The Role of Land Markets in Economic Crises

Author(s): Mason Gaffney

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By Mason Gaffney*

ABSTRACT. It is widely recognized that the economic crisis of 2009 was caused by unsound lending for real estate. Largely ignored, however, is that this contraction was easily predicted on the basis of a well-established pattern of land speculation, premature subdivision, and excessive building on marginal land that recurs approximately once every 18 years. Capital locked up in projects that are started during a land bubble is effectively lost during the downturn, leaving the nation without sufficient capital to finance ordinary business operations during the recovery period. The best instrument for avoiding this boom-bust cycle is the property tax and, more specifically, the portion that falls on land. We explore here the ways in which the property tax influences the intensity, timing, and location of development. We also examine why frequent and accurate assessment are essential to make the property tax an effective method of preventing speculative real estate bubbles.

I

Boom and Bust in Real Estate

WE HAVE FALLEN INTO an economic disaster, probably the worst since the 1930s. Here is some of the evidence:

- The unemployment rate rose 78 percent from April 2008 to April 2009 (from 5 percent to 8.9 percent), an unusually rapid increase in joblessness (U.S. Bureau of Labor Statistics 2009a).

*Mason Gaffney has been a Professor of Economics at the University of California, Riverside for 33 years; e-mail: m.gaffney@dslextreme.com. He is the author of *The Corruption of Economics*, an explanation of how land became excluded from neoclassical economic models. He has also written extensively on various aspects of resource economics, urban economics, tax policy, and capital theory.

- Nearly 12 percent of all Americans with a mortgage—a record 5.4 million homeowners—were at least one month late or in foreclosure at the end of 2008, according to the Mortgage Bankers Association (CBS News 2009).
- In addition to the 1 million households that have been hit with foreclosure since 2006, it is likely that almost 6 million further households will face that situation by 2013 (Grow, Epstein, and Berner 2009).
- The net worth of American households fell by 31 percent (annualized rate) during the fourth quarter of 2008, the largest rate of decrease in 50 years (Board of Governors of the Federal Reserve System 2009). Losses by unincorporated business were almost as great (a 29 percent drop). (Since household consumption has remained steady, there has been a huge drop in savings.)
- Corporate profits from current operations declined by $250 billion or almost 17 percent in the fourth quarter of 2008, the largest percentage drop since 1953. That does not include losses in the financial sector from mortgage defaults (Nutting 2009). Since most new investment comes from corporate profits, this bodes ill for the possibility that corporate investment will recover quickly.
- Job losses in the fourth quarter of 2008 rose to 0.9 percent, the second largest loss in 50 years. So far, 2009 has been far worse in terms of rising unemployment. Mass layoffs in February 2009 were 150 percent above the average for the period from January 2005 to October 2007 and 28 percent above the last quarter of 2008 and January 2009 (U.S. Bureau of Labor Statistics 2009b). According to Milne and Sakoui (2008), twice as many companies will declare bankruptcy in 2009 as in 2007: "The U.S. will see 62,000 companies go bust next year, compared with 42,000 this year and 28,000 last year, says a report by Euler Hermes, part of German insurer Allianz."

We probably have not yet hit the bottom, the equivalent of 1893 or 1933, so the full severity of this crisis is not visible. But based on those signs, this turn of the wheel is likely to be as damaging as those two depressions.

We have seen economic overexpansion followed by a severe contraction many times before. The peak of each cycle has recurred roughly every 18 years. Major wars and plagues have broken the rhythm, but the cycle has persisted over the last 800 years.

Understanding the cause of this cycle is imperative if we are ever to learn to tame it and avoid the catastrophe that it brings. We need a better understanding of the conditions that have repeatedly debilitated the financial system and crippled the national (and international) economy.

The place to begin looking for answers is not inside the financial system, where attention has been focused lately. Instead, to understand the cause of the current economic malaise, we need to examine the way the boom led to a bust. Our hypothesis has nothing to do with the "hangover hypothesis," a moralizing approach that proclaims suffering today as the wages of sinful overconsumption in the past. There was in fact overconsumption, but what we are looking for are the causes of that behavior outside of personal motivation. We want to understand the structural conditions that created the binge of 2002 to 2006, which led to the current contraction.

The proximate cause is plain if we will but look. The boom and bust of the land market represents a pattern of land speculation that has preceded many similar episodes in the past. Hence, we start by examining the record of how land speculation precedes economic crises.

A. Hoyt's Land Cycle Research

In his 1933 work on cycles in land values, Homer Hoyt covered in fine detail the five major cycles that crested and crashed in 1837, 1857, 1873, 1893, and 1926–1929 (Hoyt 1933). At the end he generalized "the Chicago Real Estate Cycle," a regular rhythm of boom and bust with the same features in the same sequence. The boom sets us up for the bust (Hoyt 1960: 7).

At the same time that Hoyt was publishing his work, Ernest Fisher (1928, 1933) showed that the rise and fall of suburban platting activity in a number of cities related closely to national economic phases of expansion and contraction. Fisher (1933: 153) determined that, starting in 1850:

> The most pronounced peaks in [platting] closely coincide . . . with the
> peaks in general business activity; and the most abrupt declines in platting
> activity have occurred at the time of our severest business depressions. For
> example, platting activity in the Cleveland metropolitan area reached great
> peaks in 1856, 1873, 1891, 1903, and 1926; it fell to the lowest points in
> 1861, 1878, 1896, and 1930.

Fisher discovered the same pattern in Chicago, Milwaukee, Toledo,
San Francisco, Detroit, and Grand Rapids. In short, the phenomenon
analyzed by Hoyt was not unique to Chicago.

It is uncanny how the latest boom from 2002 to 2007 tracks the
events that Hoyt recorded and generalized. There was "an increase
in rents, building, . . . and subdivision, . . . each of which was carried
in turn to speculative excess, and each of which interacted upon the
others and upon land values to generate and maintain the boom
psychology." The cycle, Hoyt (1933: 369) continued, is "the composite
effect . . . of a series of forces that . . . communicate impulses to each
other in a time sequence, . . . in a definite order."

He breaks the major events down into 20 elements (Hoyt 1933:
373–403). We can consolidate a few to simplify, but the cycle is not so
simple: if it were, mankind would have mastered it long ago, instead
of constantly repeating it. Rather, I add a few events that others than
Hoyt have noted—an asterisk (*) precedes each of these non-Hoyt
elements below.

- Population grows.
- Building rents rise.
- Values of standing buildings rise.
- New building rises.
- Easy credit comes forth to builders, land buyers, and subdividers.
- Nationally, people moving to new areas raise total need for
  buildings because migrants leave their old homes behind them.
- * Construction itself makes jobs, with demand for more buildings.
- * Outside money flows into growth areas, taking as security
  liens on new buildings and on lands. As to the local balance of
  payments, this has the same *temporary* effect as exporting the
  buildings and lands: unearned increments become part of the
  local economic base. However, this is a trap: it evolves into debt

service, an outflow of funds that, over time, exceeds the original inflow.

- Easy credit evolves into "shoestring financing" (the 1933 expression for today's "subprime lending").
- New buildings absorb vacant land; land prices boom and spread outward.
- Governments spend freely, on borrowed money, for street improvements and public works to boost land sales.
- Population growth rate slows, but "authoritative" forecasts come forth of more population growth—today's "irrational exuberance," which Hoyt calls a "mania."
- * "Builders' Illusion" sets in, where builders conflate the rise of land prices with a return on their building investment, boosting the incentive to build above what the actual return on building per se would justify. This is because building, however legitimate, entails buying and selling land, a form of "flipping." Unearned increment becomes, for some parties, part of the incentive to build. Ditto for "flipper-remodelers": it's fun to remodel or just redecorate on a rising market. This illusion may be most extreme in large, self-contained, integrated developments, where each building is expected, even in a steady market, to pay for itself in part by raising the value of adjoining parcels. The big developer, being human, may credit himself for the rising tide of the market in general. Such illusions, widely shared, can result in overproduction of new buildings relative to the basic demand.
- Land subdivision and development (or partial development) for urban use goes to greater excess than any other variable in the cycle.[1] The quantity of land is fixed, but people spread out over more and more land. Call it bringing more land into the market, or bringing the market to more land, the effect is the same: a growing overhang of ripening land.[2]
- * "Expert" appraisals of land are based on sales of comparables, and upward price trends. These sales, in turn, were influenced by appraisers who based their opinions on earlier comparables and upward trends, and so on. This is because there is no cost of production to check excesses. Thus a herd mentality can take over, divorcing prices from reality: "irrational exuberance."

- * Rising debt service overtakes inflow of new capital.
- * Corruption and graft that inevitably accompany easy money come to light, eroding and then cracking confidence in markets and banks and the "high, wide, and handsome" libertine boomtime philosophy that has papered over coven and fraud.
- * Lenders' loan turnover has to slow down as they turn from short-term trade credit or commercial loans to long-term loans based on land collateral. A bank that is all loaned out, no matter how sound its balance sheet, cannot make new loans much faster than its debtors pay back the old ones.
- * A rise of land prices cannot simply flatten out at a high plateau because the increment has become part of the expected return that buyers are paying for, and lenders are relying on. So prices that cannot rise further have to drop: there is no equilibrium level at the inflated prices of the boom.
- At the crest, asking prices almost always drop more slowly than bid prices. This makes sales (deeds recorded) drop sharply, even as recorded prices hold steady.
- Subprime borrowers face foreclosure; their distress sales force prices down, in a cumulative spiral.
- Banks, whose capital and surplus is always a small fraction of their liabilities, lose much of their capital and surplus when many debtors default. They are always vulnerable, since they borrow short and lend long, so they have to stop making new loans. Some or many fail. Depositors may panic.
- * Lending slows faster than recorded interest rates rise because banks cut off subprime borrowers. (Professor Ben Bernanke, in calmer days, developed this thesis for the 1930s.)
- * Self-financed firms fare better than bank customers, but their capital returns more slowly than before, or not at all, cutting their rate of reinvesting.
- * Building stops; workers starve or emigrate; chaos reigns, and the economy hits bottom.
- * Governments and leading gurus blame the crash on falling land values, bend their efforts to bailing out big banks and sustaining land values, prolonging the depression. In the process, most

> actors lose sight of the original cause, speculation in rising land
> values, and the stage is set to begin the next cycle.

In conclusion, the boom is initiated by rapid growth of construction
and land prices interacting in a rising spiral, and the cycle is com-
pleted with an equally rapid fall, first in land values, then in construc-
tion activity. The land market is thus closely connected to the
instability of the market and the financial system. As we shall see in
a later chapter, this cycle also does serious damage to the banking
system, causing it to freeze and stop functioning as a source of
liquidity.

On the basis of Hoyt's 18-year cycle, Harrison (1997: 27) predicted
the present crisis:

> By 2007, Britain and most of the other industrially advanced economies
> will be in the throes of frenzied activity in the land market to equal what
> happened in 1988/89. Land prices will be near their 18-year peak, driven
> by an exponential growth rate, on the verge of the collapse that will
> presage the global depression of 2010.

Foldvary (1997: 538) made a similar prediction:

> The 18-year cycle in the U.S. and similar cycles in other countries give the
> geo-Austrian cycle theory predictive power: the next major bust, 18 years
> after the 1990 downturn, will be around 2008 . . . .

B. Elements of the Land Cycle

Writing in the years after the crash of 1873, American economist Henry
George sought to understand the cause of these periodic "paroxysms"
that cause the economy to expand and contract suddenly. He believed
the origin of the problem lay with "land speculation," which meant
holding land off the market waiting for a rise. He likened it to an
unconscious "combination" (a cartel) of landowners creating an arti-
ficial scarcity. He attributed industrial depressions to inexorably rising
rents and land prices that progressively squeezed labor and investors
off the land and into the unemployment lines. It was too simple. A
good explanation must account for land value collapses, like today's,
playing a key role in the crash.

So, let us now consider how the rising price of land enters into
investment decisions that trigger a downturn, which can lead to

recession or depression. The following steps occur during the cycle of overexpansion and contraction. They do not necessarily follow this order, which is why I have called them "elements" rather than "steps."

- Element 1: From prosperity to overpricing of land. We begin with prosperity generated by normal forces of economic growth: investment of capital in the production of goods and services, which raise incomes and land values. The optimism generated by prosperity carries the seed of its own destruction because it encourages landowners to demand too much, to overprice their land and its rent. Unlike other products, land can remain overpriced for several years because it does not trigger the production of more land.
- Element 2: Overpriced land induces sprawl. Land ownership shares some features that are like a cartel. Like all cartels, the unconscious combination of land speculators creates a price umbrella under which new resources enter the market. This "price umbrella syndrome" periodically creates an artificial surplus of land. The price of marginal land is bid up high enough to bring it into use. Thus, while overpricing prevents construction on better building sites, construction continues on marginal land of lower quality and distant location, resulting in lower rates of return, and in sprawl. The significance of sprawl here is not esthetic or environmental. From an economic perspective, sprawl is harmful because it scatters economic activity over the landscape in ways that raise costs of interaction. Even in the Internet age, a great deal of economic exchange still requires movement of people and goods across space, and those costs increase as travel distances rise. When the land market encourages scattered development, it reduces the overall efficiency of economic exchange.
- Element 3: Inflated land prices reduce profitability of productive investment. Overpricing land and rents means a larger share of the pie goes to landowners as such. That necessarily leaves less of the pie for true social investors, that is, those who hire workers and create incomes to build new capital. Rising rents

squeeze tenants. They use less space, leaving vacancies. Others retreat toward cheaper, marginal land, where they are less productive and earn less income. This, in turn, lowers the marginal rate of return on investing and dramatically lowers profits (since a 10 percent drop in sales may cause a 60 percent drop in profits). Since reinvestment of working capital comes from those profits, it lowers the inducement to invest. This creates a self-reinforcing cycle during the upswing. When the marginal rate of return falls on productive investment, that makes land look more attractive as an alternative, causing land prices to be bid up further, which reduces returns on productive investments, and so on. Higher land prices lower some marginal returns still more, especially in the construction industry, which causes builders to overinvest in land purchases in advance of construction. Rising land prices evoke "rent-leading" land improvements (building in excess capacity in expectation of rising rents). At best, the added capital invested in new buildings, far ahead of market demand for them, means capital will be locked up in a long-term project, with little prospect of yielding income in the near future that can be reinvested. At worst, that capital is lost forever.

- Element 4: Land-price appreciation induces destruction of capital. After land has appreciated, those who sell appreciated land regard their gains as personal income. Most personal income is consumed. Yet there is no social production corresponding to this higher consumption. Therefore, it must draw down existing stocks of capital. Land buyers pay for the land from new savings or from recovery of old capital. There is less capital overall, because sellers have consumed what they got. Owners of income property consume their inventory and depreciation allowances. It is as though grocers ate up part of their own wares, instead of selling and replacing them, leaving some shelves empty. The normal and healthy flow of investing consists of refilling shelves as the goods go out. Now, that flow drops.[3]

- Element 5: Overpriced land misguides investing. The high price of land leads investors to substitute capital for land, at the margin. In general, the market favors substitution of low-priced inputs

for high-priced inputs, but when the price of land rises through temporary pressures, that causes distortions. In particular, the kind of capital that substitutes for land is mostly fixed capital, which turns over much slower than average. (For example, the capital stored in an office building turns over about once every 50 years. The capital stored in the inventory of a convenience store turns over several times a year.) Forms of capital that turn over slowly include: (1) land-saving capital (tall buildings, farm machinery used in the field); (2) land-enhancing capital (all investments that develop property to a higher use, such as houses on farmland or stores replacing houses); (3) land-linking capital (railroads, water pipes, electrical cable, and other connective infrastructure); (4) claim-staking capital (exploratory drilling, research and development, lobbying for special privilege, and other rent-seeking actions); and (5) rent-leading capital (excess capacity built in expectation of rising demand and rents). All of these forms of capital tie up funds for long periods and remove capital from forms that create more jobs. The details of how this works will be discussed in the next chapter of this volume.

- Element 6: Lending for overpriced land weakens banks. One might hope that banks and other financial intermediaries would show restraint and prudence by refusing to lend against overvalued property during the period of rising land prices. That is never the case. Bankers fuel the frenzy by overlending to land buyers and refinancers, with inflated appraisals. When the price of land eventually stops rising and buyers default, many financial intermediaries are criticized for being corrupt and/or mismanaged. While that may be true, attributing the negative results solely to bankers distracts us from the larger pattern that causes crises. The relationship between land speculation, excess durable capital investment, and banking crises is the subject of the final chapter of this volume.

- Element 7: Overpricing land reduces real saving, which leads to collapse. The unrealistic inflation of land prices cannot continue forever. Shifting investments to land and from short-term to long-term capital investments has real consequences that cannot

be ignored. Banks expand their balance sheets for a while, but as capital turnover slows down and capital markets lose some of their liquidity, interest rates must rise. Interest rates also increase because landowners treat their unearned gains as current income and raise their consumption, thus lowering their real saving. The upsurge of interest rates should ideally be equilibrating, calling forth more capital. In the circumstances, with much capital trapped unrecoverably in fixed forms, the high interest rate fails to evoke more funds, but worsens the capital shortage by tightening the trap.

- Element 8: Land remains overpriced, even after the economy collapses. When overpricing meets resistance, it is followed by holdout over a long period of attrition. Land has more holdout power than labor (which starves) and capital (which wastes). The holdout of land is aggravated by monopoly tendencies that are inherent in the land market. As the price of property falls below the amount owed by borrowers in their mortgage (i.e., they have negative equity), borrowers abandon their property to the lender. Also, credit contraction increases the unemployment rate, leading to a higher rate of foreclosures. Once banks hold the overvalued assets on their books, they face a choice between writing down the value to the new market value (thereby taking a loss) or holding the property until it can be sold at or near the old price. The latter choice is common, which freezes credit markets for months, years, or even decades. See Gaffney (1994: Appendices 2, 3, and 4).

Austrian cycle theorists have dwelt on this tilting of what they call "the structure of production," with too much capital getting sunk irrecoverably in what they call "higher-order" goods. Well and good, but unfortunately they find its cause solely in "forced saving" from bank expansion, with no reference at all to its geographical roots, and the role of inflated land collateral enabling bank expansion.

Banks should be regulated away from lending on land collateral. Logically, there is a powerful reason to regulate banks of deposit. This is because they are always technically insolvent, never able to meet their short-term liabilities from their long-term assets. A related reform might be to make mortgage notes part of the property tax base. This

idea is so deeply radical that I only hint at it here, without claiming to have thought it through. We will discuss the problems of land as collateral in bank expansion in the third chapter of this volume.

In the remainder of this chapter, I wish to examine two issues: (1) the factors that influence real estate decisions, including holding land and construction of improvements—specifically the location, timing, and intensity of those uses, and (2) how an unbalanced rise in land prices can be avoided, thereby preventing economic crises from occurring. This can be achieved with the property tax and particularly by frequent assessment of property values, so that rising taxes can prevent land price bubbles before they get under way.

The key mechanism for controlling swings in land prices is the property tax. To understand how the property tax performs that service, we will first examine the secondary effects of the property tax on the land use and distribution of ownership.

The elements of the proposed remedy involve improved administration of the property tax. The first remedy is better assessment, including up-to-date assessment. The second remedy involves shifting the property tax increasingly away from taxation of buildings and toward taxation of land.

Later chapters will consider remedies involving changes in the income tax and in bank regulations. In this chapter, I will focus exclusively on instruments that can regulate land price appreciation. The aim is not to prevent the increase in the *value* of land, which is one of the best indicators of the overall health of the economy. However, sharing the value of land and its increments between private owners and the public fisc will have the salutary effect of dampening economic cycles and promoting positive forms of development.

II

Factors Affecting Land Use (Intensity, Timing, Location)[i]

Property taxes affect several aspects of land use: (1) intensity, (2) frequency of demolition and renewal, (3) size of parcel, (4) choice of location of improvements, and (5) the time when land is ripe for higher use. It is the last function of affecting the timing of development that is most crucial in avoiding steep speculative increases in

land prices followed by precipitous declines. However, all aspects of the way the property tax influences development play some role in shaping the land use decisions that affect economic cycles. In short, the property tax affects land use and investment decisions.

The property tax is at least three taxes: one on land, one on buildings, and one on personal property (in practice, business inventories). Each has its distinctive effects. I treat the first two separately, and omit the last, which is the smallest, in the interest of brevity.

The effect of property taxes depends among other things on how high the real tax rate is. A rough national mean today might be about 1–2 percent with a wide dispersion about the mean. At these levels, the tax rate may not seem very high next to mortgage interest rates of 6 percent or so, and annual inflation at 4 percent or so. But subtracting 4 percent inflation from 6 percent makes the real interest rate only 2 percent, down in the same range as the property tax rate. Also, the effect of the tax rate may outweigh the effect of interest at an equal rate if the interest is only forgone interest on equity because the tax is a cash outgo.

A. Intensity of Use

1. Taxes on Buildings

The property tax on buildings is a percentage of their value and is therefore something like an increase in the real interest rate. The cost of a building consists of three independent parts. First, there is the visible cost of the materials and labor that go into making the building. When a builder borrows to construct a building, that cost is the principal of the loan. The second part of the building cost is interest on the loan. The third cost is the property tax, an annual charge against the value of the building over its life of 50 to 100 years. I have not listed those costs in order of importance. Interest is the largest cost by far in building, as it is with all very durable goods. The property tax added is the second largest cost, unless rates are uncommonly low. Finally, the principal on the loan, the cost of the building construction itself, is the third largest cost of a building.

The effect of raising building costs (interest, taxes, labor, or materials) is to reduce construction.[5] And when one does build under

conditions of higher costs, everything about a building that is marginal is made submarginal. Every individual site, considered in isolation, is less intensively improved. Chopped off are marginal increments to quality, durability, height, and all aspects of intensity (excepting lot coverage, discussed separately). In essence, one applies less capital per unit of land. It is a matter of diminishing returns of capital applied to land.

What is marginal to the owner is of more than marginal value to the health of neighborhoods, so the loss of marginal increments to one owner's capital is a collective loss of consequence. In some jurisdictions it has been found that building owners neglect exterior appearance specifically and selectively because they believe it influences assessors.

Taxing buildings makes capital more expensive, just as interest on the building loan does. A 3 percent annual property tax on a building is approximately equivalent to a 50 percent one-time excise tax on the construction of the building.[6] In other words, the building tax portion of the property tax adds 20–60 percent onto the cost of construction, depending on the tax rate. That motivates people to substitute land for capital, and encourages horizontal spread. Vertical rise meets increasing capital costs per square foot, whereas horizontal spread enjoys decreasing capital costs per square foot, up to a point, and saves on capital by consuming more land.

This produces the anomaly that taxing buildings, although it lowers intensity, acts to increase lot coverage. By putting a premium on horizontal spread, it encourages the building to invade the yard. This might be overcome by enlarging the lot, but here one runs directly into one's neighbor trying to do the same thing. A corollary is artificially forced demand for land, and higher land prices. In time this also leads to urban expansion and larger lots. (This is a reiteration of Element 2 above: Overpriced land promotes sprawl.)

A high-rise building is sometimes painted as a desperate expedient of poverty, but it is more accurately seen as a luxury that lets us enjoy the benefits of closer living without walling off all open space. The luxury is available when capital is cheap. Taxing buildings makes capital artificially dear and prices this luxury out of the market.

2. Taxation of Land Value

Because the land portion of the property tax cannot be passed forward or backward, it falls exclusively on the owner.[7] The land tax affects the selling price of land in much the same way the interest rate does. (A higher interest rate or tax rate on land lowers the selling price of land. Lower interest and tax rates raise the selling price.)[8] In theory, the tax on land should be neutral in its effect on land use. However, that is true only under the simplifying but unreal assumption that there is a perfect market for capital. In fact, interest rates vary among people. They are regressive—the poor have lower credit ratings and thus pay higher interest rates. By contrast, tax rates on land are uniform. They are not higher on the poor than on the rich. Substituting taxes for interest therefore undoes the effect of regressive interest rates. Raising the tax rate on land hits the rich owner harder than the poor.[9] This is what gives the land tax a progressive quality. It increases the bidding power of the poor for land, causing them to encroach on lands held by the rich. This occurs through subdivision of large holdings, accelerated release of ripening land to higher uses, consolidation of very small holdings, and sales of land from the rich to the poor.

The effect of land taxes on intensity of land use is therefore not a simple plus or minus. The effect is equalizing as among classes. Land taxes let the poor, who live crowded on poor land, live less crowded and move to better land. They lower density for the poor by raising it for the rich, who own most of the land.

That is not widely understood. It is often advanced that land taxes "force land into use," and result in higher density. This simplicity is catchy and will not easily give way. But it is misleading. Land taxes crowd the rich, but open up more land for the poor. Only from the standpoint of the wealthy are land taxes simply intensifying. Rather, the land tax is redistributive. Nevertheless, to the extent that the rich are able to hold land idle, particularly land with high potential for productivity, a tax on land value will tend to transfer ownership to those who will use it productively, which is likely to increase overall production.

Land taxes tend to lower intensity of land use in fringe areas, otherwise known as sprawl. This has the opposite effect of the portion

of the property tax that falls on buildings. As we saw, the building tax encourages substitution of land for capital, thus promoting demand for marginal land. By raising the cash-flow demands on those who hold high-value land in low-value uses, the land tax promotes development that will meet the demand for land in central, rather than peripheral, locations. This weakens outthrusting demand for marginal land.

B. Timing of Demolition and Renewal

1. Short-Run Effects

When a building is old, the effect of building taxes is probably to lengthen its life, and certainly to defer the renewal of its site. It is not the taxes on the old building itself that lengthen its tenure. On the contrary, they may cause premature demolition and replacement by a parking lot or a vacant lot if the owner can count on the assessor then lowering the valuation, a point on which local practice varies. Renewal is deferred beyond the optimal year of renewal because of the threat of taxes on the successor building.

Because of neighborhood effects, which are mutually reinforcing, what defers renewal of the individual site for 25 years may defer renewal of neighborhoods and cities for 50 years or, in some cases, forever. The city may die. Some cities are dying in this way. Perfectly good land is abandoned, rendered unrenewable by the cumulative neighborhood effects of counterproductive tax policy. This condition contributes to national economic malaise, particularly because the death of cities has neighborhood effects on other cities in the region, as trade falls off among them. This factor is not related to the sudden rise of land prices that causes eventual contraction and economic crisis, but it contributes to the difficulty recovering from such a catastrophe.

Land taxes are more neutral than building taxes in the renewal decision, and in perfect capital markets they might be completely so. In practice, they accelerate renewal because they drain cash from owners of derelict buildings on good locations who are waiting for high bids from potential builders on that site. In this way, land taxes affect behavior not so much through substitution effects (changing

relative prices) but through wealth and liquidity effects. Raising the tax rate on land changes relative wealth and holdout power and credit ratings. The effect of a cash drain on a holdout lowers her wealth and liquidity. The cash drain of land taxes also conveys information to many owners who are only vaguely aware that they are holding a resource of high salvage value to society. Land taxes build a fire under sleeping owners. Anyone who talks with owners of ripening land soon learns that many who are not in debt perceive their holding costs in terms of taxes more than forgone potential revenues, even though the latter are five to ten times higher than the tax bill.

2. Long-Run Effects

Taxes also affect the *planned* life of buildings. Because they act like higher interest rates, they discourage durability, which may be perceived as substituting capital for labor. From this, it is easy to infer that building taxes act to shorten planned life. Easy, but wrong, for the taxes also force substituting land for capital. In the discussion of intensity of use, that meant spreading out in space. Here it means spreading out in time, letting structures stand a long time before demolition.

So we seem to have two contrary forces at work. Building taxes cause us to build less durable structures, but then to defer demolition. These two forces are consistent in that each helps save on capital. They are at odds in that the first appears to shorten life, the second to lengthen it. The matter is resolved by distinguishing service life from carcass life of buildings. Service life is a measure of how many years of useful service is provided by the building. This can be lengthened not only by the use of better building materials up front, but also by investments in maintenance during the life of the building. Carcass life is how long a building occupies a site, which it may do for years after anyone is able to use it. Taxing buildings makes us shorten service life, but lengthen carcass life, thus creating a geriatric afterlife of buildings during which they occupy space without doing much good. Houses are built for faster recovery of capital but slower recovery of site, so that the shells of old structures, the ghosts of departed values, stand to haunt us after they have been drained of most of their serviceability. Taxing buildings defers demolition by weakening the profit motive

to rebuild and increase supply. It also lengthens the dead period between buildings when land is held out of service.

Land taxes are neutral in respect to marginal incentives, but they have a definite wealth effect, especially in contrast to the taxation of buildings. Taxing buildings drains wealth from builders and creates a liquidity crisis for them. Taxing land serves the same discipline to nonbuilders and to the holders of obsolete and inadequate improvements. By this mechanism, land taxes affect the market sharply by encouraging new development. Particularly in the recovery period after an economic downturn, when credit is tight, a tax on land could help to free up financing to redevelop cities.

C. Choice of Location

The effect of taxing buildings is not merely incremental in the manner treated so far. It changes the relative bidding power of different uses, and changes the structure of cities.

In a perfect market, uses needing high accessibility cluster around a center of maximum access. Access is mutual, so the presence of those seeking access is a net benefit to others seeking access, and clustering is self-reinforcing, up to a point. Likewise, uses needing specific mutual access, or access to the same people or things, cluster in specialized neighborhoods and districts. Aggregate transportation needs are minimized, for any level of linkage. There is a logic to market decisions—the "highest and best" use in the market sense also has a good claim to approximating highest and best use in a more ultimate sense of social good (Gaffney 1970b, 1972). So it is a social cost of moment to deny the market allocation of land without some good reason like a playground, minipark, or street.

Two rival uses compete on equal terms for land, and represent equally high and good use, when they have the same imputed site value, S:

$$S = PVR - C, \tag{1}$$

where PVR is the present value of revenues (net, discounted), and C is cost of construction. It is the difference between PVR and C that makes site value, not the absolute size of either. Thus a gas station can

sometimes compete with an apartment; though present value of revenues is less, so is construction cost. But the effect of building taxes varies with C, the tax base. As between two uses equally high and good, that is, with an equal difference of PVR and C, the building tax intercedes in favor of the one of lower construction cost (C). Although its revenue is less, the gas station outbids the apartment because the apartment would have paid more building taxes.

This is a matter of leverage. A given percentage increase in cost cuts deeper into the residual land value afforded by the more intensive use because its cost is higher relative to the land value. Let us give that some precision and generality.

We begin by converting the stream of future building taxes to a lump sum, their present value (PV). "Present value" of the stream means if you borrowed PV and paid it off on the installment plan over the life of the building, your annual payment would be the amount of your building tax. The PV of an annual payment of $1 over 60 years is a lump sum of around $14 (discounting future dollars at 7 percent per year compounded). So a property tax rate of 1 percent of building cost is equivalent to a present value of 14 percent of building cost. (In an earlier example, we used a discount rate of 5 percent, for a present value of about 19 percent of building cost for each 1 percent of tax on the building. Below, we will compare the two.)

The present value of future tax payments comes out of what a builder can bid for land. For every 1 percent added to the tax rate, he reduces his bid by 14 percent of the cost of the planned building (C). The higher is C, the more the disadvantage the high-intensity use has compared with the low-intensity use. Let us couch this in terms of the percentage drop in what competing uses can bid for a site. The absolute drop, for each 1 percent of tax rate, is:

$$-\Delta S = 0.14C. \tag{2}$$

That drop as a percentage of site value is:

$$-\Delta S/S = 0.14\,C/S. \tag{3}$$

The ratio of building costs to site value (C/S) for a high-rise structure might run 8/1. Since $8 \times 0.14 = 112$ percent, the tax reduces the bid by

more than 100 percent and so wipes out the site value. In other words, the person who plans to build a high-rise will be able to build only if the site is provided at no cost. The builder cannot afford to pay even $1 for the site because the building tax has sterilized it for that intensive use. (At a lower discount rate, such as 5 percent, the building tax would wipe out the site value at a C/S ratio of only about 5/1, a less intensive use of the site.)

By contrast, the C/S ratio for a gas station might be only 1/2. (That would be true for a $70,000 gas station on a $140,000 hot corner.) Since $1/2 \times 0.14 = 7$ percent, the oil company can outbid the high-rise competitor. The oil company would need to reduce the bid on the site only 7 percent below the bid it would have made if there were no taxes. The effect of building taxes is to give the less intensive use a comparative advantage over the more intensive.

That does not mean the total abolition of high-rise buildings every-where. This is not the way the world works. It means gas stations get more land, and better land. (They also spread out.) Apartments get less land, and worse. (They also are built shorter.) Gas stations move into the center; apartments move outward to the urban periphery. This helps account for the anomaly of intensive uses popping up on poor land and mixed in with much lower uses, while low uses preempt much of the central land. In general, there is a poorer matching of buildings and uses with sites.

The bias against uses with a high ratio of building costs to site value is a bias against the poor, who live at much higher density (higher capital/land ratio) than the rich and on land of lower unit value as a rule. I noted earlier that the tax on buildings affected incentives somewhat as would a rise of interest rates. Here we reach the limits of that parallel. The building tax is more specifically targeted against intensive use than is the interest rate. In the extreme, on an unpaved parking lot yielding income with no building, the building tax does not lower its value a bit, while a higher interest rate would lower the value. More generally, remembering that site value (S) is equal to the present value of revenues (PVR) less building cost (C), building taxes are proportional to C, while higher interest rates have an effect that is proportional to PVR. Thus the artificial scarcity of capital caused by the building tax is more disruptive to the integrity of urban linkages

than is a natural scarcity of capital reflected in high interest rates. Indeed, high interest rates would also make roads and allied infrastructure costlier, raising horizontal transportation costs and raising the premium on central location.

D. Ripening of Land for Higher Use

Under dynamic conditions, land is often in transit from one use to another and usually higher use. In anticipation of a move, it develops an "expectation value," or speculative value, that is higher than income from the current best use will support. When should the owner take the quantum jump and initiate the higher use? When is the land ripe for the change?

The choice of ripeness date (D) is difficult because a durable building, indivisible in construction, must be placed on the land to shift its use. As demand for the site grows with each succeeding year, the hypothetical optimal improvement that one would put up if he were going to build in that year changes. Each succeeding year's optimal building yields a higher revenue stream relative to the building cost and thus more net present value to the land.

To avoid premature, preclusive underimprovement or other irreversible error, one postpones building. D-date (ripeness) arrives when the value imputed to the site by each succeeding year's hypothetical optimal building stops rising faster than the interest rate. (Gaffney (1969) treats the effect on ripeness of later generations of use, a point omitted here.) If the site value is appreciating faster than the interest rate, then the owner will postpone development. When the site appreciates more slowly than the interest rate (or other investments), then the owner will sell the site and put the money into an alternative investment. (Premature development, while the site value was increasing rapidly, would produce a use that is less intensive than optimal.)

Taxing buildings affects ripeness. We have seen that taxing buildings applies leverage against intensive building. It follows that taxing buildings affects the growth rate of site values, assuming that the optimal C/S changes with ripening. The effect of a building tax is to retard ripeness by reducing the rate of growth of the building cost relative to the growth rate of the site value. The nationwide effect

of having buildings taxed in all jurisdictions is to lower the level of interest rates that investors require land to earn, thus allowing more land to lie idle at any given time. The net effect of the building tax is that landowners build less and build later. This is another way in which building taxes contribute to slow recovery from a recession.

Since buildings on fully ripened land tend to be capital intensive, it might seem that delaying ripeness would lead to more intensive use of space and less sprawl. That is not the case.[10] The main effect is to delay construction of any kind. Part of ripening is not waiting so much for greater demand but for greater certainty. Certainty means waiting for neighbors to commit themselves. Land speculators wait for neighbors to develop their property. Whoever leads off ripens his neighbor's land and shortens the sterile downtime of land between major improvements. Building taxes that retard the improvement of one site thus retard the ripeness of neighboring complementary sites by generating uncertainty. Uncertainty of this kind is an external nuisance every bit as noxious as odors and noises.

Land taxes speed up ripening, but not by adding to carrying costs, as is commonly believed. Instead, land taxes hasten ripening because buildable land is mostly held by wealthy interests whose comparative advantage lies in holding assets where the main cost is forgoing a return on equity. Hastening the ripening of such land is simply an aspect of the transfer from rich to poor discussed earlier. Nevertheless, this is a real effect. Whereas building taxes delay development, land taxes speed up the process, counteracting some of the negative effects of building taxes. It might seem that land taxes would lead to premature development if not offset by building taxes, but that is not true. Anyone who prematurely develops land because of the pressure of land taxes will lose money in the long run by foregoing future development opportunities. Because developers are quite capable of making the necessary calculations, the substitution effect of the land tax is neutral. Meanwhile, the wealth effect of the land tax is better than neutral because it removes the market distortion that is otherwise caused by differential access to credit.

Frequently, the date of ripeness is outside the owner's direct control and depends on when public works are extended. Today, in many suburban areas, sewer hookups are controlling. Here, land

taxes cannot speed ripening until sewer hookups are available. But they can then speed private building to match public sewer extensions and effect great savings on public capital of all kinds. It is traditional to blame premature building and sprawl on ad valorem assessment of ripening land. Premature extension of public works is guiltier, coupled with postmature conversion of ripe land close in, made unripe or submarginal by taxes on building or by preferential rationing of limited sewer hookups to influential speculators in peripheral lands.

III

Avoiding the Real Estate Cycle

WE HAVE NOW SEEN that the property tax—a combination of a tax on land value and a tax on building value—has complex impacts on the intensity, timing, and location of land use.

In this section, we will briefly recapitulate some of the findings of Section II, as they relate to the general issue of land price bubbles.

A. Property Tax Slows Speculation

1. Land Taxes

The basic principle is simple: an increase in the tax on land values raises the cost of holding land, particularly on those who hold land idle. As a result, it spurs development on a continuous and orderly basis, not on the manic and speculative basis of the real estate cycle.

Prospective buyers are less prone to buy real estate for speculative purposes if the tax on land values is high enough to reduce the capital value of the land and if the assessment is up to date (an issue considered below). Land taxation contains a built-in contra-cyclical factor. When a land boom reaches its manic phase, growth expectations rise so high that they offset interest costs: people think they are holding land with no net carrying cost. They expect their homes not just to shelter them but also to pay off their own mortgages, upkeep, and maintenance by appreciating. In this phase, the land tax can serve as an equilibrating force. If land is quickly reassessed at market value,

the rising tax on land during these episodes imposes a sobering cash drain on the participants (Gaffney 1993).

To be effective as a brake on periodic land booms, the tax on land values must be high enough to offset the expected growth of land values, which is the basis for rising prices in the market. If potential buyers expect land prices to rise by 10 percent per year (as they have done during some years in some cities), then the combination of taxes and interest would need to be higher than that to send the signal that the price rise cannot be sustained. Even at a lower rate, the tax on land raises carrying costs and slows down price appreciation during a bubble.

2. Building Taxes

As discussed earlier, the property tax on buildings encourages substitution of land for capital, thus promoting demand for marginal land. Since new subdivision development is part of the activity that occurs at a frenzied pace during the upswing of the real estate cycle, the building tax generally adds fuel to the fire. At the same time, the building tax may serve to overcome the tendency during a building boom to construct extravagant high-rise buildings that will not be occupied for many years following the downswing of the cycle. It seems likely that these two effects offset each other to some extent. On the whole, we should look to the taxation of land values as the key to damping the wide oscillations in the real estate cycle.

B. The Importance of Assessment

Unfortunately, the property tax *as it is currently administered* is prevented from serving as an effective antidote to sudden surges in subdivision, excessive construction, and land price increases that outrun realistic expectations of future cash flow or service value. If the property tax is to serve its proper role in splashing cold water on the overheated real estate market, the assessment process needs to be accurate and to keep up with the rising price of land. In a rising market, the frequency of assessment is of utmost importance, although it is rarely achieved by local tax authorities. The best way to solve that problem would be to eliminate the tax on buildings and to adopt

a computerized mass appraisal (CMA) system at the state level, which would enable assessments to be updated continuously.

1. Accuracy of Assessment

If assessments are not accurate, tax policy is hindered in its ability to send the right signals to potential buyers and speculators in real estate. Vertical inequity is a common problem. Assessments are regressive if lower-valued properties are assessed at a higher proportion of their market value than higher-valued properties.[11] Horizontal inequity is also a problem. In a single city, one property might be assessed at $300,000, and a property of equal value might be assessed at $500,000. Both vertical and horizontal inequity in assessment practices create the sense that the assessment is random, which reduces the power of the property tax to function as a policy tool. Bringing the assessment ratio (assessed value divided by market value) into greater uniformity will rationalize the property market within a jurisdiction, to some extent.

Actually, the situation is worse than the typical study of assessment bias reveals. The assessment/sales ratio understates actual discrimination by not considering properties that do not sell frequently. Turnover is lower among larger holdings, which are the most likely to be underassessed. Thus, it is possible to maintain a high assessment/sales ratio alongside considerable vertical inequity within a jurisdiction as long as low-value property with high turnover is assessed accurately. That is because the high-value property does not show up very often in the calculation of the ratio.

If that hidden bias is true of residential land, it is even more true of other urban land that tends to escape notice, such as old railyards, utility rights of way, and the like. The quinquennial Census of Governments at one time provided valuable evidence of assessment ratios.[12] However, real business property was excluded from the survey before the 1967 report, so subsequent reports failed to show the underassessment of industrial property. In addition, the survey from the beginning failed to include unsubdivided acreage inside standard metropolitan statistical areas (SMSAs). Much of that land is held for speculative purposes, and much is in estates held by the super-rich or as industrial acreage (Gaffney 1973). My own research in Milwaukee in the 1960s

found that industrial land there was assessed at anywhere from 5 percent to 40 percent of the market value (Gaffney 1970a: 169).

In addition, the assessment/sales ratio provides no information about the underassessment of land under existing buildings and corresponding overassessment of buildings. This practice is so wide-spread as to be viewed as normal and thus escape the attention of most researchers. Property owners want the share of building value in their official assessment to be overstated (and for land value to be correspondingly understated) because buildings are depreciable on the federal income tax, and land is not. The IRS is independent of local assessors de jure, but in fact it authorizes building owners to use locally assessed values as evidence to determine what fraction of their real estate is in the depreciable building. To the local jurisdiction, which collects the same tax rate on land and buildings, this might seem like a harmless bias. However, it is a major factor in the failure of assessors to capture the true growth of land value, which is the source of the recurrent folly of the land cycle.

To observe the extent of underassessment of land, there is no simple corrective calculation. To achieve an accurate understanding of land value, one must conduct a detailed reassessment using the building-residual method of valuation, as the great Alfred Marshall insisted, by valuing the land first, as though it were vacant, based on highest and best use (Marshall [1890] 1920: V, Ch. XI, para. 4): "The aggregate site value of any piece of building land is that which it would have if cleared of buildings and sold in a free market." The land value is then subtracted from the current market value of the land-building combination, leaving the building value as the residual. This is a forward-looking method of assessment. In contrast to the methods often used by assessors, who are swayed in their valuations by current or past use of each location, this method defines land value as reuse value, looking always to the future, not the past. Using that method in Milwaukee in 1965, I found that taxable land value was $2.4 billion, or 3.2 times as much the official (equalized) assessed value of land of $748 million (Gaffney 1970a: 170). Since that sort of underassessment of land relative to buildings remains standard practice in the United States today, one of the first reforms necessary to avoid catastrophic binges of land speculation is to adopt the building-residual method

of assessment. If that were done, the true value of land would be reflected in tax bills (and official records), and tax assessors could readily douse the flames of land speculation by rapid reassessment.

Because land is underassessed and buildings are overassessed, an improved system of assessment that corrects those biases would have an effect quite similar to shifting the tax rate from buildings to land. All of the features of a tax on land that are superior to a tax on buildings, including the damping of "irrational exuberance" associated with land booms, would be achieved simply by improving the system of assessment in most jurisdictions. Since the health of the national and international economy depends on this, there may be a need for a higher authority to step in and resolve the problem of systematic bias in current assessments.

2. Frequency of Assessment

Accuracy of property assessment is of little avail in preventing land price bubbles if the assessments are not kept up to date. If land prices double every five years in some areas during a boom, an assessment frozen at some level prior to the mania will have no influence on the behavior of buyers and sellers "flipping" property in the hopes of a quick gain. In theory, assessment occurs every year or every three years in most jurisdictions, but there are so many exceptions that the theory bears little resemblance to the practice. As an extreme example, one county in Pennsylvania was reassessed in 2000 for the first time since 1958 (Junker 2002). During the interim 42 years, the county relied on "base-year assessment," in which the assessment is marked up slightly from the previous year. That method, which has been widely used, ignores changes in the real estate market and mismeasures the true value of properties.

For all of its faults, at least Pennsylvania allows all property to be reassessed at market value, even though the new assessments cannot raise the average property tax bill by more than 5 percent over the previous tax year, no matter how much property values rise. In that sense, frequent reassessment would do little to prevent or slow down land price mania.

The biggest problem with assessment lies in California, Florida, and similar states that have adopted legislation that puts a cap on how

much assessed value is allowed to rise each year. Proposition 13 in California limited assessment growth to 2 percent or the change in the Consumer Price Index (CPI), whichever is less. Florida's Amendment 10, adopted by voters in November 1992, limits the growth of assessment of residences to 3 percent or the CPI, whichever is less. A number of states set limits on assessment increases: Alabama, Arizona, Arkansas, California, Florida, Georgia, Illinois, Iowa, Maryland, Michigan, Nevada, New Jersey, New York, Oklahoma, Oregon, South Carolina, Texas, and Washington (Mikhailov and Kolman 2002).

It is interesting to compare that list with the January 2009 list of foreclosures by state. The top eight states, ranked in terms of foreclosure activity per household (Nevada, California, Arizona, Florida, Oregon, Illinois, Georgia, and Michigan), were all states with assessment limits (RealtyTrac Staff 2009). That does not prove causation, and the data are not stable from month to month, but they confirm a plausible connection between assessment limits and land price bubbles. In states where assessments are legally limited and cannot climb the steep path of rising real estate prices, the tax on land cannot fulfill its potential as an equilibrating force. Limiting assessments has a strong political appeal to long-time residents of a state because it protects them from rising taxes as their location becomes more desirable. The downside is that that seemingly small privilege has consequences that reach around the globe. The U.S. financial debacle has crippled the economies of many other countries, and most of the damage in the United States was done in a handful of states. Those states, particularly California and Florida, allowed land prices to soar by failing to tax real estate at anything near full market value.

IV

Conclusion

THE CURRENT ECONOMIC DISTRESS that afflicts the United States and the world is the continuation of a long historical pattern. The pattern consists of a cycle of rising land prices, overinvestment in capital affixed to land, and widespread purchase of economically marginal land, followed by a rapid reversal of land prices, defaults on loans, and stranded assets that yield no cash flow.

Homer Hoyt identified a cycle that recurred at approximately 18-year intervals in Chicago in the 19th century. Instead of drawing conclusions about the kinds of policies that could prevent the human cost of those cycles in real estate, Hoyt used his knowledge to time his real estate investments, so as to make a fortune.

Nevertheless, Hoyt's data, along with Henry George's theory of periodic depressions caused by land speculation, have provided the origins for my own forays into an understanding of how land and capital interact to cause such deep crises during the downswing of the real estate cycle. That is what I have offered in this chapter.

I have provided considerable detail about how the pricing and taxing of land relates to investment decisions—their timing, intensity, and location. These relationships are important because they demonstrate that there is a connection between local decisions regarding the geographic expansion of the metropolis and national or even global consequences regarding the fate of the economy. The central message, which will continue in the following essays, is this: if economic policy encourages (or fails to discourage) the periodic overpricing of land and the concomitant investment in buildings on marginal land, the effect will be to tie up capital in marginal uses and paralyze the economy. What is perhaps surprising is how few cities, engaged in such periodic manias of overextension, can bring a national economy to its knees. This demonstrates just how sensitive the national economy is to local land markets.

If the reader takes away only one lesson from this essay, it will have been successful. That lesson is simple: the real economy matters. As I will stress in subsequent essays, the theories of Keynes and other schools of economic thought have focused far too much attention on questions of money and finance, as if an economy could be well-managed on the basis of correct monetary policies alone. What I hope I have begun to make clear is that monetary policy is a refinement. It will fail if the basics, involving land and capital, are not attended to. The basics have, however, been neglected for several generations.

Although the current economic crisis is causing great hardship to millions of people, it could perhaps turn out to be of some social value. Since this crisis has begun to reveal how little wisdom contem-

porary economists have on questions about basic economic stability, this could be the occasion for serious reformulation of economic theory. If this crisis can serve to put economists, political leaders, and the public on the path to a healthier economy in the long run, all of the suffering that families will go through may not have been in vain.

Notes

1. According to Fisher (1933: 157, 160): "In Cleveland, in 1926, there were 20 [recorded lots] per hundred in use." For other cities the percentages of subdivided lots in use were: Grand Rapids, Michigan, 24 percent; Chicago, 54 percent; Detroit, 25 percent; Milwaukee, 23 percent; Birmingham, Alabama, 25 percent. Because of this wasteful use of land, "capital expended in the installation of streets, sidewalks, and public utilities lies idle and is rapidly disappearing, while only the miles of decaying sidewalks and reeling lamp posts remain to bear mute testimony to the speculative folly of both sub-divider and 'investor.'" Also see Cornick (1938).

2. Based on recorded real estate activity in Alameda County, California, Maverick (1932) found that subdivision was the most volatile variable in the real estate cycle. He found cycles in that county of subdivision, deeds recorded, and land values from 1853 to 1929 that corresponded very closely with national cycles in real estate. He concluded that "subdivisions, number of deeds, and values all show major movements at the same times, but that the violence of the movements is great in subdivisions, intermediate in values, and relatively slight in number of deeds." Peaks in the number of lots subdivided were in 1876, 1891, 1907, and 1926, which corresponds closely to national land value peaks, which were followed by recessions. Even after smoothing the data, he found that the number of lots subdivided was 10 times greater in peak years of the cycle than in trough years.

3. In purely monetary, demand-side terms, aggregate spending remains the same at first. Consuming the inventory and depreciation allowance means a flow of investing is replaced by a flow of consumer spending. However, the added consumer spending does not flow through the "grocery store" to hire workers, create incomes, and produce goods. It is offset by "disinvestment." If money spending holds up while production and hiring fall, the result is inflation without full employment (stagflation).

4. This section draws heavily upon Gaffney (1980).

5. Delays in construction raise the interest costs of a particular building, which is why contractors are so sensitive to timing issues. However, we are concerned here only with costs that all construction shares, not with indi-vidual projects.

6. This is how that 57 percent figure is derived: using a 5 percent discount rate, a stream of annual $1 taxes for 60 years equals the value of a

$1 annuity over that period, or $18.93. Thus, a 1 percent property tax rate on the building is equivalent to an 18.9 percent excise tax on construction, and a 3 percent property tax rate on the building is approximately equivalent to a 57 percent excise tax. Since the building will depreciate somewhat over those 60 years, we round it down to a 50 percent excise tax equivalent.

7. Taxes can be shifted only to the extent that they influence supply and demand. The tax on land shifts the demand curve downward, but the supply is fixed. The net effect is to lower the price at which it sells.

8. Raising the tax on land reduces its selling price, which reduces the interest cost of buying or holding land. The selling price (V) is approximately equal to the net rent of the land (a) divided by the sum of the interest rate and tax rate, or $V = a / (i + t)$. Since $a = Vi + Vt$ (interest payment plus tax payment), if the property tax on a parcel rises by $500, the interest payment on that parcel will fall by $500. In other words, the tax on land does not raise the cost of holding land. Instead, it displaces the interest cost. More is paid to the tax collector; less is paid to the bank or other mortgage holder.

9. The carrying cost of land (c) is equal to its price or value (V) times the combination of interest (i) and the tax on land value (t). So, $c = V(i + t)$. The poor pay more to carry a given piece of land, because the cost is mostly interest. As t is made larger, V falls, so Vi falls, and the impartial tax cost displaces the regressive interest cost.

10. "Marginal" land connotes low intensity, but the connotation is misleading. Our intuitive sense of intensity is based on a physical or per acre concept (such as capital invested per acre), while economics is concerned with values (capital invested per dollar of revenue or service value). (Since site value [S] equals revenue [R] minus cost [C], or $S = R - C$, then $C = R - S$ and $C/R = [R - S]/R$.) The cost/revenue ratio defines economic marginality. Since a marginal site is one with little site value, that means $(R - S)/R$ (or C/R) rises toward unity on increasingly marginal locations, as less and less revenue is left over to provide site value. In these terms, marginal land, or land with a high cost/revenue ratio, is the most intensively used. Thus, when land ripens, it is used at a lower economic intensity, with higher site value (or economic surplus), as C/R falls.

11. A few recent studies revealing the regressive character of assessment in many jurisdictions are Sirmans, Diskin, and Friday (1995); Goolsby (1997); and Cornia and Slade (2005).

12. The final report on assessments was U.S. Department of Commerce, Bureau of the Census (1982).

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