



Land Cost as an Obstacle to Achieving Scale and Other Economies in the Supply of Low-Income Housing

By Dr. Mason Gaffney

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Mason Gaffney
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LAND COST AS AN OBSTACLE TO ACHIEVING SCALE AND
OTHER ECONOMIES IN THE SUPPLY OF
LOW-INCOME HOUSING

I. Relative importance of land cost

"Zoning, utility and land improvement problems are the tough part of the business. Any fool can build a house." -- Richard Wasserman.

4 Land is the costliest single input in house building. A fully improved vacant lot in an established neighborhood of near-in suburban Milwaukee runs around \$1.50 psf or about \$13,000 for a lot 70 x 125. On this one would place a new house costing around \$30,000, for a total value of \$43,000, with the improved lot representing 30%. Farther out the cost of raw land is a much lower percentage of the package. There the cost comes in the form of utility and land improvement expenses necessary to render peripheral land a competitive substitute for inner land. In a literally marginal location the cost of raw land falls to zero, or the farm value, if any. Around every city may be found such marginal developments. We cannot conclude, however, that land cost is unimportant to these builders, and their buyers. It is to avoid land costs nearer in that they are out there, substituting capital for land. 4 Now, that would represent no problem if the latent rent-bearing land nearer-in

cc - Stockfish
cc - D. Kamm
cc - D. Hack

were all in use bearing rent, but it is not,¹ and therein lies the problem of land cost. These costs are greatly magnified by land assembly problems aggravated by the strength of holdouts; and by zoning and utility and public works policies related to land, to be considered in this paper. The costs are magnified by the failure of cities to expand neatly in compact increments well anchored to established settlement. This extra cost may fairly be laid on the doorstep of the land market which, if it were working better, would almost certainly cause improved near-in land, served by existing infrastructure with excess capacity, to be used before calling for costly investments to improve far-out land, and to link it to urban nuclei over long distances.

The relative importance of land cost is greater than its dollar value indicates. For one reason, it is rising faster than other costs.

HUD Undersecretary Robert Wood is quoted that land costs are up 80% in the last five years. (L.A. Herald-Examiner, 1-24-68). Such an average is only broadly meaningful in a market so fragmented, but it crystallizes a large set of observations from many who are involved in the current land market. It is the more meaningful because it continues a trend that was already old by 1960, when it was documented and viewed with alarm in the August 1960 issue of House & Home.

1. It would be tiresome to cite the hundreds of studies of urban sprawl now documenting this beyond question. Every land use inventory, every city planning study, shows it.

It is the more troubling because it flies in the face of a decline and weakness in building now several years old, and a level of high interest rates that should be cutting land prices in half. It bears all the marks of cost inflation despite demand deflation, a combination that can only spell trouble in any market. The causes of overpricing land are considered in (IV), below.

Another element magnifying the weight of land cost is the effort of builders to maintain some proportionality among inputs. One often hears the argument that if you pay more for land, you have less money left to build on the land. No doubt such individual cases could be found, but the necessary assumed constraints are not very general; fixed lump of money to spend, one place to spend it. In general the effect of high land price is the opposite. The principle of substitution is at work. When land price rises, one uses less of it per dollar of house: that means more house per unit of land. That in turn means either intensification--the apartment boom--or greater quality and durability--the upper-class market. Where zoning and other public controls preclude high density, that leaves just the upper-class market. Thus high land price, through its leverage on other inputs, goes far toward determining the entire character of the housing market, and producing the dissatisfactions with market performance that occasion the present study. When we had cheap land, from 1946 to 1957 or so, we had mass building for mass markets. Now we have dear land, we have neglect of mass markets, and a sea of troubles.

The power of the principle of proportionality is illustrated and confirmed by the operation of local zoning as a fiscal control device. Suburban zoning especially has as its primary objective the rejection of fiscal deficit residents, and the reservation of land for fiscal surplus producers. The fiscal surplus is produced by the property tax, and the property tax in practice is largely a tax on buildings. The suburb aims to require the involuntary consumption of more building than individuals would choose freely, in order to raise its per capita tax base.

A direct approach to this goal would call for an ordinance requiring say \$25,000 of building per family. Such cases exist, and local codes and tolerance of union cost-inflation work to the same end. But the primary control is low-density zoning, which operates entirely through the land market. By requiring each family involuntarily to consume say an acre of land, the suburb succeeds in constraining almost each family to wrap itself in a \$50,000 home, and attains its fiscal end by using the principle of proportionality and the leverage of land cost over building cost.

The leverage of land cost on the supply of low-income housing is redoubled when we consider the filtering-down process. Whatever one may think of filtering-down as a complete solution to housing for the poor, it is obviously always going to be part of the solution, and whatever obstructs the process only throws a greater load on other solutions. As the market for new homes is narrowed to the upper class, the volume of new housing available for filtering is reduced. The

suitability for filtering is also reduced--the cost of converting mansions to rooming houses is considerable and the results dubious, whereas middle-class housing filters down simply by growing older and depreciating.

Finally, higher quality upper-class homes depreciate slower than mass homes, and reach the bottom of the filter later, if at all.

? Greater durability of buildings is a theoretically necessary result of higher land price--it is part of the substitution of capital for dearer land. I present the requisite capital theory in Appendix A. (See folder B of Becker paper.) *In LRT PP 1 come to opposite conclusion!* It is also sufficiently a matter of common observation that I here assume it to be a fact. I do not allege that slow depreciation is itself a bad thing, but remember that the longevity of upper-class homes is bought at a price, the price of pouring into them more capital which would otherwise be available for more homes. So instead of two homes that filter down in 30 years, we have one that filters down in 50--a bad bargain for the lower-income group. The bargain looks worse when we add the higher infrastructure capital cost that goes with the large lot that suburbs use as the device to raise per capita land costs.

The importance of land cost is magnified, again, by the historical amplitude of the swings in its value, both up and down. In the short run, land price is not conspicuously more wobbly than other input prices, and psychologically and metaphorically land is regarded as affording stability, permanence, and security. Physically, of course, it has these qualities: So much the more misleading to the bankers of 1932,

loaded with frozen assets when they foreclosed on unresellable land; or the speculator of 1926, who thought prices only rose. There is no historical time-series of a price that swings as widely as land, percentage-wise of course. It takes a long time--the cycle period is in decades. But the historical record is there for whoever cares to consult it. And the makings of the land cycle have not been entirely reformed off the economic scene.

The land price cycle affects building in complicated ways. We have seen that high land costs cause intensification and durability. But rising land costs have an opposite effect. The yearly price increment covers part of the holding cost. Taken by itself, this factor tends to reduce intensity and durability of buildings, the more so when it is associated with expected obsolescence of buildings. This helps account for the economy's having been able to absorb multiple increases of land price over a few years.

But when prices stabilize, or turn down from high levels, increments become decrements and add to holding costs, with profound effects on incentives to build and invest in and lend money on homes.

Giant swings in land prices therefore are an unstabilizing influence on building, the like of which is known to few other industries. When this is added to the well-known sensitivity of the industry to credit availability, the peril to stability is evident. Because credit availability to home buyers is greatly affected by land values and their trend. Mortgage credit rushes into a rising land market, and out of a falling one.

Irregularity of effective demand, in turn, inflates building costs. To achieve scale economies, a builder must spread fixed costs over time as well as over the volume of any one year. Let us say that economies of longevity--of equipment, of organizations, of specialized men and know-how--are a special subclass of economies of scale. Instability destroys some of these economies. Land cost, rising and falling, is an agent responsible for part of this cost increase.

In sum, land cost is important in housing for at least these reasons: it is a large share of total cost; a bias toward overpricing contributes to urban sprawl and inflates infrastructure costs; land cost has risen disproportionately for nearly 20 years; land cost applies leverage tending to dominate the character of new housing and price out low-income people; and land cost is unstable.

II. Unique qualities of land cost and supply

A. Salvageability

The price of land is not a cost of housing supply in the same sense that other input prices are costs, because land is not exhausted over the life of a house. One does not consume land as he does bricks and boards: one uses a finite number of years from an infinite life. Land does not depreciate with use: it is fully salvageable on demolition. Land sometimes depreciates with time and neighborhood decline, but it more commonly appreciates, especially in new and developing neighborhoods where most building occurs. Land

not only yields an appreciated salvage value on demolition, it normally appreciates under the existing structure for its existing use, a gain which is realizable and bankable long before demolition. Thus, so long as further appreciation is anticipated, and buyers have the means or the cheap credit to invest in this "growth stock," the high price of land need not be as deadly to housing as otherwise. We will see later, however, that heavy reliance on perpetual appreciation to offset high land prices can be the siren song of the Lorelei. There is no historical record to support an expectation of perpetual appreciation.

There are two basic methods for making land costs commensurable with other costs. The present value method discounts all costs and incomes to time zero. The annuity method converts all to a constant or level yearly sum over a specified life. Each method has its expository value, so let us use both.

Viewing all costs as present values, the net cost (NC) of land is the present price less the discounted salvage value. If salvage value equals present price (P_0), then:

$$(1) \quad NC = P_0 [1 - (1+i)^{-L}]$$

where i is interest rate and L is Life (in years). The expression in brackets is a coefficient less than one that tells us what fraction of the present observed price is the net cost. At high i and long L the coefficient approaches unity--forget it. The present value of land

salvage is near zero. For lower values of i and L , the coefficient is easily evaluated from standard tables of compound interest, or from the rule of thumb that money at compound interest doubles every $\frac{.72}{i}$ years.² Table I presents a number of values, for different Lives (L) and interest rates (i). Note the sensitivity of the coefficient to these variables:

Table I
Values of land salvage coefficient $[1 - (1+i)^{-L}]$
for range of values of i and L

$i \backslash L$	10	20	30	40	50	60	70
.03	.26	.45	.58	.69	.77	.83	.87
.05	.39	.62	.77	.86	.91	.95	.97
.07	.49	.74	.87	.93	.97	.99	.99
.10	.62	.86	.95	.98	.99	.99	.99
.15	.74	.94	.98	.99	.99	.99	.99

2. If $(1+i)^L = 2$; $L \ln(1+i) = \ln 2$

But $\ln(1+i) = p$, the continuous rate of interest; and $\ln 2 = \frac{.73}{.71}$.

A small adjustment to convert continuous to annual interest yields the rough rule that $L \cdot i = .72$.

At the interest rates of 1950, and the short lives of early postwar housing, net land cost was significantly below apparent cost, even without any expectation of appreciation. At today's longer lives (L) and higher interest rates (i), net cost approaches apparent cost unless we assume enhanced prospects of appreciation.

Anticipated land appreciation lowers net land cost in the eyes of the buyer, a fact which of course real estate salesmen have always used to the utmost. The proper weight of this factor is shown by raising the salvage value of land in the coefficient. In Table I we assumed salvage value (S_L) equalled initial cost (P_0). If $S_L > P_0$, the net cost of land becomes

$$(2) \quad NC = P_0 \left[1 - \frac{S_L}{P_0} (1+i)^{-L} \right]$$

In the extreme, if land appreciates as fast as money in the bank,

$$\frac{S_L}{P_0} = (1+i)^L \quad \text{and} \quad NC = 0. \quad \text{More generally, land appreciates slower}$$

than that, but still appreciates enough to lower net cost materially.

The matter is best clarified if we express land appreciation in the familiar form of a yearly percentage, comparable to the interest rate. If land price rises from P_0 to S_L over L years, that is the same as an annual percentage growth rate, g , that satisfies

$$(3) \quad (1 + g)^L = \frac{S_L}{P_0}$$

Substituting (3) into (2), we have a modified land salvage coefficient expressed in terms of the annual appreciation of land:

$$(2A) \quad NC = P_0 \left[1 - \frac{1+g}{1+i} \right]^L$$

Now within the relevant range of values of i and g and L ,

$$(4) \quad \left[\frac{1+g}{1+i} \right]^L \approx (1+i-g)^{-L}$$

We can therefore gauge the effect of any growth rate simply by subtracting it from the interest rate, and going back to Table I. That is, for example, if land appreciates at 3% a year, the land salvage coefficient for an interest rate of 8% is that which appears in the row headed 5%. For higher values of g and i and L , approximation (4) may be materially inaccurate and it would be well to construct another table--not a difficult matter.

Property tax rates (t) are handled in the reverse manner--they are added to interest rates (i).

The second method of putting commensurable values on costs of different time-characteristics is to reduce them all to level yearly sums or annuities. This is another common way of perceiving land costs: they are the yearly holding or carrying costs of the land value, less yearly appreciation. Comparing land costs and building costs, the former are smaller, per \$1000 of cost at time zero, because from land holding costs we can deduct appreciation, if any; while to building holding costs we always add depreciation and obsolescence, which are unavoidable facts of life.

The level annuity that covers interest plus depreciation over the life of a building is known as the "capital recovery factor" (c), or annuity whose present value equals one. It is simply the reciprocal of the present value formula for a level annuity.

$$(5) \quad c = C_0 \frac{1}{1-(1+i)^{-L}}$$

where $C_0 \equiv$ capital cost of building at time zero. The comparable annuity for unappreciating land is simply $P_0 \cdot i$, which is really (5) when $L = \infty$, and of course C_0 is replaced by P_0 . The yearly land cost per \$1000 of initial investment is lower than the corresponding yearly building cost, since it covers no depreciation. As with the present value method, the difference between land and building becomes negligible for high values of i and L , unless the land appreciates.

A more complete statement of holding costs of land (HC) includes property taxes levied as a small percentage of market value, and subtracts appreciation.

$$(6) \quad HC_x = P_x(i+t-g)$$

where x is any given year, t the ad valorem property tax rate, and g the current appreciation expressed as a percent. If g is large, and t is small, HC may approach zero.

B. The Ineluctability of Land Cost: the equality of holding cost and rent.

In evaluating the effect of appreciation on holding costs, let us avoid a misconception that might easily but erroneously be inferred from the discussion thus far, where I have stressed how appreciation reduces effective land cost below its apparent relative value. It

would be easy to conclude that appreciation, as opposed to its absence, simply lowers land cost, but that is very wrong: for the expectation of appreciation raises apparent land cost, that is, the initial land price, P_0 . Thus it raises the basic holding costs, $P_x(i+t)$, for all years: and later appreciation (in a perfect market with perfect foresight, etc.) simply offsets this added burden.

To tie up this point here I present the mathematical statement as a pronouncement ex cathedra; the validation of some assumptions waits on the next section (C).

The value of land (P), neither taxed nor appreciating, is:

$$(7) \quad P = \frac{a}{i}$$

where a is annual rent.³ The holding cost (HC) of the land is interest on the value; but that equals the rent (a):

$$(9) \quad HC = V \cdot i = \frac{a}{i} \cdot i = a$$

3. In practice, a must be derived by annualizing an irregular stream of costs and revenues, so:

$$(8) \quad a = \sum_0^L [(R_x - C_x) (1+i)^{-x}] \frac{1}{1-(1+i)^{-L}}$$

That holding cost equals current rent also holds true when land is appreciating, so long as we assume a perfect market. If land appreciates at $g\%$ yearly:

$$(10) \quad P_0 = \frac{a}{i-g} \quad (4)$$

But

$$(11) \quad HC = P_0(i-g) = \frac{a}{i-g} (i-g) = a$$

Thus the overall effect of appreciation is to leave holding costs equal to rent. The higher land price on which interest is charged just balances off the yearly increment of value.

The same principle appears when we add the ad valorem property tax on land to our picture. If land yields a steady rent, a , and is taxed at rate t , then

$$4. \quad P = a \left[\frac{1}{1+i} + \frac{1+g}{(1+i)^2} + \dots + \frac{1+g}{1+i}^\infty \right] =$$

$$a \frac{1}{1+i} \frac{1}{1 - \frac{1+g}{1+i}} = \frac{a}{i-g}$$

(This may need to be modified for the case of progressive obsolescence. Will current rent get behind HC then, in later years of indivisible buildings? Will provide more detail on this point if desired.)

(5)

$$(12) \quad P_0 = \frac{a}{i+t}$$

But

$$(13) \quad HC = P_0(i+t) = a$$

Finally, consolidate everything in one expression for taxed, appreciating land:

$$(14) \quad HC = P_0(i+t-g) = \frac{a}{i+t-g} (i+t-g) = a$$

From (14), as well as from (7)-(13), we can see that the holding cost of land is unavoidable, and in a perfect market equals the rent, a.

Armed with these tools, now we can dispose of some specious but ineffective proposals for lowering land cost.

1) Lower interest rates. These raise the land price base in the same proportion that they lower the rate multiplier, leaving yearly carrying costs constant. In practice, of course, there may be

5. J. P. Jensen, Property Taxation in the United States, (Chicago, University of Chicago Press, 1931), p. 64.

$$P_0 = \frac{a - tP_0}{i}; \quad P_0(i+t) = a; \quad P_0 = \frac{a}{i+t}$$

lags, so for a brief time lower rates could lower costs before they raised values. Again, capital markets are exceedingly insular, so cheap credit to one group could lower their costs relative to others. All we need is a shibboleth to separate the good guys from the bad guys--and, quite seriously, this has been an effective tool of housing stimulus. But as a general proposition, lower interest rates do not lower holding costs.

This analysis presupposes a supply of land that is not elastic to lower interest rates. It would have to be modified under assumptions which made land supply rise with a fall of interest rates. For example, subsidized cheap credit for housing helps housing take land from industry, trade, recreation, religion, and agriculture. The supply of land for any one industry has some elasticity. But it is hardly news that we can help one industry by subsidizing it at the expense of others. The point here is that there is no magic in low interest rates as a general policy that will circumvent holding costs.

2) Lower tax rates. The basic general analysis is exactly the same as for interest rates. Lower rates simply raise prices. The rate multiplier $(1+t-g)$ falls, but land price rises in the same proportion. The net result is to substitute an added interest cost for the reduced tax cost. Owing to the insularity of credit markets this will have some allocative effect. It removes a cost that bears equally on all landowners and replaces it with one that varies inversely with the credit rating of the individual. Since credit ratings vary directly with income and wealth, this is a strike against the low-income groups whose plight is our concern in this study.

Lower ad valorem land taxes mean higher land prices. Higher land prices mean the low-income home buyer has to borrow more--he pays more to his banker as the price of paying less to the tax collector. Since his banker charges him twice as much per year per \$1000 borrowed as it charges Jean Paul Getty and David Rockefeller, and won't lend him nearly as much nor for so long a time, the tax collector is a relatively benign and impartial alternative. Many affluent landowners, indeed, do not have to borrow at all. The interest cost they feel is imputed interest, at their opportunity cost rate. Since transfer costs for capital are very high, and many corporations plough back earnings to defer taxes, aggrandize management, magnify rate bases, etc., the force of imputed interest as a holding cost may be very weakly felt by wealthy owners, compared to an explicit cash payment of taxes.

So lower land taxes are at best neutral, in perfect credit markets. In a world where a banker is a man who lends you money if you can show you don't need it, lower land taxes serve to make land dearer for the poor and cheaper for the wealthy.

To be sure, this hangs on the assumption that tax assessors are less partial to the wealthy than bankers are. Some studies in some jurisdictions have shown great assessment bias in favor of larger landowners. Others have not, however, and on the whole this bias is less universal than the bankers'. It is also illegal, and certainly more susceptible of reform.

As with our conclusion about lower interest rates, this one presupposes an inelastic land supply. Here the postulate requires similar

specification of assumptions. Lower land taxes for housing alone will certainly draw land into the lower taxed industry from other uses, and the lower tax will not be fully capitalized into higher land prices. Again, it is obvious, that we can stimulate one industry by subsidizing it at the expense of others. The point here is that lower land taxation as a general policy does not lower the holding cost of land. It rests on the premise that the land supply is inelastic to lower tax rates. Taxing jurisdictions are defined as areas of land, and those areas do not change as direct functions of tax rate changes.

3) Higher tax rates

It is often alleged that higher land taxes will bring down the cost of land. This belief is open to the same basic general criticism as 2), its opposite: it focuses on half the effect and ignores the compensating counter effect. Equation (14) shows that holding cost is unaffected by higher t . The lower base value is offset by a higher rate multiplier.

However, there is a case for higher land taxes, as indicated in 2) where it was made by criticizing the effects of lower land taxes. Raising land tax substitutes an impartial tax cost for an interest charge that bears heavier on lower-income groups. Land taxation lowers the capital required for landownership, a requirement that now seems to screen out credit-weak buyers, the very group we aim to serve.

C. Land Cost and the Supply of Land

A large share of what we normally call land value is not produced by private people in the same sense that buildings are, and land rent is not a reward for producing land. Rent is a social surplus above cost. It is a scarcity value attaching to a resource supplied without cost but in limited amount by--whom, or what? Marshall described it as a "public value," the joint product of appropriation (by public armed forces) and public works. To this he added the spillover benefits of private works on neighboring land--these values are "public" too, in the sense of not being captured by their producers, but the neighbors of the producers.

It is for this reason that we can speak of land cost as not serving at all, or at least not very directly, to elicit the supply of land, and to treat supply as inelastic to price. This is not to say the supply is fixed in a meaningful economic sense. Area is fixed, but the productive and want-satisfying potential of the fixed area is indefinitely expandable as spillover benefits from social progress accumulate,⁶ and public works proliferate, and it is the productive potential of land that is the economic measure of its quantity. But this occurs mostly without the work of the landowner as such: there is no market mechanism whereby the public value of land stimulates its own production.

6. Alfred Marshall

High land costs do motivate landowners to intensify the use of their land, where zoning allows it. This is a vital economic function of land price, without which the limited supply of valuable land would be used wastefully. To make good use of a fixed supply has many effects that resemble an increase of supply, and the two are often confused. But if the difference between supply and demand has any consistent meaning, intensive use of an input when its price rises manifests reduced demand, not increased supply. That is, when we pile up 20 stories of building on a site we are using less land per unit of building. When we dump fill into the bay we are using a marginal underwater site of low value, and therefore less land (measured by value) per unit of housing produced. (Remember the fill is not land in the economic sense, but part of the building cost, just like foundation work on any site.) If it sounds paradoxical to speak of urban expansion as reduced demand for land, remember the city is not expanding into a vacuum. It is taking land from lavish users--sportsmen, gentleman farmers, nurseries, etc.--and intensifying it for the needs of those who demand less land per capita.

The significance of all this in our quest for ways to reduce housing costs may be grasped by contrasting the effect of lower interest or property tax rates on the holding costs of land and buildings. The lower rates would lower the cost of holding buildings. This would make buildings more valuable to buyers, but as the value rose above production costs there would soon be more buildings. Unit costs might even fall with higher volume of construction. With land, on the other hand,

the greater value to buyers would not elicit more supply. Nothing would stop a rise in price, therefore, until the old equilibrium was reestablished at the original level of rent and holding cost, and a higher level of land values.

We might carry this a step further and note that the lower holding cost of buildings will translate itself into added demand for land and so raise land rents (and $\therefore$ holding costs) even above their original level. But if we get into that we should note on the other hand that there is one proper sense in which intensification adds to land supply: when it creates spillovers or finances public works that enhance the productive potentiality of neighboring land. Since that is indeed a normal result of most intensification, there is a material element of truth in the otherwise misleading notion that intensification adds to land supply, so long as it be understood in, and limited to, this sense. It is subject to the qualification that some local spillover gains are transfers from other locations, and not net national gains.

But here we are moving into complexities and ramifications too extended for this short report. The main point is that the holding cost of land generally equals the yearly rent of land; that rent is fixed by supply and demand forces that are not directly affected by land taxes or interest rates; so land cost cannot be lowered by lowering land taxes or interest rates.

But is there no stimulus from land price on the motive of someone to do those things that "produce" land for housing? Yes, there is bound to be some, but it is indirect and weak. High land prices might

motivate local governments to extend public works. But it is the public equity in the land, as asserted through taxation, that is the direct motive. A higher private equity motivates public works only in the discreditable sense that it moves landowners to exert political pressure to gain from the Great American game of public works for private profit.

With these relationships in mind, let us review the effects of lower interest and tax rates. No longer are they parallel, but at odds, for the public and private equities are divided in the proportions of t and i . (Cf. Eqn. (14). The public share of rent is $P \cdot t$, and the private share is $P \cdot i$)

If i falls, the public share of rent ($\frac{t}{t+i}$) rises. This should motivate cities to extend public works. Thus it may, through the tortuous path of city councils, add to land supply. The conditions of supply response are such that he would be a bold analyst who would specify the elasticity of this function. Yet there should be some response. This qualifies our earlier conclusion that land supply is

inelastic to interest rates. *It also warns us, in terms of current policy, that today's high interest rates may reduce municipal motives to add to land supply by reducing the public equity.*

In terms of tax rates, it is a higher tax rate that should motivate cities to add to land supply by extending public works: for a higher tax rate means a higher public equity in land. This reinforces our earlier conclusion that higher land taxes do not reduce land supply: for they actually tend to cause it to be increased.

There is also some deliberate private production of land value to consider. That does not mean mere intensification, nor the exploitation of rents already latent in land: again, that is reduced demand and economy of given supply, not increased supply. Nor does it mean

incurring "ripening costs" of holding green land to maturity, an ancient doctrine linked to the name of R. T. Ely, which I defer to Appendix B. But large private landowners can by conscious planning deliberately create spillovers--"internalize externalities"--as in shopping centers, or other large, integrated land developments. If this were the predominant source of land values, indeed, the conclusion of the preceding paragraph would have to be reversed. On the whole, however, it is secondary to public works financed by government.

Unconscious or unintended spillovers from one owner's land to another's may be more important yet, but they are not motivated: they are generated, like the British Empire, in fits of absent-mindedness. On balance, therefore, higher tax rates on land are still more likely to encourage than discourage land production.

The same cannot be said for taxes on buildings, even though they raise the public equity in real estate, for they discourage the production of new and quality buildings, thus aborting the benefits these might diffuse, while encouraging the prolongation of life of very old buildings that radiate not negative spillovers, destroy neighborhood land values, and in effect sterilize a large and central supply of potentially productive land. So my conclusion applies only to the tax rate on land. But there it does apply, without further qualification.

Given the price-inelasticity of land supply, it is the nature of land prices to bear the brunt of changes in the demand for land, both up and down. Changes in supply, controlled by factors other than price, also cause sharp reactions. This is consistent with the

extraordinary amplitude of historical cycles of land prices--these betray a supply not very responsive to price.

Almost any subsidy to housing either constitutes or causes an increased demand for land. This in turn causes a rise in land rents, land prices, and holding costs. A large share of any subsidy is thus dissipated in higher land rents, a fact frequently noted.

That does not mean subsidies are wholly dissipated. By way of analogy, farm price support subsidies raise farm land values, it is true, but they also cause intensification where permitted by land retirement programs (whose role is analogous to urban low density zoning), and they bring marginal land into crops. Another analogy is the oil depletion allowance. Much of this subsidy is dissipated in higher lease bonuses and royalties. But it also causes intenser use of good fields where permitted under "allowable" programs (the low density zoning analogue in this case) and extended exploration and use of marginal fields. Thus housing subsidies do more than raise land costs. They encourage more intensive use of land, where zoning permits, and the conversion of land from other uses to housing.

It remains true, nonetheless, that there can be an egregious dead-weight loss to any subsidy program if it is let be dissipated in higher land costs which are not harnessed to elicit added supplies of land. In the context of low density zoning, or "land banks" whose deposits are never withdrawn, or other holding devices that keep land from intensive use--these are like soil banks, or oil allowable programs--there can be no increase of housing supply from intensification. Then an entire

subsidy might be dissipated! The moral, I believe, is that any housing subsidy must be geared to measures that increase land supply and allow intenser use. Otherwise it is a waste of tax money and a bitter deception on the supposed beneficiaries.

D. Instability of Land Costs

The price of urban land rises and falls in giant swings of unmatched amplitude.⁷ This is not just a result of unstable construction--it is a cause as well. But the causation is more complex than the simple direct link that dear land adds to cost. Remember the analysis of land salvage value (A, above). Rising land values may, under the right conditions, reduce net land costs, at least for some buyers, and serve to stimulate construction temporarily. Land prices that have risen high, that threaten to fall, but are sustained by various kinds of concerted but precarious holding actions--and there are such phenomena--can have the most deadening effect on construction.

Let us begin with an upswing of land prices, and see how this might lower net land costs.

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We have seen (A, above) that net land costs, NC, are a fraction of apparent land costs, P_0 , the fraction being $[1 - \frac{S_L}{P_0} (1+i)^{-L}]$ (Eqn. (2)). When anticipated salvage value (S_L) rises, net land costs fall as a fraction of apparent costs (P_0). However, in a perfect market, P_0 rises by the full amount of any rise of the discounted salvage value $[S_L(1+i)^{-L}]$. Thus the benefit of future rises is captured in advance of sale by the prior landowner, and there is no fillip to building. There is just an added credit requirement for buyers.

Any stimulus to building, therefore, from the dynamic rise of land values must come from special circumstances that let increments be captured by builders or their buyers, rather than by prior owners. There are a number of such circumstances. Let us enumerate and discuss them.

1) Buyers or builders might have better credit than sellers, and be able to discount land salvage value at lower rates. Now a great deal of suburban land with appreciation potential gravitates to very strong hands, stronger than most home buyers; so builders are not often snapping up bargains from hungry peasants. But on the other hand, urban financial power on the whole outweighs rural power. FHA helps--credit is specifically directed to the house buyer, not the prior landholder. As to bankers, there was a considerable era following the catastrophes of the '30s when they would not and often could not by law do much to underwrite speculators who were not also builders. Vacant land was not very bankable. It had a bad name.

There was also, in the early post-war utopia, a large number of "tired" speculators: persons and institutions disillusioned with their withered hopes, reduced in liquidity by their long, dry holding period, happy to get anything for land they had learned not to hold very dear. This number included lending institutions which, for regulatory and public relations reasons that would make an interesting study, had had to hold foreclosed land until they could sell it without nominal book loss. It included cities, counties, and districts which had no business holding onto dead land and which were often glad to see it revived, without being sticky about price.

The great trouble with this kind of stimulus to building, other than its transitory nature, is that weak sellers are more or less randomly located in space. Indeed, it is worse; they are more likely to be far out, or on flood plains, or other marginal sites, for it is the best land that gravitates to the strong hands, and the worst to the weak. The result is urban sprawl, and magnification of real infrastructure costs incurred to tie all these scattered pieces together. I deal later with the non-optimality of this spatial layout and the inflation of the real social costs involved in "producing" land value. Here we are more concerned with the dynamics. When we stretch out an urban transport-utility network over twice as much land as has been actually converted to urban use, we create a potential excess of land supply that thenceforth jeopardizes all land values. This plays a central role in the land busts that periodically have punctured the

euphoria of America's two-century land boom, and added to the instability of land prices. It underlines the lesson that we cannot rely on land increments as a permanent means of encouraging building. They boomerang.

2) Buyers might be more optimistic than sellers about future land salvage values, which are only forecasts and matters of opinion. The range of forecasts is very wide, as might be expected in a market of such historical instability. The more optimistic buyers will always regard land price as being low, and be guided and motivated accordingly.

It was widely noted in colleges from about 1955 on that a new generation of students was upon them who never knew the great depression, and whose attitudes showed it. Earlier, most returning veterans in 1945-46 had not known the worst of it, and it is a reasonable surmise that their war experience was so much worse, traumatic or exciting, and their joy of homecoming and discharge so great, as to make them more sanguine about civilian ventures than their fathers. Now the transfer of land from prior holders to home buyers is among other things a transfer between generations. And it is likely that we have come through an extended period when the buying generation averaged out more sanguine than the selling generation. There was also at one time strong social pressure against gouging veterans, and a "just price" psychology among some, and probably a certain amount of guilt, which dissuaded some sellers from asking what they could for land which they had acquired once very cheap.

In this context, many buyers of homes were placed in a position to reap an increment to land values which they foresaw. As with weakly financed sellers, however, pessimistic sellers are also scattered in location, with urban sprawl the result.

As to the future, the situation has clearly changed, with undeveloped land now in the hands of an optimistic generation nourished on 20 years of increments.

3) An owner of several lots in a developing area often sells a few cheap, to attract settlers whose presence lets him cash in on the remaining lots. These "Indian fighters" are in effect being paid for the spillover they will diffuse--paid in cheap land, in advance, but usually with some guarantee they settle and build on the land.

When there are more new subdivisions getting started than an area can absorb for a while and each is racing to get well started in the self-sustaining phase before it is too late, the amount of land sold at "Indian fighter" prices may be a large share of the total.

4) The buyer-builder may enjoy some leverage over public investments or zoning not available to the seller. The ability to get a variance allowing apartments in a neighborhood of older singles lets the builder reap the increment from land-use conversion. A bank of know-how and connections for dealing with utilities and the city on service to new subdivisions accomplishes something of the same end. Sellers, of course, are aware that they might enjoy some of this gain, and ask what they can. There is a "floating value," a premium in asking prices diffused over the area in which variances are tolerated

or subdivisions served. The level of the premium depends on relative bargaining positions. Again, the result is sprawl, as builders seek out weak sellers, and use their leverage to solve the frightful problem of land assembly.

To some degree, the leverage of private over public investment is not a matter of privilege to individuals, but to builders and buyers as a class. That is, cities and utilities extend service to new subdivisions because there are settlers there, or enough commitment by a subdivider to assure that he will plant settlers there. Again, the public value of land is created for builders, contingent on building. If the prior owner anticipates this in a high asking price, there are other sellers to choose from. Unless the leverage of private over public investment is limited to a small area, the prior owners cannot have it all, in their "floating value." There should be some capture of land increment by buyers as such--but again at the cost of urban sprawl, which magnifies the real social cost of supplying land for housing and is bound to show up somewhere in higher housing costs.

5) The seller may be a city, district, or county, glad for a chance to unload tax-reverted land. Its motive to sell is normally greater than a private owner's, because by selling it can begin taxing the buyer, and the present value of future taxes often exceeds the selling price of land. If the public seller has a retail tax base nearby, it is in a position to cash in on a share of the spillover benefits from housing, too. And so a city may be glad to let builders and their buyers enjoy a little land increment, to get things going.

The attitude of public holders is variable, however. During and after the depression, cities joined the banks and insurance companies in a gigantic holding action to valorize and sustain land prices. This policy can only be characterised as cartelistic and Hamiltonian, nakedly revealed in Walter Blucher's rationale:

"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." 8

Public officials swayed by such an attitude are not going to give very high priority to housing for low-income groups. In the postwar boom, many jurisdictions rediscovered the old expansionist competitive psychology and sought to attract capital and growth. They sold their dead land. Now again attitudes are changing and cities are tightening their grip on land, developing sterile inventories in "land banks" and advance purchases and unredeveloped urban renewal sites--ominous portents for low-income housing.

6) The ability to speculate in land may be limited to actual settlers, who may have a scarcity value. Absentee speculators are

8. Walter Blucher, 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 Battenheim, H.S., Urban Planning and Land Policies (Wm: 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. Also, Tax-Delinquent Land in California, California State Planning Board, Sacramento: 1938.

limited in their buying and holding prices in comparison to actual settlers, by virtue of not being in a position to value the current use of the land, but only its discounted salvage value. Their only out (other than the rare long-term lease) is to sell to settlers. Settlers bidding against each other will transfer some of the gain to prior owners. But if current settlers are scarce, and their land needs limited, they may not bid it all away. Thus the settler, by virtue of being in the housing market at the right time, may have a scarcity value which he can exploit only by buying a house.

There, then, are six basic circumstances in which a rising land market stimulates building by making land cheap to builders and buyers, by letting them capture part of the expected increment.

It should be evident that the factors are reversible, and that they pose a threat of instability. In a rising market, the depressing effects of higher costs are offset by the exuberating effects of rising values. This can let apparent land prices rise higher than the basic supply-demand balance warrants, without the market's giving enough warning of overpricing by weakening. Then when a boom crests, there is a price correction needed which can be doubly depressing if holders stand firm in the face of receding demand, and organize holding actions. The social pressure behind such actions can mount very high when real estate comprises a large share of credit collateral, and bonded municipalities panic over tax base maintenance. The land buyer is then faced with a double increase of cost: the apparent price is higher, and the expected salvage value, which in a rising market meliorated the apparent price, now aggravates it because the buyer must assume a high risk of price-decline.

A priori argumentation may seem conjectural, but historical records are harder to dismiss. The fact speaks volumes. Downswings of major land price booms have been marked by rigid holding prices in the face of standstill building, and complete collapse of deed recordings, i.e., sales.⁹ We are faced with a situation, and any theory which fails to explain it must contain some error.

E. Insularity of Individual Interest Multipliers

Since land does not depreciate as a matter of course, like other inputs, the holding cost is mostly interest on the value. Credit markets are peculiar. Collateral security is the primary basis of allocating funds; marginal productivity of investments financed by the funds is not the sole controlling factor, not even after allowing for risk associated with specific investments. It is the credit rating of the borrower that is the measure of risk to the lender. If the specific investment is a small share of total collateral, the rich borrower presents no risk to the lender, regardless of the riskiness of one investment.

And so it is widely observed that capital markets are places where money often runs uphill, where the poor lend to the rich as often as the reverse.

In terms of yearly cost, the price paid for land is proportional to an interest rate. The relevant rate is one's borrowing rate--or, for equity investment, the opportunity cost of money. And so rich and poor pay different prices for holding the same amount of land. Here is

9. H. Hoyt

L. Maverick

M. Gaffney diss.

price discrimination in reverse, with the poor paying more. Price discrimination of the other kind can be socially useful by broadening markets and letting economies of scale be realized. This reverse price discrimination, on the other hand, reinforces the ineffectiveness of the demand of the poor for land on which to live, and so acts sharply to cut housing volume.

I refer you back to (A) for additional analysis of this factor in relation to tax policy, and how it may be partially offset by heavier land taxation which substitutes a yearly tax charge for a yearly interest charge.

There is no factor in housing which acts with as much force as land cost to screen out the bottom of the market. Look at it as adding to yearly interest cost, as above; or look at it as adding to buyers' capital requirement (using the present value method of analysis): either way, it hits the poor with differential severity.

Building costs, of course, also involve borrowed money and the same kind of credit discrimination. But buildings depreciate, so interest is only part of holding costs. Cheap housing depreciates fast, so interest is perhaps only half of holding costs. The industry might even put out a cheap 20-year house for those shy of capital, but however short-lived the home, it goes on a site of infinite durability.

Consider, further, the term of loans. They are geared to the life of buildings. But they also finance the land. To retire the loan at term, the borrower must build up an equity in the land. It is a sort of forced saving, which begins with the first payment. Moralists may

*Also, price of
first floor*

approve of strengthening the character of the dissolute, but if we take as given the saving preferences of the poor, the major effect is to screen out buyers who will not be forced to save, or to allocate their savings to land purchase. Refinancing is an out, but for the poor it is not a certain option unless they have first saved, i.e., stopped being poor.

A third dimension of loans, after rate and term, is amount, and again the poor suffer. As land prices rise, and the proportionality principle prescribes costlier houses, the poor cannot swing them on any terms.

If we rank families by income, and find the assets per family in the various groups, we find that assets rise much faster than income.¹⁰ This is a universal empirical finding confirmed in many studies.¹¹ This means that "low-income" families are much stronger in terms of income than they are in terms of capital assets. It is therefore in the purchase of durable consumer goods that their relative living standards must suffer most. As to food, clothing, and even automobiles, which they can pay for as they depreciate, they are widely observed to be rather "uppity." When it comes to real estate, they are in another world. The most durable consumer good one ever buys is the land under a house, so this is the highest of all barriers for the poor to surmount.

10. Using the statistical concept of "regression fallacy," this means that if we ranked them by assets, income would rise much slower than assets.

11. FRB,

Lampman, etc.

III. The Legitimate Functions of Land Cost

Like other prices, land price has important economic functions to serve. It does not serve directly to elicit supply, we have seen. But it does serve to limit demand, to constrain economic use of a scarce resource.

Sometimes we read or hear of high land prices "driving business away" from Manhattan or other valued locations. Even such distinguished analysts as Hoover and Vernon in their Anatomy of a Metropolis fell into this usage. Now overpricing of Manhattan would drive out all uses and leave a desert, it is true. But in general high prices are simply the means whereby less intensive uses are driven out to release land to more intensive uses. The net result is to attract, not to repel, people and capital.

Alfred Marshall expressed it in terms of substituting capital for land. A taller building uses less land per foot of floor, but otherwise costs more per foot. So, as land grows dearer, one builds higher.

One also salvages land sooner from under old buildings to replace them with new. That is, land rent causes us to economize on the time-dimension as well as the space-dimension of land. And that is the story of Manhattan.

LR-PP
says
opposite.
{ A difficult point to see is that high land cost also causes builders to prefer greater durability in new buildings. This is one way to substitute capital for land--to invest capital in building longevity, piling more capital on each site. Thus buildings grow costlier and of course worth more as well without taking more space. Increased height

and quality of buildings probably also add to longevity, as a by-product, reinforcing the effect of high land costs on longevity without, however, being the sole cause. Analytical readers will note that there is an increased use of land-years associated with the more longevous building, and wonder if building longevity really does on balance economize on land. In Appendix 3 I show that it does.

The results for low-income housing are not altogether good. The optimal dwelling unit now is more durable, adding to the capital requirement of the buyer, with all the problems that entails. So any artificial maintenance of land prices or rents above a free market level is to be viewed askance; and the rise and fall of land prices in the land price cycle does capricious things to the longevity built into new structures (witness the office boom today). It is important as a general rule not to hold land costs below market levels, however, for land prices are a signal. They are the market's way of telling us that open space is not free. The function of land cost is not fully understood if we regard it simply as constraining the use of a scarce resource. Land is space; a large share of human and capital resources are devoted to overcoming or traversing space in the process of linking society together; economy of land is economy of transportation, including pipe and wire transportation of utilities.

A city may be viewed as an organism, a distributive organism stretched over space. Its circulatory system serves primarily to overcome space. The more space it must overcome, the costlier it is. Those who hold land in the interior impose costs on the system by getting in everyone else's way, by adding to the transportation costs of all who, or whose goods and services, must traverse their land. Land price

constrains them to minimize this cost imposed on others. It also prompts them to develop the third dimension of the distribute networks by building high, reducing (for a given population) the load on the first two dimensions.

Economies of compactness of cities are essentially economies of scale. That is, the more electric power, for example, we distribute inside a given perimeter the lower is the unit cost of distribution. This reinforces and makes possible economies of scale in generation, as well. If we try to achieve scale in generation by expanding the service perimeter, savings in generation are offset by higher distribution costs. The latter are a large share of total costs, and they are primarily functions of length of lines: Unit costs fall with volume, with length constant; but rise with length, volume constant.

A compact population also supplies the massed demand that alone can support the great social economy of mass transit.

But regardless of the mode of transit, a compact population with good mutual access creates that complex of linkage benefits best summarized as urban "synergism," the joint action of inputs that in combination produce effects greater than the components taken singly. Synergism in its various aspects causes cities to be in increasing returns to scale. The larger the city, the greater the social surplus, as a rule, from urban synergism. Appropriately enough, this surplus is captured in the rent of urban land, which comprises a rough measure of it.

An important function of land cost in the development of new areas, or redevelopment of old, is to synchronize investment in the interdependent items that interact synergistically to produce a total community. Thus as a city expands, high land costs at the perimeter put pressure on landowners there to convert to urban use. Obviously this mechanism is not now in very good working order. But to the extent that it is, it lets utilities, for example, achieve scale economies in serving new areas by sizing their extensions for the ultimate market, and integrating trunks and branches optimally. With poor synchronization, on the other hand, they must undersize, and keep adding parallel lines, at great expense.

We are seeking in this study to harness the principle of economies of scale to reduce housing costs. Most emphasis has been placed on the manufacture of modules, and the size of construction firms. These are however only a small part of the picture. Economies of scale of transport-utility networks taken one by one, and to cities as a whole, are achieved through the land market. They are achieved by keeping settlement compact in space, and synchronized in time. They are passed on to consumers in lower taxes, lower utility costs, and greater real value enjoyed from occupying urban land. They are also captured in higher rents, divided between public and private beneficiaries according to whether taxes are high or low.

We are seeking to find economies of scale in mass volume of building with emphasis on large firms. But volume is more a function of the size of a market than the size of individual firms. Many small firms serving

a large market will achieve economies of scale by their combined purchasing power for materials, for example, which will support large and numerous suppliers. A manufacturer of modules does not achieve scale by selling to one large buyer so much as by selling lots of modules. He requires volume within a small area to minimize transportation-distribution costs.

Vertical integration of building operations is not achieved so much by unified management or ownership of the stages of production. It is achieved by having them close together. The market can be the integrating mechanism--unified management is not the only way.

We are seeking to find economies in stability and continuity of building. Again, a large market is the solution. It pools demand from many independent sources, the random variations offsetting one another, giving the whole a greater stability than any of the parts, just as the Mississippi at its mouth is more stable than any of its hundreds of headwaters.

All these benefits the land market can bring us, by acting to focus a large volume in a small area. This is the legitimate function of land cost. In order to serve the function best, however, the land market must be in good working order. To that I turn next.

IV. Overpricing of Land

Overpricing of land is not the same as high land cost. A high land cost may be quite economical, if the land is very scarce and central. "Overpricing" occurs when a holder keeps land in a lower use, usually less intensive, and asks more than a higher use will pay. It is a mis-allocation, a situation where a lower use outbids a higher use--the "bid" of the lower user being the asking price of the holder. It is a sign of market imperfection.

The evidence of overpricing consists in that pathological condition of city layout now universally recognized under the name "urban sprawl." Overpricing is manifest in the stark contrast between the high density at which new land is actually being developed, and the low density that would be necessary to absorb all the land being held at high prices. Overpricing is manifest in the outreach of demand to remote sites past miles of low density and unused land.¹² It is manifest in land developers' sinking great capital into reclaiming marginal sites while better ones lie fallow; and in builders' investing in elevators to tap the marginal upper strata of the "Otisphere" next door to acres of low-rise. It is manifest in wreckers' clearing away still-sound buildings to salvage their valuable sites, in the midst of other sites under centenarian firetraps.

That such conditions exist I take as beyond dispute. They offend our notions of how a market should work, but the historical record makes it clear that overpricing on a grand scale has been a central feature of the land cycle, which may be visualized as a sort of corn-hog cycle with a period in decades rather than years. Perhaps some aspects of apparent overpricing may be rationalized--people keep trying. My effort will be to identify factors that cause overpricing, and then suggest policies to abate the problem.

12. House and Home: Urban Expansion ...