

The Triumph of Utilitarianism and the Marginalist Revolution

5.1. The Marginalist Revolution

5.1.1. *The 'climax' of the 1870s and 1880s*

The quarter century from the early 1870s was a period of contrasts. On the one hand, there was a continuation or, rather, an intensification, of the process of deep structural change, which had begun during the preceding twenty years; on the other, economic difficulties of various kinds and intensity appeared that looked like the first signs of a general crisis of the capitalist system, and that made many observers speak of a 'Great Depression'.

Growth proceeded at different rates in different countries, but was everywhere accompanied by a marked increase in the concentration of capital, with a spread of collusive practices, mergers, and the formation of cartels. This process was encouraged by great changes in productive techniques, which caused remarkable increases in the size of plant, especially in the mechanical, iron and steel, transport, and communications industries. Besides this, the organizational form of the limited company consolidated its position and became the privileged instrument for the mobilization and control of the huge amounts of capital needed for growth.

Social relations, in this context, began to structure themselves by taking on two different configurations in the factory and in society. Inside the firms, especially the large ones, the relations among individuals assumed a hierarchical and bureaucratized form, and this led to the first attempts at 'personnel management' and the first formulations of 'management science'. In society as a whole, on the other hand, class conflict sharpened dramatically and began to assume the form of a direct battle between powerful political and union groups. In section 5.1.4 we shall say more about the widespread explosion of social conflict and the effects it produced on the moods of the dominant classes.

The unequal development of countries also produced fiercer international competitiveness, not only in prices and technology but also in the organizational models of the firm and the national economy. This provoked both the slow decline of English industrial leadership and increased difficulties in international co-ordination, especially in capital markets. In fact, this was

also a period of financial instability: serious monetary crises occurred in various capitalist countries in 1873, 1882, 1890, and 1893. The English banking system, which tended to play the role of international lender of last resort, had great difficulty in keeping the situation under control, and often failed. The effects of these crises were aggravated, in many European countries, by those produced by a long agricultural depression, a depression which had been caused by the competition of American corn and which had produced a reduction in the prices of agricultural products and the incomes of the still large agricultural classes.

This was also a period of a world-wide reduction in prices and a slow-down in the growth of international trade—phenomena that should be considered in connection both with the deflationary impulses generated by the adoption of the Gold Standard by the main capitalist countries and with the increase in international competitiveness mentioned above. Nor should we forget the general movement away from the free-trade trend which had been so strong in the preceding twenty years, and the concomitant emergence of widespread attempts at protectionism. Finally, the national product grew in all countries through the storms of marked short-run business cycles. On the other hand, the long-run growth trend was weaker everywhere than in the successive twenty years (the *Belle époque*) and in most countries it was weaker even than the preceding twenty years. It is this phenomenon above all that has led some scholars to speak of a Great Depression. And if the relevance of such a point of view has been questioned by other scholars, especially by those who observed at the performances of the newly emerging powers, we should not forget that in Germany the *Grosse Depression* is usually associated with the *Bismarckzeit*, precisely the period we are studying here.

Let us return to economic thought. Three important books were published at the beginnings of the 1870s: *The Theory of Political Economy* (1871) by William Stanley Jevons, the *Grundsätze der Volkswirtschaftslehre* (1871) by Carl Menger, and the *Éléments d'économie politique pure* (1874–1877) by Léon Walras: three books which marked the beginning of what was later to be called the 'marginalist revolution'. These books are so different that any attempt to group them could seem daring. In fact, they had various fundamental things in common, but time was needed to realize this. Contemporary thinkers hardly noticed the three innovative contributions at all. It seemed that these authors were to meet the same cruel fate of other great heretics and forerunners. In effect, there was an almost complete silence for a decade. The time was still not ripe for the new message to be received and appreciated. Then suddenly, in the 1880s and the first half of the 1890s, the revolution exploded. Marshall, Edgeworth, and Wicksteed in England, Wieser and Böhn-Bawerk in Austria, Pantaleoni in Italy, and Cassel and Wicksell in Sweden all published fundamental works in the spirit of the new way of doing economic science. The revolution was completed in a decade. In the

following thirty years the theories were refined and generalized. But, by this time, the old classical system was dead and buried, a new orthodoxy had asserted itself, and even if certain differences between the national schools were to last a long time, it had become clear to everybody that all over the world a single science was being studied and one language spoken; the neoclassical system had imposed itself. We will discuss this in the next chapter.

This chapter will be dedicated to the three founding fathers of marginalism, and to the meaning of the revolution begun by them. First of all, however, it is necessary to turn away from history so as to be able to give a summary of the neoclassical system and to point out some of its distinctive characteristics. Even if some elements of this picture were only to appear much later, it may be useful, in order to understand the meaning of the revolution in the 1870s and 1880s, to consider where it was all going to lead.

5.1.2. *The neoclassical theoretical system*

One characteristic of the new system which was apparent from the beginning was a reduction of interest in economic growth, the great theme of the economic theories of Smith, Ricardo, Marx, and all the classical economists. Attention, instead, was focused on the problem of the allocation of *given* resources. Certainly, the basic ideas of the classical economists concerning the problem of growth continued to be influential. In lesson 36 of the *Elements*, for example, Walras put forward a theory of economic evolution that could still be considered Ricardian. The same could be said, to give another example, of the process of 'growth of wealth' described by Marshall in his *Principles*. But it is a fact that, in spite of the presence of considerations concerning the dynamics of economic systems, the founders of the neoclassical theoretical system basically did not consider the problem of the evolution of industrial economies. The central argument of the theoretical research in this period was the study of a static equilibrium system, that is, an economy, as J. B. Clark was to say later, 'free to find the final levels of equilibrium determined by the factors available at any given moment of time' (*The Distribution of Wealth*, p. 29).

At the centre of the neoclassical system is the problem of the allocation of *given* resources among alternative uses.

In the analysis of the conditions ensuring the optimal allocation of given resources among alternative uses, the neoclassical economists identified a universally valid principle, one which was able, alone, to embrace the entire economic reality. As Robbins said: 'Scarcity of means to satisfy ends of varying importance is an almost ubiquitous condition of human behaviour. Here, then, is the unity of subject of Economic Science, the forms assumed by human behaviour in disposing of scarce means' (*An Essay on the Nature and Significance of Economic Science*, p. 15). The tendency to extend the basic

model to every branch of economic investigation was reinforced during the course of the century until it culminated in the argument of P. A. Samuelson that there is a simple principle at the heart of all economic problems: a mathematical function to maximize under constraints.

Another characteristic that unites the three founding fathers, and one which was to remain a pillar of the neoclassical system, is their acceptance of the utilitarian approach; an approach which numbered among its forerunners Galiani, Beccaria, Bentham, Say, Senior, Bastiat, Cournot, and, above all, Gossen. In fact, the most important theoretical contribution of Jevons, Menger, and Walras lies, still more than in their complete and coherent reformulation of the utility theory of value and in the hypothesis of decreasing marginal utility, in the way they modified the utilitarian foundation of political economy. Their marginalism gave credit to a special version of utilitarian philosophy, one for which human behaviour is exclusively reducible to rational calculation aimed at the maximization of utility. They considered this principle to be universally valid: alone, it would have allowed the understanding of the entire economic reality.

A third distinctive element relates to the method. The neoclassical method is based on the principle of the variation of proportions, the so-called 'substitution principle', a method which has no equivalent in classical economics. In the theory of consumption, the substitutability of one basket of goods for another is assumed; in the theory of production, the substitutability of one combination of factors for another. The analysis is carried out in terms of the alternative possibilities among which the subjects, both consumers and producers, can choose. And the objective is the same: to search for the conditions under which the optimal alternative is chosen. This method presupposes that the alternatives at stake are 'open' and that the decisions taken are *reversible*; otherwise, the substitution principle would have no rational ground.

A fourth distinctive characteristic of the neoclassical approach concerns the economic agents. If they are subjects able to make rational decisions with a view to maximizing an individual goal, such as utility or profit, they must be individuals, or, at the most, 'minimum' social aggregates characterized by the individuality of the decision-making unit, such as households and companies. Thus the collective agents, the social classes and 'political bodies', which the mercantilists, the physiocrats, the classical economists, and Marx had placed at the centre of their theoretical systems, disappear from the scene. With neoclassical thought methodological individualism definitely entered economic science: knowledge of the properties of a system comes from the knowledge of the properties of its elements.

A fifth characteristic is represented by the final attainment of an objective to which many classical economists had aspired but which nobody had ever realized completely: the historicity of economic laws. Economics was likened to the natural sciences, physics in particular, and economic laws

finally assumed that absolute and objective characteristic of natural laws. The pervasiveness of the problem posed by the neoclassical economists, the problem of scarcity, establishes the universal validity of the economic laws. But for this to make sense, it is necessary to remove social relations from the field of economics, exorcizing them as a superstition, a waste of time, a subject not in line with the new scientific achievements. With the marginalist revolution also originated that reductionist project of economics which has marked all the successive neoclassical thought, a project according to which economics has no other field of research than technical relationships (the relationships between man and nature). Thus, while individualistic reductionism had led to the elimination of social classes, the anti-historicist reduction led to the elimination of social relations—which obviously meant that the study of their change also lost importance. While in the work of the classical economists and Marx the analytical apparatus was constructed with explicit reference to the capitalistic system whose laws of movement they wished to investigate, the neoclassical paradigm aimed for a complete historicity. Naturally, this was not easy to achieve. Even Walras, for example, had to use notions such as capital, interest, entrepreneur, wages— notions which make sense only in reference to the capitalist system.

Finally, a sixth important distinctive element of the neoclassical system lies in the substitution for the objective theory of value of a subjective one. At the base of the principle of subjective value is the argument that all values are individual and subjective. ‘Individual’ means that they are considered always as the ends of particular individuals. On the other hand, values are ‘subjective’ in that they arise from a process of choice: an object has value if it is desired by at least somebody. The principle of subjectivity implies that a value is such because somebody has chosen it as an end; whereas the principle of individuality postulates that there must be a particular individual to which that end can be attributed. In the opposite conception, that of objective value, values exist independently of individual choices. The individual can accept or reject values but he is not able to influence them. An immediate and important consequence of the neoclassical approach in regard to the question of value is that the theory of the distribution of income becomes a special case of the theory of value, a problem of determining the prices of the services of the productive factors rather than of sharing out income among the social classes.

5.1.3. *Was it a real revolution?*

One of the most important problems posed by the marginalist revolution for the historian of ideas is whether it was a real revolution. That name, ‘neoclassical system’, which is now given to the theoretical system originated from the marginalist revolution, seems to prove right those who argue

continuity with the preceding 'classical' theoretical system. But is the name correct? It is useful to begin precisely with this problem.

It was Marx who identified the classical theoretical system. As already mentioned, he was extremely rigorous in defining the approach and very selective in labelling the economists. The yardstick was Ricardo, but Marx went back as far as Petty and Boisguillebert to find the origins of the classical system. On the basis of his measure, the English anti-Ricardians were not considered classical, while Malthus and Say were to be taken *cum grano salis*; and even Smith was accused of a few 'vulgar notions'.

Instead, the definition of 'neoclassical' system, which is due to the institutionalist Thorstein Veblen, was referred to the work of Marshall; then it widened to embrace the whole of modern orthodox theory. It is an independent definition from the Marxian one of classical economics. Marshall himself, moreover, wished to stress the continuity of a tradition which linked him to Mill and Smith without excluding Ricardo; and he endeavoured to ignore the considerable heterogeneity of Ricardian economics with respect to that tradition.

On the other hand, the anti-Ricardian character of the marginalist revolution was extremely clear to Jevons; and there is no doubt that, if the theoretical system that originated from the revolution had been named with reference to his work, it would have been called 'anti-classical' rather than 'neoclassical'.

Now, if Marshall had been correct in rejecting any element of discontinuity between the two theoretical systems, those modern historians who deny the existence of the marginalist revolution would also be right. The idea of these historians is that, on the Continent, marginalism can be traced back, with no substantial epistemological break, to the 'classical' traditions, such as that uniting Say to Bastiat, without excluding Dupuit and Cournot, in France, or that uniting Lotz and Soden to the 'German Manchester School', without excluding von Thünen and Gossen, in Germany, or finally that uniting Galiani to Ferrara, in Italy.

England, on the other hand, would be taken as a special case. Here a particular version of the classical system developed, in the form of Ricardianism, which in a certain sense would have justified Jevons's claims of making a revolution. But then, *ex post*, Marshall turned out to be right in his rejection of the idea of a qualitative jump. Paradoxically, with this interpretation Marshall is credited with leading England out of its insularity.

But things are not exactly like this. The true precursors and founders of marginalism were not completely integrated into the classical traditions, but instead were outcasts condemned to the edges of the academic circles which cultivated orthodox theories. This is just as true for England as for the Continent (with the exception of Italy), as demonstrated by the fact that not only Jevons identified the enemy in the 'noxious influence of the authority' of Smith, Ricardo, the two Mills etc., but also Walras violently attacked Smith,

Ricardo, and Mill, and when he showed a little appreciation for Say, he quickly raised some qualifications (opposite to those of Marx). And both Jevons and Walras were aware that, when they paid tribute to Senior and Gossen, they were dealing with heretics.

In reality, in the orthodox pre-marginalist economic theories, from Smith and Say to Mill and to the theorists of economic harmonies, classical economic thought had evolved while preserving intact the Smithian theoretical dualism. The methodology of aggregates remained anchored to an explanation of production and distribution based on the social classes, and to a theory of value based on the costs of production; whereas microeconomic methodology remained linked to a theory of the competitive equilibrium based on the rationality, in the utilitarian sense, of individual choices. The two approaches continued to develop together for almost a century after Smith, remaining intertwined in more or less awkward ways. Ricardo had made his revolution, trying to free the former from the latter. The marginalists did the opposite. Their revolution consisted in this: they freed microeconomics, understood as a theory of rational individual choices, from classical macroeconomics. It was a revolution not only against Ricardo, but against all that was present in a confused way in the work of the other classical economists and which Ricardo had tried to bring to light. In other words, the 'classical' tradition, of which the neoclassical system proposed itself as a continuation, basically consisted in that Benthamian component which was partially already present in Smith, and later taken up again by the anti-Ricardians and by Mill; a component that Marx, instead, on the ground of the Ricardian criticisms of Smith, had defined as 'vulgar', i.e. non-classical. It was against Marx's classical economics that the marginalists made a revolution, not against that of Mill.

So different is the neoclassical theoretical system from the classical one (in the Marxian sense) that the revolution even led to a modification in the name itself of economic science, which from 1879 (at least in the Anglo-Saxon world) began to be called 'economics' rather than 'political economy'. The new term had been used sporadically in the preceding forty years, but in 1877 and 1878 it even appeared in the titles of books by J. M. Sturtevant and by H. D. Macleod. Subsequently, Alfred and Mary Marshall and Jevons explicitly proposed it as a more serious and scientific substitute for the old term 'political economy'.

Jevons dealt with this matter in the second edition (1879) of his *Theory of Political Economy*. His proposal to substitute economics for political economy was motivated by an economic reason, one could say: one word is better than two. Later, however, phrases slipped out which reveal an inferiority complex, or spirit of emulation, in relation to mathematics. On the other hand, Jevons felt it was important to make it clear that his aspiration was to give a new name to 'a science that almost a century ago was known to French economists as *science économique*' (p. 18).

Marshall had much clearer ideas on this point. In *The Economics of Industry* (1879), written in collaboration with his wife, Mary, he explained his motivations for the change of name by putting forward the view that economics has nothing to do with political bodies and particular political interests. These are in fact two different motivations: one explicit, concerned with avoiding confusing the science with vested interests; the other implicit, but deeper, which was only later to emerge clearly, as the neoclassical system began to differentiate itself from the classical system: to avoid relating the science to 'political' or 'collective' bodies. This second reason turned into the refusal to recognize the behaviour of collective economic agents as the subject of study of economics.

As already mentioned, the study of collective agents was precisely the feature adopted by the mercantilists to found their science: no longer (domestic) economy, but *political economy*; no longer the administration of the household, but that of the State; no longer the study of the causes of the enrichment of the individuals, but that of the nation, the people, and the merchant class. It is significant that, by rejecting the 'political' nature of economics, the neoclassical economists were once more conceiving of this science as one that has to do with the *domestic* economy. In fact, it still deals with the maximization of the welfare of the household, or of the profits of the firm, which are, in fact, individual economic agents.

5.1.4. *The reasons for success*

Another problem the marginalist revolution poses to the historians of economic thought concerns the reasons why it occurred at that historical moment. Why not at the time of Senior, Longfield, Dupuit, Cournot, and von Thünen? And why did Jevons, Menger, and Walras not remain ingenious heretics at the edges of the academic world, as seemed to be occurring in the ten years after the publication of their works? Why was there, in the 1880s, a second generation of marginalists who gave that heresy the power of a revolutionary wave? The correct way to pose the problem of the historical sense of the marginalist revolution seems to be this: it is not the problem of finding the reasons why the fundamental works of the three great neoclassical economists were published in the early 1870s, but rather of understanding why, in a period of a few years, the message contained in those works was accepted as the 'New Testament' by the majority of the economists who counted. It is possible, with some simplification, to put forward two kinds of reason: one 'internal', the other 'external'.

The first concerns the inability of the classical orthodoxy to solve a series of theoretical problems. The labour theory of value had never been watertight, and the Ricardians' attempts to escape from the difficulties with a theory of the cost of production had only made matters worse, inducing Mill to open cracks which the marginalists had no difficulty penetrating with their

corrosive criticisms. But here, generalizations were more damaging than criticisms. For example, Jevons argued that the cases of joint production, which Mill considered to be exceptions to the theory of value based on the cost of production, in fact constituted the general case. Marshall, instead, had tried to generalize the case of the goods whose production could not be increased without an increase in cost. The labour theory of value, by this time, was really only defended by Marx. Marx's version of the theory was in fact rather refined, but this did not avoid some broadsides from the neoclassical economists, as we will see later. And the weak defence set up by the Marxists (such as Hilferding) served only to discredit the theory finally, so that it lost any residue of scientific decorum.

Furthermore, the classical economists had not managed to produce a satisfactory theory of income distribution. This was a serious flaw, as the theory of distribution made up the core of the classical economic theory. The principal difficulty concerned the theory of wages, on which the whole structure was built. Once the argument is discarded that wages are forced down to the subsistence level through the operation of Malthus' population mechanism, the whole theory collapses. This was precisely one of Jevons's criticisms. On the other hand, the road taken by the Ricardians to escape from this difficulty was the theory of the wages fund, and this was even weaker and less defensible than Ricardo's own theory. It was again Jevons and Walras who put salt in the wound, by showing that the theory of the wages fund was tautological (in the best of cases) and logically inconsistent (in the worst, which were, in fact, the most widespread interpretations).

But all this is not enough to explain the success of the marginalist revolution and its rapid conquest of hegemony. The 'external' reasons are perhaps even more important than the internal ones. For some time, the Ricardian theory had been used for critical purposes by the socialist economists. In particular, the theory of surplus had been used as a foundation for a theory of capitalist exploitation. We have already mentioned that in the 1830s the 'anti-Ricardian' economists had been motivated, in their criticism of Ricardianism, by their intention to attack socialist theories. Forty years later, things were still the same. Jevons had little difficulty in linking himself to the English anti-Ricardian tradition. Walras was even more explicit when, in regard to the theory of interest, he noted: 'It has been a favourite target for socialists; and the answer which economists have given to these attacks has not, up to the present, been overwhelmingly convincing' (p. 422).

From the 1870s onwards, theoretical socialism rapidly tended to identify itself with Marxism, and unhesitatingly advanced strong claims to be a scientific theory. It was exactly against such claims that some of the second- and third-generation marginalists launched their attacks. We will limit ourselves here to mentioning the powerful 'Jevonian' attack that Wicksteed brought to bear on the Marxian theory of value in '*Das Kapital: A Criticism*', and the even harsher one attempted by Böhn-Bawerk, which we will consider in next

chapter. But in 1893 Pareto was already looking at the matter with more 'detachment', convinced that 'the criticism of Karl Marx no longer needed to be made', as it was by that time implicit 'in the improvements brought by political economy to the theory of value' (p. 141).

In order that the criticisms of socialism, and of Marxism in particular, should not seem too ideological, it was necessary to focus on their analytic bases. But these were the same as those of classical economic theory. It was necessary, therefore, to 're-invent' economic science, reconstructing it on a foundation which would allow the deletion of the concepts themselves of 'social class', 'labour power', 'capitalism', 'exploitation', 'surplus', etc. from the body of the science. The theory of marginal utility provided the solution. Moreover, it seemed that it would permit the demonstration that an almost perfect kind of social organization would be realized in a competitive economy; a kind of organization in which the market rules would allow an optimum allocation to be reached and, with it, the harmony of interests and the maximization of individual objectives.

On the other hand, the resumption of a sharp and endemic social conflict made academic communities and political and cultural circles particularly receptive to the new theory. The first Workers' International was inaugurated in London in 1864, held its most important congresses in various European capitals between 1866 and 1872, and disbanded in Philadelphia in 1876. But then, in 1889 the 2nd International was founded in Paris, and this was much more fearsome and strongly influenced by Marxism. These aggregation processes of the revolutionary organizations were driven along by the powerful resumption of the workers' struggle in all the advanced capitalist countries. The period from 1868 until the mid-1870s was characterized by sharp conflict, almost as if all the repressed anger of the preceding twenty years of peace had exploded at the same time. The Paris Commune was only the tip of the iceberg of a movement which was much more widespread and longer lasting. And the violent repressions which followed these international explosions (1872-3 in France, 1873-4 in Great Britain and Germany, 1877 in the USA and Italy) had only temporary effects. The conflict began to manifest itself again, in more or less acute forms, during the 1880s, and continued for about half the following decade.

There is thus no doubt that, when Jevons, Menger, and Walras presented a theory capable of averting attention completely from unpleasant problems, they were launching onto the market exactly the theory that was demanded. In the 1880s and 1890s, that demand was so strong that no marginalist economist had to worry about remaining on the edges of the cultural and academic worlds. A strange but eloquent fact is worth noting here. Gossen's 1854 book, which had anticipated many of the results of the marginalist revolution, had been a total publishing failure. Gossen died in 1858 with no glory. But 30 years later, a discerning Berlin publisher reprinted the book with a brief preface and a new date: 1889. It was an extraordinary success. Another curious insight,

which, if nothing else, tells us a great deal about the state of mind with which the marginalists set about constructing a value-free science, was given in a letter from Auguste Walras to his son Léon on 6 February 1859:

One thing which I find most satisfying about your work plan, and with which I am in complete agreement, is your decision to keep within the most inoffensive limits with regards to proprietors. It is a wise decision and easy enough to implement. One should dedicate oneself to political economy as one would to the science of acoustics or mechanics. (quoted in Leroy, *Auguste Walras*, p. 289)

Finally, it is worth observing that marginalism, while presenting itself as an alternative to the classical approach at the level of economic theory, preserved the basic philosophy of the latter on at least one essential question. Jevons, Menger, and Walras, and the vast majority of the marginalists of the following generations, were fervent supporters of *laissez-faire*. Certainly, while classical *laissez-faire* had focused on the problem of accumulation, neoclassical *laissez-faire* was orientated more towards the problem of allocative efficiency. The most advanced capitalist countries had by this time solved the problem of industrial take-off, so that the needs of accumulation were no longer felt in the terms in which they had been perceived by Smith. On the other hand, the 1870s and 1880s were marked by the ‘Great Depression’, the first great demonstration of the inability of capitalism to defeat the anarchy of the market. We should not be surprised, therefore, by the great success of a theory proving that the market, far from being anarchical, is the best allocator of resources, and that, if things do not work well, it is precisely because the ‘workers’ coalitions’ hinder the functioning of the market.

5.2. William Stanley Jevons

5.2.1. *Logical calculus in economics*

In 1874, after many years of work, Jevons published *The Principles of Science*, a powerful treatise on formal logic and scientific method destined to replace J. S. Mill’s *System of Logic* (1843), a work Jevons attacked as ‘an extraordinary tissue of self-contradictions’. Even though, in the *Principles*, Jevons did not intend to concern himself with the applications to the social sciences, the ideas, and above all the logical-analytical tools, that he developed there constituted the spool around which the whole of his economic works are wound. It is possible, therefore, to read in the *Theory* that economics belongs to the class of sciences which ‘*besides being logical, are also mathematical*’ (p. 80), and that ‘*our science must be mathematical simply because it deals with quantities*’ (p. 78).

In the field of economics, Jevons explicitly linked himself to Bentham. He wrote in the preface of the *Theory* that Bentham’s ideas were ‘the starting

point of the theory given in this work' (p. 44) and later: 'In this work I have attempted to treat economy as a calculus of pleasure and pain, and I have sketched out . . . the form which the science . . . must ultimately take' (p. 44). These premises brought him to the conclusion that 'value depends entirely on utility' (p. 77), a point of view which is the opposite to that adopted by most of the classical authors. Here value stands for price. The starting-point for Jevons's analysis is the exchange process. Only two characteristics define individuals as economic agents: that subjects derive utility from the consumption of goods, and that the economic agent acts on the basis of a rational plan aiming at the maximization of utility. 'To satisfy our wants to the utmost with the least effort . . . in other words to *maximize pleasure*, is the problem of economics' (p. 101).

Jevons considered utility not as an intrinsic quality of an object but as the sum of pleasures its use allows. This meaning of 'utility' had begun to be fairly widely accepted quite a while before Jevons; it is even to be found in Bentham, who uses the term in the sense both of a physical and of a psychological attribute.

It is difficult to say whether Jevons, who had a deep knowledge of Bentham's works, was aware of this ambiguity; but it is a fact that, by giving an old term a new meaning, he contributed to the creation of a troublesome source of confusion. The confusion is particularly evident in the way in which Jevons faces the questions of the measurement and comparison of utility. On the one hand are assertions such as 'I see no means by which such comparison can be accomplished. . . . Every mind is thus inscrutable to every other mind, and no common denominator of feeling seems to be possible' (p. 85). On the other hand are several passages in which Jevons expresses the opposite view, that utility is a quantity which can be measured in a cardinal sense. We will see later which and how many problems were caused by this ambiguity.

Naturally, Jevons did not overlook production and the accumulation of capital; but when dealing with questions relating to these subjects he adopted the same conceptual apparatus and, above all, the same base orientation he had used for the theory of exchange. The essential element of his contribution to this subject is his special interpretation of the law of decreasing returns, an interpretation he put forward in his treatment of rent in Chapter 4 of the *Theory*.

In studying agricultural production, Ricardo had observed that on a given plot of land it is possible to employ alternative quantities of labour assisted by other inputs, agricultural equipment, fertilizers, and so on. Ricardo maintained that it was possible to vary the proportions in which land and 'assisted labour' (i.e. labour plus capital) are employed. In this way he reached the following law: the increases in production resulting from the use of successive doses of assisted labour on the same quantity of cultivated land will first increase and then decrease.

Jevons introduced two subtle changes into the usual interpretation of the law. First, he downgraded the distinction between the extensive and the intensive case, emphasizing the latter. The classical economists, who were rather more interested in the explanation of rent than that of the prices of goods, had focused more on the *extensive* case. The *intensive* case had also been considered by them, but not without reserve—for the simple reason that, while the different productivities of plots of different quality are directly observable, the marginal productivity of a dose of input implies a change in the situation to be observed, and therefore only represents a hypothetical increase in output.

Second, the shift of interest towards the intensive case also led to an important change in the method of analysis: the reasoning had to be undertaken in terms of hypothetical rather than observable changes, and this contributed to giving credit to the thesis of symmetry between land and the other inputs. Two notable consequences were derived from this thesis:

- (1) The substitutability between land and assisted labour was extended from agricultural production to all types of production, even to those with no direct input of land.
- (2) The substitutability was extended to all inputs, whereas for the classical economists the substitutability between land and assisted labour presupposed a strict complementarity between labour and equipment.

A final point should be mentioned. Jevons dedicated a great deal of attention to the problems of economic policy and, in particular, to the questions of social policy. In his last book, *The State in Relation to Labour* (1882), and in the collection of articles published posthumously in 1883 with the title *Methods of Social Reform*, he expressly indicated the principles that, according to him, should have guided State intervention in the economy. It is not surprising, given his starting-point, that Jevons arrived at the conclusion that the natural state of a market economy is social harmony and not class conflict. ‘The supposed conflict between labour and capital is an illusion’, he wrote in *The State in Relation to Labour* (p. 98); and then, appealing to a rather unclear notion of ‘universal brotherhood’, added: ‘we ought not to look at such subjects from a class point of view, [since] in economics at any rate [we] should regard all men as brothers’ (p. 104). Jevons admitted that ‘workers are not the capitalists of themselves’ and that this increases the complexity of the problem, since the capitalists ‘come to represent a distinct interest’. However, he maintained that competition would resolve the possible conflict of interests between the two sides, as it would cause capital to be solely remunerated at the market rate of interest, while the worker would receive, in the last instance, only ‘the value that he has produced’.

Jevons’s attitude towards trade unions is interesting—a severely critical attitude but not thoroughly hostile. On the one hand, he approved of the

idea of trade unions acting as friendly societies in the search for better conditions for their own members; on the other, he fiercely opposed any attempt to fix wages by collective bargaining, because this would have destroyed the competitive mechanism. It was the acceptance of these two principles that led Jevons to the naïve conclusion that workers who wish to reduce their hours of work should also demand a lower wage.

Jevons obviously criticized the Ricardian theory of the inverse relationship between profits and wages as ‘radically fallacious’, wishing in this way to demolish the theoretical foundation of class struggle. The *Theory* is full of condemnations of Ricardo and Mill. For example: ‘that able but wrong-headed man, David Ricardo, shunted the car of economic science on to a wrong line—a line, however, on which it was further urged towards confusion by his equally able and wrong-headed admirer, John Stuart Mill’. On the other hand, the book is full of praise for Malthus, Say, Senior, and Bastiat.

5.2.2. *Wages and labour, interest and capital*

Jevons’s theory of the determination of the labour supply is also based on the utilitarian foundations of the theory of choice. This aspect of his analysis is one of his most notable achievements. And if it is true that it has contributed to placing Jevons in the top bracket of the ‘great’ figures of marginalism, it is also true that it has led to a certain undervaluation of his analyses of capital and interest, analyses which are often seen as a mere by-product of the ‘grand theory’ of choice. However, this opinion is, at least in part, unfounded.

The theory of the labour supply is based on the assertion that labour, both manual and intellectual, is an ‘unpleasant’ activity for the individual, and is undertaken only because of the greater consumption it allows. This observation may hold a grain of truth, but even today it appears, to a disenchanted eye, anything but evident outside the utilitarian framework in which it was conceived.

In Jevons’s theory, the sign of the marginal utility of labour is very clear: work gives *disutility* or negative utility, and in particular a disutility increasing with the amount of labour supplied. Jevons added to this hypothesis another, equally strong one: the worker acts autonomously, works with his own means of production, and does not depend on the employer; which implies, among other things, that the amount of labour supply is perfectly divisible and not subject to discrete changes, as is the case with dependent labour, where a contract normally fixes the hours of work. The hypothesis of perfect divisibility is essential for the application of marginal calculus, which requires infinitesimal increases of the quantities. Well aware of the ‘power’ and the limits of his hypotheses, Jevons distinguished between the subjective productivity of labour, which is measured in terms of the ‘psychophysical potential’ used by the worker in his activity, and

the objective productivity, measured in terms of the hours worked. Obviously, the former allows for the *qualitative* differences of labour in terms of psycho-physical effort to be taken into account, but makes it impossible to measure them at an operational level; the latter, on the contrary, requires the qualitative *uniformity* of labour and has the advantage of measurability.

On the basis of these hypotheses, the application of marginal calculus produces the result that the quantity of work supplied is that for which the marginal benefit derived from the remuneration of labour equals its marginal disutility. The most interesting case is the one in which an individual is able to produce more than one good. Here it is necessary that the individual earns the same marginal benefit from each activity, and consequently that he receives the same marginal disutility from each of these. But this implies that, at least in the long run, individuals will tend to exchange goods according to a ratio equivalent to that of the marginal productivities. In the long run these should level themselves out, so that *all* the individuals who are working in a certain trade continue to do so. Such productivities must also be expressed in *subjective* terms. In this, the condition of equal marginal disutilities in the different occupations becomes an important link between the utilitarian theory of exchange and the theory of labour supply.

The mere *formal* reference to the rules of marginal calculus is not enough to make Jevons's theory a 'marginalist theory' in the deepest sense. It is known that the basic hypothesis under which marginal calculus is applicable to labour supply is that the level of utilization of all the factors of production other than labour is kept constant. Thus, it is necessary to clarify the role played by the other factors of production in Jevons's system. By doing this, one may discover that the widespread idea that Jevons's theory of capital is only a by-product of his theory of the labour supply is, in fact, unfounded.

Let us first consider the case of land, already mentioned in the previous section. Is it possible to determine rent as the remuneration of a productive activity, according to the marginalist principle, under the hypothesis of constancy of the level of utilization of the other factors? To be rigorous, the extensive case should be considered in which the amount of cultivated land is progressively increased. Jevons did deal with this case; but he focused more on the intensive case, in which the increasing amount of a given factor, labour, for example, is applied to a fixed plot of land. The intensive case represents a type of 'proof' of the theory of the labour supply, in that it constitutes an application of it.

Now, as long as land has no alternative uses, Jevons's theory works perfectly: the law of decreasing returns implies that labour will exhibit a decreasing productivity as a function of the intensity of its application. Since all labour is remunerated on the basis of the disutility of the last dose applied, a surplus will arise over the preceding doses, whose productivity is higher and disutility lower; and this surplus, to the degree to which the worker is also the landowner, is resolved in rent. In this way the theory

appears to be coherent with the preceding one: intensive rent is explained in terms of the productivity of labour. But what happens when land has at least one alternative use?

In this case, the rent becomes an element of the cost of production, and this is in obvious contrast with the view of Ricardo and the other classical economists. In fact, in the preface to the *Theory* Jevons wrote: 'but when land capable of yielding rent in agriculture is applied to some other purpose, the rent which it would have yielded is an element in the cost of production of the commodity which it is employed to produce' (p. 70).

In other words, the opportunity cost of the use of land becomes an essential element in the definition of rent, and with this the theory of the labour supply is no longer sufficient to explain the level of rent. Another 'piece' of theory is necessary, one which is independent of the theory of the labour supply. And here the theory of capital appears on the scene.

Jevons considered capital, *prima facie*, as an aggregate of heterogeneous goods evaluated in monetary terms. But he then endeavoured to reduce it to a real magnitude. On the basis of his observation that capital consists in the subsistence fund necessary to remunerate labour during the production process, he tried to measure it in terms of the amount of time the fund is tied up in production.

Adopting the simple capitalization formula, he assumed that labour is invested uniformly over time, in other words, that the same amount of labour, l , is employed each year. By assuming that the production process lasts n years and that the wage is equal to 1, the *amount of capital* can be defined, in this approach, as $L = ln$, which coincides with the amount of labour employed over the entire investment period.

On the other hand, an average period of investment is defined as.

$$T = \left(\sum_{t=1}^n t \right) / n = (n + 1)/2.$$

If, for example, the production process lasts $n = 4$ years, the average investment period is:

$$T = (1 + 2 + 3 + 4)/4 = (4 + 1)/2 = 2,5.$$

Jevons then calculated the *investment amount*, K , by multiplying the amount of capital by the average investment period

$$K = LT = L(n + 1)/2.$$

He held that it is possible to increase production by increasing the amount of the investment, or by extending its average period. This is the first appearance of the concept of the marginal productivity of capital which was later taken up again by the Austrian school.

The ‘beauty’ of the concept is that capital is reduced to a homogeneous quantity measurable in terms of units of time. The production factor called ‘capital’ is reduced to the ‘time’ factor. In equilibrium, the interest rate, r , will coincide with the marginal productivity of capital and can be considered as the ‘just’ remuneration for the productive contribution of time. The reverse side of the coin is that this theory is valid only in the hypothesis of simple capitalization. If the compound capitalization formula is applied, as is correct in a capitalist economy, the amount of capital resulting from investing l units of labour n years ago is:

$$C = l \sum_{t=1}^n (1+r)^t,$$

and cannot be considered independent of the interest rate. We could no longer refer to the marginal productivity of capital as a simple expression of the physical contribution to production of the time factor.

Jevons had perceived the existence of this problem, but was unable to arrive at the inevitable theoretical consequences, of which the most important is that the marginal productivity of capital cannot be determined independently of the interest rate, so that this cannot be accounted for as remuneration for the physical productive contribution of capital. Almost a century was to pass before economists came to accept this conclusion. The problem was finally solved only in the debate on capital theory in the ‘sixties of the following century.

5.2.3. *English historical economics*

The disintegration of classical political economy in the 1870s and 1880s is demonstrated by the fact that the marginalist criticisms of it were not isolated. In this period an increasing number of economists attacked the classical theoretical system, and this gave rise to a multiplicity of alternative theoretical directions: the socialists (of which we should remember, besides Marxism, Fabianism in England, ‘agrarian socialism’ in America, the ‘Christian socialists’ and ‘chair socialists’ in Germany), the institutionalists, and the historicists. Here we will focus on the last group. We will discuss Schmoller and the ‘young German Historical School’ later, when we will also show that the historicist polemic against Menger implied an attack on political economy *tout court*, rather than on the specific marginalist theoretical system. It was to economic science in general that the historicists attributed the vices of ahistoricity, deductiveness, abstraction, and one-sidedness.

It is interesting to note that in this period a similar attack was also taking place in England, the home of classical orthodoxy. The English historicists

were less involved *en philosophe* than the Germans, but their criticisms were no less profound or radical. Strongly influenced by the Comtian idea of a unified social science, the English historical critics not only produced an excellent critical-methodological literature, but also opened up interesting avenues towards other fields of social research, especially sociology and economic history. We have already mentioned Richard Jones, a historicist who was a contemporary of Ricardo. Here we will consider the three most important English historicists of the following generation: Thomas Edward Cliffe Leslie, John Kells Ingram, and William Cunningham.

Leslie greatly appreciated Smith's use of the inductive method; however, he denied the universality of the so-called 'natural laws'. He also criticized the tendency to base economics on the simple assumption that individual behaviour is solely motivated by the thirst for wealth. Finally, he argued, acutely, that the whole of classical political economy presupposed two badly understood, yet fundamental, hypotheses: those known today as the hypotheses of complete information and perfect foresight. The validity of the classical arguments with regard to the uniformity of the rates of wages and profits, and therefore the validity of their theory of natural prices, are based on these hypotheses.

Turning to Ingram, he had argued that classical political economy was based on a type of abstract reasoning that completely ignores reality, as well as on an incorrect deductive method. Deduction, according to him, should be used only to check the results of induction and not to produce general theories from arbitrary assumptions. If they had used the correct method, the classical economists would have realized that their theories were valid only for a specific historical period.

Cunningham's criticisms of Marshall also took this direction. It is worth mentioning them here because they show a change of target from classical political economy to neoclassical economics. Obviously, the latter was much more deserving of historicist criticism than was the science of Smith and Mill. Cunningham simply accused Marshall of using economic history in an incorrect way: not for acquiring knowledge by observing facts, but only for surreptitiously confirming truths obtained in a speculative way from a *priori* *premiss*.

5.3. Léon Walras

5.3.1. *Walras's vision of the working of the economic system*

The major contribution of Léon Walras to economic analysis was his theory of the general economic equilibrium. Although the theme of the relationships among different markets had been studied by preceding economists, no one before Walras had managed to construct a general theoretical structure

capable of accounting for the multiplicity of relationships linking one market to another. The actual operation of the forces of supply and demand in one market depend on the prices established in several other markets. This is why a general analysis is necessary.

The markets must be interrelated so as to make the choices of all the economic subjects compatible. A subject who is unable to achieve the goal of maximizing his satisfaction will have excess demands for some goods and excess supplies for others. By means of exchange, the individual will use the excess supplies to eliminate the excess demands. A state of general economic equilibrium is one in which the prices are such as to allow all individuals to maximize simultaneously their own objectives, with excess demand vanishing.

The free play of competition leads to a distribution of the factors among the productions of the various goods so as to satisfy the consumers' demands. The scarcity of productive resources in respect to the demand for goods will decisively influence relative prices. Walras rejected the classical, and especially the Ricardian, distinction between scarce and reproducible goods. He stated in the *Elements of Pure Economics*:

There are no products which can be multiplied without limit. All things which form part of social wealth . . . exist only in limited quantities . . . In the production of some things like fruit, wild animals, surface ores and mineral waters, land-services play the predominant part. In the production of other things like legal and medical services, professors' lectures, songs and dances, labour preponderates. In the production of most things, however, land-services, labour and capital services are found together. It follows, therefore, that all things constituting social wealth consist of land or personal faculties. Now Mill admits that land exists in limited quantities only. If that is also true of human faculties, how can products be multiplied without limit? (p. 399)

This passage, which is important for an understanding of the neoclassical concept of scarcity, shows a serious misunderstanding of the classical theory. In fact, Ricardo maintained that it is the single good that can be reproduced without limits, not the total of goods. The structure of the means of production, in other words, can be modified to produce any combination of products provided there is freedom of entry in all industries. Competition, intended as *a process* unfolding through time and not as a static situation in which the amount of each factor is fixed and unchangeable, will induce the capitalists to transfer their own capital from the sectors in which the rate of profit is low to those in which it is high. In this way the structure of supply will adjust to that of demand, while the quantities of capital goods will tend to settle at levels that guarantee a uniform profit rate.

In Walras's conception, the economy is made up of a plurality of agents who are present on the market either as consumers or as suppliers of productive services or as entrepreneurs. The economic process originates from the meeting, in the market, of these various agents. The productive services

are transformed into goods which are bought, either by other entrepreneurs, who need them for productive uses, or by the final consumers. The latter, who have supplied the productive services to the entrepreneurs, buy produced goods from them by spending the income received in return for their productive services.

Clearly, there is no place in this model for the notion of social class. On the contrary, there are just two groups of individuals: the consumers and the entrepreneurs, distinguished solely by the different decisions they are called upon to take. The consumers decide on the composition and the level of consumption, and therefore on the level of savings; the entrepreneurs decide on the level and the composition of production and investment. The consumers' decisions do not depend on the type of income they receive, but only on the amount. The fact that an individual derives 80 per cent of his income from labour and 20 per cent from capital, or vice versa, makes no difference at all. There being no link between income categories and expenditure patterns, the links between wages and profits, on the one hand, and consumption and investment, on the other, are also cut.

At the beginning of each period, let us say one year, the economy has an initial endowment made up of a certain quantity of goods and resources, including natural resources and the goods produced in the preceding period. Each agent owns a certain quantity of goods and services: as a worker he can offer a certain number of working hours, whilst as an entrepreneur he can supply services relating to the organization and control of the productive activity. Each agent tries to attain the best results from exchange. The consumers try, in the first place, to determine that division of their own income between consumption and savings which will provide them with the ratio of maximum satisfaction between present and future consumption. Second, they determine the way in which their consumable income is to be shared out in the purchasing of various goods so as to obtain the maximum utility. Those who supply productive services try to obtain the best balance between the income received in payment for these services and the sacrifice involved in their supply. Finally, the entrepreneurs try to attain the maximum profit from their own activity, by endeavouring to maximize the difference between the value of the goods produced and the costs sustained in producing them.

The pursuit of their own individual objectives 'obliges' the agents to enter into exchange relationships. Let us consider first the single consumer. A part of the goods and services he consumes certainly comes from the initial endowment, but a larger part must be bought on the market. In exchange for this, he gives up money (or another means of payment) which, in turn, he gets back by selling other goods and services to other consumers and other firms. Thus, the consumer's income depends on the quantity of goods and services he sells to others and the price at which he manages to sell them. If we overlook the exchanges among consumers, we can say that they supply factors to the firms (labour, capital, and entrepreneurial ability) and receive

in exchange an income which is either used to buy goods and services or stored as savings. The latter then returns to the firms through the activity of the financial intermediaries.

Let us now consider the firm. In order to fulfil its production plan, the firm uses, besides the reserves and stocks of fixed factors it already possesses at the beginning of the period, other inputs it buys from other firms and consumers. The output sold gives rise to revenues. The difference between revenues and costs represents the firm's profit, which is either distributed to the owners of the firm (i.e. to the savers-consumers) or used to buy new plant so as to increase the endowment in future periods. The total production of the system is obtained by summing the production of all the firms. Intermediate goods are clearly included in this amount. These are the goods produced by a firm and used by another. If the value of intermediate consumption is subtracted from the value of total production, the value of the final output (or the gross national product, in the terminology of national accounting) is obtained. Naturally, the value of the gross national product is equal to the value of the gross national income. In fact, if the value of the intermediate consumption is subtracted from the value of the production of the single firm, the result is the amount the firm has paid for the factors employed or, rather, the income earned from these factors. And, clearly, the sum of the incomes paid to the factors by all the firms gives us the overall income earned by all the factors.

The factors of production are the same as the stocks of goods, natural resources, and services that make up the initial endowment of the system. These are owned by the consumers or by the firms; but the firms are in turn owned by the consumers. This means that the consumers possess, directly or indirectly, all the factors, so that the final remunerations only go to them. If the profits of a firm are entirely distributed, and therefore are not stocked to provide for the needs of capital accumulation, the national income is the real purchasing power in the hands of the consumers.

5.3.2. *General economic equilibrium*

The central aim of Walras's theory is to show how the voluntary exchanges among individuals who are *well-informed* (each is perfectly aware of the terms of his own choices), *self-interested* (each thinks about himself), and *rational* (each tries to maximize his goals) will lead to an organization of the production and the distribution of income which is *efficient and mutually beneficial*. The peculiarity of the problem is this: that the sole form of social interaction which is admitted is that realized on the market by means of anonymous and impersonal exchanges. Neither trade unions nor pressure groups nor cartels nor other types of social groupings are allowed, as this would violate a fundamental requirement of the general-equilibrium model, that of perfect competition.

In order to account for the fact that the actions of the individual agents are co-ordinated on the market, it is necessary to demonstrate that prices exist that render advantageous to each individual precisely those activities and choices which satisfy his needs in an efficient way. This is why the theory of prices occupies a central position in the general-equilibrium system.

On the other hand, a complex relationship is established between the prices of goods and the prices of factors. The former contributes to determining the *demand* prices of the factors used to produce goods. From the comparison between the supply price and the demand price, the market price of a factor is obtained. This, in turn, influences the supply price of the product and therefore its market price. So there is a well-articulated set of relationships between prices and quantities exchanged in regard both to inputs and to outputs. This set of relationships is in a state of general equilibrium when the prices and the quantities are such that the maximum satisfaction each agent pursues by his own choices is compatible with the maximum satisfaction pursued by all the other agents. More precisely, an economy is in a *Walrasian competitive equilibrium* when there is a set of prices such that:

- (1) in each market the demand equals the supply;
- (2) each agent is able to buy and sell exactly what he planned to do;
- (3) all the firms and consumers are able to exchange precisely those quantities of goods which maximize, respectively, profits and utilities.

It is worth noting that, in order to obtain this result, it is only necessary to know, as initial data, the number of consumers, the number of firms, the initial endowments of resources, the consumers' preferences, and the techniques available. All the rest is left to the maximizing behaviour of the agents and to the competitive mechanism. In reality, however, two *dei ex machina* are necessary for the general equilibrium to be reached: the 'auctioneer' and the 'Sisyphus entrepreneur'.

The model of price-formation underlying Walras's theory of exchange is one of competitive bargaining. According to this model, markets are conceptualized as *auctions* (one is led to think of an old French-type stock exchange), in which there are, on the one hand, stockbrokers and, on the other, the auctioneer. At the beginning of the bargaining the auctioneer 'shouts' a price for each good and leaves the agents to formulate their buying and selling proposals. If, in correspondence to the shouted prices, the auctioneer notices that, for each good, the supply and demand are equal, he will declare bargaining closed, and that price vector will be the equilibrium vector. If this does not happen, the auctioneer will adjust the prices according to the rule: increasing the prices of goods in excess demand and decreasing the prices of goods in excess supply. This trial and error process, which Walras called *tâtonnement*, will continue until all excesses of supply and demand have been eliminated. At this point the auction ends; the final

quotations are registered as the equilibrium prices, and the supply and demand declared at such prices become binding contracts; exchanges are carried out on these terms. This is the single-agreed-price bargaining; the prices shouted by the auctioneer during the adjustment process are *virtual* prices; only the equilibrium ones are the prices at which exchanges actually take place. Such a peculiar way of describing the market process is crucial if one wants to reach a Walrasian general equilibrium. If, in fact, in the course of the process of convergence to equilibrium, the agents were allowed to exchange goods at disequilibrium prices, the individual's endowments would vary in continuation, and it would never be possible to reach a Walrasian equilibrium, which, by definition, refers to the given initial allocation of resources.

Walras was certainly aware of the strong structural differences between his model and a real market economy. His main objective was to construct a model of an ideal economy which could be used as a solid base for political applications. He knew that this objective would hardly be realized in an authentic market economy. However, he nurtured the hope that the latter could be reformed along the lines of the model.

Let us now turn to the 'Sisyphus entrepreneur'. Walras considered that a firm is in equilibrium when the profit is reduced to zero owing to the competition among entrepreneurs. In effect, in the Walrasian system there is only one category of maximizers: the consumers. The entrepreneurs, like the auctioneer, are mere co-ordinators who organize the productive activity, taking techniques and prices as given. The Walrasian entrepreneur buys the inputs at the prices fixed by the auctioneer, who looks after the adjustment process in the way described above. If the revenues are above the costs, the entrepreneur registers a profit. The existence of a profit or a loss is a sign of disequilibrium. The entrepreneur reacts to such a signal according to the rule: increase the scale of production when there is a profit and decrease it when there is a loss; 'Thus, in a state of equilibrium in production, entrepreneurs make neither profit nor loss', writes Walras (p. 225). Profit depends on exceptional circumstances; from a theoretical point of view it must be considered as a signal of disequilibrium.

Walras argued, therefore, that the choice to become an entrepreneur is purely accidental. The entrepreneur could be a capitalist who pays for the services of labour and land to the respective owners, keeping for himself a residue which is equal, in equilibrium, to the interest on the services given by his capital. Or he could be a worker who, after having paid for the services of the capital and land, obtains a residue equal, in equilibrium, to his wage. The same is true with a landowner who decides to become an entrepreneur. As profits are zero in equilibrium, the socioeconomic identity of the entrepreneur is completely irrelevant. 'They [the entrepreneurs] make their living not as entrepreneurs, but as land-owners, labourers and capitalists' (p. 225). As we will see, the absence of a theory of the entrepreneur in Walras's theory

induced Schumpeter to say that he had built a brilliant theory which however was incapable of dealing with reality.

Walras constructed a system of simultaneous equations to describe the interaction between consumers and sellers. There are as many markets as there are goods, including the productive factors and their services. For each market, three types of equation are defined: one for demand, one for supply, and one for equilibrium. In each market of produced goods, the number of demand equations is equal to the number of consumers, while the number of supply equations is equal to the number of firms producing the good. In each factor market, the number of demand equations is equal to the number of firms multiplied by the number of goods produced by each of them, while the number of supply equations equals the number of owners of the factors. Furthermore, the 'production equations' are defined in such a way that the price of each product is equal to its cost of production, so that in equilibrium the entrepreneurs make 'neither profits nor losses'. The costs of production depend on the input prices and the technique in use. The latter is represented by some technical coefficients, assumed fixed, which express the proportion in which each input is combined with the output. Then, in the 'capitalization equations', it is assumed that the purchase price of each capital good is equal to its 'net income' discounted at the current rate of interest. And this implies an equilibrium configuration in which the rates of returns of all capital goods are uniform and equal to the rate of interest. Finally, there is an equation that determines the rate of interest with the forces of supply and demand of the *new* capital goods.

Now, a necessary but not sufficient condition for such a system of equations to have a solution is that the number of unknowns is equal to the number of equations. This raises three orders of problems of which Walras was not perfectly aware. The first originates from the capitalization equations which—to the extent that they impose a uniform rate of return on capital goods, a purchase price equal to the production price, and the equality between supply and demand of each capital good—introduce into the model an over-determination of a degree equal to the number of production equations of the new capital goods minus one. It is possible to avoid this problem by renouncing the uniformity requirement for the rate of returns and by interpreting the model in terms of temporary equilibrium. We will discuss this further below.

The second order of problems originates from the fact that one of the equations in Walras's system functionally depends on the others, so that the number of independent equations is lower than the number of unknowns. Intuitively, the matter can be explained in the following terms. If there is equilibrium in all the markets except one, this means that consumers have spent a sum of money equal to the value of the goods offered. But,

given that the total value of the goods produced (the national product) equals by definition the total income earned by the consumers (the national income), there will also be equality between supply and demand in the last market. In 1942 Oscar Lange called this circumstance ‘Walras’s Law’: in a general equilibrium system, if all the markets, except one, are in equilibrium and the budgets of all the agents break even, then the remaining market must also be in equilibrium. This law is the ultimate consequence of the fact that, in the Walrasian conception of the economic system, the act of demanding goods on the part of an individual presupposes that he offers goods of equal value. But Walras did not grasp the mathematical implications of this fact.

Finally, we come to a third order of problems which is perhaps the most important. Walras did not take into account the fact that having ‘counted’ as many equations, even if independent, as there are unknowns is not enough to ensure the existence of a solution. A system of equations may have no solution at all, or may have many, even an infinity. Even in the case in which a solution exists, this may have no economic meaning, as would happen if some prices or some quantities were negative. Almost a century was to pass before the neoclassical economists managed to find the solution to this problem. We will see their results in Chapter 10.

5.3.3. *Walras and the articulation of economic science*

Walras’s impact on the evolution of economic theory has been enormous. No other economist before him had managed to construct a theoretical model and an analytical method which was so vast and versatile. Others, such as Quesnay and Cournot, had formulated the idea of interdependence among economic facts. But while Cournot maintained that the problem of general equilibrium was outside the scope of mathematics, Walras proved that, at least in principle, the problem could be resolved.

Notwithstanding this, his work passed almost unnoticed in France during the twenty-five years following its publication, and it was really only in the 1950s that the attitude of French scholars towards him began to change radically. But also outside France the reception of his work was, initially, somewhat cold, if not hostile. The relationships between Walras, on the one hand, and Jevons, Edgeworth, Wicksteed, and Menger, on the other, were certainly not the most cordial. Marshall, in his *Principles*, quoted Walras only three times and in brief passages. An exception should be made for the Italians; Pantaleoni, Barone, and especially Pareto held him in great respect, and were fervent propagandists of his work.

Walras, as Menger had done, always endeavoured to maintain a clear distinction between moral values and science. He believed that pure science had nothing to do with value judgements: ‘The distinguishing characteristic

of a science is the complete indifference to consequences, good or bad, with which it carries on the pursuit of pure truth' (p. 52). And Walras added, following Bentham: 'From other points of view the question of whether a drug is wanted by a doctor to cure a patient, or by a murderer to kill his family, is a very serious matter, but from our point of view, it is totally irrelevant. So far as we are concerned, the drug is useful in both cases, and may even be more so in the latter case than in the former' (p. 65). It is this radical dualism between technical and ethical judgements that was to dominate developments in economic thought.

Walras had always intended to write another two systematic treatises, one on applied and one on social economics, which would in some way have supplemented his fundamental work on pure theory. But the debilitating rhythm of work as professor in Lausanne, a position he had gained, not without difficulty, in 1870, absorbed all his energies until 1892, when he left teaching. After this, he contented himself with publishing two collections of papers, entitled *Études d'économie sociale* (1896) and *Études d'économie politique appliquée* (1898).

Walras was a close observer of contemporary economic problems, favouring moderate reformism in socioeconomic matters. His political position, which he derived from Kant's moral philosophy and the rationalism of his times, was a mixture of traditional liberalism and the doctrine of State intervention. It is interesting that, while in regard to questions of justice he was a convinced supporter of the natural-law approach, he completely expelled the notion of natural law from economics. He never believed that, beyond observable facts, there could be a structure of economic laws capable of mirroring some natural order. As we already know, Walras was a severe critic of the classical dichotomy between natural and market prices and of everything derived from that distinction. Finally, he believed that economic analysis could not have any intrinsic connection with the measures of economic policy; he always kept the normative and positive analyses clearly separated. Walras divided economics into three different fields: pure economics, which is based on the principle of truth, and concerned with the relationships among things; applied economics, which is based on the principle of utility and concerned with the relationships between persons and things; and social economics, which is based on the principle of justice and concerned with the relationships among persons.

Walras put forward numerous articulate recommendations for economic policy. His favourite subjects were the nationalization of natural monopolies, the stabilization of prices by the monetary authorities, the capital market, whose efficiency and reliability should be ensured by the State, and the acquisition of land by the State and its concession in use to private agents in order to increase government revenues. It is worth noting the curious fact that Walras considered himself a 'scientific socialist'.

5.4. Carl Menger

5.4.1. *The birth of the Austrian School and the Methodenstreit*

The label 'Austrian School' was used for the first time, with a clearly derogatory meaning, by opponents of Menger's ideas, especially the members of the German Historical School. The philosophical life of Austria in those times was still dominated by Aristotelian realism, a way of thinking which certainly must have appeared old-fashioned to people who had read Kant and Hegel. Nevertheless, it was precisely this Aristotelian background that allowed Menger to develop a theoretical perspective which the exasperated inductivism of his German contemporaries could not but reject *en bloc*. In fact, we owe to Aristotle the idea that there are qualities and facts, such as action and human nature, which can be understood on an a priori ground, and that it is possible to formulate 'laws' without any need to confirm them inductively. It was precisely by devoting himself to the search for the 'laws of the economy' that Menger set up, in opposition to Schmoller's German Historical School, the theoretical system of the Austrian School.

Of the three champions of the marginalist revolution, Menger was undoubtedly the most sophisticated and original, particularly on the subject of methodology. While for Jervons and Walras the main purpose of economic theory was the solution of the allocative problem, for Menger it was the study of the nature of human needs, taking into account the temporal dimension of decisions. In his correspondence with Walras, Menger explained why he considered mathematics not a useful instrument for the economist. From a methodological point of view he distinguished *understanding* from *knowledge*. The first aims to find out the reasons why things happen, the second to offer a mental representation of them. To understand economic phenomena it is necessary to go back to the motivational system of agents; to know them the axiomatic method suffices.

In his *Grundsätze* Menger endeavoured to reconstruct the foundations of economic science, intended as a pure theoretical discipline, so as to offer an alternative explanation of value and prices to that proposed by the classical school. If the classical economists considered value to be essentially governed by past costs, Menger considered it to be an expression of the judgement of the consumer in regard to the goods suitable to satisfy his needs. On the other hand, Menger's book and the way of doing economic science which prevailed in the German universities at that time were poles apart. Most of the German economists also criticized classical political economy, but the principal target of their criticism was method rather than content: the historical and not the theoretical approach should be followed in economics, and should be applied only to the description, classification, and collection of observed phenomena.

In the period in which Menger published the *Principles*, the 'Old' German Historical School, that of Roscher, Knies, and Hildebrand, was giving way to the 'Young' German Historical School, led by Gustav Schmoller. Menger thus had to fight on two rather different fronts: on the theoretical front, against the classical theoretical system, and on the methodological front, against the German Historical School. This is all-important in understanding Menger's complex scientific personality and, in particular, making sense of his concern for methodological matters—a concern not found either in Jevons or in Walras.

The results of Menger's battle on the second front are well known. The German economists virtually ignored the *Principles*. For about a decade after its publication, Menger remained an isolated thinker. It was not until the 1880s, with the enthusiastic work of Böhm-Bawerk and von Wieser, that a new school formed.

Gustav Schmoller was the most important economist of imperial Germany and a leader of the 'chair socialists'. As the leader of the Young Historical School, Schmoller was a tenacious opponent of the axiomatic-deductive approach of the classical and neoclassical schools. His research programme, which Schumpeter has defined as the '*Schmollerprogramm*', overtly proposed to follow the line of that German tradition which, with the Cameralists and subsequently with List and the members of the Old Historical School, had already tried to create the presuppositions for an alternative theoretical approach to economics—alternative both to classical and to neoclassical economics. The principal accusation levelled against all of them was that they did not take into account, in their theoretical formulations, any knowledge of historical facts and material. Schmoller, instead, was a supporter of an interdisciplinary approach which aimed at blending the psychological, sociological, and philosophical aspects of the economic problems. By means of detailed historical research on the formation of the social classes and on the history of the Strasbourg weavers' guilds, Schmoller tried to show how political economy had to be liberated from 'false abstractions' and anchored to solid empirical foundations. In particular, he wished to focus both on the general effects produced by the process of capitalist accumulation on social classes and relationships and on the effects of *laissez-faire* principles and policies on less wealthy people.

Schmoller's work, however, turned out to be rather lacking on the analytical ground; above all, it failed to reach its author's main objective: the formulation of a new way of doing economic theory. Schmoller's influence on the development of economic science in Germany was somewhat harmful, especially because it helped to isolate the German economists from the rest of the world for more than half a century. In fact, economists with different cultural orientations were not allowed to work in any of the German universities. This meant that the works of the new marginalist school were received by the German academic circles with almost complete silence.

This rejection of classical and marginalist theory had an immediate effect at the political level, where all approaches differing from economic historicism were silenced as '*Manchestertum*', that is to say, as orientations favourable both to the absolute liberty of economic initiative and to the progressive reduction of the role of the State.

Schmoller was a fervent supporter of enlightened and despotic sovereigns, especially the Prussian kings, whom he considered to be the only people able to defeat particularism and unify the national economy. Social reforms and distributive justice were central elements in his theoretical work. In all respects, Schmoller could be considered as a conservative in the specific Prussian sense of the term: he rejected Marxism and liberalism, but also the anti-reformist and reactionary positions, and went as far as proposing a strategic alliance between the monarchy and the working classes.

Menger's reaction to the German Historical School was harsh. The dispute between German and Austrian economists reached its climax in 1883 with the publication of Menger's *Untersuchungen über die Methode der Sozialwissenschaften und der politischen Oekonomie insbesondere*, which officially opened the bitter *Methodenstreit* (struggle over method) and brought the new-born Austrian School to the attention of the international scientific community. There were two principal arguments with which the Viennese economist defended himself from Schmoller's attacks. The first was that 'pure science' is always *wertfrei*, value-free. Economics, if it wishes to be science, must keep itself free of value judgements: 'The so-called "ethical orientation" of political economy is thus a vague postulate devoid of any deeper meaning in respect both to the theoretical and to the practical problems of the latter, a confusion in thought' (p. 237). Here Menger anticipated by a few decades the famous argument of the neutrality of economic science which was later to be 'codified' in the 1932 *Essay* by Robbins.

The second argument is that economics can only scientifically deal with the behaviour of individual agents, whether they are consumers or firms. It is not possible to speak, in a scientific way, of economic aggregates. There would be no space in economic science for macroeconomics and concepts such as national interests or collective wealth. To move from the idea that individual desires are the only criteria of good and bad to the argument that social welfare is promoted and encouraged by policies aiming at maximizing the total amount of pleasure would lead to serious logical and practical difficulties. Menger, unlike Bentham, correctly perceived the technical difficulties of the reformist policies based on utilitarian principles: 'the greatest welfare for the greatest number' is not compatible with *methodological individualism*, that is, with the view that all propositions about the behaviour of the collective agents must be reducible to propositions about the behaviour of their individual components. In this sense, methodological individualism is opposed to holism or methodological organicism (at that

time championed by the Historical School), according to which the properties of a system are not reducible to the properties of its elements. Not only the members of the Historical School but also the classical economists and Marx, *according to this point of view*, were supporters of methodological holism: they believed that it is impossible to understand the operation of the economic system on the grounds of a theory of the behaviour of the single agents.

5.4.2. *The centrality of the theory of marginal utility in Menger*

To understand the terms of Menger's theoretical battle on the other front, i.e. the critique of classical economics, the intricacies of the theory of marginal utility must be explored. Menger never dealt with questions regarding the nature and measurement of (cardinal) utility. For him the principle of decreasing marginal utility was simply a fact of evidence. His main theoretical problem was: under which conditions can the principle of marginal utility be considered as the foundation of the whole of economics? The answer for Menger must be: under the condition that this principle can be extended from the limited field of exchange to the more complex problems of production and distribution. In other words, it is not enough to explain how it is possible, beginning from a *given* quantity of consumer goods, distributed among individuals in a known way, that a set of exchanges is established which maximizes the utility of the subjects and determines the equilibrium prices. In order that the principle of marginal utility can form the basis of a general theory, it is necessary to extend its application to the phenomena of production and distribution. And this is where the difficulties arise.

In fact, while demand can be directly linked to its subjective determinant, which is utility, supply poses special problems. Supply is regulated by the costs that must be sustained to produce the various goods; but it seems that costs cannot be reduced to utility. The only way to preserve the *symmetry* between supply and demand would be to link costs to a certain homogeneous entity which is comparable to utility. Menger's specific contribution to economics is on this problem, and this is what distinguished him both from Jevons and from Walras.

With his theories of *imputation* and *opportunity cost*, Menger resolved costs into utility. His starting point was a classification of goods according to their distance from final consumption: the 'higher-order goods', or the 'factors of production', derive their utility from the goods of the 'first order' (consumer goods) they contribute to produce. This indirect utility can be *imputed* to each productive factor by taking into account the marginal contribution it makes to the production process. In this way the actual cost sustained to produce a certain good becomes an *opportunity cost*, namely, the cost represented by the sacrifice of utility of those other goods that could have been obtained from the resources actually used to produce the good in

question. The production costs are evaluated no longer in absolute but in relative terms, i.e. in terms of sacrificed alternatives.

In conclusion, the principle of marginal utility was extended by Menger to cover the cost phenomenon and therefore the conditions of supply; so, supply and demand appear to be two aspects of the same problem and can both be explained in terms of utility. But this is not all. Since what is a cost for the firm is an income for the owners of the productive factors, the same principle is capable of explaining both the cost phenomena and the formation and distribution of income. Wages, profits, and rents depend, ultimately, on the demand and the prices of the consumer goods and are therefore determined by utility. In this way the distribution of income ceases to be a separate chapter in economic theory, as it was in the classical approach, and just becomes a section, a part devoid of autonomy, of the chapter dealing with the theory of prices.

While the other versions of marginalism needed about two decades to establish that the theory of value based on marginal utility leads directly to the marginal-productivity theory of distribution, Menger reached this conclusion immediately. In particular, we owe to him the first expression of a proposition which was later to assume a central role in the debate on the neoclassical theory of distribution: if each factor receives the value of its productive contribution, the value of the total production will be perfectly 'exhausted' in the remuneration of the factors, and there will be no surplus that somebody can appropriate without having produced it. This was to be known later as the 'theorem of product exhaustion'. We will discuss it in the next chapter.

One final observation may be useful in understanding the basic difference between the neoclassical and classical theoretical system. Smith considered market exchange as a direct consequence of man's natural propensity to 'exchange one thing for another', and therefore an expression of freedom. Menger, on the other hand, held that exchanges pertain to the order of means. Since economic transactions are costly, individuals will enter into exchange relationships only after they have made *calculations* and found that the advantages outweigh the disadvantages.

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