Structural Interdependence in Monetary Economics: Theoretical Assessment and Policy Implications

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1. Introduction.

Acknowledgment of the existence of structural interconnections in a sufficiently developed country is not a novelty in the literature of economics. It has been present since its very beginning, in Quesnay's *Tableau Économique* and Petty's and Cantillon's descriptions of production and consumption as a circular flow. Significant evidence of structural interdependence is provided by Walras's general equilibrium model, by Marx's reproduction schemes and circuit of capital, by Keynes's dismissal of the 'classical' assumption of a dichotomic economic system, by Leontief's inter-industry input-output analysis, and by other analytical approaches (von Neumann and Morgenstern strategic game theory, Copeland's flow-of-funds tables, Koopmans's activity analysis of production and allocation).

Relevant contributions to the literature on structural interdependence in economics have been made by Tobin, Davidson, Meade and Stone, Godley and Cripps, Lavoie, Lance Taylor and others, with reference to specific institutional frameworks. In the last decades this branch of research has attracted increasing attention. Sectoral flows of funds connecting balance sheets in time and space have been analyzed. Some controversial issues, however, are still partially unsettled, as regards the integration of money and finance in the theory of value and the structural relations between real and monetary variables and stock and flow variables.

The present essay is concerned with this problems. It has an introductory character and pursues a personal need of conceptual clarification. A concise critical examination of some analytical approaches to the subject will be initially done, to clear up the ground of some current

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misrepresentations present in orthodox and allegedly heterodox theoretical approaches. The existence of two separate levels of analysis of an economic system in classical political economy, implying the assumption of causal dependence of value on distribution – hereafter referred to as the 'Sraffian dichotomy' – will be questioned. Neoclassical approaches where factors of production get output shares proportional to their marginal contributions to production and general equilibrium models characterized by full interdependence of value and distribution and simultaneous determination of quantities and prices – in which everything depends on everything else – will also be examined. Keynesian and post-Keynesian approaches, implying causal ordering of endogenous variables and integration of the theory of value with the theory of money, will be carefully distinguished from pseudo-Keynesian reductionist approaches, either dynamic and formally consistent, but methodologically questionable, as SFCA, or oversimplifying and counterintuitive, as MMT and monetary circuitism. A synthetic analysis of some neo-Marxist approaches aimed at correcting and extending Marx's theoretical construction[1] completes the deconstructive part of the present essay. It casts doubts on the legitimacy of Marx's assumption of equality between the labour value of the net product of the economy and the living labour employed in the production of gross output.

In the second part of this essay some suggestions for a reformulation of the analysis of structural interdependence will be advanced, in an original 'late-Marxian' up-to-dated perspective implying a clear perception of the 'mature' Marx's gradual abandonment of the pure labour theory of value and of his move towards an augmented-cost-of-production price theory.

In this unconventional critical-Marxist framework will be argued:
- (i) that the existence of structural interdependence among productive sectors and between investment demand and the growth of social output and employment was correctly recognized

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[1] Neo-Marxism is a loose term frequently used to denote several left-wing non-determinist and non-economistic approaches to the theory of value and distribution, and cannot be tested and falsified. But it is not intended to explain all reality in an economic rooted class conflict perspective and allows some space to subjective interpretations .

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by most classical economists, with the notable exception of Ricardo, and by Marx, as a consequence of the social division of labour, differently of what maintained by leading exponents of the Sraffian school of thought;

- (ii) that monetary and fiscal stabilizing policies are both effective in the short-period, though they work differently and asymmetrically, and that, contrary to the 'new consensus' favour for monetary policy, a significant role in short-run control of aggregate demand should be assigned to fiscal policy;

- (iii) that the idea that a sovereign country should prefer monetary to fiscal policy for stabilising purposes, as well as the opposite view that a monetary policy would be scarcely effective under such conditions, are over-simplistic and should be rejected.

Some fundamental value theoretical problems, concerned with the quantitative determination of the value relation and with the measurement of real capital in a market framework, will then be discussed. Mapping issues implied by the reciprocal conversion of labour-time and money value will be dealt with, in the updated comprehensive 'late Marxian' perspective which informs the whole essay.

2. The present state of the art in the theory of value and capital.

A short look at classical political economists' surplus approach to the theory of value and distribution may be useful to introduce the discussion. Their theory of value was concerned with a qualitative explanation of the technical and social relations underlying the commodity form of value and with the quantitative determination of exchange-values according to the law of value, in a market economy where production was made for profit.

So interpreted, a theory of value should answer three fundamental questions: the search for the substance, the source and the measure of value. For Adam Smith there was a single answer to all of them, provided by human labour. The substance of value was human labour, the source of value

was the productive power of human labour time and the real measure of value the 'toil and trouble' implied by the productive effort of human labour. Capital was cumulated past labour.

Smith held three labour theories of value: a 'labour-embodied' one, for pre-capitalist societies, a 'labour-commanded' one, for a capitalist society, and an 'adding-up' theory of price, where wages, profits and rents entered as independently determined components, with the result that prices could deviate from labour values. This caused a potential source of confusion that did not pass unnoticed to Ricardo, who criticized Smith for it and retained his labour-embodied theory as a first approximation to reality, arguing that value was ultimately determined by the quantity of human labour needed to produce a commodity and by the rate of profit reckoned for the time capital remained dormant.

Value was thus affected by the social distribution of income. This posed a problem of circular reasoning, as commodities prices could not be determined independently of the distribution of income, which could not be determined independently of prices. Ricardo was unable to solve the problem of separating value from the distribution of income. His late years search for an invariable measure of absolute value was unsuccessful.[2]

Later on, Sraffa tried to provide a second-best solution with his questionable theoretical conception of an imaginary auxiliary construction, the 'standard commodity', whose value in an economic system without joint products, would be invariable with respect to changes in the distribution of income, though not to changes in the technique of production.

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[2] Value, for Ricardo, was created in production, by living and dead labour, and redistributed in the sphere of circulation. Exchange did not create value. Capital was stored-up labour time. For reproducible commodities, Ricardo held a 'cost-plus', or 'augmented' cost-of-production theory of price, inclusive of a normal profit margin. Wages were determined by subsistence conditions and profit as a residual, whose origin was not explained. Rent was not considered a cost component, but a surplus.

Two contrasting interpretations have been given of Ricardo's theoretical system. One of them, the 'neo-Ricardian' interpretation',[3] implied a logic of separation and causal ordering in macroeconomics, with independent and sequential determination of commodities quantities, prices and the distribution of income (in the original formulation, also adherence to the labour theory of value).[4] In the other one, the 'new view' of the Ricardian system, proposed by Samuel Hollander and John Hicks, who considered Ricardo a forerunner of the neoclassical paradigm of general economic equilibrium, quantities, prices and the social distribution of income were interdependently and simultaneously determined in a logic of integration by the mechanism of supply and demand.

I shall focus on the analytical structure of the neo-Ricardian interpretation of the classical surplus approach, in the version authoritatively provided by Pierangelo Garegnani, Sraffa's disciple and literary executor. His reading of classical theory implied the separation of surplus approach into two distinct logical stages, where production was divided from distribution, which preceded value.[5] The author's intention was to defend Sraffa from the charge of advocating a special case of general equilibrium theory, exclusively centred on the supply side[6], where output quantities, the technical conditions and the structure of production were not affected by the way in which income was spent.

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[3]Also improperly called 'Sraffian interpretation'. Originally advanced by Dmitriev, Bortkiewicz and other exponents of the Russian-German school of mathematical economics active at the beginning of the twentieth century, the 'neo-Ricardian' interpretation was 're-discovered' half a century later by Sraffa. Serious doubts can however be casted on the Ricardian character of Sraffa's theoretical system, in which the choice of labour as measuring rod of value was rejected and which had a static character, whereas Ricardo's system was dynamic. Besides, in Ricardo's system production prices equilibrate supply and demand, differently from Sraffa's long-period normal prices.

[4] The neo-Ricardians' attitude towards the labour theory of value was not univocal. Several neo-Ricardians had a Marxist cultural background. Some of them thought that Marx's theoretical conception could gain consistency and be improved by accounting for Sraffian contributions. Others did not.

[5] The idea that the leading classical economists and Marx denied the integrated nature of the economic system was introduced by Garegnani (1984) to support the thesis of the existence of close Ricardian and Marxian connections with Sraffa's theoretical system. This idea had been originally advanced by Ricardo in his early *Essay on Profits* (1815), in the analytical framework of a corn model, where the rate of profit could be determined as a physical ratio, but had been later abandoned by Ricardo in the third edition of his *Principles* (1821), and is not present in Marx. See Cavalieri, 2009.

[6] "Only half of an equilibrium system", in Joan Robinson words (1961, p. 54).

According to Garegnani, there is a strong connection between the theoretical systems of Sraffa, Ricardo, Marx and even Keynes and Kalecki.[7] In this perspective, Marx, who was critical of classical political economists' favourable conception of capitalism, was improperly considered the last exponent of the classical economic paradigm. Garegnani set himself the ambitious objective to reconcile all these authors in a great theoretical synthesis, for which he thought Sraffa had posed the right premises. In this framework,[8] the Sraffian system was assigned the task to determine commodities long-run prices and the Keynesian system that of determining output quantities and the level of employment, through the principle of effective demand and the multiplier mechanism.[9]

The achievement of these tasks was however problematic, for a number of reasons. First, a consistency problem of analytical nature arose, since the determination of the equilibrium values of real variables in the Keynesian framework refers to the short-period, not to the underlying long-period fully adjusted and persistent theoretical positions acting as centres of gravitation for short-period actual positions and implying a uniform rate of profit. Two distinct and competing paradigms thus emerged for the short and the long-period. They implied different conditions of the economy (flexible or rigid prices, full employment or unemployment, etc.) and it was not clear how they could be consistently combined to provide a theoretical synthesis.

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[7] Morishima and others have sponsored a formal integration of the theories of value of Marx, Leontief, von Neumann and Sraffa formulated in terms of linear algebra, with fixed-coefficient techniques of production, so to get a 'physically augmented' technical matrix in which there would no longer be labour coefficients, but only capital goods (following Torrens's method); or, alternatively, a reduction of commodity quantities to dated and cumulated amounts of labour-time (by Dmitriev's method). But Leontief assumed steady-state equilibrium and von Neumann did not consider primary factors and final consumption. Marx's labour theory of value was refused by Sraffa.

[8] Garegnani referred to a special case, a snapshot of the economy taken at a given moment in logical time, 'after the harvest' and before the sale of the product. He had in mind a classical be-partition of the economy into an analytical 'core' of independently determined variables (an *ad hoc* descriptive device, containing the 'necessary quantitative relations', or 'intermediate data', i.e. the social product, the rate of profit and technology) and an 'extra-core' of dependent variables (wage rate, relative prices, employment). In such dichotomic framework, the determination of prices would have taken place in the core and that of output levels would have occurred previously, out of the core.

[9] .

Besides, Ricardo's labour theory of value was not shared by Sraffa (in this regard, he was not a Ricardian). Marx's labour theory of value was considered by Sraffa both indefensible, for the logical inconsistencies of Marx's 'transformation' algorithm, and unnecessary for a theory of price (the main function it fulfilled in Marx's system). By emphasizing the role of material elements in production, Sraffa contributed to dismiss Marx's 'metaphysical' conception of abstract labour, which was not based on observable data.

As concerns the relationship between Keynes's and Sraffa's theoretical systems, suffices to notice that Keynes did not contest the marginal productivity theory of value and distribution (his marginal efficiency of capital is indeed a neoclassical concept) and that the analytical separation implied by Sraffa's theoretical system contrasts with Keynes's reject of classical dichotomy (considered 'a misconception').[10]

In classical political economy commodities prices were thought to be determined in the long-run by their costs of production and to be sufficiently flexible. Hence, markets cleared and full employment was ensured. As a result, there was no need of a stabilizing economic policy. In neoclassical economics too the system was considered self-equilibrating at a full employment level, but the attention shifted from the long to the short-run, from growth to resource allocation and from social conflict for the distribution of income to technical determination of factor prices. Equilibrium of savings and investment was ensured by changes in interest rates, equality of supply and demand by price changes and full employment by the flexibility of wages. The role of demand was limited to the determination of the price level.

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[10] It was an invalid division, as was later shown by Patinkin, since it did not consider the possible occurrence of a real balance effect, which would affect money hoardings and the demand for commodities when money enters directly the utility functions and is exogenously introduced in the economy, without creation of monetary illusion. The idea of this alleged classical dichotomy was not shared by Marx. It was resumed by marginalist economists, connected with the quantity theory of money and renamed 'neoclassical dichotomy'. It implied the neutrality of money and the ineffectiveness of monetary policy. But in the presence of nominal rigidities, as wage and price stickiness, the dichotomy does not hold.

The optimistic neoclassical macroeconomic conception was attacked in the 1950s by Joan Robinson. She moved an important critique to the use of aggregate production functions in neoclassical models and started the 'Cambridge debate' by posing the relevant questions – what was the meaning of the quantity of capital, in what units was heterogeneous capital measured and what determined the rate of profit. But she did not succeed to stop the use of neoclassical parables. The capital debate was however resumed in the 1960s, after the appearance of Sraffa's famous book on *Production of commodities*, where the marginalist theory of value and distribution was criticized and the classical surplus approach was re-proposed without the labour theory of value. Since the technical details of that controversy on the theory of capital are widely known, I shall not recall them.

From the last phase of the Cambridge controversy two theoretical positions emerged as successful: those of the Sraffians (the Anglo-Italian 'neo-Ricardians') and the Cambridge Keynesians, or post-Keynesians (PK).[11] In spite of some evident inconsistencies, between the micro and the macroeconomic levels of their analysis, they were able to show that in the presence of heterogeneous capital goods the Marshallian principle of factor substitution and the 'Wicksell connection' on the stabilizing role of the neoclassical interest rate mechanism had no general validity. A fall in the rate of interest (or profit) was not necessarily associated with an increase in the capital intensity of production, and no monotonic inverse relation could be drawn between capital per man and the rental price of capital. The Cambridge debate then ended, with scanty results. A lot had been deconstructed and little reconstructed. The neoclassical approach to aggregate capital was demolished, but the formal congruence general equilibrium disaggregated models of neo-Walrasian and Hicksian tipes, affected by well known limits, continued to be debated[12] and Sraffa's price theory continued to be the centre of contrasting interpretations.

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[11] A third non-neoclassical theoretical position, held by Marxists, was less directly involved.

[12] On these limits, and on the Sonnenscheim-Mantel-Debreu instability theorem, see Kirman, 1989, and Keen, 2001.

3. Pseudo-Keynesian and other questionable theoretical approaches.

Odd vogues entailing rediscoveries of past theories are frequent in economics. That of the classical surplus approach to the theory of value and distribution is a typical case in point. Another one is the periodical revival of the Austrian capital theory. The 'stock-flow consistent approach' (SFCA), 'modern monetary theory' (MMT) and some single-system approaches of Rubin's reminiscence provide further examples of the tendency of economic ideas to reappear, moving in circle, in a context of intellectual inertia, and to advance 'one funeral at a time'.

I shall hereafter be concerned with an analysis of the impact of some of these conceptions on the theory of value and distribution and on the analytical choice between integration and separation. SFCA, the approach of sectoral financial balances, described as an innovative, formally rigorous, complex and powerful post-Keynesian heterodox methodology based on a correct accounting framework,[13] is a first candidate. Some of its basic propositions are familiar truisms and can be shared. Such are the assertions that everything comes from somewhere and goes somewhere else, that flow variables cumulate over time into stock variables, that every transaction must have a corresponding counterparty, since someone's inflow is someone else's outflow, that sectoral inflows and outflows therefore sum up to zero and that a sector debts are another sector's assets. They are far from being heterodox novelties.[14] SFCA correctly acknowledges the existence of interconnections among economic variables, pointing out the importance of the behavioural characteristics of economic agents (households, firms, banks, government) and underlining that they do not optimize, as assumed by neoclassical economics, but follow simple rules of thumb.

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[13] See Godley and Lavoie, 2007, preface p. xxxiv, pp. 16-18 and 21-22. Also Fontana, 2000. The SFCA group is strictly connected with the Levy Economics Institute of Bard College, N.Y., an influential international research centre and policy think-tank (financially supported by the speculative activity of Warren Mosler, one of the founders of MMT).

[14] In recent times the Keynesian equality of aggregate income and effective demand has been questioned by Steve Keen's reassertion of an old claim by which effective demand would be equal to income plus the change in debt, multiplied by the velocity of circulation of money. Keen's argument that a growing debt creates additional demand and that this is logically consistent with SFCA, have been opposed by Krugman and Bernanke.

Simultaneous behavioural equations defining portfolio and spending decisions and dynamic adjustment mechanisms characterize SFCA models. Systems of stock-flow consistent difference or differential equations are used to describe the flows between the different sectors of the economy, connected by stocks. Stocks generate new flows, that modify the stocks, and so on, endlessly. The parameters of the model are estimated and calibrated and the system is closed and solved. Convergence to a steady state equilibrium is usually identified. The model can then be subjected to simulated shocks and parameters modifications.

Most macroeconomic models, either pre or post-Keynesian – including real business cycle models, dynamic stochastic general equilibrium models and 'peacemeal' macroeconomic models – are based on a similar accounting framework and can be considered stock-flow consistent.[15] I have two methodological critical remarks to address to SFCA modelling. One of them is that internal theoretical consistency between the micro and macroeconomic levels of analysis and formal rigour are desirable, though not sufficient qualities. The second criticism is that SFCA is not a pluralist methodology, but a normative and one-sided one, as the micro-founded models of mainstream neoclassical economics based on the principle of methodological individualism, fails to appreciate historical and institutional specificity.[16]

Being largely based on the United Nations standard system of national accounts, SFCA shares merits and drawbacks of such system.[17] It can be useful – and was actually used in some ingenuous

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[15] This is true even for old-fashioned neoclassical models implying 'Say's Law' equality, the controversial proposition by which supply would create its own demand, and Walras's law, expressing the interdependence among the excess-demand equations stemming from the budget constraint in a general equilibrium system. They can be consistent, since there are subjects who do not spend their income entirely, but save a part of it; this part is then transferred through the credit system to other subjects with a greater propensity to spend, so that at the aggregate level macroeconomic consistence is granted, because what is not spent by somebody is spent by someone else.

[16] SFCA modelling has been criticized by Thomas Palley (2013), a radical structural Keynesian, for being far from true Keynesism and post-Keynesism and charged of representing a naïve reinvention of the wheel. See also Dow, 1997 and 2008, and Hodgson, 2001.

[17] A typical inconvenience is that the social surplus is considered the heterogeneous sum of profits net of depreciation and wages inclusive of workers subsistence goods, with the result that profits are underrated and wages

attempts to provide lacking analytical foundations to monetary circuit approaches, in which there are only flows of endogenous credit money – but it is neither crucial nor necessary for sound macroeconomic reasoning.

In circuit theories, unless unreasonable *ad hoc* assumptions are introduced, firms must rely only on the total wage bill to provide households with the money they need to buy products or to subscribe new equities. Firms will therefore be unable to get the money needed to repay their bank debts, plus interest, and close the circuit. This is the obtrusive 'profit paradox' of monetary circuit theories, systematically neglected (though honestly admitted by Graziani[18]). Under such conditions, public indebtedness, which is not considered by circuitists, might provide a solution.[19]

A different methodological approach to the theory of money can be found in Foley's and Duménil's 'New Interpretation' (NI) of Marx's theoretical system, inspired by the Rubin school[20]. In Marx's monetary theory of labour value that they have in mind there is no need to transform values into prices, as everything is reckoned in terms of money.[21] Their basic idea is that Marx's

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overvalued. Hence, the social distribution of income is altered and Marx's reasons for class struggle are obscured. Moreover the concept of production cost used in national accounting does not include the imputed rental for owner-used buildings, a fictitious entry questionably reckoned in total value added, which measures the value of output less that of intermediate products. Production costs are therefore undervalued. As concerns the basic identity linking balance sheets, transactions and holding gains and losses, it should be noticed that in the opening or closing balances assets are conventionally recorded at the prices that prevail at the dates to which the balance sheets are relating.

[18] See this statement of him: "If on the other hand, wage-earners decide to keep part of their savings in the form of liquid balances (that is, banking deposits), firms will get back from the market less money than they have initially injected in it" (Graziani, 1989). To overcome the 'profit paradox', Zezza (2012), a pupil of Graziani, has fancifully proposed that the initial loans should cover the wage bill and interests (!). He says that in this way the problem is solved: "when production is complete firms can sell the output, and as they recover liquidity from sales, they can pay the interest to banks, which in turn can use this liquidity to purchase goods or equities from firms" (p. 159).

[19] This is largely known (see, for instance, Cavalieri, 1994), but has long been contested by circuitists. Only recently the existence of the problem has been acknowledged by some of them (see Forges Davanzati and Patalano, 2014)

[20] See Rubin, 1928.

[21] Marx analyzed the form of value, distinct from its substance, or content, in the third section of chapter one, volume I, of *Capital*, where he distinguished the elementary form of the use-value of a commodity, expressed in terms of itself, from the expanded or equivalent form of exchange-value, expressed in terms of another commodity, and from the general form of value, its money form.

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labour theory of value is suited to explain the net product of the system, though not to determine commodities relative production prices. Attention is focused on the net output, to avoid double counting of intermediate goods. Net output per unit of labour is the *numéraire*.

Marx's two invariance postulates are supposed to hold for the net product. Living labour is considered the only source of surplus-value and is measured in terms of labour commanded, as a theoretically undetermined and non-allocated amount of purchasing power. The correspondence of value and money is thus ensured. The value of labour-power – the quantity of labour time required to produce the wage goods needed for the reproduction of labour-power – is reckoned as the product of money wage and the value of money. Values are directly observable and are not affected by changes in the distribution of income. They are shares of employment per unit of output.[22] All is reckoned in money terms, in a labour-commanding value perspective. Values and prices necessarily coincide. The analyst attention is focused on the money-form of value. The money wage rate is taken as given.

In NI, where Marx's law of value holds as an average, for the system as a whole, though not for single sectors of production, a complete integration of the theory of value with the theory of money is achieved at the aggregate level, by redefining the value of money as the monetary expression of living labour-time and the value of labour-power as the product of wages times the value of money.[23]

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[22] This approach may generate paradoxical results, as workers doing the same job, side by side, for an equal time and getting the same money wage, would be subject to different rates of exploitation if they would buy different bundles of wage goods. In such a situation, wage goods cannot substitute labour in price equations. An essential condition required to transform the Marxian problem of production of commodities into the corresponding and different Sraffian problem is therefore lacking.

[23] The integration of labour and money is achieved by NI indirectly, in various steps. First, the labour-value of money, conceived as power of command over wage labour, is determined, as the ratio of the total amount of direct labour employed in production to the money value of the net product of the system. Then the value of labour-power is expressed in money wage terms, as the share of money wages in the net product (or by multiplying money wages by the value of money), and the causality relations which link labour values to prices are cleared. The relevance of NI may be

Two variants of NI are worth considering. One is the *Simultaneous Single System Interpretation* (SSSI), a theoretical conception in which values and prices form a single analytical system, production is instantaneous and input and output prices are simultaneously determined in equilibrium, together with the profit rate. The other one is the *Temporal Single System Interpretation* (TSSI), a disequilibrium neo-Marxist approach in which variables are sequentially considered and prices can change during the time consuming production process. The time element in production and its relation with money are emphasized. The money value of the net product equals total labour employment. The transformation problem disappears, as the inputs of a temporal production cycle must not necessarily equal in terms of value the corresponding outputs. It is a 'successivist' approach, whose attitude to interpret correctly Marx's thought has been objected on methodological and exegetical grounds.[24]

The trouble with all single-system neo-Marxist interpretations, no matter whether of simultaneist or successivist type, is that they imply a dogmatic assumption, theoretically unjustified: the 'net value equality' between the labour value of the net product and the living labour used to produce the gross output. Living labour is regarded as the only source of social surplus; past labour embodied in capital goods (Marx's 'constant capital') is considered simply suited to reproduce its value. Obviously, if this not true. Labour-intensive production processes are less profitable than capital intensive processes.

Another questionable approach to macroeconomics is 'Modern Monetary Theory' (MMT), or neo-Chartalism, also known as 'Mosler economics', a school of thought ideologically less characterized, that describes how a sovereign country with fiat money and floating exchange rates works. It brings the State into a triangular agent-based circuit approach, with firms, households and banks, and puts the government financial activity at the centre of the stage. Its basic assumption is

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questioned, as tending to obscure the role of means of production and as posing problems in presence of technical change.

[24] See, for example, Mongiovi, 2002.

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that the quantity of money in circulation is not subject to budget constraint, unless the economy has achieved full employment.[25] MMTers focus their attention on the role of State money, the inconvertible fiat legal tender, whose origin is explained by the obligation to pay taxes in it. It is argued that monetary policy is scarcely effective and that the government must first spend, to provide money to the non-government sector, and then raise taxes. The basic idea is that deficit spending by the Treasury can be run indefinitely and for unlimited amounts, quite independently of the size of the budget debt. Money is not regarded as a State liability and the government is considered as a self-funding institution, a job guarantee and an employer of last resort, that can create financial wealth and is always solvent in its own currency.[26] It might thus provide full employment without inflation, higher wages and pensions, and sanity insurance to everybody.[27] Its main proposition is that in a sovereign country public debt adds to private wealth. Its rise increases and its repayment decreases private financial wealth in nominal terms, though not in real terms.

MMTers claim that this approach provides an innovative post-Keynesian paradigm, which does not imply the neo-Keynesian IS/LM model and the Phillips curve (that they consider discredited and reactionary). In my opinion, this is hardly credible. The idea that there are no nominal constraints to government deficit spending and the policy recommendation of a zero nominal interest rate are counter-intuitive and un-Keynesian. They would trig an uncontrollable increase of aggregate demand and originate high inflation pressure and, ultimately, fiscal unsustainability. An economy is always subject to a constraint, due to the limited availability of real productive resources. For MMT fiscal austerity is mistaken and should be avoided. It is argued that bank loans can be created out of nothing and that their repayment poses no problem. Debt

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[25] Monetary sovereignty is defined as the government's power to drive money by taxing people and to collect taxes in the token of choice. See Wray, 2012.

[26] In my opinion, this idea – seemingly held by Minsky, the father of the financial instability hypothesis – is a dangerous illusion. Pure financial limits to deficit spending by a government may not exist, and should not be legally imposed, but real capacity constraints always limit the expansion of deficit spending. MMT has been recently opposed by two monetarist schools of thought, neo-monetarism and Monetary Realism.

[27] Differently from SFCA, MMT is not fit to be formally modelled.

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repayment is considered an easy task and would close the circuit. This is illogical. Finance must always come from somewhere. Inside money cannot come out from nothing. Banks need liquidity to make loans and to create money a government must either tax or borrow.

As SFCA and monetary circuitism, MMT is a pseudo-Keynesian approach to monetary theory and policy. All of them assume that loans create deposits and reserves and that banks do not act as credit intermediaries. They would not need to have money to make loans. Therefore the economy could never be constrained by narrow finance.[28]

To conclude on this point, I can accept the idea that loans make deposits, though not the obtrusive corollary that no initial finance is needed. It contradicts Clower's cash-in-advance constraint, which imposes the requirement to hold money to buy goods and services in an economy where purchases are made with money. Thus confirming that the essential function of money is to provide means of exchange.

4. On dichotomies.

The idea of a formal separation and prior determination of real variables with respect to monetary variables did not characterize classical economics. It was a questionable corollary of the controversial early versions of the quantity theory of money, which related money flows to nominal prices by assuming an exogenous supply of money, with constancy of the velocity of circulation of money and of the volume of monetary transactions.

The conceptual dichotomisation of the economic system in two separate and independent subsystems, implying neutrality of money and ineffectiveness of monetary policy, is a neoclassical theoretical construction. It is improperly called 'classical', when the neutrality of money is thought

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[28] MMTers maintain that banks create deposits when they lend and argue that when a bank makes a loan by crediting someone with a fictitious deposit, the bank records in its books both a liability (the deposit) and a corresponding asset (the loan), in formal compliance with the requirements of double entry accounting. The obvious objection is that fictitious deposits are different from real ones. They are not bank assets, but bank liabilities.

to apply only to the long-period. The idea of the non-neutrality of money was explicitly expressed by Hume in his essays *Of Money* and *Of Interest* (1752), where he argued that changes in the supply of money would affect real variables in the short-run, after a small initial interval required for money to circulate and to make their effects felt in the economy as a whole. In the long-run money was regarded by Hume as neutral. Ricardo did not share Hume's opinion on the non-neutrality of money in the short-run. He considered it an erroneous view. And so did James Mill and other exponents of the Currency School. Ricardo was not a supporter of the neutrality of money in the short and in the long-run. He was rather ambiguous in treating the subject. He admitted the neutrality of money only in the short-period and denied permanent real effects of money, for its impact on the structure of excise taxes fixed in nominal terms. As is well known, Ricardo was mainly interested in the analysis of the economy long-run positions.[29]

Irving Fisher and other neoclassical authors regarded the alleged classical dichotomy as invalid in the short-run. They considered it as applying to stationary states in which prices are constant over time. Later on the dichotomy was criticized by Lange and Patinkin, who focused their attention on the relevance that the 'real balance effect' has on the real value of inactive money holdings. He argued that in the presence of the real balance effect the determination of the general price level is impossible and that in this case monetary policy is effective even in the presence of a liquidity trap or of an investment function characterized by low interest-elasticity.[30]

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[29] Thornton and Torrens did not acknowledge the existence of money neutrality. Thornton was in the same side of Ricardo in the 'Bullion Controversy' on the return to money convertibility, but motivated his dissenting view on the neutrality of money with wages downward inflexibility in the presence of unexpected price falls. The same did other exponents of the Banking School. McCulloch and Attwood pointed out the presence of other monetary costs of production and tax charges fixed in money terms. Malthus too denied the neutrality of money owing to the forced saving productive power effects of increases in the supply of money. John Stuart Mill is credited of having identified a further source of non-neutrality of money in the confusion made by producers between general and relative price movements. On the subject, see Humphrey, 1991, and McIntyre, 2003.

[30] With endogenous money, the dichotomy between real and monetary variables and the neutrality of money would persist. With a combination of endogenous and exogenous money, the neutrality would disappear and monetary policy would be effective. An incomplete neutrality, with independence of expenditure flows from the supply of money,

In our highly financialized credit economies, the neoclassical dichotomy is clearly unrealistic. The great development of financial markets and the increased fragility of the financial sector enhance the influence of finance over the real economy.

5. Structural modelling for policy purposes.

The use of economic theory and statistical methods for structural modelling in economics will be now shortly considered, without entering into a specified description of stochastic econometric models. In such models observable endogenous variables are structurally connected, by equality or inequality relations, to explanatory variables, and can be used to test the predictive power of competing economic theories.

Keynes was critical of neoclassical theory, that he improperly termed 'classical'. He refused Say's Law of markets and the dichotomy of real and monetary variables and underlined the role of the liquidity preference function and the speculative demand for money, inversely related to the rate of interest, that he considered exclusively determined by monetary variables. In post-Keynesian theories two basic models of income determination have been proposed. One of them is the 'neoclassical synthesis' IS/LM model, originally proposed and later abandoned by Hicks. It provides a sort of compromise between pre-Keynesian and Keynesian theories.

The Hicksian IS/LM model is a static one which focuses on the demand side of the economy. It makes use of two independent and differently-sloped curves traced in the interest-rate-output space (i,Y): the downward sloped IS curve, whose shifts express changes in fiscal policy, and the LM curve, whose shifts reflect changes in monetary policy. These two curves, representing short-run equilibrium in the goods and money markets under 'fix-price' and unemployment Keynesian conditions, intersect each other, determining the equilibrium point of the static system. The addition

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though not from the real value of liquid balances, is what actually happens in the real world, as economic agents can spend at any moment more or less than their current income, by reducing or augmenting their liquid balances, thus causing effects on the price level.

to the model of a Phillips-curve ensures price adjustments and opens the way, through the natural rate of unemployment properties of such curve, to a long-run self-stabilization of the system. The purpose of this model is to represent Keynes's *General Theory* as a particular case of the traditional neoclassical paradigm – the case of fixed prices, liquidity trap, monetary illusion and aggregate supply which adapts to changes in aggregate demand.[31]

The other standard macroeconomic model is the 'aggregate demand-aggregate supply' (AD/AS) one, a post-Keynesian model of classical reminiscence, where a decreasing short-run aggregate demand curve for goods and services, relating the price level and the demand for output, and a nearly vertical long-run supply curve, relating the price level and output produced by firms, are traced in the price-output space. The two curves intersect each other, determining the equilibrium price and output levels under 'flex-price' conditions. With a Phillips-curve, they allow to interpret the Keynesian macroeconomic theory in disequilibrium terms.[32]

These two models are ultimately similar. Properly integrated, they provide new-Keynesian (NK) models suited to describe an economy with a limited degree of price flexibility. In both of them the economic system is non-dichotomic and money is non-neutral. Changes in the supply of money cause shifts in nominal demand, that affect real economic variables, though not the general

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[31] The IS curve is a negatively-sloped. In general, the LM curve is positively-sloped, but becomes horizontal in the presence of a liquidity-trap, when any amount of money supplied is absorbed by the demand for money; hence fiscal policy is fully effective on the output and employment, through the multiplier, and monetary policy is ineffective on the output and employment levels, but effective on the interest rate. The LM curve is instead a vertical line in the opposite extreme case in which the interest-elasticity of the demand for money is zero, or its income-elasticity is infinite (the so-called 'classical case', when monetary policy is fully effective on the output level and fiscal policy is ineffective on output, but effective on the interest rate and the price level). In such case a fiscal expansionary policy leads to higher interest rates, that may cause a crowding-out contractive effect on private investment. The attractiveness of the IS/LM model as a didactic device is due to its being a very simple way – questionable for its limiting assumptions – to represent the interaction between the real and the monetary sectors of the economy and to draw policy implications.

[32] Different shapes of the AS curve are conceivable. In classical macroeconomics the supply curve would be a vertical line. In a neoclassical framework it would be upward rising. In Keynesian models it is a kinked line, with a first tract either horizontal or upward rising and a second tract vertical, in correspondence of the full employment output level. Neoclassical synthesis imply a short-run upward-rising aggregate supply curve and a long-run vertical one.

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price level. Disequilibrium arises when individual plans are not mutually consistent and cannot be fully implemented. It implies an adjustment process, with price and/or quantity changes and investment or disinvestment decisions which affect the structure of capital.[33]

Other theoretical macroeconomic approaches designed to achieve similar objectives,[34] are the 'New Consensus' models (NCM), or 'new neoclassical synthesis' (NNS) models. They are characterised by an aggregate demand equation, which replaces the IS curve, by an expectations-augmented Phillips-curve, which relates unemployment and inflation, and by a monetary policy rule of the central bank, which replaces the LM curve. An aggregate supply curve shows the output level firms are prepared to offer at each price level.[35] These models have been criticized from a Keynesian perspective for their excessive emphasis on the need of a monetary policy based on inflation targeting and of a downgrading of fiscal policy, and on the observance of Taylor's rule for setting short-term interest rates to achieve and maintain price stability, regarded as the primary objective of monetary authorities.[36]

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[33] Investment will be made up to the point in which the present value of the expected future revenue of capital assets will equal the opportunity cost of capital. The speed of adjustment to equilibrium is important. In general, prices do not adjust instantaneously and stock adjustments are slower than changes in flows. In neoclassical models, investments should adjust to savings, through changes in interest rate. In Keynesian models – where investment is an autonomous variable, the driving force of the system – the adjustment process is inverted. Savings should adjust to planned investment, via income changes.

[34] They include NK models with rigid nominal wages, sticky prices, menu costs and market imperfections; 'New Keynesian Synthesis' (NKS) models, with nominal rigidities, market imperfections and rational expectations; agent-based computational economics (ACE) models, focusing on the interaction between individual agents.

[35] In the typical neoclassical version, implying flexible prices, the aggregate supply curve is upward rising in the price-quantity space. In neo-Keynesian models, the short-run aggregate supply curve is a line characterised by two or three distinct segments: a first one flat, or slightly increasing, may be followed by a rapidly increasing second one and then by a vertical segment, after the full employment point that shows the potential output capacity of the economy. Beyond this point, an increase of demand produces only inflationary effects. In this complex analytical framework, a shift in aggregate demand can lead to changes in the level of output, rather than in the price level.

[36] See e.g. Arestis, 2009, and Galí and Gertler, 2007.

As concerns the links between the real economy and the financial market, changes in asset prices affect real activities, through various channels and feedback mechanisms which cause 'wealth effects' on consumers expenditure.[37] Risk premia are important in this connection.[38]

6. On some recent unconventional readings of Marx's works.

The ongoing publication of the monumental critical edition of Marx's and Engels's works (the MEGA-2), and, particularly, that of Marx's manuscripts written in preparation of the final versions of volumes II and III of *Capital*, edited by Engels after Marx's death, have given rise to new attempts by critical Marxists to 're-read' Marx in a non-deterministic and non-economistic perspective. Some of them are in compliance with the idea that the 'mature' Marx gradually revised his initial approach to the theory of value and finally abandoned a simple labour explanation for a more realistic conception of the constitution of value.[39]

Marx considered the value relation a complex topic. To make easier its understanding, he chose to rely on a traditional method of analysis of complex problems, by successive logical approximations. In *Capital*, vol. I, he began his exposition by a real abstraction, production of commodities in general, and provisionally assumed equality of prices and values.[40] He thus relied initially on the pure labour theory of value, that he had not accepted in his early works.[41] But he did not hold it for his life time. He gradually realized that in modern capitalist societies commodities

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[37]The transmission channels are the traditional money, interest rates, foreign exchange and asset prices channels, the credit or bank lending channel and the borrower's balance sheet channel.

[38] Agent-based models focusing on the interaction of different categories of rational representative agents in a market framework, can help to get qualitative understanding of structural interaction.

[39] Among them the so-called 'single system' and 'new-left' interpretations and the contributions made by the epigones of the French Althusserian school, by Jacques Bidet's meta-structural theory, by Toni Negri's post-structuralist and workerist Marxism and by the German group of *Neue Marx-Lektüre* are worth recalling.

[40] Hence, in my opinion and unlike most interpretations, Marx did not consider either a hypothetical pre-capitalist economy, where workers own their products, or a capitalist system, where commodity production is made for profit (but this is still a controversial exegetical issue).

[41] See Rosdolsky, 1968, and Mandel, 1971.

did not exchange at their values, but at market prices, which could diverge systematically from values. This may explain why he did not finish *Capital* and in his late years he planned to write a revised edition of volume I.[42]

As a value-theorist the young Marx was not a Ricardian. He became more Ricardian later on, in his mature works. But he reasoned at a higher level of abstraction, was more concerned than Ricardo with the search for the qualitative nature of value, conceived the determination of social forms as a historical process and political economy historico-relative. He did not consider modern capitalism as the natural and definitive form of organization of society and was critical of Ricardo's failure to distinguish between labour and labour-power, of his view of relations of production as purely technical nature and of his inability to explain the source of surplus value and profit.

I shall now provide some textual evidence of this evolution of Marx's labour theory of value towards a labour-and-capital conception, which provided space for further research. In a famous passage of *Grundrisse* – the 1857-58 dense and innovative early draft of *Capital* – the incomplete 'Fragment on Machines', Marx recognized this important feature of reality and pointed out that the worker skill had by that time passed over to the machine.[43] Yet he did not abandon entirely the labour theory of value. He did no longer acknowledge its validity as a price theory, except in some unrealistic limiting cases; but retained it at a macroeconomic level, arguing that for the economy as a whole a conservation law of value as an average was effective, by which total prices equalled total values and total surplus equalled total profit.[44] The *Grundrisse* is Marx's most significant work. It

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[42] Marx, however, did not formulate a full-fledged labour-and-capital theory of value, that is a total factor productivity theory, as he probably thought that by recognizing a direct productive role of capital, whose availability involves a cost (for postponement of consumption, or for rental payment), a legitimacy of profits could be deduced.

[43] In the following passage Marx questioned the pure labor theory of value: " *… once adopted into the production process of capital, the means of labour passes through different metamorphoses, whose culmination is the machine, or rather, an automatic system of machinery… 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*" (Marx, *Grundrisse*, notebook VI, par. 585-86).

[44] This is, however, a double identity which cannot in general hold at one and the same time, once Bortkiewicz's correct system of transformation of values into prices is applied..

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contains an introduction (the *Einleitung*) and seven notebooks and was written night-time in few weeks, in a sort of feverish excitement, with the political aim to give rise to class struggle. Its salient points are the definition of the law of value in terms of surplus-value and its characterization as an explanation of capitalist exploitation of wage labour.

Textual evidence suggests that the 'mature' Marx revised his previous formulation of the labour theory of value, that he abandoned the idea that only productive living labour can transfer value directly to the product, whereas capital can only do this at the limited rate of its depreciation, and began to regard surplus-value as a direct expression of labour in general – that is of both living labour and past labour, and to consider capital as the dominating productive factor. Significant progress in this direction came in two Marx's works in the late 1850s. One of them was the *Urtext* (1858) fragment where capital was described as value in process, valorising value, rather than as a heterogeneous set of commodities. The other was *A Contribution to the Critique of Political Economy* (published in 1859 and usually called '*the Critique*'), where Marx introduced his concept of abstract labour, or socially necessary productive labour-time. It identified the substance of value, allowed to conceive value as a social relation and made possible to distinguish the theory of value of the elder Marx from his youthful conception. There Marx explicitly denied that labour could be considered the only source of wealth.[45]

Later on, in his historiographic work on the *Theories of Surplus-Value* (1861-63), Marx recalled Ricardo's admission that living labour was not the sole source of surplus-value. The composition and duration of capital were also relevant to determine commodities prices. And in the 1864 draft of the missing chapter six of the first volume of *Capital*, entitled *Results of the Immediate Process of Production*, Marx developed the idea that commodities were "the direct product of capital".

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[45] "It would be wrong to say that labour which produces use-values is the *only* source of the wealth produced by it, that is of material wealth" (*Critique*, Lawrence and Wishart, London, 1971, p. 36).

Then, in an English pamphlet, *Value, Price and Profit* (1865), Marx said that "in calculating the exchangeable value of a commodity we must add to the quantity of labour *previously* worked up in the raw material of the commodity, and the labour bestowed on the implements, tools, machinery, and buildings, with which such labour is assisted". The English form was not at its best, but the reference to the 'labour bestowed' indicates the quantity of social labour embodied in the capital goods used up in production is transferred to the product.

Moreover, in the first volume of *Capital*, chapter 23, Marx confirmed that in the relatively modern industry of his times the worker had become a mere appendage of machinery. A complete inversion of the relation between living labour and dead labour embodied in fixed capital had already taken place, marking the passage from a formal subsumption to a real subsumption of labour under capital. The passage realized an ontological inversion between the subject and the object, by which capital had become the subject and labour the object.[46]

Then, in the second volume of *Capital*, the process of reproduction and circulation of capital was analyzed by Marx through the distinct circuits of money-capital, commodity-capital and productive-capital. In the overall continuity of this metamorphosis, capital emerged as the unity of production and exchange. The traditional distinction between fixed and circulating capital had been reintroduced nearby that between constant and variable capital. Attention was focused on the relations among the various components of the circuits of capital and production was regarded as the fundamental source of value. It implied the use of both labour and capital. Circulation played no role in Marx's description of how value was created, but was considered important for the realization of value.

In *Capital*, volume III, Marx's examined again the process of capitalist production, focusing on the movements of capital as a whole and on the effects of competition among capitalists. He had the evident intention to explain how the law of value operates as a theory of price in a market

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[46] "It is not the worker who buys the means of production and subsistence, but the means of production that buy the worker to incorporate him into the means of production" (*Capital*, I, p. 1004).

economy, in contradiction with the law of the equalization of profit rates; that is, how it allows the deviation of production prices from labour values. But he did not perform this task correctly. He did not transform into prices the inputs of the production process.

In the first chapter of volume III of *Capital* Marx introduced the notion of cost-price of a commodity, the sum of constant and variable capital that includes the cost of labour, materials, capital goods and operating expenses. By adding a normal profit margin, one obtains the natural price of the commodity, an 'augmented-cost-of-production' price, in which both labour and capital appear as directly productive factors.

There are thus in Marx's mature works significant, though not conclusive indications that he modified his labour theory of value, of whose limits he had become conscious, and recognized that total factor productity, rather than living labour alone, generates the surplus. But he did it without abandoning entirely the labour theory of value, which allowed him to determine the rate of profit independently of prices and had a crucial role in his critique of capitalism as a system based on labour exploitation.[47] This passage was a significant step in Marx's process of revision of his previous incomplete theory of price. It amounted to a real change of perspective, which led, metaphorically, 'Marx beyond Marx'.[48] He did not formulate a new theory of value, but resumed a more general conception, that of Smith's 'law of value', a trans-historical abstract principle of causal determination, which was supposed to hold in all systems of production and to regulate in the long period the exchange of commodities at their value and the social distribution of labour.

The law of value, founded on social necessary labour, established a relation between values and prices. It was suitable of modifications in its operation in historical time. It was a law of the historical development of capitalism that could be ineffective in an advanced phase of capitalism, in

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[47] On this point, see Mandel, 1971, and Keen, 1993. Negri, 1978/84, speaks of 'Marx ambivalence'.

[48] The process of revision here described has been acknowledged and analyzed by various interpreters of Marx's works. See, for instance, Negri, 1978/84, and Shortall, 1994.

the presence of workers class struggle, as well as in a socialist or communist society.[49] The law was ascribed by Marx the power to establish what an economy produced, how it was produced and in which proportions labour and capital were allocated by the competitive process to the different branches of production. It had a qualitative, rather than quantitative significance. The direction of causality, for Marx, was univocally determined: it went from values, originated in the sphere of production, to prices. Deviations of single prices from labour values were admitted, but they compensated and cancelled out at an aggregate level. The precise logical itinerary of indirect derivation of prices from values, their global attractors, was not specified by Marx.[50]

Today, in our post-modern era in which science and technology are largely the product of 'immaterial' forces (Marx's *General Intellect*), the law of value is no longer adherent to reality. A new conceptual foundation of the theory of value is needed after the technical revolution of 'cognitive capitalism' that has made an immaterial force, knowledge, the main factor in the production of value.[51]

7. The valuation of heterogeneous real capital.

If the definition of a capital stock is conceptually problematic, the measurement of its real value is even more awkward, for two reasons. One of them is obvious: heterogeneous capital goods cannot be directly added together. They must be expressed in the same units and reduced to a common denominator. This task, however, is practically impossible, given the enormous variety of types of capital goods. Moreover, the real value of capital at a given time is a mixed stock-and-flow concept, which results from the combination of two differently dimensioned magnitudes: the depreciated value of the benchmark stock of specific homogeneous capital goods and a current

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[49] See Rosdolsky, 1959.

[50] The transfer of value from Marx's constant capital to final output, in the presence of technical changes, which would unpredictably affect the depreciation of capital goods, was also left undetermined.

[51] See Negri, 1978/84, who underlines that in the present capitalist societies there is no longer a working class. It has been substituted by a 'multitude' of independent singularities.

investment flow. This may suggest to convert capital stocks into flow equivalents, by accounting for the degree of capacity utilization of capital goods. But this is unknown. As a matter of fact, there is no correct method for measuring the value of a heterogeneous stock of capital goods suited of multi-specific uses and differently time dimensioned.

In principle, this could be done in a number of ways and subways:

- (i) by cumulating gross formation of fixed capital over time in constant prices and deducting depreciation and retirements, that is as the updated historical sum of costs of past investment flows, reckoned at constant prices, plus cumulated interests, minus depreciation and retirements, by use of an age-pricing profile depicting assets loss in productive efficiency (a 'backward-looking' method, used in perpetual inventory estimates); this is the basic method used in national accounting;

- (ii) at the present replacement or reproduction cost of capital goods, reckoned at current market prices, in their actual state of efficiency and wear and tear, an 'entry value' market method commonly used in insurance practice;

- (iii) at the selling or 'exit value', or realizable selling price of capital goods, if a market for second-hand capital goods exists;

- (iv) in a 'forward-looking' perspective, by the expected capacity of capital goods to produce a future flow of services (not usually observable) in a given period, whose net value should be properly discounted, accounting for inflationary developments;

- (v) by the average length of the production process (a typical 'roundabout' Austrian method);

- (vi) by relying on suitable index number techniques, using price and quantity (volume) index or chain-index formulae for computing changes in value of capital goods or capital services as weighted averages of the proportionate quality-adjusted changes in price and quantity, with the single shares in the total figuring as weights (an econometric method).

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The choice between these accounting methods should be made in compliance with the specific purpose which an analyst is pursuing (under an income-wealth perspective, a productivity perspective, a cost perspective, etc.) and in view of the availability of statistical data.[52] When the purpose is simply that of finding a correct accounting method, the choice can be guided by technical considerations, or reflect a personal preference.[53]

The simplest method, the neoclassical one which consists in summing up the monetary value of capital goods, does not provide a rational solution, as the value of single capital goods depends on their place in an entrepreneur's production plan. Entrepreneurs' individual plans for the use of capital goods are not mutually compatible. Their plans thus are not entirely fulfilled, as required by general economic equilibrium. Actual economic systems are never in equilibrium. Disequilibrium and instability are their normal state.

8. Monetary expressions of value. Measuring and mapping problems.

Money can be regarded as a direct expression of abstract labour and assigned the task of providing a formal mediation between values and prices. Since the unit cost of real capital can be measured either in terms of labour-time, in the classical way, or in terms of money, two important questions to consider are the definition of the unit cost of real capital in terms of money, as the sum of the cost of the labour-power needed to produce a unit of real output and of the unit cost of

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[52] Several analytical tools can be used in a structural interdependence framework: double-entry and Copeland's quadruple-entry bookkeeping, sector-based balance sheets linked with flows of funds, interrelated income and product accounts and social accounting . Capital gains and losses can be accounted for by revaluation matrices. Stocks can be derived by transactions-flow and revaluation matrices.

[53] The fundamental accounting equality between the value of a capital asset and the discounted value of future services provides a method to separate the quantity and price components of capital outlays. A measure of the outlay on capital services is obtained by multiplying an asset rental price by the quantity of that asset used. The volume index of capital services measures the potential flow of capital services provided by a capital stock. The separation of changes in the value of capital assets into price and quantity changes (reckoned in standard efficiency or effort units, and corrected for quality changes) is an index number technical problem. The calculation should be carried out with any superlative index number of capital services (such as the Törnqvist, the Walsh or the Fisher index).

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capital, and the analysis of whether and how the quantity of labour-time represented by a money unit, and its inverse, can be theoretically determined and empirically appraised.

The unit cost of labour-power is the ratio of total labour cost to real output. Because of the heterogeneous physical composition of output, the unit cost of labour must be expressed in terms of money, as the product of the labour share in output times a suited price index, which should account for the wage and non-wage labour costs per unit of output.

The unit cost of capital, intended as the user cost, or rental price, is the cost of renting in the market a unit of real capital. It should include the opportunity cost of the financial capital tied up per unit of output and a proper estimation of the associated premium for the specific risk factor (beta), which is unobservable and can seldom be precisely measured. It is usually reckoned as the ratio of the nominal profit rate to the productivity of fixed capital assets, based on gross output (as the ratio of a quantity index of gross output to a quantity index of capital input) or on value added (also of the ratio of two quantity indexes).

The choice of the index number formula used to aggregate heterogeneous capital assets and of the weights used in the aggregation are specific technical problems, which will not be considered here.[54]

As concerns the determination of the amount of labour-time represented by a unit of money, the mature Marx used to call "monetary expression of value" (MEV) the money equivalent of abstract labour-time, a proportionality factor relating abstract labour, the invisible social substance, to the money-form of appearance of value.[55]

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[54] Reference can be made to the OECD 2001manual on *Measuring Productivity* and to Diewert,1980.

[55] 'Monetary expression of value' is the locution used by Marx in *Value, Price and Profit* (1865, first published in 1898 by Eleanor Marx), where he pointed out that "Price, taken by itself, is nothing but the *monetary expression of value*", i.e. a form of appearance of value, and that "Looking somewhat into the *monetary expression of value*, or what comes to the same, the conversion of value into price, you will find that it is a process by which you give to the *values* of all commodities an *independent* and *homogeneous form*, or by which you express them as quantities of equal social labour. So far as it is but the monetary expression of value, price has been called *natural price* by Adam Smith, *"prix nécessaire"* by the French physiocrats". See also Kristjanson-Gural, 2008.

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In vector notation, we can write:

$$\text{MEV} \; = \; (px - m)/L \; = \; (px - m)/\lambda x,$$

where p is a price index expressing the vector of commodities unit prices, $wL\,[I - (1+r)\,A] - 1$, x is a quantity or volume index of the social product, px is the money value of the social product, m is the money value of the material and operating cost of production, augmented by the financial cost of capital, L is abstract labour-time and λ is the vector of labour coefficients.

By dividing MEV by the average unit cost of production of commodities – which is the sum of the money cost of a unit of real capital, the money cost of a unit of direct labour, the money cost of the all other input services and the money cost of a unit of financial capital – we get $(1 + r)^t$, a coefficient which includes r, the expected rate of social surplus per unit cost of output, i.e. an internal rate of return.

MEV is thus a measure of the labour value of money which reflects the true essence of value, not its external form of appearance. It is the money cost of production of a unit of real capital, augmented by the financial cost of the unit of capital. This sum is an increasing function of the organic composition of capital. In NI's terminology, it is the ratio between the price and the value of the net product of the economy.[56]

When this augmented cost – which has the dimension of units of money per units of time, that is of dollars or euros per hour – is computed, the mapping problem is solved. To get the labour-value of a money unit, it is sufficient to multiply the money unit by MEV.

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[56] In the literature there are two versions of this index: the 'simultaneist' (or atemporal) version known as the NI-MELT, which is the ratio of the value of net product of the economy to the living labour employed in the production of the gross product, and the 'temporalist' (or successivist) version, the TSSI-MELT, that 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), an amount which is suitable to change during the production process.

By dividing the price of a commodity by MEV, one gets an approximate measure of total resource factor productivity in terms of the commodity. And by dividing total commodities prices by MEV, a more general proxy of total factor productivity can be obtained.

MEV should not be confused with a different metric, the 'monetary expression of labour time' (MELT). Foley calls MELT the money value of abstract living labour time commanded by commodities, measured by a distinct ratio of a monetary magnitude, net value-added in a given period, to a labour magnitude, total living labour employed in production, which provides an inferior first approximation measure of the money value of labour-time.[57]

MELT is the product of the quantity of money in circulation times the velocity of circulation, divided by the value of money. It is thus the product of two ratios, the ratio of value added to an index of the quantity of use values produced and that of such index to the labour time expended. It is the reciprocal of the value commanded by a unit of money. Differently from MEV, MELT does not include the notional financial cost of capital, which is an implicit cost:[58]

$$\text{MELT} \ = \ (px - m')/\lambda'x,$$

where m' is the money material and operating cost of production, without the financial cost of capital, λ' is the vector of living labour coefficients. Besides, MELT privileges direct labour over indirect labour, that is living labour time over past labour embodied in capital goods. Its denominator is concrete working time, not socially necessary abstract labour.

MELT is therefore, from an analytical point of view, a less satisfactory metric than MEV. It is commonly used by Sraffian and neo-Marxist scholars,[59] but is not present in Sraffa's own theoretical system.[60]

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[57] MELT can be decomposed into MEV and the value expression of living labour-time (VELT), which measures the amount of abstract labour that corresponds at the aggregate level to a unit of concrete living labour-time and depends on the quantity of labour and the labour productivity. See Rieu, 2006.

[58] Unlike MEV, which is the sum of the real unit cost of production and the unit financial cost of capital, which is a notional cost. See Cavalieri, 2013.

[59] See, for example, Moseley, 2004, and Freeman and Kliman, 2008.

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9. Towards a reformulation of the theory of capital in a critical Marxist post-Keynesian perspective.

The Sraffian scholars' views on the alleged separation in classical economics between the determination of commodities relative quantities and the determination of prices and the social distribution of income have been critically analysed before, in the previous paragraphs, for their invalid dichotomic nature, which implies the false independence of the equilibrium values of real variables from the supply of money, rejected by Keynes.[61]

In particular, the functional interdependence of money supply and demand should be recognized. It is not correct to trace two distinct curves for the supply and the demand of money in the quantity-price space. The causal relation is bidirectional and asymmetrical; it does not go from the demand to the supply of money, as assumed by post-Keynesians, or in the opposite direction, as argued by monetarists. This bidirectionality contributes to make monetary policy a complex subject.

Can Keynes's *General Theory* be seen as complementing in the long-period Marx's theory of prices; or reciprocally, can Marx's theory of value be considered as being completed in the short-period by Keynes's theoretical system, as suggested by Garegnani and other Sraffian authors of the Anglo-Italian Marxist-Keynesian Cambridge school? I do not think so, in spite of the existence of some elements suitable to be interpreted as calling upon in this direction, including the circumstance that Keynes had no specific theory of value and Marx had no theory of the short-term determination of income and employment levels by the effective demand.

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[60] Both MEV and MELT can be modified to account for the distinction between productive and unproductive labour. Only productive labour is the source of surplus-value.

[61] A similar critique can be addressed to monetary circuit flow theories that individuate the source of demand deficiency in the way monetary and financial operations are made by the banking system in a pure credit-money framework, devoid of an initial stock of exogenous State-money. This theoretical framework contrasts with the Keynesian one, where both flows and stocks of money, held for precautionary and speculative motives, are present. Circuitism is not a particular type of Keynesism. Money is regarded as a simple means of payment, devoid of any direct utility, as in neoclassical models which entail the validity of Say's Law.

Marx and Keynes shared some basic views on the fundamental instability of the capitalist system and the possibility of a general overproduction. Both of them saw crises as connatural to capitalism and deeply rooted in its modern versions. And both opposed Say's law of markets and the traditional versions of quantity theory, that implied the neutrality of money. Last but not least, both of them did not share the alleged classical dichotomy questionably imagined by Sraffa and Garegnani. There are, however, in spite of some weak affinities, seriously contrasting features in Marx's and Keynes's theoretical systems. They are really two utterly 'incompatible bedfellows'.

Keynes was not at all sympathetic with Marx's thought, to which he did not pay much attention. He did not accept historical materialism and did not consider capitalism a temporarily limited economic system, a class system destined to pass. His attention was focused on the short-period. As a liberal, he did not object to private property of means of production, did not endorse Marx's classist conception of production and distribution and his perspective of class struggle. He opposed collectivism and nationalizations. Differently from Marx, Keynes's purpose was to reform and improve capitalism, to have it better run by qualified and socially responsible managers, not to eliminate it.

On unemployment too Marx and Keynes had different views. For Marx, capitalist competition tends to reduce production costs by an increasing use of capital intensive techniques which create unemployment. Yet he thought that capitalism needs an industrial reserve army to expand profitable production and to keep wages down. For Keynes, on the contrary, managing capitalism appropriately could succeed to keep economic activity permanently near a full employment level.

A reformulation of the theory of value, capital and distribution and of the analytical framework of accumulation and crisis thus cannot proceed along Marxian-Keynesian lines. One has to choose between them. Speaking of Marxian-Keynesism does not makes sense. It is an oxymoron.[62]

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[62] Luigi Pasinetti's attempts to establish some formal links among Marx's, Keynes's and Sraffa's theoretical constructions, by referring in a model of structural change to a natural dynamic and non-ergodic causal system based on

In *Capital*, volume III, published by Engels in 1894, Marx analyzed the relationship between commodities values and production prices, arguing that production prices include a uniform profit margin, which involves their deviation from the corresponding values. He initially considered the value relationship in its qualitative aspects, concerning absolute value, which is independent of the ratio of supply and demand. Then he looked at the value relation in its quantitative aspects, using a method of analysis that took commodities back to a common denominator, abstract labour, and focused the attention on labour values and on the net product of the economy, an aggregate of heterogeneous items. He also tried, albeit in a wrong way, to provide a formal demonstration of how values are transformed into prices.

Today, thanks to Sraffa, we know that a knowledge of labour values is not really needed to determine prices. It is sufficient to take as given output quantities, the technical conditions of production and the social distribution of the net product. All these elements are not directly dependent on labour values.

By his theory of value, Marx wished to explain two things: the absolute or intrinsic value of a commodity, its 'value substance', determined in the sphere of production and pre-existent to the exchange, and its relative value, the value-form independently realized in the market as a monetary magnitude, through the exchange. He did never refer to values as proxies of prices. Values, for Marx, had full conceptual autonomy. He thought that the value magnitude originates in the sphere of production and does not depend on exchange conditions. Commodities are exchanged because they are valuable. Exchange redistributes value among sectors and firms.

In the first volume of *Capital* (1867) Marx reasoned in terms of labour values. On their basis he reckoned total value and surplus value. In the second volume, published posthumously by Engels in 1884, he described the circuit of capital and the reproduction schemes. In the third volume,

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the classical surplus approach to value and distribution and the Keynesian principle of effective demand and implying a separation between the purely theoretical stage of the analysis and that which can be made in a specific capitalist institutional setting, have little to do, in my opinion, with the Sraffian invalid dichotomy highlighted by Garegnani. Pasinetti's and Garegnani's proposed developments of Sraffa's surplus approach go in quite different directions.

published by Engels in 1894, he dealt with the problem of the allocation of total surplus value among sectors and firms. He there expressed commodities exchange values in money terms, at their production prices (in an incorrect manner, later corrected by Bortkiewicz).

A cost-of-production theory of value, augmented by a normal profit margin[63], then emerged to explain production prices in the long period. For Marx, they were not equilibrium prices. He denied the existence of a tendency to long-term equilibrium in a market economy.

Keynes's *General Theory* was conceived by Keynes as an analysis of the economic system as a whole, covering the markets for goods, labour and money. In the first eighteen chapters, Keynes put forward a simple model of an economy with fixed wages and prices, independent savings and investment functions and a market mechanism which did not ensure equilibrium in the labour market. In the following three chapters, dealing with changes in money wages and prices, he sketched a more general version, a long-period one, where the assumption of fixed wages and prices was removed and an essential role was attributed to the money rate of interest, which was regarded as a reward for the renounce to liquidity, rather than for the postponement of consumption.

In the analysis of the important relationship between money supply and interest rates, it has become customary to make use of NK and NC models of the economy, in which aggregate demand plays a central role in determining the level of output. In NC models an aggregate demand equation relates output and employment to the real interest rate and an expectations-augmented variant of the vertical Phillips curve provides the aggregate supply equation. An interest rate rule expresses the central bank policy, that is its reaction function. A correct setting of interest rates is considered sufficient to achieve non-inflationary growth and full employment. Hence, emphasis is put on monetary policy. Fiscal policy is not needed.

Controversial features are present in these models: the absence of any role for a financial market and for a government sector responsible of fiscal policy; the lack of attention for the

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[63] Normal profit, an opportunity-cost, should be distinguished from 'pure' or 'extra' economic profit, a surplus, included in accounting profit (revenue less explicit costs).

distributional effects of monetary policies implying interest rate targeting; the reference to a systematic reaction function of the monetary authority; the choice of price stability as prior policy objective. The basic question concerns which attitude should be assumed on the trade-off between price stability and the pursuit of output and employment objectives.

These models represent a paradigm shift from an authentic Keynesian approach, for their reliance on a non-discretionary monetary policy regime, for the absence of a public sector and for the denial of any explicit role to fiscal policy. Fundamentalist PK are specifically concerned with financial relations. They support different models that underline the role of central bank role as lender of last resort. In their models the supply of money is endogenous and money is non-neutral both in the short and in the long-run.

Complex stock-flow consistent computable general equilibrium (CGE) models, dynamic stochastic general equilibrium (DSGE) models and NK models, where rational economic agents interact in an imperfect market framework, characterized by sticky wages and prices, are largely used by central banks for forecasting and policy purposes. They imply a targeting policy rule commitment and are in general preferred to real-business-cycle models of new classical type, implying continuous price adjustments suited to equilibrate supply and demand. In their rational expectations theoretical framework, no systematic monetary policy has real effects, if it is correctly anticipated by economic agents having rational expectations.[64] Thus only 'erratic' policies can produce real effects (this result is known as 'Lucas's critique'). But since information on the state of the system is costly, erroneous perceptions cannot persist indefinitely.

This state of things is at the origin of the 'time-inconsistency' dynamic problem, by which the optimal policy can change.[65] In a similar perspective, Milton Friedman and Edmund Phelps tried to resurrect the idea of a neutral policy, by pointing out that in the context of the natural rate

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[64] As shown by Sargent and Wallace, 1975. The irrelevance of monetary policy for stabilizing purposes is argued also by real business cycle theorists.

[65] In a discretionary policy framework, the presence of time-inconsistency may induce policy-makers to try to fool people by announcing low inflationary policies, in order to achieve short-term output and employment targets.

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hypothesis only an unexpected inflation could affect real output, and that, after expectations would have adjusted, the neoclassical dichotomy would be restored.

In a developed economic system, with industrial and financial circulation, Clower's rule of a cash-in-advance constraint is relevant. It confers money the role of a technical device acting as an intermediate input and make it a sort of entrance ticket and regulator in the market for goods and services. In this case, the dichotomy between real and monetary factors is contradicted and the non-neutrality of money is confirmed.

This simplistic theoretical position presupposes a world with incomplete financial markets and sets itself against Keynes's theory of the demand for money and in favour of a return to the neoclassical Robertsonian tradition, or of remaining in an empirically insignificant Walrasian box. It has been shared and over-emphasized by a number of pseudo PKs and monetary circuitists wishing to enforce the idea that money matters and to distinguish notional and effective demand for goods.[66]

The policy implications of Clower's cash-in-advance rule are clear: if the cash-in-advance constraint is binding, the case for an activist monetary policy is enforced and the reasons for a liquidity management aimed at ensuring large availability of funds can prevail on those for an aggregate demand management of Keynesian type.

10. Theoretical conclusions and policy implications.

As initially declared, the main goals sought in this paper were: (i) to show that structural interdependence among the productive sectors of a developed economy was recognized by most classical political economists (with the notable exception of Ricardo) and by Marx as an ontological property of the real world; (ii) to reconsider both the 'orthodox' thesis that a stabilizing monetary policy should be preferred to fiscal policy in an economy with exogenous money, and the 'heterodox' thesis of the scarce effectiveness of monetary policy in a sovereign country; and (iii) to

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[66] See, for example, …

underline the present tendency to interpret in a non-deterministic sense Marx's theoretical system. This three-fold task has been accomplished. On this basis, in the light of the refusal of the invalid Sraffian dichotomy, some implications on the relative effectiveness of monetary and fiscal stabilization policies, one of the most debated issues in macroeconomics, and recall that both these policies aim at achieving also other important macroeconomic objectives concerning output and employment. Monetarists and Keynesians have long debated this issue, since the middle 1960s, when a seminal work by Andersen and Jordan was published. A large number of empirical studies on the subject have been made, but they have not been conclusive. Changes in the money stock continue to be regarded by monetarists as suited to influence aggregate demand directly, while Keynesians consider their influence as an indirect one. For both of them monetary policy should be tighter in periods of full employment and inflationary pressure and easier in the presence of under-utilized economic resources.

The effectiveness of fiscal policy as an instrument to affect aggregate demand is largely conditioned by the method of financing public expenditure and by the structural composition of government spending. This state of things can make the use of fiscal policy more complex with respect of monetary, but In principle both of them can be effective, if correctly applied. Their policy-mix – e.g. a combination of restrictive fiscal policy and expansionary monetary policy – may be appropriate to stimulate capital formation, in the presence of growth targeting and in the absence of a deficit in the balance of payments. What should be firmly rejected is the illogical MMT'ers suggestion that a sovereign country could choose to experience continuous deficit spending in the public sector, for unlimited amounts, to stimulate growth and employment.

Structural adjustment economic programs implying removal of excessive government controls and cuts in public spending can sometimes have temporary negative impacts on the provision of social services and on the social distribution of income. They can limit the individual freedom to dispose of world natural resources. But the alleged dichotomy between efficiency and equity implicit in the neoliberal globalizing paradigm which underlines the supposed general

comparative advantages of deregulation, privatization, low government borrowing, flexible exchange rates, free trade and economic specialization – enforced by the Washington Consensus on financial liberalization and fiscal discipline – is questionable. It can be disputed, as is not in the best interest of developing and highly indebted countries which need emergency stabilization programs. It should not provide a stable guideline for sensitive policymakers who understand that the basic questions to afford are which kind of growth, in behalf of whom and how the adjustment costs involved should be shared.

As concerns the *vexata quaestio* of the stock or flow dimension of capital, I have criticized Marx's distinction and asymmetrical treatment of constant and variable capital. Capital (Marx's 'capital in general') is a revolving stock, that can be measured in labour-time or in money terms. Flow approaches to capital theory, as those entailed by loanable funds neoclassical theory and by the modern theories of monetary circuit, are not correct and must be rejected. They ignore the store of value function of money and disregard Keynes's liquidity preference theory.

In this essay it has been maintained that monetary and fiscal policies are institutionally conditioned by the degree of independence of the central bank and by the exchange-rate regime and that monetary policy should not be used to solve fiscal difficulties, and fiscal policy should not be used to solve monetary difficulties. Functional finance can have a significant role in price stabilization and wealth improvement, contrary to what classical economist, who favoured a permanently balanced budget, thought and is usually maintained by monetarists and new classical authors.

When capital goods are correctly recognized to be direct productive factors, Marx's 'law' of the falling trend of the profit rate on invested capital – Marx's key argument to predict the end of capitalism – no longer holds, unless the rising organic composition of capital is offset by a corresponding increase in the rate of wage labour exploitation.[67] The uncertain statistical trend of

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[67] This should not induce to accept the neo-Marxist distinction between a rising 'material' rate of profit of Sraffian type and a falling 'value' rate of profit of Marxian type.

the profit rate, however, is not *in se* sufficient to support the idea of a declining trend of the rate of fixed capital accumulation. The era of frantic accumulation seems definitively overcome.

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Abstract: ***Structural Interdependence in Monetary Economics: Theoretical Assessment and Policy Implications.***

This is a theoretical analysis of structural interdependence in monetary economics. Some recent attempts to integrate money and finance in the theory of income and expenditure are critically examined. The Sraffian dichotomic interpretation of classical political economy is refused. A version of the classical surplus approach devoid of separating connotations is sketched, where flows and stocks are consistently reconciled and net financial wealth vanishes in the aggregate. Marx's law of value is criticized and set aside, as historically outdated by the advent of cognitive capitalism. New Consensus and New Neoclassical Synthesis macroeconomic models are criticized from an orthodox Keynesian point of view. Two further results emerge from the analysis: the illegitimacy of Marx's asymmetrical treatment of constant and variable capital in the theory of value and the suggestion of a correct method for measuring the unit cost of real capital. Some reasons for reconsidering in this perspective the traditional approaches to monetary theory and policy are indicated.