On Henry George, the Austrians, and Neoclassical Choice Theory:

A New Look at the Similarities Between George and the Austrians

By PETUR O. JONSSON*

ABSTRACT. Henry George and the Austrians disagreed on whether land is inherently different from other factors. Beyond this, they had much in common. The paper specifically argues that the similarities between George and the Austrians are derived from a similar underlying approach to choice. Both relied on a subjective choice framework which yields a foundation that is quite different from that of Walrasian neoclassical economics. As a result, George and the Austrians held similar views on innovation and progress. Moreover, these views are incompatible with neoclassical choice theory which is not really equipped to deal with innovation.

I

Introduction

A CENTURY AGO, HENRY GEORGE was the most widely read and debated economist in the history of the world. And yet, a scant five decades later, he had become a "forgotten man" (see Geiger, 1941). Many writers have since puzzled over George's fall from fame to obscurity.[1] Perhaps, as Gaffney (1994) and Harrison (1994) have argued, the very development of neoclassical economics was a purposeful stratagem against George, designed to make us forget him and his ideas.[2] At the very least, it hastened his fall.

In any case, to most academicians, the florid and yet strident tone of George's writings has long camouflaged his originality and brilliance. In academic circles, such confrontational style[3] elicits misgivings and suspi-

* Petur O. Jonsson is an Associate Professor of Economics at Fayetteville State University. His work has been published in *International Advances in Economic Research*, the *Eastern Economic Journal*, the *Journal of Economics*, the *Journal of Private Enterprise*, the *Review of Social Economy*, the *Atlantic Economic Journal* (forthcoming), and a number of different proceedings and anthologies. This paper benefitted from comments from Mason Gaffney, Joseph Horton, Neil De Marchi, and two anonymous referees. An early version was presented at the *Congress of Political Economists* meetings in San Francisco in 1996.

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cions of quackery, rousing hurried rebuttals rather than careful analysis. So, while those who actually study George's ideas understand that he was both "a profound and original economist" (Yeager, 1984, 157), his critics "more often than not, display a lamentable absence of real acquaintance with his thought" (Andelson, 1979, 15).

A steady trickle of Georgist writers notwithstanding, George's reputation among mainstream economists has now fallen to the point where he is "no longer even considered . . . worthy of vituperation or rebuttal" (Roll, 1992, 386). Most of the recent history-of-thought textbooks do not even mention his name (see for example Negishi, 1989; Niehans, 1990; and Dome, 1994). Others suggest that he "contributed little, if anything, to economic analysis" (Backhouse, 1985, 147) and mention him only in passing (see Landreth and Colander, 1994, 114). Even Schumpeter (1954, 865), who certainly gave him more credit than the current crop of textbooks does, suggests that George lacked originality.

In retrospect, George's estrangement from the academic economists of his day seems contrived rather than an inevitable consequence of fundamental differences. Gaffney (1994) has demonstrated that many of the leading economists of George's time went out of their way to distort his arguments and to rewrite their own arguments in a manner that was incompatible with his reasoning. At the same time, George himself was not willing to give credit to his contemporaries, even when they expressed ideas quite compatible with his own. To wit, while much of his own work had a remarkably Austrian flavor (Yeager, 1984), George consistently railed against Austrian economics.[4] This made it all too easy to overplay the fact that George had "failed to understand" (Schumpeter, 1954, 865) the Austrians.

This paper then focuses on the foundations of George's economics. While Yeager (1954; 1984) has outlined the similarities between George and the Austrians, this paper looks specifically at George's ideas on value and choice. Following Yeager, the paper argues that George's notions of value and choice are founded on economic subjectivism that has, in all that matters, a very Austrian flavor. This subjectivism is fundamental to all of George's writings and forms the theoretical underpinnings of his economic reasoning. The paper further argues that these subjectivist ideas had a richness that was lost in the birth of neoclassical economics, albeit much of it has been recovered by such writers as Becker (1976) and more recently Gilboa and Schmeidler (1995; 1996; 1997), who have rewritten choice the-

ory in order to get a handle on some of the intrinsic complexities of consumer choice.

The next section of this paper offers a brief discussion of George's stated rejections of "Austrian" economics. Following Gaffney (1994) it is suggested that these had more to do with the questions asked than any inherent rejection of the Austrian approach. The third section then focuses on the underlying value theories of George and the Austrians. Here it is argued that George and the Austrians shared a subjective approach to choice that differed dramatically from the Walrasian neoclassical approach. The fourth section then briefly discusses how George's views on innovation and progress depended on his Austrian-like choice theory. Finally, the fifth and last section summarizes the conclusions of the paper.

II

George, the Austrians, and Marginal Analysis

YEAGER (1954; 1984) HAS DEMONSTRATED THAT in terms of methodology and basic assumptions, George had much in common with the Austrian school. And yet, George regularly belittled the "Austrian" economists. Yeager (1984, 192) draws two conclusions from this: (1) that George's "Austrian-like insights were original with him," and (2) that "George did not understand the marginal revolution" that was taking place in economics. Be that as it may, George sometimes used the Austrian label for all the marginalists, so he may not have been perfectly clear on what constituted Austrian economics.[5]

In any case, George's seeming obtuseness on the issues raised by the marginalists may have been quite deliberate. Gaffney (1995 and 1994) offers this perspective on George's quarrels with the academic economists of his day: George's single-tax proposals focused on pure economic rent[6] from land. Taxes on pure rent do not discourage production in the manner that taxes on productive activities do, and taxes on rent also curb incentives for unproductive rent-seeking. In this context, George's resistance to the marginal revolution makes a certain sense. Lumping land and capital together, and focusing on factor incomes solely in terms of marginal productivities, does direct attention away from the fact that income from land has a larger rent component than income from capital. This was George's key point, i.e. that a tax on land will not affect production and trade as

much as a tax on labor or capital. Thus Gaffney (1995, 383) suggests that George may have understood the marginalist revolution in value theory "all too well, with sure intuition, and therefore smelled a rat . . ."

This calls for a closer examination of George vs. the Austrians on the nature of utility and demand. Did George really misunderstand the Austrians, or was he reluctant to accept them because of the baggage that came along with their ideas? While Yeager (1984, 193) acknowledges George's "Austrian-like subjectivist insights," he believes that George misunderstood the Austrian notions of subjectivity and value and that as a result he did not recognize how closely the Austrian ideas paralleled his own thoughts on innovation, entrepreneurship, and progress. This is worth pursuing in some detail.

Yeager (1984, 162) does note that George must at least have "had some glimmerings of the marginalist and Austrian idea of *imputation*" in that he clearly understood that it is the value of the marginal product of labor that in turn determines wages (and that this in turn refutes the wages-fund doctrine), and he also understood that the value of the marginal product of capital determines the natural rate of interest.[7] The problem, according to Yeager, was that George failed to apply these insights to land as a factor of production.

But, we must ask, what if George's focus was not on how the value of marginal product affects factor payments, but rather on how much of a factor's compensation consists of pure economic rent?

If George was interested only in the latter of these two questions, then as Gaffney (1994) has argued, George may well have concluded that the very language of the new marginalist economics was inappropriate for the issues at hand. After all, in *Progress and Poverty* George repeatedly stressed the importance of keeping rent separate from other factor payments. He talked about the need to discriminate "between profits that are properly interest and profits which arise from other sources than the use of capital" (George, 1979, 189). Moreover, he repeatedly made the point that

> land values, which constitute such an enormous part of what is commonly called capital, are not capital at all; and that rent, which is commonly included in the receipts of capital, and which takes an ever-increasing portion of the produce of an advancing community, is not the earnings of capital, and must be carefully separated from interest (George, 1979, 189).

Thus George's refusal to carry the analogy of wages and marginal produc-

tivity from labor to land makes a certain sense. The factor payments of labor and land do not contain the same rent elements, and labor supply has characteristics quite different from the supply of land.

In short, George and the Austrians were asking different questions and therefore seeking different answers. We cannot use George's rejection of simple marginal analysis (which treats factor payments to labor the same as those made to land) to conclude that his economic approach was inherently different from the Austrian approach.

III

On the Subjective Nature of Value and Choice

AS NOTED BY GEORGE, choice theory must be based on value theory, and before we can understand the logic of choice, we must have a clearly defined economic concept of value:

> The term value is of most fundamental importance in political economy; so much so that by some writers political economy has been styled the science of values. Yet in the consideration of the meaning and nature of value we come at once into the very quicksand and fogland of economic discussion—a point which from the time of Adam Smith to the present has been wrapped in increasing confusions and beset with endless controversy (George, 1962, 212).

George (1962, 212–214) made a careful distinction between value in exchange and value in use or "utility." He, like the classical economists, talked about the "utility" of actions in terms of "their tendency to produce benefit, advantage, pleasure, good, or happiness" (Broome, 1991, 1), whereas today the term "utility" is used strictly in reference to the value of a function[8] that delineates preferences without any judgments or evaluations on how or why these preferences came to be. This thinning of the economic concept of utility paralleled the mutation of "political economy" into "positive economics."

In any case, George recognized that it is the "interaction between objective reality and subjective perceptions and appraisals" (Yeager, 1984, 162) of utilities that yields value in exchange. This is also the point made by the Austrians,[9] albeit George incorrectly thought that the Austrians believed exchange value to be entirely subjective[10] (see Yeager, 1984). His own rhetoric notwithstanding, George's kinship with the Austrian school is particularly evident in his views on the process of innovation and the subjectivity of choice. Consider the following quote:

> What man does, he does by taking thought, by consciously adjusting means to ends. He does it by adapting and contriving and experimenting and copying; by effort after effort and trial after trial. What he does, and his ways of doing it, vary with the individual, with social development, with time and place and surroundings, and with what he sees others do (George, 1962, 15–16).

This perspective on rational behavior is thoroughly Austrian. Like the Austrians, George saw human actions as a continuous process of trial and error.[11]

On the other hand, the Walrasian school generally presents choice as automatic and rule-driven. Moreover, the Walrasian system generally disregards how the setting, or framework, of rational choice affects people's objectives. That is, while a changing state of affairs may alter budget constraints and thus generate new choices, it is not presumed to affect any underlying utility functions. In contrast, both George and the Austrians believed that our preferences are themselves influenced by our circumstances. Consider these passages from George: "For on the one side, we see that men when placed in conditions that forbid the hope of improvement do become almost if not quite as stolidly content with no greater satisfactions than their fathers could obtain as the mere animals are" (George, 1962, 32). And: "But let one be shut off from air, and the desire to get it becomes at once the strongest of desires, casting out for the moment all others" (George, 1962, 82). These observations anticipate some of Elster's (1986; 1989) critiques of traditional choice theory. Moreover, from this point of view, notions like the revealed preference hypothesis make little sense. As Rothbard (1956, 228–9) later put it: "All we can say is that an action, at a specific point in time, reveals part of a man's preference scale *at that time*. There is no warrant for assuming that it remains constant from one point of time to another."

With this in mind, let us consider how the dominance of the Walrasian approach has affected the modern mainstream approach to value and choice. First, virtually all modern microeconomics textbooks start out with an axiomatic formulation of logical choice based on *pre-existing* preferences. Supposedly, people are endowed with a complete set of preordered binary preference specifications, so they always know exactly which of any two conceivable alternatives x and y they prefer. In other words, one always knows whether x is strictly preferred to y (i.e., $x \succ y$), y is strictly preferred to x (i.e., $x \prec y$), or the two are equivalent (i.e. $x \sim y$). Hence,

if a consumer's preferences are logically consistent (i.e., asymmetric and negatively transitive), one can derive a utility function that expresses the consumer's desires from these preferences (see Kreps, 1990, Chapter 2). In this context, the statement that the consumer will choose his most preferred alternative, is seen to be equivalent to the assertion that he will choose the alternative generating the highest level of utility.

Of course, none of this tells us "how a person arranges his decisions in such a coherent order to begin with" (Rawls, 1971, 558). But, until recently (see Gilboa and Schmeidler, 1995; 1996; 1997), mainstream economists have sidestepped the question of how and whether a person can come up with such a neat preference map. Let us examine what it takes for a consumer to map out his/her own preferences. First, the consumer needs some experience. Before ever tasting Dom Perignon or Beluga caviar, these cannot be compared directly with other goods. Still, where experience is lacking, inferences may possibly be drawn from the revealed preferences of other more experienced consumers, so let us assume that all goods can be compared. Building a preference map then means comparing alternative bundles of goods, so if x_i represents the quantity of any given good i (i = 0, 1, 2, . . . , m), one must compare vectors of goods on the form $\mathbf{x} = (x_1, x_2, \ldots, x_m)$. Consider how many binary preference relations it takes to generate a complete preference map for any given consumer. We must compare all the conceivable vectors of consumption bundles. If any specific good, x_i, in the vector $\mathbf{x}$, is available in up to a maximum of $\bar{q}_i$ discrete units (so, $x_i = 0, 1, 2, \ldots, \bar{q}_i$), then the total number of preference comparisons that are needed to construct a complete preference map is $(1/2)(\prod_{i=1}^{m}(\bar{q}_i + 1))(\prod_{i=1}^{m}(\bar{q}_i + 1) - 1)$. As pointed out by Jonsson (1996), this means that even if the consumer could figure out one new binary preference relation per second, it would still take $5.49755\ 10^{11}$ seconds to map out all the preference relations necessary for ten different goods available in zero to three discrete units.[12]

So, while the consumer may have a pretty good idea about what he or she wants, a complete pre-ordering of preferences is clearly impossible. Nevertheless, most of the modern economic literature relies on the existence of complete, pre-existing, transitive, and reflexive preference maps to yield well behaved utility functions, stable demand functions, consistent revealed preferences, etc. But the problem is not just that complete preference maps are unrealistic. The completeness assumption also discour-

ages inquiries into the nature and the formation of people's desires and preferences for goods.

Insights like Becker's theory of the allocation of time should have caused a reexamination of choice theory, but inertia and reliance on the completeness assumption have prevented any such trickle-down. Becker pointed out that preferences are not defined in terms of specific goods, but rather in terms of how goods help to satisfy primal desires. In other words, "underlying preferences are defined over fundamental aspects of life, such as health, prestige, sensual pleasure, benevolence, or envy, that do not always bear a stable relation to market goods and services" (Becker, 1976, 5). This is in line with both George's focus on man as "a maker" (1962, 15) and the Rawlsian view that ultimately people seek pleasure or happiness.[13] Rational human activities, including consumption, are a means to an end—not an end in themselves. In other words: "All human actions, or at least all conscious human actions, have their source in desire and their end or aim in the satisfaction of desire" (George, 1962, 411).

But, economic actions do not have a reflexive one-for-one relationship with the actual satisfaction of desire. Purchasing a given good will not in-and-of-itself yield some predetermined number of utils. An act, such as a transaction in order to acquire a good, is just one step in the process of utility maximization. As George put it, after purchasing potatoes:

> Whether I then choose to boil, bake, roast or fry them, to throw them at the dogs or to feed them to hogs, to plant them as seed, or to let them decay; to trade them off for other food or other satisfactions, or to transfer them to someone else as a free gift or under promise that by and by he will give me other potatoes or other satisfactions, is something outside of and beyond the series of transactions which originating in my desire for potatoes was ended and finished in my getting potatoes (George 1962, 428).

Just so, in a Beckerian household production framework, after a family buys market goods, the goods are used to produce consumption activities (or household commodities) that ultimately yield utility. Thus, a family produces an afternoon watching college football at home by combining goods (television set, TV-Guide, cable service, electricity, furniture, snacks etc.) and the time spent as inputs in a household production process. This approach immediately suggests that preferences for the goods we buy cannot possibly be etched in stone. Since the demand for goods is derived from the demand for household commodities (or consumption activities),

changes in household production technology or wages will change both the use of time and the demand for goods.

George did not, of course, describe household production in the same terms as Becker later used. Yet, he was insistent that "Production and distribution are in fact not separate things, but two mentally indistinguishable parts of one thing—the exertion of human labor in the satisfaction of human desire." (1962, 438) And, he was also insistent that all human exertion, not just exertion in order to produce tradables, should be considered labor (1962, Book III Chapter XVI and Book IV Chapter II). In this sense, Becker's theory of household production is very much in the spirit of George.

In this context, mapping out the relevant preferences in terms of goods must be seen as an integral part of the consumer's optimization problem, not as something that is done strictly prior to encountering the problem. Moreover, a proper dynamic specification of the household's production problem is bound to yield a set of unsolvable equations (due to too many unknowns) which also means that rationality will not necessarily translate into unique preferences in terms of goods (see Jonsson, 1992, 1994, and 1996). As a result, it may be quite rational for a consumer to rely on simple rules-of-thumb,[14] or, antithetically, to act in a seemingly unpredictable manner. This, in turn, suggests that the standard Walrasian approach to choice is inadequate.[15]

Of course, we should note that Walras himself always made it clear that his was "the problem of form, not of content: of displaying an idealized picture of the economic system, not of analyzing concrete problems" (Friedman, 1955, 904). Accordingly, he maintained a sharp distinction between the pure and the applied theory of economics. Walrasian pure theory is Panglossian and unrealistic because it was never meant to be anything else, not because Walras was inherently naive or callow. The idea was that pure theory may well be based on unrealistic assumptions and still be a valuable tool in exposing logical fallacies and in organizing our thoughts. George understood this and thus he endorsed use of "mental or imaginative experiment, by which we may separate, combine or eliminate conditions in our own imaginations, and thus test the workings of known principles" (George, 1962, 100).[16]

But George also understood that naive formalism, while not necessarily intended to provide us with blinders, may be used precisely for that purpose. As Diamond (1984, 47) later put it, there are always some researchers

who "confuse assumptions chosen for basic research with true statements about the world." Moreover, "formidable imperfections" (Fischer, 1993, 61) and vested interests in the market for economic ideas, prevent an idea that has taken root from being easily uprooted.[17] As George put it: "Economic truth, under existing conditions, has not merely to overcome the inertia of indolence and habit; it is in its very nature subject to suppressions and distortions from the influence of the most powerful and vigilant interests" (George, 1962, xxxiii).

IV

Innovation and Creative Responses

AS OUTLINED IN THE PREVIOUS SECTION, in contrast with the Walrasians, both George and the Austrians believed that economic agents do not have complete knowledge of their options and the consequences of their actions. As a result, both George and the Austrians emphasized what Schumpeter (1947) later called *creative* (as opposed to *adaptive*) economic responses. A creative economic response is more than a choice from a known menu of fully understood alternatives—it rewrites the very menu of available options and gives birth to new and previously unknown possibilities. Moreover, since a uniquely optimal solution to the agent's problem can not be found, the agent's actions are bound to be somewhat unpredictable. In other words: "What he does, and his ways of doing it, vary with the individual" (George, 1962, 15–16).

In this there is little difference between George and the Austrians. Both believed that no agent can ever do more than just scratch the surface of available options. And this, in and of itself, gives a perspective on choice that is fundamentally different from the Walrasian view. While modern choice theorists have long distinguished situations of risk, based on well defined probabilities, from situations of ambiguity, George and the Austrians took for granted the more serious problem of radical uncertainty.[18]

It is in this context that we must understand George's emphasis on the importance of "mental power which is devoted to the extension of knowledge, the improvement of methods, and the betterment of social conditions" (George, 1962, 507). The point here is the very Austrian one that reason allows man to actively change his environment to create opportunities that did not exist beforehand:

> It is the power of discovering causal relations that enables him to bring forth fire and call out light; to cook food; to make for himself coats other than the skin with which nature clothes him; to build better habitations than the trees and caves that nature offers; to construct tools; to forge weapons; to bury seeds that they may rise again in more abundant life; to tame and breed animals; to utilize in his service the forces of nature; to make of water a highway; to sail against the wind and lift himself by the force that pulls all things down; and gradually to exchange the poverty and ignorance and darkness of the savage state for the wealth and knowledge and light that come from associated effort (George, 1962, 34).

Whereas the Walrasian framework presumes that consumers have complete pre-existing preferences and that producers have well-defined production functions etc., George and the Austrians believed that people are engaged in a continuous and evolving process of optimization. It is only in this context that innovators and entrepreneurs can have a true role. After all, if all our options are known *a priori* then the very concept of innovation is meaningless.

The Austrians emphasized first the role of innovators and then the role of imitative behavior once a successful new product or method has been found. As Schumpeter later put it, an entrepreneur finds not only a better solution for himself: "But he has also triumphed for others, blazed the trail and created a model for them which they can copy. They can and will follow him, first individuals and then whole crowds" (Schumpeter, 1934, 133).

George not only understood this, he took these arguments a step further. This is what his arguments on the role of cooperation and exchange in the creation of the Greater Leviathan are all about (see George, 1962, 371–396). George's arguments on cumulative innovations and creative solutions based on "spontaneous" cooperation given free exchange and an unobstructed division of tasks, while unique to him, seem very much in the spirit of modern Austrian economics. After all, George's Greater Leviathan theme is not really compatible with neo-Walrasian notions of equilibrium manifolds and steady-state growth paths, but it makes perfect sense against the background of the entrepreneurial discovery process outlined by Kirzner (1997).

V

Concluding Remarks

HENRY GEORGE'S INSIGHTS CONCERNING the complicated and subjective nature of rational choice were quite similar to the Austrian arguments. Like

the Austrians, and unlike the Walrasians, George believed that rational human actions constitute a continuous process of trial, error, and innovation. To George, it was innovation rather than passive reaction to constraints that set man apart from the animals. In contrast, the formal choice-theoretic foundations of Walrasian economics sidestep all considerations of innovation as an integral part of optimizing behavior.

This may in part explain George's resistance to "scholastic economics." It certainly highlights a clear difference between George's economic thought and Walrasian neoclassical economics. He believed that "in man the subjective is bound in with the objective, the spiritual with the material, [thus making] the importance of material desires and satisfactions to human life as a whole is even clearer" (George, 1962, 84). People are not just robots acting mechanically to reach some clearly-specified locations in complete and pre-existing preference maps.

According to George, people's actions, while rational, are far more elusive and difficult to predict than traditional neoclassical choice theory suggests. He believed people did not just take the state-of-the-world as given *a priori.* Instead, he believed that human creativity would bring forth a continuing series of new, hitherto undiscovered, alternatives. And, in this emphasis on the process of creation, George was very much akin to the Austrians.

Endnotes

1. A number of articles that focus on these issues are reprinted in Andelson (1979), Lissner and Lissner (1991), and Blaug (1992).

2. Still, we must remember that Thünen, Walras, and Jevons all wrote their most notable works before the original publication of *Progress and Poverty* in 1879.

3. George's rhetoric tended to be confrontational rather than just polemical. Thus he described other economists as "flabby writers who have burdened the press and darkened counsel by numerous volumes which are dubbed political economy, and which pass as textbooks with the ignorant and as authority with those who do not think for themselves" (George, 1979, 43). He also accused Pope Leo XII of "communism" (George 1935c, 75), and dismissed all land titles as having been obtained by "fraud and perjury and bribery—by the arts of the lobbyist or the cunning tricks of hired lawyers, by double barreled shotguns and repeating rifles!" (George, 1935a, 10) From the first, such rhetorical excesses estranged him from academic circles. In 1877, he had all but secured an appointment to a new Chair in political economy that was to be established at Berkeley. As later explained by his son, George was then invited to give a series of lectures, the idea being that "the lectures that he was about to deliver would make the ground of his appointment" (George, Jr., 1904, 274). Except, in the first of what were to be several

lectures, George (1904) peppered his speech with scorn for the "educational machinery" and its members who were like a "monkey with a microscope" or a "mule packing a library." While this was met with "a polite and dignified quietness" (George, Jr., 1904, 280) by faculty and administrators, this was also the end of all appointment considerations and George was not even invited back to give the rest of the originally proposed lectures.

4. It should be noted that George was, by his own admission, a little confused about what constituted Austrian economics. Thus he lumped Marshall with Böhm-Bawerk, Smart, Menger, and Wieser as members of the Austrian school (George, 1962, 208). In any case, an indication of what George considered Austrian is suggested by the fact that he also referred to the Austrian school as the "psychological school" (George, 1962, 215). At other times he seems to use the term Austrian to cover all the academic or "scholastically accepted" economists that he had quarrels with. While keeping this in mind, I will use the term *neoclassical* for neoclassical economists of both the *Marshallian* and the *Walrasian* persuasion, while retaining the *Austrian* label for Menger, Wieser, Böhm-Bawerk, and their followers.

5. This may partially have been due to the fact that some of the proponents of Austrian economics tried to expropriate the English marginalists as their own. Thus, Smart, in his introduction to the English translation of Wieser's *Der Natürliche Werth*, tried to present Jevons as a popularizer of Austrian marginal utility theory (Wieser, 1892, v) even though there is no evidence that Jevons had based any of his marginal insights on the work of the Austrians.

6. George defined rent as "the price of monopoly" (George, 1979, 167) and elaborated this as follows: "The ownership of a natural agent of production will give the power of appropriating so much of the wealth produced by the exertion of labor and capital upon it as exceeds the return which the same application of labor and capital could secure in the least productive occupation in which they freely engage" (George, 1979, 169).

7. George's notions of "fructification" (Yeager, 1984, 163) as the determinant of interest are essentially the same as the natural rate of interest hypothesis. George believed that "interest springs from the power of increase which the reproductive forces of nature, and in effect the analogous capacity for exchange, give to capital" (George, 1979, 188). That is, the natural rate of interest depends on the marginal productivity of capital. Note that this was not in any respect a novel idea in George's time, the idea goes at least back to Locke (1696). But, George also saw capital as a consequence rather than a simple cause of productivity, in the sense that the relevant production technology dictates the proper levels of capital. Thus, in the 5th chapter of *Progress and Poverty*, he stressed that the capital appropriate to a particular time and era will be created unless capricious government actions etc. intervene. In other words, he argued that "to say that capital *may* limit the form and productiveness of an industry is a different thing from saying that capital *does*" (George, 1979, 83).

8. As explained by Rothbard (1956) this metamorphosis of "utility" has spawned some conceptual problems: "If utilities can be subjected to the arithmetical operation of subtraction, and can be differentiated and integrated, then obviously the concept of marginal utility must imply cardinally measurable utilities" (Rothbard, 1956, 233). On the other

hand, if we think in terms of utility from actions, all we can have are marginal utilities: "In human action, 'marginal' refers not to an infinitely small unit, but to the *relevant* unit. Any unit relevant to a particular action is marginal" (Rothbard, 1956, 233). In turn, an ordinal interpretation of these marginal utilities makes a mockery of notions of total utility derived by integration.

9. Hayek, in his introduction to the English translation of Menger's (1981) *Grundsätze*, points out that there were some differences between Menger, Wieser, and Böhm-Bawerk on exactly how costs influenced value. Wieser (1892; 1893) came closest of the three to insisting that value was entirely subjective. His argument was essentially that costs adapt to value, since the cost of productive factors will depend on the value they generate in competing employments. It is only in this sense that Wieser argued that value is entirely subjective. Still, it is possible to find quotes wherein Wieser carelessly seems to argue that value is entirely subjective. Böhm-Bawerk (1894), on the other hand, was usually very clear on the importance and role of costs.

10. George was not alone in this interpretation. Thus Macvane (1893), like George, believed that the Austrians had overstressed the subjective nature of value and had not considered costs properly. In rebuttal, Böhm-Bawerk claimed that Austrian value theory had really started out with costs. As he put it: "The whole controversy, in its final issue, turns upon the famous 'law of cost,' which holds that the value of the majority of goods, namely, those which may be regarded as freely reproducible, adjusts itself in the long run according to the cost of production. As to the actual manifestation of such a law, there can be no question. Its existence is empirically proven, and so far as the actual fact is concerned is universally acknowledged by all parties to the discussion. The real question is as to the deeper meaning, the final theoretical conclusions, which may be deduced from this empirically established law of cost" (Böhm-Bawerk, 1894, 14).

11. The hallmark of Austrian theory is the presumption of radical uncertainty or "sheer ignorance" by decision makers. In the face of radical uncertainty, mistakes will inevitably be made, and behavior can either be imitative or entrepreneurial. As Kirzner (1997) put it, the "entrepreneurial character of human action refers not simply to the circumstance that action is taken in an open-ended, uncertain world, but also the circumstance that the human agent is at all times spontaneously on the lookout for hitherto unnoticed features of the environment (present or future) which might inspire new activity on his part. Without knowing what to look for, without deploying any deliberate search technique, the entrepreneur is at all times scanning the horizon, as it were, ready to make discoveries" (Kirzner, 1997, 72). In other words, human action is a continuous process of trial and error.

12. For comparison note that ten thousand years are $3.15576\ 10^{11}$ seconds.

13. Rawls associates the term "pleasure" with feeling and sensation, i.e. it "is that feature which is common to the experience of smelling roses, of tasting chocolate, of requited affection, and so on" (Rawls, 1971, 555). As for "happiness," Rawls believes an individual will achieve it through "the successful execution of a rational plan" and the "sure confidence by good reasons that his success will endure" (Rawls, 1971, 549). This definition of happiness is reminiscent of George's "pleasure of making, the joy of overcoming, [and] the glory of rising" (George, 1962, 17).

14. A real consumer usually has many diverse objectives and faces a legion of convoluted constraints (including information constraints) so the consumer's decision problem can be exceedingly complicated. Solving the problem rigorously, if it is at all possible, may call for so much deliberative effort that the solution may in itself be expected to yield more costs than benefits. Obviously, in this context, trying to solve the problem with perfect accuracy is strictly irrational in an instrumental sense. Here, what really separates *homo economicus* from Herbert Simon's (1982) *homo cogitans* is our simplistic presentation of the consumer's problem. That is, Simon's writings on bounded rationality, complex problem solving, symbolic systems, concept formation etc. all "have to do with how humans deploy their limited processing capabilities so as to do their best with what they've got" (Newell, 1989, 400).

15. As stated by Elster (1989, 1): "A theory is indeterminate when and to the extent that it fails to yield unique predictions. It is inadequate when its predictions fail. Of these, the second is the more serious problem." Walrasian choice theory, once it incorporates a dynamic household production framework with incomplete preferences, is indeterminate. In this sense, it is less than satisfying, but it may not be inadequate. However, the traditional approach to choice theory which is based on complete prior preferences is specifically designed to be determinate, and thus it inevitably becomes inadequate. This is one of the main arguments against positive and for subjective economics (see for example Buchanan [1982] and O'Driscoll and Rizzo [1985]).

16. The fact remains that all *assumptions* which abstract from reality are necessarily *untrue*, and logical structures founded on untrue assumptions must of course be *unrealistic*. Yet, the very lack of realism may sometimes sharpen our understanding of reality. To explain how the friction of air affects the fall of a feather, we need a reference model that explains its fall in a vacuum. Similarly, it is easier to understand the consequences of imperfect information, irrationality, and price rigidities, if we have a model to describe the opposite cases of full information, rational behavior, and price flexibility. George clearly understood this, and thus he suggested that "any study of the faults aberrations and injuries which occur in the economy of society comes best after study of its natural and normal condition" (George, 1962, 102). But, conversely, he was empathic in pointing out this does not mean that we can assume away real-world problems or that we can ignore reality in giving policy advice.

17. As explained by Zupan (1991) this intellectual inertia or stickiness may be generated by (1) past investments in a old paradigm, (2) start-up costs associated with a new paradigm, (3) free-rider problems due to the public goods nature of a paradigm, and (4) network externalities.

18. Ambiguity denotes that "the probabilities of potential outcomes are neither specified in advance nor readily assessed on the basis of available evidence" (Fox and Tversky, 1995, 585). But this does not describe the kind of radical uncertainty where agents are too ignorant to assess what all the alternative outcomes are in the first place.

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