In the course of Shackle’s *Years of High Theory* 1926 -1939 [– 1960] a twin revolution took place in economic theory, associated to the names of Maynard Keynes and Piero Sraffa. In this paper we deal with three issues related to this revolution. First, some remarks are made on the making and the nature of the Sraffian revolution. In the second place, the relation between the Sraffian and the Keynesian revolution is briefly dealt with. The third section is about the significance of Piero Sraffa for modern political economy. Before dealing with these three issues we make some general remarks related to Sraffa and his work.

**Piero Sraffa and his work**

There is no other writer in economic theory who so strongly concentrates on the bare essentials of an argument as Piero Sraffa does. Consequently, his literary style is extremely terse. This means that even important matters are left unspoken, which, in turn, signifies that implications are crucially important. In hindsight it is of course much easier to see these implications and their significance. Some of these implications Sraffa may have thought of, not so in the case of others. Intuitively, we think, however, that Sraffa was aware of all the important implications of his writings.

Two reasons account for Sraffa’s deep and comprehensive insights into the functioning of monetary production economies and his awareness of the deficiencies of the marginalist supply-and-demand approach already at the time when he wrote his 1925 and 1926 articles. First, his certainly excellent knowledge of economic theory and of the history of economic thought. Indeed, Sraffa had most prestigious teachers, Luigi Einaudi on matters of money and
Edwin Cannan on the classical theory of production and distribution; moreover, he had, quite naturally, in depth knowledge of general equilibrium theory (Walras/Pareto) and of Marshall’s partial equilibrium approach both of which figured prominently in economics curricula, in Italy and elsewhere. His graduate thesis, written under the direction of Luigi Einaudi, carries all the hallmarks of a top-level dissertation; for example, Sraffa here makes “the distinction between stabilisation of the internal and the external value of money, or in other words between stabilisation of the average level of domestic prices and stabilisation of the exchange rate. [This] distinction becomes essential both when considering short-term problems and inconvertible paper money systems; thus it was of crucial importance in the economic policy decision-making of the time [a distinction taken up by Keynes]”(Roncaglia 2000, p. 6).

Second, Sraffa also had excellent knowledge about economic practice in the real and in the monetary sector, banking most importantly (Roncaglia 2000, pp. 6/7); practices like cost and price calculation were probably familiar to him. As is very likely, he got top information on these matters on account of his family background.

Given this, Piero Sraffa was, very probably, already a mature economist in the mid-twenties, with his vision of the functioning of the economy and of the relationship of the economy with society and the state largely formed. Consequently, the 1925/26 articles and his subsequent work, his 1960 book most importantly, may be considered the analytical articulation of his vision, certainly decisively shaped by his extensive preoccupation with Ricardo from 1931 onwards, the year he started to work on the edition of Ricardo’s Works and Correspondence.

The scientific aim emerging from Sraffa’s vision is twofold: first, provide a fundamental criticism of marginalist demand and supply theory which had submerged the old classical theory and pushed it into oblivion; and, second, classical theory had to be rescued and to be put on secure foundations. This was an undertaking of frightening complexity, like climbing on a very difficult mountain, and, as it would turn out, with the path to reach the mountain peak being steep and full of obstacles. And, total intellectual loneliness was Sraffa’s permanent companion, but good friends and the fact of belonging to the community of a great Cambridge college helped him to overcome isolation. And the almost unbelievable tenacity that made him ultimately succeed cannot be but greatly admired. We have not the impression that doubt was a problem for him; his work on Ricardo from 1931 onwards must have given him great confidence.
As to his theoretical standpoint and the results Sraffa obtained we entirely agree with Luigi Pasinetti: “No doubt an evolution in Sraffa’s attitudes did take place in the course of his life, but – I am now convinced more than ever – *not in his basic thoughts and convictions*” (Pasinetti 2007, p. 191, our emphasis). And as to “his remarkable final results – it seems to me – point in a double direction: i) they can be used, without being accused of ideological prejudices, for a critique of marginal economic theory, as he explicitly states; but also: ii) they can provide a solid logical basis – the starting seed we might say – for a reconstruction of economic theory” (Pasinetti 2007, pp. 191-92). Fundamentally, he had reached the aims he had set himself.

However, looking at Sraffa’s work as a whole, we do not think that he *substantially* narrowed down his impressive research programme (Pasinetti 2007, pp. 178-191). Sraffa simply analytically articulated his vision. The problems he had to solve were so immense and, consequently, took so much time, that not everything could be achieved. The history part of the research programme had to be abandoned, and so was the critique of neoclassical theory. But the *most important* aim, the “solid logical basis […] for a reconstruction of economic theory” (Pasinetti 2007, p. 192) was fully achieved. The *critique* was carried out in the course of the Cambridge-Cambridge capital theory debate shortly after the publication of his (1960) book (Garegnani 1970, Harcourt 1972). As is well known, the debate ended with a total victory of the neo-Ricardians, Sraffa’s pupils. And a *history of economic theories* can only be written once a fully-fledged alternative to neoclassical-Walrasian economics has been worked out: the own standpoint has to be fully and comprehensively clarified. And here Sraffa certainly felt that the way to go was still very long indeed.

In fact, Sraffa provided the first, probably more important part of the twin revolution that took place during Shackle’s *Years of High Theory 1926-1939[-1960]*, that is, rescuing classical theory. But there was a second part of the revolution, Keynes’s. Although Sraffa (1926) has opened classical theory in the direction of Keynes (1936), a very deep cleavage remained between Keynes (1936) and Sraffa (1960) (King 2003, chapter 10), Keynes emphasising uncertainty, Sraffa determinism. It was Luigi Pasinetti who, in a life-long effort, has brought Keynes and Sraffa together on the level of principles resulting in a fundamental system of principles of classical-Keynesian political economy (Bortis 2011). Only when this new system of political economy has been systematically worked out in the form of *Treatise on Classical-Keynesian Political Economy*, for example, can a history of economic theories be written, in a classical-Keynesian perspective this time, not in a neoclassical-Walrasian view,
as did Schumpeter in his *History of Economic Analysis*. This Sraffa could impossibly accomplish, all the more so that he must have been exhausted after the tremendous effort made during the *Years of High Theory 1926-1939*[-1960], probably physically, and mentally to the extent that he did not feel able to tackle a new huge project, for example, undertaking a critique of neoclassical theory or even writing a history of economic theories.

From Bortis (2011) now emerges that the twin Keynes-Sraffa revolution produced in the *Years of High Theory* years was, in fact, a classical-Keynesian counterrevolution against the marginalist revolution 1870-1890 which submerged not only the classical approach to production, value and distribution, but, in fact, also the critique of Say’s Law undertaken by Keynes’s precursors, Malthus, Sismondi, Hobson, and others.

*The making and the essence of the Sraffian revolution*

The theoretical revolution in economic theory produced by Piero Sraffa starts in 1926 and is accomplished in 1960. This includes the shorter period 1926 – 39, which G.L.S. Shackle denotes the *Years of High Theory* (Shackle 1967) and credits Sraffa, aged 28, with opening the probably most important time-period in the whole of the history of economic theorising! Indeed, „[our] period opens with the Sraffian Manifesto of 1926 [The Laws of Returns under Competitive Conditions], demanding the revision of [Marshallian] value theory [which, finally, in 1960, resulted in a classical theory of production, value and distribution]. The other great traditional branch of economics is monetary theory, and our period sees it transformed by [Keynes into a general theory of output and employment, interest and money (1936), which, for the first time, convincingly challenged Say’s Law]” (Shackle 1967, p. 12). The time-period in question comes to an end with Roy Harrod’s 1939 article on growth theory, which exhibits the complete instability of the capitalist system due to the income effect of investment being much stronger than the capacity effect; hence if entrepreneurs invest too much, effective demand exceeds production and the producers think that they have not invested enough!

The nature of the Sraffian revolution exhibited by (Sraffa 1926 and 1960) is twofold, critical and constructive. The Sraffian contribution to the theoretical revolution of the *Years of High Theory* starts off with a critique of Marshall’s partial equilibrium price theory based on the law of supply and demand. Here we mention but two crucial points, first the fact, that, in the
real world, there is, fundamentally, monopolistic competition, implying that it is wrong to take perfect competition as a reference and starting point, and, second, that the supply curve is not upward sloping on account of increasing marginal costs, which, in the neoclassical view, would reflect increasing difficulties of production as productive capacities are more and more intensely utilised through increasing the input of scarce factors of production, labour in the main. Both points provide the starting point for ‘shunting the car of economic theory on an entirely new line’.

First, then, Sraffa attacks the model of perfect competition. Here the equilibrium price is determined on the market and is a datum for each firm. The good produced is homogeneous, there is perfect information, and so on. The upward sloping supply curve, in fact the marginal cost curve implies that the given resources, mainly direct and indirect labour in the short term, are ever more intensely utilised. Once marginal costs equal the given prices profits are maximised if the minimum of the average cost curve is situated below the price. This optimum condition implies that all firms produce a maximum output. This means that economic activity is resource determined. In a wider view, the problem of allocating the given resources in such a way that overall output is at a maximum level now emerges (the Pareto Optimum).

Sraffa now argues that the perfect competition model cannot come to grips with the real world. Each firm of some industry produces a product of its own, which is similar, but differs from products produced by other firms in the same industry or sector of production. Customers are not indifferent as to the firm the products of which they are buying. “The causes of the preference shown by any group of buyers from a particular firm are of the most diverse nature, and may range from long custom, personal acquaintance, confidence in the quality of the product, proximity, knowledge of particular requirements and the possibility of obtaining credit, to the reputation of a trade-mark, or sign, or a name with high traditions, or to such special features of modelling or design in the product as – without constituting it a distinct commodity intended for the satisfaction of particular needs – have for their principal purpose that of distinguishing it from the products of other firms”(Sraffa 1926, pp. 190-91). A very detailed and subtle knowledge of the real world emerges here, showing that the demand curve each single firm is faced with must be falling.

The falling demand curve for the individual firm is of paramount importance for economic theory. The theory of imperfect competition, including the struggle for market shares, starts off here. Moreover, implicit links with Keynes appear since the position of the demand curves
depends upon on the incomes of consumers and, as a consequence, on national income. The importance of this point becomes clearer by having a look at Sraffa’s attack on the neoclassical supply curve. This problem is related to the determination of the price, which is not yet known. Here some almost self-evident implications, not all explicitly brought out by Sraffa, emerge.

Sraffa starts by observing that “[business] men, who regard themselves subject to competitive conditions, would consider absurd the assertion that the limit to their production is to be found in the internal conditions of production in their firm, which do not permit of the production of a greater quantity without an increase in cost. The chief obstacle against which they have to contend when they want gradually to increase their production does not lie in the cost of production – which, indeed, generally favours them in that direction – but in the difficulty of selling the larger quantity of goods without reducing the price, or without having to face increased marketing expenditures” (Sraffa 1926, p. 189).

Indeed, “[everyday] expenditures shows that a very large number of undertakings – and the majority of those which produce manufactured consumers’ goods – work under conditions of individual diminishing costs. Almost any producer of such goods, if he could rely upon the market in which he sells his products being prepared to take any quantity of them from him at the current price, without any trouble on his part except that of producing them, would extend his business enormously” (Sraffa 1926, p. 189).

Now, the diminishing costs Sraffa mentions here are obviously average total costs, and this type of costs declines because average fixed costs diminish if the quantity produced expands. This also implies that average variable costs and marginal costs are, in the short term, constant up to normal capacity utilisation as firms increase production. Moreover, it is a well-known fact that total cost curves up to capacity utilisation are linear, implying constant marginal and average prime costs, a fact that has been empirically confirmed. (In the long run, however, all types of costs, and the prices established on the basis of these costs, might be declining on account of technical progress or due to economies of scale, with which Sraffa could have dealt without problems had the necessity arisen.)

Now, what are the reasons for marginal or average variable costs to remain constant as production increases? Several instances are implied in Sraffa’s 1926 paper: direct wage costs do no change; wages are in fact fixed by contract. Moreover, labour is not scarce; hence wages will not increase when output increases even in the economy as a whole: the number of jobless may be reduced, and some workers are mobile. The prices of intermediaries bought
from other enterprises do not change either as output changes as the capacity utilisation of the firm which deliver intermediaries may adjust; stocks and delivery periods may change; intermediaries may be imported. However, all these instances may be valid in the short term, eventually in the medium term, but not permanently.

But there is one causal factor acting permanently to keep the prices of intermediaries and, most importantly, wages constant: output, as governed by demand, is given; indeed, if the position of the demand curve, governed by the given income of all consumers, is given for each firm, then aggregate demand for consumption goods is also determined. If in such a situation one or several successful firms manage to sell more, that is, to expand production, then sales and output will shrink with failing enterprises. Aggregate output will remain constant and the factor of production ultimately governing output, labour to wit, cannot become scarce as is implied with Marshall’s rising marginal cost curve.

A further step perfectly compatible with Sraffa’s analysis of marginal costs and its implications concerns pricing. With the marginal and average variable (prime) costs constant until normal capacity utilisation, a mark-up can now be made on these costs at normal capacity utilisation such that the price so calculated covers fixed costs and ensures that a normal rate of profits is realised. This is the way followed by several theoretical economists, Kahn, Kalecki, Weintraub for instance, which, in fact, exhibits current business practice.

Hence, Sraffa (1926) could have provided the micro-foundations for Keynes’s General Theory, and, given this, many misunderstandings and wrong interpretations of Keynes could have been avoided, a point noted by many post Keynesians and neo-Ricardians (see, for example, Pasinetti 2007, p. 167). We shall come back to this issue in the second section, which is about links between the Sraffian and the Keynesian revolution.

However, Sraffa did not go on in this seemingly most promising direction. He was after far bigger game. He realised that there were problems with Marshall’s partial equilibrium approach. The primary and intermediate goods delivered to firms had prices and contained profit rates on the capital put to use in the process of production; capital goods, in turn, were also produced and contained a profit rate. How could these problems, value and distribution, be solved within François Quesnay’s social and circular process of production which presumably had to be generalised somehow? It will be argued later that the problem Sraffa was facing, constituted the most intricate conundrum in the entire field of economic theory: the problem was no less than to demystify the mysterious process, given by the “one-way
avenue that leads from ‘Factors of production’ to ‘Consumption goods’ [final output]” (Sraffa 1960, p. 93).

Sraffa started to write down equations of production between 1928 and 1931, but did not get very far (Pasinetti 2007, pp. 183). These years in which he made his first attempts to articulate his vision – establish a classical theory of production, value and distribution – must have been the most difficult in his life. Pasinetti writes on this: “In fact he had already tried to formulate his theory in terms of ‘equations’ as early as in 1928. He had even shown such equations to Keynes [as is mentioned in the Preface to his 1960 book]. But in the late 1920s he had barely been able to go beyond the ‘equations without a surplus’” (Pasinetti 2007, p. 183). So in a way Sraffa had got stuck. Given this, there was the real possibility that his whole enterprise could have failed, if Keynes, who possibly realised Sraffa’s difficult situation, had not provided him with a new huge task: to edit the *Works and Correspondence of David Ricardo*.

Luigi Pasinetti remarks on this: “The sheer fact of being compelled to lecture [in 1928-31 on the advanced theory of value] stimulates Sraffa’s mind to the limit of endurance. One can see from his critical notes that he goes in depth, he goes into analysis, he goes into extension. Never does one find him going towards a synthesis. […] Criticisms add themselves to criticisms and to the critique of criticisms.

It is a fact that, at a certain point, even delivering his already written-up lectures becomes for him an excruciating experience. It must indeed have become a hard task for him to guard himself from frustration.

We can infer that Keynes’s intuition was sharp enough to realise that Sraffa was in a serious predicament, without perhaps understanding clearly the basic source and wide extent of his drama. In any case, Keynes is sufficiently impressed to become convinced that in some way somebody or something should come to the rescue. Thus Keynes manages to convince Professor T.E. Gregory of LSE to withdraw from his already signed-up agreement with the Royal Economic Society to collect and edit the works and correspondence of David Ricardo. The contract is transferred from Gregory to Sraffa. A real blessing. God knows what Sraffa would have done otherwise” (Pasinetti 2007, p. 182).

It is highly likely that editing Ricardo has not been a loss of time for Sraffa, but an essential precondition for him to succeed in his task through getting deeply acquainted with the fundamentals of classical political economy through Ricardo’s *Principles*, the first logically impeccable exposition of principles in this field. Indeed, after ten years work on Ricardo, in
“1941-1944 he really makes a breakthrough. With the advice, not always followed and actually sometimes disputed, of Abram Besicovitch, he succeeds in formulating correctly the equations with a surplus and with labour explicitly introduced, while discovering the notions of a maximum rate of profit independent of prices, of basics and non-basics, and of the ‘Standard System’” (Pasinetti 2007, p. 183). The influence of Ricardo is evident in the distinction between basics and non-basics, the necessaries and luxuries of the old classical economists.

After having completed the edition of Ricardo’s Works and Correspondence in 1955, Sraffa could now turn to his book planned already in 1928. It came out in 1960 as Production of Commodities by Means of Commodities. For the first time, the great classical problems of value and distribution, are solved in a logically impeccable way within the social and circular process of production, implying unequal conditions of production between the various industries. This is a gigantic achievement in itself, but also with respect to various intricate problems that have been solved on the way, so to say. Pasinetti states on this: “The classical theories had been abandoned at a certain stage because a few basic concepts on which they were built seemed to contain deficiencies, ambiguities and even contradictions. Sraffa’s contribution consists precisely in dispelling [all] those deficiencies, ambiguities and contradictions” (Pasinetti 2007, p. 143).

Let us first assess Sraffa’s gigantic achievement, that is, having solved the problems of value and distribution within the social and circular process of production, implying unequal conditions of production between the various sectors. This achievement can be assessed best by comparing it with Walras’s performance. Walras’s problem was relatively simple, and could easily be dealt with mathematically; he in fact dealt with the – optimising - behaviour of individuals, meeting on the market place. All variables, prices and quantities were independent of each other, rendering thus easy mathematical treatment; the optimising behaviour, under constraints, of individuals had to be formulated, giving rise to relations and equilibrium equations, which had to be equal to the number of unknowns, prices and quantities to wit. Sraffa, however, was faced with something objectively given, the social and circular process of production, which, in a way, represents a structured entity; there are complementarities and interdependencies; moreover, inputs had to be the same as outputs, which made sense with basic products only. Once the problems of value and distribution was solved on the level of basics, it was solved for the economy as a whole, since the net outputs of basics constitute inputs for all intermediate and final goods produced in an economy and
govern, as such, a given economic activity and determine the prices of intermediate and final goods, with the rate of profits being uniform in all industries and sectors, the replacement of used up means of production secured, and national income divided into wage and profit incomes. Once Sraffa’s problem is solved, everything looks relatively simple. It is like the number zero and its implications: once it is there, all calculations – additions, multiplications, and so on – are very simple and easy to handle. But imagining the number zero had not yet been discovered makes us clear that its discovery represents one of the greatest performances of the human mind. In analogy, the solution to Sraffa’s conundrum – determine value and distribution within the social and circular process of production, and all the implications alluded to in Sraffa’s 1960 book – represents by far the greatest performance in the entire history of economic theory. The mysterious avenue leading from factors of production to final output was demystified.

Let us next look at the “deficiencies, ambiguities and even contradictions of classical theory” (Pasinetti 2007, p. 143) solved by Sraffa. First, Sraffa shows that the labour theory of value is mistaken. The prices of production are not proportional to labour values if there is a uniform rate of profits. However, Sraffa’s work implies that the labour principle of value continues to hold. Quantities of direct and indirect labour may be considered the essence of prices; Bortis (2003) – Keynes and the Classics is based on this consideration: labour values and prices of production are not exclusive, but intimately linked and hence complementary; and labour values can be transformed into prices of production whenever the necessity arises, and of course vice versa (Pasinetti 1977, appendix to chapter V). Both are valid at different levels of abstraction. In fact, the labour values are essential or constitutive to prices, and the prices of production bring them into concrete existence though in modified form.

Probably, Sraffa had taken for granted this point; indeed in the introduction to Ricardo’s Principles he writes (quoting from a letter of Ricardo to James Mill): “[…] I maintain that it is not because of this division into profits and wages, - it is not because capital accumulates, that exchangeable value varies, but it is in all stages of society, owing only to two causes: on the more or less quantity of labour required, the other the greater or less durability of capital: - that the former never superseded by the latter, but is only modified by it” (Ricardo 1821, Introduction by Piero Sraffa, p. xxxvii, our emphases). This passage relates to the first edition of the principles. On the third edition Ricardo writes to Malthus: “You say that my proposition ‘that with few exceptions the quantity of labour employed in commodities
determines the rate at which they will exchange for each other, is not well founded’ I acknowledge that this is not rigidly true, but I say that it is the nearest approximation to truth […] and adds [regarding the third edition in comparison with the first]: ‘My first chapter will not be materially altered – in principle it will not be altered at all’” (Ricardo 1821, Introduction by Piero Sraffa, p. xl, our emphasis). Sraffa was, as is very likely, in agreement with these convincing arguments of Ricardo’s, above all that the conditions of production do not create value, but only modify values.

Given this, a second point arises. If the labour principle of value goes on holding and the conditions of production are not very important because they only modify values, why did Sraffa makes that tremendous effort required to work out the equations for the prices of production? Several reasons account for this, all related to Sraffa’s endeavour to clarify problems associated with the classical approach. Most importantly, Sraffa wanted to solve the transformation problem, that is, the transformation of values into prices. Here he uses Marx’s production scheme all capital is circulating capital; fixed capital is also relegated to circulating capital. Sraffa differs from Marx in one point only, certainly for purely analytical reasons: the payment of wages is made at the end of the production period; but a material reason may have come in, too: the device of paying wages at the end of the production period results in a clear separation of (non-produced) labour from the produced means of production; this separation became important for the construction of the standard commodity, and, after the publication of Sraffa (1960), for the capital-theory debate in which capital-labour ratios, differing between industries became all-important. In any case, the solution of the transformation problem which had discredited the classical approach from Ricardo (1821), through Marx’s Kapital up to Sraffa (1960) was by itself a gigantic achievement.

Moreover, he wanted to bring to the open that the social and circular process of production in the sense proper took place in the basic products sectors only. It is here that production of all commodities by means of all commodities occurred. In addition, it is on the foundations of basics that the problems of value and distribution are solved. Prices are governed by all coefficient of production and the rate of profits. Distribution, now based upon the surplus principle, could, from an analytical point of view, be reduced to a relationship between real wages and profits, a complex downward sloping distribution curve in case of the real system, a straight line for the standard system.

Sraffa (1960) is clearly a piece of pure economic theory (Pasinetti 2007, p. 187), exhibiting how the basic forces work in principle within a social and circular inter-industry framework
to govern the prices of production and the regulation of distribution. These principles are subsequently realised in concrete empirical-historical situations. The prices are realised through the normal cost and price calculation that takes place within enterprises. As such Sraffa’s (1960) book has highly important practical implications. In fact, the *prices of production* of Sraffa (1960) show how the *mark-up prices* implied in Sraffa (1926) are formed *in principle*. *This is all-important*, and it took Sraffa 32 years, from 1928 to 1960, to show this; in fact, as alluded to above, to show how mark-up pricing goes on *in principle* within the social process of production was *the* big game Sraffa was after. Sraffa has thus paved the way for clarifying the relationship between the – immensely complex - nature (interindustry) aspect of pricing and the – very simple - labour aspect of pricing (mark-up pricing), fundamentally important in macroeconomic theory; this process of clarification has been carried on in an important way in Pasinetti (1977 and 1981); for a theoretical application in a classical-Keynesian framework, see Bortis (2003, pp. 433-45).

Given this, the *fundamental* prices are not, and cannot be determined on the market, be it in a Walrasian or in a Marshallian framework. But these basic prices need not be determined by a central plan either. Sraffa shows that price formation is decentralised, that is, prices can be fixed by the individual enterprises through the calculation of normal prices; and, within the limits of the given output, governed by effective demand, this is true of quantities, too. Sraffa has thus provided us with the foundations of the price theory pertaining to a theoretical alternative to neoclassical economics and centrally planned socialism, that is, classical-Keynesian political economy, set out in Bortis (1997 and 2003).

Finally, it also emerges from Sraffa (1960), that, within a social and circular inter-industry framework, distribution can only be regulated by the surplus principle. This principle is most fruitful to analyse distribution in various countries and regions or in differing periods of time. How indeed are surpluses extracted, appropriated, distributed and used (Geoffrey Harcourt) in one country or region in differing periods of time or, in some given period of time, within various countries or regions. Probably most historians, consciously or unconsciously, make use of the surplus principle in specific historical investigations.

In his book Sraffa deals with additional problems relevant in a modern economy where the social process of production is fundamental, not the market. There are, for example, joint production, the treatment of land and fixed capital, and one could go on.

Hence, between ‘his’ *Years of High Theory* 1926 – 1960 Sraffa has produced a stupendous performance. He has indeed solved the most difficult problems of economic theory. Given
this, it is no exaggeration to call him the greatest theoretician in the entire history of economic theories, and this by far so. He indeed towers above all other theoretical economists, even Walras who concentrates on exchange, and entirely ignores the really difficult problem: production as a social and circular process and its consequences for the problems of value and distribution; given this, Walras’s general equilibrium model analytically boils down to setting forth optimisation under constraints in equilibrium conditions, and to equation counting.

_Sraffa and Keynes_

It has already been mentioned in the previous section that there is a direct and strong implicit link between Sraffa (1926) and Keynes (1936). In fact, according to Sraffa, the output of each firm is demand determined. Consequently, this is also true for the economy as a whole. Now, the position of the demand curves depends on the incomes of consumers, that is, in the aggregate, on national income. An increase in national income will shift all the demand curves to the right to a various extent and will, consequently, be associated with higher levels of output and employment. Keynes’s aggregate demand curve could be derived in a straightforward way; on the vertical axes we would have aggregate demand in nominal (money) terms and on the horizontal axes aggregate output, which would be directly linked to employment. The slope of the supply curve would be given by the normal price of the unit in which aggregate output is measured, for example a bundle of necessary consumption goods. Hence, as many Keynesian and Post Keynesian economists have perceived, Sraffa’s 1926 article could have provided sound and secure microeconomic foundations for Keynes’s _General Theory_. On account of his Ph.D. thesis, Richard Kahn (Pasinetti 2007, pp. 85-86) was probably aware of this, and Kahn’s close relationship with Keynes is well known. So it is likely that Keynes knew about the problem. Why, then, did Keynes stick to the Marshallian demand and supply framework as is clearly visible from his accepting the first (neo-)classical postulate – the wage is equal to the marginal product of labour – and his (neo-)classical theory of investment and interest? Two reasons may account for this. First, Keynes was a pupil of Marshall and, consequently, accepted his theory of value and distribution, and, in contradistinction to Sraffa, also his supply curves; this is interesting, because it was Keynes who had recommended Sraffa’s 1926 article for publication in the _Economic Journal_; hence
Keynes knew the supply curve problem; moreover, Keynes who certainly knew very well business practice on pricing should have agreed with mark-up pricing; taking account of mark-up pricing would have greatly simplified and clarified the setting forth of the principle of effective demand. This lends credit to a second, in our view more plausible thesis, Keynes possibly accepted the Marshallian theory of value and distribution for reasons of persuasion. In fact, Sraffa’s theory of price already implies the surplus principle of distribution. Had Keynes adopted Sraffa’s still vague and implicit theory of value and distribution, not yet theoretically grounded, this would have caused a turmoil, mainly because of the evident connections with the classical-Marxian theory of value and distribution. The General Theory would never have been accepted to the extent it effectively had been, at least, until the early seventies of the last century. However, and this also well-known, on account of the fact that Keynes had built his general theory of employment, interest and money upon a Marshallian basis, enabled the integration of Keynes’s work into the neoclassical equilibrium economics, first Marshallian through the IS-LM neoclassical synthesis of Hicks and Samuelson, and subsequently through the Walrasians (New and Neo-Keynesian Economics); here sticky prices and money wages and monopolistic competition could lead on to involuntary unemployment!

Hence it is evident that Keynes’s ‘monetary way to effective demand’ (Garegnani 1983) inevitably leads to integrating Keynes’s into neoclassical mainstream economics. However, Sraffa (1960) prepared the second, ‘real way to effective demand’ (Garegnani 1983 again) which is about criticising the fundamental principles of the law of supply and demand, or the market mechanism. Indeed, with production being a social process, no regular, well-behaved associations between ‘rates of interest’ and ‘quantities of capital’, in general between factor prices and factor quantities, exist in principle; this is the main result of the capital-theoretic discussion (Garegnani 1970, Harcourt 1972). This result implies that the concept of factor markets stands on very shaky foundations. The capital-theoretic discussion culminated, in the mid-sixties, in the publication of several important articles, which are gathered in the Quarterly Journal of Economics, vol. 80 (1966); for a brief summary of events see Pasinetti (1977, pp. 169–77, especially footnote 9 on p. 171). Samuelson sums up the discussion in a crucial statement: “Lower interest rates may bring lower steady-state consumption and lower capital–output ratios, and the transition to such lower interest rate can involve denial of diminishing returns and entail reverse capital deepening in which current consumption is augmented rather than sacrificed.
There often turns out to be no unambiguous way of characterizing different processes as more ‘capital intensive’, more ‘mechanized’, more ‘roundabout’ [...] If all this causes headaches for those nostalgic for the old time parables of neoclassical writing, we must remind ourselves that scholars are not born to live an easy existence. We must respect, and appraise, the facts of life” (Samuelson 1966, p. 250).

The post-Keynesians and neo-Ricardians could not benefit from this total theoretical victory because they could not offer a coherent and complete alternative system of economic theory. In fact, the neoclassical economists admitted that there are serious problems with their neoclassical-Walrasian system; for example, money and finance could be disturbing factors, resulting in bubbles in the financial sector and to crisis situations in the real sector, or that the way to equilibrium could be long and painful in a monetary economy. However, the post-Keynesian and neo-Ricardian critics had no convincing answer to the neoclassical question: What kind of comprehensive and coherent theoretical system have you to offer? Indeed, no coherent – post Keynesian - theoretical system capable of competing with neoclassical Walrasian-Marshallian economics and its developments, in the form of the Rational Expectations system for example, has come into being so far.

In fact, Joan Robinson had later remarked on the Sraffa-Keynes twin revolution that “Keynes evidently did not make much of [Sraffa’s 1928 draft of Production of Commodities by Means of Commodities] and Sraffa, in turn, never made much of the General Theory. It is the task of post-Keynesians to reconcile the two” (Joan Robinson 1978, p. 14). But how to reconcile Keynes's short-period model set in historical time, where uncertainty and expectations prevail, with Sraffa’s timeless and deterministic long-period equilibrium model? There was, in fact, a deep gap between Keynes and Sraffa.

Later, this cleavage showed up within post Keynesian economics which emerged in the 1950s and 1960s, comprising, according to Harcourt and Hamouda (1992, pp. 213-22), three broad, partly overlapping strands, the Keynesian Fundamentalists, the Robinsonian-Kaleckians, and the neo-Ricardians. In the main, the Keynesian Fundamentalists and the neo-Ricardians largely ignored each other from the 1950s until the present.

Nevertheless, attempts at synthesising the three Harcourt-Hamouda strands of post Keynesianism were undertaken. John King mentions Peter Reynolds, Philip Arestis, Marc Lavoie, and Thomas Palley (King 2003, pp. 216-19). These attempts were all outstanding. But large numbers of Post Keynesians were not convinced. For example, “Walters and Young [argued in the late 1990s] that Post Keynesian economics still lacked coherence, both
theoretically and methodologically" (King 2003, p. 218). Moreover, new and definite cleavages within post Keynesianism appeared. Indeed, when “Philip Arestis, Stephen Dunn and Malcolm Sawyer responded to [Walters’s and Young’s charge] they followed Hamouda and Harcourt in distinguishing three Post Keynesian [schools: Keynesians, Kaleckians, and institutionalists]. *The Sraffians had disappeared from the Post Keynesian pantheon, to be replaced by the institutionalists*” (King 2003, p. 219, our emphasis).

It is almost unbelievable: around the year 2000 Sraffa and the neo-Ricardians have been excluded from respectable post-Keynesian theory. The most important part of the twin Keynes-Sraffa revolution that took place in the *Years of High Theory 1926-1929[1939]* has been eliminated! This is, in fact, due to an inappropriate conception of the notion of long-period equilibrium.

Indeed, the conventional equilibrium notion starts from a disequilibrium situation in the present, which, in a stationary state, would work out and produce an eventual tendency towards a future long-period equilibrium situation. This equilibrium concept is untenable once historical time is introduced as Joan Robinson emphasized time and again: an economy cannot get into an equilibrium if there is uncertainty about the future and if, as a consequence, expectations are liable to disappointment. Consequently, Joan Robinson rightly argues that “[long-period] equilibrium is not at some date in the future; it is an imaginary state of affairs in which there are no incompatibilities in the existing situation, here and now” (Joan Robinson 1962, p. 690). However, in our perspective, the long-period equilibrium state of affairs is not imaginary, but an essential element of the real world, that is, a technological-institutional system equilibrium, implying that the desired rates of profits are realised. Such a state of affairs can of course only got hold of conceptually through a model aimed at capturing essentials, and abstracting from accidentals. The first step is to abstract conceptually from temporary and rapidly changing short- and medium-term elements of reality, i.e. *behavioural* elements related to markets and to business cycles (Bortis 1997, p. 106, scheme 3). This is to dig deeper to bring into the open the permanent or slowly evolving elements of the real world made up of the technological and economic *structure*, i.e. the material basis of a society, and the social, political, legal and cultural superstructure erected thereupon. At this stage, we further abstract from structural disequilibria and conceive of a stock equilibrium characterised by the normal profit in sectors and industries, in which there are ‘no incompatibilities, here and now’ in Joan Robinson’s terms. Given this, *technology and institutions* represent the *stable features* of social reality the classical economists, Ricardo in
the main, had in mind when they conceived of labour values (and prices of production) as the natural and fundamental prices from which actual or market prices deviate (Ricardo 1821, p. 88); these stable factors are constant or may, as a rule, evolve slowly. Hence the classical [...] equilibrium prices and quantities, as [are] implied in the Pasinettian price and quantity systems set forth in Bortis (2003, pp. 451 and 457), complemented by the supermultiplier relation (Bortis 2003, p. 464), represent, therefore, a system equilibrium, not a market equilibrium. And the system equilibrium is complete once a normal rate of profits is defined in a Sraffian vein, that is, by some variant of the surplus principle.

This is the main tenet of Bortis (1997). Since the technological-institutional system always governs equilibrium prices and quantities, there is no question of path-dependency. This problem only arises with historical realisations of principles. Hence Sraffa is fundamental for the conception of the long-period equilibrium, which is of a classical, Ricardian-Sraffian nature, and, given this, strictly non-neoclassical, or even anti-neoclassical (here equilibrium is behavioural and lies in the future). Given this Sraffa simply cannot be eliminated if an alternative to neoclassical economics is to be built up. On the contrary, Sraffa must become an essential part of this classical-Keynesian alternative through his theories of production, distribution and value and price. This, however, cannot go on at the level of the prices of production since such a model would be unnecessarily complex. One has to move down to the fundamental level, which is given the labour model. Hence one has to transform the interindustry model – of which Sraffa is a variant – to the labour model.

The starting point to do so is the social process of production, which, basically, may be seen as an interaction between man (labour) and nature (land) by means of real capital, i.e. tools and machines (Bortis 2003, pp. 433-36). The nature or land aspect of social production is set out in Pasinetti (1977). Here the (Leontief) interindustry flows are pictured: primary goods taken from nature and intermediate goods are transformed into final products in a social and, in part, circular process involving production of commodities by means of commodities – and labour (Sraffa). The labour aspect of production is set forth in Pasinetti (1981 and 1986): direct and indirect labour, in association with past labour embodied in fixed capital, produce the primary, intermediate and final products (Bortis 2003, pp. 433-36).

Analytically, the land and labour aspects of the social process of production are linked by the Pasinetti transformation: the vector of direct labour is multiplied by the transposed Leontief-inverse to yield the total (direct and indirect) labour required to produce the various commodities (Bortis 2003, p. 438, relation 19.5).
Since the i-th column of the Leontief-inverse contains the quantities of each good required directly and indirectly to produce one unit of good i, the i-th element of the n-vector, the labour vector, stands for all the labour used directly and indirectly in the whole production system to produce one unit of commodity i. Since production runs from primary, through intermediate goods to final goods, there is, evidently, vertical integration with the final goods summarising all the ‘lower-level’ efforts made to produce them.

However, the classical (Ricardian) labour model obtained by the Pasinetti transformation determines relative prices and quantities only (Pasinetti 1981, p. 23, note 30). To obtain absolute prices, the money wage rate (w) must be fixed; to determine absolute quantities requires fixing the level of employment (N) (Pasinetti 1981, pp. 32/33, Pasinetti 1986, pp. 422/23). Now, in chapter 4 of the *General Theory* – The Choice of Units – Keynes states: “In dealing with the theory of employment I propose [...] to make use of only two fundamental units of quantity, namely, quantities of money-value and quantities of employment. [...] We shall call the unit in which the quantity of employment is measured the labour-unit; and the money-wage of a labour-unit we shall call the wage-unit” (Keynes 1936, p. 41). Thus, the labour model emerging from the Pasinetti transformation links the whole body of classical theory to Keynes's employment theory and, as such, closes the gap between Keynes and Sraffa on the level of fundamental pure theory, i.e. on the level of principles. In doing so, Luigi Pasinetti has laid the long-period foundations for classical-Keynesian political economy, which may be considered a synthesis and an elaboration of the post Keynesian strands of thought. A central problem associated to elaborating a system of classical-Keynesian political economy is to adapt Keynes’s short-period theory of employment to the long run to make it compatible with the classical (Ricardian) theory of value and distribution which focuses on stable or slowly changing magnitudes (institutions and technology) and is, as such, of a long-period nature (Bortis 1997, pp. 142-204, and Bortis 2003, pp. 415-23 and pp. 460-67).

Moreover, to fix the money wage rate and the level of employment ensures that the economy considered is really a monetary production economy (M-C … P …C’-M”). Here absolute prices are all important and commodities (C - means of production and C’ – final products are always exchanged against money (M – money as finance and M’ – effective demand. The social process of production (P) stands at the centre of activities: here the means of production M are transformed into final products, and Sraffa’s basics play of course the
fundamental role in this process. Hence classical-Keynesian political economy (Bortis 1997 and 2003) is essentially a monetary production economy.

Now, we have already suggested that classical models, including Sraffa’s, determines, like Walras’s Model of General Equilibrium, relative prices only, which is the hallmark of exchange models. Given this, Sraffa (1960) may be interpreted as an exchange model and, as such, seen as a special case of general equilibrium theory, although this undertaking is highly fanciful (Hahn 1982, Mandler 2008). Moreover, it is well known that Keynes’s General Theory may easily be absorbed by the Marshallian part of mainstream economics by the Hicks-Samuelson neoclassical synthesis, summarised by the IS-LM model.

Hence Keynes and Sraffa, left isolated, are bound to be absorbed by the neoclassical mainstream. There is only one way out: bring Keynes and Sraffa together on the level of principles through the way paved by Luigi Pasinetti (Bortis 2003 and 2011). This results in the classical-Keynesian synthesis which is absolutely necessary if the classical-Keynesian counterrevolution launched by Maynard Keynes and Piero Sraffa in the course of George Shackle’s Years of High Theory 1926 – 1939 [- 1960] is to prove ultimately successful.

This means that, in a way, Sraffa’s prices of production have to be transformed into labour values again, since as Keynes has perceived, sensible macroeconomics must rest on the labour value principle. On account of his intense preoccupation with Ricardo, Piero Sraffa would, as is very likely, have agreed with this way of proceeding since Ricardo made clear that the conditions of production do not create values, but only modify labour values.

Sraffa’s significance in the history of economic theories

David Ricardo wrote on the Principles of Political Economy, Alfred Marshall on the Principles of Economics. This distinction is of the greatest importance in the history of economic theories, and allows us to bring to the open the significance of Piero Sraffa in the history of economic theorising.

Political economy in its mature form, classical-Keynesian political economy to wit, constitutes, in fact, a monetary theory of production, with production seen as a social and circular process; distribution is regulated by the surplus principle; the essence of prices are labour values brought into concrete existence through prices of production; finally, the level of employment, and the size of involuntary unemployment, are determined by effective
demand; money is endogenous and a tendency toward equilibrium in the foreign balance is brought about by quantity adjustments. Political economy thus essentially deals with the functioning of the socio-economic system, the heart of which is the social and circular process of production.

Economics, however, deals with the behaviour of individuals and collectives. In mature (neoclassical) economics (profit and utility) maximisation under constraints is the economically basic form of behaviour. The optimising behaviour of individuals and collectives is coordinated by the market in a socially sensible way; indeed, Walras’s general equilibrium is also a Pareto optimum. Real world problems arise on account of various greater or less imperfections, showing up as smaller or larger deviations from the Walras/Pareto ideal.

Piero Sraffa, and Maynard Keynes, the two great protagonists of the Years of High Theory 1926 – 1939 [- 1960] obviously both belong to the political economy type of economic theory. To bring out the significance of Piero Sraffa in the history of economic theories we have a very brief look at the great events in the history of economic theories on the broad basis of Maurice Dobb’s Theories of value and distribution since Adam Smith (Dobb 1973).

Political economy starts with François Quesnay’s fundamental ‘zigzag’ tableau économique (le grand tableau ou tableau fondamental). In Quesnay’s grand tableau the social and circular nature aspect of production appears beautifully. The fundamental prices are determined in the process of production and Quesnay explicitly mentions that these prices are known before the commodities arrive at the market. Distribution is governed by the surplus principle and the economy is set into motion by the spending of rents by the landlords (government expenditures); unemployment would occur if the landlords did not fully spend the rents. There is a circuit of money and commodities. In a way, Quesnay’s grand tableau pictures the vision of a fully-fledged monetary production economy. Sraffa decisively contributed to decisely articulate Quesnay’s vision in that he solved the problems of value and distribution, only vaguely alluded to by Quesnay.

François Quesnay was followed by Adam Smith, the founder of economics. If all individuals acted according to the principle of propriety, a combination of fellow feeling and self-interest, a harmonious society would come into being. The theory of value and distribution is dominated by the adding-up theorem, which, as Dobb suggests, already moves in the direction of a supply and demand determination of all prices, including prices of the factors of
production, labour, land and capital. The employment problem, so important with the mercantilists and Quesnay, is completely eliminated.

With the next stage, David Ricardo, the pendulum of economic theory swung back to political economy. Considering, in contradistinction to Quesnay, the labour aspect of social production, Ricardo put the theory of value (the labour value principle) and distribution (the surplus principle) on a solid basis.

The reaction against Ricardo set in almost immediately after his death (Dobb 1973, pp. 96ff.) in the form of Smithianism, that is, still vague demand and supply theory. While economics – the precursors of the marginalist school - grow stronger in the underground, suddenly, in 1867, a powerful piece of political economy was published, the first volume of Karl Marx’s 

Das Kapital, which put Ricardo in a very wide and deep-going context of politics and history.

This was certainly a crucial element in setting off the marginalist revolution, carried out by Jevons, Menger, Walras, and Marshall. As Schumpeter notes, the ‘marginalists’ built up a grandiose system of economic theory on the basis of a single principle, marginal utility, which culminated in Walras’s general equilibrium theory, applied to the real world through Marshall’s partial equilibrium model.

The significance of Piero Sraffa in the history of economic theories now clearly emerges. He, and he alone, launched the classical-Keynesian counterrevolution against the marginalist revolution through his 1926 article. Through his 1960 book he rescued the classical approach in economic theory and prepared a fundamental critique of neoclassical theory. On the basis of Sraffa – his 1960 interindustry or nature model and his preoccupation with Ricardo’s labour model - Luigi Pasinetti paved the way for a classical-Keynesian system of political economy (Bortis 2011). This was tantamount to rescuing Keynes, because Keynes’s contribution to the twin revolution of Shackle’s Years of High Theory can ultimately develop its potential on classical foundations only (Bortis 1997 and 2003), while taking account of Post-Keynesian contributions, set out in Harcourt (2006). Given this, Piero Sraffa has decisively contributed to preparing the now slowly growing ascendancy of (classical-Keynesian) political economy over (neoclassical-Walrasian) economics.

While Keynes, on the basis of very simple principles, puts the emphasis on the applied side and attempted to put his work in a wider social and political context, Sraffa concentrated on clarifying fundamental and complex pure theory related to the social and circular process of production, that is, the classical-Ricardian principles, their implications and the problems associated to them. It has already been mentioned that his theoretical performance,
establishing a classical theory of value and distribution on the basis of the social and circular process of production, is simply gigantic, and, as such, *exceeds by far* Walras’s attempt to solve all the great economic problems through a general equilibrium framework based on exchange. Moreover, Sraffa’s theoretical model is outstandingly robust and realistic, whilst Walras’s is extremely fragile, and, in a way, entirely separated from the real world. Given this, the final conclusion is inevitable: *Piero Sraffa is, by far, the greatest of all theoreticians, economists and political economists taken together.* Based upon his tremendous analytical capabilities, allied to a sharp critical mind, Piero Sraffa has *decisively* contributed to bring about a *fundamental turning point* in the history of economic theories: he in fact greatly helped to ‘shunting the car of economic science on to an entirely new line’, away from neoclassical-Walrasian economics in the direction of classical-Keynesian political economy.
References


