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Time Travelling Back to Space Age Economics

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HENRY GEORGE was the last of the classical economists, a ‘school’ first associated with Adam Smith, and later David Ricardo, Thomas Malthus and John Stuart Mill. In an era when the Enlightenment ideals of the American and French revolutions inspired increasing resistance to authority, George and his older contemporary, Karl Marx, both recognized the explosive revolutionary potential of the classical paradigm. So what was this paradigm? How did George interpret it in a way that changed the world? How did George misinterpret an important part of it? What other pieces of the story did he miss, notably in the work of contemporaries Martin Faustmann and Knut Wicksell? And how did the architects of neoclassical economics – notably John Bates Clark and Vilfredo Pareto – obliterate George and the classics to give us textbook Econ 101? In 70 prolific years, Mason Gaffney has addressed these important questions and more.

In his introduction to the *Wealth of Nations*, Adam Smith posed a key question: what determines how ‘produce is naturally distributed among the different ranks and conditions of men in the society?’ (Smith, [1776] 1904: I.1.5). This society fell quite visibly into three broad classes: the landlords, the capitalists, and the workers. They supplied the three basic ‘factors of production’: land, labor and capital. Landlords received ‘rent’, workers

received ‘wages’ and the capitalists received ‘profit’ or ‘interest’. There was some overlap between the classes and their incomes; the term ‘profit’ often conveyed a mixture of incomes. For example, a trader might own land, buildings and merchandise, and employ his own labor in the enterprise.

Classical economists used ‘land’ as shorthand for natural resources very broadly understood. ‘Land’ was not ‘wealth’, because it was not man-made. ‘Land’ included not just farmland but urban land, mines, rivers, ports, fisheries and any other kind of natural resource that could be made private under titles created and protected by the king. The Duke of Westminster owned (and still owns) much of the land under the posh West End of London! ‘Land’ also included various territorial rights, granted by the king, including patents, bank charters, rights-of-way, and commercial monopolies such as the exclusive Indian trade granted to the British East India Company.

Classical economists recognized that the landlords’ ‘rent’, what we today call ‘economic rent’, is *unearned income*, arising from the privilege of holding titles to property under protection of the state. Adam Smith writes: ‘As soon as the land of any country has all become private property, the landlords, like all other men, love to reap where they never sowed and demand a rent even for its natural produce’ (Smith [1776] 1904: I.6.8). Unearned income did not carry the stigma it does today. On the contrary, it conveyed social superiority. Jane Austen’s early 19th century landed gentry obsessed about inheriting or marrying property income of so many thousand pounds a year – heaven forbid anyone actually had to work!

The mathematically-minded financier David Ricardo figured out what determines the level of rents: the amount of rent a parcel of land commands depends on its degree of superiority to land just barely worth using (Ricardo, [1818] 1996). Superiority of land does not just depend on soil quality, but, much more important, on location. Land in the downtown of big cities commands the highest rents, due to its superior ability to facilitate the highest-value activities in an economy: the cooperation of highly skilled specialists like lawyers, bankers and brokers. Rent arises from simple ‘arbitrage’: for example, how much more would a developer pay for a good central lot than for one on the fringe of a city? Today economists still use the term ‘Ricardian rent’ in explaining the value of choice locations.

Therefore, the classical economists said, when population growth brings inferior land into cultivation, landlords’ rents from superior lands are driven up. John Stuart Mill wrote:

The ordinary progress of a society which increases in wealth, is at all times tending to augment the incomes of landlords; to give them both a greater amount and a greater proportion of the wealth of the community, independently of any trouble or outlay incurred by themselves. They grow richer, as it were in their sleep, without working, risking, or economizing. What claim have they, on the general principle of social justice, to this accession of riches? (Mill [1848] 1909: V.2.28)

Ricardo's explanation of landlords' rent left only wages for workers and interest (or profit) for capitalists to be explained.

Adam Smith was optimistic about workers' wages; he observed that their wages and conditions had already improved with population growth and new technology, and expected improvement to continue – as indeed would happen in the industrialized countries. But by the end of the 18th century the growing hordes of poor urban workers inspired more fear and hostility than sympathy. Writing in 1798, Thomas Malthus advanced a radical 'scientific' theory of wages: workers breed faster than new land can be opened for production. Hence, famine, disease and 'vice' will inevitably check their population, keeping their wages at 'subsistence' – just enough for them to feed their families and reproduce (Malthus, 1798). In language dripping with upper-class contempt for the lower orders, Malthus even opposed aid to the poor, on the grounds this would just encourage them to breed faster.

Malthus' subsistence wage theory seemed to solve the distribution problem. As Ricardo showed, with landlords' rent and workers' wages given, the balance of national income necessarily went to the capitalists – theoretically completing the entire distribution of income between the three classes of landlords, workers and capitalists! Based on subsistence wages, Ricardo also developed a crude 'labor theory of value,' explaining prices of goods by the amount of work it took to make them. Marx picked up this theory and ran with it.

The French Connection

Mason Gaffney reminds us that Adam Smith took many of his major ideas from the now little-remembered French 'Physiocrats' (Gaffney, 1982b). In 1764, confirmed homebody though he was, Smith could not resist the dazzling offer of £300 a year to tutor the young Duke of Buccleuch on a tour of Europe. They spent 1764 through 1766 in France. After a spell in Toulouse, Smith and his party visited French skeptic

and iconoclast Voltaire in his hideout at Ferney on the Swiss border, whence he could easily escape periodic prosecution. Then they moved on to Paris.

The Paris salons teemed with Enlightenment intellectuals, including Benjamin Franklin, representing the British American colonies. Among the most influential were a group known as the ‘Physiocrats’ or ‘*Oeconomistes*’, who argued for the ‘rule of nature’. Their leader was physician to the king, François Quesnay. He developed the earliest macroeconomic model, the *Tableau Economique*, showing the multiplier effect of investment in agriculture. (The salon ladies referred to the *Tableau* as ‘*les Zig-Zags*.’) Another influential Physiocrat was Anne Robert Jacques Turgot, at the time Intendant of the French province of Limoges. In 1766, Turgot wrote a short, sophisticated monograph, *Reflections on the Formation and Distribution of Wealth* (Turgot, [1766] 1793). The Physiocrats greatly impressed Adam Smith. Smith does not cite Turgot, but his economic ideas closely track those in Turgot’s monograph.

The Physiocrats coined the motto *laissez faire*, short for ‘*Laissez faire et laissez passer, le monde va de lui même!*’ (‘Let do and let pass, the world goes by itself!’). To see where they were coming from, consider the pre-revolutionary French tax system. A small part of revenues came from taxes on land, exempting land belonging to the king, the church and the nobility. The bulk of revenues came from excise taxes on anything that moved, notably salt and tobacco. There were also poll taxes. These taxes were administered by the notoriously corrupt ‘tax farmers’ who paid the king for the privilege. In addition, the *corvée* required peasants to work for free on the roads. This corrupt and wasteful system no longer generated sufficient revenues; in short, the monarchy was broke.

The Physiocrats advocated abolishing this dog’s dinner of imposts, and taxing land only – ‘*l’impôt unique*’ – including royal, church and noble land! Why? Because, as Turgot makes clear, land alone generates a surplus that can be taxed without impeding work or investment. As Intendant of Limoges, Turgot managed to put some Physiocratic principles into effect, with such good results that the desperately-strapped new King Louis XVI appointed him Finance Minister in 1774. However Turgot’s reforms did not go down well with the noble cronies of Queen Marie-Antoinette, who shortly had him fired. The king and queen may have blown their last chance to save the monarchy; in fewer than 20 years, they would meet Madame Guillotine.

The Classical Economists on Taxation

In classical times, most business was conducted in cash. Record-keeping was not adequate for our modern income taxes or sales taxes. That left two primary taxes: land taxes on the value of the landlords' land, and imposts and tariffs on bulk goods, collected mostly in ports and other trading centers.

Land taxes are the oldest form of tax, not only in Britain, but in all civilizations (Gaffney, 1994a). They were (and are) relatively easy to assess, because as grantor, a ruler could have a pretty good idea what the land was worth. In Britain, unlike France, the king had to rely on Parliament to impose the tax, giving Parliament increasing control over government. After 1688, during the reign of William and Mary, Britain's 'financial revolution' depended on an extraordinary land tax of four shillings to the pound, or 20% of assessed value (which was often much less than actual value [Heyck, 2002]). This high tax enabled Britain to develop a modern financial system: a permanent national debt consisting of bonds that paid regular interest; and a central bank, the Bank of England, founded in 1694, which loaned money to the government and issued currency. This system enabled Britain to fight several successful wars, especially against France's expansionist 'Sun King,' Louis XIV, and to extend its naval power around the world. With naval protection, Britain's merchant fleets prospered and its colonial empire expanded, bringing ever more tariff money into government coffers.

So what did Adam Smith propose? Following Physiocratic guidance, Smith set out four 'maxims of taxation'. They challenge our comfortable modern assumptions about taxation.

Smith's first maxim holds that:

The subjects of every state ought to contribute towards the support of the government, as nearly as possible, in proportion to their respective abilities; that is, in proportion to the revenue which they respectively enjoy under the protection of the state.

(Smith [1776] 1904: V.2.25)

Notice he is not just saying taxpayers should contribute in proportion to ability to pay, but effectively *in proportion to the benefits they receive from government*. As he makes clear, the greatest benefit is the security of property.

Smith's second and third maxims are just common sense: taxes should not be arbitrary, and they should be imposed at a time and place convenient to the taxpayer.

Smith's fourth maxim holds that 'Every tax ought to be so contrived as both to take out and to keep out of the pockets of the people as little as possible over and above what it brings into the public treasury of the state'. Taxes should cost as little as possible in expense and staff to collect. They should not 'obstruct the industry of the people'. The tax should not tempt people to evasion and then punish them severely for yielding to temptation. Finally, the tax should not subject people to 'the frequent visits and the odious examination of the tax-gatherer' (Smith, [1776] 1904: V.2.28).

What tax best meets these criteria? *The land tax!* Smith says it admirably meets the second, third and fourth criteria. It fails the first – the proportionate burden – because, while landlords had greatly increased in prosperity, assessments had not increased since William and Mary almost 100 years before! (Sound familiar?) That problem, says Smith, can be solved by following the recommendation of the French *Oeconomistes* to let the taxes rise and fall with the level of rents (Smith, [1776] 1904: V.2.36). That would make them 'the most equitable of all taxes'.

The Radical Classics, Marx and George

In the last third of the 19th century, the Gilded Age of the Rockefellers in the US, and the Rothschilds in London, two intellectual bomb-throwers came to prominence.

In London, Karl Marx beavered away on his masterwork, *Capital*, publishing Volume I in 1867 (Marx, [1867] 1906). A radical socialist scholar, Marx had escaped Europe during the crackdown following the publication of his *Communist Manifesto* in 1848. Building on Ricardo's labor theory, Marx argued that capitalists increasingly exploited workers by paying them less than the value of their labor. Eventually, inevitably, the workers would overthrow capitalism, ushering in a new era of proletarian harmony.

A far more unlikely bomb-thrower emerged in western United States: Henry George. An impoverished, self-educated San Francisco journalist, he recorded the spectacle of graft and violence as the Southern Pacific Railroad and other speculators grabbed vast chunks of land in advance of incoming settlers. In 1879 he published *Progress and Poverty: An Inquiry into the Cause of Industrial Depressions and of Increase of Want with Increase of Wealth ... the Remedy* (George, [1879] 1962). George accepted as self-evident the classical division of society into the three classes, though he quibbles

with some of his predecessors' use of terms. He also accepted Ricardo's theory that the rent of a given parcel of land is determined by its superiority to land barely worth using. But – like Marx – he emphatically rejected the Malthusian 'subsistence' theory of wages, denouncing Malthus for blaming poverty on the improvidence of the poor rather than the exploitation of the rich. In fact, at the very time Malthus wrote, improving (though still awful) wages and conditions of workers in England already gave the lie to his model. George instead proposed a new and original marginal theory of wages, the mirror image of Ricardo's marginal theory of rent: wages are determined by what a man can earn working on freely-available land. (Since nominally all land is owned, at least by governments, in practice freely-available land means private or public land that is inadequately policed.)

George observed (as had Adam Smith before him (Smith, [1776] 1904: III.2.7) that large landholders often underused land, or withheld it from use altogether. He usually attributed the withholding during the land rush in California to 'land speculation'; but sometimes he recognized that wealthy owners withheld land simply because they could afford to. Combining the observation of withholding with his theory of wage determination on marginal land, George concluded that great inequality in land ownership directly created great inequality in wages. That is, the greater the proportion of land belonging to a wealthy minority, the lower the quality of land available to poor workers – and hence, by arbitrage, the lower the bottom tier of wages in a society.

George did not have to look far for a remedy; he simply lifted Adam Smith's case for land value taxation. Moreover, he pointed out, this remedy lies in the hands of every state and municipality: simply shift the general property tax onto land values only, and abolish any other taxes. The land tax would collect the unearned income of 'land monopolists', forcing them to sell or lease out underused holdings, thereby making land available to workers. The tax would effectively claim public ownership of natural resources by collecting the rent for public purposes, and distribute operating control of those resources to the most productive users.

While Adam Smith and the other classical economists had merely claimed the superiority of land taxation, George made it a worldwide crusade. He toured the English-speaking world – including Britain's oppressed Irish colony – stirring up huge crowds. He inspired leaders as diverse as John Dewey in the US, Winston Churchill in England, and Leo Tolstoy in Russia. In short, George became a threat to the *status quo*.

The Neoclassical Counter-revolution

The robber barons reacted. They, after all, the captains of oil, steel, coal and timber industries – such as John D. Rockefeller, Ezra Cornell, Henry Clay Frick and Andrew Carnegie – owned vast tracts of eminently taxable land and other natural resources. As Mason Gaffney has documented (Gaffney, 1994b), they hired experts to confuse and diffuse the opposition. So when Rockefeller set up the University of Chicago in 1890, the economics department understood its founder’s needs. So did the economics department of Columbia University, recruited by its President (and later New York Mayor) Seth Low, an ally of J.P. Morgan, financier to the robber barons.

What did the robber-baron-friendly scholars do? Most influential was John Bates Clark of Columbia University, in whose honor is named the John Bates Clark Medal. Willfully misunderstanding the classical meaning of ‘land,’ he simply eliminated land altogether, by merging it into capital, because ‘land and artificial goods are blended in an intimate mixture’ (Clark, 1908: XIII.5). That’s about as logical as saying if you spread a layer of jam on peanut butter, you might as well treat the result as a jam sandwich.¹ But it served a useful political purpose: it eliminated economic rent – unearned income – by merging it into profit. Thus Clark rendered George’s – and Smith’s – analysis and remedy meaningless. There was no longer any unearned income to tax! Without unearned income, it followed that all taxes were harmful, as, according to Smith’s fourth maxim, they discouraged both work and capital investment! Hence the modern maxim advocating ‘broad-based’ taxes: ‘Tax everything a little bit to minimize the inevitable damage and make evasion less worthwhile by keeping rates low.’

Clark emphasized efficiency; laborers should be paid what they contributed at the margin. Thus, Clark writes:

the share of wealth that falls to any producing agent tends, under natural law, to equal the amount that he creates. A man’s pay tends to equal the value of the product or fraction of a product that can be specifically imputed to him.

(Clark, 1898: 4)

1 Appraisers routinely separate land from buildings, because the value of land depends primarily on location, while the value of buildings depends on construction costs less depreciation. New York law requires assessors to report land and building values separately – a lingering effect of Henry George’s influence.

So much for any claim that laborers were exploited!

Clark also eliminated time, and with it, history. Neoclassical economics became what it remains today, a flat world through which we flit for a moment like mayflies, a world of timeless truth like physics, good for showing that rent control creates a housing shortage, and a minimum wage creates unemployment, but helpless before phenomena like growing inequality or events like the 2008 crash. Clark's students, notably Frank Knight, shaped the Chicago School of neoclassical economics.

Let's recap what Clark accomplished.

Clark merged land and capital into a timeless entity, 'Capital', designated 'K,' that mates with another timeless entity 'Labor', designated 'L', to produce timeless output, 'Q'. Wages depend solely on what the last bit of labor adds to Q. At a blow, Clark has eliminated inequality and unearned income, and reduced wages to a scientific formula determined by the inexorable operation of 'natural law'! Neoclassical economics in the USA

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followed Clark, to the extent that the future Clark medal and Swedish Bank 'Nobel' prize winner Robert Solow could joke in 1955 that '... if God had meant there to be more than two factors of production, He would have made it easier for us to draw three dimensional diagrams' (Solow, 1955: 101).

While Clark was reconstructing economics in America, European economists responded to the growing threat not only of George but also of Marx. One of these was Italian nobleman Vilfredo Pareto (1848-1923). Pareto contributed two major concepts. First, he estimated that 80% of the land in Italy belonged to 20% of the population, from which he concluded that inequality follows a natural law: the 80:20 rule, with which we should not tamper. More famously, he developed the policy rule known as 'Pareto optimality'. This rule holds that we should undertake no policy changes unless they make at least one person better off and no one worse off. Sounds fair and reasonable, doesn't it? By that logic the US should have paid the slaveholders in full after the Civil War! By that logic, once having cut taxes on the rich, we cannot raise them again! *The status quo rules, no matter how cruel or illogical the route that got us there.*

Box 3:1

Corporations as Unions of Landlords

In his *Financial Times* article, US economic editor Robin Harding glosses over the transition from classical to neoclassical economics by simply assuming that classical ‘land’ means only ‘farmland.’ He writes: ‘As land became less important to the industrial economy, labor unions rose and European aristocracies were overthrown, the idea of economic rents died away’ (Harding, 2012). How convenient! But I’m glad you mentioned unions, Mr. Harding, for after all, what is a corporation but a union of landlords? And what is the modern ‘industrial economy’ but vast constellations of such unions, heavy in natural resources – think ExxonMobil. And that even includes Walmart. What is Walmart US, after all, but a collection of over 4,500 huge parking lots and one-story stores and distribution centers, occupying prime real estate at highway intersections across the country – not to mention extorting tax privileges from their local hosts?

The neoclassical revolution accomplished something more: it removed the taint of privilege and unearned income from corporations (Box 3:1).

How George Missed a Key Classical Concept

In the classical world, capital meant physical, man-made things, used in production of goods or more capital. Capital fell naturally into two classes: ‘fixed’, like buildings and machines, and ‘circulating’ like inventories of goods in process and consumption goods. A major part of circulating capital was the so-called ‘wages-fund’ – John Stuart Mill’s term (Mill, [1848] 1909). The wages-fund was the stock of consumption goods that had to be stored up before the beginning of a production cycle, in order to compensate the workmen before the product was completed and sold, and a new stock of consumption goods purchased for the next cycle. The shorter the cycle, the more employment a given wages-fund stock could support. Thus because domestic trade necessarily operates on a shorter cycle than long-distance trade, Adam Smith could write that

capital employed in the home-trade necessarily puts into motion a greater quantity of domestic industry, and gives revenue and employment to a greater number of the inhabitants of the country, than an equal capital employed in the foreign trade of consumption... (Smith, [1776] 1904) iv.2.6)

In his effort to model the distribution of income, David Ricardo created an elegant three-factor model with a fixed-length cycle, his ‘corn model’ (Ricardo, [1818] 1996). The corn model consists of a simple agricultural cycle with a single good, ‘corn’ (British for grain), that serves as both capital and consumption good. At the beginning of a cycle, the ‘proprietor’ holds a stock of corn, the ‘wages-fund.’ This serves to feed the workers until the new corn can be harvested. (If the proprietor does not own his own land, the fund also serves to advance the rent.) At harvest time, the proprietor receives back his original stock, plus a percentage profit. If the proprietor does not consume his entire profit, but uses it to expand his wages-fund and hire more workers, each harvest will exceed the prior – creating economic growth.

Unfortunately, Ricardo divided his wages-fund by the number of workers to come up with the Malthusian subsistence wage, thus apparently justifying the Malthusian hypothesis that due to workers’ propensity to over-breed, wages always remained at subsistence. George reacted by dismissing the wages-fund as Malthusian ploy, together with the classical distinction between fixed and circulating capital. As noted above, he developed his own marginal theory of wages. As Gaffney has pointed out, George’s dismissal of the wages fund deprives his case for land taxation of a powerful additional argument: liberating land will speed up the cycle of capital replacement, increasing productivity and employment (Gaffney, 1975).

Ironically, while George dismissed the wages fund for its Malthusian implications, John Bates Clark effectively dismissed it for a different reason: it was incompatible with his static model which makes no distinction between land and capital. Clark’s model, carried over into modern macroeconomics, leaves us with an awkward series of monthly or annual snapshots, with no concept of a capital replacement cycle, let alone the possibility of creating more jobs by speeding up that cycle.

Gaffney Rediscovered Faustmann

Martin Faustmann, a German forester, worked out a formula for the proper length of time to let a tree grow before harvesting it, assuming a new crop of trees would immediately be planted. The answer is not obvious. Do we let a tree grow to ‘maturity’? But trees like redwoods can grow for thousands of years, at an ever slower rate. So the proper time must be shorter. It is sometimes suggested we should cut a tree when it is no longer increasing in value faster than compound interest on the

planting cost. But that is not soon enough, because it does not account for the value of clearing the land to start the next crop. We get the correct answer by maximizing the present value of the forest land, solving for the optimum cycle length. The answer depends both on the intrinsic growth rates of different species of trees, on the interest rate applied and on the cost of labor. The sooner a tree's growth rate slows, the higher the interest rate, and the lower the labor cost, the sooner the tree should be cut.

The Faustmann formula lay forgotten for many years, probably a victim of the neoclassical elimination of time and rent. Gaffney resurrected the Faustmann formula in *Concepts of Financial Maturity of Timber and Other Assets* (1957). He received immediate acclaim, including from Paul Samuelson, but the formula was soon forgotten again. However, as Gaffney elaborated it, the formula extends way beyond trees, in fact to the whole economy. It applies to any kind of output that is produced in a cycle using labor and natural resources, although the more durable the output – as in trees and buildings – the more important it becomes not to use too long a cycle. The Faustmann formula solves the problem the early classical economists grappled with: shorter cycles produce more output and employment, but how much shorter?

The tree model applies at least roughly to any production process that results in batches of goods which increase in value with time until sold or used at the end of a cycle. The cycle may be intrinsically long, as for trees, or intrinsically short, as for baked goods. Wine aging in a cellar is a familiar long-cycle model, first constructed by Wicksell (Wicksell, [1905] 1971). The cellar owner maximizes the present value of land: space in his cellar. Manufactured goods fit the model. In most cases, producing goods on a longer cycle increases their quality and value, to a point. (Workers are not so rushed; the first coat of paint can dry before the second is applied, and so on.) The model also applies to groceries on a shelf: the higher the price the grocer puts on the goods, the longer they will take to sell. So he has to pick a price that gives him an optimal replacement cycle.

A simple permutation of the Faustmann model serves to explain depreciating assets like buildings and machinery (and human capital, but we won't go there). A building delivers a flow of services, from construction or purchase time, until demolition or selling time. Usually, the service flow declines steadily, at least as the building ages. Whether or not service flow declines, the building depreciates, as it approaches the end of its

useful life. (It would depreciate even if its service flow remained constant, then suddenly ceased, like the 'one hoss shay'.) The amount of depreciation over the building's life just equals the cost of construction or purchase.

The building model applies at least roughly to any asset that yields a flow of services or income until replaced. Such assets include roads, machinery, reference books in a library, refrigerators, cars, clothing, paintings and 'durables' in general. In addition, such assets include things that produce a continuous flow of physical output over their lives, such as fruit trees or power plants. In fact, most production can be treated as a combination of the tree and building models, such as a factory whose plant and equipment produce batches of goods for sale. And note that the same asset may be appreciating or depreciating at different stages in its physical life. For example, a refrigerator appreciates on the manufacturer's assembly line; it then depreciates in the purchaser's kitchen.

In my own work, *Consequences and Causes of Unequal Distribution of Wealth* (1984), I applied Gaffney's work on the Faustmann formula to differences in the behavior of large and small firms (and rich and poor people). As I showed, large and small firms differ in that large firms have relatively low internal discount rates and high internal labor costs. This happens simply because large firms have easier access to cheap working capital, mostly internally generated, but face a labor bottleneck due to layers of supervision.

An immediate consequence of low internal discount rates is that large firms (or rich people) have a comparative advantage in acquiring and holding titles to high-rent natural resources. I define a high-rent natural resource as one that generates a high ratio of output to input of labor and materials, relative to other resources *in the same use category*. High-rent is usually but not always determined by location. For example, Wall Street land is high-rent for financial services compared to land in the same use in nearby central Newark. Well-watered, accessible forest land is high-rent compared to forest land on steep remote mountains. A broadcast license for the New York metropolitan area is high-rent compared to one for Pittsburgh. A patent for a heartburn drug is high-rent compared to one for a rare genetic disease, not due to location, but to number of customers. Under the same title-holders, the optimal cycle on a high-rent resource is shorter: buildings in Wall Street will be replaced more often than in Newark, trees on accessible land will be harvested more often, broadcast equipment and programs will be upgraded more often

in New York, and more new patents will be developed for heartburn than for rare diseases. To casual observers, large firms' advantage in holding high-rent resources often makes them appear more modern and successful than small firms.

I constructed models both for appreciating assets like trees or wine in a cellar, and depreciating assets like buildings or machinery. For any kind of appreciating assets, large firms always generate more output *per man-hour*, leading to the false conclusion that they are more 'productive'. They also show a higher profit share of income, which is often taken to mean they are more 'efficient', when in fact they are merely more land- and capital-intensive. Large firms, however, provide less employment per dollar of sales or assets. For example, according to 2007 US Census data, comparing firms with over \$100m in sales to those with under half-a-million, the big firms averaged three employees per \$100m sales while the small ones averaged fifteen. Where large and small firms occupy the same quality land – as frequently occurs when sprawl places them side by side – large firms will use a longer cycle of production for both appreciating and depreciating assets. (However, if we compare large firms on high-rent with small firms on low-rent land, large firms may use a faster cycle.) There are some differences as to appreciating and depreciating assets between large and small firms. On the same quality land, large firms will operate with a higher ratio of appreciating assets to land, but a lower ratio of depreciating assets. That is, large firms may let their trees grow longer, but replace their buildings sooner. On much higher-rent land, large firms' ratio of improvements to land value is always lower, for trees or buildings.

As I showed, the more unequal an economy, the more it behaves like the dominant economic entities, so the Faustmann formula helps predict the effects of inequality on overall economic function. It fortifies George's case against inequality. The larger the proportion of an economy's land and other natural resources held by a wealthy minority, the more investments will be made on a longer, slower cycle, resulting in less output and employment than were those resources more widely held.

The Faustmann formula also makes it very easy to show how taxes on output, sales, or wages damage the economy: *they lengthen the cycle of production*. A tax on land has no effect at all when added to the formula. However, to the extent that a tax on land reduces inequality, it raises the discount rate applied in economic decisions, speeding up the production cycle, increasing output and employment.

George and Wicksell on the Boom/Bust Cycle

Progress and Poverty is subtitled *An Inquiry into the Cause of Industrial Depressions and of Increase of Want with Increase of Wealth ... the Remedy*. Yet George devotes only a very short chapter – 18 pages – to ‘The Primary Cause of Recurring Paroxysms of Industrial Depression’. This is perhaps an acknowledgement that he is on shaky ground. In his final, unfinished book, *The Science of Political Economy* (1981), he does not address the issue at all.

George first reviews and dismisses as secondary other factors in the business cycle, notably

the essential defect of currencies which contract when most needed, and the tremendous alternations in volume that occur in the simpler forms of commercial credit, which, to a much greater extent than currency in any form, constitute the medium or flux of exchanges ...’ (George, 1879: 263)

He dismisses ‘overproduction and overconsumption’, blaming ‘the speculative advance in rent’ which he sees as equivalent to ‘a lockout of labor and capital by landowners’. To summarize, George sees growth as setting off a speculative bubble which carries the seeds of its own destruction. That is, the bubble stimulates land withholding which eventually cuts off production, bursting the bubble. Then the cycle repeats.

George’s remedy for the boom and bust cycle is the same: land value taxation. This eliminates the speculative value of land, bringing the ‘speculative margin’ back down to the ‘productive margin’ – raising wages to what a man can earn at the productive margin.

Swedish economist Knut Wicksell came of age during the ‘marginalist revolution’ set off by Stanley Jevons, Carl Menger and Leon Walras in the early 1870s. Like George, he was a rebel and social critic. Unlike George, he was an ardent Malthusian – a position which scandalized Swedish society and inhibited his career. Like George, he supported land value taxation, though without making it a crusade (Wicksell, Musgrave & Peacock, 1958:114-115).

Wicksell posits that there exists a ‘natural’ or ‘real’ rate of interest that, all else being equal, would bring desired saving into line with desired investment. This natural rate varies with conditions in the economy. A time of optimism, for example due to new technology, will raise the natural rate as investors compete for capital. However banks cannot easily identify the invisible natural rate; in the short run they may set their interest rates either higher or lower than the natural rate. If banks hold

their rates lower than the natural rate, prices will rise. If higher, prices will fall (Wicksell, [1898] 1965: 69-72).

Wicksell's theory of interest and prices offers a potential explanation for the boom and bust cycle. Banks are conservative, he argues. They are slow to change their practices in the face of changing economic circumstances. So when the economy booms, banks may hold their rates too low for too long, fueling a bubble. Eventually the banks raise rates, and when the bubble bursts, hold them too high for too long, delaying recovery.

The excessively low bank rate during a boom 'may act as an incentive to increased business activity and thus to conversion on a large scale of liquid capital into fixed capital, which ... is the outstanding characteristic of good times...' Wicksell notes the implications for distribution:

But if the formation of the real capital which is then absolutely essential is only based on the rise in prices itself, i.e. is due to diminished consumption on the part of those persons or classes of society with fixed money incomes, then the increased prosperity could scarcely be very great or enduring.

(Wicksell, [1906] 1967: 209)

Wicksell's theory resembles that of George in an important respect: he believes that real events in the underlying economy drive the boom and bust cycle. The interest rate and price effects follow and exaggerate the underlying population and technology cycle. At best policy can moderate the cycle by keeping the bank rate more in line with the natural rate.

George by contrast, sees a speculative cycle arising from the psychology of rapid economic growth, aggravated by inequality of landownership. The powerful single tax policy can simultaneously dampen speculation, reduce inequality and stimulate even more rapid economic growth. Where Wicksell is a pessimist, George is an optimist.

Gaffney on Speculation and the Boom/Bust Cycle

In *Land speculation as an Obstacle to Ideal Allocation of Land* (1956), Mason Gaffney develops a modern capital-theoretical explanation of what George called 'land speculation'.

As George describes them, land speculators are individuals who 'cannot or will not' put land to its best current use, because they are holding it for a rise in price. This definition needs clarification.

- All landholders ‘speculate,’ in the sense that they hold property only as long as the discounted value of expected future income (or other benefits) equals or exceeds the (net) market price.
- Some landholders withhold land even absent rising prices, because they have different priorities. Often they are wealthy enough not to need the income – think of the great lords of all civilizations who kept fertile land as hunting preserves.
- It is sometimes economically logical to withhold appreciating land from use lest the present use preempts a better use later. It would be a bad investment to plant an orange orchard in land that will be ripe for a subdivision in five years, or to build a two-story building on land soon ripe for six.

Gaffney disentangles these points. It is true that all landholders speculate. It is also true that – even absent rising prices – they may differ in their priorities. And given rising prices, they may vary in their optimism. More important, however, some land holders may use much lower internal discount rates than others in valuing land. In general, wealthier individuals and better-capitalized corporations use lower discount rates, for an obvious reason: having better collateral, they can borrow at lower rates, and having higher income, they have less urgent need for cash. This phenomenon is called ‘capital market failure’. Wealthier individuals or organizations face their own internal structure of prices and incentives and respond accordingly. Within any category of use, low discount rate entities tend to use land less intensively. Land market failure and capital market failure are two sides of a coin. As Gaffney elaborates in ‘The Unwieldy Time-Dimension of Space’ (1961), they are an inescapable reality.

But while capital and land market failure are universal, they take a particularly pernicious form where land values are rising rapidly. On the western frontier, George observed tens of thousands of prime, well-located acres grabbed up and held out of use by eastern absentees, forcing settlers to spread out onto more remote and poorer quality land. He devoted his first book, *Our Land and Land Policy* ([1871] 1900) to describing this phenomenon. Dramatic widespread withholding happens because expectations of appreciation amplify the difference in offers for land between poor high-discount bidders and rich low-discount bidders.

Gaffney Combines George and Wicksell

In ‘Causes of Downturns: An Austro-Georgist Synthesis’ (1982a), Gaffney’s working paper draws on his earlier work and on Wicksell to extend and clarify George’s model. He identifies five major features of the boom and bust cycle.

1 Overpricing Land As George observed, a period of growth and prosperity sets land values to increasing, especially in transition areas between different uses: downtown-residential, residential-farmland, farmland-forest. Over-optimism about price increases gives large, low-discount buyers and holders an edge, driving more marginal buyers and users to less-suitable areas, aggravating sprawl. As George observed, excessive land prices and rents cut into wages and returns on investment.

2 Loss and Waste of Capital Excessive land prices distort and displace real investment. Owners of appreciating land, including US homeowners in the bubble before 2008, understandably begin to treat their appreciation as real income. They cash in by taking out new mortgages. They spend instead of saving. This ‘wealth effect’ causes net disinvestment. Owners of income property fail to reinvest. As Gaffney writes, ‘It is as though grocers ate up part of their own wares, instead of selling and replacing them, leaving some shelves empty. Most of the flow of investing consists of refilling shelves as the goods go out. Now, that flow drops’ (Gaffney, 1982a: 2). Low-discount buyers tend to hold rather than improve.

3 Over-conversion of Circulating Capital There is over-investment in fixed capital. George largely missed this point; Wicksell emphasized it, but only as a consequence of bank interest rates below the hidden ‘natural’ rate. Sprawl requires over-extended roads and utility lines. To save on expensive land, owners build overly tall buildings, or irrigate dry farmland to increase yields per acre. Gaffney identifies ‘claim-staking’, i.e. rent-seeking investments, like logging roads, some R&D, preemptive patenting, accepting losses to capture broadcast licenses, etc. He points out that ‘This is the slowest-turning [capital] of all, because often the payoff is capturing land and its resources in perpetuity’ (Gaffney, 1982a: 3). And then there is overinvestment in ‘land-leading’ capital, excess capacity in anticipation of further growth, for example platted land in swamps and deserts (Gaffney, 1982a: 4). Towards the end of a boom,

such malinvestment creates a severe shortage of circulating capital, causing a brief spike in interest rates. Half-completed projects are abandoned, often never to resume. Existing capital loses real value, as more of its cash flow must now be imputed to interest. Gaffney calls this phenomenon a ‘macro-economic glitch’.

4 Lower Marginal Rate of Return Overpricing land and rent leaves less for what Gaffney calls ‘social investors’, those who hire labor and build new capital. It lowers the return on real investment. This starts a vicious circle. Lower marginal rate of return on real investment makes land look even more attractive, further fueling the boom. The price rise becomes increasingly unstable, motivated more and more by expectations of further price increases. Once the rise even pauses, it must soon fall.

5 Collapse of Credit System There is a lacuna in both George and Wicksell: the role of collateral in credit extension. In fact, collateral and credit play an important role in a boom. Under any circumstances, banks extend more and cheaper credit to well-collateralized low-discount entities. In a boom, this increases these entities’ ability to outbid poorly collateralized entities. However, as a boom progresses, lenders become increasingly ready to lend on inflated values to flaky projects – a further driver of prices and a further waste of capital. Loss of liquidity and unstable prices eventually burst the bubble. Land prices should drop like a rock when the expectation of growth disappears. In fact, the market freezes, as low-discount entities do what they do best – wait.

Gaffney has shown how the neoclassical revolution has created the barren and irrelevant textbook economics of today.

In the credit system:

- After a few losses on bad collateral, banks tighten up their lending. In fact, they overreact, cutting off lending to all but their best collateralized customers.
- Government regulators overreact. As their equity shrinks, banks cut off lines of credit and stop rolling over loans to smaller customers. Businesses close, unemployment rises. The money supply dries up, possibly creating deflation.

As long as the market remains frozen, returns on investment remain

preternaturally low. As banks ration credit, lending only to the best-collateralized, interest rates remain low as well. As Gaffney notes, this creates an illusion that there is an excess of liquid capital seeking investment. In reality, both supply and demand for new capital are low. And consequently production and employment remain low.

Much of the damage is invisible: infrastructure and buildings still stand, but lifeless as if hit by a neutron bomb. As prices and rents finally begin to fall, the economy slowly revives. Gaffney observes:

Bank expansion and collapse add to the severity of boom and slump, so much so that the ordinary economist is likely to see the banking accordion as the original cause, rather than the effect of the cycle. Simple sequential observation, however, shows that land cycles have a life of their own, leading banking cycles.

(Gaffney, 1982a: 6)

Gaffney's Contribution

Mason Gaffney has greatly enriched our understanding of the ideas of Henry George by showing their origin with the English classical economists and the French Physiocrats. He has also filled in serious gaps in George's understanding, notably of the cycle of production, and the cycle of boom and bust. Finally, he has shown how the neoclassical revolution, reacting against the radical implications of George and the classical economists, has created the barren and irrelevant textbook economics of today.

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