

10-29-69 Seminar, R.F.F.

M-1

I, B, I, C.

'Overheating' is like undersaving. Wages just  $\Delta$  cons. w/o extra output or saving.

Goes w. right wing thought. Need more capl, and more prop. income to motivate cap. further.

Burnett & Morse fit this pattern, by fingering cap.

scarcity as limit on growth. Or do they? I can't find it.

Are 2 reasons why propy. needn't get so much.

1. Much is land rent

2. Can activate & utilize capl.

I, B, I, h

AR answers all 4 pessimists.

a. Malthusian. Deploy capl. to sub. for land, and by AR, do it w. low cap/labor ratio, so don't run out of capl. either

b. Undercons., oversaving, underinv. -- in general, ~~the~~ "underspending" school. ~~Replac. cons.~~ Ripening supplies create their own demand, synchronized by replant. in antic. of sale.

As to prop. to save net  $>$  invest,  $\equiv \Delta c.b.$ , higher activity of  $\Delta$  turnover tends to cause that, but  $\Delta M$  can always offset it, as can higher inv. opps, etc ... the monetary thermostat to be treated in B, 3, c.

c. Overdepending, or Calvinistic pessimism.

Spending for replacement is automatically synched w. ripening of goods.

d. Structural

change factor mix - already covered by micro section.

Invs. close to land, preserving or subbing for land. —

why are they esply. long lived?

a. Soil consn. — to prevent irreversible loss

b. Land fill — may last forever

c. Highway cuts — same.

d. Draining swamp — same

e. Presumpting land — creates tenure forever

f.

All these are stimulated by high demand for land due to under use of good land.

Q-1

Mineral pattern.

Better ores frozen, or used slowly. When used slowly, cash flow is mostly income, because:

- life is lengthened, lowering depletion charge
- cash flow is lower

So cap. not recovered. But slow use maintains price, causes further exploring. This sinks cap.

Exploring also yields immediate inc. to indiv. in A.L.V., and this may be consumable by owner as current inc. However, I doubt if this is so simple.

— he may hold it, in which case he has invested & saved the inc.

— he may sell or bank it — then someone else has saved.

Think about it.

Forcl. Mat. - site renewal freq.

Urban Expansion. Land cycles.

Allocation of land to highest use, mkt. barriers.

Water law - effect on systems

Optimal spatial utility pricing, transportation rates. True soc. cost of scatter.

Ag. policy, ambivalence - w. NCLTRC, Nat. Study Group

Land use & property taxes in Mke. Effects on land use & SOC of SVE.

1. Here to solicit research support. Role here is mendicant.  
a. Released time; b, Counsel & imprimatur. M.S.
  2. Role of res. in macro-ec.  
<sup>Qualifications? Matter of opinion</sup>  
Background in earlier work, skirted topic, never came full to grips. (over)
  3. Not an orthodox Keynesian, so really involves two major aspects -
    - a) A Wicksellian macro-ec.; ~~a Domarion, Dorfmanian~~  
<sup>emphasis</sup>
    - b) Role of resources.
      - a) Not as bad a problem as sounds. Translatable. H on Domar & Dorfman behind it. Will just be doing what Domar says shd. be done, use gross invt. instead of net. Emphasize cap-output ratios, in modern style. "Balanced growth"
      - Easily expressed. E.g. of baby's storage capacity.
      - b) Turns out to have as much to do w. capital as w. nat. res.

- effect of res. limit. on structure of capital, cap/output ratios.

(b) Does not deal much w. gn. of res. limit's growth -

.. already R77 has done a lot on that.

  - 4. Relation to earlier R77 work  
I agree w. Barnett & Morse, cap. scarcity is limit on growth, & not natural element. Is not a meaningful statement in bald form, bes. hi cap. requirement might be surrogate for scarce res. My thesis is, intl. factors cause us to use much more capl. than necy. to dev. given res. to given end.  
<sup>Emphasis on quality, needs to be reconciled w. res. as emplmt. base.</sup>  
<sup>Danger of the deer-park viewpoint.</sup>
  - 5. a) E.g. is water. Princ. of fctv. disadvantages. S.F. & L.A. Kwh. system.
  - b) 2d e.g. is agric. Idle good land, sub. cap. to dev. new land.
- (Wd. like to integrate project w. study of fnc. program w. Nat. Study Group.)
- b $\frac{1}{2}$ ) E.g. of timber. Cos. fail to regenerate best lands on coast range, ~~or~~ in so, causes repen. of poorer land where cycles longer; or capl. in more access roads etc.

c) 3d e.g. is urban sprawl

d) 4th e.g. is iron ore. FTC Rpt. '52, U.S.S. retains big surpluses  
Oil: Ts. private holds up price umbrella, so we explore offshore, Colo. shale, Athabasca Tar,  
develop great excess capacity.

All e.g.s. have this in common: land withheld, causes invmt. of

capl. in very durable forms as subst. Much of the slow-liquidating

capl. is public - SOC. SOC sector is ballooned up by underinvestment of

best priv. ~~lands~~ res.

In case of stock res., can add that natural or geol. capl. is kept sterile & non-circulating, & compensation forces circg. capl. to be frozen also.

6. Ambiversion

Hoarding of real capl. - in my demography, that outranks hoarding money.

Artific. scarcity within given framework of SOC

" abundance bcs SOC overextended — pattern of excess capacity.

7. New approach to dim. rets., relation of res. to emplmt.

Refutes orthodox Keynesians, supports Barnett & Morse. W. balanced growth, no dim. rets. to capl.

Land & emplmt -- related to r.f. of capl. on land. Intensity

of cap. on land is impt. as it affects r.f. Mere lack of intensity can be

overcome, re emplmt. effects, by spreading out to new lands. But ~~they~~

that entails heavy SOC, slow r.f.

Slower r.f., heavy SOC, reflects marginality of land, in part ... (hi i.g.).

But as much or more, reflects scatter

8. Policy -

Containment needed. Truman doctrine neg. n.g.

Positive containment aimed for.

Idea of <sup>developmental</sup> compensatory p.w. not so hot. Coals to Newcastle, & slows r.f.

9. Resources & monetary system & flow of payments

Resources as collateral value, neglected in my paper.

Banking collapse of '31-33.

10.

Rigid wages assumed? State explicitly.

Kneere found it very difficult.

Kernman's & Acrilans, you could have more land covered with more, if Kernman last long enough.

Systematic models needed

Klein's from af Kn & classical

10-29-69 Seminar, hard points varied.

1. Meaning of capital intensive (Krutilla)

Many people think of the ratio of "capl. service" (interest plus amortization) to current operating inputs, as measure of or index to capital intensity.

Regardless of whether cap. service is mostly int. or mostly recovery of capital.

This shd. be mentioned as a mis. leading usage.

A good approach is in tax terms. The capl. share is the taxable income of the investor.

2. High turnover makes more junk (Kneese)

Q: Auto, e.g.

A: answers.

a. It is true that higher throughput makes more junk, whether from higher turnover or any cause. But the conflict is between empl. or real income & scrap; not between turnover & scrap.

b. Older cars pollute air more.

c. Slow replacement in centers makes us rely on cars more.

3. Cap. inc. tax makes capl. turn over faster b/c. return before tax must be higher. (Kneese.)

Answers.

a. Tax partially absorbed by investor

b. Tax avoidable by going to longer investment

c. If tax not absorbed by capt., then higher  $i$  is appropriate  
bes. this signals scarcity of capt.

Taxing the income of capital will make people economize on it.  
If they succeed, there is surplus capital. What becomes of it?  
Either:

1. It goes away. Then tax is shifted, etc. -- but  
there is no gain to empl. Higher turnover compensates for less  
stock.

2. It stays, - then it absorbs tax, no change.

As in Tistoe, property tax is neutral; inc. tax is avoidable  
by slowing turnover.

4. Stock of capt., valued in money, is defined or measured by  
discounting.

Answer:

In s.r., this can revalue existing stock

In l.r., or after statics, no. Stock valued at  
Co. Investment move to shorter lives, if  $i$  rises.

Spatial, temporal, and macro-economic aspects of transport-utility  
networks for resource development and  
environmental enhancement \*

I. Spatial Aspects

A. Importance

Cost of various space-networks as proportion of total costs.

Space-networks the circulatory systems of society, means of mutual access, basic to an open society, with subdivision of land into medium and small ownerships. Common carrier principle; public interest. Alternative of monopoly control; or internalization of externalities by giant landowners.

B. Partial analysis of space-networks.

Sizing of network lines at each point in space. Economies of scale: decreasing costs of volume, increasing costs of traverse. Zonal imputation of costs by division of grand system into subsystems.

Terminating networks: length of lines.

Location of storage in networks.

Optimal finance. User charges and flat charges, varying with location, in context of long run decreasing costs to volume, increasing costs to distance, complicated by increasing costs to volume in congested center; and short run increasing costs to undersized or obsolete plant coupled with long run decreasing costs to replacement plant.

Relations of rent-bearing and deficit-making subsystems of grand system. Are they divisible? Should one carry the other?

Layout of networks to minimize costs. Trunks and branches and geometry.

C. Coordination of space-networks and use of served land.

Optimal land-use intensity in terms of space-network length and congestion. Land-use as the third dimension of the space-network (vertical transportation). Effect on land-use intensity of effluent and other user-charges to abate congestion of space-networks. Does the market achieve optimal land-use intensity?

Pollution as a form of congestion; congestion as the essence of increasing costs.

Other network-related factors in finding optimal intensity. Minimizing populated space whose environment requires enhancement, e.g. by drainage, flood control; maximizing opportunities and minimizing costs of collecting and

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\* Henceforth "space-networks," for brevity.

recycling wastes; minimizing effluent wastes by exploiting economies of scale; minimizing net negative spillovers from the transportation process; maximizing access to extra-urban open space for waste disposal, input supplies, recreation, and interurban travel.

Spatial specialization in environmental enhancement. Improving dense areas by sacrificing light ones.

Optimizing social controls over space use.

Use of land value increments to meet deficits of marginal cost pricing.

D. General equilibrium of cities and other communities under space-networks.

Relation of space-network economies and optimal scale of cities.

Spatial aspect of pecuniary spillovers. Achievement of "total community" via mutual accessibility, allowing vertical integration of economic processes to occur in the market place, obviating giant firms and owners as well as conscious governmental direction of many matters other than space-networks. Environment for small business, democratic society.

E. Network financing and distributive equity.

F. Institutional aspects of network control.

Possibilities of cartelistic valorization of land by limiting service areas. Alternating cycles of containment and expansion.

Decentralist biases and their motives: price discrimination in favor of the more elastic peripheral demand; preclusive capture of developing territory--imperialist analogue; income tax motive--early deductions, deferred liabilities; rate base maintenance; etc.

Trunks and feeders and local micro-networks--the problem of imbalance. Institutions for integrating.

Controlling spillovers by control of space.

## II. Temporal Aspects

### A. Importance

Capital costs for space-networks are an unusually high proportion of total costs; and the capital is above average in longevity. Production of land substitutes is often involved--cuts and fills, e.g.--with some of the character of land, like Wicksell's "rent-goods." Payout is slow, especially when extensions are developmental, or promotional, ahead of demand; and the served land fills in slowly.

## B. Partial analysis of space-networks.

Selecting optimal date of initiating network. Frequently supersedes prior set of individualized private service units, congested and in increasing costs. How select optimal date of supersession of increasing cost plant by decreasing-cost plant?

Optimal longevity of plant. Trade-off between capital cost and operating cost.

Optimal sizing of plant under conditions of long run decreasing costs to volume, rising demand, progressive obsolescence, and uncertainty.

Replacement policy under decreasing costs, and spatial differentiation of subsystems, replaceable separately.

Optimal pricing policy over life of plants, from opening period of excess capacity to terminal years of short run increasing costs (or at least higher marginal costs than at first. It is possible and even likely we will find it is never economical to defer replacement long enough to enter stage of increasing short run costs.)

Peak-load pricing-diurnal and seasonal.

Relation of rent-bearing years (if any) to deficit years--should one carry the other?

## C. Synchronization of network development and complementary intensification of private land.

Waste of unsynchronized investment--prolonged deferral of income from sunk capital; failure to achieve synergistic benefits of "total community."

Use of network financing mechanism as community synchronizer: land taxes.

Synchronizing complementary parts of networks: trunks and branches. Can higher levels of government, financing trunks, bring pressure on lower levels to supply feeders and micro networks?

Synchronizing replacements: trunks, branches, private land. Relation of optimal lives of subsystems--do some parts dominate the whole?

## D. Bias toward hyper longevity of capital.

Low intensity of private land leads to longer network lines, investments of above-average durability (same as capital-intensity).

Wrong replacement policy defers renewal of obsolete and congested facilities.

Low density of private land, fewer customers per mile, adds to cost per customer and makes replacement too costly.

Income tax policy.

Regulatory policy.

Motive to capture territory--preclusive and therefore premature investments.

Logrolling, and political extensions to submarginal territory.

Others--there are many.

### III. Case studies

A. Water Supply in California (see attached prospectus on Irrigation Districts; and address given at Penn State).

B. Pollution Abatement (joint, with Kneese-Bower).

### IV. Macro-economic Aspects

Role of capital longevity (and replacement) in macro-economics. Real aggregate demand a direct function of replacement frequency of real capital. Bohm-Bawerk model updated by Brems and Dorfman. Further integration with macro cash-flow analyses, showing the dependence of real income on replacement frequency of capital.

Staggering models showing the identity of capital longevity and capital intensity. Analogy between concepts of replacement, and recycling salvaged materials.

Role of land values in determining longevity of buildings--a vital matter overlooked by Bohm-Bawerk, Brems, and Dorfman, and only lightly touched by Wicksell. Precise definitions of land-use "intensity," and factor proportions, in respect to durability of capital on land.

Institutional biases holding land-use intensity below its optimum level.

Inflation of capital required by space-networks resulting from above: longer lines, slower replacement. Inflation of aggregate capital requirements of economy, by making overall production more capital intensive. Slowdown of aggregate replacement frequency of nation's capital. Reduced real demand for labor. Over-load thrown on fiscal-monetary policy to sustain full employment, resulting in inflation, gold outflow, and related crises.

Probable net effects of pollution-abatement measures on factor proportions, thence on real aggregate demand. Desirable modification of otherwise optimal abatement measures to coordinate with national macro-economic goals.

Need for macro-economic analysis to forecast interest rates which in turn are central to all capital budgeting.

Increasing returns to capital in the aggregate, due to complementation of space-networks and private land they open for improvement. [Current capital shortage as the evidence of such increasing returns.] Needed modification of macro models now guiding policy and forecasting.

Public works<sup>0</sup> investment is a classic macro-economic tool. But it has not been closely analyzed. In particular, the decline in real reinvestment as a result of freezing capital in concrete for low returns and late recovery needs close examination.

Policy recommendations to eliminate intertemporal bias in favor of long lived investments, both private and public: to speed replacement (but not factitiously, as by breaking windows or designing for obsolescence) in order to promote employment without overloading monetary tools and forcing inflation.

7/68

MASON GAFFNEY

Re capt., land, & life.

R-1

An operation may simply require more capt. w/o requiring more land. e.g. a bldg. may be built to last longer, on given site.

Or an opn. may require more capt., plus more land to hold the capt. e.g.s.:

1. Sewage treatment. A slow process requires, for given flow, longer storage, more sewage on hand at all times. At given depth, this requires more land.

2. Wine, same ... except watch quality factor.

3. Trees, cattle, etc.

✓ 4. Bldgs., too, ... the critical assum. is the const. flow.

Thus if assume trade-off of st & life, put same  $C_0$  on each site, lengthen life, reduce st, this requires more land.

It doesn't release any capt. to activate the land, tho — just sends out consumers needing it. Thus hurts labor.

December 19, 1969

Dr. Arthur Okun  
The Brookings Institution  
1775 Massachusetts Avenue, N.W.  
Washington, D.C. 20036

Dear Art:

Dave Martin tells me that my work is closer to yours than the "new Malthusianism" phrase suggests. He says that you have felt concerned that macro policy must trade off inflation and unemployment, and have taken the lead in looking to micro policies to resolve the dilemma. That is the line I am trying to develop. The approach that strikes me as promising is to speed up the payout from investments.

The enclosed brief passages from testimony on another topic telegraph the model I hope to develop. It is a revival of Wicksell on replacement, Dorfman on bath tubs, and Brems, if you will--but brought down to earth.

When I have a model ready I would value your criticism; and I would be interested anytime in your attitude toward the general idea that speeding replacement and turnover is an essential macro reform. Hope you stick around.

Sincerely,

Mason Gaffney

MGMG:VLM: