Considerations on the Fundamental Principles of Pure Political Economy

Vilfredo Pareto

Edited by
Roberto Marchionatti and Fiorenzo Mornati

Routledge Studies in the History of Economics

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Considerations on the Fundamental Principles of Pure Political Economy (*Considerazioni sui principi fondamentali dell'economia pura*) was originally published as a series of five articles in the *Giornale degli Economisti* between May 1892 and October 1893. They were the first systematic representation of Vilfredo Pareto's contribution to pure economics and their publication in this volume in English closes a serious gap in the knowledge of the work of one of the founders of modern economic science.

In the book, Pareto deals with an impressively wide range of subjects including the nature and the limits of the new theories of marginalist economics, the use of mathematics in economics, the problem of method and the hedonistic hypothesis, the concept of *homo œconomicus* and, last but not least, the concept of final degree of utility.

These reflections make the *Considerations* an assessment of the state of the new economic theories expounded in a mathematical form at the beginning of the 1890s. These papers have exerted a great deal of influence in the subsequent development of economic theory. As such, the volume can be considered required reading for all serious economists across the world.

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Roberto Marchionatti and Fiorenzo Mornati

Premise

Vilfredo Pareto is considered to be among the great economists in the history of economic thought and one of the founders of modern economic science, but economists still have very limited acquaintance with his thought. This lack certainly stems also from the fact that none of his major works in economics were available in English until the 1971 translation of the *Manuel d'économie politique* (1909). Thus only economists proficient in French or Italian could gain firsthand knowledge of his works. Before 1971, only a few of Pareto's papers had been translated in English: 'Sul fenomeno economico. Lettera a Benedetto Croce' (1900) and 'Economie mathématique' (1911) were published in the *International Economic Papers* in 1953 and 1955, respectively, in addition to 'The new theories of economics', 'a brief exposé' of his theory, published in the *Journal of Political Economy* in 1897. The *Cours d'économie politique* (1896–1897) was never translated into English, and neither was the 'Considerazioni sui principi fondamentali dell'economia pura', a series of articles published in the Italian *Giornale degli Economisti* between May 1892 and October 1893. They are translated here for the first time.

The set of articles making up the 'Considerazioni' are the first systematic representation of Pareto's contribution to pure economics. Above all, they are a methodological and theoretical reflection on the concepts of utility and marginal utility considered as the basic theoretical category of the new marginalist economics. The articles discuss and thoroughly examine a wide range of topics, including: the nature and the limits of the hypotheses on which the new theories of marginalist economics were based; the use of mathematics in economics; the problem of method; the hedonistic hypothesis and the concept of *homo oeconomicus*; the concept of final degree of utility; the conditions of maximization of collective utility (preliminary considerations); the analytical determination of the marginal utility of money; the law of demand. These reflections make the 'Considerazioni' a fundamental assessment of the state of the 'new economic theories' expounded in a mathematical form at the beginning of the 1890s. Later, these papers influenced the

development of consumer theory and laid the groundwork for Eugen Slutsky's introduction of income and substitution effects in 1915.

The 'Considerazioni' have been increasingly recognized as crucial in the development of the Pareto's thought.[1] Nevertheless, they remain a much-quoted but little-read and studied work. This translation aims to close this gap. The following introduction reconstructs the genesis and development of the 'Considerazioni' in the contest of late nineteenth-century economic theory.

The new mathematical theories of economics at the time of the 'Considerazioni'

The new approach to economics characterized by the adoption of the mathematical method of reasoning came to life in the 1870s. The decade 1871–1881 witnessed the emergence of the mathematical revolution in economics in the works of William Stanley Jevons, Léon Walras, Alfred Marshall and Francis Ysidro Edgeworth. The 1880s saw the mathematical method in economics spread throughout Europe. The 1890s, particularly 1892–1897, produce an intense work in mathematical economics, which established itself as an important, although small, school in economics (see Marchionatti 2004).

The importance of Pareto's work in this context can be appreciated in the light of the theoretical situation in the years straddling the end of the 1880s and the beginning of 1890s. In those years major contributions in the field were published: the second edition of Walras's *Eléments d'économie politique pure* in 1889, the first (1890) and second (1891) editions of Marshall's *Principles of Economics*, and *Untersuchungen über die Theorie des Preises* by the Austrian economists Rudolf Auspitz and Richard Lieben in 1889. The late 1880s were also the years when the early controversies within mathematical economics emerged: Edgeworth, Walras, Bortkievicz, and Auspitz and Lieben were directly involved in two disputes that illustrate different conceptions of the role mathematics should play in economics (Edgeworth 1889a, 1889b and 1891; Walras 1890; Bortkievicz 1890; Auspitz and Lieben 1890; see also Walras 1965).

According to the pioneers of this new approach, mathematics – the 'sovereign science' as Edgeworth defined it – guaranteed scientific rigour because it permitted researchers to adopt rigorously deductive reasoning. The mechanical analogy of the classical physics made mathematical language the natural expression of an economic reasoning that seemed clearer and more precise than Ricardo's or Stuart Mill's language. Mathematical calculus was considered the most powerful tool for describing and understanding the general quantitative relations between the fundamental variables on which the theory was based. One fundamental feature of the new mathematical economics was the so-called hedonistic hypothesis, which holds that when individuals act they are motivated by their desire to obtain the greatest satisfaction of needs

through the lowest individual effort. Such an hypothesis seemed tailor-made for the mathematics of differential calculus. In this vein, Edgeworth (1881) maintained that the principal inquiries in pure economics could all be seen as problems of the determination of a maximum, starting from quantitative relations of the form 'x is greater or less than y; and increases or decreases with the increase of z'. Edgeworth was actually the economist who gave the most complete formulation of the hedonistic hypothesis, building on Jevonian foundations. For him, economic calculus was the study of the equilibrium of a system of hedonistic forces that tend to maximize individual utility. On the analytical level, the main achievements of the new approach were in the field of the theory of consumer behaviour and on the theory of exchange. These theories started out from a limited number of abstract premises and ended up exhibiting a high level of generality and simplicity.

A central issue in the new economics was the role and the extent of mathematics in economics. Walras had a boundless admiration for the solid edifice of classical mechanics, which he regarded as the model for scientific knowledge. His book, based on the principle of general economic equilibrium, was inspired by his aim to build a science of political economy that was the same as the Newtonian science of mechanics. Walras's aim was to create a theory of economics with the same formal properties that characterized celestial mechanics, as Jaffé (1977) outlined. Walras considered economics a physical-mathematical science like mechanics. Hence mathematical method and language were the natural expression of reasoning in political economy.

Marshall thought differently. He conceived economics as a human science and emphasized the instrumental and limited use of mathematics in economics. Although Walras and Marshall concurred that mathematics was necessary for deductive reasoning, Marshall carefully limited the function and extent of abstract mathematical reasoning in economics. In Appendix D of his *Principles*, 'Uses of abstracting reasoning in economics', Marshall wrote that it is illusory to think that there is room for long trains of deductive reasoning in economics since economic material is often inadequate to bear the strains of the mathematician's machinery. Edgeworth (1889a) adopted a Marshallian line of thinking about the role of mathematics in economics. He emphasized that 'our little branch of learning is of quite rudimentary form' and that 'the solid structure and regular ramifications of the more developed mathematical sciences are wanting' (Edgeworth 1889a: 551).

The different conception of the nature of the economic science that separated Walras and Marshall (and Edgeworth) can explain not only the differing extent of their use of mathematics in economics but also their differing attitudes towards abstractions. Marshall and Edgeworth used greater realism in the hypotheses and models and thus thought that Walras's theories were ruined by an excess of abstraction. The contrast between Edgeworth and Marshall, on the one side, and Walras on the other, became an issue of public debate after Edgeworth reviewed the second edition of Walras's *Eléments* in *Nature* (September 1889) and after he delivered his Presidential Address 'On

the Application of Mathematics to Political Economy' to section F of the British Association for the Advancement of Science Address a few days later. This began a controversy over Walras's theory of exchange that also involved Ladislaus Bortkievicz, at that time a young follower of Walras.[2] Edgeworth criticized three points that Walras considered fundamental to his theoretical work. First, he criticized the theorem on the maximum utility of new capital goods. Second, he criticized the theory of the entrepreneur who in equilibrium makes neither a profit nor a loss. Third, he criticized the theory of *tâtonnement* – i.e. the method Walras used to represent the determination of the equilibrium prices in a competitive market system. Edgeworth agreed with Walras 'in his plea for the use of mathematical reasoning in economics', but added that Walras prejudiced 'the case by his advocacy', because of his excessive use of mathematical symbols. Throughout his criticism Edgeworth's main point is that there is an excessive elaboration of mathematical reasoning in the *Eléments*, 'in such a manner as to justify the particular prejudice against it' (Edgeworth 1889b: 435). Bortkievicz (1890) took up the case for Walras in the *Revue d'économie politique*, maintaining that Walras's theory was logically correct and that Edgeworth's short article contained obscurities. In his reply Edgeworth (1891) conceded that his criticism of Walras was too succinct, but reaffirmed his view that Walras conceived the nature of industrial competition in a too-limited and narrow a way. In essence, the controversy between Edgeworth and Walras reveals the clash of two different methodological requirements. On the one hand, is Walras's requirement of rigour and simplicity that is brought on by the reduction of economics to mathematical treatment. According to Walras, his own simple model of free competition was the general case. Therefore, he thought, Edgeworth took the wrong approach because he subordinated the general case to particular cases. On the other hand, Edgeworth required a more realistic model. Thus he implicitly maintained that the Walrasian level of abstraction could not represent the general case. Edgeworth could only accept the Walrasian case as an extreme simplification.

The controversy between Walras and the English economists is echoed in another important controversy – the one between Walras and the pair Auspitz and Lieben after the publication of their book, *Untersuchungen*. Auspitz and Lieben had used partial analysis and had assumed the constancy of the marginal utility of money in a Marshallian-type theoretical context of partial equilibrium. The book widely uses an apparatus of curves like those used by Marshall in his 1879 essays. Walras (1890) attacks Auspitz's and Lieben's partial analysis of supply and demand. However, his real target was Marshall, whom Walras erroneously thought had inspired them (see Walras's letter to Pantaleoni of 5 January 1890, in Walras 1965, vol. II: 384–387). Ironically enough, Auspitz and Lieben had never known about Marshall's work when they were writing the book. Two points stand out in Walras's critique. First, Auspitz and Lieben had introduced money into the theory of exchange

because they were aiming to integrate the theories of value and money from the beginning of their argumentation. Walras considered this methodologically unscientific. Second, Auspitz and Lieben's demand and supply curves represented quantity demanded or supplied as a function of the price of a commodity alone. Walras countered that this was not exact, because the demand and supply curves had been plotted under the *ceteris paribus* hypothesis – i.e. under the assumption that the prices of the other commodities and productive services had not been affected. Walras pointed out that when the price of a commodity changes, this change disturbs the whole of the existing equilibrium, whose every element must be readjusted in turn.

Auspitz and Lieben (1890) replied to Walras. They tried to make it clear that they had assumed the value of money constant for each individual because this seemed a better procedure than Walras's totally abstracting from money in his theory of exchange, something that they considered too drastic. In addition they rebutted Walras's critique of the *ceteris paribus* hypothesis. They pointed out that they were aware of the fact that the quantity demanded for a commodity is a function of all the prices, as they had written in Appendix IV of their book. Nevertheless, they had found that the *ceteris paribus* assumption was the best way to deal with a wide range of issues. Auspitz and Lieben further criticized Walras's conception of the cost function. Walras had assumed constant costs for all the producers in equilibrium. On the contrary, Auspitz and Lieben assumed increasing costs and, on this basis, they developed a theory of producer surplus. In addition, they examined Walras's position that free trade led to a consumer gain but not producer gain. This would imply, according to Auspitz and Lieben, that a producer had no motivation to develop his entrepreneurial activity. Furthermore, they rejected Walras's position that the equality of the cost of production and the price was the same thing as the equality of demand and supply. For them, everyday experience reveals that there are always differences between prices and costs even though the market always works to balance supply and demand. For them, Walras's idea that entrepreneurs make neither gain nor loss in a perfect competition market was equivalent to eliminating the entrepreneur.

Walras did not reply. He had first hoped that Bortkievicz would fill in for him, as he had against Edgeworth, but Bortkievicz chose to remove himself from the dispute. Then Walras wrote to him:

> It is not probable that I will decide to intervene. I am very tired and I think that the time has arrived for me to make way for somebody other. If it is necessary, I will wait to find people who know that the secret of the science is to put the general case up front and to relegate the particular cases and exceptions to the second level. This is the core of my controversy with Edgeworth.
>
> (Letter to Bortkievicz of 27 February 1891, in Walras 1965, vol. II: 434–435)

The crucial issues of the role and extension of the use of mathematics in economics and the partial equilibrium will appear again in the work of Vilfredo Pareto, the leading figure in the new economics between the 1890s and the First World War.

Pareto at the beginning of the 1890s

Pareto retired from his position in industry in May 1890, at the age of 42. He was to spend the next 30 years or so studying and carrying out his project to write a treatise on 'rational political economy' in the manner of treatises on rational mechanics. Born in 1848, he studied mathematics and engineering. He was awarded a degree in mathematics in 1867 and one in engineering in 1870 at the University of Turin. Around 1870 he started working as an engineer at the Railway Company of Florence (*Strade Ferrate Romane*). For the next 20 years Pareto worked as deputy manager and then general director of *Ferriere Italiane*, an iron works company at San Giovanni in Valdarno, near Florence. In 1890 he left the company and retired to Fiesole.[3]

At that time he was motivated in his theoretical work by his support of free trade, a policy championed by the Radical Party, a small opposition party that he had been sympathizing with from the mid-1880s. In the previous ten years he had been active in the ranks of the Conservative Liberal Party led by Ubaldino Peruzzi, a former Italian minister of the Interior and major of Florence. The commercial war between Italy and France that broke out in 1887 induced Pareto to think about the economic basis of economic liberalism. At first he borrowed ideas from Gustave de Molinari, the editor of the *Journal of Economistes*, and leader of the French liberalism (Mornati 2000). Both of them thought that it was necessary to describe the damage that protectionism brings. Pareto added two crucial points to de Molinari's arguments: he emphasized the need to find political and social allies for the free-trade policy and to give a new scientific and rigorous foundation to free trade. The development of Pareto's interest in the application of mathematics to political economy is connected with this second objective.

Pareto had admired the books and articles of Maffeo Pantaleoni and was to become a close friend of him.[4] Pantaleoni advised him to study the work of Léon Walras. Pareto had already started to read the 1877 edition of Walras's *Eléments d'économie politique pure* (letter to Walras, 12 September 1891), but he had broken off because he had no taste for its metaphysical components. Pantaleoni assured Pareto that there was something other than metaphysics in Walras's work (see the letter to Pantaleoni of 27 July 1892). Actually, Pareto was decisively inspired to undertake his political–scientific project through his reading of Pantaleoni's *Principi di economia pura* and of the second edition of Walras's *Eléments* as well as through his ensuing intellectual relationship with Walras.

Pareto was in no way an amateur, some retired engineer who was just tacking some new interest in economic theory onto his old passion for

mathematics. On the contrary, he took on his project with all the attributes of a scholar who had a critical conception of scientific activities. He was an advocate of the prevailing standards of natural sciences as a practice strongly associated with experimental proof. For this reason, his attitude was strongly anti-metaphysical (see the letter to Walras of 15 March 1892). In fact, he began his *Cours* emphasizing that 'economics is a natural science, founded exclusively on facts' (Pareto 1896–1897, vol. 1, §1). This concept was also clearly expressed in the 'Considerazioni'. It implies that the method of economics is the experimental method – i.e. that of the natural sciences. Pareto brought John Stuart Mill into his discussion of method in economics. He had read his magnum opus, *A System of Logic*, in 1874 in the French translation (1866) of the sixth (penultimate) edition. Here Mill maintained that economics must use the 'concrete-deductive method' (the logico-experimental method in Pareto's terminology). This method follows these steps: an initial induction from observed phenomena, a theoretical deduction from them, a comparison between the deductions and the real facts, a subsequent modification and addition in order to obtain new ideal schemes of the observed facts, and so on indefinitely. However, Pareto did not accept everything in Mill. He disagreed over the role and importance of mathematics, holding that Mill underestimated the value of mathematics. In fact, mathematics is a sort of logic that helps researchers avoid formal errors of reasoning. Epistemological statements like these are incorporated and extensively discussed in the first part of the 'Considerazioni'.

The genesis of the 'Considerazioni'

Pareto's reflection on the issues discussed in the 'Considerazioni' started in mid-year 1891, partially in response to his reading of Maffeo Pantaleoni's *Principi di economia pura* (1889).[5] At that time Pareto had some knowledge of economic works by Cournot, Walras and Jevons, which he probably read in the Italian translation in the series of the *Biblioteca dell'Economista* edited by Gerolamo Boccardo. These readings aroused some misgivings in Pareto about the at times inappropriate or erroneous use of the mathematical method in economics and about the hedonistic theory, which was at the basis of the new economic theories. He expressed his doubts as well as his long-standing mistrust of political economy in several letters to Maffeo Pantaleoni in July and October 1891, and to Walras (letter of 21 September 1891). Pareto's doubts mainly focused on Cournot's attempts to demonstrate the advantages of the economic protection: 'I considered a method leading to such conclusions to be *hazardous*' (letter to Pantaleoni of 8 July, 1891, in Pareto 1984, vol. I: 45). His doubts were somewhat mitigated by his reading of Pantaleoni's *Principi* and Walras's *Eléments*. He called *Eléments* 'an important work' (letter to Pantaleoni of 7 October 1891, in Pareto 1984, vol. I: 77) that opened the scientific path to political economy (letter to Walras of 15 September 1891). Pareto's critique of the new theories touched many

crucial issues: the shape of utility curves was based on limited empirical – i.e. experimental – evidence; the concept of *homo oeconomicus* was a notion of someone 'who does not exist in nature'; the hypothesis of intentionality – i.e. perfect rationality – of *homo oeconomicus*'s action contradicted the fact that 'men act on the basis of habits more than reason'; the hypothesis that in the exchange men compare the degree of utility of the various exchanged goods was far-fetched. Pareto wrote, 'I think that most people do not know how to do this'. The definition of the final degree of utility was highly imprecise, something that Pareto considered 'the crux of the matter' (letter to Pantaleoni of 3 October 1891, in Pareto 1984, vol. I: 67). On the other hand, he thought that there was a general agreement on the need to use mathematics in political economy:

> I think that as far as mathematics is concerned, we all agree. I do not deny that there are problems which are too complex to be treated other than mathematically. I admit that the graphical method is often the most elegant and simplest way to expound the solution of some problems. Far be it from me to be opposed to the mathematical political economy, I think that sooner or later it is going to be the basis of the economic science. . . . We also perfectly agree that the issue of the usefulness of mathematics in political economy is different from the issue on the validity of the theory of the final degree of utility.
>
> (Letter to Pantaleoni of 3 October 1891, in Pareto 1984, vol. I: 65)

Early in October 1891, when his ideas on these issues 'little by little become clear and assume a more precise form', Pareto started to write a paper on the final degree of utility (letter to Pantaleoni of 7 October 1891, in Pareto 1984, vol. I: 72–73). At the beginning of December he sent Pantaleoni the first part of his paper, commenting that it was getting longer and asking him for some comments. In the meantime he wrote a short paper on Cournot that was published in January 1892 in the *Giornale degli Economisti*, edited by Pantaleoni himself. Pareto's topic was Cournot's misuse of mathematics, but his critique was meant to be extended to all those economists who thought that the simple mathematical expression of a line of reasoning was a guarantee of its truth. In a letter to Pantaleoni of December 1891, Pareto wrote:

> I am not an opponent of the new school. . . . However, I am an opponent of all the reasoning based on false assumptions. . . . According to me, the true enemy of the science is the reasoning that seems rigorous but, as a matter of fact, is based on false premises.
>
> (Letter to Pantaleoni of 9 December 1891, in Pareto 1984, vol. I: 118)

In the letter quoted above to Pantaleoni of 7 October, Pareto had clearly

expressed his thoughts on mathematics: 'I agree with those who think that mathematics is a sort of a complicated-syllogism-making machine. The important thing is to correctly pose the problem. Then a mathematician can solve it' (letter to Pantaleoni of 7 October 1891, in Pareto 1984, vol. I: 74).

In the meantime, Pareto was broadening his knowledge of the new economics and filling in his previous gaps, thanks to books and journals that Pantaleoni gave him. Pareto was particularly struck by Edgeworth's *Mathematical Psychics* and by the dispute between Walras and the pair Auspitz and Lieben. Pareto considered *Mathematical Psychics* to be fundamentally important for the foundation of the new political economy. He considered the Walras–Auspitz and Lieben dispute of such an importance that it needed to be discussed in an article he would write 'before the publication of the paper on the principles of the new science' (letter of 25 December 1891, in Pareto 1984, vol. I: 129).

By 1 January, 1892 Pareto had read Walras' criticism of Auspitz and Lieben but not their reply. In a letter to Walras on this date, he expressed his agreement with his observations, which rightly showed 'the mistake made by these men claiming that protection is a benefit! According to me, this is absolutely false' (letter to Walras of 1 January 1892, in Walras 1965, vol. II: 473). Walras then sent him Auspitz's and Lieben's reply, which he judged as inadequate. Pareto then informed Pantaleoni that he was going to write the article on the controversy in a month (letter of 20 January 1892), but he actually finished the article in about ten days. Later, he stressed that 'the series of articles on the principles of the new science will not be ready until a few months from now. I am not yet completely satisfied with it'. He added: 'as the ideas mature, I will write the great paper on the principles' (letter to Pantaleoni of 31 January 1892, in Pareto 1984, vol. I: 173). On 17 February 1892, Pareto informed Pantaleoni: 'On the final degree of utility there are still some points around which I see some mist. Notwithstanding, I think that I will be able to send to you the first part of the paper by March because it all seems ready to go' (letter to Pantaleoni of 17 February 1892, in Pareto 1984, vol. I: 183).

On 4 March 1892, Pareto informed Pantaleoni that 'the first part of the article is ready' (letter to Pantaleoni of 4 March 1892, in Pareto 1984, vol. I: 193). It contained his introductory remarks, including his beliefs on method. Pareto further wrote that he did not understand 'why Walras does not like neither Edgeworth nor Marshall' (ibid.: 194). He supposed that there was some 'rivalry' between them, probably referring to a letter from Walras of 23 February 1892, that contained a strongly negative judgement of Marshall, Edgeworth, Launhardt, Auspitz and Lieben. In fact, Walras called their works 'lucubrations', laborious studies that showed that 'one could elaborate a great number of false systems in a mathematical form' (letter to Walras of 23 February 1892, in Walras 1965, vol. II: 483). In the end, Pareto did not deal with the Edgeworth–Walras dispute.

Pareto's second article was completed before mid-April and published in