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Abstract

In this paper, I argue that the insightful and rich collection of various definitions of economics provided by Backhouse and Medema (2009a,b) suffers from a major shortcoming: it misses Walras' contributions on this topic. Borrowing from the authors' taxonomy, I will show that Walras' 'synthetic method' provides a particular interpretation that brings together 'wealth-based,' 'scarcity-based,' and 'market-exchange based' definitions of economics. Finally, I will argue that the 'scarcity-based' definition of economics originated with the Walrases (the father and son) rather than Robbins ([1932]1935). Walras pioneered the notion of scarcity as a subjective agent-based reality existing at an individual level.

Keywords: Applied political economy, pure political economy, scarcity, social economics, Walrasian definitions of economics.

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A Note on Backhouse and Medema: On Walras' Contribution to the Definition of Economics

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Introduction

“*Pure economics* is, in essence, the theory of the determination of prices under a hypothetical régime of perfectly free competition. The sum total of all things, material or immaterial, on which a price can be set because they are *scarce* (i.e. both *useful* and *limited in quantity*), constitutes *social wealth*. Hence pure economics is also the theory of *social wealth*” (Walras, [1926]2003, p. 40).

The insightful and rich collection of various definitions of economics provided by Backhouse and Medema (2009a,b) includes classical economists such as Jevons, Marshall, Menger, Mill, Ricardo, Smith, Say, Sidgwick, Whately, Wicksell, Wicksteed, but it includes *no reference* to the definitions of the founder of the general equilibrium of competitive markets. This lacuna is regrettable for at least two reasons:

- 1) While the various definitions quoted by Backhouse and Medema seem to be often contradictory and mutually exclusive, Walras' classification of political economy as 'science,' 'art,' and 'ethics' opens the door for a 'synthetic method' to reconcile these definitions.
- 2) Contrary to what the authors suggest, the scarcity-based definition of economics did not originate with Robbins but rather with Auguste and Léon Walras (father and son). Robbin's scarcity-based definition of economics falls within the scope of Léon Walras' definition of our discipline.

In this short note, I will try to show the relevance of Walras' synthetic method of defining economics and his pioneering role in scarcity-based definition of economics.

Walras' synthetic method in defining economics

According to Backhouse and Medema's classifications, classical authors Adam Smith and Jean-Baptiste Say both promote a "wealth-oriented definition" of economics (2009a, p. 223). However, in his first lesson of *Elements of Pure Economics*, Walras argued that Smith's definition of the objects of political economy contradicts with the definition advocated by Say. For Smith, the author of *Wealth of Nations*, political economy acts as "a branch of the science of a statesman or legislator" ([1776] 1961, Book II, Chapter V, paragraph 31). with two distinct objectives: to provide plentiful revenue for the people and to supply the State with a sufficient income. To Walras, the underpinning criteria of these two objects are 'interest' and 'equity' and not scientific 'truth,' in direct opposition with Say's definition of political economy as a science:

It is evident at a glance that J.B. Say's definition is not only different from Adam Smith's, but, from a certain point of view, is its exact opposite. According to Adam Smith's view, the whole of political economy is an *art* rather than a *science*; while, according to Say, it is entirely a *natural* science. From Say's definition it would seem that the *production, distribution, and consumption* of wealth take place, if not spontaneously, at least in a *manner* somehow independent of the will of man (Walras, [1926] 1993, p. 54).

Walras tried to synthesize Smith's and Say's definitions in his first four lessons of *Elements*. He argued that the 'synthetic method' is necessary in a discipline whenever irreducible

opposing scientific paradigms exist (Walras, [1868]1990; [1872]2000). He suggested a tripartite division of economics:

- 1) *Pure political economy* or the study of the nature of social wealth or price systems in market exchange as a ‘natural fact’¹ – its criterion is scientific truth.
- 2) *Applied political economy* or the study of producing social wealth in agriculture, industry, and trade. This field addresses ‘human facts,’ particularly the relationships between ‘persons’ and ‘things’² (including animals). Its criterion is interest.
- 3) *Social economics* or the study of distribution of the social wealth or the theory of property and taxes. This branch of economics also explores ‘human facts,’ specifically the relationships between ‘persons’ and other ‘persons.’ Its criterion is equity.

Although applied and social economics both examine ‘human facts,’ a fundamental distinction must be drawn in the realm of human phenomena. Relationships between ‘persons’ and ‘things’ are based on the subordination of the purpose of ‘things’ to the purpose of ‘persons.’ In fact, Robbins’ distinction between ‘ends’ and ‘means,’ to which Backhouse and Medema refer, already existed in Walras’ distinction between ‘persons’ and ‘things.’³ Persons are self-conscious and have the liberty to choose their ends, while things lack this faculty, and should be used as a means to achieve persons’ ends. In contrast, the relationships between

¹ Walras divides the facts into two categories: those which result from the play of the “blind and ineluctable forces of nature” (natural facts) and those which result from the existence of human will, a force that is free and cognitive (human facts) (Walras, [1926]1993, p. 61).

² ‘Things’ are broadly defined, and they include animals. Two faculties distinguish ‘persons’ from ‘things’ – self-consciousness and independent will (Walras [1926]1993, p. 62).

³ It is noteworthy, that Walras was influenced by Kant (1785) on this point. For more details about Kant’s influence on Walras, see Dockèe (1996) and Rebeyrol (1999).

‘persons’ and other ‘persons’ are based on the reciprocity of rights and obligations. They lead to mutual coordination of human destinies.

To summarize, all three branches of economics study *social wealth* in the following way:

Table 1. Walras’ taxonomy of different branches of economics.

Branch of Economics	Fundamental Criterion	Type of Facts	Social Wealth	Field of Studies
Pure Political Economy	Truth	Natural facts	Nature of social wealth	Exchange
Applied Political Economy	Interest	Human facts	Production of social wealth	Industry
Social Economics	Equity	Human facts	Distribution of social wealth	Property and taxes

Many studies have focused on this tripartite division of economics and the normative or positive character of Walrasian economics (see e.g., Dockès, 1996; Jaffé, 1977, 1980; Morishima, 1977, 1980; Rebeyrol, 1999; Walker, 1984). This discussion is beyond the scope of this note, but briefly, Walras considered Adam Smith’s definition of political economy to pertain to the ‘applied political economy’ and ‘social economics,’ whereas he considered Jean-Baptiste Say’s definition to pertain to the ‘pure political economy.’ Thus, borrowing from Backhouse and Medema’s taxonomy, Walras’ definitions of economics might be regrouped among ‘wealth-oriented’ ones. However, it is noteworthy that according to Walras,

all three branches of economics derive from the *scarcity* of resources. This contention is based on the following observation: “Value in *exchange*, *industry* and *property* are, then, the three generic phenomena or the three orders or groups of specific facts which result from the limitation in quantity of utilities or the scarcity of things. All three are bound up with the whole of social wealth and nothing else” (Walras, [1926]1993, p. 68).

Exchange, industry, and property constitute the objects of study of pure political economy, applied political economy, and social economics, respectively. All three of these fields are the consequences of scarcity. Scarcity generates industry so that scarce resources could be multiplied. Scarcity also necessitates property and leads to exchange. Hence, scarcity is the source of social wealth, and the question of producing and distributing social wealth boils down to the ways that scarcity is managed. In other words, Walras provides a synthesis of Smith’s and Say’s ‘wealth-based’ definitions of classical economics on the basis of a ‘scarcity-based’ definition.

The next section will show that Walras also advocated a synthesis of ‘scarcity-based’ and ‘market-exchange’ definitions of economics.

Walras’ scarcity-based and exchange-based definitions of economics

Backhouse and Medema (2009a,b) distinguished between a broad (‘scarcity-based’) definition of economics and a narrow (‘market exchange’) one. Walras’ definition embraces both types, because he considers economics to be a science of both ‘exchange value’ and ‘scarcity.’ Walras’ reflections on the relationships between these two principal concepts can be traced back to the early 1860s.

The original idea that the *scarcity* of goods and services, namely their utility and their limited quantity, is the *cause* of exchange value originated with Auguste Walras (Walras Sr.).⁴ The main theoretical problem for Léon Walras (Walras Jr.) was to reconcile this idea with a second line of reasoning pertaining to the determination of the exchange value by the law of supply and demand.

Walras wrestled with questions such as: How is exchange value determined? Is it determined *before* the exchange by the *absolute value* of each product or service in accordance with their *scarcity*? Or is it determined *in and through* exchange by the law of supply and demand? The application of mathematics to the political economy demanded clarification of this point. He wrote three papers about these issues over the course of a decade: Walras [1860]1993; Walras [1869-1870]1993; and Walras [1871]1993.

In his first paper, Walras used indeterminate functions to describe the ‘absolute value’ using the following equation:

$$V = F(Q_o, Q_d) \quad F'(Q_o) < 0, \quad F'(Q_d) > 0 \quad (1)$$

In this equation, the ‘absolute value’ (V) of every product or service is related negatively to the supply quantity (Q_o) and positively to the demand quantity (Q_d). He traced a surface in a three-dimensional space and specified the function’s form in the following manner:

$$V = Q_d / Q_o \quad (2)$$

In case of free goods (Q_o → ∞, V=0); and if the market is not open, the value will be indeterminate (Q_d=Q_o=0, V=0/0).

⁴ Jean-Jacques Burlamaqui (1747) had a pioneering role in defining the scarcity as the cause of exchange value, and was a source of inspiration for Auguste Walras.

This formulation has an obvious problem when markets are in equilibrium, i.e., when the quantities of supply and demand are positive and equal ($Q_d = Q_o$). Then, the value amounts to 1. However, this value does not capture the ‘absolute value’ – it only shows temporal variation in (V). Although Walras had not yet abandoned the old formulation of the law of supply and demand according to which the ratio of supply and demand determines price, he aptly noted that the function (V) is ‘indeterminable,’ because neither (V) nor (Q_d) can be measured (contrary to Q_o , which can be measured in terms of physical quantity).

Walras noted that scarcity poses a measurement problem with regard to demand quantity. “The demand quantity or the sum of needs cannot be measured. There is no [measurement] unit for need or demand” (Walras, [1860]1993, p. 339; the word in the bracket is added). The demand quantity is not a physical quantity, because it includes needs and desires. Walras defined scarcity in terms of the ratio of demand to supply, so scarcity becomes identical to the ‘absolute value.’ In this way, scarcity confounds the ‘absolute value’ of products and services. But the measurement problem undermined Walras’ first attempt to reconcile the scarcity explanation of the exchange value with the law of supply and demand.

Walras’ scheme of reasoning can be depicted as follows:

$$\text{Absolute value} = \text{Scarcity} = (\text{Sum of the needs} / \text{Sum of the provisions}) = (\text{Utility} / \text{Quantity}) = (\text{Demand} / \text{Supply})$$

If these equations were correct, then the ‘absolute value’ of every product or service would be identical to its *scarcity*, and the *scarcity* could be regarded as the *cause of exchange value*, i.e., the ratio between absolute values. That is what Walras tried to show; his first attempt assumed the determination of the absolute value prior to the exchange value, on the basis of scarcity.

However, the upshot of the non-measurability of needs and desires was that the scarcities or ‘absolute values’ could not be measured; only their *ratios* could be estimated. Walras’ second solution assumed away the preliminary determination of ‘absolute value’ or scarcity: “It derives from there ...that only the *relative and not absolute value* can be measured” (Walras, [1869-1870]1993, p. 354). Walras developed this idea using diverse metaphors borrowed from physics and mechanics. For instance, he systematically compared *scarcity* with the mass of heavy bodies, and density with the ratio of mass (directly immeasurable) to volume.

In this second solution, demand, which was previously immeasurable as utility, becomes measurable as ‘budget constraint’⁵ – the ‘desire’ for a good can now be measured by the other good against which it is exchanged. “An economic desire is a desire that can be translated into supply of a certain quantity of wealth” (ibid., p. 336). Walras came close to a sort of ‘demand as purchasing power’ or effective demand. Notably, he wrote that “the demand is, in its turn, a function of supply” (Walras, ibid., p. 353). In 1869–1870, equation (2) was transformed into the following new equation:

$$V_b / V_a = B_d A_o / A_d B_o = [B_d / B_o] / [A_d / A_o] \quad (3)$$

While (V_a) and (V_b) denote respectively the absolute values of the commodities (A) and (B), (A_d) and (B_d) indicate the needs or demand. They can be regarded as only “indirectly measurable...proportional to the quantities of the same commodity that is supplied on the market with the perspective of acquiring A, B through exchange” (ibid., p. 349). If (A_o) and (B_o) stand for the quantities supplied and *effectively exchanged*, and if we concede that these

⁵ Walras intimated the ‘rationality’ version of the budget constraint by imposing a restriction of ‘zero value of (planned) trade’ for the individual trader, but this was *quid pro quo* (Say’s Principle), not income constrained utility maximization (see Jaffé, 1954, p. 165). According to Jaffé, Walras considered his equations of exchange to be ‘budget constraints’ as part of the requirements for justice in exchange. This interpretation was contested by Walker (1996, pp. 47–48), who denied any normative implication for budget constraints in Walras. The budget constraint was implicitly present in Walras, but not explicitly, as shown by Costa (1998, p. 137).

quantities or ratios provide respectively the measurement for demand quantities of (B_d) and (A_d) of the other commodity against which they exchange, then the ratio of absolute values appears to be the square value of the ratio of exchanged quantities:

$$V_b / V_a = [A_o / B_o]^2 \quad (4)$$

However, Walras did not follow this line of argument and did not derive this last equation. One year later, he suggested a third solution (Walras 1871/1993) to the problem. In this new attempt, he no longer makes any reference to *utility*. This solution reappeared in the fifth lesson of *Eléments* (Walras [1874]1988). He began by arguing that while scarcity is the *cause* of exchange value, and the exchange value is the *effect*; exchange can be studied in the opposite sense, starting with the *effect*.

The equation of the exchange between two commodities was now defined as follows:

$$m V_a = n V_b \quad (5)$$

where (m) and (n) are the physical quantities of commodities (A) and (B). Considering equation (3), we now have:

$$V_b / V_a = [B_d / B_o] / [A_d / A_o] = m/n$$

The *Eléments* provided a new definition of price in terms of the ratio of absolute values, which at this point were employed indifferently as ‘values’ or ‘exchange values.’ “Let us define *prices* in general as ratios between values in exchange or as relative values in exchange...it follows...that $V_b / V_a = P_b = m/n$ ” (Walras [1926]1993, p. 87). Thus, the prices or ratios of values in an exchange are equal to the inverse ratios of the quantities exchanged.

In Walras’ second solution, $[B_d / B_o]$ was the ratio of the sum of needs to the sum of the provisions (or scarcities); in the third solution, the relative prices were equal to the ratios of

the intensities of the last needs satisfied. The question now is: How is scarcity positioned in this final version of Walras' theory of exchange value?

In this third and final interpretation, scarcity appears only as a possible explanation of the exchange relationships at an *individual* level. Walras stressed:

“To avoid any confusion between the scarcity and the exchange value, it is essential to note again that *the exchange value is real or objective, it exists in the things; whereas the scarcity is in us, it is subjective or personal*. There is not such a thing as the scarcity of the commodity (A) or the commodity (B). Consequently, there is not anything as a ratio of the scarcity of (A) to the scarcity of (B)... *There exist only the scarcities of the commodity (A) and the commodity (B) for the carriers of (1), (2), (3)...of these two commodities*, and the common ratios of the scarcities of (A) to the scarcities of (B)...for these carriers. It is only in conjunction with this or that individual that we can...define the scarcity as the derivative of the effective utility with respect to the quantity owned.” ([1873]1993, p. 45–46, emphases added).

For Walras, scarcity is not objective and does not pertain to commodities; it is subjective and agent-oriented. If ‘scarcity’ were interpreted in an objective sense, ‘overproduction’ (or ‘general glut’) would be the opposite of a ‘shortage economy.’⁶ But in the Walrasian framework, ‘general glut’ and scarcity are not mutually exclusive, because scarcity is subjective and exists at an individual level. Lesson 28 of Walras' *Eléments* ([1874]1988, p. 255-260) was devoted to a critique of Cournot; in it, Walras concluded that the scarcities of commodities are always modified in variable proportions for different agents and even in different directions for all commodities except one, which assumes the role of ‘numeraire.’

⁶ For example, Janos Kornai (1980) contrasted ‘overproduction’ in capitalist economies with ‘shortage economy’ in socialist economies.

Thus, Walras' theory of social wealth embraces two systems: 1) an objective theory of exchange value; and 2) a subjective or agency-based theory of scarcities.

The former system entails the general equilibrium of competitive market over which individual agents have no influence. This theory is determinist, and agents cannot change its laws; they can only discover these laws and use them to promote their interests as if they are confronted with 'natural facts'.

The second system defines how exchange relationships are established at an individual level according to the subjective scarcity of commodities for agents. The tension between these two elements is constant in Walras' work, and has developed in two different directions since the Second World War. Arrow and Debreu's general equilibrium modeling focused on the first system, and the LSE opportunity cost approach focused on the second dimension (Buchanan and Thirlby, 1973). In a sense, Robbins' 'scarcity-oriented' definition of economics (Robbins, [1932] 1935), as well as Lange's definition of our discipline as "the science of administration of scarce resources in human society" (Lange, 1945–46, p. 19) fall within Walras' scarcity-based definition of economics.

Conclusions

If modern economics since the Second World War is based on general equilibrium modeling, its underpinning tenets should be sought in the works of Léon Walras. Any essay on the definition of economics that doesn't refer explicitly to his works will be missing a central piece in the history of our discipline.

Furthermore, Walras' 'synthetic method' provides a particular interpretation that brings together 'wealth-based,' 'scarcity-based,' and 'market-exchange based' definitions of economics. This synthesis perhaps suffers from inconsistencies, tensions, and logical gaps or

contradictions, but its richness can be found in the relevance and actuality of different tendencies that are synthesized in the Walrasian theoretical framework.

Finally, it should be noted that the 'scarcity-based' definition of economics originated with the Walrases (father and son). Robbins followed the path that had already been set out by Walras, with regard to scarcity being seen as a 'subjective' construction existing at an individual level, and thus as an agent-based reality.

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