



Unemployment as Related to Land, Taxation, and Capital Turnover

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PRELIMINARY DRAFT
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UNEMPLOYMENT AS RELATED TO LAND,
TAXATION, AND CAPITAL TURNOVER

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"Inert Wealth is worth less than Enterprise, . . ." -- Bartoli

Joblessness is inexorably regaining its pre-war place as the plainest manifestation of malfunction in the United States economy. The day fast returneth when no one will be allowed to speak above a whisper on economic questions without intoning "full employment" with due reverence and frequency. Heaven protect us from the abuses this obsession may occasion -- I condone them not, nor ask immunity from critics who may recognize other values and criteria as well. But it does behoove economists and others to begin again to approach most issues with at least one eye on employment effects.

Economists dealing with land should have little trouble making a connection. Even those economists who object to the distinction of land from products find it hard to deny that our nation's abundant natural resources have some relation to the high opportunities for labor here compared with China.

In the 19th century there was little doubt in most people's minds that westward expansion onto new lands had something to do with employment opportunities. To be sure, there has been a good deal of scholarly quibbling in recent decades over just how many unemployed Connecticut millhands entered homesteads in Nebraska, etc., and some economic historians in their revisionist ardor seem to have proven that we never could have moved west at all. As the center of population approaches St. Louis, however, one has a smug certainty that we could. As one pores over Homer Hoyt's 100 YEARS OF LAND VALUES IN CHICAGO, and the spate of current scholarship rediscovering the urban frontier, one realizes that the western lands providing employment opportunities were urban as well as rural.

To say that there is a connection between land and employment is not to say that simple access to land is always a sufficient condition for employment. In the 1930's lands were abandoned for taxes in great volume. Once abandoned, these "dead lands" were often tied up and held back so as not to spoil the market, so I will not concede that they were then accessible. But it seems reasonable to conjecture that before abandonment they must have been for sale quite cheap. Yet, that was not adequate to bring full employment. cf. J. S. Mill

The relationship between land and employment is I think nonetheless real, but simply more intricate and interesting than the simple 'access-to-land' phrase conveys. It entails an interplay of land and labor with a third element, capital, and an interplay of the free market with governments which dispose over volumes of capital with which they help develop new lands. In the process, governments manifest a propensity to freeze up capital in durable public works whence it is recovered only slowly if at all, where it is inert and ceases to turn over, and where it substitutes for labor instead of complementing it. But of that, more later.

Modern economics has benefited from growing specialization, but it has paid a heavy price in compartmentalization of thought. "Land Economics", specifically, has become a small cult among cults, and itself split into isolated rural and urban subcults, neither of which recognizes much effect from the phenomena it surveys on national prosperity and the employment of labor, which are exogenous givens. The economic base analysts are perhaps the nearest thing to a link between land economics and employment economics, and there is hope for the future

in this field if its practitioners can push on to develop a science in which the general welfare outweighs the clients'. As to the land planners, their professional ethic seems to elevate esthetics, at a level fit for upper class budgets, above the bread and butter of the unwashed masses, a failing for which the intrepid Herbert Gans chastised them at their recent convention in Los Angeles. The unwashed are wished away by pleas for birth control -- presumably retroactive.

As of now, therefore, employment is the province of the national income accountants, model-builders, and bankers. But these usually end up telling us, after due flourishes of virtuosity and expertise, that basically we must choose between inflation and "structural" or "institutional" reforms, the latter being no responsibility of theirs. And so the buck is passed around among the overspecialized, stopping nowhere.

Thoreau had a nice phrase for it. "Men esteem truth remote, in the outskirts of the system." Thoreau also had a prescription: "But all these times and places and occasions are now and here. God culminates in the present moment, and will never be more divine in the lapse of all the ages." I do not vouch for the theology, but in the spirit of Thoreau let us see if we cannot find something bearing on the overarching problem of employment and income determination, now and here, in the analysis of land and taxation.

I feel a sense of urgency about the question which I would like to communicate. We have suffered unemployment before, survived, and recovered. But we have not had for one hundred years so grim a threat to national survival, and never before was the threat so geared to the

performance of our economic system. And never has biological survival been so at stake.

The last, especially, calls for some reassessment of the relative weights we attach to our petty vested interests in the present dispensation, on the one scale, and the strength of the economy and nation on the other. These are apocalyptic times -- no times to greet any considered proposal for strengthening the economy in a mean, captious spirit, or what amounts to the same thing, with the presumption that those other fellows will so greet it. It is no longer seemly to deride and discount a proposal because it jars the institutional and intellectual status quo -- the status quo bids fair to be a death trap. Western Europe has been galvanized by danger into the economic union we always thought precluded by petty vested interests. So far we have no comparable advance to boast. I venture that if we do not come up with one, if we continue to suffer unemployment and instability, if we have nothing to offer the uncommitted nations but moralizing and nay-saying, and a liberalism whose panacea is the deficit finance they have practiced for years: then we are scheduled for heavy losses, and perhaps, as the enemy grows bolder, the holocaust.

I do not mean, of course, we should hop the first car that goes off its trolley. I mean it is time to think big, as befits a people whose survival is jeopardized. It is time to re-evaluate some of the conditioned reflexes which automatically guide many of us away from interesting ideas because they are too radical -- not for us, of course, but for the weak stomachs of others. Radicalism is relative. No social innovation presumes to approach the radicalism of ICBM warfare. So

long as that alternative is being seriously considered, mere economic reform is painless by comparison. So long as our lives and property are staked on the gamesman's computer programs every few months, it hardly seems rational to quake at minor disruptions that might attend any innovation that could improve our chances of avoiding war by making peace economically workable.

And so I have no apologies if the present paper seems ambitious. We can ill afford to putter around with anything less.

Along with a sense of urgency, I ask your indulgence also to communicate a sense of excitement. Five years ago, with the seers of the soaring sixties in full cry, I published a presentiment of long run reversal in the conjuncture of urban expansion.¹ I rationalized my position then as best I could in a few superficial words, but much of the underlying rationale I withheld. The palpable sickness of the sixties, however, gives me more confidence in the unspoken basis of the forecast -- enough to expose it now to the light of day, along with its positive policy implications. If the forecast was pessimistic, the policy implications are optimistic, and it is the latter which I refer to as exciting.

In a word, my pessimistic forecast was based on the slowdown in the turnover or replacement frequency of the nation's capital stock that must ensue from years of heavy commitment to exceedingly durable construction; and my optimism is based on the possibility of accelerating

¹ Gaffney, M., "Urban Expansion -- Will It Ever Stop?", Land, The 1958 Yearbook of Agriculture, pp. 503-21.

replacement frequency, once the importance of doing so is realized and the means to do so are accepted. Knowledgeable economists will see shades of Wicksell et al., and I acknowledge a debt. I ask a separate pigeon-hole, however, because of my emphasis on the role of land and its rent in determining replacement frequency. That role is the theme this paper now proceeds to develop.

1. Land denial as a cause of unemployment

a. The crude cold-storage approach

There have been times and places when governments deliberately withheld land from commerce. The artificial land scarcity so created tended to tip the terms of trade between factors to the advantage of landholders, as might be expected. It tended to valorize land directly by reducing the available supply; increase rents by lowering wage rates and profit rates; and raise land prices, relative to rent, by lowering capitalization rates. It helped swell the ranks of the unemployed, and so temper the insolence of workmen.

A modern government, at least at the national level, would hardly avow the cause of lowering wage rates, but in past years the aim was openly embraced. Edward G. Wakefield has given his name to the philosophy, by virtue of his prominent success in selling it to the powers that ruled Australia in the early 19th century. A. Hamilton symbolizes the the Wakefield viewpoint for United States history,¹ preceded by George III with his Proclamation Line and followed by a series of increasingly frustrated enemies of westward migration.

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¹ Jensen, M., The New Nation.

Hamilton's rationale, granting his premises, was a remarkably well-integrated piece of economic reasoning. He sought not merely to maximize revenues from sale of public lands, as would a marginalistic monopolist who had read the modern economists, but by selling even less, to maximize the value of the public lands as collateral for a national debt.

In Czarist Russia it was Valuev, Minister of the Interior under Alexander II, who epitomized the Czarist policy of artificial land scarcity, withholding from settlement State lands in European Russia.¹

In Latin America there is hardly to be found a nation whose government has shown real enthusiasm for the public works and land policies *which comes first?* needed to move redundant labor onto empty lands -- nor is there any longer room for serious doubt that many of the empty lands of Latin America have the latent potential to respond to a reasonable husbandry, so common has become the testimony to that effect from knowledgeable observers.

The Wakefield cold-storage policy is not entirely a thing of long ago or far away. The United States Congress, faced with that wonderful abundance of nutriment known as "the farm problem," has directed its main efforts to removing from farming not labor, nor yet capital, not research, nor urban subsidies to rural transportation, utilities, and education -- but simply land, paying the landowner a market rental for idling it. Thus, if labor and capital are driven from farming, it is only by virtue of their worsened bargaining position vis-à-vis the

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¹ Treadgold, D., The Great Siberian Migration, Princeton University Press, 1957.

land factor, which in turn gains both from higher product prices and cheaper complements: landless labor and, for a time, unexhausted existing capital trapped by its short run immobility.

In many a small city it is an open secret that the powers tie up potential industrial sites to prevent interlopers¹ spoiling the labor market. Even distinguished and liberal urban planners have endorsed the cold-storage approach to the "dead land" problem that hung over American cities from 1930-50, as witness W. Blucher's prescription:

Land speculatively held for potential use . . . constitutes a threat to the value of other properties within the city. . . It would thus be to the advantage of the remaining 2/3 of the property in the community . . . to have the 1/3 of the area . . . more or less permanently removed from private ownership.¹

b. Subtler approaches to cold-storage

Those crude methods and diaphonous motivations have not always set well with the intended victims. Indeed we will see, as part of our major thesis, they have provoked extreme countermeasures in the United States, such as more than to offset them. There are subtler and less extreme forms of land denial, however, which pervade most of

¹ Blucher, W., A Program for the Use of Tax-Abandoned Lands, Chicago: American Society of Planning Officials, 1942, Introduction. See also pp. 13-14.

Cf. Boston Municipal Res. Bur., and the Buffalo case, cited in Buttenheim, H. S., Urban Planning and Land Policies (Wb: GPO, 1939), p. 254; and Progress Report, National Resources Committee, 1939, p. 10; Aschman, F. T., 'Dead Land,' LE 25 (3): 240-46 (1949), p. 243; Beatty, Clarence W., "How Dead is Chicago's Dead Land," MS. in author's files, 1949.

For comparable procedures in rural areas see:

Tax Collection Procedure: Land Use Implications and Administrative Problems, Bureau of Agricultural Economics, 1939.

Tax-Delinquent Land in California, California State Planning Board Sacto: 1938.

economic life and in their aggregate effect do much to minimize the employment opportunities afforded by our abundant natural resources.

There are marked contrasts in the intensity of use of comparable lands throughout the United States --- more generally, let us say, contrasts in the factor proportions obtaining in the exploitation of different lands. I am not speaking of contrasts due to different qualities of land, although that is also an interesting question. Let us think in terms of an arbitrary "standard acre," say the value of the equivalent of an acre of prototypic Putnam loam on a paved secondary road 10 miles from the county seat in Boone County, Missouri, in 1962.

Again, I am not speaking of contrasts due to legitimate economic forces in perfect markets. No one expects that every piece of land calls for just the same ratio of labor to land value. But only a Pangloss could observe the prevailing contrasts of factor proportions and explain most of them away on that basis. Dord

Most obviously, many good lands are not used at all. The streamers of urbanism growing out from our cities are interwoven with such lands. Many other lands are used so lightly that anyone conducting a land use survey in which "vacant" is one of his headings is hard put to classify many lands as between that and some improved category, unless he has many special subheadings for billboards, superfluous grounds, infrequently used parking space, empty buildings, potato patches in the city, etc. Many of the best central sites are under-improved, in contrast to heavily improved peripheral sites. I will not cite chapter and verse --- we all see those things every day. They are the essence of that urban sprawl we deplore. + +

Frequently the contrasts in factor proportions are correlated with size of landholding -- not in every instance, but in the statistical sense. In a crude way we can divine that from data on many industries which show larger firms generally with a lower labor input per unit of output than smaller ones. Often we call that "efficiency," because of the incredible acceptance of the usage, even among economists who should know better, of output per man as the measure of economic efficiency. But it almost certainly betrays a contrast of factor proportions. The larger firms are better financed, and so use more assets per man than the smaller firms.

They also use more durable assets. The data tend to show a lower turnover of assets among the larger firms, and that despite high-universal understatement of asset values among the old established giants who acquired their land assets at the prices of 1900. Low turnover of assets reflects, inter alia, a higher proportion of the land factor. Land is the most durable asset. It never turns over.

Consider the agricultural industry as an example. When we rank farms by size of landholding, we find progressively less labor used per dollar of land value as we move toward the higher brackets. We also find less capital, in the form of buildings, machinery, orchards, livestock, drains, wells, etc., per dollar of land value.

There are several statistical traps in such an allegation, among them the "regression fallacy," and the ranking of farms by area instead of standard acres. I have treated those questions at length elsewhere¹ and

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¹ Gaffney, M., "Land Speculation as an Obstacle to Ideal Allocation of Land," Unpublished dissertation, Berkeley, University of California, 1956. Chapter 3, "Of Large Farms and Small."

satisfied at least myself that the alleged tendency is a true one and not a statistical mirage. But really, there is not much dispute on the simple fact, for the standard defense of large farms, by their sincerest friends, is the "efficiency" they achieve by spreading the cost of indivisible human and capital inputs over more land.

Marginalist economists will point, and rightly so, to the inadequacy of mere ratios or averages in economic analysis. The soil bank programs have furnished us more direct evidence on the marginal productivity of land. Under the programs, the government enters the market as a tenant, bidding to all comers a standard rent for spare acres on farms (and more per acre for whole farms.) Who are the comers, who accept the deal? They seem to average larger than the non-participants, and to have a lesser commitment of labor and buildings per standard acre.¹

Agriculture offers an example of the space dimension of intensity of application of labor to land. There is also a time dimension, of which this paper treats primarily. Consider the land used for urban housing. This land provides employment largely at the time a house is built. Labor is not applied to land in a steady yearly flow, as in farming, but periodically, once in a half-century or so. There is a large initial dose of labor-cost, which is then spread over many years. The longer the period between site renewals, ceteris paribus, the less

Wherein different from public housing?
No maintenance? No improvement?

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¹ Johnson, Ralph D., The Conservation Reserve Program in Nebraska, Nebraska Agricultural Experiment Station Bulletin 470, 1962.; Agricultural Research Service, United States Department of Agriculture, The Conservation Reserve Program of the Soil Bank, Agricultural Information Bulletin, Discussion of these materials in my Reply to Professors Loftsgard and Kaldor, in Miller, Frank (Editor), Rent Problems and Practices, University of Missouri, 1963.

intense the application of labor to land over time.

not necessarily

That is not simply to say that the more houses are built the more labor is used, but to say something much more interesting. A given supply of housing can be provided using different proportions of land, labor, and capital. Labor is used in the building. The contributions of land and capital are to carry the building, the one physically and the other financially, through time. The total value of services supplied by a house over its economic life much exceeds, normally, the building cost. The excess¹ is the contribution of land and capital. The longer that houses endure before site renewal, the less is the share of labor in the provision of housing services; the greater is the share of land.

*suppose the
site had been and
remained marginal?*

Viewing it marginally, in the later years of a house, the marginal cost of time is nothing for labor. The cost increment of a year's time is largely the cost of tying up the site for another year.

As to the services of capital, they are rendered in a diminishing stream. Their timing is intermediate between labor -- concentrated in initial construction -- and land -- spread evenly over time.

Capital's service is a function of time, like land's, but unlike land, capital is withdrawn and recovered from the house as the investment is liquidated, and there remains little or no unrecovered capital in a very old house. There is room for quibbling -- but not here -- over measures of the capital recovery, but few would dispute the general

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¹ This excess is the 'agio' of Bohm-Bawerk, as modified by Wicksell to include land.

proposition that much of the capital is recovered from a building during its first half-life. So we can generalize, roughly, about factor proportions in the provision of housing services: the longer the renewal period, c.p., the lower falls the labor/capital ratio; the lower the capital/land ratio; and of course, a fortiori, the lower the labor/land ratio.

A conservative mortgage banker of my acquaintance has told me that 85% of the cost of a new house is labor. I was not convinced, but suppose it were 100%, that is no index to factor proportions. For the major contributions of capital and ^{a surplus} land come later. The net rents over building-life far outmeasure the building cost, the more so as the building grows old. The excess, or agio, is land-rent and capital-interest. I would be surprised to learn that labor gets as much as 1/3 of the total paid (including properly imputed rent and interest) for shelter.

no capital: it does not matter whether the form is durable or not, but on the total account (or value) of the capital society is using.

That means a city's housing may be supplied with different proportions of land, labor, and capital, depending on the renewal period. For a given area, without growth, if the renewal period averages 100 years, then just 1% of the sites will provide employment for construction labor in an average year. If the period is 20 years, 5% of the sites are renewed yearly. There is then a higher proportion of labor in the provision of housing services.

How does this affect the cost of housing services?

The example is oversimplified, and not definitive. We need not here pursue all the convolutions and variations to make sure ceteris are paribus -- they would make another article. The point is that speedier site renewal is a dimension of increased intensity of application of labor to land, one which does not entail the usual connotations of

crowding, increased height and lot coverage, etc. It also entails a substitution of labor for capital, as the 20 year houses would require *But capital is labor.* less durable construction than the 100 year ones.

There are fewer distracting incidentals if we consider the example of forestry. Labor is expended periodically in harvesting and regenerating. Between harvests time passes, and rent and interest accumulate. The shorter the growth cycle, the greater is the share of labor in the final stumpage value; the less the share of land and capital. If we have staggered rotations, and a 33 year cycle, 3% of our land is harvested yearly; if 66 years, $1\frac{1}{2}\%$; etc. By shortening cycles we produce timber with a higher use of labor. *Again - at what relative costs?*

Here we find ourselves in the midst of capital theory as developed by Senior, Ricardo, Von Thunen, Jevons, Barone, and especially Bohm-Bawerk, Wicksell, Akerman, Spiethoff and other central Europeans, only with a wrinkle of our own, the concept of site renewal. This adds a spatial dimension, and a touch of earthy realism, to what has been too purely a chronological exercise.

I will not devote much space here to expounding the pure capital theory, although there is room for improvement even in Wicksell, the most lucid expositor of this school. I will postulate and in general subscribe to Wicksell's powerful capital theory, as expounded in his Value, Capital and Rent; also to Robert Dorfman's recent excellent re-statement of the position.¹ Here let us concentrate on the spatial aspects which they neglected.

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¹ Dorfman, Robert, "Waiting and the Period of Production," QJE 73:351-72, August, 1959.

Subscribing to Wicksell, parenthetically, is not an empty acceptance of received dogma. I do not believe the profession has begun to grasp the optimistic implication of the point that you can mate a given capital stock with a higher or lower national income by rotating the capital faster or slower; that you can mop up unemployed labor and idle land by inciting capital to turn over faster; etc. Wicksell criticized Walras and Pareto as follows: "their theory . . . is at bottom merely a theory . . . of instantaneous production involving, besides labor and land, certain technical accessories called capital."¹ The exact words might be levelled against Joan Robinson and others, who have treated Wicksell's question and yet contrived to miss the really exciting point he made.² J. B. Clark, F. Knight, H. Ellis, G. Stigler, Earl Rolph and their followers refused to accept the concept of capital turnover, among other reasons because it implies a clear distinction, which they reject, between land, which does not turn over, and capital, which does.³ Even the later Austrians were drawn into quibbling that diverted them from the core concept of capital turnover. The underconsumptionists and national income accountants of our times, who have upstaged the Austrians and won not just the galleries but most of the box seats, have found such popular favor in the discussion of cash flows that they give remarkably little heed to the capital substance which those shadows are alleged to dominate.

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¹ Selected Papers on Economic Theory, E. Lindahl, (Ed.), Cambridge: Harvard University Press, 1958, p. 185.

² Robinson, J., The Accumulation of Capital, 1958, p. 396.

³ J. B. Clark later changed his position on this point.

But, as I say, I here postulate Wicksell's capital theory, assuming whatever risks that may entail, and build from there.

About this time some readers are suspecting me of building a case for make-work policies. In one sense that is true, but I hasten to disavow the pejorative connotations. The optimistic implication of Bohm-Bawerk's and Wicksell's capital theory is that the unfettered free market has a powerful equilibrating force driving towards full employment. I accept that.

My concern is to identify the obstacles to the happy fulfillment of the promise. I am not content with Bohm-Bawerk's frictions, nor Wicksell's and Hayek's banking policy, although each plays a role. I am not content with Keynes' cash-flow analysis, which presumes that the turnover frequency of real capital is immediately responsive to spending, when in fact it is at any time largely preordained by the *Ret. Prim.* built-in durability of capital, which in turn may be the key factor determining the timing of replacement spending, and hence consumption spending. I think an important obstacle to the working of the free market's macro-economic thermostat is to be found by study of the land market as it affects the durability of capital. Let us then resume that topic.

2. Overcompensation in the United States

a. Efforts at containment and exclusion

We have already surveyed a number of conscious policies calculated to valorize land, contain labor within bounds, and worsen labor's bargaining position; and a number of subtler phenomena which might be manipulated to effect similar ends, or which might achieve the ends without conscious intent.

the Hamiltonians prevail in many areas, we give over others to the expansionists whose activities turn the terms of factor bargaining against land by bringing new supplies into the market. *- But at what price to labor?*

The most publicized current example of this ambivalence is the dissonance of our farm programs, part of them retiring good land, another part of them developing new land, and new techniques to raise yields, under heavy public subsidy. Far from being a new form of madness, however, the antipathetic farm programs are a continuation of an old pattern. In the 19th century the expansionist answer to containment and exclusion was public support for west-thrusting military action, land settlement, and internal improvement -- and there is little question of which movement prevailed. Providing employment opportunities was clearly part of the rationale. "Go West, Young Man" was not just the slogan of a journalist but the motif of what became the Republican Party. After the Civil War, indeed, the movement so far out-reached itself as to devalue not only American farm land, but European as well, breeding Populism here and protection there. In the 20th century we edged into reclamation programs. In the great depression we spoke of "compensatory investment" in public works and emphasized the spending multiplier, induced investment and secondary benefits, all compounded with appropriate blends of soil and water conservation. In our own day, "regional development" is the good word, and logrolling the means to greater land development subsidies than ever, to a degree not generally realized.

Let us look at the urban manifestations of the counter-dominance of containment and expansion. Many of the potentially best lands of our best-placed cities are, in a strict economic sense, underused, depriving

labor both of the land's full services, and the employment opportunities it could offer. I have mentioned some of the kinds of anti-economic policies that lead to this, and could expand, but let me here simply postulate the fact and placate doubters by the next paragraph.

Those who are excluded from the best lands are not, in our culture, simply pushed into the backwoods and up the steep hillsides, as in Latin America, to eke out a subsistence. It is our policy, at the national, state, and local levels, to use taxes collected from the established areas to subsidize the transportation and utility works needed to develop new lands. That is as true of urban land as of rural land.

Let us begin at the national level. Water conservation is not just a rural interest. Consider, for example, Senator Kerr's pet project to make an ocean port of that great "land-locked" emporium, Tulsa; or the effect of the Central Arizona Project on Phoenix; Isabella Dam on Bakersfield; Hoover Dam on Los Angeles; Pine Flat Dam on Hanford; Columbia Valley Dams on Portland; Ozark Dams on Springfield; etc. ad infinitum. Consider the impact of the interstate highway system on the south and west, which get more than they pay for. Consider the implications of Federal subsidy to feeder airlines serving the less advantaged cities. Consider the pattern of Federal subsidy to electric power: private power keeps the richer markets, cheap Federal power is found in some of the least economical places to distribute power. Consider the meaning of the humble postage stamp, which takes a letter across the street or the continent at a fixed price; or the interdistrict clearing service of the Federal Reserve System which lets you bank 3,000 miles away from home without extra cost.

*Guth.
Condit.*

Let us look at the state level. The pattern is well-known: the big cities subsidize the roads of the whole state. That includes "interurban" highways that are mainly expressways via which demand for central city land leaks out over new territories. Federal "interstate" highways of course do the same.

Turn to the local level. If we examine at all carefully the utility rate structures that prevail in cities we generally find the centers are subsidizing the peripheries. There is an attempt at uniformity of rates and service quality over a wide zone, even though distribution and peaking costs are lower in the center where customers are closer to each other, and the load centers, and their demands are less peaked. When new lands get utilities the owners feel abused if asked to pay for extensions from the trunks, yet they require capacity in the trunks clear back to the load centers.

The upshot of all that is that we are continually eroding the scarcity value of our best lands by subsidizing the development of new lands. On balance, I am convinced that policies of artificial scarcity of land are more than offset by policies of artificial abundance of land. We have not entirely rejected Wakefield and Hamilton -- we still give over large areas to unrealistic large-lot zoning, under-taxed speculators, tax-free institutions with excessive idle grounds, etc. But in the pulling and hauling between rival factions, the expansionists seem generally to have the better of it. In the land busts that have periodically punctured the euphoria of our expanding economy there has been land going begging. Even in periods of booming land prices, like the twenties, the buoyancy was less the result of real scarcity than a monumental speculative

miscalculation which created for many years a false sense of scarcity and served to stimulate massive new developments in overwhelming volume.

At the risk of oversimplification let me summarize the syndrome in broad strokes. Public action largely creates the framework of politics, land tenure, transportation, and utility networks that determine how much land is accessible to the market at every degree of intensity of use. Within that framework there is an artificial scarcity of land, because many localities do not rise to the potentialities created for them by Nature, and Federal and state works; and many individuals who hold underdeveloped land do not rise to the opportunities created for them by local works. But society overcompensates for this artificial scarcity, this shortfall of private enterprise, by expanding the public framework under heavy subsidy at the fringes. Thus we have, at any given time, at once an artificial scarcity within the existing framework, and an artificial abundance because the framework stretches further, and brings into the market more land, than economically justified.

This scarcity is artificial in the sense that the land is overpriced; it is being held for a rise in price. But as price depends on the margin, so too is the "new" land overpriced. So the artificial scarcity can -

3. Overcompensation as cause of unemployment

What, then might be the relation between land denial and unemployment in the United States? The crude direct relation that obtains in Latin America does not prevail here; nor is our unemployment unrelieved by intervals of prosperity, as there. The relation here is to be found, I think, in the process of overcompensation. In a word, overcompensation by land development entails freezing up a large part of the economy's capital stock in inordinately slow-yielding forms; in such forms it is less complementary to labor than when it turns faster; and from such forms it cannot be quickly recovered once a large mistake comes to light. Let us expand.

Ref. Price

a. Employment and the replacement frequency of capital

i. Replacement frequency and national income

The replacement frequency of capital I define as the number of times per annum that a capital stock is depleted and replaced (Replacements per Annum, or RPA). It is measurable roughly as the output/capital ratio. It might equally well be called the frequency or velocity or tempo, stroke, or beat of rotation, turnover, transformation, change, conversion, moving, revolving, swapping, or reciprocation of capital, and to point up analogies I will use some of those terms from time to time. Frequency is reciprocally related to Wicksell's "period of investment," an adaptation of Bohm-Bawerk's "period of production," but avoids much of the clumsiness of the last and lets us bypass the wastelands of quibbling scouted by J. B. Clark, F. Knight, N. Kaldor, F. Hayek, and others. Replacement frequency is reciprocally related to the durability of capital: the more durable the capital stock, the slower it turns over.¹

The importance of capital turnover -- and this is at the heart of *Part Prim.* my thesis -- is that it limits national output and income. If we exclude direct services, and net capital formation, all production requires some *No.* turnover of the pre-existent capital stock: that is, productive factors contribute to the stock and consume an equivalent amount of it (less *NO - wealth, yes; capital, no. In this meaning, there could never be a decreasing of stock?* their savings, which make the net capital formation.)

Let us define the product of a capital stock times its turnover frequency as the "momentum" of the stock (borrowing a physical analogy: *invalid*

¹ Cf. Robert Dorfman's entertaining analysis of the "bathtub theorem." R. Dorfman, "Waiting and the Period of Production," QJE 73:351-72 (August, 1959).

momentum is mass times velocity.) National output equals capital momentum $a = c + d + e$ plus services plus capital formation, with the momentum item being much larger than the latter two together. —?

That would be simply a truism if capital momentum were flexible and easily adjustable in response to spending changes; if the monetary symbol entirely controlled the material substance. That is implicit in modern macro-theory. The heresy for which I beseech a hearing is that the cause-effect relationship runs more the other way.

Real consumption from the capital stock is not entirely at the option of consumers as such -- that is a cardinal fallacy implicit in the "consumer determinism" that pervades much of our macro-economic analysis today. They can only consume that much of the stock which is ready to consume. Capitalists can only liquidate the liquescent. They cannot accelerate time-depreciation. Streets and houses ration out their value to consumers in stints of so much per year, and no more. Real consumption is, at any time, largely predetermined by the tempo at which existing capital has been designed to reach consumability.¹

Be consumed?
Has no bearing: how about the house or that that becomes outmoded?

¹ There are presentiments of this idea in several economists. Thus Wicksell: "If . . . more labor is available than can be employed . . . a shorter period of production . . . is adopted, and the capital which was before insufficient is now able to give employment to all workers. . . ." Value, Capital, and Rent, New York, Rinehart and Company, 1954, p. 127. See also pp. 131-33; 145-46, et passim. I am not sure that even Wicksell appreciated the macro-economic implications of the point. He treats it as an aspect of distribution theory, a means of showing how a large change in capital volume would cause an adjustment in capital durability that would minimize changes in factor prices.

And Bohm-Bawerk: ". . . any given total of present goods, be it large or small, is sufficient to purchase and remunerate the total supply of labor. . . All that is required is to bring about a corresponding contraction or extension of the production period." Positive Theory of Capital, Vol. II of Capital and Interest, So. Holland, Ill.; Libertarian Press, 1959, p. 354.

But neither these nor others have elevated the principle to the eminence I believe it deserves, and modern literature overlooks, or, occasionally, refutes it. Even developmentalists who argue for low capital/output ratios do so on other grounds and boast not their kinship with the central European neoclassics and the powerful macro-economic principle they toyed with.

Built-in durability not only limits real consumption, but in a free market it largely controls the tempo of replacement. As capital is liquidated it brings in replacement funds. In anticipation, but concurrently, capitalists hire factors to replace it. Thus money income is made available to consumers in nice synchronization with availability of consumer goods for them.

Note that the initiative does not lie with consumers as such. The determinant is the capitalist's rate of liquidation. He controls most assets, both solid and liquid. It is his decisions that make money move or not. "The consumer" as such lives from hand to mouth, and spends when he gets.

Note that capitalists' present decisions to replace are largely imposed on them by their past decisions frozen into the durability of capital. Thus a considerable part of the determination of spending is controlled, at any time, by the dead hand of yesterday. Commitment of capital to time-depreciation is irreversible. Liquidation is a function of liquescence.

Note also that public efforts to stimulate output by spending injections cannot immediately thaw out frozen real capital. That is, they cannot accelerate time-depreciation, but only depletion and use-depreciation. If circulating capital is tight, exogenous spending injections may simply inflate consumer prices, long before 'full employment' of labor is achieved.

Inflation is avoidable if the newly hired labor produces immediately consumable services, but, a) that is not the most productive use of labor and is a desperate expedient forced on us by shortage of liquid capital; and b) we have usually put labor to work in pump-priming efforts producing

the most durable kinds of public works, which in its short-run effect is the same as declaring a bonus.

Inflation is also avoidable by increase of net saving by consumers -- that is, if they let saving be forced on them by monetary expansion. In the event that consumers would so react, monetary injections might do more good than harm and help pull us from a tight spot. The timing would have to be judicious, however, and use of the device sparing, lest it simply worsen the original problem by directing more capital into too durable forms.

ii. Replacement frequency and factor proportions

Another way of looking at capital replacement frequency is as an aspect of factor proportions. As previously pointed out, we can increase the labor component in housing by shortening the life of houses, because labor is used primarily in construction, while the services of capital and land are supplied over the ensuing years. So it is with all capital. Consider a simple forestry example. We spend \$100 on regeneration labor in January, 1900, and in 1962 have stumpage value (that is, net of harvest costs) of \$600. The labor proportion is $1/6$. The longer we postpone harvest, the higher goes the stumpage, the lower goes the labor proportion in the value of the final product, and the longer we tie up capital and land in uses that deny opportunities to labor.

Suppose, instead, we put that \$100 into the wages of bakers on a busy corner without a Sunday closing law and turn it once a day. We would buy and sell \$36,500 worth of labor services in a year, coupling it with flour and other ingredients whose turnover, and capital requirement, we will for simplicity ignore. Here, with the same capital of \$100, we

*Capital pays
wages?
11/7*

are in 62 years employing $62 \times \$36,500 = \$2,263,000$ worth of labor which is 22,630 times the \$100 we spend on labor in 62 years of forestry. Clearly capital in this form, and the land underneath it, are more complementary to labor than in forestry. The labor proportion approaches 100%, and the total product is much greater.

Or, going off to the other extreme, suppose society were swept by a new mystery religion that made us build everything with maximum durability. No more ring and valve jobs: every car a Rolls-Royce; no more jerry-building; every house of steel and granite. No more frayed carpets: better a six-foot Kerman accent rug, to become an heirloom, than wall-to-wall Acrilan for 15 years. No more steel drills: diamonds or nothing. And so on.¹

What is the result? Fewer cars, fewer houses, fewer carpets, fewer drills. We pour our capital into a fraction of the usable things we now enjoy. Every object would contain locked up in itself not just the services needed today and the next few years, but for the next 100. Every object would be a great warehouse of inert capital. The keys to the warehouse would be in the hand of Father Time; man would have lost control over withdrawals.

There would be less to consume each year, and less to replace. Capital would turn slow-motion, in tempo largo. Incomes generated by replacement would be low, and real consumption correspondingly low.

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¹ Someone is bound to accuse me of advocating 'planned obsolescence,' or the broken window fallacy. I deny both charges, and have confidence that most of my readers will see the difference.

Unless incomes generated by net capital formations and services could rise to take up the slack there would be idle labor.

There would also be empty land. Let us think of capital as symbolized by rugs, and land by floorspace. Let us visualize one Kerman as equivalent to ten layers of Acrilans in a stack, and (for simplicity) also costing the same as ten Acrilans. We can thus get as many square-yard-years from one Kerman as ten Acrilans, only with the difference that the yard-years of Acrilan are rendered in parallel over one Acrilan-life, while the Kerman yard-years come in series, over ten Acrilan-lives.

If we invest in Kermans we will thus have considerably more capital requirement per yard of floor, and with a given capital we will cover much less floor than with Acrilans. The Kermans will cover better than 10% of the Acrilan space, because they do last longer, but over one Kerman-life, the average capital requirement equals five Acrilans (from ten in the first Acrilan-life down to one in the last). So the Kermans will eventually cover 20% of the space of the Acrilans, with a given capital and staggered replacement.

So with buildings on lots. The more initial capital per building, the fewer lots can have buildings. In the extreme, a fanatic society might pour most of its capital into a few pyramids built to endure through all the ages. That would concentrate the society's capital on a few highly-improved sites, leaving nothing for the rest. // 0

That makes two ways in which a low capital-replacement frequency, or high durability, reduces the employment opportunities of labor on land. It reduces the amount of land in use, as we have just seen; and, as we saw earlier, it reduces the frequency with which labor is applied

to the land that is used. Thus it simultaneously reduces the effective land supply, and substitutes land for labor.¹ At the same time, it sequesters much of the capital, hiding it under the top rug, so to speak; and substitutes capital for labor.

It would be fascinating and useful to extend such speculations into a systematic tableau. The role of the replacement frequency of real capital in national income determination has yet to be developed, and it would modify substantially the present doctrines prevailing in that field. That at least is my heresy. But, the main points having been sketched out, let us move on.

b. Overcompensatory territorial expansion and capital turnover

Next let us look into the effects of disorderly overcompensatory territorial expansion on capital turnover or replacement frequency. Note the word "disorderly." It refers to the kind of counterdominant expansion we actually get, with Hamiltonian policies suppressing development in some areas and expansionist subsidies forcing growth in other, frequently less favored areas; with land speculation running riot in growth areas, scattering development over several times the area actually needed and necessitating huge investments in transportation and utility networks to link together the pieces. Let us call it the containment-expansion syndrome, or ambiversion.

The effects are complex and elusive, the more so when we add the dynamic factors. But at least two large negative effects on capital

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¹ The great advance of Wicksell over Bohm-Bawerk was to show that long periods between replacement tied up not only capital but land; that the land input was a function of time parallel to the capital input, and not as Bohm-Bawerk treated it, a function of replacement parallel to labor.

replacement frequency stand out: the large commitment of capital to durable land-substitutes and public works: and the reduced unit cost of land (a point hard to accept in the present conjuncture) which eases one important stimulus to high replacement frequency.

1. Social overhead capital

Begin with the first. Capital replacement is tightly linked to the land question for the obvious reason that replacement requires a place, a site. As owners recover capital from old buildings they do not reinvest it in situ because the site remains occupied by the old building, bled of its value but not of its preemptiveness. Buildings are not like cracker boxes on the grocer's shelves, which when liquidated, make shelf space for new boxes. They are like cracker boxes on the kitchen shelf which preempt the same space empty as full.

Those facts alone do not doom us to perpetual migration. One economic function of land prices is to incite landowners to demolish old cracker boxes to provide places for reinvestment. Even ideally the renewal frequency of sites would be slower than the replacement frequency of capital, but yet a balance would be reached where yearly demolition released enough sites for the capital recovered from standing buildings to find places on which to be replaced.

We have never reached such an orderly equilibrium. We do keep migrating. One reason for that is growth, but a greater factor is simply *the value of housing increases yearly* migration of existing capital in a pattern dominated by the containment-expansion ambiversion.

Public policy is biased against site renewal, so renewal cannot proceed at an economic pace. Sites with old buildings are subsidized

in many ways. Taxes are low. Grandfather clauses permit code violations not vouchsafed to new buildings. Welfare payments to slum dwellers assure steady rent payments. And so on. A new building means higher property taxes, stricter code enforcement, loss of welfare payments, higher income and excise taxes on occupants, etc. Let us take simply the tax on buildings to represent those many factors.

Public policy thus ties up sites under old buildings longer than unbiassed market forces would dictate, and after the capital has been recovered from the buildings. It creates an artificial shortage of "places" on which to replace capital, as though the grocer sold the crackers and let the empty boxes clog his shelves. There are then two major choices: non-replacement and stagnation; or migration.¹ We have chosen the second.

Migration in preference to renewal would increase the need for social overhead capital even if new settlements were compact, but that is not the half of it. New settlement is sprawled over counties and states in chaos so extreme that there are no longer many so captious or complacent to deny the obvious -- and that is an extremity.

Social capital requirements for this kind of land settlement are much greater than for compact settlement. Most obviously, mileage requirements per capita are much higher for transportation and utility networks. The capital is also required in durable forms of below-average replacement frequency.

Let us expand the latter point, which has several aspects.

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¹ And a minor choice, remodeling, which we ignore here.

One aspect is that when capital is used to substitute for land, much of it is cast into forms that resemble land -- and one trait of land is high durability. Land fill is an example. The work once done is likely to last so long that for practical purposes it is perpetual. Investors determining the optimal extent and intensity of such works, therefore, will rationally carry them to the point where investments yield only interest, and no recovery of capital at all.

Land fills are the prototype for much land-substitutive investment. Land reclamation work typically involves a high component of such durable capital: exploration and survey and prospecting, dams, roadbeds, cuts and fills, levelling, draining, clearing, earth-moving of all kinds. Land conservation work also invests capital in very durable forms. Where an investment prevents irreversible damage to aquifers, fisheries, etc., part of the investment can be regarded as yielding perpetual income and need never be recovered.¹

If we substitute for urban land by going up, taller buildings must generally require more massive foundations and higher durability.

If we substitute by going out, we build bridges, overpasses, roadbeds, pipelines, and related durable capital. Public capital which is invested in transportation-utility networks is very durable for a cause in addition to the nature of the capital. Public developmental capital often yields little direct revenue, or less than enough to pay its cost. It finds its economic and political vindications, wholly or partly, in

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¹ Wicksell described such perdurable capital as "rent-goods" and classed them with land, which never turns over. He probably overdid it, but the general point is relevant here.

the enhanced value of the land it serves and links with the market. The land is permanent. Therefore the need for the capital is as assuredly permanent as is possible in this uncertain world, and it makes sense to build great durability into the developmental works.

Add to that the public bodies are sheltered in several ways from the yardstick of market interest rates, and discount future values much more lightly than do private citizens, and you have some notion of what a sinkhole for capital public developmental works are. The investments may be productive, but capital turnover slows to a crawl.

The only kind of land-substitution that would in general increase capital turnover is faster renewal frequency of sites already developed, but that is the kind that whose suppression was the postulate of our analysis.

A second aspect of the problem is that much of social overhead capital yields no direct revenue, and so generates no replacement funds, however fast it may need replacement. That is not to say the public capital is not justified. As we have just noted, its payoff is in enhanced land values. However, the increment to land value is to the owner as income, causing him to increase his consumption. Increased ordinary income from the enhanced land can replace income from other investments and permits their liquidation for consumption. Thus society's capital becomes landowners' income and is disinvested, even if the investment was well-conceived (which is not always the case).

Now it is true that society later recoups its capital by increased taxes. But the taxes do not come from landowners as such. They come from that fraction of landowners who install taxable capital on their

land, and there generate taxable sales and income. Or they come from state and federal taxpayers outside the area. Thus they do little to damp the immediate rise of land prices, a "floating value" hovering about on angel wings, which, indeed, typically blesses more land than will ultimately be developed intensively or soon enough to warrant it.

That means that whereas recoupment is deferred, pending the development of tax bases other than land values, the land price increments, and putative corresponding disinvestment of equivalent landowners' assets, accompany or precede construction. Sometimes there is no recoupment -- recall the bankruptcy of states after 1836, and of municipalities under the Municipal Bankruptcy Act of 1935. Recall the Bureau of Reclamation's initial ten-year "revolving fund," which might be six revolutions old in 1962 had it ever completed the first.

Sometimes the public debt is funded permanently -- again no recoupment. Sometimes the developmental investments are both private and misguided, like the assets frozen in 1929 subdivisions, a pure loss of social capital. But at best there is a lag between the immediate gratification of landowners and the deferred penance of taxpayers, during which the national pool of capital is drawn down.

The point must be qualified because landowners' marginal propensity to consume from unrealized land price increments may not be the same as from ordinary income. But that question we must leave to some other toiler in the vineyards, and press on.

ii. Capital on private land

Now let us take up the second negative effect of overcompensatory territorial expansion on capital turnover. That is the cheapening of central land and consequent easing of one economic constraint on the

lavish use of time to substitute for labor.

Some readers are wondering how we move so easily from talk of enhancing land to talk of cheapening land. It is partly that we are speaking of different lands. Bringing farm land into the urban sphere raises the price of specific lands, by changing their use, but at the same time it tends to lower the unit value of urban land by increasing the supply. It is also partly that we are dealing with a cycle, beginning with scarcity, leading to massive substitution and new development, culminating in a decline. The cycle is too complex for more than sketchy treatment here. But first let us establish the effect of low unit land rents and prices on renewal and replacement frequency.

For that, it is best to begin again with a forestry example. Cutting cycles, or forest "rotations," are much quicker on dearer forest land than on marginal land. That is partly because trees grow faster there, but it also is because the land is scarce and there is an economic pressure -- rent -- to release the land from a maturing crop, and begin the next crop. Rent on forest land advances harvest and regeneration earlier than they would come without it.

Similarly, farmers hurry cattle off to market earlier when land is scarce. Merchants clear their shelves faster where shelf space is dearer -- in effect, they expand in the 4th or time dimension to compensate for shortage of the first three. Motorists remove their cars sooner when parking fees are higher. Water masters release water sooner when their reservoirs are limited.

And so on. Land rent is, like interest on capital, a cost that is a function of time. Like interest, it introduces a note of urgency into all economic calculation.

How, then, must the development of excess land capacity by subsidized public works affect the turnover of capital on private land? It seems to me unavoidable that in the long run it must lower unit rents, and slow turnover. I know the point is obscured by cyclical gyrations, whereby the tendency of territorial expansion to lower unit rents is lost in the contagious enthusiasms and Malthusian anxieties of a land boom, and where the dynamic influence of rising land prices does queer things to investors' incentives. But, if we look far enough back in history -- no farther than 1929, in fact -- the development of excess land-capacity and decline of unit values is a clear result of compensatory overexpansion.

The point is also obscured by the thought that, although unit rents are lower, capital can spread over more units. Our equimarginal economic instincts should tell us, though, that that is a tempering factor rather than a completely offsetting one. Cheaper land relaxes the economic constraint on lavish land use both in space and time. If there were no spatial expansion, the whole effect would be manifest in temporal expansion, or slower renewal. And if there were no temporal expansion the whole effect would be in spatial expansion. But in fact the adjustment proceeds in both dimensions, to a new equilibrium marked by less capital per standard acre, and longer renewal periods.

Some readers may object that my forestry, cattle, and inventory examples dealt with appreciating capital and would not apply to depreciating capital like buildings. But, if we wish, we can analyze buildings as though they were composed of appreciating parts. Let us conceive of a 50 year building as an annulose nest of 50 one-year buildings. Each year the house sheds its outermost annulus, as a snake its skin. The

innermost or 50th house has a small value in year zero, but appreciates as it reaches the surface, just as though it were a living thing.¹

Now it might seem that capital is saving on land by layering or nesting up this way. But if we give the 50th house a 'free ride' for 49 years by charging land rent off against the other houses as they are consecutively consumed, then we must charge a full year's rent in the 50th year, to the 50th house. It preempts the site, that year, from its best future use, and must cover that rent cost before anything remains to impute to the 50th house as such.

The higher is that rent, the less incentive there is to build that 50th year into the house in the first place; that is, the lower is the present value, in year zero, of house number 50. Thus with depreciating capital as well as appreciating the principle holds that rent penalizes durability, and quickens capital turnover.

That is not to say that rent reduces the capital installed on a site. Rent softens, or lowers the durability of capital, but it tends to increase the initial volume of capital per unit land by constraining the excessive use of land-space by capital. Thus rent tends to increase both the mass of initial capital per site, and its replacement frequency. In the terminology of Hansen and Hawtrey, it causes a 'widening' of capital

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¹ There are still important differences between appreciating and depreciating capital. One is that with growing capital there is more latitude for adjusting the replacement frequency late in the cycle. One cannot turn trees back into chicks, but one can cut them sooner or later. Another difference is that growing capital has a salvage value, so interest on the capital is an important time-cost as maturity approaches, while with depreciating capital there is no salvage value except the site, and rent determines clearance timing by itself.

In either case, however, rent serves to quicken the liquidation rate that is built into capital ab initio.

and an 'undeeptening' (of the time-dimension.)¹ Thus it tends doubly to increase what we have called the 'momentum' of capital (volume x turnover) on given private lands. Thus it increases opportunities for labor there, for capital momentum equals the input of hired factors.

The upshot then is that compensatory territorial overexpansion tends to retard the replacement frequency of capital in two ways: first, by locking up capital in slow-moving public works; and second, by cheapening private lands and so slowing replacement frequency there. Note the word "overexpansion." I am not saying expansion is always wrong, as we store up new capital and spawn new people. There must be an optimum here, as in everything. Only that optimum is so remote from the mess we are in today that for the present paper I will rest with the conclusion we would benefit from territorial contraction.

What we have shown here is that territorial expansion, especially the disorderly kind we practice, is a poor substitute for optimizing the use of land already contained within the peripheries of our transportation-utility networks. Sustained full employment is not to be found in spasms of expansion, but in continual economy and renewal of the best sites.

iii. A glimpse at the dynamics of territorial expansion.

We have been treating a dynamic situation in terms that might be described as comparative statics. That is necessary in a brief survey, in which we cannot begin to do justice to the dynamics of the subject,

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¹ Wicksell, who used this kind of terminology earlier, also used 'height' to represent prolongation, and horizontal length to represent volume. The analogy is confusing, I think, and not at all mnemonic. I much prefer to describe the temporal aspect in temporal terms like frequency, tempo, etc.

the transitions between positions. Let us here at least try to sketch some dynamic phenomena, without which the statics are not always plausible. Two transitional factors worth emphasizing are changes of land prices, and capital flows.

Urban expansion may tend to lower average unit prices of urban land, but as noted before, it raises prices of newly urbanized lands. The rising of price evokes opposite responses from different groups. It causes some speculators to sit on idle land for years. But it draws a positive response from some builders, to whom land is just another raw material which they turn over nearly as fast as the other materials in a house. The prospect that materials will appreciate in one's hands is a lucrative adjunct and a stimulus to any business. It is, however, a speculative stimulus which forces growth rather than just facilitate it. Without formal proof, it seems likely that it overstimulates building and commits more capital to this durable form than would be optimal.

Thus rising land prices both stimulate overbuilding and broadcast it over areas much wider than those actually built on. New transportation-utility networks are required for both the new buildings and thereby, unavoidably, for the empty spaces between. Thus the rising land prices that attend supersession of land uses tend doubly to retard the replacement frequency of capital.

Capital requirements are very high, which is another way of saying there are abundant investment opportunities in urban expansion. Overpricing of land has been accused of choking off investment opportunities, but overpricing of the best lands creates other sorts of opportunities for the development of substitute lands. The problem, it seems to me, is

not that investment opportunities simply disappear, but that they move farther and farther away from the ultimate consumer, requiring more capital than society can muster. If we increase the capital requirements of production, then production cannot increase as fast as we create new capital.¹

It is also unavoidable that some day the overpriced land will seek a market. Then the problem becomes not finding investment outlets, but finding capital to improve all that land, and finding demand for its services. There is a certain contradiction in an economy's undertaking concurrently to spread its capital over more land, and to retard its turnover. The danger is that we start more than we can finish.

Whence comes the capital for territorial expansion? Net new capital formation supplies some, but, directly or indirectly, a large share must come from recovery of capital from older buildings elsewhere. These yield up a surplus because old sites are not renewed as buildings depreciate.

In the early years of a land cycle, peripheral growth areas typically import capital from older areas. Among other effects, that capital flow tips the terms of trade in favor of the growth area -- a familiar principle of international finance. It tends thereby to generate expectations in the growth area more favorable than can be sustained, and virtually guarantees that some of the oversanguine investments of the growth period will never be turned over, but languish pending in perpetuity.

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¹ Harrod's assumption of a fixed "Relation" between capital and output thus assumes away this sort of barrier to growth, and disqualifies his theory from shedding much light on some of the key issues in economic growth.

The growing fringe of an expanding economy does not feed on the country, like a grass fire. It draws its sustenance from the older center. But as it sucks the center dry, the center begins to demand capital too, for renewal. That worsens the terms of trade of growth areas, presaging trouble recovering all the capital committed there. It adds to the already excessive capital requirements imposed by disorderly expansion.

Thus the demand for disposable capital rises high. Now, what of supply? Supply does not run dry simply because the older buildings are exhausted of value. Their value has been stored up in newer buildings of the earlier boom, which buildings are now themselves yielding up their value for reinvestment. There may be some "echo effect" from irregular amortization patterns inherited from earlier booms. There is probably a slowdown of capital recoveries because investments of the early boom were too slow-turning -- that we have already mentioned. Now let us sketch out the effects of a dynamic factor, the rise of land prices, which as much as any influence is responsible for a shortfall of capital supply.

When, as a building depreciates, the land under it appreciates an equal amount, the owner is spared any need to reinvest the proceeds to maintain his assets. He may regard as net income everything the building yields to him. If he wanted to make two steps of it he could deduct depreciation and then add the land increment, but it would come to the same thing. Thus the rise of land prices destroys capital.

But how is it that land prices rise if, as I allege, we are developing excess land-capacity? There are several causes, and in their analysis we can identify another way that rising land prices destroy capital.

I have mentioned supersession: specific lands shift to higher uses. Another cause is the speculative fever, which defies rational analysis but is an observable and substantial factor in boom land markets. A third cause is the increase of optimal area of land units, which pushes the marginal value of land for expansion up above the whole-unit value.

A fourth cause, of especial interest here, I will call the concentric ring effect. There is not just one front of territorial expansion, neatly defined. There are as many fronts as there are different intensities of land use, and many of them are hard to find because of the intermingling of land uses. Now as developmental works expand, and land loses scarcity in its present use, it often gains the prospect of higher use.

Say we bring on the market more land for citrus. That devalues old citrus land -- for citrus. Meantime a city is expanding, however, and residential value supersedes citrus value, at least over some areas. Residential expansion tends to devalue old residential land -- for residences. Meantime commerce is expanding, however, and freeways and industry and schools and institutions, and those values supersede residential value in many areas. And so on.

Even if type of use does not change radically, any rise of land prices imposes some locational obsolescence on buildings. Residences that were appropriate to \$500 lots ill become \$7,000 ones, even if they are the same lots.

How does locational obsolescence destroy capital? Let us revert, for the moment, from true dynamics to comparative statics. If the value of land in its best future use -- its "expectation value," as the foresters say -- if that value rises while the value of the present

land-building package does not, the value of the building is impaired. It is pirated, so to speak, by the land.

The effect of that on capital recovery is evident if we suppose land expectation value to have risen to equal the present land-building package value, so that nothing but a little inertia delays demolition. Then all the yields of the building are net income. There is no depreciation. The owner can consume it all without a qualm.

That is the extreme case, to illustrate the point. In general, land expectation value rises to pirate away only part of the building value. The part so pirated ceases to depreciate. Its gross yield becomes net income.

This effect is not dynamic. It is not due to rising land prices. It is due to their having risen. It is in addition to the dynamic movement in its effect.

The effect of each is to destroy capital. The gross yields from buildings, orchards, and other improvements fixed to land, that might have been reinvested to meet the demand for capital, become largely income and are consumed.

The effect of high land values is not entirely bad. High land values generally tend to promote quicker-turning new investments, and the high land values of the late boom do that. But the timing is unfortunate. High land values promote not just fast capital, but lots of it -- more per acre. Coming as they do at a time of worsening capital shortage, they aggravate the problem and help to bring it to a crisis before their faster return of capital can be much help.

If high rents and land prices could be sustained they could serve a very constructive role, inciting owners to apply capital heavily and frequently. But land prices cannot, under conditions as described, be sustained. There is not enough capital to finish improving all the land as soon and as intensively as would be appropriate to the high prices.

With much capital destroyed, and much other capital frozen or viscous in half-finished land developments, expansion must finally grind to a halt from shortage of disposable capital. The lyrics of "How the heck can you work when there's no work to do" are heard again in the land.

The role of land prices in the sequence has been in several ways to expand demands for disposable capital, but to contract the supply by indisposing or freezing some capital, and pirating and destroying other. Now, as the resulting shortage of disposable capital brings a crisis of high interest rates, land values must pay the penalty for their mischief. High interest rates erode land prices both by lowering the share of gross income imputable to land, and raising the rate at which the rent is capitalized. Land values also suffer from higher local taxes, as municipalities struggle to meet the high commitments assumed in the earlier flush of growth. Land values suffer from depressed expectations, as financing of promised developmental works grows harder, and voters revive the habit of rejecting bond issues.

The prospect of falling land prices is as depressing to builders as the earlier rise was stimulating, and that, coupled with tight capital, chokes off building. Asking prices tend to lag behind bids in such times, and a long period of attrition set in with few transfers. The fall of land collateral staggers financial institutions, and the stage is set for a cumulative downspin.

The downspin may be aggravated or meliorated by the handling of monetary and fiscal policy, but monetary machinations alone cannot thaw out frozen capital. We can make money, and make money turn, yes, but merely turning money does not turn real capital. We can use the fiscal and monetary powers of government to force the creation of new circulating capital, and that would speed recovery. But in the main we must let the passage of time free the bulk of our capital, and pray we do not then use it to build pyramids.

I will not say that new land development does not for a time employ labor. It is better than complete stagnation. Once in a generation or so, to pick up our capital from one place and lay it down somewhere else does employ labor. But how much better it would be to move it enough quicker, and more regularly, to afford steady employment at higher wages.

iv. Replacement frequency and the acceleration principle
of J. M. Clark

The unstabilizing effect of change in growth rate is directly proportional to the durability of a capital stock. If we are replacing 5% of our houses yearly, and adding 1%, then growth is $1/6$ of housing production and can halve or double without cataclysmic effects on the whole. But if we are replacing 1% and adding 1%, then growth is half the whole, and changes in growth rate are seriously unstabilizing.

That is, I believe, the simple essence of what is called the acceleration principle. Certainly it was what J. M. Clark stressed in his original article on the principle. Some later expositors seem to have gotten away

from the main point,¹ so I refer to it as Clark's acceleration principle. The bearing of the principle on our subject is so obvious I will merely call attention to it: a low replacement frequency of capital, along with its other drawbacks, aggravates the problem of economic instability.

v. Territorial expansion and adoption of innovations

If expansion does not help employment directly, it does accelerate adoption of new techniques and so forestall stagnation, so the argument goes. But it seems to me quite obvious that that which slows capital replacement is no friend of innovation.

We hear many theories these days about how to transform primitive cultures into modern, and much worry about modernizing our own capital. The goals would be much more attainable, it seems to me, with an advanced turnover tempo. Every time capital is replaced it can be completely transformed, but if it lasts 80 years it cannot be the least altered during the period. Quick change of capital is not a sufficient condition for speedy innovation, but none is more necessary. Given the other conditions, one might almost say that the rate of adoption of innovations is a simple direct function of the rate of replacement.

Far be it for me to deny the important truths of the Turner thesis. The venturesome frontiersman, freed from binding traditions and stultifying prejudices, goes back to direct observation of Nature and adopts innovations before his book-blinded Eastern cousins. My plea is that we

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¹ It is common for them to emphasize a sort of "crack-the-whip" principle, where small percentage changes in "consumer goods industries" bring large changes in the "capital goods industries." The distinction is suggestive, but too vague. Durability is the essence, and durable consumer goods, like houses and seaside resorts, are much more subject to acceleration gyrations than are soft capital goods like feed grains or potter's clay.

modify our institutions (and perhaps even our books!) so that those pioneers need not turn away from the rest of us in order to innovate. For in removing themselves they also remove more than their aliquot share of our capital, and retard its future turning tempo. Thus, while pioneering seems to be associated with mobility and change, and while it is, as I have mentioned, an improvement over sedentary stagnation, it retards the evolution of capital by lengthening the period between generations, and renders the economy less progressive, less adaptable, more ponderous, more clumsy, more sprawling, and more vulnerable to any nimble competitor in peace or war.

4. Land taxation as an alternative to territorial expansion

Finally, we turn to policy. How best to quicken replacement? In general the answer must lie in raising the costs of time relative to the costs of replacement: in making it costlier for capital to stand still, and cheaper to revolve.

The later Austrians have stressed the Ricardo effect, and the need to lower wage rates and raise interest rates. Formally I must concede and confirm their reasoning, but I question the Leavy emphasis on the villainy of workers. Overpricing of organized labor is a problem, I agree, and Wicksell's capital theory can be used to demonstrate a remarkably high elasticity of demand for labor because a small drop in wage rates raises the relative attractiveness of short over long investments, quickens capital turnover, and thereby substitutes labor for capital and land. But if one's ultimate goal is to increase the rewards of human labor there is something unconvincing about insisting that the first step must always be to reduce them. I do not condone Jimmy Hoffa, or even Walter Reuther,

but I think we can leave them in peace for a bit and at least begin breaking the capital-labor deadlock by giving our attention to fiscal policy and the land question.

I also question the Austrians' heavy emphasis on interest rates. On first blush, nothing is more plausible than that high interest rates speed replacement, and so they do in any partial analysis. Here, however, I refer back to the principle that replacement requires a place, and site renewal is slower than capital turnover. High interest rates alone will speed capital replacement, but not site clearing and renewal. Indeed, they will probably retard site renewal by lowering the net rent expectable from sites in their best future use. They also may weaken the impact of whatever land taxes are levied, by raising capitalization rates and lowering the land price which is the tax base.

High interest rates alone, therefore, lead capital to migrate. Capital migration, as we have emphasized, leads to the very thing we are seeking to avoid, a lengthening of the Austrian "period of production." One might truly say that lengthening supply lines in space also lengthens them in time.

Whether the negative effects of migration would outweigh the positive effects of higher interest rates, or simply temper them, I will not try in general to say. I do insist that we can speed turnover more surely by raising the time-cost of holding land, which accelerates both capital replacement and site renewal.

Recall the syndrome summarized earlier. There is at any time an artificial scarcity of land, within the framework of public works, because the market somehow fails to incite landowners and municipalities

to rise to their opportunities. At the same time there is an artificial abundance of land because the public works are overextended. The obvious solution is to use the excess land capacity, rather than add to it; to apply more capital to underused private lands, where it will turn fast, rather than into more public works where it may never turn at all.

Toward that end the most effective policy would be to increase taxes levied on the base of the expectation value of land. Such land taxes help in several ways.

It is tempting simply to say they make it costlier to hold land each year. While that is the upshot of it, the truth is not quite that simple or directly reached. Land taxes are capitalized into lower land prices, and to the extent that they increase tax costs they tend also to lower the base on which interest costs are reckoned. Interest, whether explicit or implicit, on the price of a land title is the major yearly cost of holding title. Land taxes tend to replace the interest cost by a tax cost, rather than to heap the latter on the former. Their impact comes in other ways, therefore, than in a general and simple sense raising the yearly cost of holding land.

One way is that, for many landowners, land taxes replace an implicit charge by an explicit one. Those who borrow to buy land pay explicit interest, but self-financed landowners do not. Now, it is a wonderful thing that the science of economics has given us the notion of an alternative use as a cost, and we all chafe at students and occasional colleagues who don't get the point. But when we observe the behavior of actual landowners, it is hard to avoid the conclusion that many of them don't get the point either. The lag between stimulus and response

in land markets is measured in generations, when there is only the implicit cost of alternative uses to activate the inert.

Like Alexander Hamilton with our public lands, many landholders are content with the rise of their lands' expectation values and collateral values, asking nothing by way of ordinary income that would require that they bestir themselves. They do not hasten to improve the opportunities showered on them by developmental public works, experiment station research, cheaper inputs, or shifts in demand. There are some leaders who do adapt quickly, but those who do not adapt, neither do they perish. They are not even asked to move over. The procession of laggards straggles out over decades.

An explicit tax charge, by contrast, applies leverage to all landowners, just as corporate bondholders apply leverage to equity holders. The higher the land tax, the higher the percentage gain from any given absolute gain such as would follow from bringing land up to its highest and best current use; the higher the percentage loss from holding back. Opportunity alone is enough to bestir the most enterprising landowners; explicit mortgage payments incite many more. Those who are neither enterprising nor in debt, or whose enterprise takes the perverse form of holding land for the rise, need to feel some more universal sort of constraint to scrub or get out of the tub. Land taxes supply the needed leverage.

Related to the leverage effect is what I will call the "in rem effect." Land taxes are levied on a thing (rem), a site, regardless of who owns it. Interest rates on the other hand are in personam, they vary with persons, because borrowers and lenders are always partly

insulated from one another by credit rationing and the high cost and risk of making loans. There is no one "market" rate of interest, but a spectrum, not to mention differences in other important conditions of loans. Slow-moving landholders, by and large, are those on whom interest costs fall lightly, usually in the form of implicit opportunity costs.

The in rem effect occurs when we substitute the in rem tax cost for the in personam interest cost by raising land taxes. Well-financed landholders do find their holding costs increased, because the impersonal tax rate is higher than their personal interest rates. These landholders are the ones who have been dawdling with redundant lands -- who else could afford to?

So the land tax does make it costlier to hold land where it counts, that is for the well-financed. It doesn't affect everyone that way. The weakly financed, indeed, find it cheaper to hold land, as tax capitalization makes land prices fall by a greater percentage than the ratio of the increased tax rate to their high internal or in personam interest rates.

Without land taxes, we rely on implicit interest charges to make landholders feel the full social costs of preempting land from others who need it. Because interest rates are in personam, the well-financed are sheltered from feeling the full yearly cost. The full yearly cost is the marginal net value product of a year's land-time in the hands of some nearby landholder whose holding is overmanned, overequipped, and undersized, and who cannot buy more land because of weak finances.

One might question the probability of weakly financed persons' lands' being "overequipped." They often are. Weak finances handicap one in

buying all assets, but the handicap increases with their durability, and declines with their replacement frequency. Since land never turns over (zero replacement frequency) there is no asset in whose purchase financial strength, or waiting power, is so important. So land generally makes up a smaller proportion of the total assets of the weakly financed. That means that, if they own land at all, they tend to combine it with more capital equipment per standard acre.

The capital of the weakly financed also tends to turn faster because of their low waiting power. That means they do more volume per dollar of capital than do the well-financed, and therefore, a fortiori, more volume per standard acre.

With heavy land taxes, land ceases to be preserved for the financially strong. It becomes something one can hire and pay for from year to year. The competition of the weakly financed, now held in abeyance, is thus brought full to bear on the well-financed. As the latter finally feel the true social cost as a personal cost they are constrained either to use their excess lands better or to release them to someone else who will apply capital ^{more heavily} heavier and oftener.

Thus land taxes let us employ our capital and labor on less land than now. That in itself shortens mileage requirements of transportation-utility networks, and reduces social requirements for durable social overhead capital. It also promotes closer clustering of land users -- indeed, it is not easy always to separate the two effects. Wherever there is a premium on central location, land taxes will rise toward the center or 100% location and serve as a sort of mandatory injunction that the best lands be used first and heaviest. There will be no doughnut-shaped

cities, no haphazard sprawl and straggle, but a focussing of production, storage, and exchange in centers of maximum mutual accessibility. Social overhead is minimized and capital released for faster-turning uses on private land.

Heavy differential taxation of favored central land should also help relieve much of the political pressure to subsidize transport-utility extensions onto uneconomic peripheral lands. Much of the animus behind such subsidies is the desire in some very crude sense to treat all landowners equally, to spread thin the economic rent that tends to concentrate in a very few centers and a very few hands. When we levy on those concentrated central rents we solve the problem of distributive equity in a simple direct way without needing to waste the nation's capital extending sops to the disinherited. Nor will peripheral landholders seek extramarginal extensions so eagerly when higher land taxes would accompany them.

Finally, land taxes help speed capital turnover by letting us reduce other taxes. The taxes most obviously unfriendly to turnover are turnover taxes. Excise taxes hit capital each time it moves, but leave it in peace when it lies sequestered and still. It is an anomaly in the later Austrians, whom in some ways obviously I follow, that they admire sales taxes, which obviously I do not. To escape sales taxes, capital will tend to move in longer "periods of production."

Income taxes, too, seem biassed against capital rotation, although probably not to the same degree. If I turn my capital slower, my taxable realized income is longer deferred. If I play my cards right I get long-term capital gains treatment. I couple my capital with fewer other

income-receiving factors, including my own labor, and so in a sense reduce the tax liability associated with the capital. I receive tax-free implicit interest income from my durable consumer goods. And so on.

The tax on buildings is harder to evaluate. On balance, I think it tends to slow turnover. Like high interest rates, building taxes cut into the net income imputable to land in its best future use, lower the expectation value of land, and in that way ease the pressure to renew sites.

Building taxes resemble interest rates in many ways. Most of what we said of higher interest rates applies here, also. In any partial analysis, building taxes would seem to discourage adding to present value in order to add to remote future revenues. The tax hits the added value once a year until it is finally recouped. In that way the tax discourages slow turnover.

But building taxes also slow down site renewal. Therefore they tend to raise the amount by which capital replacement frequency outspeeds site renewal frequency. They foster longevity without durability. Thus they leave slums uncleared, accelerate capital migration, worsen urban sprawl, extend the slow-turning social overhead sector, and so on.

Building taxes also seem calculated to discourage new capital formation, in which regard they are not entirely parallel to higher interest rates. They also discourage quality, as distinct from durability, in building, and that hardly seems salutary.

Building taxes do seem less odious than excise taxes, which are clearly the worst of the lot. With limited short-run choices, therefore, in the heat of politics, there is much to be said for the general property tax which penalizes capital for standing still rather than for moving.

But there is more to be said for a simple tax on the expectation value of land, exempting capital altogether.

Severance taxes fall roughly in the same class with excises. They tend to defer the extraction of geological funds, and extend the time during which the lower layers are locked in sterile cold storage, and they do it without any compensating stimulus to private exploration.

Severance taxes seem generally premised on the revived hyper-Malthusian philosophy that is only now beginning to run its course in the United States. The recent work by Landsberg, Fischman, and Fisher will go far to help lay Malthus to rest for our generation, and it would seem time to reverse the shift away from ad valorem to severance taxes on geological funds.

There is a conservationist role for severance taxes, I believe, in the late years of mines, to preclude disorderly looting and abandonment. But there is some danger of our forgetting the constructive role of ad valorem taxes in the early years of mines, to accelerate the fructification of a sterile stockpile of potential value. Geological funds are the material vehicle which labor requires to create capital. There are adequate market incentives to reserve much of them for the future without adding a fiscal bias to the restrictive bias of cartels, conferences, and commissions we already have.

Conclusion

In this paper I try to show how land policy bears on labor employment, and how taxes levied on the expectation value of land would help to make land and capital more complementary to labor. The exposition is often elliptical, from having many assertions in a small space. There is a

need for formally explicating the mathematical models that are in my mind as I draw many conclusions in literary form. Many of my allegations need empirical fortification.

There is an especial need to translate the macro-economics of replacement frequency into the received Keynesian terminology. Keynes made that difficult by setting up his language so as to subsume and obscure capital replacement, by describing "consumption" as an income-creating expenditure. In fact, it is the replacement of what is consumed that generates money income. Current orthodoxy does not contemplate that replacement frequency might be anything but a complaisant dependent variable, a function of spending. It is my position that it is the replacement of what-is-expected-to-be-consumed-because-it-has-become-consumable that holds the initiative and taps the beat in the circular flow of payments; that slow-moving money is the result more than the cause of slow-moving real capital. Obviously such a departure from the law and the prophets¹ demands more defense than it has received here.

I hope my colleagues will recognize this as the exploratory introduction of a more intensive work, and indulge my desire to benefit at this formative stage from their criticism.

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¹ I do not imply that all economists are overlooking the matter. E. D. Domar in 1957 suggested the use of gross investment in macro-economic models, to handle the replacement question. (Essays in the Theory of Economic Growth, New York: Oxford University Press, 1957, p. 33.) George Terborgh has given us some interesting material on replacement and employment, but without signaling its full importance. (Bogey of Economic Maturity, Chicago: M. A. P. F., 1945, Chapter VII.) I have already cited Robert Dorfman. R. C. Blitz has two recent articles of interest. And so on.

Despite all the need of embroidery, however, the basic thesis can be summarized in a few words. There are simultaneously both an artificial scarcity of land, and an artificial abundance: the scarcity because private lands "under the ditch" do not take full advantage of the ditch; the abundance because ditches are then uneconomically extended under subsidy. That retards the turning tempo of our capital stock, which in turn limits income and employment.

Land use can best be consolidated, and the capital tempo quickened, by levying more of our taxes on the base of the expectation value of land, and fewer taxes on the movement and activity of capital. To that kind of conducting, the capital instruments in the economic symphony will respond with a rising accelerando! to the tempo allegretto of full employment.