A Critical Marxist Approach to Capital Theory

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1. Beyond Marx's treatment of capital theory.

The present paper aims at providing a logically consistent reformulation of Marx's theories of value and capital. The author's purpose is to draw the main lines of a critical-Marxist reconstructive approach to Marx's theory of capital.

By critical-Marxist we mean an approach internal to the cultural tradition of Western Marxism which takes Marx's system as main reference point, but does not regard it as something that should be accepted or rejected *in toto*. Critical Marxists do not interpret Marx's intellectual heritage dogmatically. They do not consider Marxism a science, but a method of social research, and do not hesitate to call Marx's views in question and to contrast them on specific points, when this is needed.

The line of demarcation between 'critical' social theory and 'scientific' or fundamentalist Marxism is not easy to trace. 'Orthodox' Marxists consider Marxism a science, the science of the laws of motion of society. They practice economic reductionism and determinism and underline the methodological relevance of dialectical materialism.[1] A possible line of separation between orthodox and critical Marxism could be identified in their respective acceptance and refusal to stress the importance of the available quantities of physical inputs in production and to downgrade the relevance of money.

Critical Marxism is a sociological mix of historical materialism and positive humanism, whose origin can be found in the 'critical theory' of the Frankfurt school of social research of Horkheimer, Fromm, Adorno and Marcuse, active in Germany in the 20th century inter-war period. It has evident connections with certain strands of French postmodernist social science (Lyotard, Baudrillard), with Gramsci's idealistic historicism and with cultural position of the last Lukács, the author of the *Ontology of Social Being*, who rejected dialectic materialism and replaced human activity at the centre of economic attention. Critical Marxists share Marx's project of a different and egalitarian society, one in which each person would be granted equal dignity and same opportunities of social progress, in which an end would be put to the repressive state system and less importance would be attributed to the increase of individual wealth and more to establish human relations of solidarity.[2]

Marx saw communism and humanism as two ethical conceptions linked by strong ties of reciprocal implication. Communism was the demand for a radical social change, the design of a new society characterized by the abolition of individual asset ownership and heritage rights, collective property of means of production, self-government of producers and communitarian and essential forms of consumption. A classless society based on reason and knowledge, in which, after a transitory phase, individual liberty would be effective, equal for everybody and necessarily

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[1] 'Orthodox' or scientific Marxism, linked to the names of Bordiga, Luxemburg, Hilferding, Mandel, Kropotkin, Pannekoek, Mattick, Della Volpe and the first Colletti, should not be confused with the vulgar and determinist Marxism of the Third International.

[2] Among critical Marxists let us mention the neo-Ricardian exponents of the Russian-German school of mathematical economics active at the beginning of the 20th century (Dmitriev, Bortkiewicz, Tugan-Baranowsky) as well as a large number single scholars (Sweezy, Okishio, Steedman, Laibman, Debord and others) and structured groups of left-wing intellectuals (the British *New Left* of Williams and Anderson, the German *Neue Marx-Lectüre* of Backhaus and Reichelt, the French post-structuralist Marxists, the Italian workerist and autonomist movements of Panzieri, Tronti, Negri, etc.).

limited, labour exploitation would disappear and each human being would contribute to the creation of wealth in conformity with his abilities and would be rewarded according to his basic needs. Humanism was a responsible philosophy of man that implied a positive approach to life and a cooperative and non-competitive attitude towards other people.[3]

In Marx's opinion, humanism and naturalism were two distinct though not mutually exclusive categories of historiographic interpretation. They could be reconciled. Between man and nature there was no necessary antagonism. Human beings were not subject to rigid natural laws and could be conscious protagonists of their social history, even in the presence of objective circumstances which were out of their control.[4]

Theoretical Marxism, which draws inspiration from Marx's theoretical work, must be correctly conceived. It is an explanation of how a capitalist society works. It is neither the anthropocentric humanism of the young-Hegelian and Feuerbachian type professed by the young Marx, nor the anti-humanist philosophical perspective often ascribed to the 'mature' Marx, after his controversial 'epistemological break' of the middle 1840s which signed the passage from ideology to science.

The specific purpose of this paper is to reconsider, after the definitive abandonment of the pure labour theory of value, some of the main theoretical categories that characterize Marx's analytical treatment of value and capital and to advocate the passage to the different labour-and-capital theory of value that is sketched in the final version of Marx's theoretical system. In compliance with Jacques Derrida's post-structural methodology of textual reading and discourse analysis, we shall first deconstruct and then reconstruct Marx's theoretical approach to value and capital. With some changes which we shall introduce to make his discourse more consistent on logical grounds and better suited to interpret the past history and the present perspectives of capitalism.

Let us briefly clear by now what we intend do in this paper. We want to provide a critical Marxist correct reformulation of Marx's theories of value and capital. For this purpose, we shall retain some of the basic components of Marx's intellectual heritage. Namely:

- (a) his method of analysis of the economic system in its historical materialist evolution;
- (b) his description of the logic of capital accumulation;
- (c) his idea of capitalism as a contradictory, unstable and socially oppressive economic system.
- (d) his approach to value as a social relation of production; a value-form, not a substance;

We shall however depart from some questionable interpretations of Marx's analysis of specific doctrinal points. In particular, we shall

- (i) refuse to conceive dialectical materialism as the general science of the laws of motion of human societies;
- (ii) reject Marx's conception of variable and constant capital;
- (iii) abandon the quantitative version of Marx's pure labour theory of value;
- (iv) refuse Marx's 'net price' or 'new value' equality between net social output and total living labour.

As shown by Sraffa, Marx's treatment of value is 'redundant' in the determination of commodities relative prices, when the initial quantities of commodities, the technical coefficients of production and the wage rate are known.

For the readers sake, it may be convenient to introduce our analysis by recalling very briefly the controversial results of the symposium on 'Paradoxes in Capital Theory' which took place in the November 1966 issue of the *Quarterly Journal of Economics* between the neo-Ricardian or 'Anglo-Italian' school of Cambridge, England, and the MIT neoclassical synthesis school of Cambridge, Mass. In that occasion, two papers by Pasinetti and Garegnani proved that the neoclassical

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[3] Leading Marxist humanists include Lukács, Fromm, Bloch, Korsch, Adorno, Marcuse, Dunayevskaya, Schaff, Garaudy, Sève and exponents of the Yugoslav Praxis School. Among the supporters of the thesis of Marx's theoretical anti-humanism, we may mention Althusser, Foucault and some French structuralist Marxists.

[4] A synthetic formulation of historical materialism was given by Marx in his preface to the *Contribution to a Critique of Political Economy*, which contains a short autobiography and a concise description of his conception of history, characterized by the idea of a primacy of the world material structure over the intangible superstructure.

assumption of a single homogeneous capital substance was logically untenable and had to be abandoned. The discussion which followed made clear that capital is not a single factor, that profit is not the reward for capital, that there are no necessary and unidirectional relationships linking in production factor prices and quantities, that the social distribution of income is not univocally determined by the technology of the system and that there is no measure of capital intensity independent of the rate of interest.

The Cambridge Debate, however, had a limited impact on capital theory and did not provide an alternative approach to the aggregate versions of the neoclassical theory of capital. As some previous debates on capital theory [5], it was not conclusive. Its theoretical implications are still controversial. It has been shown that paradoxical capital behaviours are logically possible, but their empirical relevance has not been established. They are often regarded as anomalies, logical curiosa or scarcely significant local puzzles. Aggregate neoclassical capital models continue to be used, in spite of the very stringent conditions implied by a correct aggregating procedure.[6]

There is therefore still the need of a satisfactory theory of capital. The situation at this regard has not substantially changed in the early 1980s, when Duncan Foley proposed a new reading of Marx's writings on value and capital, the 'New Interpretation' (NI), that we shall examine in the next pages. We do not share his analytical treatment of the subject and shall independently proceed in the reconstruction of the theory of capital along critical Marxian lines by rejecting both the orthodox Marxist idea of a social mechanism determining the value of money in terms of the living labour commanded by commodities and Foley's assertion that the value of labour-power is equal to the wage rate multiplied by the value of money. In our opinion, the value of labour-power is the money equivalent of the social labour time presently required to produce the commodities a worker buys.

2. A critical Marxist perspective.

Critical Marxism was first developed as a research methodology in social sciences and a critical theory of capitalist society in the 1920s and 1930s at the Frankfurt Institut für Sozialforschung. Initially, this work was made by a German cultural elite in opposition to the idealistic and positivistic tendencies dominant at those times, and later on, after the Nazi's advent to power in Germany and the forced exile of several members of the institute, also in opposition to the rising attention given in the Soviet Union to *diamat*, a rigid interpretation of dialectical materialism. Critical theory focused on the fundamental conflict between human reason and nature. The attempt to reduce Marxism to a natural science in the widespread climate of social Darwinism was opposed. And Marxism nature of social and historical science was reaffirmed.

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[5] We are specifically referring to: (i) the early debate on the construction of an intertemporal theory of capital in equilibrium, that took place at the end of the 19th century and opposed to leading neoclassical American capital theorists (J.B. Clark, Fisher, Fetter and Knight) the 'Old' Austrian School (Menger, Wieser and Böhm-Bawerk), which focused on the analysis of capital structure, an important technical debate that reversed the direction of value imputation, from the historical cost of capital goods to their expected future earnings; (ii) the academic debate that took place in the 1920s and 1930s between the 'New' Austrian School of Mises and Hayek and the Keynesian Cambridge Circus (Keynes, Kaldor, Sraffa) and saw the final prevalence of the Keynesian line; (iii) then Hicks, a leading general equilibrium theorist, proposed a pseudo-dynamic model of temporary equilibrium in which all inputs and outputs were timed, and later on suggested to reformulate the theory of capital along alleged neo-Austrian lines which included both circulating and fixed capital; (iv) a further debate was the discussion that in the 1950s opposed Joan Robinson to Samuelson, Solow and Swan on the measurement of capital and on the legitimacy of the use of aggregate production functions. The analytical attention then shifted from the relation between capital and interest to that between the capital stock and the output flow and on whether general equilibrium disaggregated approaches to capital theory were subject to the same criticisms moved to aggregate neoclassical model.

[6] The restrictiveness of the econometric conditions implied by capital aggregation in production functions (additivity, convexity, homoteticity, etc.) have been underlined by several authors (Leontief, Nataf, Gorman, F.M. Fisher, Sato and others).

Marx's approach to history recognized the existence of objective reality independently of human consciousness. Marx looked at the development of productive forces as the main lever of social transformation, but tried to reconcile this idea with the anthropocentric perspective of positive humanism. The result was a complex ontological conception that pursued a dialectical synthesis of subject (human beings) and object (material processes). No matter whether they regard themselves as orthodox or not, all Marxists take historical materialism as the basic methodological guideline in their analysis of society and in their attempts to transform such analysis into an active political action. Historical materialism is both a model of interpretation of the real world and a stimulus to act to change society. But it probably needs today to undergo a revision in a non exclusively economic deterministic direction in order to keep in line with reality. Marx's idea that the material reality of modes of production comes first and all the rest follows – that "the mode of production of material life determines altogether the social, political and intellectual life process" [7] – is still valid, but the univocal direction of causality implied by the 'economic-base/superstructure' model of determination must be reconsidered and it must be admitted that it suffers important exceptions[8]. Today the dialectic of social classes can no longer be conceived as the simple bipolar one entailed by the outdated scholastic paradigm of pure capitalism.

In this modified cultural climate, critical Marxist theoretical conceptions have shown a tendency to diversify and increase in number. Now they include a variety of different forms and it is difficult to group them today under general labels, such as Western cultural Marxism, Austro-Marxism, world-systemic Marxism, radical political economics, or new-left Marxism. A simple enumeration of the various forms of theoretical Marxism would take pages. References to 'a thousand Marxisms' or to as many critical Marxisms as there are Marxists seem however inappropriate. Some forms of Marxism are really critical, but others are not. They are old versions of Marx's theories re-proposed as new 'orthodox' ones.

Basic components of critical Marxism are a communitarian and solidaristic vision of the world and a positive humanism, of classist rather than individual existentialist nature. The result of their reciprocal implication is a peculiar mix of materialism and spiritualism, particularly evident in two of Marx's early writings: the 1844 *Economic and Philosophical Manuscripts* and *The German Ideology* (written with Engels), discovered and published for the first time in the 1930s.[9] An intellectual perspective that contrasted with the lack of humanity of capitalism. And a perspective that was destined to be much modified by Marx in the following years.is denied by some interpreters of Marx's theoretical system.

A central point of discussion is still today whether or not the early philosophical humanism of the young Marx turned later on in its very opposite, that is an anti-humanism which rejected the philosophy of spirit of idealistic kind as false consciousness.

For Marx, social history was the result of a dialectical synthesis of opposites. He regarded historicism as a non-deterministic theoretical perspective. He refused to conceive economics as an ontological way of thinking, and to consider economic factors the ultimate cause of social changes. He did not believe in rigid laws of motion determining the evolution of social history.

Some important questions arise at this point. Can the distinct cognitive paths of the young and the senior Marx be mutually reconciled? Does a 'return to Marx beyond the Marxisms' appear

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[7] K. Marx, *Zur Kritik der Politischen Ökonomie* (1859).

[8] As pointed out by Althusser, the case can generate the necessity and there cannot be much space for theoretical humanism and historicism when the historical process is conceived as governed by the case. See L. Althusser, *Contradiction and Overdetermination* and *Marxisme et humanism*. By overdetermination Althusser – the theoretician of aleatory materialism – meant the irreducibility of the system as a whole to the properties of its elements. It has qualities and laws of its own, and they establish through a feedback process the properties of the components. Marx used to say that "the real is the synthesis of many determinations".

[9] At that time, Marx was a left-wing 'young Hegelian', sensitive to Feuerbach's positive humanism and materialist reinterpretation of Hegel's philosophy and of his dialectical method of reasoning. He believed in the fundamental unity of logics and ontology, denied the primacy of praxis and the distinction between objective knowledge (science) and ideology (false consciousness).

possible? [10] Or does the abandonment of the labour theory of value [11] imply a collapse of the entire Marx's theoretical system, and thus sign the passage to a new age, that of 'post-Marxism'?

These are all open questions to which we hope to be able to answer with our present proposal of a new critical Marxist approach to the problem.

3. The labour theory of value in a capitalist system.

To recall why the labour theory of value cannot hold in a capitalist society, we shall make use of a simple model of production of Ricardian lineage, with homogeneous labour, circulating capital and a linear technology of activity analysis type, with a finite number of activities and no joint products. We can write a matrix system of quantity equations

$$\boldsymbol{y} = (\boldsymbol{I} - \boldsymbol{A})\,\boldsymbol{x} \qquad [1],$$

where $\boldsymbol{y}$ is the net product vector denoting the activity levels, $\boldsymbol{x}$ is its quantity or volume size index and $\boldsymbol{I}$ is the identity matrix. It will describe the technological structure of the model and the commodity composition of the net product $\boldsymbol{y}$ required to satisfy at a certain moment a given final demand.

$\boldsymbol{A}$ is a Leontief input-output matrix of technical coefficients of single product industries, that is the direct requirements matrix, derived from the inter-industry transactions matrix (in which the rows are producing sectors and the columns consuming sectors) by dividing each cell by its column total. $\boldsymbol{Ax}$ is capital, supposed entirely of circulating nature.

If the system is viable, the matrix $(\boldsymbol{I} - \boldsymbol{A})$ can be written as a convergent geometric series with an infinite number of terms, $(\boldsymbol{I} + \boldsymbol{A}_1 + \boldsymbol{A}_2 + \boldsymbol{A}_3 +... + \boldsymbol{A}_n)$, where $\boldsymbol{A}_n$ tends to zero as n tends to infinity. Its inverse $(\boldsymbol{I} - \boldsymbol{A})^{-1}$ describes the vertically integrated temporal structure of production and can be used to calculate the total production of commodities required to satisfy any possible composition of final demand. The vector of production prices of commodities can be expressed in money terms as a sum of profits and wages:

$$\boldsymbol{p} = \boldsymbol{pA}\,(1 + r) + \boldsymbol{a}_n w \qquad [2],$$

where r is the equilibrium rate of profit, equal to the rate of interest on money capital, $\boldsymbol{a}_n$ is the row vector of the direct labour inputs and w is the real wage rate. Therefore the production prices of commodities are the sum of three elements: (i) the cost of the material means of production, $\boldsymbol{pA}$; (ii) the labour cost, $\boldsymbol{a}_n w$; and (iii) $\boldsymbol{pA}r$, the financial cost of money capital, or required profit on the money capital advanced.[12]

[10] To which Marx? To the 'young Hegelian' idealist, or to the elder and 'mature' historical materialist? The evolution of Marx's thought does not provide a single reliable point of reference. Marx was linked to Hegel's idealistic philosophy by an intellectual relation which was initially of substantial identification and became later a critical one. He said that he accepted Hegel's dialectics in its "rational kernel" (the dialectic itself), but reversed it in its "mystical shell", thus turning from idealism to historical materialism.

[11] The labour theory of value, introduced by Marx in *Capital*, vol. I, in the framework of his analysis of the immediate process of production, was abandoned in *Capital*, vol. III, where Marx described the process of capitalist production as a whole and admitted that the price of production of a commodity could diverge from its value and that the commodities are exchanged in proportion to the quantities of capital required by their production.

[12] The labour cost involved by the production of the bundle of the consumption goods of the capitalist class is not considered. Should this cost also be accounted for among the cost components of production prices? Or should at least the labour cost of the necessary consumption of the capitalist class (conventionally reckoned) be accounted for as an indirect cost element? This is a controversial point.

We are thus dealing with a system of n price equations, with n+2 unknowns (n prices, r and w), that can be closed by taking the price of a commodity as *numéraire* and by adding a further equation providing an exogenous value of r or w. The general solution is the price vector

$$\boldsymbol{p} = \boldsymbol{a}_n w\, [\boldsymbol{I} - (1 + r)\, \boldsymbol{A}]^{-1} \qquad [3].$$

Commodity prices depend on the quantities of abstract labour embodied in the commodities produced, on the technical conditions of production that determine the amount of the surplus and on the social distribution of income between wages and profits. The total purchasing power of the commodities produced in the economy, expressed in terms of labour commanded at prices $\boldsymbol{p}$**,** when the real wage is taken as *numéraire*, equals the sum of wages and profits. In the limit case in which $w = 1$ and $r = 0$, the labour theory of value hold in its pure form and the values coincide with the prices of production of commodities.

Let us proceed. Since the matrix within the square brackets can be expanded in an infinite Taylor series of convergent powers, in terms of the dated quantities of direct and indirect abstract labour embodied in the various stages of production, vertically integrated, it is now possible to operate a reduction of commodities prices to dated and weighted labour quantities. The processes of production will thus be considered in a diachronic key, as sequences of labour inputs following each other over time up to the production of the commodities destined to the final uses.

To ensure convergence of the Taylor power series, the factor of capitalization at a compound rate $(1+r)^t$ must be less than the inverse of the eigenvalue with greatest modulus of matrix $\boldsymbol{A}$. This condition is satisfied for any value of r lower than the greatest theoretical one, which corresponds to a subsistence wage. Relation [3] can then be re-written as a polynomial matrix equation

$$\boldsymbol{p} = \boldsymbol{a}_n w + (1 + r)\, \boldsymbol{a}_n \boldsymbol{A} w + (1 + r)^2\, \boldsymbol{a}_n\, \boldsymbol{A}^2 w + ... \qquad [4],$$

in which production prices are shown as sums of payments to workers (wages) and capitalists (profits, compounded over the investment life), each term is smaller than the previous one and $\boldsymbol{A}^n \to 0$ as n tends to infinity. If this equation of 'reduction of prices to dated quantities of labour' is satisfied by a particular price vector, any positive multiple of the vector satisfies it.

From this matrix equation we see that the prices of commodities, the form in which products show up in a capitalist society, are made of an infinite number of overlapping layers of wages and profits. They do not depend on labour-values, but on the proportions in which labour and capital are employed in the different stages of production and on the social distribution of income between wages and profits. With differing organic composition of capital in the single production processes, for every level of the rate of profit there is a given set of relative prices and a given real wage rate. Under such conditions, a proportionality relation between prices and labour-values is only conceivable in the highly unrealistic limit cases in which $r = 0$ and $w = 1$.

We can therefore conclude that human labour is the ultimate source of value, its qualitative substance, but that the labour theory of value does not hold in its quantitative version in an economic system in which there are capital goods and production is made for profit.

4. Value forms: labour, capital and money.

Capital is a complex and controversial economic category with a peculiar three-fold dimension – physical, financial and temporal. It accomplishes the fundamental technical functions of making possible future production, intertemporal resource allocation and the valuation of assets.

There is no generally accepted definition of capital. It has been defined as a collection of heterogeneous and material instrumental goods, different for species, age and technical characters (the point of view of classical political economy); as a fund of productive values (the financial dimension of capital); as a link between the past, the present and the future (the temporal dimension of capital, that of Jevons and the Austrian school); and as a social relation of production (Marx).

Capital takes different forms: those of money-capital, productive capital and commodity-capital. The determination of its value is a controversial theoretical issue. Capital goods must be valued in money, at their market price, that includes a profit margin, which in turn depends on the price of capital. To avoid circular reasoning, the prices of commodities and the social distribution of income must therefore be simultaneously determined. This has been done, by Bortkiewicz and later on by Sraffa and others.

Marx regarded capital as a systemic totality. He measured capital and its components both in terms of quantities of labour-time and of quantities of money. He considered these methods of measurement equivalent. He also made the crucial assumption of a strict proportionality relation between the quantities of labour-time embodied in commodities and the quantities of money capital invested. There are numerical examples in the three volumes of *Capital* – as those in the reproduction schemes of vol. II, part 3, and in vol. III, chapters 9 and 41-44 – of his use of both these methods of measurement.

Marx's idea of capital as a whole is logically untenable and should be rejected as a metaphysical concept, a pure abstraction, devoid of empirical content. In the real world there is no such thing as undifferentiated capital, but heterogeneous capital goods differing from each other by substance, form, age and duration. We shall here refer to a different notion of capital, focused on its internal and essential determinations. Capital, in our opinion, is value in progress, valorizing value. Though not self-valorizing value, as argued by Marx, because production requires the joint availability of capital, labour and natural resources.

Let us now look at labour, which, for Marx, is the only source of surplus-value. The value of labour equals the quantity of socially necessary labour which is needed to create and sustain the worker. Capitalists, who pay to workers the value of their labour-power, are then in the position to force them to work for more time than is needed to reproduce the value of the wage. This is labour exploitation. Employers pay workers less than the value workers produce, and thus they get a surplus-value, a profit whose origin is workers unpaid extra labour. This is possible because labour-power is a peculiar commodity which, differently from material means of production, under suitable technical conditions can produce more than its value.

We are here in presence of a crucial but unproved and illegitimate assumption made by Marx, one that critical Marxists refuse: the assumption that physical means of production, as raw materials and machinery, cannot transfer to the product more than the value they lose in production. It may be objected that labour-power produces value and surplus-value only when it is combined with other factors of production, in proportions determined by the technological conditions in which the system operates. Therefore the rate of surplus-value should not be measured, as Marx did, with reference to variable capital, but to the sum of constant and variable capital.

In the absence of technical progress, Marx determined the price of production of commodities by multiplying the sum of living and dead labour by a normal profit factor, independently determined at a macroeconomic level, for the system as a whole.[13] In his reproduction schemes, which were intended to establish the equilibrium conditions for steady growth of the system, he made the simplifying assumption of a linear technology implying constant returns to scale, and he attributed the same relevance to the requirements of living and dead labour.

We cannot follow him on this ground. Commodities normal prices will be valued at the social costs of production, in money terms, and will include a notional cost, the opportunity cost of invested capital. Marx does not consider this notional cost, but he adds to the real cost of production of commodities a profit margin, reckoned at a uniform 'normal' rate. Is his method correct? To answer this question, the nature of profit must be further analyzed.

[13] Marx's profit rate was the ratio of total surplus-value S to the sum $C+V$ of constant and variable capital. It was applied to capital invested without distinguishing the specific dates of its investment. An equal relevance was thus ascribed to all the units of labour involved in production, independently of their location in time.

Profit on capital is a residual category of income, the difference between price and cost of production. It is the remuneration of invested capital in the presence of wage labour exploitation. If workers were not rewarded with a wage inferior to labour productivity, but with the entire product of their labour, there would be no profit. In the computation of profit, attention must be paid to the opportunity cost of invested capital, which is the expected return of the best alternative foregone when a specific investment choice is made. That is the minimum level of return required by an investor.

Is the opportunity cost of capital the same thing of normal profit? This is a crucial and controversial point. An economist answer would probably be affirmative.[14] That of a professional accountant would be negative. In business accounting, profit is the net worth of accumulated wealth, measured by the excess of the money value of assets over that of liabilities. [15]

Marx asserted, but did not demonstrate, the 'new value equality' between the net product of the economy and the living labour employed in the production of gross output. This alleged accounting identity, devoid of any explanatory power, plays in Marx's theoretical system a fundamental role. It allows to disregard the productivity of capital goods and to consider living labour as the only source of new value. This is the only case logically consistent with a labour theory of value. But it is a completely unrealistic case. In the presence of material means of production, the 'net value' equality would hold only if capital goods were not considered directly productive of net output (the erroneous meaning that Marx gave to 'constant capital'). The accumulated dead labour embodied in capital goods is a specific factor of production. As living labour, it is required to produce new value. In the labour theory of value this is not recognized.

This fundamental error can be disguised, though not avoided, by centering the attention on the net product of the system, which does not include the depreciation of capital goods, instead than on the gross product of the economy, which includes the depreciation. This is indeed what several neo-Marxist authors have done, on the footsteps of the NI interpretation of Marx's theoretical system, or of its variants, all of which imply the arbitrary assumption of the equivalence of the net output of the economy and the value of the living labour used in the production of gross output. This is a totally unjustified assumption, a smart *escamotage* of neo-Marxist authors who deny a direct productive role of capital goods, that we are not prepared to share.[16]

5. Capital as value in progress. Basic relations in capital theory.

A connected and relevant question concerns the role of money in production and the origin of the money form of value. Money, the typical for of appearance of value, is potential capital, potential value in progress, but is not a factor of production. Money is a multi-functional economic category. It is medium of exchange, means of payment, external measure of value, possible store of wealth, standard of price and powerful instrument of economic dominance [17]. And it is a logical premise of

[14] Economists do not regard normal profit as a surplus element, but as a cost. They distinguish normal profit from the producer surplus, or quasi-rent, the difference between revenue and variable cost, which represents a temporary extra-payment to a scarce factor of production.

[15] In the professional accountant approach profit is not conceived as the difference between total revenue and total cost, but as the difference between total revenue and explicit costs (real expenses). The opportunity-cost of capital is not considered. Profit therefore looks higher.

[16] A crucial feature in the NI approach is its reference to the net rather than to the gross output of the system. In this way the money value of labour-power does necessarily coincide with the monetary expression of Marx's variable capital, without any need to transform values into prices of production. Commodities values can thus be seen as 'normalized' expressions of such prices. If to get the net output, one subtracts from the gross output of the economy also the necessary consumption of workers – as is logically required by a symmetrical treatment of capital and labour – total profit will equal total surplus-value (which is one of Marx's invariance postulates).

[17] Market economies do not recognize equal importance to every person, but to every unit of money. Who owns a million dollars disposes in a market framework of a million 'rights to vote'.

production activity, because any production must be previously financed. To be able to buy or to hire what is needed to start a production activity, firms must dispose of an initial money fund, whose provision implies a financial cost.

Marx's theory of value was a two-fold one, one with two different faces. It was derived by the Ricardian labour theory of value and was not a theory of relative prices, but the logical basis for an analysis of the theory of labour exploitation. Marx's main purpose was "*to lay bare the economic laws of motion of modern society*" and to justify his idea of a necessary antagonism between workers and capitalists.

Marx's labour theory of value was not the same as that of Ricardo. Two significant changes had been introduced by Marx: the reference to abstract rather than to concrete labour time and the distinction between labour and labour-power. But capital had no autonomous productive role. It was dead labour embodied in capital goods and could only absorb, 'vampire alike', the productive power of living labour. Later on, Marx changed this theory, in *Capital*, vol. III, where he reversed his previous conception of the productivity of capital and recognized that in advanced capitalist systems a large part of the productive power of labour was gradually transferred to capital. This was a radical turning, that implied the passage from a 'pure' labour theory of value to a different 'mixed' labour-and-capital theory. It was confirmed in Marx's *Manuscripts* of 1861-63, where he wrote: "*We have seen not only how capital produces, but how it is itself produced, and how it emerges from the production process as a relation changed in essence… Since living labour is incorporated into capital…, as soon as the labour process starts, all the productive powers of social labour present themselves as productive powers of capital*" [18]. For the senior Marx, the source of value was not labour, but labour and capital.[19]

This radical change, a 180 degrees turning, of theoretical perspective was possible because for Marx labour and capital were not, from a technical point of view, two opposing entities. They were linked by a relation of reciprocal implication. Wage-labour was 'variable capital', the cost of reproducing labour-power, and 'constant' capital was stored-up labour, the abstract objectified in the concrete. This made possible a rejection of the labour theory of value in its quantitative version, that of Marx's reproduction schemes, and its confirmation in a qualitative version, where labour continued to be seen as the ultimate source of value.[20]

Whenever a commodity selling-price exceeds its cost-price, there is a surplus-value and a profit on capital. Profit can therefore be defined as the excess of the selling-price over the cost-price of a commodity. The ratio of profit to invested capital is the profit rate. The average rate of profit is influenced by the capital intensity of production. When the rate of surplus-value is given, the rate of profit on capital depends on the capital intensity of production and on the speed of rotation of capital. In the long run, the competition between producers tends to equalize the rate of profit of the different sectors of the economy, because convenient transfers of capital tend to take place from the less profitable towards the more profitable industries.

In the course of time, fixed capital is gradually transformed into circulating capital. This phenomenon, known as the 'rotation of capital', takes place because fixed capital is subject to

[18] See MECW, vol. 34, XXI, 1317.

[19] In his 1894 *Preface* to the posthumous edition of the third volume of Marx's *Capital*, Engels wrote: "the Marxian law of value holds generally, as far as economic laws are valid at all, for the whole period of simple commodity production – that is, up to the time when the latter suffers a modification through the appearance of the capitalist form of production. Up to that time, prices gravitate towards the values fixed according to the Marxian law and oscillate around those values"..

[20] Marx used to group together fixed capital and raw materials. He called them 'constant capital' (C). The net product was for Marx the sum of 'variable capital' (V), i.e. the wage bill, and 'surplus-value' (S). Gross product was $C+V+S$, net product $V+S$, the rate of surplus-value S/V, the rate of profit $S/(C+V)$ and the 'organic composition of capital' C/V. Marx's distinction between variable and constant capital does not coincide with the earlier classical distinction between fixed and circulating or working capital. Marx's constant capital includes some circulating capital (raw and auxiliary materials and goods in process).

depreciate for physical and technical wear and tear. But amortization quotas in money form are usually set aside in view of the future replacement of the equipment. An increasing part of constant capital thus takes a money form and moves temporarily out of the production process, to enter again in it later on, when the plant renewal takes place. In the meanwhile it remains at the disposal of the firm, which can utilize it for short terms necessities of capital.

Fixed and circulating capital have different speeds of rotation. That of circulating capital is higher. As the capital intensity of production is normally increasing in the long-run, this tends to determine a falling rate of profit, that however can be contrasted in the short run by a lengthening of the working day, by an intensification of labour or by a reduction of the wage rate.

For Marx, on logical grounds priority in production is due to the possession of money capital. "Money", he says, is "the point of departure for the immediate process of production". His circuit of capital, ($M - C - M'$), assigns a priority to the money form. This is just the contrary of what has later been done by Sraffa, whose analysis of production of commodities started from the physical quantities of inputs and regarded money simply as a unit of measure.

The concept of capital is related to that of income, the flow of wealth that can be consumed while keeping capital intact in value terms, in conformity with a 'preservation principle' similar to that which apply to energy in physics (first law of thermodynamics). Income is the sum of final consumption and of the net increase in the value of the existing stock of capital, inclusive of capital gains and losses. Different concepts of income are used by economists for distinct analytical purposes: measurability and comparability of performances, forecasting, planning, etc. In the accounting practice, income is defined on the basis of a different 'realization principle'. It is the excess of revenues over costs.[21]

The origin of profit, for Marx, was the systematic exploitation of wage labor by capitalists. He thought that workers were entitled to obtain the entire product of their labour, less the necessary allowances made to provide investible resources and public goods and to satisfy the basic welfare needs of disabled people. The quantitative basis of his theory of exploitation was the labour theory of value. With the abandonment of the labour theory of value, Marx's concept of capitalist exploitation has become hardly tenable. The causal nexus between surplus-labour and exploitation is no longer evident. It is therefore impossible to compare the quantity of labour-time that a worker makes for a capitalist with that embodied in the wage goods that the worker receives as remuneration, or with that commanded in the market by his money wage. Marx's concept of labour exploitation must therefore be reconsidered and has to be disengaged by the labour theory of value. When workers are paid less than the value they produce there is labour exploitation. Clearly, this concerns only living labour. Dead labour has been exploited in the past and can no longer be exploited.

6. The integration of money in the theory of capital.

In a capitalist society, where the value-form of commodities acquires special relevance, the valorization of capital becomes a primary aim of economic activity and the growth of capital is placed before the pursuit of the welfare of civil society. There is thus a subversion of a natural scale of values. In the pursuit of profit, human beings become simple means.

Labour and capital are the basic elements in any production activity. They must necessarily be combined to produce an output. Nothing can be produced with unassisted labour or unassisted capital. But traditional Marxists recognize an active role in production only to living labour and assign to capital goods a merely passive role.

[21] There are two distinct accounting approaches to the definition of income: the balance sheet method, based on the comparison of assets and liabilities at a given point in time, and the income statement method, based on the comparison of revenue inflows and cost outflows over a given period. Values are reckoned in the balance sheet only when they are realized by an income statement transaction. The cost side should include real expenses and notional imputed costs.

The integration of money in the theory of capital requires awareness of the working of the channels that link the financial sector of the economy to the real one and that provide the required feedback loops. That is of the markets for financial assets, of the bank lending channel and of the financial accelerator. What must be cleared is the direction of causal relations. Do they go from the financial sector to the real one, through the bank-lending policy? Or is the financial sector ultimately conditioned by the needs of the real sector? Which is the driving force at work in the system? We believe in the existence of a bidirectional and asymmetrical causal nexus. The supply of money has a mixed nature. It is partly exogenous, for the presence of fiat money, the legal tender issued by the monetary authority, and partly endogenous, for the credit money issued by commercial banks on demand by firms, in form of bank loans or overdraft facilities.

The determination of the prevalence of the endogenous or the exogenous component in the nominal supply of money is still an open problem in the literature. Whereas the real supply of money, which depends on the demand for money, via the velocity of circulation, has an evident endogenous nature. The central bank cannot be simplistically conceived as an accommodating price-maker and quantity-taker. However some post-Keynesians, working in the banking school tradition, consider the supply of money infinitely interest-elastic at the level of the interest rate established by the monetary authority (or taken by them as an inflation target). They represent it by a horizontal line in the interest-money space and are therefore called 'the 'horizontalists'. They focus their attention on the flows of credit money, disregard the possible use of money as a store of wealth (a stock variable) and consider the central bank a compliant lender of last resort. [22] Their vision is opposed by the 'verticalists', who, following the old view of money of the currency school, depict money supply by a vertical line, intersected at the market interest rate by a downward-sloping curve of the demand for money. [23]

Our personal position, an intermediate one, is in line with that of leading non-fundamentalist British post-Keynesians, as Charles Goodhart, Sheila Dow and Victoria Chick. We believe that the functional interdependence of the demand and the supply of money should be recognized. There is no unique causal connection going in a single direction. It is indeed problematic to distinguish the demand from the supply of money in the presence of both fiat and credit money. It is therefore not correct to trace two distinct curves for the demand and the supply of money in the Marshallian quantity-price space, as is still done in most textbooks.

7. Problems of monetization and dimensional conversion in capital theory.

Two main problems of dimensional conversion must now be afforded. The first one, typical of every stock-and-flow model, concerns the conversion of capital stock estimates into corresponding estimates of flows of capital services and depreciation allowances, and vice versa. Estimates of stocks and flows are interdependent, though not necessarily proportional.

Prices and quantities of capital services must be distinguished. Prices depend on the level of technology and are subject to change over an asset life. User costs, or rental prices, are paid for the use of assets. Quantities are expression of asset productive efficiency, vary with asset ages and vintages and tend to decrease over time, for the physical and technical deterioration of capital assets.

[22] They maintain that their position matches Keynes's views on the subject. This is, however, a controversial point. Keynes's opinions on the subject, first expressed in endogenous terms in the *Treatise on Money*, were modified in the *General Theory*, where the supply of money was regarded as exogenously determined by the monetary authority, to allow the closure of the underlying analytical model, which included two liquidity-preference functions. This radical change of theoretical perspective, was not confirmed in some later writings.

[23] There are two distinct groups of them: the 'structuralists', who represent the supply of money by a positively sloped line, due to the presence of institutional constraints, uncertainty and increasing financial risk, and the 'neo-chartalists', who deny that the expansion of credit money can go on indefinitely over time and attribute to commercial banks a liquidity preference that may affect negatively their responsiveness to the demand for credit.

Several difficulties must be overcome to measure capital assets and capital services. Valuation methods for measuring capital are known, but all of them are subject to strong criticisms. Let us briefly consider some of these methods. Treating capital as a reserve of value with constant purchasing power – the method used by Marshall, Walras, Fisher and other neoclassical economists – implies knowledge of unknown future prices. A second method of valuation, based on the current replacement cost and employed by Denison and others, is influenced by changes in relative prices and by the social distribution of income. Moreover, for an estimate of the depreciated value of old assets that are no longer produced but can still be utilized, this method cannot be used. Prices based on replacement costs could perhaps be substituted by demand reservation prices. A third method, that of perpetual inventory, based on the historical cost of production and employed by Jevons and the Austrians, implies the use of a constant interest rate and a subjective estimate of the duration of capital goods.

Quality changes of capital goods due to technological progress are difficult to appraise. They imply a disaggregation of the components of a changing mix of capital assets. Besides, as regards capital services, account should be taken of the degree of capacity utilization of the stock of capital. It may not be constant over time and should therefore be estimated as an average. Quality changes could in such case be measured per unit of the services rendered by capital goods.

A second important problem of dimensional nature which arises in the theory of capital concerns the reciprocal conversion of labour-time and money costs. The conversion is possible, but requires use of special price indexes. The labour cost of output can be reckoned in money terms, at market prices, by a valuation parameter. This was correctly individuated by Marx, who called it 'the monetary expression of value' (MEV).

MEV is the ratio px/L of the total social product reckoned at market prices to the total amount of social labour-time, present and past, used in production (p is a price index and x a volume index of the product). It is therefore a measure of the average unit labour cost of output in money terms, which expresses the quantity of money that corresponds to a unit of abstract labour-time. [24]

If we call C_R the money cost of real capital, C_L the money cost of direct labour, C_K the money cost of all other inputs, summing up these components and adding the opportunity-cost of financial capital [25], $r\,(C_R + C_L + C_K)$, we can write

$$\text{MEV} = (C_R + C_L + C_K)(1 + r) \qquad [5],$$

as a proportionality factor not affected by the particular type of monetary system. It is a valuation parameter that can be used to convert abstract labour values into money prices.

It should be noticed that the relation linking the quantities of labour-time to the corresponding quantities of money is not of simple proportionality. It reflects the unexpressed underground relationship between values and prices of production.

Marx's monetary expression of value must be distinguished from the 'monetary expression of labour-time' (MELT), a different valuation parameter, later introduced in the literature by Duncan Foley and commonly used by those neo-Marxists who accept the quantitative version of the labour theory of value. [26] The latter index is the ratio of the net social product reckoned at market prices

[24] 'Monetary expression of value' is the name used by Marx in *Value, Price and Profit*, a paper in which he pointed out that "price, taken by itself, is nothing but the *monetary expression of value"*. In his major work, *Capital*, Marx made use of this proportionality factor to transform labour values into money values. On this point, see Kristjanson-Gural, 2008.

[25] By financial capital we mean a fund of uncommitted purchasing power available for investments and measured in money terms, though not necessarily held in the form of money.

[26] In the literature there are two versions of this index: the 'simultaneist' (or atemporal) version and the 'temporalist' (or successivist) version. The former one, known as NI-MELT, is the ratio of the value of net product to living labour. The other one, the TSSI-MELT, is the amount of money value of the net product which exchanges at current prices with a unit of living labour-time; i.e. the ratio of a unit of money to the amount of living labour-time that the unit commands,

(i.e. of the money value added) to the living labour-time used in production. Thus not to total labour time, living and past. Living labour is regarded as the only source of net of social product, and no account is taken, on the cost side, of the financial cost of capital. On the benefit side, to mark the different roles attributed in production to living and dead labour, attention is intentionally focused on the money value of the net total product, instead than on the money value of the gross total product. The result is an underrating the productive role of the dead labour embodied in fixed capital.

8. Measuring labour-time in money terms. MEV vs. MELT.

MEV is different from MELT. We must therefore establish which of them should be chosen. The money value of commodities reckoned at their current market prices, a variable that accounts for all explicit and implicit costs, including the financial cost of capital? Or the money value of the living labour-time which commodities command at the current wage level? This is a different valuation parameter, measured by the ratio of the money value of the net product reckoned at market prices to the living labour used in the economy. As we have explained, it does not consider the productive contribution of dead labour and does not account for the financial cost of capital.

A general principle of valuation has to be devised. This is not an easy task, since it implies the separation of asset values into price and volume components combined into a single weighted index. For this purpose, commodities should be divisible into distinct homogeneous groups and should satisfy a weak separability econometric condition.

There are two substantial reasons why the money value of total labour-time should be preferred to the money value of living labour. One of them, recognized by the senior Marx, is the awareness that in a sufficiently developed capitalist system the role of living human labour is not preponderant. Living labour reduces a simple appendix of the dead labour embodied in capital goods. The other reason is that the financial cost implied by the provision of capital cannot be ignored.

In a famous passage of *Grundrisse* (1857-58), the 'Fragment on Machines', Marx wrote: "*In the machine, and even more in machinery as an automatic system, the use value, i.e. the material quality of the means of labour, is transformed into an existence adequate to fixed capital and to capital as such; and the form in which it was adopted into the production process of capital, the direct means of labour, is superseded by a form posited by capital itself and corresponding to it…. It is the machine which possesses skill and strength in place of the worker, is itself the virtuoso… The worker's activity, reduced to a mere abstraction of activity, is determined and regulated on all sides by the movement of the machinery, and not the opposite*". [27]

As we said, the quantitative aspect of the labour theory of value was revived by the appearance of the New Interpretation of Marx's economic theory, proposed by Foley and Duménil along neo-Ricardian and non-Sraffian lines, to reaffirm Marx's theory of value. In their approach to the subject money had a central place. It was no longer assigned the simple role of a *numéraire*, but was

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a ratio which can change during the production process. If we denote the first version by 'sigma' (σ) and the second one by 'tau' (τ), we have

$$\sigma = px/L^* = p(I-A)\,x/lx \qquad \text{and} \qquad \tau = py/L^* = p(x-c)/L^* = p(x-c)/lx.$$

Here L^* is living labour, A is the input-output matrix of technical coefficients, l is the vector of living labour coefficients, x is a volume-index vector of the gross product, y is that of net product, c is the vector of constant capital and py is the money price of the net product. σ is the money value of gross product at market prices, per unit of living labour; τ is the corresponding money price of the net product. Both of them can be derived only *ex post*, that is when commodities prices are known.

[27] Marx, *Grundrisse,* 1857-58, notebook VI, pp. 692-93. There is here an explicit acknowledgment that in a technologically advanced industrial society machines are directly productive of surplus-value. They are not constant capital. They add to the value of output more than what they lose by depreciation in exchange.

conceived as the standard expression of social labour-time and was granted the task of providing a technical mediation between values and prices.

Their NI recognized that money represents abstract labour-time and that value and capital can be measured either in labour-time units, expressing the physical effort involved in production, or in money units, in efficiency terms. But it was not sufficiently cleared that for this purpose the money unit has to be chosen in such ways to ensure the equality of the money value of the net product with the money value of the living labour employed in the production of total output.

In NI profits are defined as total revenues minus total costs, as in the accounting practice; the value of net product is equal in money terms that of living labour and the value of money is the inverse of the labour expression of money. Money expresses directly, without mediations, the value of output in price terms. Constant capital is assumed as initially given in terms of money and the aggregate quantities of money capital which are used to purchase means of production and to pay money wages to workers, as well as the general rate of profit, are directly given and unexplained initial data, determined before the corresponding individual quantities.

Three interesting results follow from this approach: (i) no transformation problem from values to prices of production of commodities can arise, because values and prices necessarily coincide, as parts of a single analytical system; (ii) Marx's two aggregate equalities or 'invariance postulates' between total values and total prices and between total surplus-value and total profit are satisfied for the net product of the system; (iii) the theory of value appears as a necessary prerequisite for the determination of the rate of profit and production prices. Differently from what happens in Sraffa's theoretical model.

The value of a commodity, however, is not measured by the amount of social labour-time embodied in the commodity, as in the traditional quantitative version of the labour theory of value, but by the amount of social labour-time that can be bought with the quantity of money that the owner of the commodity can obtain by selling the commodity in the market. The basic assumption is that in each period of time the money value of the net product reckoned at market prices is a correct expression of the productivity of living labour.

There is therefore a substantial revival of the quantitative version of the labour theory of value, in a money-form consistent with a labour commanded theory of value. No particular theory of price formation and level of money wage are implied. Prices are determined independently of labour values and are equal to the money value of abstract labour-time. The value of the labour-power is not represented by a basket of wage goods. It is the share of wages in the net product, reckoned at market prices. All is reckoned in money terms, in a labour-commanding value perspective. And the labour theory of value holds for the economic system as a whole, though not at a lower level of abstraction.

Some serious objections can however be raised against this approach to the problem. It does not clear sufficiently the disequilibrium dynamics of the capitalist system, the fall of the rate of profit and the existence of labour exploitation. It does not explain why the exchange-value of labour-power should be identified with the money wage, rather than with the real wage, which is what really matters. It denies Morishima's and Okishio's controversial Fundamental Marxian Theorem, by allowing for the possible coexistence of positive surplus-values and negative profits. And it incurs in circular reasoning, because the monetary expression of labour-time cannot be determined without a previous knowledge of the aggregate price of the net product, and vice versa.

This is why we cannot accept the logical premises of the NI approach to the theory of capital, and of its variants.[28] Namely, the alleged equivalence of new value and living labour and the idea

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[28] At least two variants of NI should be mentioned. One is the *Simultaneous Single System Interpretation* (SSSI), suggested by Wolff, Callari, Roberts and other Sraffian scholars, in which money is regarded as a form of labour value and all values are directly expressed in money terms, at production prices. There is therefore no need to transform values into money prices. Input and output prices are simultaneously determined and necessarily coincide. A stationary equilibrium of the economy is assumed. This explains the name *Equilibrium Marxism* given to this approach by some critics. A second variant of NI – the *Temporal Single System Interpretation* (TSSI), or *Marxian Disequilibrium*

that the valuation of the net output of the system should be referred to the amount of labour commanded, instead than to that of embodied labour. The labour commanded perspective implies passing through the contingent judgment of the market and is thus unduly affected by the casual historical relation which links demand and supply at a given point in time. This is one of the basic points that justify the present approach to the theory of capital.

To conclude, we have shown that a logically consistent critical Marxist reformulation of Marx's theory of capital, conceived as valorizing value, or value in progress, is possible in the analytical framework of the up-to-now neglected labour-and-capital theory of value sketched out by the senior Marx.

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Abstract: *A Critical Marxist Approach to Capital Theory.*

This essay provides a critical Marxist reformulation, internal to the cultural tradition of Western Marxism, of Marx's theoretical treatment of value and capital. It implies the abandonment of the 'pure' labour theory of value of the young Marx in favour of a 'mixed' labour-and capital theory of value reflecting the different theoretical perspective shown by the mature Marx, after his epistemological break described by Althusser. The accounting practice of defining and measuring income and capital is criticized, for its disregard of the financial cost of invested capital. Foley's 'New Interpretation' of Marx's theoretical system and its main variants are refused for their acritical endorsement of Marx's assumption of a 'new-value equality' between the net product of the economy and the living labour employed in the production of gross output. A different method for converting quantities of labour-time in terms of money, which accounts for explicit and implicit costs, is proposed.

JEL Classification: B12, B22, B51, D24, D46, E11, E22, E41, G31.

Keywords: value; labour; capital; money; income; capital theory; Marx; critical Marxism; scientific Marxism; surplus approach; net value equality; new interpretation; single-system interpretations; MEV; MELT.