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EMPLOYMENT AND INCOME DISTRIBUTION FROM A CLASSICAL-KEYNESIAN VIEWPOINT

SOME TOOLS TO GROUND A NORMATIVE ANALYSIS

Enrico Bellino

Materiali di Discussione n. 3
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Abstract. *Two unambiguous phenomena have characterized the environment in which the global crisis has spread: a thirty–year increase in the profit share and a significant increase in the 'degree of financiarisation'. Dominant economic theory does not seem suitably equipped to provide solid benchmarks for orientating a normative analysis on these aspects. This paper will analyze the two mentioned phenomena in light of an alternative paradigm, based on Classical and Keynesian lines, with the purpose of not only highlighting the two specific issues but also outlining a normative framework based on the Classical–Keynesian approach to political economy.*

Employment and Income Distribution from a Classical–Keynesian Viewpoint

Some Tools to Ground a Normative Analysis[1]

Enrico Bellino[2]

1. Introduction

Industrial and post–industrial economic systems are characterized by two unambiguous phenomena which are at the center of discussions on the current crisis: the increase of the profit share over the past thirty years and the increased degree of 'financiarisation' of economic systems. Mainstream economics seems ill equipped to face these issues satisfactorily, in particular from a normative stance. For example, questions like 'what levels of profits are needed by the system?' or, 'is there a desirable degree of financiarisation for economic systems?' do not seem to find useful answers in the Paretian approach.

This paper sets out to provide the basic elements needed to develop an alternative normative framework based on the Classical–Keynesian approach. The theoretical reference framework is the Classical one as reproposed and reformulated quite recently by Sraffa (1960), and later developed and generalized by Garegnani (1983), (1984) and Pasinetti (1981), (2007). Part of the arguments presented are intrinsically connected with output levels and their evolution through time. The Keynesian principle of effective demand seems quite compatible with the methodology of Classical analysis. For this reason,

1. Paper originally presented at the Conference: "The Global Crisis", University of Siena, January 26–27, 2010; forthcoming in E. Brancaccio and G. Fontana (eds.), *The Global Economic Crisis: New Perspectives on the Critique of Economic Theory and Policy*, Routledge, London, 2011. I am grateful to Emiliano Brancaccio, Roberto Ciccone, Nadia Garbellini, Giorgio Gattei, Kazuhiro Kurose, Paolo Leon, Sergio Levrero, Sebastiano Nerozzi, Arrigo Opocher, Luigi Pasinetti, Angelo Reati, Neri Salvadori, Ariel Wirkierman, Takashi Yagi and two anonymous referees for having discussed many of the arguments presented here. A particular thank is due to Luciano Boggio for having pointed out my attention on a slip contained in a previous version of this work. I am grateful for the financial support received from Università Cattolica: 'linea di ricerca D3.2 – Disuguaglianza dei risultati e disuguaglianza delle opportunità'; and from the Italian Ministerial funds: 'PRIN 2007 – Settori eterogenei, crescita e progresso tecnico'. Finally, I am grateful to Micaela Tavasani, for English revision.

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the Pasinetti's framework of structural change represents an excellent tool for presenting my arguments. This paper suggests a way to derive some normative propositions concerning income distribution (and related issues) with the purpose of suggesting a line of research along which all strands of the modern Classical approach can agree with and, hopefully, to which they can contribute with further results.

2. Welfare Paretian analysis and income distribution

Neoclassical analysis has developed in parallel both a positive and a normative level of economic analysis based on the same individualistic approach. This methodological basis has proved to have several strengths in both levels of analysis, essentially because it is based on the ultimate consequences of economic activities: satisfying the final wants of the individuals. Nevertheless, this methodological approach has at times conditioned the kind of results that could be obtained: as the description of any situation is reduced to a description of *how* relevant individuals *behave*, also the outcome of the normative analysis cannot but incorporate *just* what *single individuals* want to happen without taking into consideration the needs of the system as a whole. These weaknesses make it impossible for the Paretian approach to tackle some of the relevant issues which are currently at stake in a meaningful way. For example, as noticed in the Introduction, it is hard to identify useful benchmarks to orientate income distribution, or to define a desirable degree of financiarisation of an economic system.

Distributive issues can be faced in at least two ways in Neoclassical analysis. One is concerned with the notion of wealth conceived as a *stock*. Consider a pure exchange economy with two individuals, A and B, and two goods, X and Y. Feasible allocations of the economy's endowments of these two goods, $\bar{x}$ and $\bar{y}$, are represented by all points of the Edgeworth box (see the left–hand graph of Figure 1). The set of Pareto–efficient allocations is represented by a subset of this box, the contract curve CC'. The curve on the right–hand side of Figure 1 is built by moving along the CC' curve: it indicates the maximum level of utility assigned to one individual for any given level of utility assigned to the other individual. It constitutes the *utility frontier* (UF) of the society. All movements from any point of the Edgeworth box *toward* the CC' curve — or from any point *below* the utility frontier *toward* it — can be justified on the basis of economic considerations deriving from the notion of Pareto efficiency. All movements *along* the CC' curve — or along the UF curve — entail reallocations of endowments between individuals; they are not ex-

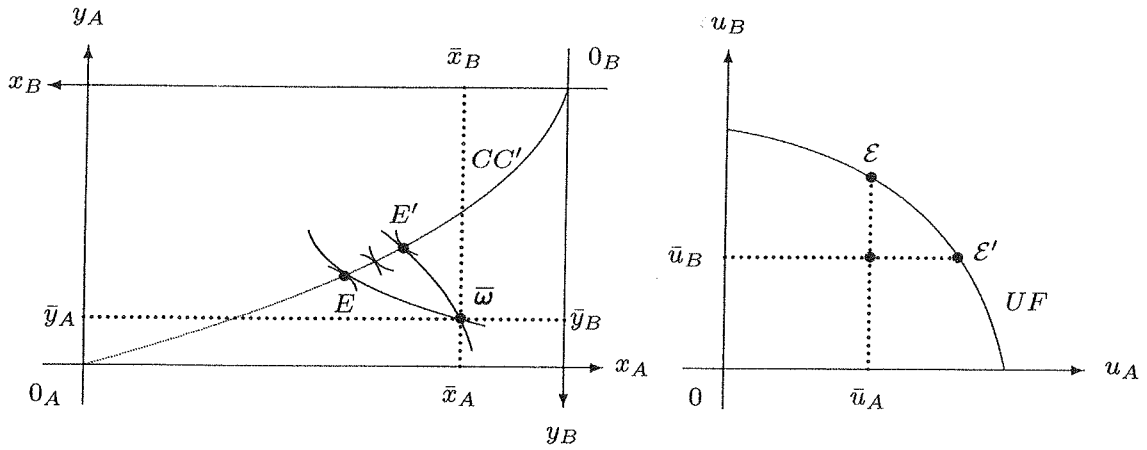

Figure 1: The contract curve (CC') and the utility frontier (UF)

cluded, but they *cannot* be justified by efficiency arguments. Their justification is to be found outside the pure field of economic theory, in the sphere of social choices: in ethical, political, social, in brief 'institutional' arguments. For example, if the property rights on initial endowments are specified by vector $\overline{\omega} = [\bar{x}_A, \bar{y}_A; \bar{x}_B, \bar{y}_B]$, on the basis of efficiency arguments we can justify every movement from vector $\overline{\omega}$ to any point in the subset EE' of curve CC' — or every movement from point $(\bar{u}_A, \bar{u}_B)$ to the subset $\mathcal{E}\mathcal{E}'$ of curve UF. Once the system is on curve CC' — or on curve EE' — every further movement along these curves must be justified on the basis of arguments outside the pure field of economic theory.

Hence, by looking at wealth in terms of stocks, Neoclassical economic analysis gives space, by separating the analysis of efficiency from that of equity, to the possibility of affecting initial endowments on the basis of economic arguments up to the point where the system reaches an efficient allocation; once it is reached, any further movement must be justified on the basis of 'institutional' arguments.

More rigid conclusions can be drawn if we look at distributive relationships in terms of income flows, that is, in terms of factor prices (i.e. wages and profits). Hence, we must introduce production.[3] Consider, for simplicity, a system with two final goods, X and Y, produced by means of capital, K, and labour, L. Given the quantities that must be produced of final goods, $\overline{X}$, and $\overline{Y}$ — here considered as given for simplicity —, a unique (and feasible) allocation of factors among industries (composed of identical firms) is identified:

3. We are not considering here the difficulties for Neoclassical theories to formulate a coherent value and distribution theory when capital is seriously taken into consideration. On this, see Garegnani (1990) and (2003).

K_x^*, L_x^*, K_y^* and L_y^*. If technology is 'well–behaved', this allocation univocally identifies the equilibrium factor price ratio: the ratio between the rental price of capital and the wage rate is equal to the (equalized) marginal rates of technical substitution of the two industries. Geometrically this is represented by the common slope of the tangent isoquants of the two industries corresponding to the levels of final goods $\overline{X}$ and $\overline{Y}$:

$$\mathrm{MRTS}_x(K_x^*, L_x^*) = \left(\frac{\pi}{w}\right)^* = \mathrm{MRTS}_y(K_y^*, L_y^*)$$

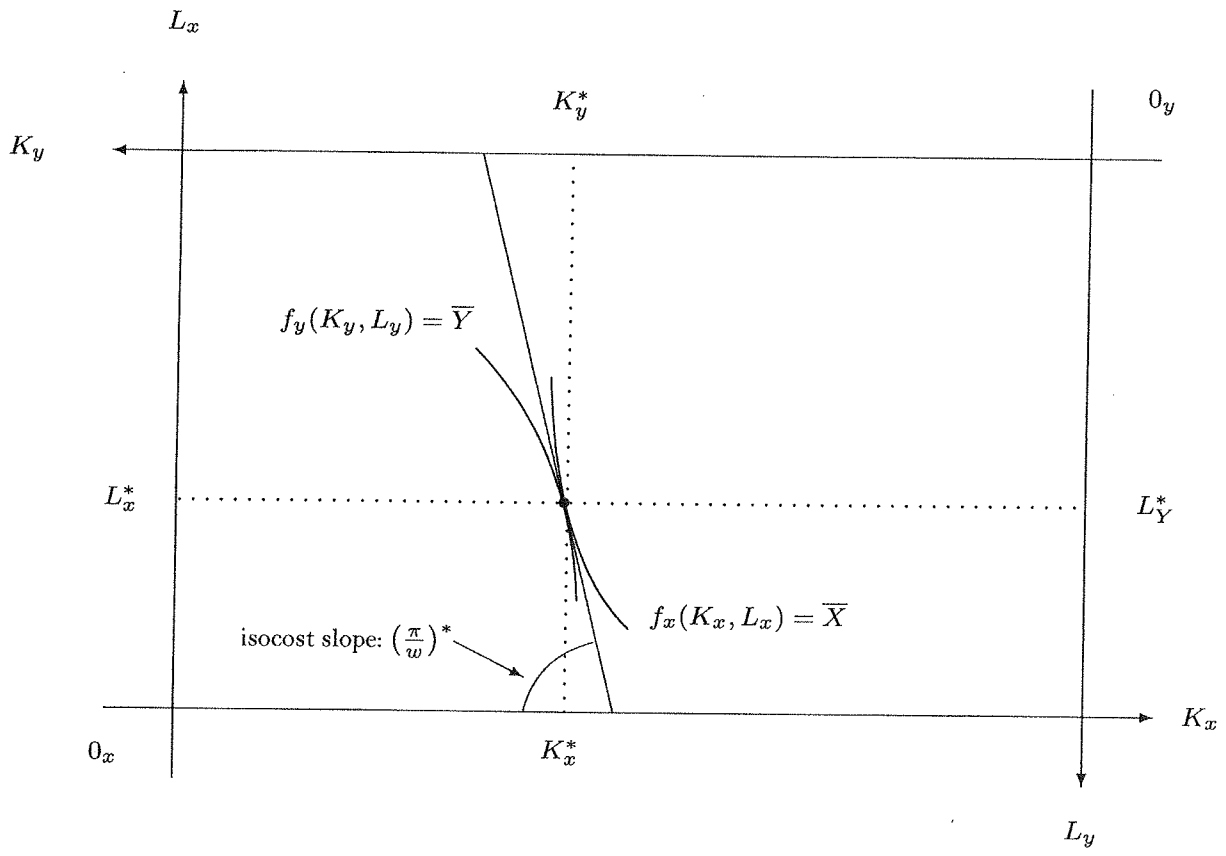

Figure 2: Univocal determination of the factor price ratio

Income distribution, expressed by factor price ratio $\left(\frac{\pi}{w}\right)^*$, is univocally determined by market equilibrium. It is simply the outcome of the interaction between the supply of capital and labour — their 'endowments', which regulate the size of the Edgeworth box — and the demand of capital and labour, indirectly induced by the demand of final goods. Income distribution thus determined has the relevant property to ensure full employment of capital and labour. We have therefore no elements to consider one price ratio as more

desirable than another one: the 'market' univocally determines it. Moreover, according to market conditions, it can take any configuration. For example, it can be quite 'acceptable' from a 'social' point of view or, on the contrary, it can be quite 'unbalanced' in favour of capitalists (or workers). At least, through suitable reallocations of initial endowments of the two individuals, the market outcome can be modified, thus modifying the resulting factor price ratio. But this approach is more indirect and, again, it is based on considerations developed outside the sphere of pure economic theory. In any case, we have *no economic basis* to consider one factor price ratio more 'desirable' than another by the system as a whole.

This kind of analysis leaves one quite dissatisfied. Firstly, if we look at the distribution of initial endowments, the results seems too vague (*all* redistribution can be accepted on the basis of extra–economic elements). Moreover, the focus remains limited to the point of view of individuals. We do not have a global vision of the system: is there one set of configurations that is more desirable than another for the working of the system as a whole? Lastly, if income distribution is perfectly determined, no redistribution can be justified within the inner 'core' of Neoclassical theory. All these elements prevent Neoclassical analysis from providing useful landmarks in issues concerning functional income distribution. In fact, on that basis we find no element to assert that the decline in the wage share over the last three decades is unjustified.[4]

In the next Section we will turn to an entirely alternative framework grounded on Classical and Keynesian lines with the purpose of developing a normative analysis whose results appear more promising on these matters.

3. A Classical–Keynesian approach: the reference framework

The reference framework referred to throughout this essay is the 'modern' version of Classical analysis, started by Sraffa (1960), shaped by Garegnani (1984) and extended by Pasinetti (1981).[5] We will follow, in particular, the analytical formulation proposed by Pasinetti in his 'structural change' model, where the Classical production apparatus is complemented by Keynes' output theory and the post–Keynesian distribution theory.

4. On the contrary, there are several *interpretations* of the present reduction of labour share which normally trace it back to the kind of technical progress, to changes in the composition of the labour force, etc.. For a survey of these interpretations see Ellis and Smith (2007).

5. See, also, Garegnani (2007) and Pasinetti (1986).

3.1. *A formal description of the economic system*

Consider an economic system where C final commodities are produced by means of labour and capital goods. To simplify, let's consider the case where capital goods are produced just by labour.[6] Let $c = 1, \ldots, C$ the index of final goods. To produce final good c a_{Nc} units of labour and a specific set of capital goods are required. Each of these sets can be considered as a single (composite) capital good, that can be called 'productive capacity of final good c'. Conventionally, one unit of productive capacity of final good c produces exactly 1 unit of final good c. Let's suppose that in each production period a *constant* proportion, $1/T_c$, of each productive capacity is worn out. Moreover, producing one unit of productive capacity of good c requires a_{Nk_c} units of labour. Let Q_N be the existing population which is assumed to coincide with the labour force for simplicity (this assumption can be relaxed: see Pasinetti (1981, Chapter III, § 3)). Let a_{cN} be the units of final good c required by each individual as final consumption, and let a_{k_cN} be the coefficient of individual demand of capital good c by the final sector (net investment). Let Q_c and Q_{k_c} denote the quantities produced of final good c, and of its productive capacity k_c. Let p_c and p_{k_c} be their corresponding prices, and π_c the corresponding profit rates (that for the moment are not assumed to be uniform among sectors). The production relationships can be represented by two equation systems, one for quantities and one for prices:

$$\begin{cases} Q_c = a_{cN}Q_N, \quad c = 1, \ldots, C, \\ Q_{k_c} = \frac{1}{T_c} \cdot Q_c + a_{k_cN}Q_N, \quad c = 1, \ldots, C, \\ \sum_{c=1}^{C} a_{Nc}Q_c + \sum_{c=1}^{C} a_{Nk_c}Q_{k_c} = Q_N, \end{cases} \tag{1}$$

and

$$\begin{cases} p_c = (\pi_c + 1/T_c)p_{k_c} + a_{Nc}w, \quad c = 1, \ldots, C, \\ p_{k_c} = a_{Nk_c}w, \quad c = 1, \ldots, C, \\ \sum_{c=1}^{C} a_{cN}p_c + \sum_{c=1}^{C}(a_{k_cN} - \pi_c a_{cN})p_{k_c} = w. \end{cases} \tag{2}$$

The first $2C$ equations of system (1) determine the quantities produced of each good according to its effective demand; the first C equations concern final goods, the second C equations concern the productive capacity of

6. The general case, where capital goods are produced by labour and other capital goods, is contained in Pasinetti (1981, in particular Chapter II, Section 7); for further details see Bellino (2009); see moreover Pasinetti (1988a).

final goods, and show the two components of demand for productive capacity: replacement (Q_c/T_c) and net investments ($a_{k_cN}Q_N$). The last equation of system (1) establishes that in equilibrium, labour requirements (in producing final goods and their productive capacities) must equal the existing labour force.

The first $2C$ equations of system (2) determine prices of final goods and of their productive capacities. The last equation of this system refers to *net* national income and states that in equilibrium wages plus profits must equal the expenditure for final and investment goods.[7]

3.2. Solutions for quantities and prices; the macro–economic condition

Systems (1) and (2) are linear and homogeneous; in order to exclude trivial solutions, the determinants of their coefficients matrices must equal zero. For both systems, this condition can be expressed as

$$\sum_{c=1}^{C} a_{Nc}a_{cN} + \sum_{c=1}^{C} \frac{1}{T_c} a_{Nk_c}a_{cN} + \sum_{c=1}^{C} a_{Nk_c}a_{k_cN} = 1. \tag{3}$$

Once this condition is satisfied (we will return to this point briefly), systems (1) and (2), respectively, can be solved with respect to quantities and prices:

$$\begin{cases} Q_c = a_{cN}\bar{Q}_N, \quad c = 1, \ldots, C, \\ Q_{k_c} = \left(a_{k_cN} + \frac{1}{T_c} \cdot a_{cN}\right)\bar{Q}_N, \quad c = 1, \ldots, C \end{cases} \tag{4}$$

$$\begin{cases} p_c = \left[a_{Nc} + \left(\pi_c + \frac{1}{T_c}\right) \cdot a_{Nk_c}\right] w, \quad c = 1, \ldots, C, \\ p_{k_c} = a_{Nk_c} w, \quad c = 1, \ldots, C, \end{cases} \tag{5}$$

where $\bar{Q}_N$ is the given amount of existing population, and prices and wages are expressed in terms of a specific commodity, or a bundle of commodities, or of labour. Solutions (4) indicate those quantities that, *if produced*, satisfy final demand and the demand for commodities employed as capital goods. The latter has two components: the replacement of capital goods worn out in the production process, $(1/T_c)a_{cN}\bar{Q}_N$, and the expansion of the productive capacity, $a_{k_cN}\bar{Q}_N$ (this component will be analyzed in further detail in subsection 4.1).

Solutions (5) represents those prices that, *if realized*, permit each industry, given the profit rates to be paid, to recover the purchasing power necessary to

7. For further details see Pasinetti (1981, Chapter II).

repeat the production process on a scale which is at least unchanged. Prices (5) can thus be interpreted as 'necessary prices' and income distribution must be determined outside the price equations, essentially in the institutional sphere, as commonly accepted within the modern Classical approach.

Finally, equation (3) represents the macro–economic condition since it links together all sectors. As is well known (see Pasinetti (1981, Chapter II)), this condition — *if satisfied* — ensures that national income expenditure is complete so that effective demand reaches the level which generates an output equal to the entire potential output of the economic system: this ensures full employment of the labour force.

Equations (3), (4) and (5) just describe the conditions that *must* be satisfied in order to pursue the following objectives: satisfaction of final wants, repetition of the production activity, and full employment. They do not describe *if* and *how* the system will actually accomplish these goals. The theory limits itself to stating that if we want to pursue these objectives, conditions (3), (4) and (5) *must be* satisfied. This qualifies relations (3), (4) and (5) as *fundamental* for the working of the economic system, independently of the mechanisms (if any) that permit their actual enforcement (for example the market, a central planner, a mix, etc.). In Pasinetti's words, the set of fundamental relations constitutes the *natural system.* This 'separation' between 'natural' and 'institutional' levels of analysis immediately creates ample room for normative analysis when one or more fundamental relations are not automatically or efficiently enforced by the system. We will return to this point in Section 5.

4. Profit and income distribution

4.1. *The 'natural' profit rates*

As noted in the previous Section, determining the necessary prices through equations (5) requires that the profit rates are determined priorly, outside the production sphere. Let's consider a capitalistic system and assume, for a moment, that profit rates π_c are uniform among industries as a result, for example, of competition among capitalists. The necessity to determine one of the two distributive variables *prior* to prices is a known, crucial feature of modern Classical production theory (see Sraffa (1960), Garegnani (1984) and Pasinetti (1988b)). If we chose, following a well–established tradition, to fix the profit rate exogenously to the price equations, we see that it can be fixed between zero and a maximum level (the maximum rate of profit) without jeopardizing the reproduction possibilities of the system. Under this perspective, profits

appear as a revenue whose only justification is that wages do not absorb the entire net social product (the higher the capitalists' ability to keep wages low, the higher the profits). Obviously, at this stage of the reasoning, also the opposite could be argued: wages arise to the extent that profits do not absorb the entire net social product. Anyway, these conclusions can be significantly subverted if we consider a growing system: in that case, profits immediately become a 'necessary' magnitude for the growth of the system.[8]

In order to appreciate these elements we must proceed with a dynamic extension of our analysis. Let's suppose that population, technology and the tastes of consumers change over time in a differentiated way. Following Pasinetti (1981, Chapters III–IV), let's assume the following time paths for Q_N and for a_{cN}, a_{Nc} and a_{Nk_c}:

$$Q_N(t) = Q_N(0)\mathrm{e}^{gt}, \tag{6a}$$

$$a_{cN}(t) = a_{cN}(0)\mathrm{e}^{r_c t}, \quad c = 1, \ldots, C \tag{6b}$$

$$a_{Nc}(t) = a_{Nc}(0)\mathrm{e}^{-\rho_c t}, \quad c = 1, \ldots, C, \tag{6c}$$

$$a_{Nk_c}(t) = a_{Nk_c}(0)\mathrm{e}^{-\rho_{k_c} t}, \quad c = 1, \ldots, C. \tag{6d}$$

(6a) indicates that population grows at rate g; (6b) describes the evolution of final demand for each commodity; (6c) and (6d) describe how technical progress affects labour productivity of the various sectors. In principle $r_c \neq r_{c'}$, $\rho_c \neq \rho_{c'}$ and $\rho_{k_c} \neq \rho_{k_{c'}}$, for any $c, c' = 1, \ldots, C$.

Consider now the coefficients of individual demand for new capital goods, $a_{k_c N}$: if the final demand of commodities evolves according to (6b) it is necessary that investment coefficients $a_{k_c N}$ evolve according to the following dynamic equilibrium condition:[9]

$$a_{k_c N}(t) = (g + r_c)a_{cN}(0)e^{r_c t}, \quad c = 1, \ldots, C. \tag{7}$$

Once technical and consumption coefficients evolve as described by (6) and

8. The perspective adopted here mirrors the one elaborated within the post–Keynesian theories of income distribution and economic growth (see, for example, Kaldor (1955-56), Robinson (1956) and Pasinetti (1962)), according to which growth is financed by profits. There is another perspective, developed within the Classical reappraisal of political economy, where growth can be financed by savings coming from an increase of output generated by an increase in the degree of utilization of productive capacity, without the need to affect income distribution: see Garegnani (1992). A comparison between these approaches will be object of subsequent research.

9. For details see Pasinetti (1981, Chapter V, Section 4).

(7) solutions (4) and (5) become equilibrium *paths*:

$$Q_c(t) = a_{cN}(0) \cdot \bar{Q}_N(0) e^{(r_c+g)t}, \quad c = 1, \ldots, C, \tag{8a}$$

$$Q_{k_c}(t) = \left(g + r_c + \frac{1}{T_c}\right) [a_{cN}(0) \cdot \bar{Q}_N(0)] e^{(g+r_c)t}, \quad c = 1, \ldots, C \tag{8b}$$

and

$$p_c(t) = w a_{Nc}(0) e^{-\rho_c t} + \left(\pi_c + \tfrac{1}{T_c}\right) \cdot w a_{Nk_c}(0) e^{-\rho_{k_c} t}, \quad c = 1, \ldots, C, \tag{9a}$$

$$p_{k_c}(t) = w a_{Nk_c}(0) e^{-\rho_{k_c} t}, \quad c = 1, \ldots, C. \tag{9b}$$

We see thus, that if output of final commodity c has to keep up with the expansion of its corresponding demand, it must increase at the rate of $r_c + g$. Consequently, both the correspondent (vertically integrated) sector and the (vertically integrated) sector producing its specific capital good *need* a net investment representing the $r_c + g$ percent of the existing capital stock. Hence sectoral rates

$$\pi_c^* = \pi_{k_c}^* = g + r_c, \quad c = 1, \ldots, C, \tag{10}$$

constitute a set of rates of return — called, by Pasinetti, the 'natural' profit rates — that if totally reinvested guarantee the repetition of the production activities of the system and their expansion according to the evolution of the final demand of each commodity. Some of these rates may be negative (when $r_c < 0$ and $g < |r_c|$). This indicates that the size of the corresponding sector must be reduced.[10]

Equations (10) determine thus an 'ideal' structure of profit rates that would permit a sectoral allocation of (a part of) the surplus according to evolving social needs. This provides a 'social' justification for profits. As we are in a pre–institutional level, it would seem more appropriate to call the π_c^*s and the $\pi_{k_c}^*$s 'rates of return', as the term 'profit' is normally associated with a capitalistic economy. But, to keep the terminology close to that used by Pasinetti, the term 'natural profit rates' will be used in this paper.

4.2. *Characteristics of natural income distribution*

This particular way of closing price equations has a few relevant consequences that are worth being noted.

10. The seminal idea that a growing system requires a *differentiated* structure of rates of profit was proposed by Leon (1965) within a framework which, for several respects, can be considered a forerunner of structural change analysis. Another Classical framework where a structure of sectoral rates of profit has been considered, although with a partially different perspective, is Benetti, Bidard, and Klimovsky (2007).

a) (Hyper–integrated labour theory of value) Inserting the natural profit rates in solutions (9) of the price system we obtain:

$$\begin{cases} p_c = w[a_{Nc} + (1/T_c)a_{Nk_c} + (g + r_c)a_{Nk_c}], & c = 1, \cdots, C \\ p_{k_c} = wa_{Nk_c} & c = 1, \cdots, C. \end{cases} \tag{11}$$

Prices here are entirely determined by labour quantities. This is evident for the prices of capital goods. The price of each final good c is the sum of three components: the labour employed in its production (*direct labour*); the labour employed in reproducing the fraction of productive capacity consumed to produce final good c (*indirect labour*); and the labour that the system must devote to produce the additional productive capacity necessary to expand the supply of final good c in line with the expansion of its final demand. A *labour theory of value* re–appears though with a renewed interpretation.[11]

This is a relevant result, as it requires no particular assumptions on technology; it descends directly from fixing sectoral profit rates at their natural levels: a situation that — as we will soon see — does not *describe* what actually happens in capitalist economies. Hence labour quantities involved in prices (11) do not reflect *actual* exchange ratios.

b) (Profits as a source of growth) In the natural configuration, 'profits' appear justified insofar as they are the source for financing investments, and not as the income for some class, typically that of capitalists. The members of this class or, more in general, the promoters and the coordinators of productive activities, perceive wages for their working activity, and their consumption comes entirely from wages.

c) (Natural profits turn totally into wages) As in the natural system the price of each commodity reduces entirely to wages, profits — being totally reinvested — are immediately re–introduced into the system in the form of wages, those wages that go to pay the hyper–indirect labour.

From these characteristics, we can enucleate the principle through which net product is distributed in the natural system: each individual receives a fraction of the net product in proportion to the quantity of labour contributed with respect to the total labour of the system; Pasinetti (1981, Chapter VIII, Section 10) called this principle the 'labour principle' of income distribution.

11. This result can be easily extended to the general case, not considered here, where also capital goods are produced by means of labour and capital goods. For details see Bellino (2009, footnote 7).

4.3. *'Natural' rate of interest*

Before discussing the possible relations between the natural configuration of the system and its actual configuration, notice that there is a further phenomenon which can affect income distribution: the debt and credit relationships that can be undertaken among individuals. Suppose that all debts and credits are stipulated, as usual, in terms of the commodity chosen as numeraire: if h is the numeraire ($p_h = 1$) suppose that individual i' lends L units of h to individual i''; on maturity i'' will have to restore L units of the same commodity h to i' (plus, possibly, interest). On the basis of what was noted before, in the natural configuration, the purchasing power lent by i' to i'' is earned on the basis of labour contributed to the system. This element is crucial in defining the appropriate ('natural') amount of numeraire which has to be given back. Observe that labour is a resource whose remuneration appreciates with respect to other commodities just insofar as the latter depreciate as a consequence of technical change, which reduces labour coefficients.[12] We want to avoid that those who are engaged in credit and debt relationships may incur in real gains and losses with respect to the 'labour principle' of natural income distribution, due to the structural change of prices described by (9). The more (or the less) a commodity enjoys productivity increases — either in their production processes or in that of their capital goods — the more it depreciates (or it appreciates) with respect to other commodities. Hence if, for example, the numeraire, in terms of which all assets and liabilities are supposed to be denominated, is a commodity whose production enjoys a high productivity gain, then the repayment of the L units of numeraire will give the lender a *reduced* purchasing power with respect to that of the wage rate. In order to eliminate this deviation with respect to the 'labour principle', it is necessary that a particular interest rate is calculated on debt and credit relations in such a way as to convey to the lender the amount of purchasing power that, at the repayment of the loan, makes it possible for him to 'command' the same amount of labour that he would have been able to buy with L units of h when the loan was stipulated. As labour has a purchasing power that increases at pace ρ_h with respect to commodity h, the rate of interest that restores the natural configuration called the *natural rate of interest*, is[13]

$$i_h^* = \rho_h. \tag{12}$$

12. This fact is immediately apparent if equations (9) are solved with respect to w, with p_c and p_{k_c} considered as given.

13. If loans are denominated in other units of account, the way to identify the natural rate of interest changes accordingly; see Pasinetti (1981, Chapter VIII, Section 9).

5. 'Natural' system and actual systems

The main relations characterizing the 'natural' configuration of the economic system may be resumed as follow:

(N1) output levels, identified by equations (4);
(N2) relative prices, identified by equations (5);
(N3) full employment, entailed by the macro–economic condition(3);
(N4) natural profit rates, identified by equations (10);
(N5) natural rate of interest, identified by equation (12).

This minimal list of objectives constitutes an ideal configuration of the system that, if realized, accomplishes the potential of the system concerning growth, employment and the satisfaction of final wants, a setting which is undoubtedly desirable for the economic system. It does not involve any characteristic of 'optimality' typical of Pareto–efficient allocations. Rather it is based on the notion of 'necessity': in fact, conditions (N1)–(N5) amount to a set of *necessary conditions* in order to accomplish a particular set of goals.

It is now time to focus on the mechanisms — if any — that can enforce this configuration in actual economic systems. According to the perspective adopted in the present framework, that in many respects could be extended to the whole modern Classical approach, the accomplishment of goals (N1)–(N5) regard the sphere of 'institutional' investigation (for a clear separation of these aspects see Pasinetti (2007, Chapters IX and X)).

The objectives listed in (N1)–(N5) are not automatically accomplished by the system. As already observed, the conditions of (N1) can be thought to be accomplished by the Keynesian principle of effective demand, a mechanism that quite reasonably can be assumed at work in modern industrial economies. The conditions of (N2) constitute a set of necessary conditions that, *given the rate(s) of profit*, guarantee the reproducibility of the various commodities. If we are in a capitalistic system, a uniform rate of profit should prevail and once this rate has been determined goal (N2) is accomplished by the market through competition which tends to bring into equality normal prices and the expenses of production. If on the contrary, the set of (differentiated) natural rates of profit prevails, there is no automatic mechanism to guarantee that conditions (N2) are satisfied.

The condition of (N3) is a goal, as widely recognized by many economists and policy makers, that is not attained automatically by the system. Changes in technical coefficients and in final demand coefficients induce, through macro-economic condition (3), two kinds of effects on employment: i) an *inter–sectoral*

mobility of labour, described by changes in the relative weights of the addenda of (3): each of them represents the labour share in total employment of the respective sector; ii) a *macro–economic effect*, induced by technical change which by reducing labour input coefficients has a negative effect on total employment. Hence, the increase of individual final demand coefficients is not just a possibility, but a *necessity* to counterbalances this effect. Empirical evidence shows that this increase is normally limited by a saturation phenomenon. So, the *tendency* to generate unemployment is an unavoidable characteristic of growing economic systems. Possible remedies to unemployment can be: an increase in exports (this would require a reformulation of the model which should include imports), an increase of the number of produced commodities, a reduction of individual labour time and of the activity rate of the total population. All these remedies are not mutually exclusive, nor are they automatic; it is the task of institutions to choose the appropriate mix. In conclusion, technical progress opens new potential for production, but, it also continuously opens new problems for employment, at both the sectoral and aggregate level. Institutions have thus to find new solutions, which need to be differentiated according to the particular situation of the economy. In other words an ever differentiated coordination problem is permanently open in modern industrial and post–industrial economies. The opposite of the *laissez–faire*!

Consider now condition (N4). Equations (10), if satisfied, would put each industry in the condition to self–finance its potential growth. The differentiated evolution of the final demand of the various commodities would require, however, a *differentiated* structure of profit rates which is in evident contradiction with the competitive tendency to uniformity of sectoral profit rates. Hence, the situation described by equation (10) is not supported by any automatic mechanism. For the moment, we can appreciate its relevance only as *the* benchmark as it identifies the necessities for accumulation of the various industries. In particular, it identifies a *minimum* level for the profits in a growing economy: we saw previously that, within the Classical perspective, profits appear as remuneration without justification, at least at the natural or fundamental level. The reference to a growing framework upsets this conclusion: if potential growth has to become actual, the system *needs* profits, *at least* as specified by profit rates (10).[14]

14. See footnote 8.

6. 'Natural' income distribution in capitalist economies

Till now we have kept the analysis at a pre–institutional level. But the discussions in the previous Sections raise a question about the relevance of the natural configuration of profit rates for actual systems characterized by the competitive tendency to uniformity of such rates. The situation is further complicated by the fact that profits rates indicated in relations (10) refer to vertically integrated sectors and not to industries: thus each commodity should yield a different rate of profit (and a different price) according to the vertically integrated sector it is employed in. It is impossible to realize this situation in any real economic system! Thus, it would be useful to discover a device for retaining the normative content of the natural profit rates in connection with the specific context of capitalism. For the remaining analysis, the pre–institutional level will therefore be abandoned to enter the capitalistic system.

Consider now the last equation of the price system (2) and multiply both sides by Q_N:

$$\underbrace{\sum_{c=1}^{C} a_{cN} p_c Q_N}_{\text{consumption}} + \underbrace{\sum_{c=1}^{C} a_{k_c N} p_{k_c} Q_N}_{\text{net investments}} = \underbrace{w Q_N}_{\text{wages}} + \underbrace{\sum_{c=1}^{C} \pi_c a_{c_N} p_{k_c} Q_N}_{\text{profits}};$$

replace the expression of $a_{k_c N}$ according to equation (7):

$$\sum_{c=1}^{C} a_{cN} p_c Q_N + \sum_{c=1}^{C} (g + r_c) a_{cN} p_{k_c} Q_N = w Q_N + \sum_{c=1}^{C} \pi_c a_{c_N} p_{k_c} Q_N \quad (13)$$

By taking into account that in a capitalistic system there is a tendency towards a *uniform* rate of profit, that is,

$$\pi_c = \pi, \quad (14)$$

prices determined by system (2) will take the form of *production prices*:

$$p_c = \left[a_{Nc} + \left(\pi + \tfrac{1}{T_c} \right) \cdot a_{Nk_c} \right] w, \quad c = 1, \ldots, C, \quad (15a)$$

$$p_{k_c} = a_{Nk_c} w, \quad c = 1, \ldots, C. \quad (15b)$$

Under these conditions we can look for that uniform level of the rate of profit that is necessary and contemporarily that is sufficient to recruit globally the financial resources necessary to produce the final commodities in the same amounts that are demanded in the natural system. After substituting

condition (14) into equation (13) this level is obtained by imposing the condition that net investments are financed *only* by profits, like in the natural system, i.e.,

$$\sum_{c=1}^{C}(g+r_c)a_{cN}a_{Nk_c}wQ_N = \sum_{c=1}^{C}\pi a_{c_N}a_{Nk_c}wQ_N.$$

Simplifying and solving with respect to π yields:

$$\bar{\pi}^* = \frac{\sum_{c=1}^{C}(g+r_c)a_{cN}a_{Nk_c}}{\sum_{c=1}^{C}a_{c_N}a_{Nk_c}} = \frac{\sum_{c=1}^{C}\pi_c^* a_{cN}a_{Nk_c}}{\sum_{c=1}^{C}a_{c_N}a_{Nk_c}}. \qquad (16)$$

The uniform level of the rate of profit that, if realized, put the system in condition to 'replicate' the sectoral growth rates of the natural system turns out to be the weighted average of natural profit rates. The differentiated structure of natural profit rates (10) has the merit of bringing out the natural purpose of profits: that of financing growth, given the (differentiated) evolution of demand. But it is practically impossible to implement conditions (10). Formula (16) channels the same global financial requirements, but it is expressed in a way which is compatible with the institutional context of capitalism. Through a suitable series of inflows and outflows of financial resources among the sectors, this *uniform* profit rate makes it possible to replicate, in principle, the same performance that in the natural system is sustained by natural profit rates. Under this perspective, a minimal financial system would be required in order to re–address the profits from sectors with growth rates lower than the average towards those sectors with growth rates higher than the average.

Obviously the average of natural profit rates, $\bar{\pi}^*$, represents the *minimum* return necessary to accomplish system's growth potentials. $\bar{\pi}^*$ does not define an upper limit for the actual profit rate with the same degree of necessity. In capitalistic systems, the *actual* profit rate may be higher with respect to $\bar{\pi}^*$ for, at least, two reasons: i) in order to facilitate the flows of financial resources among sectors; ii) to provide capitalists with a further revenue in addition to wages obtained for the work of coordinating and directing production activities: an additional revenue that could be granted them in a measure to be determined at an institutional level (and not on a technical basis) essentially to compensate the 'risk and trouble' connected with undertaking the production activity. This reduces wages correspondingly. All this allows one to argue that $\bar{\pi}^*$ is a rate from which the actual profit rate should not deviate 'too much'. An excess of the actual rate from $\bar{\pi}^*$ not ascribable to reasons i) and ii) above again qualifies profits as a surplus without any economic or social justification.

A final remark completes the argument. The uniform rate $\bar{\pi}^*$, being a weighted average of natural profit rates, depends directly on the r_cs, the coefficients of variation of final demand of the various commodities. These rates of changes, describing the evolution of individuals' preference structure, are taken as given in the Pasinetti's framework, but even if the final demand of each final commodity may evolve in a way that can be considered 'arbitrary', the r_cs, and thus the natural profit rates π_c^*, are not completely free to assume any value. The *overall* expense for final commodities has to be linked to the *source* of growth of individual incomes: the growth of productivity. At the sectoral level, there would be no meaning in envisaging a precise relationship between each natural profit rate (π_c^*) and its corresponding rate of change of productivity (ρ_c). But a link between the natural profit rates and the rates of change of productivity must be verified *at the overall level.* After substituting (6) and (7) the macroeconomic condition (3) can be rewritten as:

$$\sum_{c=1}^{C} \omega_c e^{(r_c-\rho_c)t} + \sum_{c=1}^{C} \omega_{k_c} e^{(r_c-\rho_{k_c})t} = 1, \tag{17}$$

where

$$\omega_c = a_{Nc}(0)a_{cN}(0), \quad c = 1, \ldots, C$$
$$\omega_{k_c}\left(\tfrac{1}{T_c} + g + r_c\right) a_{Nk_c}(0)a_{cN}(0), \quad c = 1, \ldots, C.$$

The r_cs are to be considered as given, but at the overall they must satisfy condition (17) if full employment is to be preserved. A similar relation binds the natural profit rates π_c^*.

7. Concluding remarks

The modern Classical approach can become a fully fledged theoretical framework if the normative side of analysis is developed alongside the positive one. The material proposed in the previous pages has proved to be quite an easy task due to the logical structure characterizing the approach. The fundamental relations, called 'natural system' by Pasinetti, can be easily put in the form of 'necessary conditions' for accomplishing a list of specific goals. Within capitalistic economies, some of these relations tend to be spontaneously satisfied as a consequence of the behaviour of some groups of individuals. Within industrial systems, one can observe the tendency for (both sectoral and aggregate) output to be determined by effective demand; or the tendency for normal

prices to adjust to the expenses of production as a consequence of competition among firms; or for sectoral profit rates to tend toward uniformity as a consequence of competition among capitalists. These elements constitute the *positive* level of analysis.

On the other hand, there are other fundamental relations, which do not find *spontaneous* accomplishment within capitalistic economies. In their case, it is the task of public institutions to ensure their accomplishment. In certain cases it is a feasible task at least in principle. For example, reaching full–employment as seen in Section 5 is not a trivial problem given that it may have different causes, and therefore require different solutions from period to period, and from country to country; yet, it is possible in principle to identify the level of aggregate demand which will ensure the full employment of the labour force. However, there are other fundamental relations that can *never* be accomplished even in principle. For example, obtaining the natural configuration of profit rates. There is no mechanism to achieve it. In Section 6, a way through which the natural configuration of income distribution can be 'simulated' within capitalistic economies by means of an average of the natural profit rates ($\bar{\pi}^*$) was proved. If this rate is totally reinvested, it would permit each final sector to expand according to the potential growth of its final demand. In this way, it comes to constitute a benchmark for assessing the actual distributing configuration of a capitalistic system. Hence, a spread between the actual rate of profit, π_t, and $\bar{\pi}^*$ may be justified for 'institutional' reasons, essentially as risk compensation.

Once we are in a situation where such a uniform profit rate prevails, it is necessary for the financial system to attend to the redistribution of profits — earned in each sector on a uniform basis — according to the specific accumulation requirements. This is the first and most crucial role of finance in a capitalistic economy. A second role, also prefigured by the previous analysis, is coordinating individual debt and credit relations. These are two essential and basic roles which are necessary to a capitalistic economy to approach the benchmark represented by the natural system.

All these elements show that it is extremely necessary to clarify the roles that finance can or must have in current economic systems where finance has pervaded and sometime even contaminated various branches of economic activity. The points which have emerged from this work can constitute a starting point for further discussions.

Bibliography

Bellino, E. (2009): "The Classical Approach to Distribution and the "Natural System"," MPRA Paper, No. 14901, April.

Benetti, C., C. Bidard, and E. Klimovsky (2007): "Classical dynamics of disequilibrium," *Cambridge Journal of Economics*, 31(1), 41–54.

Ellis, L., and K. Smith (2007): "The global upward trend in the profit share," BIS Working Papers, No. 231.

Garegnani, P. (1983): "The Classical Theory of Wages and the Role of Demand Schedules in the Determination of Relative Prices," *The American Economic Review – Papers and Proceedings of the Ninety-Fifth Annual Meeting of the American Economic Association*, 73(2), 309–313.

(1984): "Value and Distribution in the Classical Economists and in Marx," *Oxford Economic Papers*, 36(2), 291–325.

(1990): "Quantity of capital," in *Capital Theory – The New Palgrave*, ed. by J. Eatwell, M. Milgate, and P. Newman, pp. 1–78. Macmillan Press, London.

(1992): "Some Notes for an Analysis of Accumulation," in *Beyond the Steady-State*, ed. by E. J. Nell, D. Laibman, and J. Halevi, pp. 47–71. Macmillan, Basingstoke and London.

(2003): "Savings, Investment and Capital in a System of General Intertemporal Equilibrium," in *General Equilibrium: Problems and Prospects*, ed. by F. Hahn, and F. Petri, pp. 117–172. Routledge, London.

(2007): "Professor Samuelson on Sraffa and the Classical economists," *The European Journal of the History of Economic Thought*, 14(2), 181–242.

Kaldor, N. (1955-56): "Alternative Theories of Distribution," *The Review of Economic Studies*, XXIII(2)(61), 83–100.

Leon, P. (1965): *Ipotesi sullo sviluppo dell'Economia Capitalistica.* Boringhieri, Torino, English translation: *Structural Change and Growth in Capitalism*, Johns Hopkins Press, Baltimora, 1967.

Pasinetti, L. L. (1962): "Rate of Profit and Income Distribution in Relation to the Rate of Economic Growth," *The Review of Economic Studies*, 29(4), 267–279.

(1981): *Structural Change and Economic Growth – A Theoretical Essay on the Dynamics of the Wealth of Nations.* Cambridge University Press, Cambridge.

(1986): "Theory of Value – a Source of Alternative Paradigms in Economic Analysis," in *Foundations of Economics: Structures of Inquiry and Economic Theory*, ed. by M. Baranzini, and R. Scazzieri, pp. 409–31. Basil Blackwell, Oxford.

(1988a): "Growing subsystems, vertically hyper-integrated sectors and the labour theory of value," *Cambridge Journal of Economics*, 12(1), 125–34.

(1988b): "Sraffa on income distribution," *Cambridge Journal of Economics*, 12(1), 135–138.

(2007): *Keynes and the Cambridge Keynesians.* Cambridge University Press, Cambridge.

ROBINSON, J. V. (1956): *The Accumulation of Capital.* Macmillan, London.

SRAFFA, P. (1960): *Production of Commodities by Means of Commodities – Prelude to a Critique of Economic Theory.* Cambridge University Press, Cambridge.

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