

## Why Rent Matters:

Explaining wage and output stagnation with the classical and neoclassical determination of wages and rent

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An economic puzzle yet to be adequately explained is why wages have stagnated despite an increase in per-capital GDP. A possible answer examined here is the extent to which the gains were captured by increasing land rent, capitalized into higher land values. The classical theory analyzed here claims that an on-going increase in productivity will increase rent by a greater proportion than the increase in wages, and may end up not increasing wages, the entire gain swallowed by higher absolute rent and a greater ratio of rent to wages.

This paper presents the following propositions based on classical theory:

- 1) When there is a gain in productivity, land rent will rise by the same proportion, while wages will at first rise by the gain minus the cost of creating and applying the investment.
- 2) If greater productivity enables profitable production to move into previously submarginal areas, rent rises and wages fall.
- 3) Speculative land holdings used suboptimally exacerbate the rise in rent and fall in wages.
- 4) These propositions have economic significance because the portion of land rent in national income has been calculated to be between a fifth to a third or more of national income.
- 5) Much of the rent is not currently observed and counted because it consists of hidden and suppressed rent, hidden in other categories such as taxes and interest, and suppressed by policies that reduce the rent that would otherwise be paid.
- 6) The use of rent for public revenue would convert suppressed rent into explicit rent that would promote growth, raise wages, and reduce income inequality.
- 7) To have beneficial effects, a tax on land rent or land value would not even have to tax additional rent, but could collect the potential rent, already being taxed indirectly, into rent taxed directly.
- 8) The broad theoretical implication is that neoclassical theory is significantly incomplete, and would be made more comprehensive and better able to remedy economic woes by integrating the relevant classical theory that was jettisoned during the neoclassical turn.

### I. Theories and depictions of rent and wages

#### *Neoclassical theory*

In the neoclassical theory of wages, there is an aggregate production function, output  $Y$  as a function of number of labor hours  $N$ , holding capital goods and land constant (figure 1 below). Labor has a diminishing marginal product with increasing  $N$ . The slope of a point on the aggregate production function is the marginal product of labor, which equals the wage level, thus determining the demand for labor. The real wage  $W/P$  and employment  $N^*$  are set by the intersection of labor demand and supply.

Figure 1: **Aggregate Production Function**

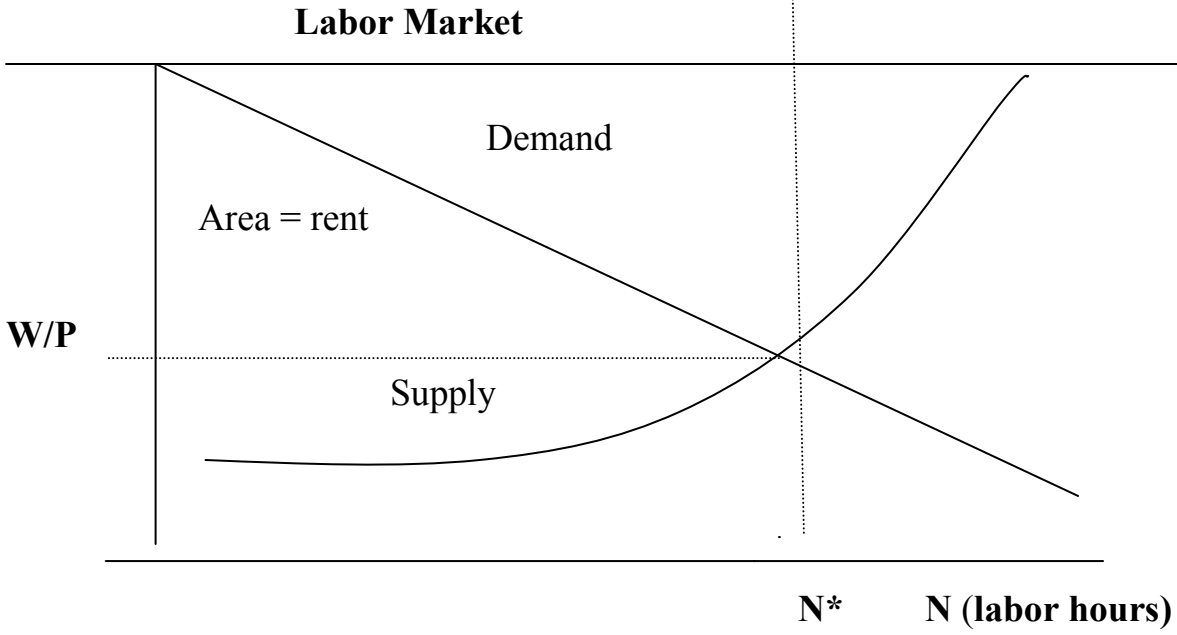
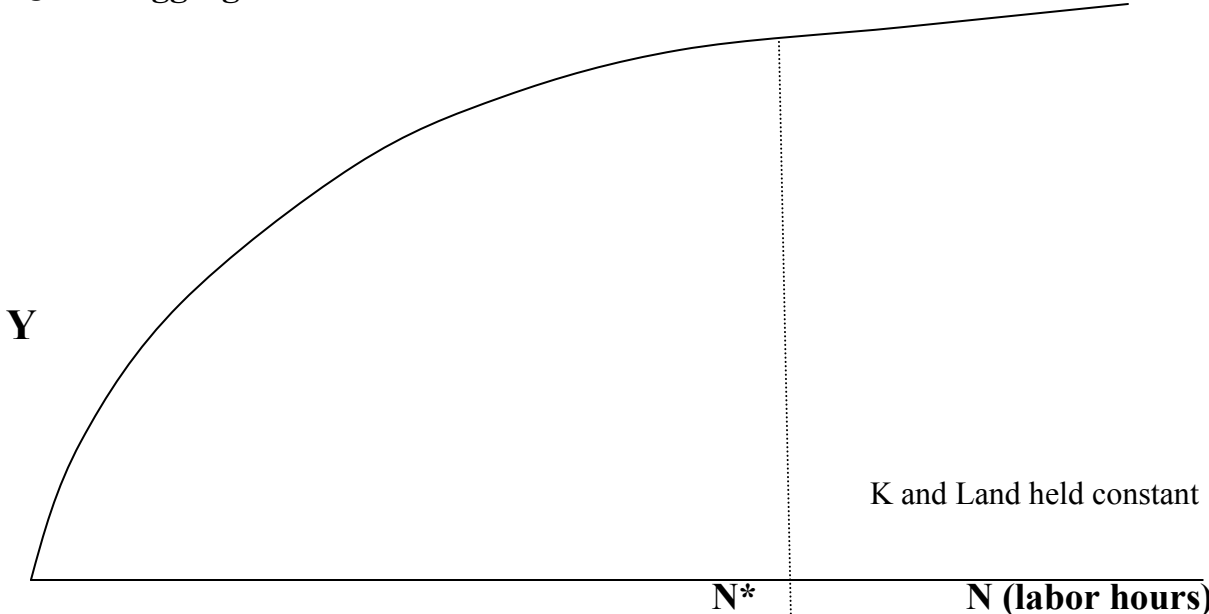


Figure 2



Since the marginal product of labor is less than the average product, given the long-run competitive equilibrium with zero profits, there is a surplus (AP minus MP) which is absorbed by land rent, given competitive markets for labor and capital goods. The area between the demand for labor curve and the wage constitutes land rent.

However, the usual neoclassical depiction of land rent shows a vertical supply curve, representing the fixed amount of land (fig. 2 above, “rent in the property tax on land). The demand curve slopes down as the quantity of space demanded rises with lower rent. The intersection of supply and demand sets the market rent. The area above the rent line is the users’ surplus. The land rent is the rectangle bounded by the rent line and the vertical quantity line. The rent is a pure surplus, as land has no cost of production. A tax on the rent does not affect the rent, and does not shift supply or demand, thus a tax on land rent has no deadweight loss.

Whereas a tax on produced goods raises the buyer’s price, a tax on a good with a fixed supply reduces the price, since the price of land could fall to zero without changing the supply. Given a constant rent, interest rate, and tax rate, the price of land equals the rent divided by the sum of the interest and tax rates:

$$p = r / (i+t)$$

where  $t$  is the tax rate on land.

The portion of rent that is taxed equals  $t / (i+t)$ . The taxation of land rent is equivalent to the taxation of land value. Since the price of land falls when taxed, after the transition, a tax on land value is not a burden even to the new landowner, since the tax replaces what would have been paid in mortgage interest. If the psychological impact of the tax paid in money is greater than the opportunity cost of foregone rent, the tax on land value pushes land towards its optimal use.

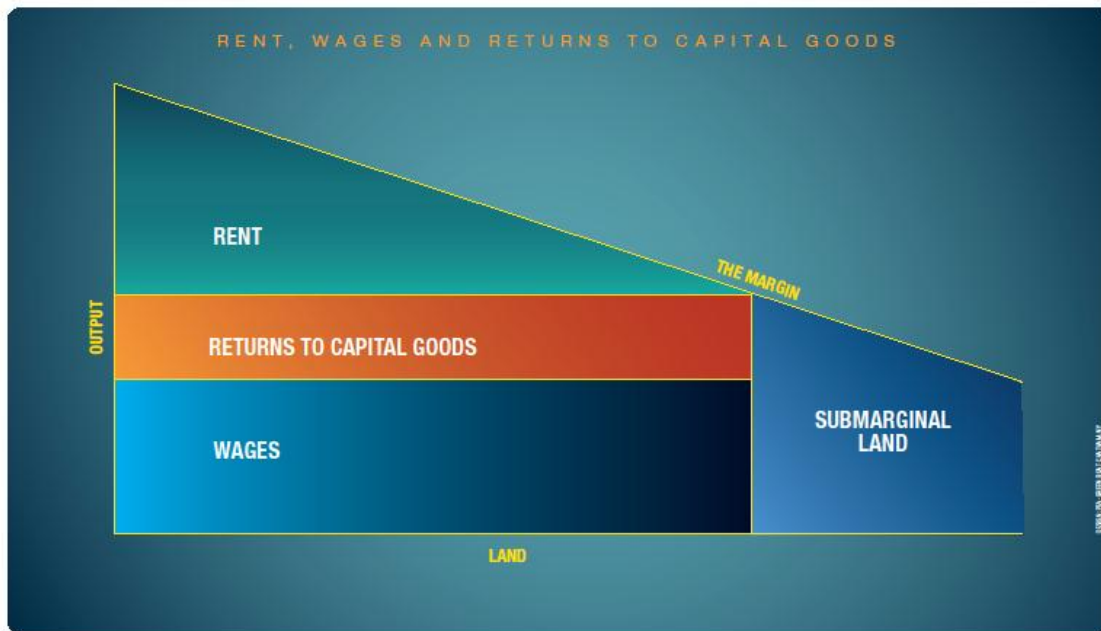
Mason Gaffney (1994a) and Nicolaus Tideman (1999) have argued that a tax on land value is better than neutral, i.e. there is a benefit to taxing land value aside from the public revenue. One reason is that credit markets are imperfect, hence potential buyers with actually good credit are denied loans due to the uncertainty of their credit worthiness. The lower price of land would enable them to acquire real estate. Secondly, during a real estate boom, the most optimistic speculators buy real estate towards the peak of the boom, and then they suffer the winner’s curse. Land value taxation would prevent this by avoiding land-value booms (Foldvary 2005).

Loans to purchase land value are unproductive and crowd out loans for investment. By reducing the price of land to a small fraction of the non-taxed price, a tax on rent or land value would replace loans to purchase land with more loans for enterprise and capital goods.

Figure 3



Figure 4



*classical theory*

The classical theory of land and wages was set forth predominately by David Ricardo (1817), and later modified by Henry George (1879). Whereas neoclassical land theory typically is focused on a vertical supply, classical theory recognized that there are various grades of land quality or productivity. This classical model can be represented by a histogram (figure 3 above), the rectangles depicting declining productivity of land. An agricultural model best illustrates the essential features (Foldvary 1994).

In a classical-school dynamic agricultural model, at first the land is occupied by farms of equal size with one worker per farm. (Figure 4 shows the classical model with a linearly declining output rather than with histograms, and with three factors.) The “margin of production” is the least productive land in use. Land beyond that is submarginal. The land at the margin has no rent. The production in super-marginal land beyond payments for labor and capital goods constitutes land rent.

Classical theory has a “law of rent” by which land rent is the differential rent. If each plot of land has the same amount of labor, then the rent of a plot of land equals its output minus the output at the margin of production.

In a dynamic presentation of the model, capital goods are first omitted, leaving land and labor as the original and ultimate factors. By the classical “law of wages,” the wage level for unskilled labor is set at the extensive margin of production, since workers are mobile. As land becomes occupied, new settlers occupy land at the margin and shift the margin out. Thus with population growth, as the margin moves to ever less productive land, wages fall and rent rises (proposition 2).

Henry George added land speculation to the model. If land can be claimed without being used, marginal land gets claimed faster, and those who seek to use land push the margin further out. Thus the effect of unproductive land holding is to further depress wages and raise rent (proposition 3). Wages are not necessarily at subsistence, but population growth will depress wages until they reach subsistence, unless countered by greater productivity. Empirically, in much of the world, low-skilled workers are poor, while much of the wealth goes to rent.

In a particular firm, when the marginal product of labor is greater than the wage, workers are added until the marginal product equals the wage. The workers with the lowest marginal product constitute the intensive margin of production. The marginal products of the extensive and intensive margins are equal. Since, before the intensive margin, the marginal products are greater than the wage, the additional labor hired up to the intensive margin further increases the rent surplus. Hence, the employment of additional workers in super-marginal lands does not change the classical rent/labor relationship, but intensifies it. The more intense use of land, with more labor, does change the simple law of rent: the rent of a plot of land equals its output minus the costs of labor and capital goods, rent being a residual that does not affect the price of goods.

When capital goods are added to the classical rent-wages model, the effect is first analyzed at the rent-free margin of production. The capital goods (also representing better

technology) increase output, and if the increase is greater than the cost of the goods, then wages will rise by the difference. By the law of wages, the economy-wide wage level is set at the margin of production. Since labor and capital goods cost the same throughout all lands, much of the gains from economic progress is captured by rent. For example, if output doubles at the margin, and half of the increase is paid for capital goods, then wages increase by 50 percent, while rent doubles for all qualities of super-marginal land. Generally, as stated in “proposition 1” above, when there is a gain in productivity, classical theory proposes that land rent will rise by the same proportion, while wages will at first rise by the gain minus the cost of creating and applying the investment.

Rent in the classical model has a counterpart in the neoclassical model of the social surplus in competitive industries. If the costs of labor and capital goods is uniform, then the long-run supply curve slopes up only due to the differing locational productivities. Low-cost firms are so because their locations are highly productive, and they pay for this greater productivity in rent. Hence the “producer surplus” represents the same rent as the classical model of land and rent. Since the landowner does neither produces goods nor land, he is a non-producer, and the surplus could more aptly be termed a “non-producer surplus” (Foldvary, 2005).

Whereas many economists believe that total rent is much smaller than the amount of government revenue, they overlook the phenomenon of much of taxation coming from rent or being at the expense of rent. Suppose the consumer and “producer” surpluses are equal, and that rent is 20 percent of income. Then half the surplus that goes to tax comes from the “producer” surplus, i.e. rent, and 20 percent of the consumer surplus that gets paid as tax comes from rent, hence 60 percent of the tax would be from rent or at the expense of rent (figure 5).

The shrinking of the “producer” surplus from taxation (whether the tax is on sales, value added, or income) reduces the observed rent. The tax is thus at the expense of rent by reducing what otherwise would have been paid as rent. There is a reduction of kinetic rent but not of potential rent. As stated in proposition 7, to have beneficial effects, a tax on land rent or land value would not even have to tax additional rent, but could collect the potential rent, already being taxed indirectly, into rent taxed directly.

We can divide rent into three categories regarding its visibility. First is the observed or explicit rent, payments of tenants to landowners, including forms such as admission charges. Second is hidden rent, including the rental value of owner-occupied real estate, the portion of corporate profits that is land rent (figure 6), the implicit benefits of government-held lands, the portion of land rent that is paid in property tax and income taxes, and the portion of mortgage interest that comes from land rent. Explicit and hidden rents are both kinetic, in that they consist of explicit and implicit flows. Third is suppressed rent, the reduction of rent caused by imposed governmental costs, including taxation and excessive (unproductive) regulations (proposition 5). The potential rent includes the kinetic and the suppressed rent.



Figure 6

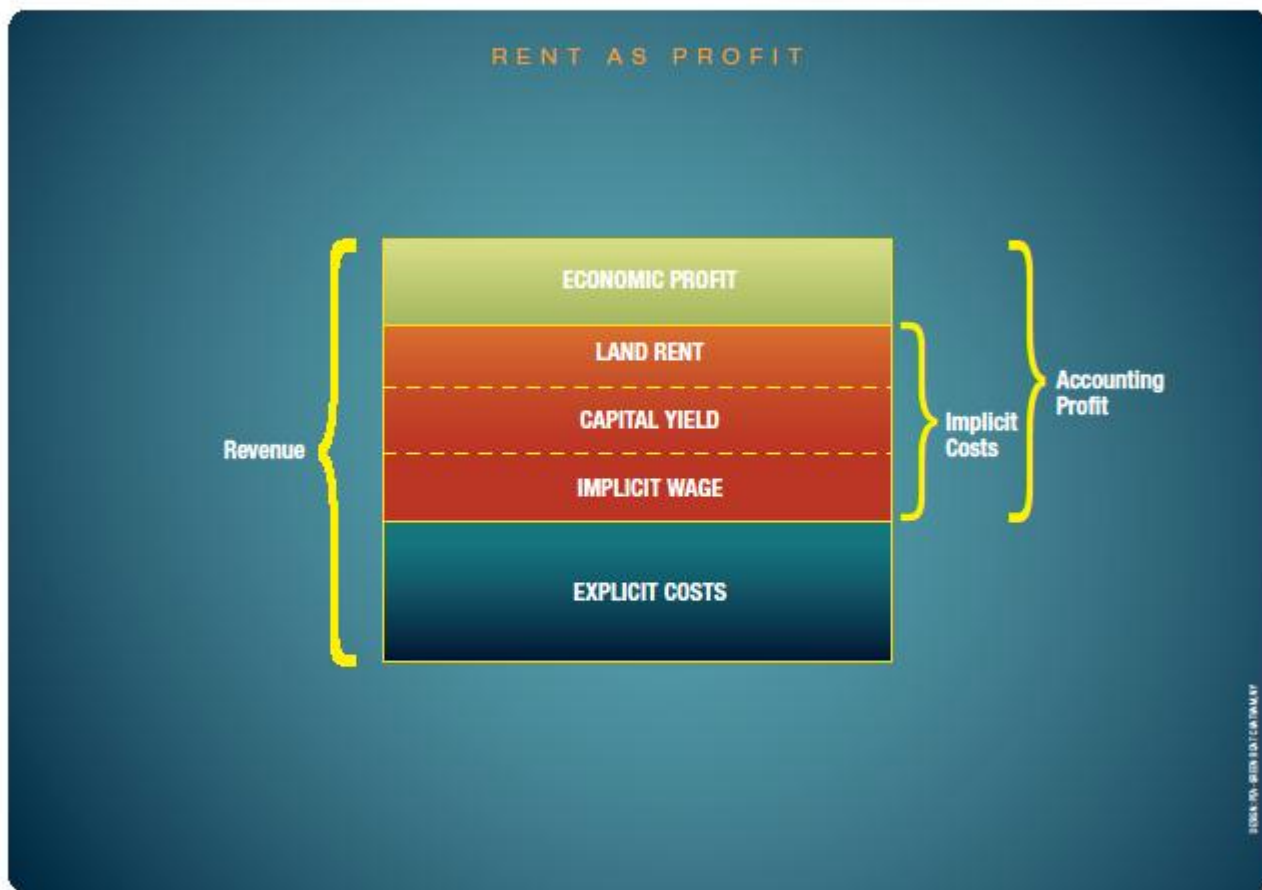
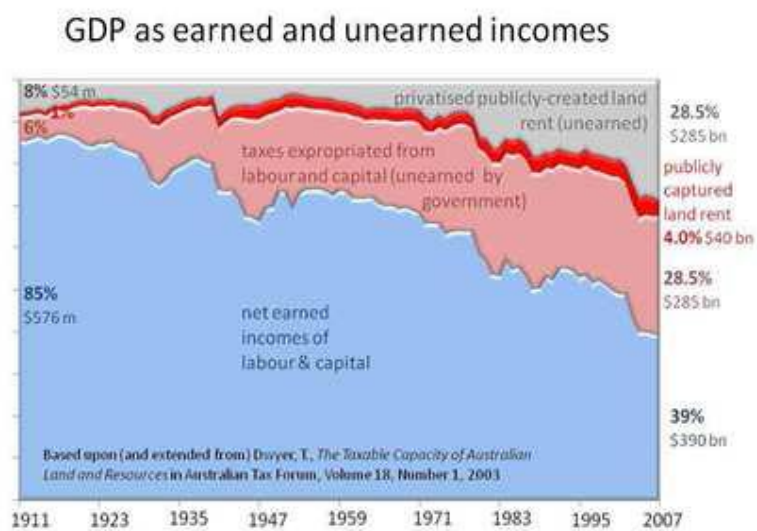


Figure 7, rent in Australia



## Empirical studies of the amount of rent

With respect to proposition 4 above, several studies of the amount of land rent in the US economy have estimated that the rent is about 20 percent of national income (Cord 1985, 1991; Miles 1990). The national rent in the United Kingdom has been estimated at 22 percent of national income (Banks, 1989).

Studies of land value and land rent in Australia, using a five percent capitalization rate, found that kinetic land rent is a third of its national income (Dwyer, 2003; Scott, 1986) (Figure 7). While Australia has valuable mineral land, most of its land value is urban, and has been rising rapidly. Since the USA has ten times the population of Australia, without about the same area (excluding Alaska), it would be reasonable to estimate that the US has at least that proportion of kinetic rent, Hence the portion of US national income that constitutes total kinetic rent probably ranges from one fifth to one third or more. If it is one third, then with taxes amounting to about a third of national income, if half of US tax revenue is from or at the expense of rent, then adding in the suppressed rent brings the portion of total rent in national income at one third plus one sixth, or half of national income. As taxes are shifted from labor and capital goods to land rent, the suppressed rent becomes kinetic, and since a land-value tax is on the potential rent, the tax turns the hidden rent into explicit rent, thus an effect of land-value taxation is to make all rent explicit (proposition 6).

Economic land includes natural materials and the spectrum as well as space, and the above studies included these rents in their calculations.

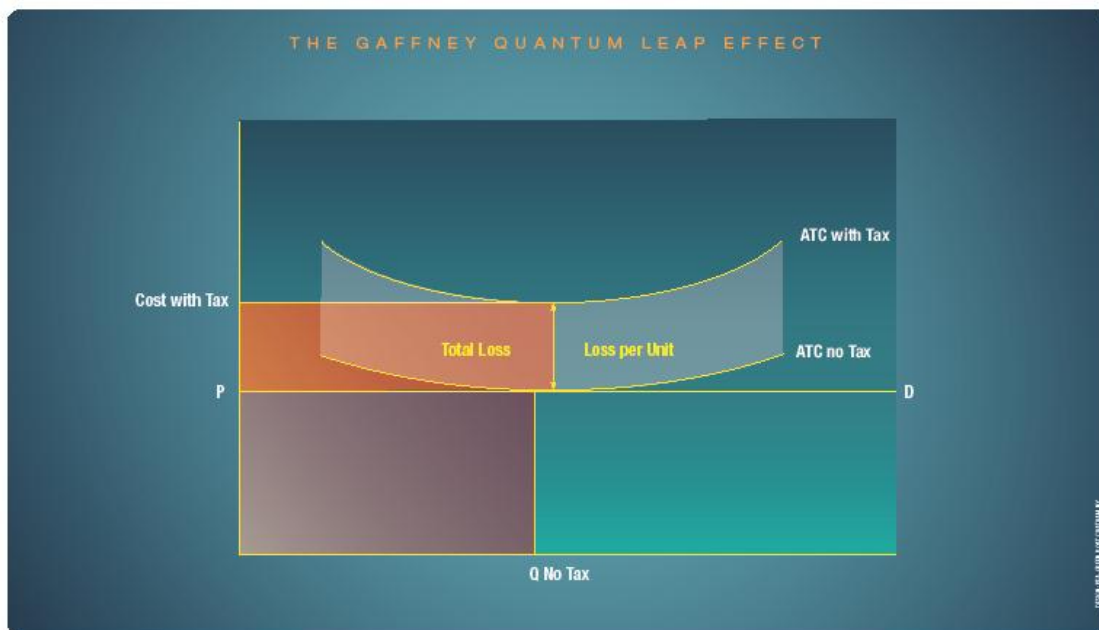
Economists have thought that land rent is a tiny portion of national income perhaps because the national income accounts measure only net rental income of natural persons. That data excludes the land rent of corporate and governmental lands. Moreover, the published number is the rent income, after subtracting taxes, mortgages, and other costs (Gaffney 1970). Besides the hidden forms of rent discussed above, rent is also masked by pseudo-depreciation and the use of historical land costs rather than current market prices in corporate reporting. Because building value can be depreciated but not land value, there is political pressure to over-assess buildings and under-assess land value. This benefits property owners without reducing property taxes.

The kinetic rent is also reduced by the “quantum leap effect.” This is the leap in output that occurs when there is a shift in the use of land, and thus of production and employment at the site. This can be illustrated by the following example (Gaffney 1999):

Table 1: Effect on Net Revenues of a 10% Tax on Gross Revenues

| <u>Land Use</u> | <u>G</u><br>(\$k) | <u>C</u><br>(\$k) | <u>N</u><br>(\$k) | <u>G/N</u> | <u>Tax</u><br>(\$k) | <u>NAT</u><br>(\$k) | <u>Tax/N</u><br>(%) |
|-----------------|-------------------|-------------------|-------------------|------------|---------------------|---------------------|---------------------|
| A               | 100               | 90                | 10                | 10         | 10                  | 0                   | 100                 |
| B               | 20                | 15                | 5                 | 4          | 2                   | 3                   | 40                  |

Figure 8



A and B are two uses of the sites. G is the gross revenue, C the firms' costs,  $N = G - C$ , Tax is on gross revenues, and NAT is Net revenue After Tax. Without the tax, the firm would be A, with gross revenue of 100. But when the tax is imposed, NAT is zero, and firm A is replaced by firm B with a gross revenue of 20 (and generally also one fifth the employment) (Fig. 8).

As stated by Gaffney (1999, p. 5), "The higher use, A, produces more goods, makes more jobs, and yields more Net Product: it is clearly the higher use. The tax on G, however, turns A into a lower use than B, in the eyes of the landowner or manager. A 10% tax on G is a 100% tax on the N from use A, wiping out the entire incentive to put land to use A. It is a 40% tax on the N from use B, leaving 60% of the Net Product for the landowner. The landowner would choose use A in the absence of taxes, or with a tax on N; but the tax on G forces him to choose use B, which is socially inferior. This, in a nutshell, expresses the damage done by imposing taxes on bases other than N, the Net Revenue of land. The tax lowers output, employment, and investment opportunities for capital, all three. Fourth, it lowers tax revenues well below their maximum possible level of \$10k, the Net Revenue from use A."

The amount of output and rent lost to the quantum leap downward of land use due to taxation is unknown, but possibly as large or even greater than the conventional Harberger deadweight loss which amounts to over ten percent of GDP (Tideman and Plassman 1998). Firms that compete globally, such as book stores, and are unable to raise their prices, and have been earning only normal profits, will shut down when taxes cut into their profits. Thus the suppressed rent is substantially greater than indicated on neoclassical graphs of deadweight losses from taxation.

There is also a theoretical basis for the proposition that land rent is an adequate tax base even for today's large governmental spending for goods. The "Henry George theorem" of public finance suggests that land rent can pay for optimal public goods (Atkinson and Stiglitz, 1987). The utility function is  $U(G, X)$ , where G is a collective and X a private good. (G does not include transfer payments.) Output Y is a function of N workers:

$$Y = f(N) = XN + G.$$

$$X = \{f(N) - G\} / N$$

The wage is the marginal product of labor:

$$\partial f / \partial N = X$$

Therefore,

$$\partial f / \partial N = \{(f(N) - G) / N\}$$

$$G = f(N) - Nf'(N)$$

With land and labor the ultimate and original factors of production, rent (®) is the difference between total product Y and total wages:

$$R = f(N) - Nf'(N)$$

Therefore,  $R = G$ .

For goods and services, the Henry George theorem suggests that the combination of land rent, pollution charges, and user fees could pay for public goods.

### **Land rent in boom and bust**

Analysis of boom-bust cycles concludes that land values play a dominant role in business cycles (Foldvary 1997, Foldvary 2007). The real estate boom is essentially a land-value boom. As land rent captures much of the gain from economic expansion, speculators add to the demand. Much of the land rent is generated by the public works and civic service of government, paid for mostly from taxes on wages, business profits, and exchange. The governmental subsidies to land value include mortgage guarantees, cheap credit due to central bank policy, the government-sponsored enterprise Fannie Mae and Freddie Mac that generate a secondary market in mortgages as well as mortgage-backed securities, and the favorable tax treatment of real estate.

If 80 to 90 percent of land value or rent were taxed, there would be no profit in land speculation, as the price of land would fall to a small fraction of the non-taxed price. The financial industry chiefs want land value as a collateral so that they can have a greater demand for loans, but the recession of 2007-9 showed that land value is a fickle collateral. If most of land value were taxed, there would be substantially fewer and milder booms and busts.

### **Summary**

Land played an important role in classical theory, especially in the determination of wages and rent and in the distribution of income. The land factor was suppressed in the neoclassical turn, as neoclassical economics became a two-factor school (Gaffney 1994b). However, in fact, land plays a significant role in the distribution of income, in public finance, in the concept of the surplus, in economic growth, and in business cycles (proposition 8). By mostly ignoring the role of land and its rent, by having lost some insights from classical theory, and by undervaluing the amount of rent, conventional neoclassical theory presents a highly incomplete and even misleading explanation of public finance, the wage level, economic inequality, economic growth, and the business cycle (Feder 1996).

As one example of where neoclassical theory is misleading by ignoring land, it is often stated that there is an inevitable trade-off between efficiency and equity. Indeed, redistributive policies do reduce output. However, a tax shift that replaces taxes on wages and goods with taxes on land value would increase both efficiency and equality. Hence, relative to the status quo, the tradeoff is not necessary. We can have more of both. But this is significant only because land rent is a substantial portion of national income, and not the tiny amount often asserted.

Greater attention to land rent also has profound policy implications. For example, the government of Greece has recently announce plans for a national property tax to reduce its budget deficit. A property tax would be less vulnerable to tax evasion. If Greece had enacted a significant property tax on land before its debt crisis emerged, it may well have prevented it.

The choices that have been discussed for governments deep in debt have been cuts in spending, tax hikes, and defaults. What has not been discussed is an “efficiency tax shift” to replace taxes on wages, profits, goods, and value added with a tax on land value. A substantial shift would generate growth and thus reduce spending for welfare. A permanent credible tax shift would enhance credit ratings and reduce debt service. But because the land factor has been disregarded, the efficiency tax shift is not even discussed.

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