

CHAPTER THREE

A New Look at the “Henry George Theorem”

... [T]he value of land is at the beginning ... nothing, but as society develops by the increase of population and the advance of the arts, it becomes greater and greater. In every civilized country, even the newest, the value of land taken as a whole is sufficient to bear the entire expenses of government. In the better developed countries it is much more than sufficient...

— Henry George

The “Henry George Theorem” states that the level of rents in a country or a given area will be equal to, or close to, the regular spending of government in that area, so that a simple uniform tax on land (and location)—a tax that would not reduce or distort economic activity—will raise enough to support the costs of normal government activity. Clearly, this theorem is central to George’s major policy proposal, the single tax on land, which became the basis for a popular movement worldwide and caused a huge upheaval in the British Parliament, though support for it never reached that high a level in the United States.

The Traditional Case

Many arguments for this have been advanced, and alleged proofs offered—starting, of course, with George himself, who chiefly

noted that the advances in output that gave rise to rents also depended on parallel increases in government. More public goods and services will be needed to support increases in private output, so government activity tended naturally to move together with the growth that drove up rents. But George had a further point: private growth would be faster and more reliable if government were able to deliver the public services—roads and bridges, schools and sewers, police and courts, etc.—needed to support development and markets. Moreover, government spending tended to increase land values. Taxing labor and investments would just slow down development, but taxing rents would not; the recipients of rents performed no necessary services—indeed, they often stood in the way of productive activity. Taxing rents would provide a fund for government investment in public services. Rents should therefore be taxed to the full and the taxes spent on public investment. Government spending would then not only rise to the level of rents, if the latter were taxed to the limit, but would also push up land values as it increased, raising rents as well.

In fact, rents were never taxed to the full; taxes on rents tended to be a part of property taxes, varying across jurisdictions, especially in the United States, and at different times. For a long time, it still seemed that rents and government spending moved together and stood at roughly comparable levels. Georgists offered an argument to explain this—that public spending drove land values higher—which seemed plausible, but why was the increase in land values about the same in magnitude as the additional public spending? What about private investment

spending—did it not also drive up land values? Was it not also true that some kinds of investment—the new factory produces a smell, there goes the neighborhood!—reduced land values? Neighborhoods might simply deteriorate, losing value—how would we know? It seemed likely that many factors were involved, so the Georgist claims were not very convincing.

Economic theorists interested in the George tradition offered mathematical “proofs”—building models and deriving the result that the level of aggregate rents equaled the level of government spending. The so-called “proofs,” however, are neither very convincing nor very Georgist, because they start from an individualist neoclassical framework, so they do not capture the essentially classical ideas of Henry George. Moreover, they are too static, often running together profits and rents or even consumption and investment, and finally, as with much mainstream thinking, assume that “individuals” can make “choices” based on information they could not possibly have.⁸

⁸ Stiglitz has presented an argument (Atkinson and Stiglitz, 1987), repeated and developed by Foldvary (2005), to claim that a simple derivation will show that rents equal government spending (assuming implausibly that the land/labor ratio is optimal, and that wages and investment are combined, so profit as the payment for the services of capital equipment is ignored.) The variables are Y = output, N = employment, G = public goods (government), X = private goods, and R = rents. The demonstration works as follows:

$$Y = f(N) = XN + G, \text{ from which it follows that } X = (Y - G)/N.$$

Next, marginal productivity is introduced:

$$dY/dN = X = \text{“wages.”}$$

Empirical studies, however, do show that over long stretches of time the two were fairly close,⁹ although after World War II it seems that government spending came to substantially outstrip rents, even if “rents” are defined quite widely (that is to say, to include all kinds of earnings from monopoly or oligopoly power, not just land and location and resources; see the appendix to this chapter). But was that long-term closeness merely an accident? Let’s consider the question.

But it is actually investment plus consumption per worker, and private goods per worker, so

$$dY/dN = (Y - G)/N, \text{ and thus } G = Y - XN = f(N) - f'(N)N.$$

But,

Rent = Output – Total Private Earnings (of private goods), so

$$\text{Rent} = f(N) - f'(N)N = G.$$

This is really not acceptable, plus the entire exercise is concerned with the properties of a position of static equilibrium. Normally, $Y = C + I + G$, but here it seems that $Y = X + G$; that is, output is divided between private goods, X , and public goods, G . The division of private goods between those intended for consumption and those intended for investment—a key determinant of the rate of growth—is not considered, in spite of the fact that the increase of rents depends on the rate of growth. But worse, if $Y = X + G$, as it must if the conclusion is correct, then $Y = (Y - G)/N + G$, so that $NY = Y - G + NG$, implying $N = (Y - G)/(Y - G) = 1$. What does this mean? Should we interpret $N = 1$ to designate full employment? If $N = 1$, a constant, can we legitimately consider $f(N)$ and $f'(N)$? Clearly not. If N is constant, $dN = 0$, and dY/dN is illegitimate.

⁹ Correspondence with Andrew Mazzone, 2015–16.

Rents, Demand Pressure, and Taxes

The argument can be made that rents arise because of demand pressure against fixed positions—land, locations, resources—driving up prices. Demand pressure, in turn, arises because of expansion, itself partly the result of government. But government development is, in turn, driven by the desire to expand the economy, which requires police and courts, schools and sewers, roads and bridges and harbors, public health and welfare—not to mention military preparation or science and technology. We can consider how things might look, if, in fact, the expansion driving the rise in rents and the expansion driving the increase in government spending were both driven by the development of private and other (e.g., cooperative) investment.

Suppose taxes fall on income and sales, while spending goes toward goods and services; it might seem that the taxes would reduce the demand pressure driving up rents. If the tax is collected before or during the economic activity in question, then it might well reduce demand, so that rents would not rise as much. That is to say, growth would still drive up rents, but growth financed by taxes would drive them up less. The taxes would reduce private spending—unless they were uncertain in amount and collected at the end of the period, as with many income taxes. Growth financed by borrowing, on the other hand, might be more stimulative, since the funds borrowed might come from banks in a flexible monetary system.

The issue is complicated, however. Suppose the initial impetus to demand is an increase of government spending to hire

new employees (police, firefighters, administrators). Assuming wages and salaries are spent on consumer goods, if this new government employment is financed by a tax on wages (or a sales tax on consumer goods) that is just sufficient to cover the additional spending, no net stimulus will be given to the economy: the tax will reduce overall consumer spending by the same amount the new government hiring will increase it. So there would be no additional pressure on fixed positions, leading rents to rise.

But if the tax is collected later—especially if it is calculated later, as with many income taxes—then it may not have as much impact on spending. In this case, taxes would not have such a great effect on the impact of growth on rents. If financed by bonds underwritten by banks operating in a flexible monetary environment—such as we have today in the United States and the UK—a government spending expansion will definitely increase overall demand, and drive up rents. This will also be the case if the government funds its spending directly by “creating money,” although in this instance there may be a need to “sterilize” the new money in order to forestall inflationary pressures. (This means taking policy measures to prevent the new money from flowing into re-spending channels, for example attracting it into financial markets.)

Of course, the Georgist point is that taxes should fall wholly on rents, not on the productive economic activity that generates the pressures creating rents, and that if they did so, growth would be stronger and employment higher.

Analyzing Growth

Recall our analysis of growth from the initial period to the next period. New settlers move in, new patterns of cooperation emerge, certain locations prove highly advantageous, others have serious drawbacks, some resources are better than others, some land is easier to cultivate—in short, there are many kinds of differentials. Those who have positioned themselves in favorable locations will benefit, either by producing at an advantage or renting their positions to other producers. The pressures generating growth work themselves out partly by expanding economic activities—investing and building capacity, intensifying cultivation, producing more goods and services, furthering the division of labor and innovation—but also partly by paying rents for access to and use of superior locations and resources, and by driving up the price of scarce skills and specialized knowledge and tools.

Growth and Rents

The size of the rents at any time—the amount of purchasing power drawn away from wages and profits—will be proportional to the rate of growth, g . Let us call α the proportionality factor; it could equal 1, so that g puts full pressure on rents, as Henry George thought; or it could be significantly less, in which case growth will increase rents but the effect could be small or negligible. In either case, the rents in any period will equal α times g times Y :

$$R_i = R_{i-1} + \alpha g(Y_i - Y_{i-1}) = R_{i-2} + \alpha g(Y_{i-1} - Y_{i-2}) + \alpha g(Y_i - Y_{i-1}) = \dots$$

Redoing the numbers for the periods and rewriting,

$$R_N = R_0 + \alpha g[(Y_1 - Y_0) + (Y_2 - Y_1) + \dots + (Y_n - Y_{n-1})].$$

Rents are proportional to g , but if at any point $g = 0$, rents do not disappear; they fall to their previous level, R_{i-1} . If $g < 0$, then rents will diminish from the previous level in proportion to negative g . For the moment let us assume that g is always the same; or perhaps, that a moving average of g 's over several years is constant. Clearly, then, we can replace the rental term at the beginning of the right-hand side of the appropriate formula for rents all the way back to the beginning of the "settlement."

Growth or Development and Costs of Government

Let's reconsider growth and development as settlers move in and find a place on the "unbounded savannah," this time noting that new settlers inspire transformational growth, not growth through replication. With more people there can be more cooperation, and more opportunity for the separation of function and division of labor to create greater productivity and greater prosperity. As this takes place it will require more and more public goods—roads, bridges, public health measures, police and courts, schools, etc.—in order to take full advantage of

the possibilities opening up. Suppose new settlers arrive and are able (with funds they brought with them or through loans from the newly emerging banks) to expand cultivation, opening new lands. This additional demand for land traditionally drives up rents. But these settlers also open blacksmith shops, grocery stores, and hardware stores, set themselves up as doctors, nurses, and lawyers. The new areas will be further from the established center(s); they will very likely (but not always) have poorer resources, and less advantageous locations; rents will rise. But the new areas will need police and roads and bridges and schools and sewers. *Government will expand in pace with the advance of settlement.*

To model this, let τ be the coefficient indicating the amount of new government spending required, calculated as a fraction of the new growth in economic activity. Put another way, it shows how much government must increase its activities to manage and support the growth of the economy, expressed as a fraction of that growth. (Note that τ is exactly analogous to α .) Then we can write an equation for government (G) that echoes the equation for rents:

$$G_n = G_0 + \tau g[(Y_1 - Y_0) + (Y_2 - Y_1) + \dots + (Y_n - Y_{n-1})]$$

Now compare this with the equation for rents; they are the same except for the coefficient and the initial terms. As a result, we can combine and solve, giving us:

$$(R_n - R_0) / [G_n - G_0] = \alpha / \tau$$

The ratio of aggregate rents to the total costs of government depends only on the coefficients. If they are equal, then the Henry George Theorem will hold; if they are not equal but close, then rents will be close to covering the costs of government—though the discrepancy could go either way.

In any case, it seems that rents and the costs of government must tend to rise together in the kind of society George envisioned. Consider the case just described: New settlers invest in land and in businesses, expanding the area of settlement. Now government must also expand in this area, in pace with the rise in business. But *an increase in government tends to lead to increases in productivity and in innovation*. However, an increase in productivity will lead to an increase in the demand for land, since existing businesses can make do with fewer workers, and workers so released will seek land to set up new businesses, driving up rents.

There is a good case for something like the Henry George Theorem to hold true in a society that is largely agrarian and craft-based, prior to mass production. But once industry adopts mass production technology, labor will be displaced on a large scale by farm machinery and flow to the city. Rural rent payments will tend to fall, urban to rise; aggregate rents will tend to increase, because urban rental rates will tend to be higher, but the total impact on rent is likely not to be that great, certainly less than doubling it. Monopoly, however, will increase, and new forms of “appropriateable” space—for example, air rights, light, intellectual property rights—will emerge. Financial “monopolies” will develop, and some of this will be driven by growth.

By comparison, the move to the cities and suburbs will have an enormous impact on the costs of government, leading it to increase by factors of 3, 4, 5, or more. Think of congestion costs, of public infrastructure, of public health expenses; think of the increase in policing and in the courts; think of the changes in the nature of the family—and the consequent need for caring for children and the aged. Importantly, these changes tend to *interact*, so that the need for government oversight and control rises not additively, but multiplicatively, as growth and development take place. As a result, government costs may go up exponentially, rising much faster than rents. Suffice to say, in the United States (as elsewhere), as the rural percentage of the population has declined and the urban increased, the agenda of government has changed, and the costs of government have risen dramatically.

So, in the age of mass production, and still more in the information economy, the Henry George Theorem may be out of date: rents alone may not cover the cost of government. But a more comprehensive notion of “rents,” applying to an extended concept of “land” and more contemporary forms of monopoly, might. (In the appendix below, Andrew Mazzone recasts the 2016 GDP accounts for the US to account for the influence of monopoly power.) The single tax could still have a role to play—the case for it is still sound—and it can probably make an important contribution, although it may not be able to do the job alone.

In this regard, the Henry George approach could be extended: instead of focusing only on rents and real estate, it could

consider the whole financial sector. Just as Henry George advocated taxing rents, we could now consider taxing financial earning.

Discussion of Revised 2016 GDP Accounts, by Andrew Mazzone

In today's world, the discussion of monopoly has become prevalent. Since the 2008 financial crisis and the consequent examination of its causes, speculation and the unequal distribution of income have been cited as proximate causes. There is plenty of good literature on this subject today, which I will bypass in the following discussion. My contribution to these debates revolves around the application of the philosophy and economics of Henry George. George wrote his seminal work, *Progress and Poverty*, in 1879. In that book, his essential proposition was that land speculation was a prime mover of the boom-and-bust cycles in capitalist economies, and that taxing away land rents and using them as the basis for funding government would go a long way toward curing the basic ills of the capitalist system. The fact is, there is no one supercure for any one wrong in a social system. But George's model has emerged repeatedly as one that warrants testing. However, testing has occurred only in sporadic ways at various times and in various countries. When tried, it has exhibited positive tendencies, but not in a manner sufficient enough to persuade wholesale adoption of his policy. It is true that, in effect, taxing land typically amounts to taxing the very wealthy in a capitalist society. As a practical matter, there is no expectation that this group would enthusiastically back such a

tax, and I will not further belabor this point. But the one reason that is cited over and over as the reason to dismiss the George theorem out of hand is the assertion that there simply would not be enough land-tax revenues to fund a modern-day government. This study seeks to dispel that notion.

In George's day, government expense as a percentage of the gross domestic product (GDP) was 5 percent or less. Today, it is 25 percent in the United States. In current-day US GDP accounts, rental income is recorded as 2 percent to 3 percent of GDP. Leading economists of our day, such as Paul Krugman, rightly dismiss the 2 percent figure as not worthy of discussion. As a prelude to my further commentary, I am going to broaden George's concept of monopoly from land only into land plus other monopolies that have arisen in a modern economy. Thus, even though land and land-related monopolies remain a significant driver of monopoly in the capitalist world, I am extending George's theory of monopoly to encompass the broader instances of monopoly that are found in today's economy. To that end, I have recast the 2016 US GDP accounts to illustrate the amount of monopoly in the US economy, by line item. The details are available for inspection in the chart below, but together they amount to approximately 22 percent of GDP. (We could add \$440B in interest payments on homeowner properties to the above table in the Real Estate and Excess Monopoly section. There may also be another \$300B to be collected in user fees on government-owned infrastructure. We should distinguish cash flow items from those that represent accounting changes—but we have not carried out these changes at this time.)

If you take total tax collections in the United States—including local, state, and federal—these equal 25 percent of GDP, or roughly the amount in my recast GDP accounts. Moreover, one can easily fund a half-trillion dollars in the US tax collections if you assume the following: first, by making income distributions much more favorable to middle-class and working-income people, who have a higher marginal propensity to consume goods and services than the top few percent of the population; and second, by shifting, where possible, *from* income, sales, and corporate taxes *to* taxes on monopoly. Such approaches would result in far better alignment of the motivational tendencies across workers and business owners. These would probably increase economic activity and, by extension, increase tax revenues.

The implementation of such taxes would have to be done over a reasonable time period. For, while we can speculate on the possible good benefits, we can't know their impact for certain from a macro perspective until they are put into practice. Practically speaking, it's highly unlikely that we would make a total shift to taxing 100 percent of monopoly rents; however, we should attempt to precisely identify the magnitudes at issue. Therefore, to aid in establishing a mechanism for assessing land rents, which are not formally developed for taxing purposes and are constantly open for debate, I have proposed a simple empirical approach, which suggests conclusions as follows:

- 1) Land rents are a function of economic activity in a given area.
- 2) The proxy for economic activity is either city domestic product, or state domestic product, or national domestic product.
- 3) Over any given real estate cycle, the average values of land will approximate the GDP for that area. In other words, we can postulate a one-to-one correspondence between the value of land and the value of GDP.
- 4) If we analyzed land values by individual states in the United States, we would find that land values are greater than GDP in the slow-growing states and lower than GDP in the fast-growing states. They average to a one-to-one ratio when combined.

It's a fact in the United States that there is a tendency to both under-assess land and to delay reassessment of land. From a real estate operator's point of view, this is rational, because structures can be depreciated but land cannot. Thus, the market value of real estate can be shown to be primarily that of structure, not of land by means of lagging land assessments.

Reconstructed 2016 GDP Accounts

Reconstructed 2016 GDP Accounts					
Economic Indicator	2016 GDP (Actual)		A Monopoly Adjustment	2016 GDP (Modified)	
	USD Trillion	Percent		USD Trillion	USD Trillion
Gross domestic income	19.0	100.0		\$19.1	100.0
Employee compensation, paid					
Wages and salaries to persons	8.0	42.1	(.7) ¹	7.0	36.6
Supplements to wages and salaries	1.9	10.1		1.9	10.0
Taxes on production and imports	1.2	6.3		1.2	6.3
Net operating surplus					
Private enterprises					
Net interest and miscellaneous payments, domestic industries	0.7	3.7		0.7	3.7
Proprietors' income with inventory valuation and capital consumption adjustments	1.4	7.4	(.1) ¹ (.15) ² (.25) ²	.87	4.5
Rental income of persons with capital consumption adjustment (return from structures)	.42	2.2		.42	2.2
Excess rental income (return from land)	(.28+.5) .78	1.5	.56 ³ .7 ¹ .3 ¹ .1 ⁴ .2 ⁴ .75 ³ .5 ²	3.89	20.4
Corporate profits with inventory valuation and capital consumption adjustments, domestic industries	1.7	9.0	(.2) ¹ (.15) ² (.25) ²	.97	5.1
Consumption of fixed capital					
Private	2.4	12.6	(.75) ³	1.65	8.7
Government	0.5	2.6		0.5	2.6
Capital gains (not land related)	.49			.49	

¹ Monopoly due to excess (in billions of US dollars): finance (\$350), patent charges (\$210), CEO and executive compensation (\$150), professional charges (\$200), and technology profits (\$90). Sources: Baker (2015); Henry George School research studies (2016).

² Returns due to leasing land. Sources: AIG (2011); Loopnet.com (2016).

³ Depreciation due to nonresidential fixed investment. \$2.3 trillion is adjusted by the following factors: .66 to separate real estate depreciation from non-real estate depreciation; .66 to identify nonresidential depreciation; and .75 to adjust for recapture of depreciation. Source: Federal Reserve Bank of St. Louis FRED database, January 2016.

⁴ To reverse resource rents credited to both corporate profits and proprietors' income. Source: Royalty Exchange, Denver, Colorado, 2017.

⁵ Capital gains not listed in the GDP accounts are allocated to excess rental income for illustrative purposes. GDP calculation is for real estate/land only. Source: CBO/JCT (2016).