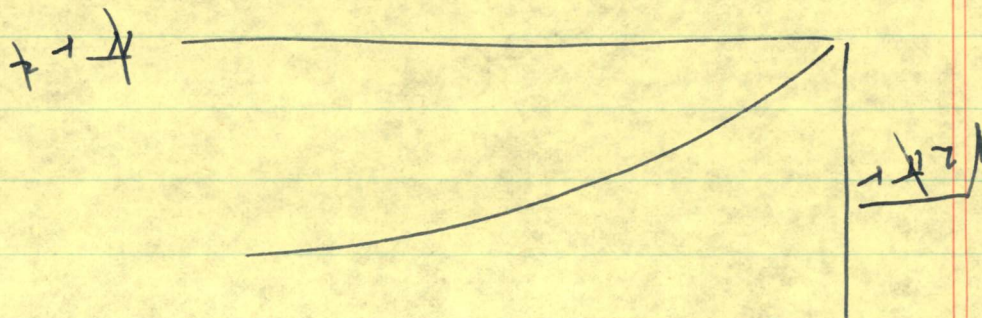
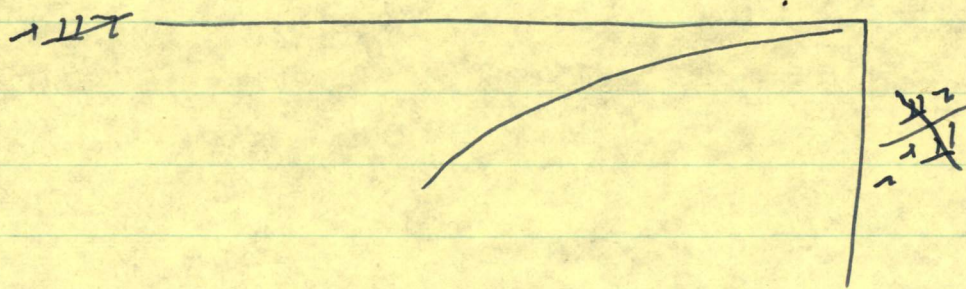
$$(\pi r^2)^{\frac{1}{2}} = \pi^{\frac{1}{2}} r$$



$$b = \frac{b}{18} = \left(\frac{3}{b} \right)$$

$$b = \frac{4}{91} = \left(\frac{2}{4} \right)$$

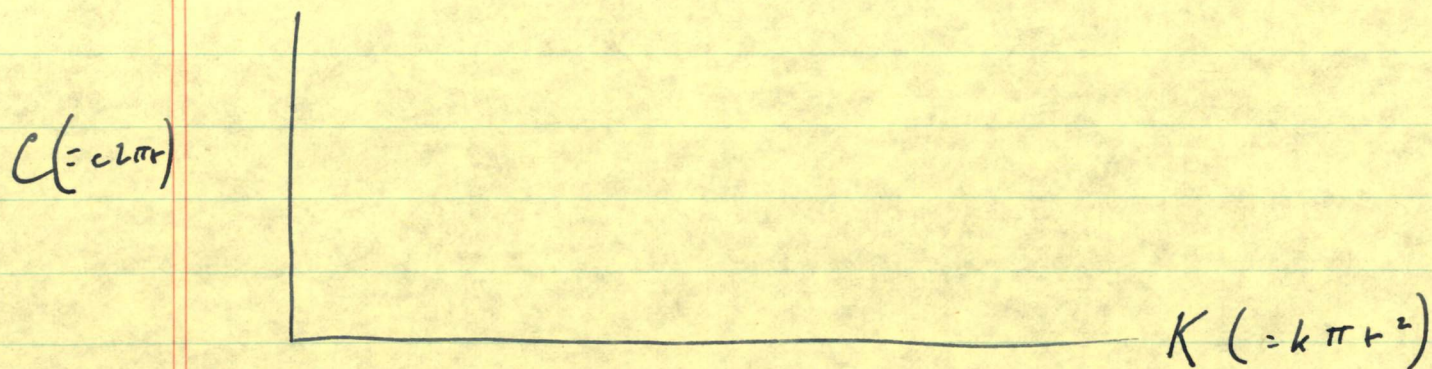
$$x = \frac{x}{x} = \left(\frac{x}{x} \right)$$



$$b' x = \frac{x}{9-1} = \frac{x}{8}$$

$$\frac{2}{7} x = \frac{x}{7-1} = \frac{x}{6}$$

$$dC = \frac{\pi r^2}{2\pi r} = \frac{1}{2} \frac{r^2}{r} = \frac{1}{2} r = \frac{1}{2} r$$



$$\frac{c}{K} = \frac{c 2\pi r}{k \pi r^2} = \frac{2c}{k r}$$

$$c = K \left(\frac{2c}{k} \right) \frac{1}{r} =$$

$$\frac{dC}{dK} = \left(\frac{2c}{k} \right) = ?$$

$$\frac{dC}{dK} = \frac{\frac{dC}{dr}}{\frac{dK}{dr}} = \frac{2\pi}{2\pi r} = \frac{1}{r}$$

$$\frac{dC}{dr} = \frac{d 2\pi r}{dr} = 2\pi$$

$$\frac{dK}{dr} = \frac{d \pi r^2}{dr} = 2\pi r$$

Capacity, $K = k \pi r^2$; $r = \sqrt{\frac{K}{k \pi}} = \left(\frac{K}{k \pi}\right)^{\frac{1}{2}}$

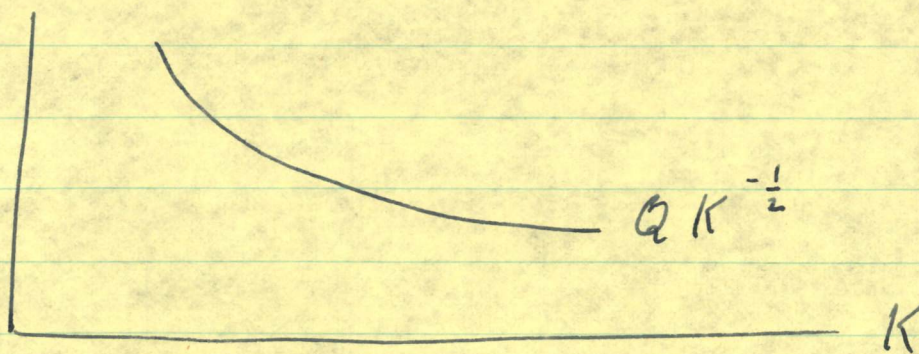
Cost, $C = c 2 \pi r$

$$AC = \frac{C}{K} = AC = \frac{c 2 \pi r}{k \pi r^2} = \frac{2c}{k} \frac{1}{r}$$

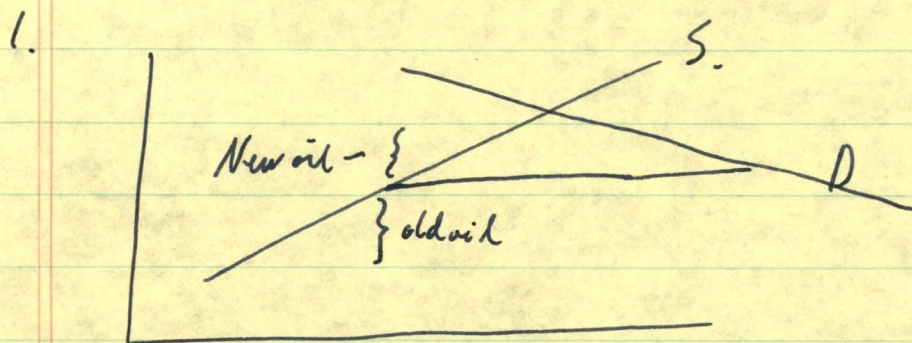
$$C = K \frac{2c}{k} \frac{1}{r} = K \frac{2c}{k} \frac{1}{\left(\frac{K}{k \pi}\right)^{\frac{1}{2}}} = 2c \frac{K}{k} \left(\frac{K}{k \pi}\right)^{-\frac{1}{2}}$$

$$= 2c \frac{K^{\frac{1}{2}}}{k^{\frac{1}{2}}} \left(\frac{1}{\pi}\right)^{-\frac{1}{2}} = \left[\frac{2c}{k^{\frac{1}{2}}} \left(\frac{1}{\pi}\right)^{-\frac{1}{2}} \right] K^{\frac{1}{2}} = Q K^{\frac{1}{2}}$$

$$\frac{C}{K} = Q \frac{K^{\frac{1}{2}}}{K} = Q K^{-\frac{1}{2}}$$

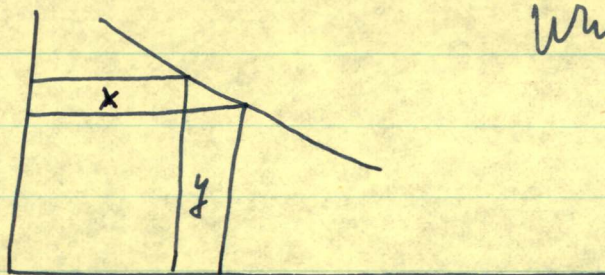


Admin. 200, Feb. 22, 1977



Price control & shortage of energy.

2.



Why $MR = P - \frac{P}{e}$

$P = y$

$\frac{P}{e} = \frac{P}{\frac{\Delta Q}{Q} \frac{P}{\Delta P}} = Q \frac{\Delta P}{\Delta Q}$

~~$x = Q \cdot \frac{\Delta y}{\Delta x} = \frac{Q}{\Delta Q} \frac{\Delta P}{P} \cdot P = \frac{P}{\frac{\Delta Q}{Q} \frac{P}{\Delta P}} = \frac{P}{e}$~~

~~$\Delta y = \Delta x \cdot \frac{\Delta y}{\Delta x}$~~



$x = Q \cdot \frac{\Delta P}{\Delta Q} = \frac{\Delta P / P}{\Delta Q / Q} \cdot P = \frac{P}{e}$

Admin. 200

Tues, Feb. 15, 1977

Chap. 6 Theory of demand

- Is what chief engineers & administrators mess out on.
They talk of needs, requirements, duties. Fixed. Or rising.
The lesson of eng. is that few coefficients are fixed.

(A lesson forgotten by some engs:

I-O engs

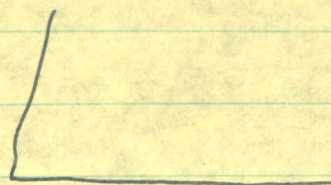
Macro engs.

A lesson needed in age of limits.

Needed to forecast sales; & to set price.
And to remind produ. people why it is they're in business.

Income effect & substa. effect. Mainly substa. effect.

$$\epsilon \text{ \& } MR: MR = 1 - \frac{1}{\epsilon}$$



ϵ	MR
∞	P
1	0
0	$-\infty$

S & D

Surplus & shortage

Dual fr. of price.

$E = 0$, price still functions

But actually, $E > 0$

One of greatest social inventions, is price flex.

E.g. crises of scarcity: water, energy. Concerns,
Peak load pricing. B.C. ferries.

Who pays taxes?

Min. wage & unemployment

Durable goods - what is the most important factor
affecting demand? I.e. Or is it lowering
cost? Arbitrary.

What happens now: under price, then build excess
capacity. Then Δ cons. move, get into more trouble.

Underpricing for distrib. reasons - B.C. & Canada.
2-price policy for energy.

Inc. class.

X - class.

Monopoly pricing

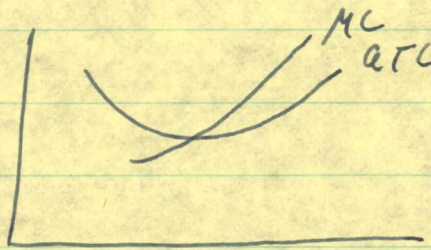
Split-market pricing

Cartel pricing

Have to keep regul. firms in.

Also, prorate.

And leave them enough to be viable.



Complex.

MC pricing for coop or public agency.

Ec. 701. Some topics to cover.

Replacement policy

Imputation

Euler's

Thru time -- capital profit as residual

Analogies w. schools of thought in religion, philosophy, sciences

Balance of payments -

Joan Robinson's goof

Trade barriers & terms of trade

Gains from trade

Opt. scale

MNR approach

Cobb-Douglas approach

Min. LRAC "

Intensity, opt.

NR

i.g.

Risk

Risk & i.g.

What factors bears risk

Risk & horizontal imputation

Risk & residual imputation

External Economies

Mgtl. Cost pricing

Factor proportions

Inverse relations of mgtl. products

Tax shifting. Excess burden

Capital theory

Annualization, replacement, valuations, finding yields

Acctg. & Ec. Theory - Powellson

Relation of Distr. Equity & Allocative Effic.

Efficiency (& "productivity")

Requires defn. of output; differs from simple eng. g. terms.
Value as key concept.

Merit. of capt. - avoiding circularity

"Economic Man" - assigns A. Smith on wages.

Ec. Law & determinism

Nominalism vs. Realism.

Value in use vs. value in exchange

Price th. w/o time & space: location th. & capt. th.
to rectify.

Can price th. be applied directly to policy?

Is the ecst. as such a mere technician? Can he not at least seek to promote his techniques?

Is a school for leadership, not mercenaries. Best science differs from art.

Also, once accepting com. servty., exist. is already to some extent a mere adviser

VMP vs. MVP

Supply curves vs. supply response one-way paths.

Sen. fourth S curve

Sinking funds & utility rates

Admin 200

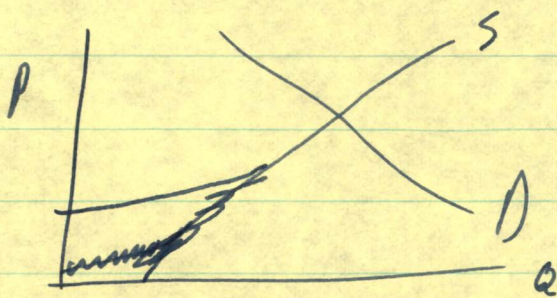
Thurs., Jan. 20, 1977

- 1 Exam on Thurs., Jan. 27. No grade
- 2 Trouble w. h.s. algebra. Don't go thru life w/o algebra. Cripples you, & it's easy.
- 3 Subdividing land for homes
Evidence on how MNP plummets. Dropping unit values. Despite enormous e.s. of scale, law of cube.
- 4 Note from #3, theory transcends technology.
Not subject to obsolescence. Helps you come to grips w. all manner of situations. That's why we teach it.

Space & time -- 2 most basic elements of life.

5 Mor from here.

- a) ~~L.r. cost curves & a replica~~
- a) MC curves. Set $P = MC$ (Δ of MC)
- b) How S & O set price. Joint determination
You have just solved simul. eqns!
 Δ costs, & taxes, are not neatly shifted fwd.
- c) S curve is ΣMC of firms
- d) Mgmt. cost pricing
 Δ cost, surplus, imputed away (& can be taxed)
 $-\Delta$ cost, special problems.



$$S: Q = -20 + 2P$$

$$D: Q = 40 - 2P$$

$$-20 + 2P = 40 - 2P$$

$$4P = 60$$

$$P = 15$$

$$Q =$$

Wed., Apr. 5, '67

Consumption & Demand.

1. Cons. of fund res. - using up.

Cons. of flow res., harder to see what is consumed. (Also of flowing funds.) Congestion the key word.
Parking space.

Tiebout's confusion -- he opposed user charges for parking. He didn't realize that cons. of space is cons. production.
"Public goods" -- how cons. of street lights is rationed.

Spatial element.

TU -- any cost of turning on set?

- Spatial aspect of cost, if you move out further
- Minasian's arguments.

User charges, problems of regul. cost pricing

Refer to
Assign Minasian

2. Cons. sorry.

Basic.

Cost means foregone cons. satisfaction. So when we balance human satisfaction vs. \$ cost, we are really comparing likes.

Assume distr. of purch. power (not income). If disappears, better to redistrib. directly than by inff. Name some cases where sacrifice eff. to equity.

3. Aim. m.u.? Basis of case for progressive inc. tax, etc.

a. If so, applies to assets, not income.

b. Interpersonal comparisons impossible?

c. Have to make someone better off w/o anyone worse off

c. Is dubious. Banker Pres. who works hard probably wants

extra \$ more than poor man who doesn't.

- ✓ d. A good criterion is when time-pref. gets low.
Moral: tax property.

4. Cons. surplus.

What is it?

Has it been destroyed by Hicks?

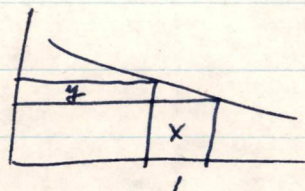
What ~~can you~~ practical implications, for pricing pol.

What if demand curves are irreversible?

8/

5. AR, MR, & ASV

6. $MR = P - P/e$



$$y = Q \cdot (\Delta P) = \frac{Q \cdot \Delta P}{\Delta Q \cdot P} \cdot P = \frac{P}{e}$$

$$-\Delta P = \Delta Q \cdot x$$

$$\frac{P}{e} = P \cdot \frac{\Delta P \cdot Q}{\Delta Q \cdot P} = \Delta P \cdot Q$$

$$\Delta P = \frac{P}{Q} \cdot \frac{1}{e}$$

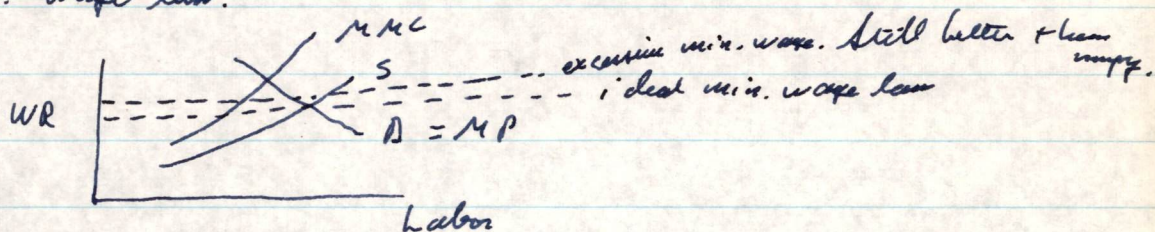
Mon.

1. Dobb.

The city is a monopoly.

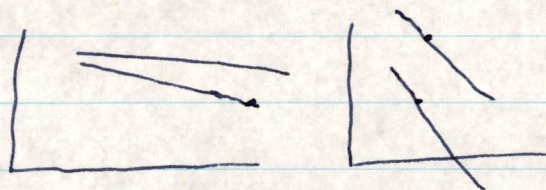
Int'l. trade - the nation is a monopoly. Much of its theory can be so summarized. Tariffs & ex. frs.; improve terms of trade.

✓ 2. Case of min. wage law.



Same idea w. max. price, for monopoly.

3. Equating MR. Opposite of taxing foreigners.



Apply to ecs. of time. Demand is more elastic in

future. Equate discounted marginal revs., postpone price impact

4. Merger Mergers.

Note reasons other than "scale."

Old mergers - for price wars, vert. int.

5. Golden Triangle from Δ output

6. Excess burden

7. Spence

Does on w/ pricing

Subsidy on p.u.

"Paying or imputing" $\equiv$ "accounting"

MNP is M.Mut.

MP is same as MNP bcs, if add new acre, pull over mobile inputs from base acres; their cost is their MP there.

MP thus is much less than gross ~~sett~~ yield of new acre.

~~Internal~~

Intramural or internal o.c. is thus important idea.

And MNP at a point tends to $=$ MP. Difference arises from large Δ s. The bases to which we add things differ after a while.

Prodn. Hackler, "Meaning of MP" 159, contrasts limited divisibility of complements vs. unlim. div. of land.

Prodn. J.D. Black, Prodn. Ecs. 547-48, may be good assignment on limits of mqr's time & effort.

stress mqr's escape into future

Prodn. Bldg. Ec. An. p. 762 varies one input, lets others catch up.

Lenticular anal. handles cases of inconstant scale e.c.s. — usual methods don't, but stop at abjuring us to remember they require assume const. rets.

Distr Stigler, Thy of Comp. Price, 178, shows resid. rent $=$ MP of land, assuming const. scale.

Escape into future.

1. If input, defer price comp. of invt.

2. Min. turnover, min. input. input

3. alter factor propus., more capt./ labor. Min. problem of mgt. labor.

3. Deferred judgement - higher fudge factor.

If I get half of what I shd. from ^{my} land, I still show some income; and I can claim I am preparing for higher future income; or understate o.c. of land at hist. cost, etc.

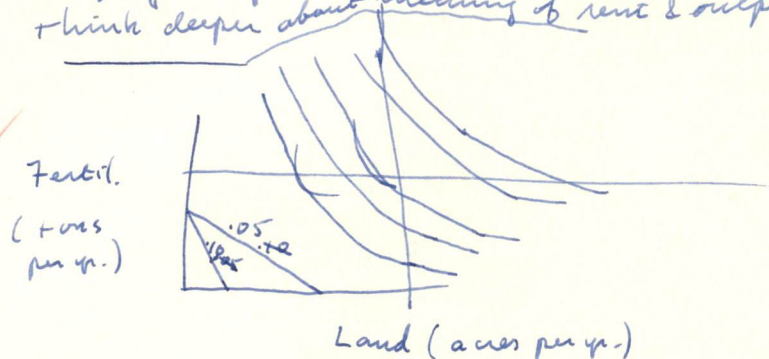
If I get half the proper gross from produce, I lose $\frac{1}{2}$ my capt. immediately, and nothing else to show for it.

If I get $\frac{1}{2}$ the proper net markup, I still have no fudge factor.

$$\text{Dynamic } = m = n: \quad \frac{\Delta R}{P} + \frac{\Delta P}{P} = i + t$$

Tiebout's defn. of output. A party's lot - does output

Δ if you party another can there? Yes, but it leads us to think deeper about meaning of rent & output & congestion, etc., so it's good for us to realize.



Comparative advantage

$$\text{Cost of Fert.} = \text{Price} (1+i)$$

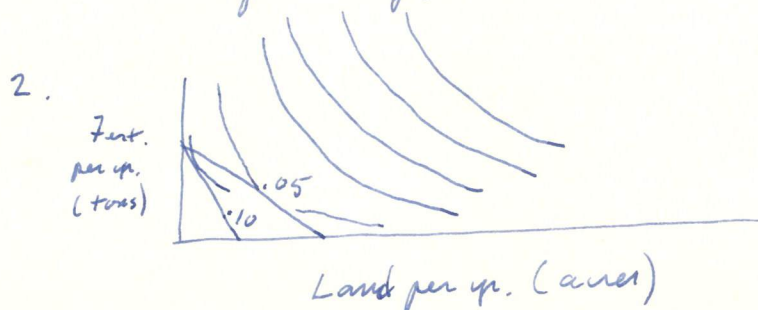
$$\text{Cost of Land} = \text{Price} (i)$$

Unless we define output of fertilizer as output above cost, to isolate the contribn. of capt. But since the fert., unlike land, is embodied in the product, there seems good

reasons ~~to~~ not to deduct its cost from output.

As a matter of exposition, proceed in this:

1. Hypoth. at lower i , ~~we add land~~ factor propns. in enterp. become more capt. heavy.



3. Then raise objections about defin. of output, as minor quibbles. Should contribn. of capt. to output be ^{value-added} net of fert. cost? It is, of course, but subject is factor propns., & cost of fert. versus capt.

Land is not embodied in product; fert. is. But that is primarily another way of say'g the fert. deprec. or runs out or is exhausted. It need not be all physically embodied in product.

✓ Big point. Adding fert. requires Δ gross output $20 \times$ the capt. v.a. I.e. is minor element in decision. So drop of i won't make you add much fert.; but you will add much land.

As you add fert. & Δ gross output, run into dim. rets. by rais'g capacity of input, i.e. fixed inputs much faster than when add land.

~~Prodn.~~ Stigler, Thy of Price 115, Shows inverse relation of MP's. ?
~~K & H~~ 347,

~~Space~~ | Renne, chap. on Thy.
E & W

~~Prodn.~~ J S Mill

✓ Dispersion of fincl. power is very great due to cumulative effects of inheritance, linkage of risk (Hunt), credit relations, social & pol. connections, compound int., advantage of a good start in life, family & college contacts, etc.

Land is perfectly divisible. Fences, driveways, streets, are not. These cannot be scaled down as ~~the~~ land is reduced. Cost of subdivision is cost of applying more capl. per land.

Labour: $AP = \frac{TP}{\frac{1}{20}}$; $AP = 20 TP$
 $AP = 30$
 $TP = \frac{30}{20} = 1\frac{1}{2}$

$AP \text{ land} = 1\frac{1}{2}$

When msg. on abscissa "Men/acre", then MP means MP per acre, ~~and AP~~ -- so to find MP of one man, mult. MP per acre x no. of acres. TP is per acre; AP is per acre.
 So, to convert to yields, simply take TP of labor -- it is per acre.

Likewise, TP of land is output per man
above wd. make good exam ques. Give a table of
MP of labor, let them figure (1) AP of labor
(2) TP of land
(3) MP

space

W.I. Myers, Ex. Study of Farm Layout 491-4
Council U. & ES Memoir 34. '20

Extra land must be reqd. in loan. as well as quantity, unlike
other inputs. So, disens. of scale apply espy. to land.

Re food as inferior good. In W.W. II, % of inc. spent on food
did not fall. Bes. of more = distribn., probly.

a perfect mkt. wd. not equalize fm. sizes, bcs. mgs. differ.
Mgs. w. fewer outside alternatives wd. grow larger. But
that is reverse of what prevails today!

Dist.

Hart, Linkage of risk

Prodn.

~~Black, J.D.~~, ~~Myers~~, ^{Hayes &} ~~Clauson~~, ^{Wilcox &} Farm Mgmt.
N.Y. Macm., '47

Intro. to Ecs. for Ag., Macm., '53

Prodn. Ecs. Holt '26

Time

Babcock

Jensen, J.P.

~~Time~~ P. Davidson, "Pricing Problems of the Crude Oil Trade."
AER 53: 85 - 108 (3-63)

~~Notes~~ R. Turvey, "Optimization & Suboptim. in Fishing Regula."
AER 54: 64 - 76 (3-64).
 a small gem. Theoretical power, applied to practical
 problem w. due disdain for negative immanulating welfare costs.

→ D. Campbell, "Comment", AER 54: 114 - 18

P. Davidson "Reply" AER 54: 125 - 31

A.E. Kahn, "The Deple. Allowance & Cartelism"

AER 54: 286 - 311.

✓ Pro Lut - by making all firms equal, it equalizes their
 mkt. power, so monopol. cannot use surpluses to discipline mkt. ones.

Giffen's law - strong assets tend to carry weak. Dissip. rent, etc.

Ec. 901

Readings

~~Welf.~~ H. Mohring, "Urban Highway Investment," in R. Dorfman (ed.) Measuring Benefits of Govt. Investments. Wn: Brookings Inst., 1965, pp. 231 - 91

(Includes comment by Allen Ferguson and Paul Sittler.)

~~Welf.~~ R. Musgrave, Theory of Public Finance.

Ch. 1. A Multiple Theory of the Public Household.

(Elementary but readable statement of some problems of providing public goods. Use in Welfare Eco. section.)

~~Welf.~~ B. Chinitz & C. Tiebout, "Role of Cost-benefit Analysis in the Public Sector of Metrop. Areas," in J. Margolis (ed.) The Public Economy of Urban Communities. Wn: P.I.F., 1965

Admin. 200

Tu. Jan. 4, '77

I Plan of Course

Framework is M & M

Ec. thg applied to mgmt. decisions, public & priv.

Combo. of basic theory & application

Theory resembles Micro-econ., but is more applied.

Application drawn from my own experience plus good
exps. E.g.

Public-interest advocacy (PIRG; PIE; EDT; EAction; Cons. Prot'n)

S.P. land holdings.

Water in S & V, Economy & admin. of

Forest lands: Canadian, U.S., priv.

Mined leasing, public lands, Alk.

Prop. tax (Lynn book?). Sen. v. Priest

Replacement policy

Land dev't.; city planning; p.w. planning, layout, etc.

Fed. water policy

Urban renewal

~~Also some macro.~~

Transportation

Environmental pollution control.

a-f. effect, utility rate-making

Energy policy

Empl. policy.

Pricing munic. services

Also some macro-econ.

Plus your interests.

Deal. If you will write papers, I will review them, & work with you to improve them.

✓ Not an assignment. Is a prereq. for an A grade. Don't guarantee A; but lack of outside paper guarantees won't get an A.

Is better than forcing unwilling people to write.

Form of a report, not a Jnl. article.

Value of course? Intellectually satisfying and useful, at same time.

Job openings for applied econs., endless. Barely scratched surface. Empty agencies all over. Need to learn to enter the secret worlds dominated by engineers, biologists, foresters, doctors, lawyers ... get their number, stave off their attempts to overwhelm you w. technicalities, apply simple econ. There is the frontier ... not way out on the fringes of pedantry.

II. Chap. I. *Aggl Econ. Scope & Method.*

$$\frac{F}{P} = A e^{n_i}$$

$$n_i = \ln \frac{F}{P} = \ln F - \ln P$$

~~Richter scale. Increase by 1 and fr. As by 100%, or doubles.~~

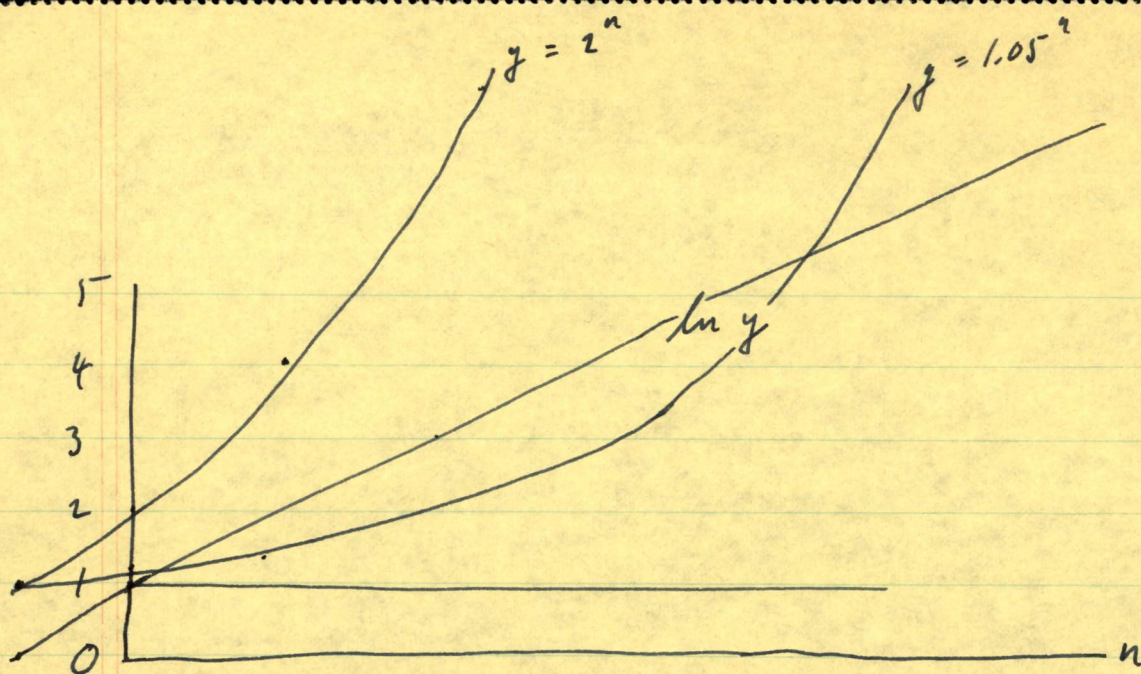
<u>Base 10</u>		<u>Base 2</u>		<u>Base e</u>	
<u>Log</u>	<u>No.</u>	<u>Log</u>	<u>No.</u>	<u>Ln</u>	<u>No.</u>
0	1	0	1	0	1
1	10	1	2	1	2.718..
2	100	2	4	2	
3	1000	3	8		
4	10,000	4	16		

$$y = e^{n_i}$$

$$n_i = \ln y$$

$$\frac{d \ln y}{dy} = \frac{dy/dy}{y} = \frac{1}{y}$$

<u>Log</u>	<u>Base 10</u>	<u>Base 2</u>	<u>Base e</u>	<u>Base 1.05</u>
0	1	1	1	1
1	10	2	2.718...	1.05
2	100	4	7.389...	1.1025
3	1000	8	20.09	1.1576
4	10 000	16	54,60..	1.2155



$$y = (1+i)^n$$

$$\frac{dy}{dn} = i(1+i)^n$$

$$\frac{dy/dn}{y} = i$$

No matter how large i is.
So the % Δ in fn. is (the base - 1)

$$y = x^n$$

$$n = \log_x y$$

$$\frac{dy}{dx} = nx^{n-1}$$

$$\frac{dy}{dn} = ?$$

$$\ln y = n \ln x$$

$$\frac{d \ln y}{dn} = \ln x + n \frac{d \ln x}{dn} \quad \text{but } \ln x = \frac{\ln y}{n}$$

$$y = (1+i)^n$$

$$\frac{dy}{dn} = i(1+i)^n$$

$$y = x^n$$

$$\frac{dy}{dn} = (x-1)(x^n)$$

$$\frac{dy}{dx} = nx^{n-1}$$

$$y = (1+i)^n$$

$$\log y = n \log(1+i)$$

$$2^x = 1.05$$

$$x \ln 2 = \ln 1.05$$

$$x = \frac{\ln 2}{\ln 1.05} = \frac{.69315}{.049} = 14.2$$

$$x = \frac{\ln 1.05}{\ln 2} = .0704$$

$$\ln 25 = 3.218876 \dots$$

$$- \ln 26 = \underline{3.258096 \dots}$$

$$.03922 \dots$$

$$2^x = 25$$

$$2^{x'} = 26$$

$$e^y = 25$$

$$e^{y'} = 26$$

$$10^z = 25$$

$$10^{z'} = 26$$

$$\frac{2^{x'}}{2^x} = \frac{26}{25} = \frac{e^{y'}}{e^y}$$

$$2^{(x'-x)} = e^{(y'-y)}$$

$$(x'-x) \ln 2 = y' - y$$

Something on regression fallacy and
analysis of size of farm: and
of distribn. of wealth and
asset composition.

2-3-64

1. Who's here

2. Tests - ~~many~~ ~~3~~ Midtm. & Final
Paper. Outline by March 28.

3. Grading

Mgt & incentive method

Discussion

Paper

4. Assmnt. - one or 2 a week. Supplements. Include
applns. of thy., vignettes.

5. Kinds of thy.

Macro.

Micro

(All allied to
tax pol. Tax is
another form of
price. Will use
many e.g.s.)

Price. Mkt. structures.

Prodn.

Distrib. Fnl. & psnl. Cutting pie. Rent, classical e.s.
Exhausting the product.

Space

Time. Replacement

Welfare (Allocation; = mgt; e.s.; m-pricing; etc.)

2-5-64

6. Role of thy. (next p.)

7. Review

Teaching needs

1. Proceed more step by step
Sequence is important

2. List & outline more

3. Challenges, projects - esp. in grad.
courses.

Things they can do -- within
their capacity.

Last Day of Class

5-27

Review

Kinds of thy.

Creation & use of communability
= inql. allow.

Transcendental quality of theory

Gains from trade - apply to p.w.

Danger of theory - ~~ex~~ excessive formalism, ritual, defensiveness.

Tried to avoid. No formula feed'g, use as tools.

Ave - inql relation, several appearances.

Ave. Ben vs. Ave. Rev.

AR & MR. Elasticity $MR = P - Q \cdot \Delta P = P - \frac{P}{e}$

~~AVMP~~ & MRP

Open accor, individ. & group MP

Cumulative inelastic, where ^{buyer's} ~~seller's~~ MRP curve is seller's

AR curve

~~ANP~~ & MNP. Meaning of max ANP. Euler's

MC & AC

- Δg AC, SR & LR

Replacement & scaling problems

MR & AR per unit time, where AR is adjusted. Max.

"AR" where = "MR"

Replace where $\frac{MR}{\text{salvage value}} < i + c$

Proportions & Scale -- parallel treatment

Fallacy of arrogation

" " prorogation (=negot. price.)

Time-problem, negot. & maximiza. solutions

✓✓ In yr. fwd. planning, maximize

✓✓ In yr. replacement decision, marginalize

What you max. is less input. than writ'g = as right

Tendency toward equal factor prices. If $NP_1 = NP_2$, but $IQ_1 > IQ_2$, MNP of land differs

MP. Inverse relation of. Reversibility of stages

Effect of price control on MR

Elast. & success of deval.

Loss of output from mispy-mispy.

S L D & internat. trade. Gains from trade.

Admin 200

Thurs., Jan. 6

Prodn Ec.

TP, AP, MP

$$\frac{MP}{AP}$$

$$\frac{\frac{\Delta P}{\Delta L}}{\frac{P}{L}} = \frac{\frac{\Delta P/P}{\Delta L/L}}{1} = \text{elast.}$$

Stages

$$MP = MC$$

= input allocn

Asymmetry -- adding land to labor

MP is not yield of unit acre

Hi AP of labor is 0 MP of land.
Productivity, energy-efficiency, etc.

~~From~~

Admin. 200

Thurs., Jan. 13, 1911

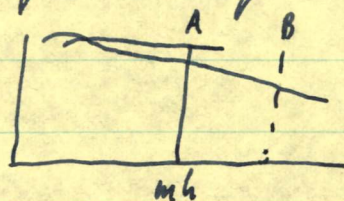
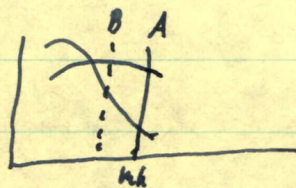
8. Intensity doesn't imply higher GNP or rent.
" does " " MNP

Admin 200

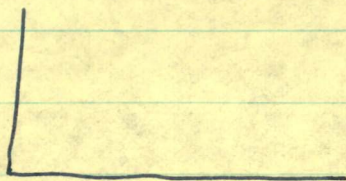
Tues. Jan. 11

1 Review production.

Case A: Shift called for



Case B: No shift called for



2 Peek ahead. Why ore-mining is bad e.g.

Faster involves shortening life. (Note: climate. rets. is not same as running out of ore.)

3 When produce in Stage I. ^{e.g. 1} Limited demand?

No — reduce output by getting rid of extra land.

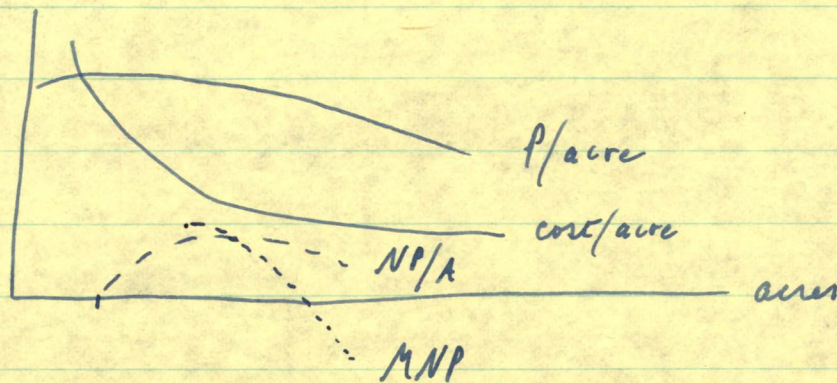
Or, when you're holding land for future. E.g. r.o.w. for 6 lanes, use only 2.

4 Does Dim. rets. say that more K raises MP of ^{workers?} ~~land~~?

No -- when there are 3 inputs, K may subst. for ~~the~~ W, have a hi valence for land. Farm machines, energy.

5. Open access, over-perception of MP

5 Scale. Rather than isoquants, use CC



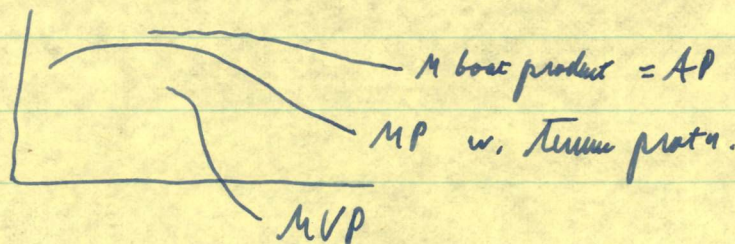
$$i.g. = \frac{C}{P}$$

$$NP = P - C$$

Forest e.g. from B.C. Size of logging shows.

Euler's. Distrib. exhausts product.
This also covers distrib. shg (which used to be most of econ.)

6 3 concepts of MP



Ask again
on
Thurs. 7

"Low-quality" input, invts.

Admin. 200
Tues., Jan. 18, 1977

1 Distrib. Forest Engineer e.g., of Net Product analysis.

Discuss. Note internal x - sub. of being too large. -
relate to a.f. falling of consolidating accts. Object of
inval. analysis is to disaggregate.

Note onelette school position. Nihilism, defeatism,
confusion, & concealment.

E.g., defending pork barrel p.w. by citing Hoover Dam.
Some is good, so more is better.

✓ { Defending subec. expansion by citing the profitable
core. Overlooking effects of: a) internalizing profits
b) Time lag -- being rich comes
from yesterday, doesn't show effci. Today.
c) Henry VI effect - Glory is
like a circle in the water

2 Distrib. cap. thy summary. Note needed corrections.

3 Value of abstract thy.

What happens when you proceed w/o it, some e.g.s.

a) Royalties. Need to adjust for cost diffs. Sliding scale, or step scale, based on prodn. The big pools are cheaper. Note other cost factors this overlooks.

Is tempting to use concrete e.g.s. then to base policy on them. But they are not universal.

b) Pollution control. Congress & the big Tail-end Charlie approach. Subsidize a gadget.

c) Saving resources & using more labor.

So proposal is to suppress the extractive sector, and stimulate the service sector.

But truck farming is labor-int; & resid. is K & land-intensive.

Or, move from pulp to saw timber, bcs. sawmills are labor-int. & pulp mills are K & res.-intensive. But upstream & downstream, it's the reverse. So, use price system, carry the message to every nook & cranny. Balance the pluses & minuses.

3. Abstract thy. (cont)

Use some mtl. from old notes.

4. Objectives of studying cost curves, & relations to Product curves.

In product analysis, Fixed input was assumed. Cost curves, we show it declining per unit, AFC.

(NP analysis does both at once)

In prodn. thy, can relate contribn. of one input to it, unit cost, show how much to use. In cost analysis, relate sum of costs to price of product, show how much to produce.

In either case, have 2 ~~st~~ stages of analysis, S.r. & L.r. S.r. is where you assume one thing is fixed, vary other things. L.r. is where you let the 'fixed' thing vary. (NP analysis is L.r.) L.r. doesn't necl. mean longer time; means more variables.

S.r. is like snowplowing when learning to ski. Gets you started.

In all fields, you start learning by having a secure

fixed base; and then learning how to get along w/o it.

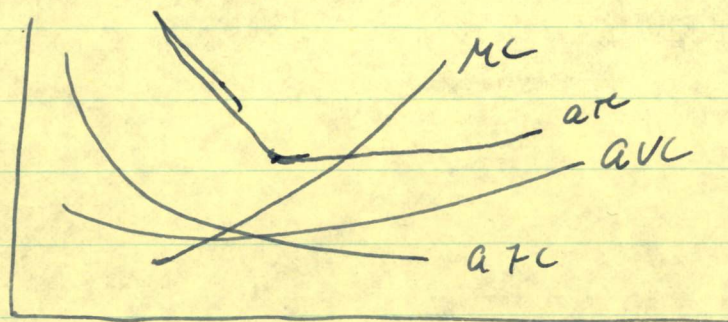
In stat., from regression to multiple regression

In calc., " partial diff. to derivatives (?)

In physics, from mechanics to relativity

In life, from family anchor to the world, see your parents as people

5. S.t. cost analysis.



a) AVC rises b.c. of dim. rets. Δ cost = dim. rets.

b) FC don't have to be met — precisely because they are fixed. Even if owner goes broke, resources are still there to be used.

In L.t. they may go away. But some res. are fixed in L.r., too.

Fixed to the indy., not to the firm. But if price falls, they have no better alt. anywhere in the indy.

Anything Fixed, its return is price-determined rather than determining. If fixed in L.v., a rent; in S.v., quasi-rent.

Opp. cost is the meaning — as vs. historical cost.
Opp. cost is what doesn't appear in the budget — but should.
" " is for Opport. — our subject — & decisions, re allocating res.

Opp. cost includes "implicit" (imputed) costs.

To judge effic., we must include them.

Biggest imputed costs are int., deprec., rent, & mgt's salary.

Effic

Wed, Feb. 15

1. No new papers to announce. See me.

2. Summarize & correct open access case.

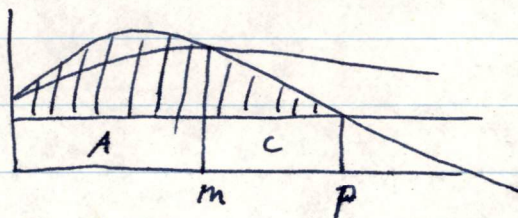
Note e.g. of my learning in class.

3. Relate to Post ed. re parking

4. Tie up def. of effic.

Effic. = 100% only when output $\geq$ input.

If stop short of $MP = MC$, input > output has more of fixed input is max. net return.



Input is not A , but $A + \text{|||||}$

Move to $MP = MC$, you add to input, but add more to output, $\therefore \Delta$ effic.

The % Δ output > % Δ input, bcs. input > output at m .

At p , output = input, bcs. both are area under MP curve. To left of p , input > output

5. Does MP curve begin from origin?

Ec. 701, Mon., 3-3-69

1. U.Z. plucking. Quote from Eli Black
cf. Role. (Cornuelle was with both!)
cf. Irvine

2. Re drawing MP curves backwards - what does it mean?

3. Prove Euler's theorem.

4. $\alpha + \beta = 1$ means if you Δ every input by 1%, ΔP by

$$\frac{\alpha}{100} \% + \frac{\beta}{100} \% = 1\%$$

5. Taxes on inputs or outputs Δ scale; lower intensity; drive
mrgd. land out of use, but this is less potent than that it lowers
intensity, bcs. land mrgd. for an intensive use is supermrgd. for less intensive one.
Price supports, reverse.

6. Ecs. of scale, & limits.

Gets into mrgnt. & admin.

Only remark here that coord. via mkt. mechanism is a
superior alternative, from view of community

7. Wicks. notes, items 26, 29

Ex. 701, 5-25-64

1 the

8/11

"Rent."

W/o fut. rationale?

Neither elicits supply nor preserves it.

Allocates it — is inept.

But allocation is distorted by diff. cap.

Need diff. cap. to smooth out unequal timing, but not to cap.

Can sub. in rent tax change

Unique to land? Counter arguments

1. Man can Δ land supply.

No, he intensifies use. Invests cap. in ways ~~comp~~ to bring in more land (comp. to the new, sub. to the old). Or moves from one use to another.

2. Are other differentials

a. Many aspect of Ricardian exposition

3. People get rents. — celebrities, anyway.

a. Above alternative use. Indefinable unless close

b. Man has altern. of leisure: land puts no value on its own leisure

c. Labor supply inelastic^{no wage?}? Not down to zero.

Not will anyone work for no money. Supply withdrawn

4. Interest is rent — we save, regardless.

Not at zero-int. Borrow infinitely

Cap. moves between tax jurisdictions

Hi Δ lowers l.v., stimulates cap. flight.

A test of what is "rent". Wd. the resource ^{be supplied &} remain if net return were all taxed away? By lump sum. Announced in advance. (no fair trapping people afterwards)

A few rare instances, people might do for free what they now do for money, but only by accident. — no importance. But overall supply of labor vastly changed.

Quasi-rent is unprofit. W's Rent-goods. Cuts & fills.

Alta. ^{which restricts its oil output,} prorates oil prodn. according to depth of well.
on the theory that the overhead of more expensive wells
needs to be met. Is that good economics?

Ex. 520

Another moral from MNR

diagram:

Risk, variability, etc. do not argue for
less intensive use.

Ex. 201

Ans.

When is the AP the MP, even though the elasticity of product $\neq 1$?
(under open tenure)

Risk, probability

✓ Lec. "Risk, Uncertainty, and the Unprofitability of Compounding Probabilities," by A. G. Hart.

Res. title suggests he is questioning usual practice of adding risk to discount rate.

Distinguish clearly

- a. Antic. fluctuation (of income & cost)
- b. Unreliability or uncertainty of predictions.
 - i. Insurable
 - ii. Uninsurable.

Applications

a. Urban promise

b. Transactions and precautionary motives for holding money.

{ Tiebout's qu. If parks elsewhere on lot, are you Ag output? Yes -- ~~for~~ it is input that is constant.

Fallacy in micro, or land ec., from residual approach to L.V., is to think intensity is risk.

As Babeoch points out, can divide antic. earnings of a bldg. into parts, and the first quarter of earnings are of higher quality than the last quarter. But who should get the blame for the low quality of the last quarter? If land is not residual, the last quarter of land is as quality as any other. It is not intensity,

then, but scale that should get the blame. This is a
direc. of scale. And of putting to end of credit line.

It is also a direc. of using flow resources, (and
flowing funds.) If demand is variable at the margins,
so should costs be, by using more variable inputs like
labor & funds.

Since land (and time-depreciating capt.) are
the non-withdrawable resources, ~~the~~ the low quality of
the "best quarter" of antici. future income
argues vs. using much ① land; much ② durable capt.; and
③ large scale.

Of what signif. is it that in leases, landowner gets a
steady income and lessee bears fluctuations? Certainly
argues vs. regarding land as residual; but also lends
less plausibility to regarding land return as
less risky than bldg. The land input is steady. —
opp. cost is steady, but the rev. inc +

The 1. Q. qu. When valuing land, land is not included as a
cost, so lower 1. Q. means something, & gives a surer value. As land
becomes a smaller share of total inputs, rent becomes larger but less
steady and less certain. But that's odd, bec. wages are also
becoming less certain by virtue of getting into unpred. range.
That's double-counting. The uncertainty in one presupposes
certainty in the other. Actually, both wages & rent are certain,

as such. Investor or capl. is what bears uncertainty.

When is it of less certainty?

E. 701, Mon. Feb. 20

Applications of 1.2. ~~& class of products.~~

1.2.

1. Ag. price supports

a. Mgt. i.g. as well as ave. Brings in mgt. As of hi mgt.

i.g.

b. Mgt. land of hi gross. Note hi leverage on land price.

c. Reduce risks by price fixing, bring on needs.

d. (relates to (a)). Shift from lo - intensity use to hi, on given land, has the bigger % & rent from the hi.



(Shift max. to left)

2. Re risks.

Is it better to keep to low i.g. to min. risks?

Only if you own land, & regard it as cushion.

3. Re taxes

If on gross, effects are reverse of price supports. Drive out mgt. land.

Inc. tax lets you deduct some costs, but not your own or family labor. Thus helps big farm. who hires labor. And hits mgt. land.

If on land rent, = 0 on mgt. land. Also on mgt. As to superior land