Marx and Sraffa on the Theory of Value

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"Nowadays people know the price of everything and the value of nothing."
Oscar Wilde, The Picture of Dorian Gray (1891)

ABSTRACT

The essential aim is to reconstruct the original Marxian theory of value within the tradition of the classical "surplus" approach and to contrast this distinctive and unique Marxian critique of the classical tradition with the critique of the modern Sraffian and neo-Ricardian value formulations. Engaging in some of the perennial controversies over the ostensible "transformation problem", it will be argued that Marx's original theory of value represents a radical break from the classical labour theory of value developed by Smith and Ricardo. In this sense, Ricardo's seminal "embodied labour" theory of value constitutes the critical historical antecedent in the recent revival of the Sraffa/Marx value controversies. The Sraffian rehabilitation of the Ricardian system, however, also inherits some of the original Ricardian fallacies and confusion over the categories of use-value/exchange-value, concrete/abstract labour, surplus value/profit, etc. In other words, it is impossible to reconcile the Marxian and Sraffian value formulations from an epistemological standpoint. Despite these irreconcilable *theoretical* problems, there are still some promising *analytical* lines of inquiry between the Marxian and Sraffian value/price systems.

Introduction

A brief excursion into some of the contoversies, which have informed the Marxian/Sraffian debates over the theory of value, reveals a bewildering and contradictory set of propositions and divergent modes of analyses. Most of these perennial debates can be described quite aptly as the "dialogue of the deaf" (Fine, 1986: 7). The aim of this brief survey is to clarify some of these misconceptions and to reinstate Marx's original theory. At the same time, it should be conceded that the modern Sraffian critiques have made valuable contributions and have reinvigorated the classical "surplus" approach. But the Sraffian paradigm also encounters serious limitations since it is grounded in a peculiar linear and "embodied labour" theory of value informed by the restrictive assumptions of a pure commodity economy. Needless to say, such a conception shares very little in common with Marx's quite unique formulation. It is therefore very difficult, if not impossible, to reconcile some of these contending theories because they appear to inhabit different paradigms. In this sense, the critics of Marx's theory of value have at times misconstrued both the philosophical intentions and the methodology of the original Marxian perspective.[1]

The Marxian Theory of Value: A Restatement

In the overall Marxian system, the quantitative dimension of the theory of value is expressed by the embodied socially necessary labour time required to produce a specific quantity of commodities. "The value of any commodity - and this is also of the commodities which capital consists of - is determined not by the necessary labour-time that it itself contains, but by the *socially* necessary labour-time required for its reproduction" (Marx, 1990, Vol. 3: 238). While it is possible to quantify the *concrete* labour-power expended to produce a particular commodity, the "socially necessary labour time" embodied in the commodity-form encounters serious analytical problems. "Socially necessary labour" in the Marxian schema is synonymous with the concept of *abstract labour*. As soon as commodities enter into the sphere of circulation as exchange-values, the problem of measurement itself arises because of the operation of market prices, which might not reflect the actual values embodied in the process of production. From the standpoint of its use-value, concrete labour is merely the qualitative dimension of particular heterogeneous forms of labour expended in the labour process and transformed into commodities during successive acts of exchange. Abstract social labour, on the other hand, possesses an independent, homogeneous property, which is commensurate and exchangeable with other commodities. It follows that abstract labour is not reducible to a given price structure since it embodies the value inherent in capitalistic modes of production. Yet it is not tautological to affirm that from the standpoint of society as a whole, abstract labour regulates and acts as the centre of gravity in the formation of average prices insofar as quantities of abstract labour are embodied in generalised commodity production (Gleicher, 1983: 111).

At a very abstract level of analysis, Marx theorises that commodities have something in common, which can be quantified and measured. In the formal relations of exchange-value, Marx argues that the principle of equal exchange operates in the sense that qualitatively different commodities exchange for their equivalent values. Since use-value merely reflects differing *qualities* between commodities, it cannot denote a universal quantitative relation, even though capitalist production would not be possible in the absence of use-values. Indeed, production in any mode of production would not occur if commodities ceased to possess any use-values. "Labour, then, as the creator of use-values, as useful labour, is a condition of human existence which is independent of all forms of society; it is an eternal natural necessity which mediates the metabolism between man and nature, and therefore human life itself" (Marx, 1990, Vol.1: 133). Exchange-value, which constitutes the *differentia specifica* of capitalist production, is necessarily related to the *quantitative* aspect of commodities (Park, 2003: 163). Labour embodied in commodities simultaneously reflects both the qualitative aspect of concrete useful labour and abstract social labour. Abstract labour is thus defined as the general expenditure of human social labour; it is the *materialised substance* of value insofar as it embodies the quantitative dimension of value. "The value of a commodity is related to the value of any other commodity as the labour-time necessary for the production of the other. As exchange-values, all commodities are merely definite quantities of *congealed labour-time*" (Marx, 1990, Vol.1: 130). Marx argues that this embodied labour can be measured in units of time. It is the energy expended by labour which ultimately sets in motion the quantitative law of value.

> In order to find out how the simple expression of the value of a commodity lies hidden in the value-relation between two commodities, we must, first of all, consider the value-relation quite independently of its quantitative aspect. The usual mode of procedure is the precise opposite of this: nothing is seen in the value-relation but the proportion in which definite quantities of two sorts of commodities count as equal to each other. It is overlooked that the magnitudes of different things become comparable in quantitative terms when they have been reduced to the same unit. Only as expressions of the same unit do they have a common denominator, and are therefore commensurable magnitudes. (Marx, 1990, Vol.1: 141)

The determination of value as abstract labour-time establishes an analytical link between the sphere of exchange and the process of capitalist production. Value is therefore the universal attribute of the commodity-form, which no longer differentiates one commodity from another, despite the quite evident differences in the demand and the formation of simple use-values. “The common factor in the exchange relation, or in the exchange-value of the commodity, is therefore its value....What exclusively determines the magnitude of the value of any article is therefore the amount of labour socially necessary, or the labour-time socially necessary for its production" (Marx, 1990, Vol.1: 129). This corresponds to the two-fold character of generalised commodity production: the socially homogeneous quality of value, on the one hand, and the heterogeneity of use-values, on the other hand (Sekine, 1980: 293). The value form, in this sense, represents the *social* form of the commodity in its intrinsic capacity to enter into the process of exchange. The general equivalent form, according to Marx, embodies the monetary expression of exchange-value.[2] It follows that if labour is designated as the substance of value and accordingly, the quantity of socially necessary labour measures the value of commodities, labour itself cannot be a commodity since the "value of labour" becomes entirely tautological and superfluous. "It is therefore the quantity of labour required to produce it, not the objectified form of that labour, which determines the amount of the value of a commodity....Labour is the substance, and the immanent measure of value, but it has no value itself" (Marx, 1990, Vol.1: 677).

The magnitude of value is itself an expression of the socially necessary labour-time embodied in the commodity-form. However, on the more concrete, quantitative level of analysis, labour is also an input in the production of commodities, the price of which can be measured in terms of the necessary commodities required to reproduce labour-power. For this reason, Marx makes the critical distinction between *labour* and *labour-power*. The latter represents the quantitative, commodity-form, which also expresses the exchange-value (wages) of workers (Park, 2003: 165). “Thus money wages are the exchange-value of labour-power measured in money. The labour-time equivalent of the basket of goods bought by the worker from the money wage is variable capital or necessary labour. This is measured in labour-time”(Desai, 1998: 10). Conceived in its commodity-form, capitalists purchase labour-power in order to produce surplus-value. The wages received by workers endows them with purchasing power, which allows labour-power to reproduce itself. Consequently, the very essence of exploitation is expressed by the difference between labour embodied in the goods consumed by the worker and the labour-power expended in the capitalist process of production. The law of value in this sense regulates the distribution of labour between different branches of production. Competition between different capitals tends to equalise prices toward an average set of production prices in the long run (Nagatani, 2004: 66). But as Marx emphasises, the prices of production should not be confused with market values expressed in money terms. "Values are quantities of labour, and have nothing to do with money prices as such. The equalisation of the rate of profit between different branches of production occurs through the transfer of *quantities of surplus-value* from one branch to another" (Mandel, 1990, Vol.1: 27).

The laws of motion, which govern capital accumulation, set in train these competitive forces and bring about a divergence of prices from values. Hence, under dynamic conditions, prices will not necessarily be proportional to values; nor should prices be quantitatively derived from a previous known set of values. As a general rule, production prices and the formation of an average rate of profit are determined by the logic of the capitalist market in which the laws of supply and demand ensure an unstable equilibrium (Itoh, 1988: 226). It is therefore quite misleading to assert that capitalistically produced commodities have a positive set of equilibrium prices because they embody the law of value. The formation of prices does not necessarily presuppose capitalistically produced commodities. Indeed, if these commodities cannot realise a set of exchange-values, they cease to possess any value at all. It is precisely this incessant tension between the use-value and exchange-value of commodity production which animates and governs the whole problematic basis of capitalist production. The ultimate object of capital is to transform mere use-values into exchange-values and to convert surplus-value into profit through the well known circuit, M-C-M'. All capitalistically produced commodities are, by their very essence, value-objects insofar as their intrinsic value is expressed in the form of positive equilibrium prices (Sekine, 1980: 294).

Production prices, in the original Marxian conception, as well as in the classical tradition of Smith and Ricardo, constitute the cost-price in addition to the average rate of profit rather than the production of values. Market prices tend to fluctuate as a result of the laws of supply and demand and gravitate towards equilibrium production prices. But the transformation of values into prices of production does not imply any change in the abstract, socially-necessary labour time required to produce commodities. Consequently, the movement of prices is no longer directly *determined* by the law of value, though it does govern the prices of production in a very complicated and approximate manner (Uno, 1980: 79). "Since it is the total value of the commodities that governs the total surplus-value, while this in turn governs the level of average profit and hence the general rate of profit - as a general law or as governing the fluctuations - it follows that the law of value regulates the prices of production" (Marx, 1990, Vol.3: 281). Prices of production which deviate from values merely reflect a redistribution between individual capitalists of the existing surplus-value produced. In this process, the general, aggregate rate of profit tends to be equalised as capital migrates from sectors experiencing a relatively low rate of profit to those sectors enjoying a higher rate of profit. "The prices that arise when the average of the different rates of profit is drawn from the different spheres of production, and this average is added to the cost prices of these different spheres of production, are the *prices of production*....Thus the production price of a commodity equals its cost price plus the percentage profit added to it in accordance with the general rate of profit, its cost price plus the average price" (Marx, Vol.3: 257).

Marx's embodied labour value system is radically different from the classical conception developed by Smith and Ricardo. The distinction between use-value and exchange-value implies that the substance of value should not be equated with its commodity form. Smith's original conception of value can be best described as a "command" type theory in which the value of a commodity was embodied in the labour it could command in the market. Smith assumed that wages were basically determined *ex post,* that is to say, after the sale of the commodity. Both the amount of labour required to produce a commodity and the socially determined level of wages would determine the value of a particular commodity. Indeed, given the analytical problems encountered by this approach, Smith was to eventually abandon the labour theory of value altogether. The "surplus" approach developed by the classical economists was based upon a distributional or an "adding-up" theory of value, which attempted to explain the prices of commodities as the sum of wages, profit and rent and the class relations that these sources of income represented. It would be reasonable to contend that wages in this surplus approach were exogenously given and determined by historical and social conditions (Foley, 2000: 4). “In this way Smith came to argue that the profit rate is dependent upon something he described as the 'competition between capitalists', while at the same time contending that real wages tend towards a socially-determined subsistence, and rents are determined by still other distinct circumstances. As Marx put it, Smith came to envisage the real wage, the rate of profits and rent of land as “determined independently and separately” (Garegnani, 1991: 101-02).

Ricardo was unable to reconcile the labour theory of value as soon as it was assumed that profit was a deduction from the product of labour.[3] The original Ricardian theory was limited to analysing the *magnitude of value* expressed in terms of proportionate quantities of labour embodied in their production. Ricardo failed to grasp the peculiar characteristic of labour-power which has the unique ability to create exchange-values (De Angelis, 1998: 278-79). This problem became quite evident when the procedure was applied to capitals of differing capital/labour ratios and turn-over times. The formation of prices in terms of exchange ratios no longer conformed to the Ricardian labour theory of value (Sweezy, 1975: xxvii). Ricardo attempted to reconcile this logical inconsistency inherited by the surplus approach insofar as long run equilibrium prices (or "natural" prices) tended to diverge from the original proportionality of the labour embodied in them. In other words, competition would tend to equalise prices around a centre of gravity in the long run. However, the fluctuation of prices from the labour embodied in the production of commodities contradicted the logical foundations of Ricardo's labour theory of value. The share of rent and profit appeared to vary between sectors, which led to a breakdown of the labour theory of value based on embodied labour values. In order to resolve this logical inconsistency, Ricardo embarked upon a life-long intellectual pursuit to develop a more general analytical framework by which he could deduce an "invariable standard of value", either through a standard commodity or a weighted average for which the distributional implications of the labour theory of value could be calculated more precisely. Sraffa's "standard commodity" represents the culmination of this intellectual project (Sraffa, 1960).

Marx had overcome this logical inconsistency by introducing the concept of abstract labour and by making the critical distinction between use-value and exchange-value. Viewed as social labour or labour in general, Marx had argued that value can only be realised in the sphere of exchange. "Labour only takes the form of abstract labour and the products of labour the form of values, to the extent that the production process assumes the social form of commodity production, i.e., production based on exchanges" (Rubin, 1978: 123). It is precisely the dichotomy between use-value and exchange-value, mediated by the two-fold character of labour in terms of its quantitative and qualitative aspects, that the problem of value resolves itself. The procedure developed by Marx necessarily moves from exchange-value to the concept of value and ultimately to an analysis of the labour process itself. "Marx analyses the "form of value" separately from exchange-value. In order to introduce the social form of the product of labour in the concept of value itself, we are forced to split or divide the social form of the product which has not yet concretised in a specific object, but represents as it were the abstract character of a commodity" (Rubin, 1978: 132).

The concept of abstract labour forms the very foundation of Marx's theory of value. Indeed, the dual nature of labour conceived both as concrete labour producing use-values and abstract labour realised in the sphere of exchange and circulation, constitutes the very core of Marx's immanent critique of the classical economists. This reformulation of the theory of value from its classical origins signifies a radical scientific departure. Marx's theory can be said to represent an epistemological *rupture* from classical economics (Althusser & Balibar, 1979: 149). This paradigmatic shift was a necessary prelude in the discovery of the general category of surplus-value. In this sense it would be grossly erroneous to categorise Marx's theory of value within the classical tradition. One of the unfortunate legacies of these perennial controversies, which have enveloped the so-called "transformation" problem, continues to be the ideological fog which still obfuscates Marx's unique and quite revolutionary reformulation of the theory of value. "For Marx, the problem of value as an embodiment of abstract human labour is not a problem of measurement, of *numeraire,* but a problem of essence" (Mandel, 1990, Vol.1: 18). In the final analysis, the concept of value is intrinsic to the commodity-form. The *differentia specifica* of historically determined capitalist relations of production implies that the substance of value is both labour and its transformation into its commodity form as labour-power. At the same time, the commodity which embodies this objectified labour-power constitutes value and its self-expansion (Kliman, 2003: 20). Ultimately, the alienated form of labour-power reflects the very essence of capitalism conceived as the manifestation of *commodity fetishism.*

For Marx, the evolution of abstract labour signifies the advent of the capitalist mode of production from its feudal integument and is therefore assigned a privileged and central role in the historical development of capitalist society. In stark contrast to the classical conception of absolute value embodied by labour, Marx argues that value itself is merely a socially determined relation and thus historically specific to a particular mode of production. It was precisely because the classical theorists were unable to interpret the *value-form* as the “outward appearance” or as the phenomenal form of social production that they confined themselves to an analysis of the *magnitude* of value (Rosdolsky, 1977: 123). Unlike the classical school, Marx stressed that abstract labour constitutes the social, materialised substance of value. The category of value under capitalistic conditions, can only manifest itself as exchange-value and cannot be derived merely from the act of exchange (Pilling, 1986: 35). In other words, the form of appearance of value as it manifests itself as a market relation tends to conceal and mystify the real nature of class relations and exploitation in the actual creation of surplus-value within the sphere of production. It was from this perspective that Marx formulated his incisive critique of the Ricardian socialists during his own time. Unable to distinguish between concrete and abstract labour, Ricardian socialists argued that labour was the sole source of exchange-value and it therefore followed that workers should receive the entire value of the net social product (Roncaglia, 1978: 140). Analysing only the concrete form of labour and constructing a labour theory of value based upon its quantitative and empirically derived dimensions, the classical economists failed to grasp the profound *social* nature of abstract labour. “Thus, while concrete labour can be seen directly, abstract labour appears only in its effects” (Gerstein, 1986: 52). Hilferding quite lucidly reveals the problems associated with this fallacy of composition in the classical line of reasoning as well as the limitations inherent in the methodological individualism of the neoclassical school.

> Every thing of value which starts from use-value, that is to say, from the natural qualities of the thing, whether from its original form as a useful thing or from its function, the satisfaction of a want, starts from the individual relationship between a thing and a human being instead of starting from the social relationships of human beings one with another....Such an outlook is unhistorical and unsocial. Its categories are natural and eternal categories. (Hilferding, in Sweezy, ed, 1975: 175)

The Sraffian Critique

Most of the Sraffian critiques tend to assume that the Marxian theory of value is merely an elaboration of the classical theory and that, as a result, Marx's original theory should be designated as an *embodied labour theory* (Garegnani, 1980). In other words, the so-called transformation problem is interpreted to be a formal, deductive procedure, based on Ricardian assumptions in which the law of value determines the embodied labour ratios of exchange. This approach abstracts entirely from the monetary expression, or the money-form of exchange-value: money is simply viewed as a unit of account to reflect simple exchange ratios (Mohun, 1994: 405). There is no longer the distinctive and critical Marxian dichotomy of exchange-value and use-value; nor is there a perceived problem of the realisation of surplus-value into profit. Capital itself appears to be devoid of its inner logic of valorisation and perpetual self-expansion.

The emergent Sraffian view is reflected in the subsequent attempts to "solve" the ostensible transformation riddle, which has its origins in the earlier critiques articulated by Bohm-Bawerk and Bortkiewicz early last century (Sweezy, 1975). The earlier neo-Ricardian tradition was grounded in the "surplus" approach in which profit or the surplus-product merely represents a *deduction* from the product of labour. But as Marx and Ricardo himself were well aware, the whole argument is quite tautological and circular (Rowthorn, 1974: 82). If all output is defined as the product of labour, how is it logically possible to then argue that the surplus-product is a deduction from the total product? Indeed, the whole object of Marx's immanent critique of the classical theory of value was to reveal the *absence* of the theoretical category of *surplus-value.* Yet despite these irreconcilable methodological differences between Marx and the classical school, the transformation problem appears to revolve around the perceived logical inconsistency of Marx's treatment of prices of production in volume 3 of *Capital.* The neo-Ricardian and Sraffian critiques share a common line of attack: the Marxian concepts of surplus-value and profit cannot be reconciled on the basis of the "prices of production". Steedman, for instance, argues that: "He (Marx) asserted that the ratio of *total* surplus-value to total constant and variable capital determined the rate of profit. He then determined the "price of production" for each commodity by multiplying the appropriate (c+v) by (1 + the rate of profit)" (Steedman, 1975: 75-76).

Informed by this deductive interpretation, the various Sraffian critiques then proceed to argue that the fundamental flaw in Marx's concept of value is that Marx equates the rate of profit [s/(c+v)] with the equalisation of profitability in the economy as a whole (Garegnani, 1980). It is then surmised that the fundamental Marxian theorem of total value equals total prices ceases to apply as a general rule in the economy as a whole when viewed as a closed system. Using a simple mathematical formula, Marx's aggregate prices of production translates into the Ricardian version of aggregate profits equals the price of gross output minus the price of total inputs, divided by the price of these inputs. But since prices are *not* proportional to values, this simple aggregation breaks down. In other words, s/(c+v) is *not* the rate of profit (Steedman, 1974: 76). Marx's transformation procedure is therefore valid only insofar as it is assumed that the organic composition of capital remains the same in every branch of production. As soon as these simplifying assumptions are relaxed, however, neo-Ricardian critics have argued that a serious anomaly arises (Sweezy, 1968: 109). Hence, it is claimed by Marx's critics that his method of transformation is erroneous since it fails to take into account the fact that a set of values constitute a matrix of both inputs and outputs, which have to be transformed into prices (Meek, 1956). It is precisely the solution to this mathematical problem that has been at the very epicentre of these perennial value controversies over the past century. These critiques constitute what Harvey (1999) has described as the "linear" vintage of Marx's theory of value: "Since everyone concedes that capitalists operate with exchange-values and not with values, Marx's analysis of the "laws of motion" of capitalism stands or falls, according to this interpretation, with the logical coherence of the transformation" (Harvey, 1999: 4).

Quite simply, it is claimed that Marx had only transformed the outputs into prices of production, while all of the inputs (including labour-power) continued to be expressed in terms of values (Dobb, 1976). It can be deduced that as soon as these inputs are transformed, both the rate of profit and the prices of outputs would necessarily diverge. In order to derive an average rate of profit, the traditional Marxian procedure ignores the fact that the rate of profit converted from the average rate of surplus-value would necessarily be different from the rate of profit derived from the prices of production. As Dobb (1973) has quite astutely opined: "To explain the *general nature* of profits, you must start from the theorem that, on an average commodities *are sold at their real values,* and *that profits are derived from selling them at their values.* If you cannot explain profit upon this supposition, you cannot explain it at all" (Dobb, 1973: 146-47). Consequently, an enormous amount of intellectual time and energy has been invested in discovering this ultimate "solution", which culminated in the publication of Sraffa's seminal *Production of Commodities by Means of Commodities* in 1960 (Roncaglia, 2000). Indeed, the entire logical edifice of Marx's theory of value appears to have inherited a serious anomaly. One solution, suggested by some neo-Ricardians (i.e., Steedman 1975, Hodgson, 1980) was to abandon the labour theory of value altogether. If a solution could be obtained without reference to Marx's theory of value, then the theory itself represents an unnecessary detour and should be considered superfluous, if not entirely redundant. An alternative approach to these controversies could be devised by applying the Sraffian system in the determination of prices.

> Sraffa (1960) demonstrated the remarkable fact that in his model the mere description of the observed configuration of physical inputs and outputs permitted one to identify frontier uniform profit rates vis a vis uniform wage rates. And that if either the profit rate or the wage rate is additionally given, then the other as well as all prices can be calculated. This is a model of "determination" of prices as seen by an observer with access to other data, deriving one set of magnitudes (prices) from another set (the physical input-output configuration and, say, the profit rate). But this view of determination does not specify anything about causation. More importantly, it does not deny the *influence* of other forces on prices. (Sen, 1986: 179)

In the *Production of Commodities by Means of Commodities*, Sraffa begins his analysis with a rudimentary model based on simple reproduction in which the surplus is absorbed into workers' and capitalists' consumption and capitalists' investment in the means of production. In such a simple self-replicating schema, there is a unique set of exchange-values, which after each successive cycle of reproduction, restores the original distribution of net output. Relative prices are a function of technology and technical relations. Since prices cannot be determined before the actual rate of profit is known, both prices and the rate of profit can be determined simultaneously (Bharadwaj, 1971: 184). In a self-reproducing state under the conditions of simple commodity production, the following set of equations can be derived:

$$(AaPa + BaPb + ... + KaPk)(1+r) + LaW = APa \qquad (1)$$
$$(AbPa + BbPb + ... + KbPk)(1+r) + LbW = BPb \qquad (2)$$
$$(AkPa + BkPb + ... + KkPk)(1+r) + LkW = KPk \qquad (3)$$

$Aa, Ba....Ka$ are the quantities of commodities $a,b....k$ required to produce the quantity A of a; $Ab, Bb....Kb$ are the quantity of commodities $a,b....k$ needed to produce the quantity B of b and so forth; $La, Lb....Lk$ are the annual quantities of labour inputs in the industries producing $a,b,....k$, respectively. The unknowns are the prices $Pa, Pb....Pk$ of commodities $a, b....k$ respectively, the wage rate w and the uniform rate of profit, r. Sraffa then introduces a set of equations in order to define national income expressed in terms of K prices and the wage:

$$\{A - (Aa + Ab + ... + Ak)\}Pa + \{B - (Ba + Bb + ...Bk)\}Pb + ...$$
$$\{K - (Ka + Kb + ...Kk)\}Pk = 1 \qquad (4)$$

Ricardo had attempted to develop a systematic procedure by which to measure "values" in terms of a commodity that would represent an "invariant standard of value", that is to say, would embody an average in relation to the proportions of capital and labour in the production of all commodities. The object of this procedure was to measure the value of a social product in terms of this invariant standard so that changes in the wage/profit ratio could be identified with changes in the relative prices of commodities (Garegnani, 1990: 294). The classical theory failed to distinguish between the causes of relative price movements; either changes in the quantities of labour embodied in commodities, or changes in income distribution could be identified, but in the absence of an invariant standard, it was impossible to isolate the effects of these forces on prices (Bellino, 2004).

Sraffa's great achievement was to devise a method which would solve the problem of invariance in relation to income distribution in terms of the wage/profit share of national income. In order to resolve Ricardo's dilemma and avoid the tautological reasoning implicit in the classical theory of value, Sraffa made the critical distinction between basic and non-basic commodities. Assuming a system based on simple commodity exchange with no joint products, a basic good enters both directly and indirectly as an input in the production of a matrix of commodities. A non-basic good, on the other hand, can be produced by a basic good either in combination or without non-basic goods but does not itself enter as an input into the production of a basic good. It follows that non-basics can be excluded from the determination of the system of prices because changes in their prices would not affect other commodities. The basic commodities reproduce themselves both as inputs and outputs. Or to use a more naturalistic metaphor: "It is like in nature where the species on the whole only reproduces itself, but on the edge throws out some mutations" (Steindl, 1990: 386). The essence of the problem is that unless we have an absolute measure of value "it is impossible to tell of any particular price fluctuation whether it arises from the peculiarities of the commodity which is being measured or from those of the measuring standard" (Sraffa, 1960: 18).

Sraffa defines the invariant standard as an industry (or commodity) which exhibits the unique characteristic of the balancing ratio (expressed as a value ratio of the net product to the means of production), which would be equal to the rate of profit corresponding to a zero wage. The maximum rate of profit would be denoted as *R*. Indeed, the commodity which satisfies this property could also be a composite commodity as long as only basic commodities enter into the standard commodity (or industry):...."the various commodities are represented among its aggregate means of production in *the same proportions* as they are among its products" (Sraffa, 1960: 26). On the other hand, the composite commodity could also be derived by a set of commodities arranged "in such proportions that the commodity composition of the aggregate product are identical" (Sraffa, 1960: 26). As long as the wage is expressed in terms of the standard commodity, the same ratio can be aggregated for the economic system as a whole. Sraffa's theory of distribution is quite unique in the sense that rather than measuring the wage as embodied labour via the Ricardian method, the theory insists upon measuring the wage in terms of the net product. Despite the problems that would inevitably arise when the theory is adjusted to a more complex world in which consumption and investment modify these static assumptions, the logical consistency of this approach does provide a basis for a more coherent theory of distribution.

> Let us assume that in the real economy workers do not save. It is then possible, in principle, to identify wages and profits in terms of physical commodities consumed and received by the 2 classes....This will, on the basis of valuation at *R* prices, give the shares of wages and profits. If we go further and assume that capitalists invest all their profits, then the dichotomy according to wages and profits will coincide with the dichotomy according to consumption and investment. In this way we shall, by sheer force of assumption, remain in the commodity world. (Steindl, 1990: 387)

By formulating the "standard system" on the basis of solving the rate of profit and prices simultaneously, Sraffa constructs a model in which the wage is expressed as a proportion of the standard net product and denoted as *w*, while the ratio of profits can simply be denoted as 1-*w*. Therefore, if the total surplus is expressed as *R*, then in a standard system in which inputs and the net product are essentially one and the same identity, the rate of profit would be equal to *R*(1-*w*)(Eatwell & Panico, 2004: 450). Sraffa postulates that since the standard net product is used as a *numeraire* or as an invariant measure of value, the standard system would mirror exactly the relationship between the wage and the rate of profit expressed as physical quantities. In short, if we assume that the entire national income is accrued to wages and thus the rate of profit is zero, relative values will be determined by the direct and indirect labour inputs in total output. On the other hand, if we assume a positive rate of profit, the simple Ricardian labour theory of value would cease to apply. In this case, the determination of relative prices and their fluctuations would tend to vary between industries with differing proportions of labour and means of production (or Marx's organic composition of capital). A relative change in either the wage or the profit share of national income would bring about fluctuations in relative prices in order to equilibrate divergences between "deficit" and "surplus" industries.

From the standpoint of embodied labour, Sraffa introduces the procedure of "reduction to dated quantities of labour". The previous equations (1), (2) and (3) are replaced by a series of labour-terms denoted by their respective dates. By doing so, it is possible to avoid the problem of joint production in which there is a different price to each input, which also appears as an output. The reduction-equation for each of these commodities can be measured by multiplying the wage by a series of labour-terms dated during the period in which the specified labour input is transformed into the final product. In order to derive the price equation for a particular product, the uniform rate of profit during the transformation can be expressed by equation (5):

$$LaW + La_1w(1+r) + ...La_nw(1+r)^n +....= APa \qquad (5)$$

Prices can therefore be derived either: (1) by expressing production in terms of labour inputs expended per unit of output within a specified production period; or (2) by simply aggregating the commodity inputs per unit of output and therefore deriving both the rate of profit and prices of production simultaneously. "In the first case the level of real wages has to be explicitly postulated, in the second case this has to be included as one of the commodity-inputs" (Dobb, 1973: 260).

The Sraffian solution to the transformation problem implies the very negation of the law of value itself. Prices of production, according to this approach, could be calculated on the basis of a mathematical set of technical relations in which the cost of production for each commodity could be defined as the prices of inputs and the average wage. Accordingly, the total sum of costs multiplied by the uniform rate of profit equals the total sum of profits (Dumenil, 1980: 435). Hence, gross output can be denoted as *GP*; the means of production as *MP*; and net output as *NP,* to derive the equation:

$$GP = MP + NP \qquad (6)$$

In order to establish the standard industry, the price of both *GP* and *MP* in this industry should be invariant in relation to changes in the uniform rate of profit. It follows that net output would remain constant in the event of changes in distribution and therefore the ratio of net output to means of production would also remain constant. In this critical sense, Sraffa defines wages as the share of net output instead of the classical notion of embodied labour required to produce labour-power. If one assumes for the sake of pure conjecture that wages equal zero, the entire proportion of net output is appropriated by capitalists in the form of profits. The maximum rate of profit can thus be defined as:

$$R = NP/MP \qquad (7)$$

The significance of this equation is that in the borderline industry, the maximum rate of profit is independent of the *actual* rate of profit and more importantly, is also independent of relative prices. Sraffa's standard industry would thus possess this property of invariance. Ricardo's invariant measure of value can therefore be solved mathematically if the maximum rate of profit (*R*) is known. Given the wage share in net output, it is possible to calculate the actual rate of profit as simply (1-*w*). The solution can be expressed as:

$$r = \frac{\text{Total Profits}}{MP} = \frac{NP(1\text{-}w)}{MP} = R(1\text{-}w) \qquad (8)$$

The value of *R* reveals the maximum rate of profit for the economy as a whole and that the relationship between the wage and the uniform rate of profit [$r = R(1\text{-}w)$] will hold as long as wages are measured in terms of the net output of the standard industry. In essence, Sraffa shows that income distribution can be analysed independently of value (Pasinetti, 1986: 426). "For Sraffa, as for Marx, "supply and demand" merely ensure the actual market prices tend towards these long-run equilibrium prices (or "prices of production") because of the equalisation of the rate of profit brought about by competition" (Howard & King, 1975: 154).

It can be surmised that within the confines of a pure commodity economy, analogous to Ricardo's "corn" model, Sraffa does formulate a solution to the classical problem of discovering an invariant standard of value. In the context of the economic surplus, the Sraffian system rehabilitates the classical theory, which in its various incantations, has its intellectual roots firmly grounded in the *embodied* labour theory of value. Doubtless, this tradition stands in stark contrast to marginalist notions of utility and revealed preferences. Despite the numerous strands and controversies that the theory of value has inherited, the great attraction of this approach lies precisely in its sparse, elegant simplicity. But the extent to which Sraffa's theory relates to the Marxian theoretical framework in terms of the transformation problem continues to provoke considerable controversy. The essential dilemma is that the Sraffian solution - by treating wages as a ratio of net output and by constructing the auxiliary concept of the standard commodity - ultimately bypasses the Marxian theory of value. In other words, by formulating a "solution" to the transformation problem (at least in terms of distribution) on the basis of the Sraffian model, the Marxian theory of value is rendered obsolete (Hodgson, 1980). It is still possible to assimilate the Sraffian schema within the Marxian framework but this would be at the cost of abandoning the unique Marxian theory of value (Garegnani, 2005). Indeed, it would be akin to performing the *dramatis personae* of Hamlet but without the Prince. If we assume that the deviation of "prices of production" (denoted in terms of the exchange ratios of commodities) from their "values" (expressed as ratios of embodied labour), then it follows logically that the process of the redistribution of surplus value according to differing organic compositions of capital cannot occur based upon the formula of the *embodied* labour theory of value (Garegnani, 1980: 7).

In Defence of Marx

The Sraffian critics of the Marxian theory of value claim that the rate of exploitation and the magnitude of the economic "surplus" can be measured in terms of embodied labour time. Despite the enormous methodological and practical problems of measurement, it is assumed that prices are proportional to a set of labour values. From these assumptions, it follows that in order to verify the ostensible Marxian theorem, two basic conditions need to be satisfied: (1) the sum of values must equal the sum of prices, and (2) the sum of surplus values must equal the sum of profits. In a closed system, these two equalities must necessarily hold in order to affirm the Marxian theory of embodied labour value. However, all attempts by both neo-Ricardians and Sraffians alike have failed to provide an adequate "solution". Indeed, at first glance, it would appear that in order to achieve a state of "equilibrium", the solution presupposes a regime of proportional growth in which all of the surplus-value is accumulated. Quite apart from the fact that the very notion of a *static* equilibrium is quite alien to the Marxian system, Marx's market prices do not represent the classical Ricardian conception of exchange ratios under the conditions of simple commodity exchange. Simple commodity exchange presupposes the pre-eminence of use-value rather than exchange-value, which would be entirely inimical and antithetical to the whole concept of *capital* itself. Indeed, even if one assumes that Ricardo's pure commodity “corn” model is logically consistent and internally coherent this is not to suggest that it is in any way a theory of capitalism. As Rowthorn has quite cogently argued, in the ahistorical relations reflected in the neo-Ricardian and Sraffian equations, there is no reason to suppose that there are capitalists that exploit workers rather than workers who simply hire machines (Rowthorn, 1974). Social-class relations are therefore mystified and reified.

In volume 1 of *Capital,* Marx clearly argues that the rate of exchange for a specific commodity is undertaken in order to realise its money-form in terms of a universal equivalent. The entire object of capitalist exchange is convert surplus-value into profit. This represents the *sine qua non* of the capitalist form of production. In the Ricardian system, this critical distinction is abstracted, if not entirely ignored, to assume simple commodity exchange based on a "corn" standard. In other words, the money-form itself is inverted into its opposite: the ratios of exchange merely reflect definite ratios of supply and demand. Furthermore, the failure to distinguish between labour and labour-power leads into a blind alley. Labour-power is not a produced commodity, which needs to be "transformed" into prices of production, nor should one assume that as an input, labour-power accrues an average rate of profit. This rather crude form of commodity fetishism obscures the real intrinsic nature of capitalist exploitation. A closer examination of Sraffa's labour-time inputs reveals that these have very little in common with Marx's concept of socially necessary labour time. By ignoring the use-value and exchange-value character of the commodity-form, Sraffians fall into Ricardo's original fallacy of equating exchange-value with labour-time inputs; *value becomes its measure*. In the Ricardian system, profits are a mere residual determined exogenously, while the rate of profit itself becomes the independent variable. "As can be studied in the case of the Ricardian school, it is completely wrong-headed to seek directly to present the law of the profit rate as the rate of surplus-value, or vice versa" (Marx, 1990, Vol.3: 136).

In volume 1, the level of analysis abstracts from "capital as a whole" and assumes that commodities exchange for their *values.* It is only at this level of analysis that it is logically possible to assume that commodities embody equivalent quantities of labour (Hilferding, 1975: 156). Much of the confusion over the so-called "transformation problem", from Bohm-Barwerk onwards, is based upon the misconception surrounding Marx's analysis of value and prices. If value is equivalent to price, deviations could only occur in the sphere of exchange and distribution; not in the process of production or in the *valorisation* of capital. On an aggregate level, within a closed system, these deviations would merely reflect the *redistribution* of surplus-value already produced between individual capitals. A permanent deviation of the prices of production from aggregate values would logically contradict the law of value itself. What ultimately governs the redistribution of surplus-value in the economy as a whole is the capitalist law of competition. Competition is the prime mover in the process of the transformation of values into prices of production. Price fluctuations tend to gravitate around their average values and by doing so, bring about the equalisation of prices in the economy as a whole. The law of value therefore constitutes the logical primacy over the formation of prices. From a historical standpoint, the law of value asserts itself more pervasively as competition and capitalist social relations subsume other pre-capitalist social formations. To be sure, as capital itself becomes more mobile, there arises the tendency for the equalisation of the rate of profit between sectors with divergent organic compositions of capital.

What competition does *not* show, however, is the determination of values that governs the

> movement of production; that it is values that stand behind the prices of production and ultimately determine them. Competition exhibits rather the following phenomena: (1) average profits that are independent of the organic composition of capital in the various spheres of production, i.e. independent of the mass of living labour appropriated in a given sphere of exploitation; (2) rises and falls in the prices of production as a result of changes in the wage level - a phenomena which at first sight seems completely to contradict the value relationship of commodities; (3) fluctuations in market prices that reduce the average market price of a commodity over a given period of time, not to its market *value* but rather to a market price of production that diverges from this market value and is something very different. All these phenomena *seem* to contradict both the determination of value by labour-time and the nature of surplus-value as consisting of unpaid surplus labour. *In competition, therefore, everything appears upside down.* (Marx, 1990, Vol.3: 311)

The essential object of Marx's theory of value, as we have already alluded, is to demonstrate that profit originates from the sphere of production rather than from circulation. However, the rate of profit for the individual capitalist might also depend upon factors within the sphere of circulation. Yet the fallacy of composition suggests that the gains accrued by an individual capitalist might be at the expense of another capitalist. Hence, a zero-sum game is played out if one assumes that the conditions of production and the real wage uniquely determine the average rate of profit. Although a redistribution of surplus-value occurs in the sphere of circulation, the transformation of values into prices of production reinforces Marx's seminal theory of exploitation. It follows that changes in the average rate of profit can only occur from changes in the rate of exploitation, either intensively or extensively, which will ultimately affect the real wage. By contrast, the Sraffian system is implicitly microeconomic to the extent that aggregate magnitudes are generally ignored insofar as they constitute the sum total of individual magnitudes. The Marxian methodology, however, begins with the sum total of “social capital” and proceeds to derive an analysis of individual capitals, which are themselves the bearers of competition. The methodological order of determination is therefore from the abstract to the concrete (Moseley, 2004: 38). For Marx, the central aim of the transformation procedure was to demonstrate that the law of value continues to operate at a more abstract level of analysis as the focus of analysis shifts from the process of production to the sphere of exchange and circulation, which corresponds with volumes 1 and 3 of *Capital* respectively.

> The general rate of profit is determined therefore by two factors: (1) the organic composition of the capitals in the various spheres of production, i.e. the different rates of profit in the particular spheres; (2) the distribution of total social capital between these different spheres, i.e. the relative magnitudes of the capitals invested in each particular sphere, and hence at a particular rate of profit, i.e. the relative share of the total social capital swallowed up by each particular sphere of production. In volumes 1 and 2 we were only concerned with the *values* of commodities. Now a part of this value has split away as the *cost price,* on the one hand, while on the other, the *production price* of the commodity has also developed, as a transformed form of value. (Marx, 1990, Vol.3: 263)

From the standpoint of the Sraffian critique, the quantities of constant and variable capital invested in each branch of production are ultimately derived from the real wage and the given technical conditions of production. In stark contrast, the Marxian methodology *assumes* these individual quantities to have been realised in money terms. Consequently, the quantities of constant and variable capital need not be transformed from labour values into price terms because their prices have already been determined (Moseley, 1998: 24-25). The effect of equalising the rate of profit is to change the exchange ratios of two hypothetical commodities. Each commodity now exchanges according to the ratios revealed by $c + v + p$ rather than $c + v$

+ s. The former represents the concept of the "prices of production" and is measured not in money prices but in terms of values. It is evident that the transformation procedure is not merely an accounting exercise but, more importantly, the formation of prices of production is a necessary means by which surplus-value is distributed between different sectors based on their divergent value compositions and different turn-over times. Prices of production in this sense tend towards and reflect *market prices* to the extent that these prices are determined by the competitive forces of supply and demand between individual capitalists rather than by the direct imperatives which govern the production of surplus-value by “social capital” as a whole (Harvey, 1999: 68).

Marx's formulation of the so-called transformation problem was never intended to be merely a deductive procedure in which prices could be deduced from values and vice versa. Instead, the two sets of magnitudes could be derived more or less independently (Carchedi, 1984: 437). Given this level of complexity, the problem of how these identities were determined became the other major preoccupation. In this regard, Marx was quite explicit in his acknowledgement of the classical theory of the *natural price,* which had been derived by Adam Smith's original notion of the cost of production plus the average rate of profit (Baumol, 1974: 55). However, Marx's immanent critique of the classical theory was that this procedure merely expressed the outward "appearance" which had concealed the essential relationship between the transformation of surplus-value into profit. The problem of embodied labour and the proportionality between prices and values only constitutes a subsidiary issue since this would represent a special and highly improbable case under the normal conditions of the capitalist process of valorisation and accumulation (Laibman, 1980). Marx did not intend to establish a proportionality between values and prices but, on the contrary, to show that individual exploitation and individual profit are disproportional unless some restrictive conditions are imposed: "Thus it is clear that the transformation problem has the aim of showing how 'the aggregate exploitation of labour on the part of the total social capital' is, in a capitalist economy, obscured by the distinction of prices from values; the other aim is to show how living labour can be the sole source of profit" (Morishima, 1973: 85-6).

> Marx conceived the transformation process as the actual redistribution inherent in the actual transformation of individual values into market prices and at the same time as the tendential redistribution inherent in the tendency market prices exhibit toward production prices, due to capital movement across branches. In their turn, once the commodities are sold (at their actual market price) to become inputs of the next process, they again become individual values that will realise their actual social value only when the output in which they are incorporated as inputs is sold. (Carchedi, 1998: 110)

The Sraffian critique ignores the critical and essential fact that Marx's prices of production merely constitute *modified* values, which are the result of the formation of an average rate of profit in the economy as a whole. Consequently, prices of production in the original Marxian conception cannot represent market prices (Rosdolsky, 1977: 411). Indeed, the misconception that the prices of production are the cause of market prices is to conflate causation with “calculation” (Fine, 1986: 6). Prices of production are simply a *tendency* produced by the actual movement of market prices. “It is an inversion of reality to treat the tendency as if it produced the actual....It is the movement of market prices which gives rise to price of production, not the other way round. This is the reverse of the neoclassical conception according to which the long-run equilibrium prices are the real and causal phenomenon” (Freeman & Carchedi, 1996: xvii). Marx's theory of value is not and does not profess to be a theory of price determination simply because the methodology is not concerned with this neoclassical equilibrium procedure. In short, Marx cannot be interpreted within a neoclassical framework of Walrasian equilibrium.

“The reason why Marx’s theory of value is not a theory of price is that *there is no way to reduce observable concrete labour to social abstract labour in advance, outside the market which actually reflects the reduction*....Abstract labour as such can be 'measured' only when it takes the independent form of money, a form that poses it against the bodily form of the commodity in which it is embodied” (Gerstein, 1986: 52-53). The object of Marx’s theory of value was not to determine equilibrium prices, but to reveal the creation of value and the distribution and appropriation of the various concrete forms of income between social classes (Hardach, *et al.*, 1979: 24).

The prices of production therefore represent a modified form of value. The fundamental error made by Sraffians and other critics is their misguided attempts to change $c + v$ into prices of production. Yet it is precisely the value of the capital consumed which is transformed into the commodity-form. Prices represent the "phenomenal form" or the market expression of the underlying essence of value-production. Profit, for Marx, "is that disguise of surplus-value which must be removed before the real nature of surplus-value can be discovered. In the surplus-value, the relation between capital and labour is laid bare" (Marx, Vol.1, in Meek, 1956: 95). But the actual conversion of surplus-value into average profit implies that most commodities are not sold "at their values" but rather at the prevailing market prices, which tend to diverge from their values. The tendency toward the equalisation of profit in the economy as a whole therefore necessarily implies that prices will logically diverge from values but total surplus-value will be redistributed between different branches of production through the equalisation of average prices. Marx thus modifies and "corrects" the classical theory of long run "natural" prices by making the distinction between surplus-value and profit and between values and prices. The transformation of values into prices therefore presupposes the conversion of surplus-value into profit. The fundamental defect of the Sraffian method lies in its inability to distinguish between the various *forms* of value (Itoh, 1976). Consequently, the analysis is confined merely to the *quantitative* level of an embodied labour theory of value. The Marxian approach is radically different. Since the price of production of a commodity enters as an element into the cost price of other commodities, prices of production will necessarily diverge from their values. "The price system can only arrange distribution between individuals and among classes. If the price of a set of inputs is multiplied by $(1 + r)$, nothing is augmented or created. This is the core of Marx's theory" (Dumenil, 1980: 436-37).

From a methodological standpoint, the so-called transformation problem is not so much a deductive or mathematical conception. Indeed, as Uno (1980) has quite cogently argued, the transformation procedure can only be rigorously and coherently grasped as a dialectical movement from one level of analysis to another. Marx's methodology is to move from the most abstract categories of analysis to the more concrete (Sekine, 1980: 166).[4] The commodity-form is transformed into the money-form and, assuming the realisation of surplus-value into profit, into the capital-form. The concept of value therefore becomes more concrete as its quantitative form approaches a "pure" capitalist society in which the "prices of production" are themselves the concrete market expression of the law of value (Albritton, 1984: 164-65). From a more philosophical perspective, value categories reveal the inner logic of commodity fetishism and the reified social relations, which characterise capitalist society. The only real exception to Marx’s transformation procedure can arise when the assumptions of a “pure” competitive capitalism cease to predominate. Indeed, monopoly capital theorists claim that the law of value breaks down as a means of regulating exchange-values under the conditions of monopolistic competition (Sweezy, 1968). The emergence of monopolistic competition as the dominant mode of accumulation means that monopoly prices of production cannot be technically derived from values and tend to be determined on the basis of market power, or by the Kaleckian concept of the “degree of monopoly” based upon a profit "mark-up" (Kalecki, 1971: 17). The phase of monopoly capitalism therefore inherits a natural tendency towards economic stagnation (Baran & Sweezy, 1966; Lucarelli, 2004). From this standpoint, the law of value is only meaningful for the economy as a whole (Semmler, 1982).

Conclusion

The original Marxian theory of value has not only withstood the various neo-Ricardian and Sraffian critiques, but also appears to have been reinvigorated by these controversies. It should be conceded, however, that in terms of the labour-embodied or "linear" vintages, the Sraffian system has made an enormous contribution to the original Ricardian theory. Indeed, the ultimate irony is that by rehabilitating the classical surplus approach, the Sraffian critique has been more damaging to the neoclassical, marginalist tradition than to the Marxian paradigm.[5] The analytical weaknesses of Marx's transformation procedure in relation to the quantitative, labour-embodied dimensions of the theory of value continue to provoke considerable controversy. In this technical context, the Sraffian analytical procedure offers one possible solution, though at the expense of Marx's original formulation. Roncaglia's rather succinct conclusion perhaps best captures the current dilemma: “It can thus be concluded that Sraffa's system of prices of production cannot provide a substitute for Marx's theory of labour values at least in the sense that Marx meant the theory to be used....To the extent that this procedure has shown itself to be helpful, it would seem permissible to suppose that Sraffa's point of view is not at all that different from the point of view adopted by Marx to resolve the much larger task that he has proposed for himself” (Roncaglia, 1978: 143). A critical evaluation of these controversies reveals that the essential core of Marx's theory of value remains quite robust, logically rigorous and relatively immune to its various critics. Yet this conclusion is not to suggest that the Marxian theory is immutable and infallible. To be sure, the very nature of Marxian dialectics and the progressive spirit of scientific inquiry itself would be hostile to any form of dogmatism. In this sense, these controversies have been quite seminal and should continue to inform contemporary discourses.

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[1] The limited scope of this study precludes a more detailed discussion of the more recent controversies within the Marxian tradition over the ostensible transformation problem. Readers are invited to explore some of these new interpretations in Foley (1986) & Fine (1979) in relation to the procedure based on the monetary expression of labour time (MELT), and the more recent elaborations known as the “temporal single-system” interpretations in Freeman, Kliman & Wells, (eds) (2004) and Freeman & Carchedi (eds) (1996).

[2] It is precisely on this basis that the “monetary expression of labour time” (MELT) theorists attempt to find a solution to the so-called transformation problem: “Whatever the particular monetary system, Marx’s theory implies the existence of a quantitative equivalence in any particular period between the monetary unit and social labour-time. I will call this the 'monetary expression of the labour time' (MELT), which has dimensions of $ (or other currency units) per hour (or other time unit) of labour” (Foley, 2000: 7).

[3] “For Ricardo, the rate of profit was given by the ratio of the difference between the labour embodied in the net product (NP) and the labour embodied by the capital advanced to produce that product (W)(i.e., the labour embodied in the wage bill) to the labour embodied in the wage bill ((NP-W)/W)” (Halevi & Kriesler, 1991: 81).

[4] One of the seminal studies of the process of drafting *Capital* is provided by Rosdolsky (1977) in which the influence of Hegel's *Logic* comes to the forefront in Marx's dialectical method of analysis during the early drafts but is not reflected in the final draft of *Capital*. As Rosdolsky quite succinctly observes: “Marx shows that the method of ’ascending from the abstract to the concrete' is the only scientific way of 'appropriating the concrete and reproducing it as the concrete in thought'. 'The concrete is the concrete' so runs the famous sentence of the Introduction, 'because it is the synthesis of many determinations, hence the unity of the diverse'. Therefore it can only be fully understood by means of thought as a 'process of synthesis'; that is, by means of progressive reconstruction of the concrete from the most simple, abstract definitions of the concrete itself” (Rosdolsky, 1977: 26; quoted from the *Grundrisse*, 1870: 60).

[5] In a recent archival discovery, Professor Garegnani has uncovered the extent to which Sraffa's intellectual evolution shifted from a rather ambivalent, though sympathetic attitude to Marx's ideas in his earlier research in the 1920s to a more mature understanding of Marx as a great economic theorist in the course of his exhaustive and monumental work on the collected writings and correspondence of Ricardo. In Garegnani’s own words: “Sraffa certainly had a good knowledge of Marx. He sympathised with his political and philosophical theses and also with some aspects of his ideas in economic theory, but entertained doubts about the strictly economical, rather than political-philosophical value of other aspects, including the labour theory of value. It is only after his independent re-discovery of what he saw to be Classical economics....that Sraffa came to recognise a new Marx as economic theorist....to come then....to the conclusion that the labour theory of value had in fact had a basic analytical role: that of expressing independently of distribution the aggregate on which a theory founded in the notion of social surplus naturally operates” (Garegnani, 2005: 485).