

Raleigh June 10

3-4-70, R77.

1. Y. opp. to raise gas. -- ~~also~~ also about previous papers.
No muzzle rule.

2. Paper is ~~part of my program at R77.~~

Replacement

Intersite sector.

Time & space

User changes & pollution control.

A.

3. Conditions when to replace CIA by mass

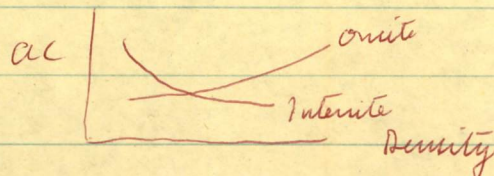
(Exaltation of Labor, field of wells, pollution of steel mills,
flush of ~~septic tanks~~ toilets, corruption of mayors)

4. Mass use sticks. Intersite sector. Decig. costs.

Downing's figures. Density the key.

Intersite is major cost -- dominates total.

5. Stone.



6. CIA, Δg costs. As a collection. Bes. of neg. exts.

(Or, if defender, bes. of s.r. small capacity. Then can use same analysis for movg. to larger plant on LAC envelope)

7. So, one replacing Δg cost by $-\Delta g$ cost, get big jump in opt. volume.

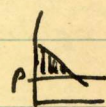
B. ~~Rept~~ Distinctive wrinkles.

1. General replacement criterion. $Rent_D < Rent_C$
(Later turns out to be S.i. of ch., usually $> rent_C$.)

2. Not same as "min. costs" unless ~~in~~ demand fixed. Larger volume, too.

Since $-\Delta g C$, $\Delta vol.$ very large. No limit on cost side.
Limit is on demand side.

3. Rents of ch. include contrib. to offstreet rents.



Farebox deficit.

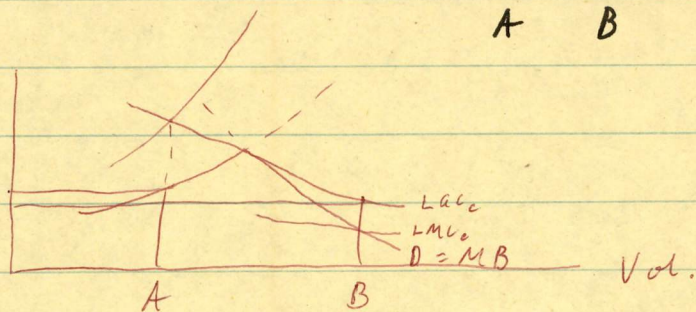
Rationale: Ave. Ben. $> a.c.$. Demand is MB.

4. Demand elasticity det. by offstreet density, ~~&~~
Immigration policy det. density. (Mrs. Rusge)

5. Replacement is epochal. Discontinuous.

Esply. if $P = MC$ & MC is MSC including
effluent charges etc.

c. Model



$$DMB = \sum MB$$

$DMC = \text{Diff. of 2 rectangles}$

$$DMUC \equiv \frac{DMC}{B - A} \quad \text{Shows how cheap it is to}$$

add people here, where density already high, in pref to new
area.

D. Morals p. 15

E. Inst. barriers p. 19

F. Capital costs

1. Useful age, CIA.

Capl. cost is current.

CIA loses much advantage from being a deferrer.

2. Plant decay

$P = SMC$ is ideal.

New plant will decay, lose capax. So, on given demand curve, vol. wd. fall over L .

LMC includes FC . But not all FC ; rather, the slice allocated to one year. How big the slice?

$LMC = SMC$ solves problem in texts. Assumes no decay. Ok for one-hor. shay. FC const, bec. $Int. + Deprecn. = \delta I$, & $\delta I = \text{const.}$

Decaying plant, SMC lower at first, but FC higher by same amt. So don't build any earlier on acct. of lower SMC .

But do build earlier ~~one~~ by ignoring LO .

G. Growing Demand

1. Rise of attainable unit costs

- a. Shorten Life, to keep close to D curve. c. 20 years.
(Another bias. People w. franchises always claim to require 50-100 years to amortize plant.)
- b. Differential advantage of larger plants enhanced.

2. Ripening

Max. PVS

Gains of waiting p. 48

Costs of waiting, p. 51

p. 53 Cost includes deferring succession. When you invest $P_1 G_{\dots}$ for $P_2 G_{\dots}$, you give up $P_1 G_2$ for $P_2 G_1$, etc. --- i.e., defer G_2 .
Ignoring $G_{>1}$ biases vs. smaller plants, G_2 comes sooner for smaller plants.

Unit of bias: omits half the cost of waiting, or $\frac{2}{5}$.

RIMS

Send to Ralph Hofmeister
Prof. Ecs.
U. Minn.

~~for Jerry D.~~

Dear Prof. Hofmeister:

Jerry Nelson suggested I send you the enclosed. He says you are working on a parallel problem in Indian ex. development.

Sincerely