



Walras or Pareto: Who is to Blame for the State of Modern Economic Theory?

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ABSTRACT

Walras and Pareto are considered founders of the *Ecole de Lausanne*. However, their points of view on economics as a science were at considerable variance and their appreciation of each other was limited. On the path from Adam Smith's Invisible Hand to Arrow and Debreu's proof of the existence of equilibrium, Walras is thought of as having formulated the general equilibrium model and Pareto as having improved upon and advanced theory and economics down the path that Walras had envisaged. The purpose of this article is to suggest that this is too simple a picture, that the road to an adequate explanation of the Invisible Hand petered out and Pareto's contribution was instrumental in its demise. Paradoxically, the almost technical generalization of the Walrasian model that Pareto developed locked pure economic theory and modern macroeconomics, which has based itself on that theory, into a dead end. Both their different scientific visions and their antagonistic personal relationship meant that, while their interests coincided for a period, they could hardly be regarded as having a common project and thus the *Ecole de Lausanne* is a misnomer.

KEYWORDS

Ecole de Lausanne; general equilibrium; ordinality; rationality; scientific vision

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1. Introduction

A simplistic view of the evolution of economic theory, and one which is often recounted to economics students, is that of the emergence of a natural liberal economic order that reinforced the idea that liberalism is the final state to which economies and societies are heading. A simple narrative is that the political idea that individuals left to their own devices would self-organize into a satisfactory state was formalized, in economics, through the marginal revolution, improved upon by the *Ecole de Lausanne* and finally terminated in the Arrow–Debreu general equilibrium model. Walras and Pareto are frequently described as belonging to or, indeed, as founders of the *Ecole de Lausanne* in question. This view conveys the idea that the ‘invisible hand’ of Adam Smith was the starting point for this intellectual route, and that what followed provided the basis for explaining what laid behind this implicit mechanism. The quotation usually cited to validate this view is:

Every individual ... neither intends to promote the public interest, nor knows how much he is promoting it ... he intends only his own security; and by directing that industry in such a manner as its produce may be of the greatest value, he intends only his own gain, and he is in this, as in many other cases, led by an invisible hand to promote an end which was no part of his intention. (Smith 1976 [1776], iv.ii.9)

In reality, the arguments made by Smith that might be, and have been, interpreted as in favour of *laissez faire*, stem from a longer tradition going back at least as far as Hobbes and Locke. Nevertheless, the idea that an economic system would self-organize satisfactorily, which was promoted by Mill and others, persisted and evolved into a discussion regarding the mechanism that would lead to such a state. During this time, it became clear that, if markets were to be important, the final state in question should be, in some sense, an equilibrium. While this notion was easy to capture in the case of the market for a single good, it was far less evident that a state in which all markets cleared simultaneously existed and even more difficult to show that such a state would be attained.

The suggestion is, usually, that Walras was interested in and developed a theory of such an equilibrium, recognized the importance of the interdependence of markets and wished to avoid what was later termed ‘partial equilibrium’. He insisted on the idea that markets were interlinked and that what happened on the market for one good had an impact on the other markets. He thus laid the foundations for general equilibrium theory and Pareto improved and expanded on these. Pareto is therefore considered as having made progress on the path that Walras followed and that culminated in the work of Arrow and Debreu. There is also the frequently repeated assertion that Walras and Pareto collaborated and that each had great respect for the other. My purpose in this article is to examine the evolution of thought on this subject and to suggest that, actually, Walras and Pareto had little in common, that their relationship was far from simple and that the intellectual road that Walras thought economics should and would take did not correspond to Pareto’s vision of how the discipline of economics would evolve.¹

I will start by considering the path that Walras set us on and then explain why this does not coincide with Pareto’s views. One cannot deny that the direction taken by economics, and particularly theoretical economics, in the twentieth century was to a great extent due to Walras’ influence. This was not so much due to his own results but rather a reflection of his vision. He was convinced that economics should have ‘sound mathematical foundations’ and his concern for this is reflected in his correspondence with his contemporaries, such as Poincaré. Indeed, his considerable correspondence with Poincaré, and some of the leading mathematicians of his time, demonstrated his anxiety to show that economics was on the road to becoming a science. He firmly believed that there were fundamental laws which governed the system, and that had the same status as the laws of physics. For example, he stated:

The law of supply and demand steers the exchange of goods in the same way that the universal law of gravity steers all the movements of the planets. Here already economic law

¹An excellent and complete account of the relationship between Walras and Pareto is provided by Bridel and Mornati (2009). The detailed annotations to the English translation of Pareto’s *Manuel* (Montesano et al. 2014) provide clear insights into the points upon which their views were in disagreement.

appears in its universal validity and its complexity and nothing can appear so beautiful, in other words great and at the same time so simple as the system of the astronomic world. (Walras 1874/1954, Leçon 34)

Again, he insisted:

It took from a hundred to a hundred and fifty or two hundred years for the astronomy of Kepler to become the astronomy of Newton and Laplace, and for the mechanics of Galileo to become the mechanics of d'Alembert and Lagrange. On the other hand, less than a century has elapsed between the publication of Adam Smith's work and the contributions of Cournot, Gossen, Jevons, and myself. (Cited in Wood 1993, pp. 32–33)

Walras actually went on to say that in the twentieth century 'justice would be done' and that his achievements along with those of Cournot, Gossen and Jevons would be recognized as invaluable contributions to the advancement of economic science. Justice was already done, in a certain sense, when Schumpeter (1954, p. 827) stated:

So far as pure theory is concerned, Walras is in my opinion the greatest of all economists. This system of economic equilibrium, uniting, as it does, the quality of 'revolutionary' creativeness with the quality of classic synthesis, is the only work by an economist that will stand comparison with the achievements of theoretical physics. Compared with it, most of the theoretical writings of that period—and beyond—however valuable in themselves and however original subjectively, look like boats beside a liner, like inadequate attempts to catch some particular aspect of Walrasian truth. It is the outstanding landmark on the road that economics travels towards the status of a rigorous or exact science and, though outmoded by now, still stands at the back of much of the best theoretical work of our time.

Yet, this is strange for someone whose vision was one of 'creative destruction' and a world in constant upheaval, and thus very far from the Walrasian concept of equilibrium. Perhaps the key lies in the fact that Schumpeter explicitly suggested that Walras was the giant of 'pure economic theory' and that his reputation, therefore, should not be hobbled by problems of empirical validation.

2. Walrasian General Equilibrium

What cannot be contested is that Walras' specific vision of the nature of equilibrium became a benchmark for modern economic theory. What are the ingredients that characterize the 'Walrasian' general equilibrium model and what was Walras' own position with respect to them? Backhaus and Maks (2006, p. 1) suggest the following caricature of what they describe as 'the common university-trained scholar's' understanding of the Walrasian model:

Walras developed the general economic equilibrium model but did not care about uniqueness and stability of an equilibrium. It is a model with exchange and production only and it assumes an auctioneer who announces price vectors to establish the equilibrium.

To this highly restricted vision should be added the underlying characteristics of the model, perfect competition, the nature of equilibrium as a market clearing set of prices, and some notion of perfect information. In addition, one cannot actually leave to one side the problem of stability or how one actually gets to equilibrium and Walras devoted a great deal of time to the discussion of this issue and the nature of Walras' ideas on the subject has been the subject of an intense debate.

Walker (1996, 1999a), for example, pointed out that the auctioneer was never mentioned by Walras whereas De Vroey (1999) argued that the only way to make Walras' approach consistent was with an auctioneer and that logically the auctioneer was implicitly present in the Walrasian analysis. I will come back to this later since this argument epitomizes the difficulty of passing from vague allusions to the invisible hand to a model in which the mechanism that brings about equilibrium is specified.

This is important since what is at stake is whether Walras had a vision of the economy as a genuinely dynamic process or one that somehow, almost by assumption, arrived at, what he had in mind as, a static equilibrium. The vision of equilibrium as a state rather than a manifestation of a dynamic process is certainly that which is characteristic of the Arrow–Debreu model. It is also the one that, despite the misleading name used for modern macroeconomic models, dynamic stochastic general equilibrium, underlies them.

Indeed, Arrow and Debreu (1954, p. 265), themselves, stated bluntly:

Walras first formulated the state of the economic system at any point of time as the solution of a system of simultaneous equations representing the demand for goods by consumers, the supply of goods by producers and the equilibrium condition that supply equal demand on every market.

It should be observed that the preceding description is a very limited account of what constitutes the Walrasian general equilibrium approach. Furthermore, to suggest that the Walrasian analysis led us directly to the Arrow–Debreu model would miss an important step, that of the transformation of the underlying problem from one in which marginal utilities were paramount into one based on individuals with preference orders but not cardinal utility functions. That step is due to Pareto, although it is sometimes mistakenly attributed to Hicks and Allen (see Schumpeter 1954, p. 1066).

However, the Arrow–Debreu framework is characterized by its lack of institutional features and that would not be inconsistent with Walras' abstract view of an 'ideal' economy. But recall that, at the outset, I spelled out the path that many have argued has been taken from the invisible hand of Adam Smith to the Arrow–Debreu formulation. If this is what is at stake, then there should be a consistent concern along that path with the stability problem, which is that of showing how the invisible hand does its work.

Yet the fundamental problem with the Walrasian framework, as it evolved towards Arrow–Debreu, is the impossibility of showing the stability of an economy under the sort of adjustment process that Walras had in mind, as was later shown by Sonnenschein (1972), Mantel (1974) and Debreu (1974). This contradicts Walras' assertion that he had 'proved' such stability or convergence. This, of course, had it been true, might have provided a justification for the elusive invisible hand. But, above all, there is no place in this framework for the out of equilibrium dynamics that would need to be specified if one were to argue that the economy 'tends towards equilibrium'. Thus, whilst Walras is to be lauded for his insistence on the interdependence of markets, we should also then be aware that he set us on a path towards economic models that, while admirably internally consistent, seem to be devoid of empirical content.

3. The Separation of the Paths of Walras and Pareto

3.1. Cardinal and Ordinal Utility

But, I argued at the outset, as have Bridel and Mornati (2009) and others, that it is difficult to picture Walras and Pareto as belonging to the same school since they differed in so many ways. But if this is so, where do the main differences between Walras and Pareto in economic theory lie? Pareto was clearly influenced by Edgeworth and devoted some time early in his work to reconciling Edgeworth's individualist or, as it is sometimes called, 'hedonist' approach with the general equilibrium vision proposed by Walras. However, Pareto made, in so doing, an important step, which was to consider ordinal preferences rather than focus on a cardinal approach. He is therefore thought of as the precursor of modern microeconomic theory in which individuals are characterized by preference orders rather than cardinal utility functions where marginal utility can, in principle, be measured. He then developed what has come to be called the Pareto optimum, but which should be referred to as a Pareto efficient state, a situation in which no individual can be made better off without some other individual being made worse off. The basic idea was already in Edgeworth's concept of the 'contract curve'. This criterion, as is well known, is very weak.

To be more precise, once one accepts the idea that interpersonal comparisons of utility are impossible, then one has to accept a classification in which the Pareto efficient states constitute an equivalence class. However, the class of Pareto efficient or optimal states is large, and no distinction can be made between two of these states, on the basis of distributional considerations for example. This is ironic when one notes that Pareto devoted a considerable amount of time and energy to developing a law that he hoped covered a large class of empirically observed income distributions. So, the other contribution for which Pareto is best known in economics, his Pareto Law, aimed at providing a basis for just the comparisons that his approach to general equilibrium ruled out.

He did, however, indicate that Walrasian equilibria are Pareto efficient and thus satisfied his very limited definition of efficiency or optimality. Although he stated that they were just special cases, this statement constitutes what is now called the 'first fundamental theorem of welfare economics'. In the *Cours d'économie politique* (1896), Pareto worked within a Walrasian–Edgeworthian framework; however, in the *Manuel d'économie politique* (1909), he moved to an analysis that could be considered as within the modern framework of rational choice theory.

In particular, Pareto insisted on the fact that it was from the interaction between rational individuals that a 'satisfactory' social state would arise and, as just mentioned, in that class were the Walrasian equilibria. This approach, according to Bridel and Mornati (2009), was consistent with Pareto's overall view, which could be described as 'essentiellement, empiriste, déductive-concrète et "vérificationniste"'. Indeed, Pareto abandoned the Walrasian theory based on a non-observable or measurable marginal utility and decided to develop an axiomatic theory of rational choice as his basis. He was then able to move on to consider the collective result of individuals taking rational actions. This can clearly be seen in his *Manuel*. He was satisfied that

economics could now focus on choices rather than on abstract utility functions (Pareto 1909, III, 36bis).²

3.2. The Paretian Turn

Why was this such an important turning point? First, it led economics down the path to Samuelson's revealed preference theory. Second, this, in turn, was proved by Uzawa (1960) to be equivalent to making the standard assumptions on ordinal preferences. So, the argument was complete: analysing choices, which, in principle, are observable, was enough to yield the results of general equilibrium theory. The axiomatization that Pareto initiated led to the modern 'sound micro-foundations' for economic theory. As we will see, this also led to the downfall of the theoretical underpinnings of the invisible hand.

Walras, on the other hand, was convinced that he had shown that the invisible hand worked. Although Walras' argument proved to be wrong, Pareto did not manage to show that there was a mechanism that would lead an economy to an equilibrium, nor was he convinced that such a mechanism existed. As Schumpeter (1949, p. 159) observed, some of Pareto's arguments in the *Manuel*:

were put to the use of showing that the economic system's tendency towards a unique and stable solution (i.e., a unique set of values that will satisfy the conditions) is a much more doubtful matter than the economists of the period, including Walras, supposed.

He cited, in particular Pareto's contribution to the *Encyclopédie de Sciences Mathématiques* in which he discussed the instability of equilibria.

4. The Personal Relationship between Walras and Pareto

But this separation of the paths followed by Walras and Pareto is also a reflection of the rather hostile relationship between the two. Walras saw himself as developing a logically consistent theory and stated, in particular, that:

M. Pareto believes that the goal of science is to get closer and closer to reality by successive approximations. But I believe that the goal of science is to develop a certain ideal model and then to relate reality to that ideal, and that is why I have specified such an ideal (Walras 2000, p. 567).

The two had fundamentally different epistemological notions of what constituted a science. But their differences were not limited to the purely intellectual level. In a letter dated 8 August 1911, some time after Walras' death, Pareto clearly identified Walras as his enemy and stated,

I owe it to Pantaleoni that I have a concrete conception of pure economics and to Walras that I have a clear conception of economic equilibrium. Later on, I became a friend of Pantaleoni's and Walras became my enemy because I was unwilling to follow him in his meta-physical fantasies, but I have spoken and continue to speak the truth about friend and foe alike and to proclaim from the housetops what I owed to them. You complain about

²As any historian of economic thought will know, there was an intense debate on this subject, including a discussion as to whether individuals could rank the difference in utility between pairs of alternatives to which Pareto contributed and a series of contributions to the integrability problem. Yet, the main point, which is that the Paretian turn to an ordinalist approach marked an important shift in the direction of economic theory, remains valid.

Pantaleoni's hostility but what would you have said about Walras' hostility to me? He wrote around Europe stirring up ill feeling against me. He induced Bortkiewicz (I have the proofs of this) to write a slanderous review of my *Course*. He wrote to Poincaré, distorting the truth and using this distortion to make believe that Poincaré disagreed with me on the conception of quantity. There was nobody to whom he did not speak ill of me. (Pareto 1975, p. 735)

5. A Shift in the Aims of Economic Theory

5.1. Abandoning the Invisible Hand and the Problem of Competition

Having argued that Pareto's contribution showing that ordinal utility could be used as a basis for general equilibrium analysis, one has then to accept that gradually the path moved from trying to develop a mechanism corresponding to the invisible hand to one in which the preoccupation became that of showing that there was, in fact, a solution to the simultaneous equation problem. The existence question, first solved by Wald (1936), became the central problem for general equilibrium theory and the idea that the 'stability' problem regarding whether an economy would actually be led to an equilibrium was put on one side.

While Debreu asserted that he was a disciple of Walras, he, nevertheless, clearly separated the problem of the welfare properties of the equilibrium of a perfectly competitive economy from that of how such an equilibrium might be attained. Indeed, when Sonnenschein's (1972) paper appeared showing that within the standard framework no tendency to equilibrium could be proved, Debreu said that he had never worked on the problem since he thought that it had no solution.³ Walras himself made no such distinction. In a letter to von Bortkiewicz he stated, for example:

I take the almost universal regime of free competition in regard to exchange, that which was described by John Stuart Mill, and which consists in raising the price in the case of the quantity demanded exceeding the quantity supplied and lowering it in the case of the quantity supplied exceeding the quantity demanded, and I demonstrate that the process leads to equilibrium by establishing the equality of the quantities supplied and demanded. Whereupon there is thrown at my head the market for English public debt, the system of English auctions, the system of Dutch auctions etc., etc. (Jaffé 1965, pp. 434–435)

Here, Walras seems to argue that his process does the job and considers as irrelevant the argument that, in reality, prices are formed differently in many cases. He was wrong on three counts. First, *Tatonnement* does not necessarily converge to equilibrium (see Sonnenschein 1972); second, prices are often formed differently than in that process; and, third, what Walras calls perfect competition should not be equated with his adjustment process. Indeed, his assertions were contradicted by those who followed the general equilibrium path to its end (the Arrow–Debreu model). The notion, perfected by Arrow and Debreu, of perfect competition was defined as a situation in which all actors in the economy are price takers and consider that they have no impact on the announced and commonly known price vector for all goods.⁴ But this defied common-sense economic logic, and aroused the anger of a number of economists, Hayek in particular.

³Private communication.

⁴It was the development of that view, which could only be justified as a limit case in which there is a continuum of individuals, as Aumann (1964) was later to explain.

Indeed, Hayek made a vigorous attack on this concept of perfect competition and in so doing echoed Edgeworth's early criticisms of Walras. He argued that:

the modern theory of competition deals almost exclusively with a state ... in which it is assumed that the data for the different individuals are fully adjusted to each other, while the problem which requires explanation is the nature of the process by which the data are thus adjusted. (Hayek 1948, p. 94)

That is, the modern theory of competitive equilibrium assumes such a situation to exist while what is needed is an explanation of its emergence as the result of the competitive process. In other words, we have reached a situation in which the definition of perfectly competitive equilibrium is diametrically opposed to the view that Walras expressed originally and which I cited previously. Walras still had in mind that equilibrium is a result of a process. However, the process he developed was clearly a centralized one and one which had nothing to do with competition as commonly defined. Hayek thought, paradoxically, in complete accord with Walras, that competition should be thought of as a process that would lead to equilibrium; however, in contradiction to Walras, he thought that this process had to be completely decentralized if it was to involve competition in a meaningful sense. Indeed, his argument uses the definition of Samuel Johnson (1755), who described competition as 'the action of endeavouring to gain what another endeavours to gain at the same time'. Hayek (1948, p. 96) expressed this clearly when he stated:

Now, how many of the devices adopted in ordinary life to that end would still be open to a seller in a market in which so-called 'perfect competition' prevails? I believe that the answer is exactly none. Advertising, undercutting, and improving ('differentiation') the goods or services produced are all excluded by definition—'perfect' competition means indeed the absence of all competitive activities.

Indeed, it is difficult to deny that the notion of perfect competition in modern equilibrium models is thought of as providing an analytical framework within which to draw conclusions as to the welfare properties of equilibria rather than as an idealized description of any real economy or market.⁵

But now the question arises as to whether the followers abandoned Walras by taking a path that he had not envisaged and focusing on the existence problem rather than explaining the invisible hand mechanism. The evidence seems to be against this and favours the idea that Walras himself had changed his goal. Whilst he struggled for a long time to show that markets would converge to equilibrium through the *tatonnement* process, he finally abandoned that idea and admitted that his process should just be viewed as an algorithm to solve the demand and supply equations. He did not show that this worked, but, since proving that equilibrium exists required mathematical tools which were not at Walras' disposal, he can hardly be blamed for that.

⁵There have, of course, been efforts to reconcile a more realistic idea of competition with the equilibrium notion and thus to provide an explanation as to how an economy might achieve an equilibrium state; a particularly interesting effort in this direction is made by Makowski and Ostroy (2001).

5.2. *The Persistence of the Invisible Hand*

Having explained that the development of general equilibrium theory finally led to an extensive analysis of equilibrium states and not of how they were achieved, one might be tempted to think that the invisible hand question was left, at best, unsolved. However, there are two observations to be made here. First, not all economic theorists were convinced that this was the path that economics should take. Consider Hicks' (1939, p. 60) observation:

To some people (including no doubt Walras himself) the system of simultaneous equations determining a whole price-system seems to have vast significance. They derive intense satisfaction from the contemplation of such a system of subtly interrelated prices; and the further the analysis can be carried (in fact it can be carried a good way) ... the better they are pleased, and the profounder the insight into the working of a competitive economic system they feel they get.

Second, as Mark Blaug has pointed out, the idea that we failed to find a satisfactory explanation or proof of an invisible hand mechanism is far from what even the most distinguished theorists state and tell their students. Just to take a first example, Rodrik (2015, p. 50), an extremely accomplished theorist, states: 'The First Fundamental Theorem is a big deal because it actually proves the Invisible Hand Hypothesis.' Yet this is what it does not do. The invisible hand hypothesis concerns the process by which individual self-interested acts are translated into a socially satisfactory outcome, and on this, as we have seen, the first fundamental theorem of welfare economics is silent.⁶

Thus, there is a persistent myth that the invisible hand problem has been solved within general equilibrium theory whereas the path towards that solution has petered out precisely because of results from within that theory. So, in some sense, the trail dies out in 1906 with Pareto's proof of the first fundamental theorem of welfare economics and, as Frank Hahn (2002, p. 224) stated when talking of attempts to establish stability results and referring to the Sonnenschein–Mantel–Debreu result, 'the enterprise was doomed not to be capable of reaching general conclusions in the Walrasian setting. A theorem not directly related to, or connected with, dynamics did the damage.'

But Hahn went on to argue that the fault could, at least in part, be laid at Walras's door. He stated:

Apart from technical problems there are also serious economic ones. The [Walrasian] model is one of perfect competition, everyone takes prices for given. Who is supposed to change them? The only escape in the Walrasian model is the auctioneer. This suggests that search for realism will lead away from perfect competition towards at least some monopoly power of some firms. If that is not done, we are in the situation of looking for a theory of dynamics applied to the auctioneer and since he is a fiction and we have agreed that under perfect competition no agent active in the economy changes price, so we reach a dead end. (Hahn 2002, p. 224)

⁶Blaug (2007) provides numerous citations of leading economists who have made similar claims, and in particular he mentions Ross Starr (1997, p. 209), who states firmly that the first fundamental theorem of welfare economics is a mathematical statement of Adam Smith's notion of the invisible hand leading to an efficient allocation. He also cites Mas-Colell, Whinston, and Green (1995), who repeatedly claim that the first fundamental theorem is a formalization of Smith's claims about the invisible hand of the market, Arrow and Hahn (1971), Hahn (1982), and many others.

He also observed that all this had occurred to Arrow some years previously.

So, Hahn would not have been happy with De Vroey's assertion that it was the auctioneer that made Walras' analysis coherent. Hahn thought that the introduction of imperfect competition and monopoly might provide an answer and, indeed, this route has been taken by many economists and Keynes himself thought that such an approach was necessary.

As I stated earlier, Debreu claimed to have put the problem of stability to one side; however, a careful reading of his later contributions suggests that he was making a different argument. In Debreu (1998, p. 10), he states:

The complexity of an economy stands in sharp contrast to the simplicity of a question that must be raised about its operation. Many agents compose the economy, and they have to deal with a large number of commodities. Each one of those agents makes decisions about the quantity of each one of those commodities that he will produce or consume: the number of variables involved is the product of the number of agents and the number of commodities. Moreover, in this decision-making process the agents act independently of each other, and they are guided by self-interest. Why is high disorder not the result? ... Why does one not observe for every commodity a large excess of demand, evidenced, for instance, by lengthy waiting times for orders to be filled, or a large excess of supply over demand, evidenced, for instance, by massive inventories?

My interpretation of this is that Debreu was convinced that the economy did, indeed, self-organize to achieve a socially satisfactory outcome, and he explicitly states that the interaction between agents reduces the difference between demand and supply and tends towards equilibrium. Given what one can show about the competitive equilibrium, it does have, albeit minimal, welfare properties and this, unexplained, reduction of 'excess demand or supply' can be viewed as the idea of the invisible hand. But the fact that this seems to happen is a purely empirical matter and so Debreu, the purest of theorists, argued that the invisible hand works but could provide no theoretical justification for his assertion. In particular, he did not believe that Walras had solved the formal problem of demonstrating that economies out of equilibrium would converge to an equilibrium.⁷

The magnitude of this task was emphasized by Saari and Simon (1978), whose work gave an indication, but one that has been somewhat overlooked, as to why the stability problem was basically unsolvable in the context of the general equilibrium model. They reasoned on the basis of a mechanism in which agents send messages specifying their demands and supplies as a function of the prevailing prices and the mechanism responding by transmitting new prices or signals to which agents would respond with new messages. What has come to be called the Walrasian auctioneer is a special case of a general mechanism in which the signals from the mechanism to the individuals and those sent by the individuals need not necessarily involve prices and quantities.

The destructive conclusion that Saari and Simon came to was that any mechanism of the type just described—and not just the Walrasian special case—that would ensure that an economy out of equilibrium would converge to an equilibrium would require an infinite amount of information. Thus, if we were to hope that the invisible hand could be given a formal representation it would have to be outside the Walrasian framework.

⁷Indeed, he contributed to the Sonnenschein–Mantel–Debreu theorem, which shows that the tatonnement process does not necessarily converge to an equilibrium.

6. The Evolution of Economic Theory and the Role of Walras and Pareto

The path from Adam Smith to Arrow and Debreu, so often described as a natural and almost inevitable path for economic theory, was far from a smooth and continuous process. Its passage by the *Ecole de Lausanne* was not a simple one. It is worth citing a metaphor used by Einstein and relayed by Hahn (1974, p. 31):

Creating a new theory is not like destroying an old barn and erecting a skyscraper in its place. It is rather like climbing a mountain, gaining new and wider views, discovering new connections between our starting point and its rich environment. But the point from which we started still exists and can be seen, although it appears smaller and forms a tiny part of our broad view gained by the mastery of the obstacles on our way up.

According to this view, Walras and Pareto formed part of a team tackling the summits of economic theory with shared views on the methods to be used and the goals to be achieved. But, in fact, Walras and Pareto had different ideas regarding what economic theory should be. Walras believed that it was possible to develop an economic science in the same sense as physics, for example, and that one had to construct an ideal economy and study divergences from it. Pareto, on the other hand, argued that the only reasonable approach was to modify theory in the light of observations and to progressively approximate reality.

Pareto joined Walras at one point, using similar mathematical techniques to make progress in building an economic framework based on individual rationality. However, it was he who changed the course of economic theory by introducing ordinal preferences as the basis and putting marginal utility to one side. By proving the first fundamental theorem of welfare economics, he was changing the orientation of economic theory to one in which economists focused more on the characteristics of the states of an economy rather than worrying about how those states were attained.

Had we followed another path than that which Pareto promoted, with rather different and possibly interdependent preferences or assumptions on the distribution of wealth for example, we might not have reached an impasse. The double temptation to insist on making assumptions, in accord with the liberal foundations of our discipline, only about individuals and also to make those assumptions as parsimonious as possible led us to the current position.

This should explain why it was the apparently innocuous progress made on the theoretical front by Pareto that led economic theory to abandon the focus on the mechanism of the invisible hand and to concentrate on the properties of equilibrium states rather than on how they were attained. The first fundamental theorem of welfare economics, which we owe to Pareto, epitomizes this development and reflects a departure, in my view, from the ideas and ambitions of Walras. This important moment, referred to by Bruni and Sugden (2007) as the ‘Paretian Turn’, was the beginning of a movement to base economic decisions solely on actual choice. As Bruni (2013, p. 55) states:

For most of the twentieth century, however, without bothering much about these problems, nor taking into consideration Pareto’s strict limits assigned to economics, mainstream economics was Paretian and extended economics tools to domains that Pareto should have considered beyond the boundaries of economics (family, religions, politics, altruism, *etc.*). Limits to the domain of rational choice theory were not discussed by Paretian

microeconomics, and there was an implicit assumption that the theory was universal in its application. The preferences of economic agents were a priori assumed to satisfy strong axioms of consistency, without any need to test their empirical ground to respond to the many empirical anomalies of the true ‘naked fact of choice’.

But Pareto carefully limited his pure economic theory to one of rational choice and thought that this applied to a very limited domain. Indeed, when proposing what we now call the first fundamental theorem of welfare economics, Pareto claimed that this ‘satisfactory’ collective outcome would only correspond to what would happen in a world in which individuals took rational rather than ‘non-rational’ actions. He thought that the treatment of the latter case was the basic problem of sociology and I will return to this. In one sense, Pareto instigated a major change in economics but not the one he intended, as the previous citation shows. There are two possible views on this. One is that Pareto wished to extend his analysis to a larger domain than economics but kept the same theoretical structure for economics and considered that it could be applied to a limited set of cases. The alternative, and one which has been advanced in sociology, is that Pareto lost his faith in the sort of rationality to which he had contributed so much and felt that the role of emotions and social factors in economic decision making had been under-emphasized.

It is clear that the only way to see if Pareto himself wanted to keep his pure theory intact within a more general context or whether he came to see other considerations as more important is to take a look at the contributions that he made to sociology. It is also worth recalling that this was, for a considerable period, the major source of his renown.

7. Pareto and Sociology

Pareto (1916) devoted the last part of his life to his work on sociology and wrote the “*Trattato di Sociologia Generale*”. In so doing, his passage from economics to sociology was characterized by the abandoning of rationality in the sense that he had himself developed, with the possible exception of a class of mundane material decisions. Indeed, at one point in his *Trattato* he says that rationality is just the varnish that individuals put, ex post, on their non-rational actions to justify them. In saying this he is clearly abandoning the path followed by Walras. I will dwell on this since, looking at this part of Pareto’s contributions, it is clear that, if he is to be identified with an *Ecole de Lausanne*, then that school was not simply a step on the road to modern general equilibrium theory.

Thus, I would support a position that is orthogonal to some authorities who believe that, in moving to sociology, Pareto simply expanded the set of phenomena that he was dealing with and that his earlier view of economics was embedded neatly into this larger framework. One proponent of the separatist view was Talcott Parsons, who used the distinction between logical and non-logical reasoning to make his argument. He spent a great deal of time discussing Pareto’s contributions and his book, *The Structure of Social Action* (Parsons 1937), deals with setting Pareto within the context of the work of Emile Durkheim, Max Weber and Alfred Marshall. There, he takes the position that Pareto had a pure economic theory that was linked to but separate from other

disciplines such as sociology or psychology.⁸ Parsons, in fact, defined sociology as a 'residual science' that dealt only with non-logical actions. More recently, however, there seems to be a convergence to the view that Pareto's pure theory did not remain as an integral component of a larger system but was a dependent part of a social system. Dalziel and Higgins (2006) reject the 'division of labour' between rational economic and non-rational actions in other spheres. Aspers (2001) argues that economic sociology, of which Pareto was one of the founders, provides a valuable counterweight to economic theory that assumes logical action; however, not within a framework made up of independent disciplinary contributions but rather as a complete social system.

An important consideration in judging Pareto's work is to accept the fact that his vision changed and this, in part, explains the fact that sociologists more familiar with his later work have formed a different impression from many of their economic counterparts whose knowledge of Pareto's contribution is limited to one of the mathematical appendices (to the *Manuel* and to the *Manuale*).⁹ As an illustration, it is interesting to observe that Pareto moved away from his interest in a representative individual and discussed, at length, in his sociology, the problem of heterogeneity, a problem with which economics is still plagued today.

However, I would like to argue that Pareto made important contributions in his sociology, which had implications for economics but not of the purely theoretical kind. In the broad framework of a social system, Pareto's vision of the 'circulation of elites' is a good example. This became one of the leitmotifs of Pareto's sociology. He believed that the 'elites' play a major role in the evolution of the whole socio-economic solution. He was convinced that a class of more able and more ambitious people emerges within society, but that such elites were not necessarily durable and as they came to rest on their laurels others would take over. Pareto considered that the elites did not simply change amongst themselves; rather, those who had not been members of an elite before could become part of an elite and others might move into the non-elite category. A few individuals may join the ranks of elites from the non-elite groups and a few former members of elites may become non-elite members of society. He thus saw society as being in a state of cyclical flux, with different groups assuming control. His use of the term 'elite' reveals his perception of a hierarchy of capacities that qualified some individuals to become leaders. The theory behind his conception of the

elite is that, in every society there are, to use his own words, 'people who possess in a marked degree the qualities of intelligence, character, skill, capacity, of whatever kind'.

He went on to say that there are two kinds of elite, and that the two groups are disjointed. He used a large spectrum of historical examples from Roman and later Italian history to justify his arguments. He argued that such a circulation of elites was a standard feature of socio-economic systems. He thought that in a free and open society there would be a natural evolution of elites, which one might think of as some sort of evolutionary selection. However, he also argued that societies are characterized by imperfections and that this could lead to decadence in the ruling class and a loss of societal

⁸It is worth noting that in the preface to the second 1968 edition Parsons takes a more global view and sees Pareto as providing a useful bridge between economics and other disciplines in developing a general theory.

⁹Anyone interested in this should definitely read the critical edition of Pareto's *Manuel* by Montesano et al. (2014).

welfare. This process of decadence and replacement of the ruling class was what led him to remark that ‘history is the graveyard of aristocracies’. At any given time one elite will dominate but it will necessarily be for a short time. Ruling aristocracies do not last; they may be displaced by a different group or evolve as their descendants take over. As Pareto observed, ‘In Germany the aristocracy of the present day is very largely made up of descendants of vassals of the “Lords of Old”.’

The process of replacement was, by no means, automatic; sometimes people from the old elite can hang on and are joined by others from previous elites. However, he did think that major upheavals such as wars or revolutions could result in a significant change in leadership. Yet, one has many examples of individuals who have remained in important positions even through several important regime changes. Such people remain in what he described as ‘vital positions’ and this, he thought, characterized the progress of society.

As I have said, it has been argued that Pareto maintained his ideas on economic decisions in his social theory but, in fact, Pareto developed his ideas on non-rational behaviour and claimed that this was the basis of most decision making. He first argued that people were endowed with ‘residues’, which are the reasons or motives for behaviour; in other words, the bases of human action, the sentiments that determine behaviour. He defined six types of residue. While the residues are the underlying real motives for behaviour, he thought that there are also ‘derivations’, which are the excuses or rationalizations we use to justify our behaviour. Thus, people would like to believe that they are rational, or at least consistent.

Pareto argued that people in ruling elites have a predominance of either Class I residues, whereby they are ‘foxes’, or Class II residues, whereby they are ‘lions’. He argued that the way in which a country is governed, and its economy run, depends on whether the ruling elite is composed of foxes or lions. The foxes are bold and adventurous, and live by cunning and cleverness. When it comes to managing the economy, foxes are the risk-loving speculators, who are always seeking maximum profits, whereas lions, in contrast, are solid, conservative and look for returns on safe investments. When Class I residues are dominant in the ruling elites, foxes will rule; however, when those with Class II residues become dominant, lions will take over. Indeed, Pareto observed that history reveals a constant alternation between elites with predominantly Class I residues and Class II residues.

However, towards the end of his life Pareto modified his theory and argued that one ruling elite is not necessarily replaced by another one and that there can be periods of decentralization in which one group does not have control of the whole system. He cited Athens, where the aristocracy passed away without leaving descendants.

Why is this important for the way in which economics has developed and been practised? Pareto argued that the circulation of elites generates cycles that are not necessarily synchronized with those generated by the economic system and shocks to it. Pareto provided an intuitive, if not formal, explanation for the sort of fluctuations that are empirically observed in the evolution of our socio-economic system. These fluctuations are not due to the exogenous shocks that are still used as justifications in modern macroeconomics,¹⁰ but rather to the self-organization of the system that generates its own cycles endogenously. He argued that three types of cycle occur: social, economic and political. These

¹⁰This recourse has been strongly criticized by Paul Romer (2016), for example.

were correlated but not synchronous. Social cycles reflect the change in mood of the population. A first argument is that society's desires, in terms of freedom, cycle. This is because, in a less constrained situation, people appreciate and profit from their freedom but this leads to abuses, the increasing decadence of society and social sentiment starts favouring a growing call for stricter rules. This is a point made by Hayek. As stricter rules are enforced, however, there is a reaction against the constraints and a swing back in favour of more freedom and autonomy. This social cycle is linked to economic activity through the demand for the new investment capital needed to replace its older counterpart. As a society prospers, its growth requires more investment for replacement but this coincides with a growth in demand for consumer goods. As capital flows to that sector to meet the demand, insufficient means are available to replace capital in the existing economy. This leads to a slowing of growth, as Pareto stated, with the shrinking of infrastructure, diminished consumption and the disappearance of vulnerable firms. A period of hedonic excessive consumption is followed by a period of frugality, with debt being reduced to 'reasonable levels' reminiscent of recent arguments in favour of austerity. This economic cycle is also linked to the political cycle. For Pareto, this involved swings between centralization involving efforts to diminish the inefficiency of a highly decentralized economy followed by a swing back to a system better adapted to responding to the different needs of widely dispersed sectors and less centralization.

This extremely simplified version of the arguments put forward in the *Trattato* shows that Pareto had moved far from the Walrasian path and, I would argue, did not consider the economic part of the whole system as being that envisaged in the purely economic general equilibrium approach but as being linked to the social and political parts of the system, which, through the feedback from one component to another, generated the cycles that we observe.¹¹

Pareto's vision, though sometimes poorly articulated, is remarkably prescient. His description of the role of sentiments has been further developed in the work of Shiller (2019) and Tuckett (2011); for example, where the emphasis is on the dominant narrative in society, narratives may change even if the facts they are built on do not. Thus, perceptions and sentiments will change and the behaviour of the actors in the socio-economic system will change as a result. All this will occur with no fundamental change to any economic variable.

To complete the picture, towards the end of his life Pareto developed arguments on the evolution of the political system. Rather than power simply shifting from one elite to another, he saw the system as shifting from centralization with a strong central

¹¹Some writers have suggested that the rational individual described in Pareto's earlier theoretical analysis was still present when one considers the repeated and simple consumption choices that people make and indeed Pareto himself, at one point, seems to make this argument, when he stated:

We will study the many logical, repeated actions which men perform to procure the things which satisfy their tastes. ... we are concerned only with certain relations between objective facts and subjective facts, principally the tastes of men. Moreover, we will simplify the problem still more by assuming that the subjective fact conforms perfectly to the objective fact. This can be done because we will consider only repeated actions to be a basis for claiming that there is a logical connection uniting such actions. (Pareto 1909, ch.3, §1)

However, if we follow the general equilibrium path to its logical conclusion in the Arrow–Debreu world, people are never assumed to make 'repeated' choices since they are choosing from infinite streams of consumption and not making independent daily choices.

authority to a more decentralized organization. Decentralization increases as people recoil from the increase in power of those who govern and lose touch with the needs of individuals, while centralization reappears when the system degenerates into chaos as individualism takes over. Thus, the shifts in sentiment are reflected in the evolution of the political system and, as I have said, this in some ways anticipates Hayek's (1944) *Road to Serfdom*.

8. Political and Ideological Background

The ways in which the thoughts of Walras and Pareto evolved were not only different insofar as economic theory is concerned. As Thomas Piketty (2014) has argued, much of economic theory is essentially conditioned by ideologies and one cannot free economic discourse from their influence. As he stated:

To put it bluntly, the discipline of economics has yet to get over its childish passion for mathematics and for purely theoretical and often highly ideological speculation, at the expense of historical research and collaboration with the other social sciences. Economists are all too often preoccupied with petty mathematical problems of interest only to themselves. This obsession with mathematics is an easy way of acquiring the appearance of scientificity without having to answer the far more complex questions posed by the world we live in. (Piketty 2014, p. 36)

This is very revealing, for Walras was convinced that solving the mathematical difficulties associated with economic theory was paramount. Yet, while Pareto opened the road to the mathematization of economics, he left it leaving theoretical economics in the situation that Piketty describes. So, rather than forming a team climbing the same theoretical mountain, their ideas and their characters meant that, according to Bridel and Mornati (2009), they had little in common and, despite their joint presence in Lausanne, had only a three-year period during which they engaged in any serious intellectual collaboration. If we are to take Piketty's argument seriously, then it might be of some interest to look at the ideologies of Walras and Pareto and, in particular, their political ideologies. Whilst this gives an insight into their vision of economics, it can hardly be an explanation for their intellectual divergence. Whilst Walras was clearly associated with socialism, this did not penetrate his thinking on general equilibrium, the interest that he shared with Pareto. Pareto was not particularly politically involved during his period at Lausanne with Walras and it was only some time after the death of Walras that his much-cited and exaggerated flirtation with fascism occurred.

Walras was accused of being a socialist in somewhat derogatory terms, particularly in his less theoretical work. This was in part because of his early assertion that, 'we will reconcile communism and individualism by introducing the distinction between social conditions and positions' (Walras 1868, p. 154). But it was also because his proposition to nationalize land and to use the revenue from it to replace taxes was considered to be extreme and revolutionary. He simply saw this as a way of reducing inequality without having to resort to rather arbitrary ex post redistribution. His argument was a simple one, as he stated:

The land does not belong to all the men of one generation; it belongs to humanity, that is, to all generations of men ... In legal terms, humanity is the landowner, and the current generation is the usufructuary of the land. (Walras 1896, p. 189)

Despite the mention of communism, Walras did not subscribe to the Marxist concept of the state partly since he did not believe that the state could make the necessary calculations for all of the variables involved.¹² Curiously, it was another Lausanne economist, Barone (1908), in his article 'Ministry of Production in a Collectivist State', who showed, at least in principle, that a socialist economy could do as well as a capitalist one. The prices involved were no more than the solution to a set of equations in a Walrasian system—whether these were solved by the government or the market was irrelevant. In this, he followed Pareto's (1906) arguments. This debate continued and Lange argued that not only would a centralized system be able to solve the Walrasian equations but it would also be able to introduce ethical and distributive considerations that a market system could not incorporate. It seemed, as far as the computational feasibility went, that Lange (1936, 1937) and other Paretian economists, such as Taylor (1929) and Lerner (1934), had won the day, and, as Lange (1967, p. 158) observed much later:

Were I to rewrite my essay ['On the Economic Theory of Socialism'] today my task would be much simpler. My answer to Hayek and Robbins would be: so, what's the trouble? Let us put the simultaneous equations on an electronic computer and we shall obtain the solution in less than a second. The market process with its cumbersome tâtonnements appears old fashioned. Indeed, it may be considered as a computing device of the pre-electronic age.

Walras also thought that people should first be put on an equal footing, which he envisaged through the nationalization of land and from that point on markets would solve the problem for many goods through price variation equalizing supply and demand. He did, however, believe that the state should be responsible for some sectors and proposed a 'great experiment' to identify which sectors should be under private control and which under state control. His reconciliation consisted in recognizing that men are not born equal in terms of their talents and human capital and that they should naturally be allowed to benefit from these. It was only their access to natural resources in general that should be equalized by the state.

Nevertheless, it is difficult to deny Walras' adherence to the general principles of socialism and, at one point, he declared, 'I am not an economist, I am a socialist.'¹³ But one can ask, what kind of socialist?¹⁴ A group of left-wing personalities proposed the creation of a *Société du Crédit au Travail* with the explicit intention of promoting a change in the organization of work and a social revolution, and Walras was involved. One might also describe this as introducing a worm into the capitalist apple. Walras had a much less revolutionary ambition and later participated in the creation of a cooperative savings bank. He saw cooperatives as promoters of democracy and thought that this would also be a way of stimulating saving and the creation of a 'popular capital fund'. Leon Say was to be the president and Walras the secretary. As his association with Say indicates, Walras was not openly hostile to the capitalist ethic and accepted a job with the *Chemins de Fer du Nord*, a company owned by the Rothschilds, an interesting echo of Pareto's early job. Although Say helped Walras initially, their relation was

¹²This position is related to the 'socialist calculation' debate between Lange (1936, 1937) and Hayek (1945).

¹³This quotation from Walras' 'Notes d'humeur' is disputed since the word *architecte* seems to be in the place of *socialiste* in the original. For a discussion, see Walker (1999b) and the comments of Bridel (1999) and Potier (1999).

¹⁴Socialism had and has no clear identity. In his 1924 *Dictionary of Socialism*, Angelo Rappoport examined no fewer than forty definitions of socialism, and stated that 'there are many mansions in the House of Socialism' (1924, v, pp. 34–41) because the term was used across the political spectrum from Leninists to Mussolini.

spoiled when Say declared, before *l'Académie des sciences morales et politiques*: 'Moreover socialism is not our religion, and neither is it our confessor. It is, quite simply, our enemy.' Walras found, as many have, that flirting with capitalists whom he thought were sympathetic to his ideas, and who had the resources to give him the recognition that he thought he deserved, was destined to end in failure.

But Walras was intent on pursuing his own idea of socialism. He was not in favour of an authoritarian state but believed that the state had an important role to play. Despite the many failures in his endeavours, he was not modest in his ambitions nor in his evaluation of the merits of his own contributions. So, it was his over-evaluation of his own work and his fear that others would take the credit that led him to fall out with Pareto. This tendency to put too much emphasis on the superiority of his work showed a lack of modesty that is also revealed by the fact that he, on three occasions, in 1905, 1906 and 1907, proposed himself for the Nobel Peace Prize. He prepared a speech for the award in which he claimed to have found a system that would ensure peace through the establishment of social justice by the nationalization of land and free trade.

Pareto was also far from modest, especially in his assessments of others, and in particular of Walras, but, unlike Walras, was a self-avowed liberal and might even be described as a libertarian. It is impossible to understand the political stances of Walras or Pareto without understanding the political climate at the time. In the latter part of the nineteenth century, there was a continuing tension between the basic tenets of liberalism and the emergence of radical social movements. This, it is claimed, meant that many liberals regarded socialist movements as a threat to the very foundations of social order. A major preoccupation of those who professed to be liberals concerned private property rights, which Pareto shared but was orthogonal to Walras' position in favour of the nationalization of land.

It is tempting to suggest that the hostility that developed between Walras and Pareto was due, in large part, to their differences in political ideology. But, although, Pareto made disparaging remarks about Walras' advocacy of socialism, he was far from being at the opposite political extreme during the three years in which they were both working on the general equilibrium problem. While Pareto's name has often been associated with fascism, this reputation was based on events at the end of Pareto's life, long after Walras' death in 1910, and cannot be thought of as a source of friction between the two men.

Again, it is worth stating that Pareto was in no doubt about the value of his own ideas; as he stated in a letter to Pantaleoni:

What is the use even if we advance economic science, if then we are alone, the few of us, to know the truth? Isn't it our duty to have others know it as well? To strive, so that justice vanquishes the corruption and injustice that oppresses us? (Pareto 1960, letter to Pantaleoni, 6 December 1891)

But here was a clear indication that, at that time, he saw the real danger not as coming from the rise of the left but from the ruling class with their tendency, as he saw it, to steal and to intervene. Thus, a more appropriate description of Pareto's attitude would be that of 'conservative' and one with quite strong ethical principles. Indeed, he was a supporter of the young Italian socialists who protested against the corruption of the system and, at

the end of the nineteenth century, he personally helped them and took some socialist refugees into his home in Lausanne. This was at a time when the left was being persecuted by the Italian government. Perhaps even more surprising was that his friend, Pantaleoni, given his later affiliation with fascism, did the same and welcomed socialist refugees into his house in Geneva.

For many years Pareto offered money, shelter and counsel to political exiles or the politically persecuted. He was particularly active in 1898 after the repression of riots over the shortage of bread, amongst other problems, which led to hundreds of deaths and the resignation of the government. In fact, Pareto could be thought of as a libertarian, but one who had a considerable social conscience. However, the fact that he was ready to help young socialists who were being unfairly treated does not mean that he had any sympathy for their political views. For, as he said to Pantaleoni,

I realize that the day will come when things go badly for Switzerland if the socialists triumph. If I am still alive, I will then transport my household goods to England. But I hope to be dead by the time that happens. (Pareto 1960, Letter to Pantaleoni, 17 March 1897)

As Powers (1987) states, 'he was possessed of that duality of mood we continue to find among people who are extremely conservative and yet ardent in their belief in personal liberty'.

Indeed, Pareto (1903, Vol. 1, p. 2) explicitly claimed not to adhere to any political doctrine:

My purpose is not to defend a doctrine, a tendency or to attack those doctrines to which I do not subscribe. Nor do I wish to persuade anybody. I have only one wish, namely, to search objectively for truth.

Much more plausible an explanation for his poor relationship with Walras is not that he disagreed with Walras' political views but, rather, that he thought that Walras himself had not thought them through enough. This is clearly revealed by what he said after having written a eulogy for Walras that was read at his jubilee. Pareto regretted having written it and said in a letter to Pantaleoni that if it was ever published he would add a couple of lines: 'But be aware that I find the idea of universal mathematical peace absurd and Walras' scientific socialism ridiculous' (Pareto 1960, letter to Pantaleoni, June 1909).

9. Conclusion

Despite their different characters and personal antagonism, it would be convenient to group Walras and Pareto together as two consecutive actors in the same intellectual story; however, this would be highly misleading. There are several reasons for this, as I have noted. First, in terms of their intellectual approach, there was a relatively short period during which they seemed to be working on a common approach to the problem of general equilibrium. Yet even that collaboration gave rise to difficulties, with Walras being convinced that Pareto had taken some of his ideas. They expressed their differences in their correspondence and acknowledged their separate visions of what a science should be. In some sense, it has to be said that Walras' view of what constitutes a scientific paradigm has remained dominant in economics. Think of an ideal

model and then see how that can be reconciled with the empirical economic evidence. This is different from other sciences that build original models from empirical observations and then make successive ‘approximations’, to use Pareto’s term.

Their paths also diverged in their treatment of the goals and behaviours of the individual. This is where Pareto first clearly led theoretical economics away from the path that Walras had traced. By making the simplifying and apparently innocent assumption that individuals have preference orderings rather than cardinal utility functions, he built the basis for both modern microeconomics and the ‘solid micro-foundations’ upon which today’s macroeconomics claim to be based. But, ironically, having constructed the mathematically coherent framework for rationality, which was blithely, if blindly, followed by ‘mainstream economics’ later in his career, he came progressively to abandon the idea of a ‘rational individual’ satisfying some axioms of consistency. Walras, on the other hand, continued to work till his death in 1910 in the homo economicus framework without having to confront the Paretian Turn.¹⁵ Again, it is worth emphasizing that the shift referred to in the expression I have just cited has been differently interpreted. Bruni and Sugden (2007) see it as a return to psychology as a basis for the analysis of choice and as the beginning of a shift to behavioural economics and away from what Pareto himself called ‘pure economics’. On the same lines, it might be observed that using ordinal preferences greatly enhanced the domain over which they could be defined, and Pareto could have integrated this into his sociology instead of adhering to his separation into logical (confined to repeated choices over material alternatives) and non-logical actions in relation to choices of what John Stuart Mill called ‘higher pleasures’.

It was nevertheless Pareto’s changes of direction in pure economic theory that shifted that theory from the Walrasian path and pointed the way to later general equilibrium theory. But he quickly moved towards sociology and his subsequent questioning of rationality led him to a different intellectual position far removed from that of Walras.¹⁶ This suggests, as Bridel and Mornati (2009) and Baranzini and Allison (2016), amongst others, have done, that the *Ecole de Lausanne*, at least as a cooperative intellectual venture, is a mythical construct.

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¹⁵It is perhaps worth remarking that cardinality had a discrete return with Von Neumann and Morgenstern’s expected utility axioms but this did nothing to change the path of modern macroeconomics, which has continued to adhere firmly to the Paretian, Arrow–Debreu framework.

¹⁶It would, I think, be a stretch of the imagination to credit Pareto with being the father of behavioural economics.

References

- Arrow, K. J., and G. Debreu. 1954. 'Existence of an Equilibrium for a Competitive Economy.' *Econometrica* 22 (3): 265–290.
- Arrow, K. J., and F. H. Hahn. 1971. *General Competitive Analysis*. San Francisco: Holden Day.
- Aspers, P. 2001. 'Crossing the Boundary of Economics and Sociology: The Case of Vilfredo Pareto.' *The American Journal of Economics and Sociology* 60 (2): 519–545.
- Aumann, R. J. 1964. 'Markets with a Continuum of Traders.' *Econometrica* 32 (1/2): 39–50.
- Backhaus, J., and H. Maks. 2006. 'Introduction.' In *From Walras to Pareto*, edited by J. Backhaus and H. Maks. Heidelberg: Springer Verlag.
- Baranzini, R., and F. Allison. 2016. 'Lausanne School', Chapter 19. In *Handbook of History of Economic Analysis*, vol. 2, edited by G. Faccarello and H. D. Kurz, 281–294. Cheltenham: Edward Elgar.
- Barone, E. 1908. 'Il Ministro della Produzione nello Stato Collettivista.' *Giornale Degli Economisti* 37: 267–293.
- Blaug, M. 2007. 'The Fundamental Theorems of Modern Welfare Economics, Historically Contemplated.' *History of Political Economy* 39 (2): 185–207.
- Bridel, P. 1999. 'Une note d'humeur de Walras – Commentaire.' *Economies et Sociétés* 33 (4): 161–164.
- Bridel, P., and F. Mornati. 2009. 'De l'équilibre général comme 'branche de la métaphysique': Ou de l'opinion de Pareto sur le projet Walrasien.' *Revue économique* 60 (4): 869–890.
- Bruni, L. 2013. 'The Paretian Turn.' *Revue Européenne des Sciences Sociales* 51 (2): 47–64.
- Bruni, L., and R. Sugden. 2007. 'The Road Not Taken: How Psychology Was Removed from Economics, and How It Might Be Brought Back.' *The Economic Journal* 117: 146–173.
- Dalziel, P., and J. Higgins. 2006. 'Pareto, Parsons, and the Boundary between Economics and Sociology.' *The American Journal of Economics and Sociology* 65: 109–126.
- De Vroey, M. 1999. 'Transforming Walras Into a Marshallian Economist: A Critical Review of Donald Walker's Walras's Market Models.' *Journal of the History of Economic Thought* 21: 413–435.
- Debreu, G. 1974. 'Excess Demand Functions.' *Journal of Mathematical Economics* 1: 15–21.
- Debreu, G. 1998. 'Existence', Chapter 2. In *Elements of General Equilibrium Analysis*, edited by A. Kirman. Cambridge: Cambridge University Press.
- Hahn, F. H. 1974. *On the Notion of Equilibrium in Economics: An Inaugural Lecture*. Cambridge: Cambridge University Press.
- Hahn, F. H. 1982. 'Reflections on the Invisible Hand.' *Lloyds Bank Review* 144: 1–21.
- Hahn, F. H. 2002. 'On the Possibility of Economic Dynamics.' In *Equilibrium, Markets and Dynamics: Essays in Honour of Claus Weddepohl*, edited by C. Hommes, R. Ramer, and C. A. Withagen, 221–230. Berlin: Springer-Verlag.
- Hayek, F. A. 1944. *The Road to Serfdom*. Chicago: University of Chicago Press.
- Hayek, Friedrich A. 1945. 'The Use of Knowledge in Society.' *The American Economic Review* 35 (4): 519–530.
- Hayek, F. A. 1948. 'The Meaning of Competition.' In *Individualism and Economic Order*, 92–106. London: Routledge and Kegan Paul Ltd.
- Hicks, J. 1939. *Value and Capital*. Oxford: Oxford University Press.
- Jaffé, W., ed. 1965. *Correspondence of Léon Walras and Related Papers*, 3 vols. Amsterdam: North-Holland.
- Johnson, S. 1755. *Dictionary of the English Language*. London: J. & P. Knapton.
- Lange, O. 1936. 'On the Economic Theory of Socialism: Part One.' *The Review of Economic Studies* 4 (1): 53–71.
- Lange, O. 1937. 'On the Economic Theory of Socialism: Part Two.' *The Review of Economic Studies* 4 (2): 123–142.
- Lange, O. 1967. 'The Computer and the Market.' In *Socialism, Capitalism and Economic Growth. Essays Presented to Maurice*, edited by C. H. Feinstein, 158–161. Cambridge, Cambridge University Press.

- Makowski, L., and J. M. Ostroy. 2001. 'Perfect Competition and the Creativity of the Market.' *Journal of Economic Literature* 39 (2): 479–535.
- Mantel, R. 1974. 'On the Characterisation of Aggregate Excess Demand.' *Journal of Economic Theory* 7: 348–353.
- Mas-Colell, A., M. D. Whinston, and J. R. Green. 1995. *Microeconomic Theory*. New York: Oxford University Press.
- Pareto, V. 1896. *Cours d'économie Politique*, 2 vols. Lausanne: Librairie de l'Université.
- Pareto, V. 1903. *Les systèmes socialistes*, 2 vols. Paris: Giard & Brière.
- Pareto, V. 1906. *Manuale di Economia Politica*. Milano: Societa Editrice Libraria.
- Pareto, V. 1909. *Manuel d'économie politique*. Paris: Giard et Brière.
- Pareto, V. 1916. *Trattato di Sociologia Generale*, 4 vols. Florence: Barbera. Translated as *The Mind and Society*, edited by A. Livingston. New York: Harcourt Brace & Co., 1935.
- Pareto, V. 1960. *Lettere a Maffeo Pantaleoni, 1890–1923*, vol. I–III. Edited by G. de Rosa. Rome: Banca Nazionale di Lavoro.
- Pareto, V. 1975. *Œuvres Complètes, Tome 19(2): Correspondance*. Edited by G. Busino. Genève: Librairie Droz.
- Pareto, V. 2014. *Manual of Political Economy. A Critical and Variorum Edition*. Edited by A. Montesano, A. Zanni, L. Bruni, J. Chipman, and M. McLure. Oxford: Oxford University Press.
- Parsons, T. 1937. *The Structure of Social Action*. New York: McGraw Hill.
- Piketty, T. 2014. *Capital in the Twenty First Century*. Cambridge, Mass: Harvard University Press.
- Potier, J.-P. 1999. 'Une note d'humeur de Walras – Commentaire.' *Economies et Sociétés* 33 (4): 171–174.
- Powers, C. H. 1987. *Vilfredo Pareto*. Edited by J. H. Turner. Newbury Park, CA: Sage Publications.
- Rappoport, A. 1924. *Dictionary of Socialism*. London: T. Fischer Unwin.
- Rodrik, D. 2015. *Economics Rules*. New York: W.W. Norton.
- Romer, P. 2016. 'The Trouble with Macroeconomics.' *The American Economist* 20: 1–20.
- Saari, D., and C. P. Simon 1978. 'Effective Price Mechanisms.' *Econometrica* 46: 1097–1125.
- Schumpeter, J. A. 1949. 'Vilfredo Pareto (1848–1923).' *The Quarterly Journal of Economics* 63: 147–173.
- Schumpeter, J. A. 1954. *History of Economic Analysis*. London: Allen & Unwin.
- Shiller, R. 2019. *Narrative Economics: How Stories Go Viral and Drive Major Economic Events*. Princeton: Princeton University Press.
- Smith, A. [1776] 1976. *An Inquiry Into the Nature and Causes of the Wealth of Nations*. London: Strahan and Cadell. Reprint edited by R. H. Campbell and A. S. Skinner, textual editor W. B. Todd. Oxford: Clarendon Press.
- Sonnenschein, H. 1972. 'Market Excess Demand Functions.' *Econometrica* 40: 549–563.
- Starr, R. M. 1997. *General Equilibrium Theory: An Introduction*. Cambridge: Cambridge University Press.
- Taylor, F. 1929. 'The Guidance of Production in a Socialist State.' *American Economic Review* 19: 1–8.
- Tuckett, D. 2011. *Minding the Markets: An Emotional Finance View of Financial Instability*. London: Palgrave Macmillan.
- Uzawa, H. 1960. 'Preference and Rational Choice in the Theory of Consumption.' In *Mathematical Methods in the Social Sciences*, edited by K. J. Arrow, S. Karlin, and P. Suppes, 129–148. Stanford: Stanford University Press.
- Wald, A. 1936. 'Über einige Gleichungssysteme der mathematischen Ökonomie.' *Zeitschrift für Nationalökonomie* 7: 637–670.
- Walker, D. A. 1996. *Walras's Market Models*. Cambridge: Cambridge University Press.
- Walker, D. A. 1999a. 'Some Comments on Léon Walras's Health and Productivity.' *Journal of the History of Economic Thought* 21: 437–448.
- Walker, D. A. 1999b. 'Une note d'humeur de Léon Walras.' *Economies et Sociétés* 33 (4): 151–160.
- Walras, L. 1874. *Elements d'économie pure, ou théorie de la richesse sociale*. Paris: Guillaumin et cie.

- Walras, Léon. 1990[1868]. 'Méthode de conciliation ou de synthèse.' In *Oeuvres économiques complètes / Auguste et Léon Walras. Tome 9 - Études d'économie sociale - théorie de la répartition de la richesse sociale*, 151–173. Paris: Economica.
- Walras, L. 1990[1896]. 'Théorie de la propriété.' In *Oeuvres économiques complètes / Auguste et Léon Walras. Tome 9 - Études d'économie sociale - théorie de la répartition de la richesse sociale*, 177–212. Paris: Economica.
- Walras, L. 2000. *Œuvres Diverses*, vol. XIII. Edited by P. Dockés. Paris: Économica.
- Wood, J. C. 1993. *Léon Walras: The Life of Léon Walras and Perspectives on his Thought*. London: Taylor & Francis.

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