Henry George, John Rae, and the theory of capital in a rapidly transforming economy

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Abstract

Purpose – The purpose of this paper is to establish a historical context for the often maligned capital theory of Henry George within a North American frontier tradition that includes John Rae.

Design/methodology/approach – Modern discussions of rapid technological and institutional change provide a framework for detailed re-examination of the capital theories of Rae and George, whose critics were largely constrained by a rigid neoclassical perspective.

Findings – Both Rae and George presented capital theories, defined as explanations of the supply of and demand for capital resulting in a determinate capital stock. Both writers stress elements that were not emphasized in neoclassical capital theory, most notably that the capital stock can increase rapidly under certain conditions; increases in knowledge, inventions, technical and technological changes, and scale are more important than mere accumulation of capital; high rates of return combined with rapid technical obsolescence and physical deterioration provide the opportunity for rapid changes in the form of the capital stock, and; the ephemeral nature, and hence potential mobility, of capital implies that security of property is essential for economic growth.

Research limitations/implications – The focus on two writers leads to the question of how widespread their ideas were in nineteenth century North America.

Practical implications – The rapidly changing technology and institutions that Rae and George observed place their theories closer to some modern trends in the study of economic development than to the literature of neoclassical capital theory.

Originality/value – George's grasp of economic theory deserves greater respect than it has often received in the economics literature when his work is considered in its historical context.

Keywords United States of America, Economic theory, Capital, Economic development, Agglomeration

Paper type Research paper

1. Introduction

To the majority of modern economists trained in the neoclassical tradition, the remark of Henry George (1839-1897) "that the social organism secretes, as it were, the necessary amount of capital just as the human organism in a healthy condition secretes the requisite fat" (George [1879] 1956, p. 86) probably seems appallingly simple minded, or perhaps just appalling.[1] This paper will argue, however, that George's capital theory was informed by, and consistent with, a "frontier tradition" in North American capital theory and that it has a very modern flavor and implications for economic development. Rae (1796-1872) was the most profound expositor of this theory. His work was cited by Henry George, as well as by Jevons, Boehm-Bawerk,

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Fisher, and other established members of the profession. Rae and George differed on important policy issues, notably tariffs, but their respective approaches to the role of capital in economic development shared many features, especially the stress on technological change and incentives. As modern discussions of economic development shift away from mere accumulation of capital to the role of institutional and technological change – topics that are handled poorly by the neoclassical theory and only very abstractly by the Austrian – the frontier tradition offers some important insights for our consideration.

2. Henry George's capital theory

Classical economics grew up singing Adam Smith's paean to frugality:

> Capitals are increased by parsimony, and diminished by prodigality and misconduct[. . .] Parsimony, by increasing the fund which is destined for the maintenance of productive hands, tends to increase the number of those hands whose labour adds to the value of the subject upon which it is bestowed[. . .] It puts into motion an additional quantity of industry, which gives an additional value to the annual produce[. . .]
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> By what a frugal man annually saves, he not only affords maintenance to an additional number of productive hands, for that or the ensuing year, but, like the founder of a public workhouse, he establishes as it were a perpetual fund for the maintenance of an equal number in all times to come[. . .]
>
> The prodigal perverts it in this manner. By not confining his expense within his income, he encroaches upon his capital. Like him who perverts the revenues of some pious foundation to profane purposes, he pays the wages of idleness with those funds which the frugality of his forefathers had, as it were, consecrated to the maintenance of industry[. . .] The conduct of every prodigal, by feeding the idle with the bread of the industrious, tends not only to beggar himself, but to impoverish his country" [Smith, 1937, pp. 321-22 passim][2].

Capital theory since Adam Smith has tended to follow in his Scottish footsteps, albeit with less colorful prose, but Henry George did not. His deviation did not stem from ignorance. Henry George was well read in classical economics and, although put off by the terminology of the marginal analysis that was being developed as he wrote, approached economic topics with a marginalist framework. He maintained strict distinctions among the three factors of land, labor, and capital. The former two were necessary for the production of wealth, while capital, as the produced means of production, facilitated the efforts of labor to produce wealth from land.

Henry George's vision of the economy, as spelled out in *Progress and Poverty*, was one of rapid growth in population and wealth, both of which required land. As all of the vacant land moves into private ownership, rents rise to absorb the entire surplus above the yield of the marginal land. Thus, landowners benefit from progress, and leave labor and capital in relative poverty (a smaller share of national income) or perhaps even absolutely poorer than they were before the "progress." George proposed to remedy the problem by taxing away the bulk of the economic rent of land and eliminating all taxes on labor, capital, and transactions. At first glance, this sounds like the standard classical vision of Ricardian rent and Malthusian population theory leading eventually to a stationary state with wages at the subsistence level and no profits. This would be a gross misinterpretation of George's vision.

From the perspective of 1879, one notable feature of *Progress and Poverty* was the sustained assault on the "wages fund doctrine" which held that the fund for the payment

of wages is fixed by the amount of accumulated capital available for that purpose; hence, any increase in the amount of labor would reduce the wage payment per laborer and any increase in the wage rate would cause unemployment. Within the world of economic theory, marginal productivity analysis was superseding the wages fund as George was writing; but George's analysis of the wages fund reveals some of the most significant assumptions that underlie his treatment of capital. The capital theory of George and Rae was concerned with rapid economic growth and development, but the marginal productivity theory that was becoming mainstream after the 1870s turned the focus of capital theory toward questions internal to the body of economic theory, such as the meaning of capital, whether aggregate capital had meaning, and whether each factor could be paid its marginal product.

One of George's key assumptions is that economies of scale (broadly defined to include economies of agglomeration) are so strong that they overwhelm any tendency toward diminishing returns as the growing population worked with a fixed supply of land. "The denser the population the more minute becomes the subdivision of labor, the greater the economies of production and distribution, and [. . .] a greater number of people can produce a larger proportionate amount of wealth, and more fully supply their wants, than can a smaller number" (George [1879] 1956, p. 150). The immediate purpose of this statement was to discredit the dismal Malthusian forecast and to focus on distribution of income, rather than an inadequate total, as the source of poverty. Nevertheless, it is extremely significant for capital theory because it implies a focus on changes in technique as scale increases. Neoclassical capital theory, for reasons related to the internal consistency of the whole marginal approach, increasingly boxed itself into the use of simplistic aggregate production functions in which returns to scale could be analyzed only under the assumption of fixed factor proportions (Gold, 1981).

Growth in output per person with land as a fixed factor, as George analyzed it, amounts to a denial of the assumption of homogeneity (of any degree) as a characteristic of the production function and leads to the expectation that factor proportions will change as the rate of output changes, that different processes will be used as population density increases, and that technological change will be induced by changing economic circumstances, as well. In short, it is a more dynamic context than the neoclassical theory that culminated in the inherently static "growth models" of the 1960s; i.e. taking time derivatives of Cobb-Douglas production functions. While George did recognize decreasing costs within individual firms as sales and specialization increased, he emphasized the economies resulting from agglomeration as population densities increased. This was particularly significant because it shifted the focus from agricultural land and food production, the typical focus of classical discussions, to cities, which account for the bulk of land rents in advanced economies. Moreover, the urban setting provides a clear illustration of the way in which the activities of neighbors or the government can add to the value of a particular parcel of land.

The most striking feature of George's capital theory is his assertion of the temporary nature of capital. This should not be confused with the view common in some other capital theories that working capital is most important. Rather, it is a recognition of the rapidity of physical depreciation (inspired by his early career aboard wooden sailing vessels or observations of western mining camps?) and of economic obsolescence as the community grows and innovation progresses. "Wealth will not bear much accumulation; except in a

few unimportant forms it will not keep. The matter of the universe, which, when worked up by labor into desirable forms, constitutes wealth, is constantly tending back to its original state [. . .] Stop labor in any community, and wealth would vanish almost as the jet of a fountain vanishes when the flow of water is shut off. Let labor again exert itself, and wealth will almost as immediately reappear" (George [1879] 1956, p. 148). The implications of the twin insights of physical decay and economic obsolescence will be revisited below.

Another of George's insights is the sensitivity of the production of wealth to the institutional framework. In undeveloped countries, "Is it not the rapacity and abuses of government, the insecurity of property, the ignorance and prejudice of the people, that prevent the accumulation and use of capital? [. . .] Yet how quickly the capital habitually used is reproduced in a community that has been swept by war [. . .]" (George [1879] 1956, p. 83). For George, of course, the most important institutional feature was the tax structure: tax land rents and eliminate all taxes on labor, capital, and consumption.

Two additional features will be noted only briefly here, although they are also of great importance. One is George's empirical observation that high wages are correlated (both over time and from place to place) with high interest rates and low wages are correlated with low interest rates (George [1879], 1956, pp. 7, 19, 145). This belief provided part of the rationale for George's attack on the wages fund theory (George [1879] 1956, p. 219). It also is the background for his claim that rents absorb an increasing share of wealth as population density and the production of wealth increase. Specifically, George argued that land, as the fixed factor, absorbs all of the surplus as successive doses of labor and capital require access to land in order to produce wealth. The division between labor and capital, however, is determined in a Boehm-Bawerkian way by the technical superiority of present over future goods;, i.e. the marginal efficiency of investment, to use a more modern term (George [1879] 1956, p. 219). By returning to the Ricardian device of determining rent directly within the model and then splitting the remainder with a subsidiary calculation, George avoided the marginalist problem of determining wages, rent, and interest within the model and then worrying about whether they exhausted the entire product.

Although George rejected the concept of "human capital" as a metaphor, not science, (George [1879] 1956, BkI, Ch2) he placed great importance on the growth of knowledge, wealth, and the power to use natural resources to improve human life. The power of human intellect is fundamental to his attack on the Malthusian fear of the consequences of population growth. Moreover, his discussion of it is the setting for the brilliant Book X of *Progress and Poverty* on *The Law of Human Progress*. In George's view, the accumulation of scientific and technical knowledge is a cultural phenomenon. Modern civilized man is not genetically superior to ancient civilized man or to the modern savage, but rather he stands on a pyramid built by the ancients. The key variable is the amount of brain power that can be expended on progress. Under the right conditions, a large population can progress faster than a small one. One million people can think more great thoughts than can 100.[3] If institutions are defective, however, civilization may regress:

> Mental power is [. . .] the motor of progress, and men tend to advance in proportion to the mental power expended in progression [. . .] The mental power which can be devoted to progress is only what is left after what is required for nonprogressive purposes [. . .] [maintenance and conflict] [. . .] By maintenance I mean, not only the support of existence, but the keeping up of the social condition and the holding of advances already gained. By conflict

> I mean not merely warfare and preparation for warfare, but all expenditure of mental power in seeking the gratification of desire at the expense of others, and in resistance to such aggression. (George [1879] 1956, p. 507).

A modern student of Public Choice would refer to the last two categories as "Rent Seeking" and "Rent Avoidance."

To summarize, Henry George visualized a world in which capital could be created quickly under favorable institutional conditions, but was highly mobile and required constant maintenance. Even with maintenance, it still decays and the value is rapidly destroyed by advances in productivity and invention. Interest is a return accruing from the increase in value as time passes in agriculture and winemaking, but also in manufacturing and in the changes in time and place of the merchant's inventories. If there were no rent, wages would equal the whole product minus that part necessary to induce the storing up of labor as capital. Once land is differentiated (primarily by location, but also by fertility), the amount of wages plus interest depends on the margin of use, with the surplus going to the landowner. The split between wages and interest depends on the benefit of taking the roundabout path of converting labor into capital to produce wealth, instead of using labor directly. Many firms have strongly decreasing average costs as production increases. Much of the saving comes from specialization and invention. Even more important are the economies of agglomerating many activities in the same location. The owners of the land underlying cities are the main beneficiaries of agglomeration.

3. John Rae and his capital theory

Superficially, John Rae provides a striking contrast to Henry George. George's *Progress and Poverty* has been read by millions, but is rarely treated seriously and sympathetically by professional economists[4]. Rae's *New Principles of Political Economy* has been difficult to obtain and rarely read during most of the time since its publication in 1834, but it did attract serious attention from the better economists including George (George, 1898, p. 121), Mill, Veblen, Schumpeter, and Fisher. (See the account by (Mair, 1990).) Boehm-Bawerk discovered Rae after writing his *History and Critique of Interest Theories* and gave him credit for anticipating many of his own ideas when he wrote the second edition. It is noteworthy that George, who died in the midst of his campaign for mayor of New York on October 29, 1897, refers to Rae despite the fact that Rae's first professional revival began with a *Quarterly Journal of Economics* article in that very year[5].

Rae was born in Scotland in 1796, studied medicine at Aberdeen, and emigrated to Canada in 1822. He taught at backwoods schools while participating vigorously in public affairs, doing geological field work, and writing *New Principles of Political Economy*. Rae's economic ideas were shaped by his life on the Canadian frontier, and one goal was to argue for tariff protection for the infant manufacturing industries of North America[6].

The purpose of this summary is not to repeat the detailed exposition of Rae's capital theory contained in Boehm-Bawerk or the general sketch of his ideas done by Mair (1990) or the specialized essays in Hamouda *et al.* (1998), but rather to call attention to the points of similarity between the theories of Rae and George. Since, George had read Rae and Rae had worked out his capital theory in considerable detail, it seems appropriate to call attention to those aspects of Rae's work that provide more systematic expositions of topics that George only touched on.

Rae's book was written as a response to Adam Smith's *Wealth of Nations*, so it sbegins with an analysis of situations in which individual acquisition of wealth consists of a transfer from other individuals, rather than an increase in national wealth as argued by Smith (Rae, 1964, pp. 11-12). This, of course, is one of George's main themes, although the reasons emphasized by the two are different. George argues that individuals can become wealthy by producing wealth, which adds to national wealth, or by obliging others to pay them for use of land or other government created privilege, which does not add to national wealth (George, 1898, Ch XIV). Rae argues that, under most circumstances, the only way that national wealth can be increased significantly is for the productive techniques to be changed (Rae, 1964, p. 13). He points out that individuals who become wealthy typically acquire wealth from other individuals who are becoming poorer. Such transfers are probably not a crushing refutation of Smith's insistence that national wealth is the sum of individual wealth. Rae's example, however, is more pertinent. He speaks of the man who has become wealthy by acquiring ten farms and suggests that the nation that has become ten times as wealthy over some period of time has probably not increased every item of land and capital in the same proportion. This gives a particularly prominent role to invention, as well as to the transfer of technology from other countries and its adaptation to domestic conditions (Rae, 1964, p. 15). The government can assist in advancing domestic technology (Rae, 1964, p. 15), and this is useful because individual firms can rarely capture the full benefits of investing in technology transfer because the skills spillover rapidly to other firms (Rae, 1964, p. 52).

Rae's vision of the world has sharply diminishing marginal productivity of capital, combined with a rate of savings that is highly responsive to the interest rate (Rae, 1964, p. 22). The strength of "the effective desire for accumulation" varies among the individuals in a society, but those with a higher effective desire will offer more in current consumption goods to those with a low effective desire and thus will acquire more and more of the existing capital.

Although Rae does sometimes use the term "rate of return," his preferred approach to the concept is in terms of the time for an equivalent point-input, point-output investment to double. "Instruments" of order A return double the original investment in one year. Order B doubles in two years, and instruments of order Z double in 26 years (Rae, 1834, Book II, Ch. IV). A nice feature of this approach is that it leads to a focus on more rapid exhaustion of an instrument through more intensive use as a source of greater profit (Rae, 1834 pp. 114, 164). For example, an excellent road may wear out more quickly than a poor one because the excellent road will be used by a larger volume of traffic per year. Society realizes the return, in the form of a larger volume of services, in a shorter time, which implies a higher rate of return.

For Rae, the determinants of the capital stock of a country were "the effective desire of accumulation" (the inverse of the marginal rate of time preference), and the factors affecting the return from investment:

- the quantity and quality of materials (natural resources);
- the progress of the inventive facultyl; and
- the rate of wages of labor (with a lower wage making a greater range of projects profitable) (p. 130).

Nothing can be done about natural resources, wages are determined outside his model and, in any event, cannot be depressed much, so that leaves invention as the only feasible way to encourage the accumulation of more capital.

As a result of the assumptions and analysis, Rae realized that he had devised a theory of the determination of the amount of capital that a society would accumulate under given conditions. The equilibrium capital stock was exactly analogous to the equilibrium population that resulted from the subsistence wage theory combined with the wages fund, which was accepted by Rae but not by George. Rae devoted considerable attention to "the circumstances which determine the strength of the effective desire of accumulation" (Rae, 1834, Bk.II, Ch VI). In effect, Rae provided a reservation rate of time preference that paralleled the culturally determined subsistence wage:

> There must be some strong inherent vice in any community, where the certain prospect of plentiful subsistence does not produce an abundant population. It can only be, also, from the effects of some great inherent vice, that, in any community, a very profitable investment can be held out, and yet capital not accumulate with rapidity. Where there is no sufficient prospect of subsistence, people may be restrained from marriage [...] Where there is no sufficient prospect of profit, people may be withheld from accumulat ing capital [...] But the fact is, that people, rather than live single, are inclined to marry at all risks, and hence population is kept down by misery, and premature death; and they are also, rather than do nothing, inclined to embark in adventures where the chances are against their success; hence the vast numbers of unsuccessful projects that in most communities are continually dissipating accumulations of capital [...] To form a right judgment of the powers of any community [...] to increase its capital, we must consider, that, if abundance of secure and profitable investments for capital were presented, its members would be more eager to possess additional capital, and, therefore, would be more prompted to accumulate it; and the capital they possessed would be more productive, and would not be subject to be risked and lost in imprudent speculations (Rae, 1834, pp. 29-30].

Rae's ideas about capital were more detailed and more fully worked out than were George's. But both had some version of a marginal efficiency of investment and a marginal rate of time preference, as well as subsidiary assumptions that led to a determinate capital stock. Those are the elements of capital theory. They disagreed on the wages fund and subsistence wage theory and the role of government in fostering technological change and on the protective tariff. Rae's book was oriented toward building a case for government intervention to foster the transfer of technology to North America. George analyzed the history of civilization at a more abstract level and pleaded the case for an end to privilege, especially the privilege of receiving land rents, but also tariffs. Yet both were keen observers of American conditions, as well as students of history.

4. A frontier capital theory

Rae and George were both shaped by the North American frontier, and that experience gave to both of their capital theories certain similarities that set the two apart from the neoclassical mainstream.[7] Both Rae and George had observed the rapid growth of the capital stock under the ideal conditions of the developing frontier. Rae and George used theory to analyze the dynamics of the economic growth and development that they observed around them, while neoclassical capital theory increasingly focused on consistency with the general body of microeconomic theory[8].

4.1 Supply of capital

One notable feature of the frontier view is the challenge to the classical view that capital must be laboriously increased penny by penny and generation by generation. Where did the capital that appeared so quickly in frontier communities come from? Was it an export from the "overstocked" East? Both Rae and George found that individual work effort and savings responded strongly to investment opportunities. The amount that people work and the amount of production that is consumed are variables. Rae also emphasized the amount of capital lost in failed investments when opportunities are scarce. George stressed the significant maintenance costs of the existing capital stock, which presumably could be used to increase the stock that had been diminished by a catastrophe. Mason Gaffney (2006) has recently studied the recovery processes in Chicago after the great fire, in San Francisco after the great earthquake, and in New Orleans after Hurricane Katrina. The former two cities were left to own devices and heavy taxation on land values. They recovered rapidly, while New Orleans, with much outside "help" but inferior institutions, still languishes.

When the flow of investment, rather than the stock of capital, is the focus, attention must turn to investment in particular heterogeneous "instruments." This puts the frontier theorists squarely in the tradition of Austrian economists such as Hayek and Lachman, who deny the possibility of measuring the capital stock and stress its heterogeneity.

4.2 Changes in technique and technology

Both Rae and George were impressed by the importance of knowledge, invention, technology transfer, and economies of scale in increasing the wealth of the community. This would seem to be an obvious point to the casual observer, but the professional economist will realize how devastating to the conclusions of neoclassical growth theory is the observation that technology changes drastically, rapidly, and unpredictably.

4.3 Cash flow and creative destruction

Rapid changes in technology, division of labor, and the form and function of cities have a corresponding cost in the rapid obsolescence of the existing capital stock. Schumpeter described the "creative destruction" of the existing capital stock by successful innovations. One consequence of a regime of rapid technological change is that durability is not worth buying. The emphasis should be on extracting as much production as possible from an asset while it still has some economic value. If maintenance costs are high, the asset will be scrapped earlier and replaced by the new. George writes about interest rates per month that would be considered usurious if they were for a year, and Rae uses examples of instruments of order D (corresponding to 19 percent per year) or thereabouts. If one thinks of depreciation over an expected life of three or four years and high expected rates of profit, then the cash flows from frontier investments were enormous relative to the investment. Creative destruction would not be anything to fear. The question would be how to direct those cash flows into the next opportunity.

4.4 Security of property

With continued growth dependent on a constant flow of new investment to maintain and expand the rapidly depreciating capital stock, security for investors is absolutely essential. George mentioned how quickly capital could move away when it

was threatened. Both George and Rae discussed situations where development had failed because investors did not feel confident that they would be allowed to keep the full returns from successful investments.

5. Conclusions

It might be argued that Rae and George were not even playing in the same sandbox with the neoclassical capital theorists. After all, they were not writing about equilibrium or whether the interest rate would be positive in the stationary state. They were concerned with the process of rapid economic development. Can anything of use to the modern discussion of economic development be learned from this brief excursion into the less traveled byways of the history of capital theory?

It is notable that the field of development economics, itself, originally built around the mainstream neoclassical views concerning capital with the addition of some socialist inspired ideas concerning the efficacy of central planning, has been undergoing considerable reexamination. William Easterly (2003), for example, has been harshly critical of the behavior of the World Bank and the IMF, which have inflicted the mainstream prescriptions on the less developed world. A decade earlier Bauer (1991, p. 43) had concluded, based on a long career studying economic development, that, "The growth of income does not depend on the volume of saving and investment, and poor people can save and invest sufficient amounts to emerge from poverty[. . .] To have capital is the result of economic achievement, not its precondition." He recommended that the government protect life, liberty, and property and let individuals pursue their own objectives.

The microcredit approach attracted widespread attention in 2006 when Professor Muhammad Yunus and his Grameen Bank received the Nobel Peace Prize. The successes of small loans in enabling the poor to advance themselves raise the question of how much better their lives would be in a world with institutions devised by Henry George. The importance of secure property rights for the poor has been stressed by Soto (2000). Of course, the feasibility of securing good land titles for the poor is enhanced by a significant land value tax. The steps are still small, but both theory and practice show some signs of moving toward Henry George. To achieve George's full vision, however, requires some changes.

Suppose we were to be able to provide even the poorest of the poor with security both for person and for property. Suppose, further, that a serious land value tax were to provide access to the land for whoever could make the most efficient use of it. And suppose, still further, that the revenues from the land value tax were used to relieve people of tax burdens on labor, capital, and transactions. Finally, assume that the people could control the rent seekers, corrupt politicians, and incompetent international do-gooders. Maybe, just maybe, the social organism would, indeed, "secrete the necessary amount of capital." I think so. You may want to accuse Henry George of appalling optimism about politics, but don't call his capital theory simple minded.

Notes

1. Mason Gaffney, a longtime admirer of George, comments, "George on capital theory is best forgotten" Gaffney (2008, p. 135).
2. This sentiment is perhaps not surprising, coming from a Scotland where failed merchants were described as "decayed" Buchan (2004, p. 30).

3. The modern protesters against "Limits to Growth," e.g. Julian Simon, make the same point.
4. George's stature among professional economists seems to be rising. See, for example, Whitaker (1997).
5. Rae's most recent professional revival can be credited to the work of James (1965).
6. The Scottish claims on Rae's ideas are argued strongly by Dow *et al.* (1998).
7. It is disconcerting, however, that the frontier elements were so quickly forgotten, with Rae, as quoted by Mill, becoming the apologist for protection and George inspiring socialism. See, e.g. Murray 1981, pp. xviii ff. and 58-62.
8. The reasons why the often arcane debates in capital theory were so important to microeconomics are made clear in Harcourt (1972).

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