

Marshall and Walras : Incompatible Bedfellows

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Marshall and Walras: Incompatible Bedfellows?

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Abstract

The standard view about the relation between the Marshallian and the Walrasian approaches is that they are complementary to each other. My aim in this paper is to show that, on the contrary, they constitute alternative sub-research programs within the wider neoclassical paradigm. I make my point by contrasting the two approaches against the following benchmarks: the purpose of economic theory according to Marshall and Walras, their views as to the role of mathematics, their ways of looking at the working of the economy as whole, the conception of equilibrium underpinning their theories and, finally, their trade organization assumptions.

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I. Introduction

Alfred Marshall (1842-1924) and Leon Walras (1834-1910) are the two towering historical figures of neoclassical theory. Although aware that these authors differed in purpose and methodology, most present-day economists think that these differences are small beer compared to their common endorsement of the neoclassical approach. In contrast, the aim of the present paper is to show that these differences are sufficiently important to warrant the conclusion that the Marshallian and the Walrasian approaches are alternative, not complementary, research programs within the broader neoclassical family.

Though a minority view, the claim of a Marshall/Walras divide is long standing. Probably the first author to have brought it to the forefront was Milton Friedman in his 1949 paper on demand theory (Friedman [1949] 1953).¹ A present-day steadfast defender of this standpoint is Leijonhufvud (1998, 2006a, 2006b). However the line taken in this paper is different from his. As is well known, several more or less incompatible trends are present in Marshall's writings. For Leijonhufvud, his biological and institutional insights are the most interesting ones. For example, to him, Marshall's economic agents adopt an adaptive, procedural rationality instead of being engaged in optimizing behavior. Whenever such a line is taken, the issue of the relationship between Marshall and Walras is easily sealed: they are poles apart. My claim is that there exists a Marshall/Walras divide even when Marshall is considered to be a straight neoclassical as opposed to be an evolutionist or institutionalist economist — that is, whenever Book V of his *Principles* (1920), the object of which is equilibrium or value theory, is considered his central contribution to economic theory.

To make my point, I shall compare the two approaches with respect to the following benchmarks: the purpose of economic theory according to Marshall and Walras, their views on the role of mathematics, their way of broaching the working of the economy as whole, the conception of equilibrium underpinning their theories, and, finally, their trade organization assumptions.

II. General purpose

The following statement aptly captures Marshall's theoretical purpose:

Marshallian theory is problem oriented in the following sense: 1) that it is focused on actual problems from the world of experience; 2) that one begins analysis of a problem well-armed with observed and related facts; 3) that the structure of analysis is dictated by the specific problem one is dealing with; 4) that real world institutions are accounted for and dealt with; 5) that definitions of terms are problem specific; and 6) that

¹ See De Vroey (2009a and 2009b).

mathematical considerations do not take a dominant place in the analysis. (Hammond 1992: 226)

In the same vein, Whitaker characterizes Marshall as “an author dubious about the value of unadorned theory and anxious to adapt that thinking to an ever-changing reality” (Whitaker 1990: 220). To Marshall, according to the celebrated expression, economic theory was an engine for the discovery of concrete truth. His purpose was to explain everyday business, to solve practical issues — such as the question of what the impact of an increase in demand will be on the price of a particular good?

In contrast, Walras was interested in matters of principle, in questions of a more philosophical nature — in particular, the logical existence and the efficiency of the equilibrium of a decentralized economy, a query that can be traced back to Adam Smith’s attempt to elucidate the mechanism behind his invisible hand metaphor. However, Walras addressed this issue at an incomparably higher level of abstraction than Smith. He was well aware that his theory was about an ideal type, a theoretical parable. To him, the role of theory *vis-à-vis* reality was to be a foil, an ideal to be attained, not a description of reality.

The physico-mathematical sciences, like the mathematical sciences, in the narrow sense, do go beyond experience as soon as they have drawn their type concepts from it. From real-type concepts, these sciences abstract ideal-type concepts from which they define, and then on the basis of these definitions they construct *a priori* the whole framework of their theorems and proofs. After that they go back to experience not to confirm but to apply their conclusions. ... Following the same procedure, the pure theory of economics ought to take over from experience certain type concepts, like those of exchange, supply, demand, market, capital, income, productive services and products. From these real-type concepts the pure science of economics should then abstract and define ideal-type concepts in terms of which it carries on its reasoning. The return to reality should not take place until the science is completed and then only with a view to practical applications. Thus in an ideal market we have ideal prices which stand in an exact relation to an ideal demand and supply. (In the same way, Walras, dissociating himself from Pareto’s viewpoint, wrote that “Pareto believes that the aim of science is to come closer to reality through successive approximations. I, for one, believe that the eventual aim of science is to bring reality close to a certain ideal. This is why I formulate this ideal” (Walras 2000: 567, own translation).

A similar testimony appears in Walras’ annotation on p. 17 of his copy of Cournot’s *Principes de la théorie de la richesse*, held at the Centre Walras-Pareto of the University of Lausanne, where he wrote “la théorie pure n’attend aucune confirmation de la réalité” (pure theory requires no confirmation from reality), quoted in Baranzani, R. and P. Bridel (2005, p. 360, note 3). Another testimony is Walras’s following dissenting comment on Pareto:

Pareto believes that the aim of science is to come closer to reality through successive approximations. I, for one, believe that the eventual aim of science is to bring reality close to a certain ideal. This is why I formulate this ideal (Walras 2000: 567, own translation).²

III. The role of mathematics

Walras and Marshall were also poles apart over the role of mathematics, a rather ironic state of affairs. Marshall, who had received a mathematical education, was convinced that mathematics should have only a limited, ancillary role.⁵ In contrast, Walras, a poor mathematician, strongly believed that mathematical economics was the future of the discipline. In his words:

The whole theory is mathematical. Although it may be described in ordinary language, the proof of the theory must be given mathematically. It is only with the aid of mathematics that I can understand what is meant by the condition of maximum utility. (Walras, Preface to the Fourth edition of the *Element*, 1954: 43).⁶

For his part, Marshall moved in the opposite direction, from giving pride of place to mathematics and graphs in his early writings to relegating these to footnotes and appendices in the *Principles*:

But I know I had a growing feeling in the later years of my work at the subject that a good mathematical theorem dealing with economic hypotheses was very unlikely to be good economics: and I went more and more on the rules – (1) Use Mathematics as a shorthand language rather than as an engine of inquiry. (2) Keep to them until you have done. (3) Translate into English. (4) Then illustrate by examples that are important in real life. (5) Burn the mathematics. (6) If you can't succeed in (4), burn (3). This last I did often. I believe in Newton's *Principia* methods, because they carry so much of the

² It ought to be admitted, however, that Walras did not always stick to this radical standpoint. For example, his remarks at the end of the *Elements*, referring to the need to go from point-in-time analysis to the study of continuous markets, suggests the opposite, namely that theoretical progress means coming closer to reality!

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⁶ "As to mathematical language, why should I persist in using everyday language to explain things in the most cumbrous and incorrect way, as Ricardo has done and as John Stuart Mill does repeatedly in his *Principles of Political Economy*, when these same things can be stated far more succinctly, precisely and clearly in the language of mathematics?" (Walras 1954: 71–72).

ordinary mind with them. Mathematics used in a Fellowship thesis by a man who is not a mathematician by nature — and I have come across a good deal of that — seems to me an unmixed evil. And I think you should do all you can to prevent people from using Mathematics in cases in which the English language is as short as the Mathematical... (Letter to Bowley, dated February 27, 1906; Whitaker 1996: 130).⁷

According to Groenewegen, an important reason for Marshall's reservations about giving mathematics an important place in economic theory was his growing fear of the consequences of pursuing the logic of mathematical reasoning to the limit:

An economist's 'greed' for facts was an essential countervailing force to the thrill of the chase mathematical reasoning provided, if contact with reality of that economics [sic] was to be preserved (Groenewegen 1995: 413).

It is noteworthy, that Marshall has hardly been taken at his word about the role of mathematics. Subsequent commentators, such as Irving Fisher, have found it appropriate to praise him for having fostered the development of mathematical economics.⁸ Many of Marshall's disciples, though still prone to defend empirical relevance against mathematical elegance, largely abandoned his banning of mathematics. Therefore when it comes to Marshallian economics, rather than to the economics of Marshall, the difference in the role of mathematics between the Marshallian and the Walrasian approach becomes only a matter of degree.

IV. Broaching the study of the economy as a whole

"Man's powers are limited", Marshall stated, while "almost every one of nature's riddle is complex" (1920: 366). "Breaking up a complex question, studying one bit at a time, and at last combining his partial solutions with a supreme effort of his whole small strength into some sort of an attempt at a solution of the whole riddle" (Marshall 1920: 366) was the solution he favored. In line with this, he proposed, first, to divide the economy into industries, to be studied separately, and, second, since the analysis of time was so tricky, to distinguish three time categories: the market day (the unit period of exchange); the short period; and the

⁷ See also the Preface to the Fifth Edition of the *Principles* (Marshall 1898) and Marshall's 1908 or 1909 letter to Colson (Whitaker 1996: 228).

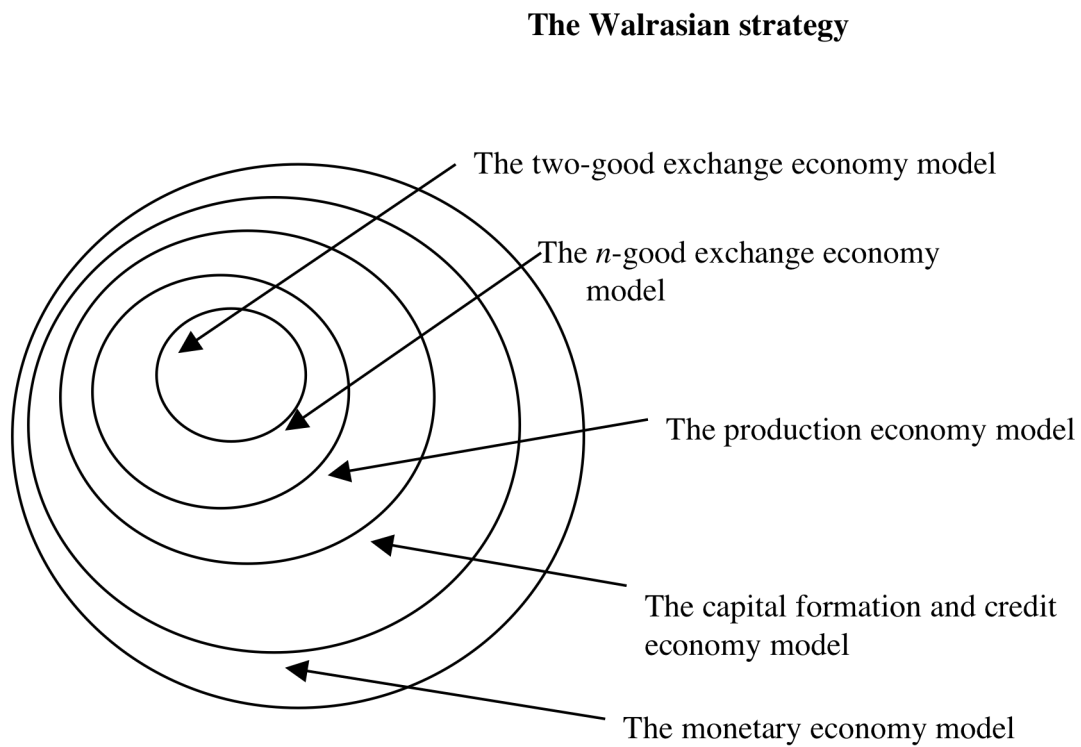
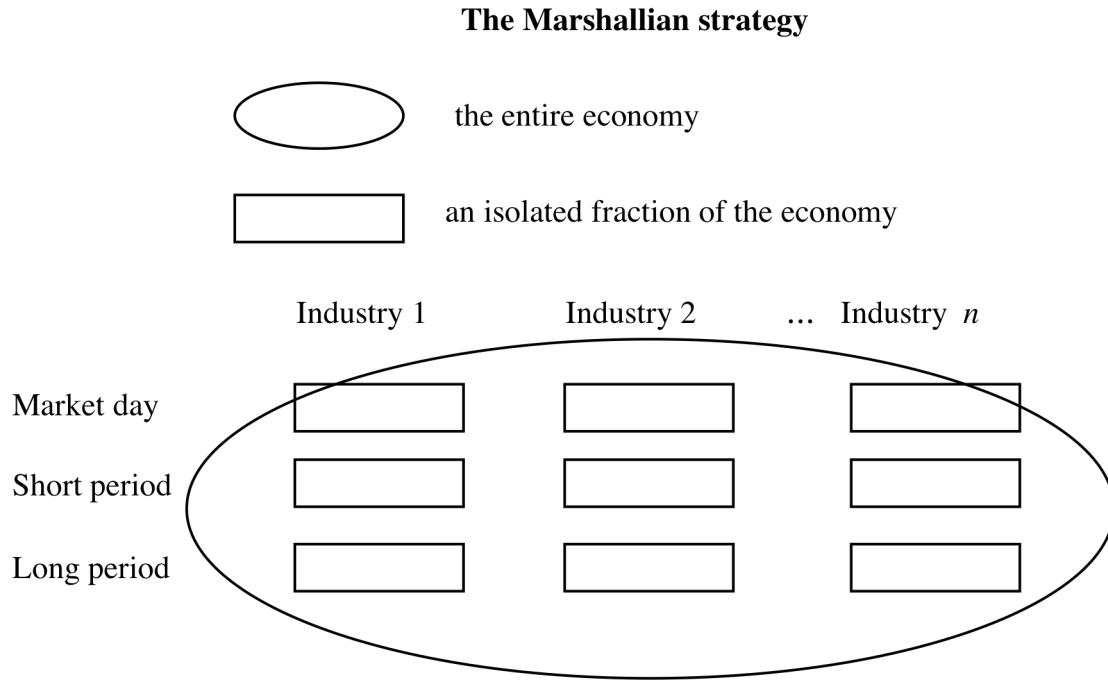
⁸ In Fisher's words: "But the progress of the new method during this period was small compared with that which followed the appearance of Marshall's first volume. This work, which immediately took rank among the foremost treatises, has spread the mathematical ideas far and wide. Many who had never heard of mathematical economics began to give it serious consideration. Naturally, the old disputes broke out afresh. Marshall's diagrams and formulae were called dangerous, falsely accurate, academic playthings. But Marshall's moderate and judicious tone in treating of the utility of mathematics, his relegation of all his mathematics to footnotes and appendices, won his readers, and at the same time showed plainly *lacunae* in the text wherever mathematical notes were examined. The reader's prejudice melted away as he discovered their extreme simplicity, and found them throwing light into many dark corners of economic theory". (Fisher 1898: 136)

long period. This strategy amounted to postponing the study of the functioning of the economy as a whole, i.e. the piecing together of these partial results. As Clower and Due (1972: 58) put it, “Partial equilibrium analysis does not deny the existence of market interactions; it merely leaves the explicit analysis of such interactions to later analysis”.

No such two-tier strategy is to be found in Walras’s work. This is premised on the view that, from the onset, the object of study should be an entire economy. Simplifications had, of course, to be introduced; but they pertained to the characterization of the economy as a whole and did not involve dividing it into separate sub-entities. Walras started his analysis with the most rudimentary economy possible, a two-good exchange economy, where the two goods (oats and wheat) constituted the entire economy. The principle determining the equilibrium of this simple economy having been established, Walras went on to consider a slightly more complicated economy, an n -good exchange economy. His next step was to introduce production into the picture. In the end, he had a chain of encompassing models, starting from the simplest and moving towards more and more completeness: the two-good exchange-economy model, the n -good exchange-economy model, the production model, the capital-formation and credit-economy model and, finally, the monetary-economy model.

Figure 1 illustrates Marshall and Walras’s alternative strategies diagrammatically.

Figure 1. Marshall and Walras's models for simplifying the real economy



Marshall made it his priority to study the particular rectangles in the upper part of Figure 1 (branches of the economy during a given time span) separately. Marshall's point was not that theory should be confined to the study of a single 'rectangle'. It was rather that economists needed to proceed gradually. For example, in his fishing industry example, Marshall studied the gravitational process between market-day, short-period and long-period equilibrium within an industry — that is, in terms of the Figure, he looked at vertical connections. He also endeavored to construct horizontal connections.⁹ Moreover, in Note XXI of the *Principles'* Mathematical Appendix, he provided “a bird's eye view of the problems of joint demand, composite demand, joint supply and composite supply when they all rise together”, and made the point that, however complicated the problem might become, it was theoretical determined since the number of unknowns was equal to the number of equations (1920: 885).

Nonetheless, all in all, in the *Principles*, no serious attempt is made to tackle the study of the economy as a whole.¹⁰

Marshall's treatment of market interdependence fell far short of a full theory of general equilibrium on Walrasian lines. Even when formalizing market interdependence in the mathematical appendix to the *Principles*, he simply treated the demand or supply of each commodity as a function of nothing but the price of the commodity itself. The links between the generation of income in factor markets and the expenditure of that income in product markets were left quite vague. Again, it must be recalled that the development of comprehensive, fully articulated, equilibrium theories was not Marshall's aim. (Whitaker 1987: 360)

To summarize, Marshall was adept at breaking up complex problems into elementary parts, which were then studied in isolation. By contrast, Walras's strategy consisted of simplifying the economy to the extreme without ever departing from the study of a complete economy. To use an image, Marshallian theory can be compared to a roadmap. Such maps cover a specific area. The larger their scale, the more detailed the picture of the real configuration of the terrain they are able to provide, but the smaller the area covered. In turn, Walrasian theory can be compared to a globe, which represents the whole earth at once, illuminating the relative positions of the different oceans and continents. Each of these two strategies has its pros and cons. The Marshallian strategy permits a detailed study of particular topics. However, its drawback is that the delineation of its subject of study is always arbitrary. Strictly speaking, no industry or market can be separated from the rest of the economy. Hence, the *ceteris*

⁹ “Thus we begin by isolating the primary relationship of supply, demand and price in regard to a particular commodity: we reduce to inaction all other forces by the phrase “other things being equal”. ... The next step is to set more forces free from the hypothetical slumber imposed on them; and to call into activity, for instance, changes in the demand for hides when considering the price of beef” (Preface of the Fifth edition of *The Principles*, 1898).

¹⁰ For the opposite viewpoint, see Dimand (1990).

paribus assumption is always a coup. Moreover, the piecing together phase has proven to be an extremely difficult task. In view of this difficulty, Walras's decision to consider the economy as a whole from the outset of his investigation looks clever. But the drawback of this strategy is obvious: the analysis is too abstract to come to grips with the complexities of reality.

V. Equilibrium

Equilibrium is at the core of both Marshall's and Walras's reasoning. Both of them adopted the stationary equilibrium conception in which equilibrium is defined as a state of rest.¹¹ However, their priorities were different. Walras's main aim was to demonstrate the logical existence of general equilibrium, a state where all agents' optimizing trading plans are compatible. He did not sidestep the question of the formation of equilibrium (i.e. the issue of how the logically existing equilibrium state is reached) but when a conflict between these two aims arose, he gave the priority to the logical existence of equilibrium. In sharp contrast, Marshall was little interested in demonstrating that equilibrium existed logically, contenting himself with assuming that this was the case. His priority was the study of adjustment towards equilibrium. Both authors adhered to the subjective theory of value and accepted the principle that economic outcomes found their starting point in agents' optimizing behavior. They both grounded the demand for goods on marginal utility (Marshall in Book III, Chapter 3 of the *Principles*, Walras in Lessons 8 and 9 of the *Elements*) but Walras gave a formal demonstration of the transition from optimizing behavior to demand, while Marshall hardly bothered with this aspect.

Moreover, their differences were more than a matter of priority. There was a deeper, conceptual difference. The best way to bring it out is to investigate the role of disequilibrium in their theories.

*Disequilibrium in Marshallian theory*¹²

In Marshall's value theory, two equilibrium concepts co-exist, market-day equilibrium (in short, market equilibrium) and normal equilibrium, which works as a centre of gravity for market equilibrium.¹³ Hence there are also two adjustment processes. Marshall studied the process of adjustment towards market equilibrium in his corn model in Chapter II of Book V

¹¹ The following quote from Lucas nicely captures the gist of the stationary-equilibrium standpoint: "The underlying idea seems to be taken from physics, as referring to a system 'at rest'. In economics, I suppose such a static equilibrium corresponds to a prediction as to how an economy would behave should external shocks remain fixed over a long period, so that households and firms would adjust to facing the same set of prices over and over again and attune their behavior accordingly" (Lucas, [1980] 1981: 278).

¹² For a more detailed analysis, see De Vroey (2007).

¹³ Nowadays, the short/long period equilibrium distinction has replaced Marshall's distinction between market equilibrium and normal equilibrium. I stick to Marshall's original distinction, which is less ambiguous.

of the *Principles*. There, he offers two explanations for the attainment of market equilibrium (the matching of market supply and demand or market clearing). The most appealing one admits disequilibrium trade, i.e. exchanges can take place at ‘false prices’, to borrow Hicks’s expression. States of disequilibrium, meaning a departure from market equilibrium, thus have an effective existence. However, the outcome of the adjustment process is only slightly different from that which would have occurred without false trading: the final price is the same as the ‘true equilibrium’ price (Marshall’s expression), the total quantity traded is also the same; only agents’ money balances are different. This result is obtained because Marshall assumes that the marginal utility of money is constant, itself a consequence of the assumption that an agent’s expenditure in the market under consideration represents only a small fraction of his or her total income. Hence income effects are discarded. Unfortunately, this assumption is *ad hoc*, and cannot be generalized. For the general case, Marshall is compelled to fall back on a less attractive explanation, the assumption that all agents hold perfect information about market conditions. This gives them the ability to mentally reconstruct its equilibrium values. In this case, market clearing is always present.

However, if disequilibrium states are discarded as far as market equilibrium is concerned, there is still room for them when it comes to the formation of normal equilibrium. It takes time for a new normal-equilibrium position to be attained after a shock has disturbed an earlier one. During this process, the market is in a state of disequilibrium, now understood as a discrepancy between market and normal prices and quantities, rather than as a lack of market clearing. This possible co-existence of market clearing and disequilibrium is, in my eyes, the hallmark of the Marshallian conception of equilibrium. Oddly enough, most commentators are unaware of it. Instead, they take it for granted that Marshallian disequilibrium means market non-clearing, a contamination of the Marshallian conception by the Walrasian, to which I now turn.

Disequilibrium in Walrasian theory

Is there room for states of disequilibrium in Walras’s theory? The answer is ‘Yes’ according to the first edition of the *Elements* but ‘No’ according to the fourth and fifth editions! Over the editions, Walras changed the meaning of tâtonnement.¹⁴ Initially, disequilibrium trade was allowed, but later it was denied. The exact changes made were as follows. In the first edition, disequilibrium trade was present in Walras’s various models. In the second edition, following Bertrand’s criticism in his 1883 review (Bertrand 1883), Walras introduced the ‘no trade out of equilibrium’ assumption into his exchange model (exchanges being suspended as long as the market is out of equilibrium), but kept disequilibrium trading in the production model. Walras’s final standpoint emerged in the fourth edition, where the absence of disequilibrium

¹⁴ See Jaffé (1983, Chapter 14) and Donzelli (2007).

trade was extended to all models and the ‘ticket’ scenario was introduced. The rationale for these changes was Walras’s growing awareness that disequilibrium trade generated income effects. These result in a failure of the economy to converge towards the equilibrium values calculated in the logical existence of equilibrium study. Faced with a dilemma between logical consistency and realism, Walras eventually decided that logic had to have the upper hand.¹⁵

In the earlier stages of Walras’s theory, its underlying time frame was unclear. Was it concerned with a long-lasting single period of exchange or with a succession of such periods? No answer is available. After, the exclusion of false trading the matter becomes clearer. At least as far as his exchange and production models are concerned, Walras’s theory pertains to a given period of exchange. Since the tâtonnement process is supposed to take place instantaneously, no duration needs to be ascribed to this period.

The contrast between Walras’s and Marshall’s conceptions is then as follows. In Walras’s theory, first, disequilibrium has only a virtual existence (it is eliminated before becoming effective), and, second, market clearing and equilibrium are one and the same thing. Neither of these features are present in the Marshallian conception.

The discussion above relates to the static Walrasian model. While a first rough attempt at a dynamic analysis is to be found in Walras capital formation and credit model, a more complete treatment had to await Hicks’s *Value and Capital* book (1939) and the development of neo-Walrasian theory. In his book, Hicks distinguishes between point-in-time and intertemporal outcomes. Equilibrium, meaning market clearing, is a permanent characteristic of the first outcome but disequilibrium, now meaning the non-fulfillment of expectations, is a possible occurrence in the second. Thus Hicks brings disequilibrium back into the picture. However, no falling back on the Marshallian conception ensues. The underlying reason is that neo-Walrasian theory abandons the stationary-equilibrium perspective adopted by Marshall (and from which Walras himself was unable to depart fully, although consistency required it). The stationary-equilibrium perspective rests on the assumption that the data of the economy remain unchanged over the period of analysis, except for reversible changes. Irreversible changes, however small they may be, are confined to the time between periods of analysis. Hence they are not analyzed, since the exclusive concern of a stationary-equilibrium theory is what goes on during a period of analysis. As noted by Donzelli (1989: 158), this is a dramatic shortcoming: “such models are structurally incapable of providing the slightest explanation of any economic phenomenon whose occurrence essentially depends on economic activities

¹⁵ Walrasian scholars differ in their judgment of Walras’s deletion of false trading in the fourth edition of the *Elements*. To Jaffé and Donzelli, this deletion is in accordance with the overall logic of Walras’s reasoning. By contrast, Walker (1996) thinks that the fourth edition marks a regression. As explained in De Vroey (1999a), I basically agree with Jaffé and Donzelli.

¹⁷ See De Vroey (1999b) for further discussion of this point.

taking place in time”. In contrast, neo-Walrasian theory is able to consider both the adjustment towards intertemporal equilibrium and changes in intertemporal equilibrium positions.

VI. The Walrasian market versus the Marshallian market; the Walrasian economy versus the Marshallian economy

Let me start by making a statement, which looks like a tautology: a market economy consists of markets. When Marshall’s and Walras’s contributions are considered against this background, the idea of a division of labor between Marshall and Walras looks compelling: Marshall concerned himself with the study of parts, the markets, Walras with that of the whole. The first is partial equilibrium, the second general equilibrium. In this framework, why bother with a Marshallian general equilibrium theory? As Schumpeter put it in his semi-centennial appraisal of Marshall’s *Principles*, “A full elaboration of the theory of general equilibrium [by Marshall] could only have duplicated the work of Walras” ([1941] 1952: 100).

But what if the proposition, that a market economy consists of markets, rests on a confusion about the meaning of the term ‘market’? What if, in other words, the term “market” means something different in Marshallian and Walrasian theory? In my opinion, this is the case. In the Marshallian framework, a market is a specific institutional set-up permitting the exchange of a given good or service against money, in isolation from exchanges involving other commodities. Each market is a separate locus for the formation of a partial equilibrium. This is also the common-sense understanding of the notion. In the Walrasian approach, the notion of a market is associated with a given good or service. This approach holds that general equilibrium is attained whenever the excess demand is nil in all markets. However, when a Walrasian economist, commenting on the Walrasian model, states that at a given price vector the market for corn fails to clear, he or she just means that the excess demand for corn is not zero. Nothing would be lost if the equilibrium conditions were rephrased in this way without mentioning the word market. Here, the market notion does not refer to the existence of a specific institutional set-up where the equilibrium price of corn against money is formed. The set-up in which the equilibrium quantity of corn traded is arrived at is the tâtonnement process, which encompasses the joint formation of equilibrium prices for all goods and services. So, the Walrasian economy constitutes a single Marshallian market — a grand market for that matter, so huge that no real-world counterpart for it can be conceived of.

The view that there is continuity between the Marshallian market and the Walrasian economy ought thus to be foregone: the generalization of a Marshallian market does not lead to a Walrasian economy; conversely, the Walrasian economy is not composed of Marshallian markets (in the plural!).¹⁷ In other words, extending the Marshallian market into a complete

economy does not lead to a Walrasian economy but to a different construct, the Marshallian economy.

This last remark suggests that some further reflection on the notion of an economy is needed. In the general-equilibrium literature, this notion is usually understood in a narrow sense as referring to a list of agents (with their endowments, preferences and objectives), a list of commodities and a list of firms (with their ownership structure and technical constraints). This account is incomplete due to its silence on the subject of the functioning of the economy. Such neglect is due to the fact that the task usually assigned to general equilibrium theory is to analyze the existence, uniqueness, stability and welfare characteristics of the equilibrium of a given economy at any given point in time and over time. However, the theoretical investigation should not be restricted to this task. The economy whose equilibrium is discussed ought also to be depicted as a social system, comprising a set of institutions, trade arrangements, rules of the game, and means of communication between agents. Without these factors, the issue of the attainment of equilibrium cannot be tackled in earnest. In other words, the following question cannot be sidestepped: granted that, for a given economy, some equilibrium values logically exist, what institutional conditions are needed for these values to be attained? Clearly, the answer to this question needs to go beyond the usual ‘market forces’ and ‘invisible hand’ metaphors.

The Walrasian economy

A principle feature of the Walrasian economy is its integrated character. A Walrasian general equilibrium consists of a unique, multilateral contract bearing on all goods, and involving all agents. Equilibrium is reached at one stroke, under the auctioneer’s auspices. Everything takes place simultaneously and in each trade round the formation of equilibrium occurs in logical time. Actual transactions remain suspended until the equilibrium price vector is arrived at — otherwise income effects would arise. Once the institutional dimension has been taken into account, the auctioneer hypothesis turns out to be central. Usually, Walrasian economists accept its presence in their theory only grudgingly. From my perspective, it becomes a compelling ingredient of Walrasian theory (even if Walras did not explicitly introduce it). I am willing to go so far as to claim that Walrasian theory and the auctioneer hypothesis are part and parcel of each other — all of which shows how artificial a construction the Walrasian economy is.

It ought to be remarked that the propositions, “the Walrasian economy is perfectly competitive” and “in a Walrasian economy equilibrium prices are formed by the auctioneer”, amount to the same thing. Perfect competition is defined by the fact that agents are price-takers. Hence prices have to be formed by a non-agent, such as the auctioneer.

Three implications of adopting the auctioneer hypothesis must be emphasized. First, in an auctioneer-led economy, agents do not need information about excess demand functions and

their underpinnings. As Kirman (2006: XV) put it, “assuming the Walrasian auctioneer, little information is needed by individual agents; the information has all been processed for them”. More precisely, agents’ domain of information pertains to the quality of goods and services traded, past values and the states of the world. Second, whenever the auctioneer assumption is made, price flexibility follows. As Lucas points out, once it is admitted that the auctioneer is an artifact introduced to dodge the thorny problem of price formation, it makes little sense to impede it from doing its job of bringing prices to their equilibrium values (Lucas 1987: 52). Third and finally, the auctioneer hypothesis and imperfect competition run counter each other. This follows from reflecting on the communication structure of an auctioneer-led system. The auctioneer economy is a set of bilateral relationships between the auctioneer and isolated individual agents. Before the attainment of equilibrium, agents’ exclusive social link is with the auctioneer. They do not interact or communicate with each other. As a result, whenever a given agent makes a trading offer by responding to the prices announced by the auctioneer, he or she does not know how many other agents are making a similar offer. An agent can be in a monopolistic position without being aware of it, and so is unable to take advantage of it! The same point can be made by looking at things from the information point of view. In an auctioneer economy, agents have no knowledge of market excess demand functions. This feature runs counter to the central trait of monopoly or oligopoly theory, that the agent with market power knows the objective demand function for the good he or she is selling. Hence the tâtonnement set-up itself guarantees the ‘perfectness’ of competition, whatever monopolistic factors may be present in the economy.

In short, Walrasian theory and price rigidity are incompatible bedfellows. Walrasian theory and imperfect competition are also incompatible bedfellows. All this is a direct result of adopting the auctioneer assumption.

A final aspect to be considered is whether a Walrasian economy is monetary. For the sake of differentiating between the Walrasian and Marshallian approaches, it suffices to note that the presence of money in Walrasian theory is at best problematic while, as will be seen, it is a compelling presence in the Marshallian approach.¹⁸

The Marshallian economy

The Marshallian notion of an economy cannot be derived directly from Marshall’s writings, since the study of an economy as a whole was not his concern. However, the trade technology that would have underpinned his general equilibrium analysis, had he been able to construct

¹⁸ Ostroy (1992: 784) states that “By introducing money after he had completed his theory of exchange, Walras clearly made monetary phenomena an optional ad-on rather than an integral component of the mechanism of exchange”. Hahn has made the same point repeatedly. “There is nothing I can say about the equilibrium of an economy with money which I cannot also say about the equilibrium of a non-monetary economy, [that is] the money of this construction is only a contingent store of value and has no other role” (Hahn [1973] 1984: 160).

it, can be derived by extrapolating from the institutional set-up upon which Marshall's partial equilibrium analysis is based.

A Marshallian economy comprises separate markets, each of which is a separate locus for the formation of market equilibrium. Unlike Walras, Marshall assumed that production occurs in advance of trade. Thus a Marshallian economy is a sequence economy where input markets occurs in advance of goods markets. Households enter the goods markets with an income originating from the sales of their services in the factors markets, and the distribution of profits from earlier market-days. Therefore a Marshallian economy is typically a dual-decision hypothesis system (Clower [1965] 1984).¹⁹

Another feature of the Marshallian economy is its monetary character. Money is present from the beginning of Marshall's analysis of the market. In fact, it forms part of the definition of a market as an institutional arrangement whereby a given good is exchanged for money.

In Marshall's model the price formation process occurs without an auctioneer. Agents are price-quantity makers. As discussed above, the linchpin of the formation of market equilibrium is agents' ability to mentally reconstruct market demand and supply functions. The information attributed to agents is thus significantly greater than in the Walrasian economy. They need to assess relevant market supply and demand functions on their own. Therefore, they must be informed about the relevant underlying private data.

As far as competition is concerned, Marshall himself had the knack of saying both that his theory did not feature perfect competition (1920: 541), and that he assumed that "the forces of supply and demand have free play" (1920: 341). Clearly these statements are incompatible. Turning to the writings of subsequent Marshallians, such as to Frank Knight, a clearer image emerges (Knight 1921: 76 seq.). Knight posited nine requirements for perfect competition amongst which were perfect mobility, perfect communication between individuals, and the exclusion of all forms of collusion. What is interesting for my purposes, is Knight's view that these assumptions are "idealizations or purifications of tendencies which hold good more or less in reality". This means that he accepted that perfect competition is a matter of degree. In other words, the Marshallian economy, unlike the Walrasian one, admits departures from perfect competition. The presence of the auctioneer is an impediment to the introduction of imperfect information and rigidity in the Walrasian set up. The absence of the auctioneer in the Marshallian economy permits their introduction.²⁰

¹⁹ As Leijonhufvud (1998: 28) put it: "The dual decision hypothesis may seem contrived from the standpoint of the kind of neo-Walrasian choice theory which compels all decisions to be made simultaneously once and for all. But from a Marshallian dynamic standpoint, sequential decision-making is as natural as it is common-sensical".

²⁰ The next step is to argue that monopolistic competition general equilibrium models ought to be viewed as marking the foundations of Marshallian general equilibrium analysis.

Table 1 summarizes the contrasts between the Walrasian and the Marshallian economies that have been identified in this paper.

Table 1. Trade organization in Walrasian and Marshallian economies

	The Walrasian economy	The Marshallian economy
The structure of the economy	A single grand market covering all agents and commodities	A juxtaposition of markets each of which is an autonomous institutional set-up for the formation of equilibrium
Time framework	All exchanges occur simultaneously	Input and output markets open sequentially
Price formation	The auctioneer sets prices	Agents are price/quantity-setters
Information	Perfect information over a limited domain	Perfect information over a wide domain including market supplies and demands
Money	No agreement as to the monetary character of this economy	Markets are monetary
Allowed type of competition	Exclusively perfect competition	Both perfect and imperfect competition

VII. Concluding remarks

The aim of this paper was to substantiate the claim that the Walrasian and the Marshallian approaches constitute alternative sub-research programs within the wider neoclassical paradigm. I have shown that, when it comes to the role of mathematics, the difference between them is only a matter of degree. But the differences are deeper with reference to other benchmarks, such as the strategy adopted for studying the economy as a whole, and the conception of equilibrium and trade organization.

As a final point, let me stress that, unlike most defenders of the Marshall/Walras divide viewpoint, I do not claim that one approach is superior to the other (usually, the divide claim is made by critics of the Walrasian approach). Had I taken this standpoint, I would not have claimed that these approaches are alternative programs, each having their pros and cons as well as their ebbs and flows.

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