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Henry George and Classical Growth Theory

A Significant Contribution to Modeling Scale Economies

By JOHN K. WHITAKER *

ABSTRACT. It is widely recognized that the analysis of economic growth in Henry George's *Progress and Poverty* was considerably influenced by the British classical tradition, especially the writings of Adam Smith, David Ricardo, and John Stuart Mill. What has been less clearly perceived is that George made significant extensions to the classical theory. This paper's aim is to provide an interpretation, and to some extent a "rational reconstruction," of George's positive analysis, largely leaving aside the striking normative lessons he drew from it. George's unsatisfactory treatment of capital is disposed of in Section I, while Section II—the core of the paper—follows George's lead in aggregating capital and labor into a single productive factor which is employed in a given natural environment. Section III adds the complication of improvement in the arts of production, and Section IV deals briefly with George's views on land speculation. Section V assesses, comparing George with his contemporary Alfred Marshall.

HENRY GEORGE (1839–1897) is widely regarded as a mediocre amateur economist who absorbed—perhaps too well—the general ideas of the British classical school as to the effects of growth on factoral income distribution, and built thereon a social reform movement reflecting a largely outmoded view of the world. There can be little doubt that in writing *Progress and Poverty*, first published in 1879,[1] George was strongly influenced by the classical economists, especially Adam Smith, David Ricardo, and John Stuart Mill, as well as by the views of Thomas Robert Malthus on population. (Subsequently he was to claim

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affinity with the Physiocrats, but that was more retrospective affiliation than formative influence.) George's claims that land was rightly the property of all and pure rent an unearned and undeserved individual income echoed a long tradition, also associated with the classical school, especially James Mill and his son John Stuart, and rather naturally incited by classical rent theory. What distinguished George's proposals and helps account for the worldwide furor they raised was his call for "expropriation now" by the immediate punitive taxation of pure Ricardian rent without compensation to landowners.

However, my concern here is not with George the social reformer, propagandist, and political activist, but with George the economic theorist: that is, not with the normative aspects of his thought but with the positive ones. I hope to show that his modeling of the economic growth process in *Progress and Poverty* went well beyond the classical paradigm and displayed considerable ingenuity, innovativeness, and analytical skill. In particular, he took spatial aspects into account, in a way giving him some claim to be regarded as a significant contributor to spatial economics. His analytical performance was, of course, not without flaws. In particular, his treatment of capital remains problematic and I propose to dispose briefly of that facet of his thought before expounding his analysis in the context of a two-factor setting involving only land and labor. This, as will be seen, follows a line of simplification suggested by George himself. It allows the exposition to be sharpened and focused on essentials.

I

The Problem of Capital

ON THE PLUS SIDE, George deserves considerable credit for breaking away from the unsatisfactory wage-fund idea that all wages have to be advanced during the gestation period of any production process from a previously accumulated store of *finished* workers' consumption goods—perhaps a relic of a propensity of earlier writers to treat all production as synchronously yielded by an annual harvest cycle and all wages as immediately consumed. George recognized clearly the possibility of a balanced-flow situation in which production starts for any good are undertaken at a steady rate in time and current con-

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sumption requirements are met by the output emerging from a just-maturing previous start. Maintained stocks of *finished* consumer goods are then required only for precautionary purposes to bridge unexpected *changes* in equilibrium flow levels. This by now common conceptualization, clearly stated (without reference to George) by Alfred Marshall (1888), was firmly indicated by George in 1879 (pp. 71–9).

When it came to the question of how production yield at the no-rent margin was divided between labor and capital, George's treatment became sketchy and elusive, although with intriguing hints of marginal-productivity thinking. He alluded vaguely to the productivity of time in biological growth processes, but argued more significantly that capital was simply "labor stored up in matter" and that with free competition the "natural relation between interest and wages" required that both direct and stored-up labor obtain "equal returns to equal exertions" (pp.198–9). This led to his main proposition: wages and interest tend to remain in fixed ratio, rising and falling together, for "if wages fall, interest must also fall in proportion, else it becomes more profitable to turn labor into capital than to apply it directly" (p.199). This proposition could hardly refer to the relation between the wage rate and the interest rate and is best interpreted in terms of the absolute shares in output accruing to labor and capital. Even so, it gives no scope to the productivity of waiting and the need to compensate it, or to changes in the relative supplies of labor and capital.[2] But his proposition greatly simplified George's enquiry by freeing it from any further discussion of the distribution of income between labor and capital and by focusing attention on the distribution between land and labor-allied-with-capital—both labor and capital being equally oppressed by a rise in the share of output claimed by landowners. Thus:

> the primary division of wealth in distribution is dual, not tripartite. Capital is but a form of labor and its distinction from labor is in reality but a subdivision, just as the division of labor into skilled and unskilled would be (p.203).

George recognized that he had now

> reached the same point as would have been attained had we simply treated capital as a form of labor, and sought the law which divides the produce between rent and wages; that is to say, between the possessors of

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> the two factors, natural substances and powers, and human exertion—which two factors by their union produce all wealth (p.203).

The simplification to two productive factors that George suggests here will be adopted from now on, allowing the inadequacies of his treatment of capital to be bypassed. There is one important proviso, however. The harmony George discerned between the interests of labor and capital applied only under free competition. *Monopolized* capital was as inimical to the interests of labor and competitive capital as was the private ownership of land. Indeed, George's tendency, following a common nineteenth century practice, to refer to the private ownership of land as "land monopoly" even when control was fragmented drew the parallel even more tightly.[3] The elimination or control of monopoly and protectionism, and the active promotion of free competition became important subsidiary planks in George's policy platform.[4] But he saw monopolistic distortions largely as epiphenomena resulting from an undue concentration of wealth and power whose ultimate source lay in the "great problem" posed by private land ownership (see p.193). The problems posed by concentrated capital will not be pursued further here.

II

The "Great Problem"

FOR GEORGE THE "GREAT PROBLEM" was to diagnose the fundamental causes of "the increase of want with the increase of wealth" (as the subtitle to *Progress and Poverty* put it) that he saw manifested in the world around him. The secular aspects of his diagnosis, our concern here,[5] are set out in Book IV of *Progress and Poverty* which is entitled "Effect of material progress upon the distribution of wealth." George here drew heavily upon the classical theory of growth and distribution, accepting its adverse distributional implications for labor but vehemently disputing its pessimistic prognosis for overall living standards, even in the absence of sustained technical progress.

George in effect discussed the problem in a macroeconomic two-factor setting, with "land" standing for all aspects of the physical environment and "labor" for all forms of human effort devoted to production. Rather than restrict rent creation to primary production, as

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Ricardo had done, George worked with an aggregative concept of output as a whole, arguing that all production draws to some extent on appropriable aspects of the physical environment (pp. 168–70). He followed Ricardo, however, in identifying the competitive real wage rate with the "average produce of labor at the margin of cultivation" (p. 206), which represented "the produce which labor can obtain at the highest point of natural productiveness open to it without the payment of rent" (p. 213). But he departed sharply from the pessimistic Malthus-Ricardo tradition by introducing two general classes of scale economy. These take effect even if there is no improvement in "the arts," in which term George includes both "improvements in the arts of production and exchange" and "improvements in knowledge, education, government, police, manners, and morals, so far as they increase the power of producing wealth" (p. 228).

The first scale effect reflects increased possibilities for specialization of tasks and functions as the labor force grows: "increased population, of itself, and without any advance in the arts, implies an increase in the productive power of labor. . . . with every additional pair of hands which increasing population brings, there is a more than proportionate addition to the productive power of labor" (p. 232), an increase which applies to all labor, not just the incremental addition.

The second scale effect reflects agglomeration economies arising as the density of economic activity in urban centers increases. These economies do not raise the productivity of all labor, but only of that employed on the specific pieces of land that are the site of urban development. Population growth, by increasing such agglomeration economies, "brings out a superior power in labor, which is localized on land—which attaches not to labor generally, but only to labor exerted on particular land; and which thus inheres in the land as much as any qualities of soil, climate, mineral deposit, or natural situation, and passes, as they do, with the possession of the land" (p. 235).

Increased urban concentration not only increases efficiency in production and exchange of tangible goods, but also makes possible provision of otherwise unattainable amenities and services, all of which should be reflected in the overall measure of output. George's famous account (pp. 235–42) of the evolution of a tract of land from vacant prairie to bustling urban center makes these points unforgettably: loss

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of peace and rural solitude was something that he—a city dweller at heart—gave little heed to.

The growth of urban population, itself driven by an overall growth in population and economic activity, increases the productive power of urban land in a way "equivalent to the multiplication of its original fertility by the hundred fold and the thousand fold" (p. 241). Thus it is that "the lands which yield the highest rent, are not lands of surpassing natural fertility, but lands to which a surpassing utility has been given by the increase of population" (p. 242). This increasing of land rent by urban agglomeration was for George the most important influence raising the share of rent in total output, an effect which he justly believed had been neglected hitherto by "political economists" (p. 243).[6]

Population growth with a fixed land endowment inevitably forces marginal production to take place under conditions less well endowed by nature than before. This may involve recourse only to more distant and inconvenient sites rather than to land of inferior intrinsic quality.[7] In any case, workers at the no-rent margin will operate under worse conditions. However, increased productivity accruing to all workers from the specialization effect as population grows may still prevent output per worker at the no-rent margin from falling, the greater individual efficiency of the marginal worker compensating for a less propitious working environment.

Despite this, the added benefits new workers create for *other* workers through the increased-specialization effect and the benefits they create by enhancing agglomeration economies fail to accrue to them. By George's assumption that competitive wages are determined by the *direct* output contribution that a worker makes at the no-rent margin, these benefits are in effect treated as uncompensated external benefits. They accrue not to the additional workers who create them but to the already active workers whose efficiency is raised and to the landlords who are the residual claimants to the benefits of increased urban agglomeration.

The existence of specialization and agglomeration economies made it seem quite possible—even likely—to George that population growth could increase output per head overall, even without any "improvement in the arts" occurring, a conviction which underlay his fervent anti-Malthusianism. But growth in output per head did not guar-

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antee that labor would share in the gains due to population growth. Despite increased national prosperity, there would, George claimed, at best be a decline in labor's share of output and at worst an absolute decline in its living standards.

A simple formalization will help to illustrate these points more clearly. The level of total output, Q, as a function of total labor input, L, assumed proportional to population, may be approximated as

$$Q = A(L)[F(L) + B(L)] \tag{1}$$

Here A(L) reflects the increased-specialization effect,[8] B(L) reflects the increased output arising from urban agglomeration, and F(L) represents the standard way in which land limitation exerts a diminishing-return effect.[9] The following qualitative restrictions apply (primes denoting derivatives)

$$A', B', F' > 0 > F'' \tag{2}$$

It is evident that these qualitative restrictions are consistent with the possibility that output per head, Q/L, may rise as population and labor force grow, despite the presence of diminishing returns to land.

The real wage rate, w, at any level of L is given by the derivative of Q with respect to L, holding A(L) and B(L) constant since extra labor is not compensated for creating specialization and agglomeration economies for other individuals. Thus

$$w = A(L)F'(L) \tag{3}$$

which may rise or fall as L increases, depending upon the balance between increase in average labor efficiency and diminishing return to extra labor of constant efficiency. This is argued by George in the following terms:

> Let us suppose land of diminishing qualities. The best would naturally be settled first, and as population increased production would take in the next lower quality, and so on. But as the increase of population, by permitting greater economies, adds to the effectiveness of labor, the cause which brought each quality of land successively into cultivation would at the same time increase the amount of wealth that the same quantity of labor could produce from it. . . . If the relations of quantity and quality were such that increasing population added to the effectiveness of labor faster than it

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> compelled a resort to less productive qualities of land, though the margin of cultivation would fall and rent would rise, the minimum return to labor would increase (p.233).

Even if the real wage rate fell, labor's *absolute* share of output, wL, might rise, although even it could fall if the onset of diminishing returns to land is very severe. In any case, an increase in the agglomeration effect, B(L), will have no effect upon labor's absolute share of output, but it will lower the *relative* share received by labor.

Absolute rent is given by

$$R = Q - wL = A(L)[F(L)-LF'(L) + B(L)] \tag{4}$$

so that (in abbreviated notations)

$$dR/dL = (A'R/A) + A(B'-LF'')>0 \tag{5}$$

which implies that absolute rent must increase as L does. The *relative* share of labor is given by

$$wL/Q = (LF'/F)/(1+B/F) \tag{6}$$

It is well known that for the class of diminishing-return production functions like F(L) the elasticity LF′/F may rise or fall with L, although remaining less than unity. If it rises with L, and if B/F falls with L (or does not rise too rapidly) as is logically possible, then labor's relative share will rise as L increases, belying George's claim that a reduction is inevitable. A rapid growth in agglomeration economies makes his claim more likely, however.

Even before introducing agglomeration economies, George had claimed that "increase of population, as it operates to extend production to lower natural levels, operates to increase rent and lower wages as a proportion, and may or may not reduce wages as a quantity: while it seldom can, and probably never does, reduce the aggregate production of wealth as compared with the aggregate expenditure of labor, but on the contrary increases, and frequently largely increases it" (p.234). But although he thus formally claimed only the necessity of *relative* immiserization of labor, he was prone to take a darker view and to slip into assuming the likelihood of *absolute* immiserization: for

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example, "in spite of the increase of productive power, wages constantly tend to a minimum which will give but a bare living" (p.282).[10]

George saw immiserization as the consequence of inappropriate human institutions, not of the inescapable niggardliness of nature as Malthus had claimed. The contrast between rising output per head and the deteriorating position of labor gave fire to his proposal to tax away the rent of land. However, the public revenue thus raised was to be devoted only to public purposes, not redistributed to individuals. Since a continuing decline in the competitive real wage rate would remain a possibility even after the regime change, the question of whether improved public facilities could permanently preserve living standards while wages were falling should have been addressed. But George was prone to a rosy view of his proposed new regime, in contrast to his dark view of the existing one.

III

Will "Improvement in the Arts" Offer an Escape?

THE DISCUSSION HAS RESTED SO FAR on the restrictive assumption that no advances occur in the arts of production, exchange, or social organization. It would appear that such advances might help ameliorate the position of workers, even under a regime of private land ownership. However, George, by a clever but hardly defensible restriction, severely narrowed this potential escape route. He supposed in effect that improvement in the arts always takes a labor augmenting character, turning one worker into the equivalent of more than one worker but otherwise leaving production conditions unchanged. Thus, "the effect of inventions and improvements in the productive arts is to save labor—that is, to enable the same result to be secured with less labor, or a greater result with the same labor" (p.244). It follows that improvements in the arts tighten the grip of the natural-resource constraint in the same manner as would population growth. The return at the margin to a worker of given efficiency must be lowered, but the typical worker is now more efficient, so that the effect on the real wage *per worker* is ambiguous.

The effects of improvement in the arts are analyzed most simply by assuming that population stays constant, due perhaps to "an extensive circulation of Annie Besant's pamphlets" (p.249). In that case:

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> as invention and improvement go on, constantly adding to the efficiency of labor, the margin of production will be pushed lower and lower, and rent constantly increased, though population should remain stationary. . . . Whether, in any particular case, the lowering of the margin of production lags behind or exceeds the increase in productive power, will depend, I conceive, upon what may be called the area of productiveness that can be utilized before cultivation is forced to the next lowest point (p. 251).[11]

This passage may be formalized by assuming that, with constant population, production function (1) may be re-expressed as

$$Q = G(L.E);\ G'>0>G'' \tag{7}$$

where E is the number of units of labor of standard efficiency represented by an individual worker.[12] Advance in the arts increases E. The competitive real wage *per worker*, w, is now given by the notional change in output resulting from an extra worker. Thus:

$$w = \frac{\partial Q}{\partial L} = EG'(L.E) \tag{8}$$

so that G′(L.E) which equals w/E is the wage of a hypothetical worker of efficiency E = 1. With L constant, an increase in E lowers G′(L.E). The overall effect on w will be an increase if G′ falls in smaller ratio than E increases, and so on.

Rent is now given by

$$R = Q - wL = G - LEG' \tag{9}$$

It must increase as E does since

$$\partial R/\partial E = -L^2EG''>0 \tag{10}$$

Though perceiving the effect on workers of an advance in the arts as ambiguous, George was again prone to take the dark view of actual prospects.[13]

IV

The Role of Land Speculation

GEORGE OBSERVED THAT RISING LAND RENTS and land values due to population growth or improvement in the arts would induce land speculation

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in a regime of private land ownership. He argued that speculatively held land would—at least in North America—tend to be kept out of productive use, further tightening the effective natural-resource constraint on production (see pp. 251–60). While his argument is logically satisfactory, its premises might be questioned. In any case, for this effect to tighten the resource constraint progressively, as George assumed (p.259), continual expansion of speculative land holding would be necessary. The anti-social nature of all speculative withholding of land from production might also be questioned. In an evolving economy, a site may have a profitable use in prospect for which the time is not yet ripe, yet temporary use in the interim may require too large a sunk investment to be justifiable. Exhaustible resources raise a similar issue more pointedly. Glimmerings of thinking along these lines might be discerned in George's observation, apropos of vacant lots in a rapidly growing city, that "[t]hese lots, some of them extremely valuable, are withheld from use, or from the full use to which they might be put, because their owners, not being able or not wishing to improve them, prefer, in expectation of the advance of land values, to hold them for a higher rate than could now be obtained from those willing to improve them" (p.257). But the thought was not pursued.

George believed that his proposed "single tax" would virtually eliminate the incentive for speculative landholding, producing a major relaxation of the natural resource constraint on production (pp. 436–8). What he again failed to emphasize was that the resulting one-time improvement in labor's position might be undermined by a continuing adverse wage trend.

V

Closing Remarks

I HOPE TO HAVE DEMONSTRATED THAT George in 1879 showed more ability and innovativeness as an economic theorist than is usually admitted, and that *Progress and Poverty* has claims to be regarded as a significant contribution to the analysis of economic growth. If one compares the thinking of George and Marshall about the macroeconomics of growth and distribution at this time it is not clear that the advantages lie wholly on Marshall's side. Both attempted to extend the classical

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model so as to incorporate scale economies and both struggled to correct and improve the classical theory of distribution. As to the former, it is true that Marshall was more aware than George of the need to reconcile scale economies with the persistence of competition, but he had hardly resolved the matter in 1879, and perhaps never did. George, on the other hand, deserves credit for his pioneering treatment of the economies of agglomeration, richer than Marshall's rather sketchy treatment of external economies. When it came to breaking with the classical theory of distribution, George escaped the more easily from wages-fund preconceptions, but Marshall's vestigial marginal productivity theory of 1879 pointed to a more satisfactory treatment of capital and interest than George was ever able to achieve.[14]

George was of course entirely self taught as an economist and perhaps too confident in his own power of thinking through intricate economic and social issues. This, together with the grandiosity of his ambitions, left him open to easy criticism. The economists of his day gave him a largely hostile reception, paying little heed to the economic-theoretical component of his work. For this and other reasons he failed to advance as an economic theorist in the years following 1879. Since his era historians of economics have tended to perpetuate the neglect of *Progress and Poverty*'s contribution to economic theory despite full awareness of George's significance as social critic and reformer.

Notes

1. *Progress and Poverty: An Inquiry into the Causes of Industrial Depressions and of Increase of Want with Increase of Wealth* was published privately in 1879, the first commercial edition appearing in 1880 with many subsequent editions, none significantly changed from the 1879 version. References here are to the frequently reprinted 50th anniversary edition (George 1929) to which all unspecified page references below refer and where the chapters most heavily drawn upon have the following page ranges: I.4(71–9), III.2(165–72), III.3(173–9), III.6(204–17), IV.2(230–43), IV.3(244–54), IV.4(255–60).

2. In defense of George it can be noted that he viewed capital as a fungible component of the broader stock of wealth accumulated by saving and not as a given magnitude devoted inelastically to production.

3. See, for example, p. 412. It should be stressed that George did in fact analyze land rent in Ricardian fashion, assuming free competition among many landowners.

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4. George (1886) gave special emphasis to these matters but they had already been dealt with emphatically in *Progress and Poverty*.

5. George also placed considerable stress on the immiserizing effects of persistent business cycles but this facet of his thought will not be pursued here.

6. It can hardly be claimed that the possibility of scale or agglomeration economies had gone unnoticed—the writings of Adam Smith, Edward Gibbon Wakefield (on whom see Kittrell 1973), and the American protectionists led by Henry Carey are enough to refute such a claim. George's contribution was rather to fit these notions skillfully into a coherent macroeconomic framework with results strikingly different from those of the classical growth theory derived from David Ricardo.

7. See pp. 256-8. This point helps explain the apparent anomaly of an obsession with natural-resource limitations being bred in the vastness of the American West.

8. George hints at the implied assumption that increased efficiency is output augmenting: "If population be doubled, land of but 20 productiveness may yield to the same amount of labor as much as land of 30 productiveness could before yield" (p. 232).

9. To justify (1) assume that it holds only for L>M (fixed) and that all agglomeration effects occur on lands where the M highest-yielding workers are employed. Then A(L)B(L) is the output of the M workers employed on this land (increasing with overall labor force, L, due to specialization and agglomeration economies despite the fixity of the land area involved) while A(L)F(L) is the output of the other L-M workers who work under the less propitious conditions where diminishing returns are significant and no agglomeration economies arise.

10. George, discussing rent, asserted, "I am using wages not in the sense of a quantity, but in the sense of a proportion" (p. 216) but did not adhere consistently to this usage. By implication he defined the real wage rate in terms of command over output as a whole, including a full share of manufactures and services. Had he assumed that workers predominantly consume primary products, whose relative prices rise as the natural-resource constraint tightens, his claim for adverse effects on labor could have been strengthened. He viewed the bare minimum to which real wages might be driven as a conventional subsistence level, suppressing population growth.

11. George continues (pp. 251–2) with a numerical example. Output per man at the margin is initially 20, but worker efficiency increases by 10 percent. If the output at the margin of a unit of labor *of the old efficiency* now falls to 18 (that is by 10 percent) when released workers have been re-employed, then the real wage is unchanged. If the fall is only to 19 the real wage increases by 5 percent. Any fall in the marginal yield raises rent, however.

12. To obtain (7) from (1), replace F(L) by F(L.E), treating A(L) and B(L) as

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constants, on the reasonable assumption that specialization and agglomeration effects are unchanged if population is unchanged.

13. As George recognized (p.252), workers could always protect themselves collectively from a cut in real wages by reducing labor supply sufficiently to keep L.E constant.

14. On Marshall's early work on distribution and growth see Donoghue (1995) and Whitaker (1974).

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