The 'Core' and the 'Natural system': a Comparison between Two Perspectives in Modern Classical Political Economy[*]

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> "*Quelli che ti spiegano le tu idee*
> *senza fartele capire ...*"
>
> (E. Jannacci, "Quelli che ... ", 1975, Italian pop song)

Abstract. Two research programmes have clearly emerged in the literature flowed by Sraffa's framework of *Production of Commodities by means of Commodities*: one leaded to Pierangelo Garegnani and another one to Luigi Pasinetti. The programmes have been conceived independently one another and for different purposes. Yet, I will emphasize how they are characterized by a similar analytical and methodological line, originated by the common root in classical political economy; this makes these approaches complementary elements of a more general theoretical framework: the modern classical-Keynesian approach.

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1. Introduction

The 'modern classical political economy' is a field of research that has flown directly from the analytical framework proposed by Sraffa (1960) and from the works of those scholars that have gravitated around Cambridge (UK) between the Sixties and the Eighties. This group of scholars is addressed by several labels, like Sraffians, modern classicals, Neo-Ricardians, post-Keynesians (although this adjective is less

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appropriate[1]), etc. There are a lot of surveys that aim to outline these research programmes (for example, Harcourt, 1972, Pasinetti, 2007, Baranzini, 2014). The present paper aims to discover and to outline the different approaches have emerged and developed within this field of research. Undoubtedly a common origin in classical political economy and in Sraffa is evident. But we also observe at least a twofold way by which Sraffa's research programme has been carried on, one linked to the name of Luigi Pasinetti and the other to that of Pierangelo Garegnani. Here I propose a comparative look at these approaches and I will try to draw some possible connection between them. I do *not* intend to act as an interpreter of these authors and of these approaches. Rather, I will propose what *I have learned* from these approaches, and what I consider a common and a solid basis to ground nowadays an economic investigation. I will act more as an economist rather than an historian of economic thought: this means that I am more interested in uncovering the connections and indicating the possible integration rather than to emphasize the differences among these approaches, that I do not intend not deny.

2. The logical framework of Classical surplus theories

For expositional reasons it is convenient to start from the reconstruction of the logical framework of classical surplus theories provided by Pierangelo Garegnani (see, in particular, Garegnani, 1984, 1987 and 2007).

The main focus of Classical Political Economy was the determination of the size of social surplus and of its distribution. The peculiar feature of these theories is the view that the shares of the product other than wages are determined *residually*. This means that once the replacements of the means of production employed and wages (pre-determined on the basis of institutional mechanisms) are deduced from the social product, what remains, the residuum, goes to profits and rents. In other terms profits and rents arise because wages do not absorb the entire net product. This view clearly outlines a society where capitalists and land-owners have a prominent position in the distributive process. This principle can be expressed by the following equation:

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[1] A detailed analysis of these classifications is beyond the purposes of this essay. We just limit to recall that the term 'post-Keynesian' is normally referred to the group of scholars directly connected with Keynes, like Richard Kahn, Nicholas Kaldor, Michael Kalecki and Joan Robison. Luigi Pasinetti belongs, in some ways, both to post-Keynesian and to Sraffians: it represents a sort of 'bridge' between the groups.

$$\Pi + R = (X - A) - W, \tag{1}$$

where Π are profits, R are rents, X is the social product, A is the replacement of the means of production and W are wages. There is a fundamental logical requirement in order to provide relation (1) a theoretical meaning, i.e. to interpret it as an equation and not just as an accounting identity: all the magnitudes on the r.h.s. of (1) can be considered as given in the stage of analysis where we study the determination of the magnitude of the shares other than wages. In other terms, X, A and W are 'intermediate data', by using a term quite recently introduced by Garegnani (2007).

It is known that this represented an Achille's heel for Smith's surplus theory of profits, that Ricardo perceived very clearly, but was unable to solve satisfactorily. The difficulties arise from the fact that X, A and W are *values* of aggregates having different compositions. The determination of the prices of the commodities entering them should thus be *prior* to the determination of the shares other than wages described by equation (1), but the determination of 'natural' prices for Smith requires the knowledge of wages, profits and rents. Sraffa's (1960) framework provides a solution to these difficulties, and Garegnani (1984) has defined in details the logical requirements of this determination. It is useful to recall here briefly the main steps. Consider a system where commodities are produced by themselves and labour, all capital is circulating and there is no joint production; abstract from rents for the sake of simplicity. Free competition ensures a tendency of prices to cover wages and gross profits. The prices of commodities must satisfy the following equations

$$\mathbf{p}^{\mathrm{T}}\hat{\mathbf{x}} = \mathbf{q}^{\mathrm{T}}\mathbf{A} + w\boldsymbol{\ell}^{\mathrm{T}}, \tag{2}$$

where $\mathbf{p}$ is the price vector, $\hat{\mathbf{x}}$ is the diagonal matrix of gross output of the various industries, $\mathbf{A} = [a_{ci}]$ is a square matrix where a_{ci} is the quantity of commodity c annually employed by industry i, and c, $i = 1, 2, ..., C = I$ (processes are represented on the rows), $\mathbf{q}$ is the vector of the gross rental prices (they include depreciation) of the various commodities used as capital goods, w is the wage rate and ℓ is the vector of the annual quantities of labour employed in each industry. This formulation, which recalls Smith's notion of natural prices[2], is still incomplete, as it overlooks the elementary fact that it is

not possible to fix all distributive variables, **q** and *w*, independently one another.[3] This inconsistency, typical of an *adding up* theory of prices for which the claim of each class can be accommodated by a suitable variation of prices, is eliminated once it is recognized that in normal conditions gross rental prices of the commodities used as capital goods, **q**, are linked to the prices of reproduction of these goods, **p**, by the relation[4]

$$\mathbf{q} = (1 + \pi)\mathbf{p}, \tag{3}$$

where π is the uniform rate of return or rate of profit. After replacing equation (3) into equation (2) we obtain the usual formulation of the price system:

$$\mathbf{p}^{\mathrm{T}}\hat{\mathbf{x}} = (1 + \pi)\mathbf{p}^{\mathrm{T}}\mathbf{A} + w\ell^{\mathrm{T}}. \tag{4}$$

It should be recognized that price equations (2) plus equations (3) or, which is equivalent, system (4), is common to both classical and long-period neoclassical approaches.[5] What really differentiates them are the forces which regulate income distribution: the relative scarcity of factors in the neoclassical approach—expressed by the supply and demand curves which co-determine the prices of commodities and the distributive variables—and social and historical (i.e. institutional) factors in the classical approach.

Hence, in order to avoid any co-determination prices-quantities typical of an explanation of income distribution in terms of supply and demand it is necessary that some of the magnitudes involved in system (4) are considered *as given*. This is the case for the quantities produced, **x**, the quantities of commodities employed as means of production, **A**, and the quantities of labour ℓ. It is not a chance that Sraffa starts the Preface of his book by warning that

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raising, preparing, and bringing it to market, according to their natural rates, the commodity is then sold for what may be called its natural price."

[3] Smith (1776, chp. VII) writes "The natural price itself varies with the natural rate of each of its component parts, of wages, profits, and rents". On this, see Garegnani (1984, § 9) and Sraffa (1951, p. xxxv).

[4] Equations (3) holds for the case where all commodities are *circulating capital* goods. In the case of fixed capital (with a constant depreciation rate) they should be replaced by $\mathbf{q} = (\hat{\boldsymbol{\delta}} + \pi\mathbf{I})\mathbf{p}$, where $\hat{\boldsymbol{\delta}} = [\delta_c]$ is the diagonal matrix of the depreciation rates of the various commodities when used as capital goods.

[5] Equation system (2) correspond to the price equations of capital goods of Walras' system, while conditions (3) are the conditions of uniformity of the rates of return on the supply prices of capital goods of Walras' system; the same conditions, written in the form (4) are correspond to the Sraffa price system.

> [a]nyone accustomed to think in terms of the equilibrium of demand and supply may be inclined, on reading these pages, to suppose that the argument rests on a tacit assumption of constant returns in all industries. If such a supposition is found helpful, there is no harm in the reader's adopting it as a temporary working hypothesis. In fact, however, no such assumption is made. No changes in output and [...] no changes in the proportions in which different means of production are used by an industry are considered, so that no question arises as to the variation or the constancy of returns. The investigation is concerned exclusively with such properties of an economic system as do not depend on changes in the scale of production or in the proportions of `factors' (Sraffa, 1960, p. v)

In this way, once a *numéraire* has been chosen, it is possible to deduce from the price equations (4) the relation between the rate of profit and the wage rate. As known, when the Standard commodity is chosen as *numéraire* this relation takes the simple form

$$\pi = R(1 - w), \quad \text{or} \quad w = 1 - \frac{\pi}{R}, \tag{5}$$

where $R = (1 - \lambda^*)/\lambda^*$ is the maximum rate of profit and λ^* is the dominant eigenvalue of $\mathbf{A}\hat{\mathbf{x}}^{-1}$. Formula (5) depicts clearly the *trade-off* between profits and wages, which was could not be caught by looking at the price equations (2) only; in other terms it displays very clearly the *residual character* of one distributive variable with respect to the other. With another *numéraire*, the relation between π and w takes a more complicated form, but it shows equally the trade-off between profits and wages. Independently of the *numéraire* chosen, relation (5) (or the analogous relation between π and w entailed by the *numéraire* chosen) shows that that income distribution must be determined *outside* the price equations, that is, outside the sphere of production.

While the attitude of marginalists has that of searching this determination in the 'factors market' the attitude of classical economists (both 'old' and modern) has been that of searching this determination in the 'institutional sphere'. This point has not always been clear in the wide literature arisen around Sraffa's work. One recurrent point was the idea that Sraffa's price equations represented just *one side of the economic relation*, the supply side, and that they needed a set of demand equations to close the model: for example Samuelson writes:

> [m]y fundamental point, let it now be clear, was that Piero Sraffa sought to have but one leg to stand on. Competitive prices, everyone now knows, must stand squarely on the two legs of (1) tastes, desires, needs and distribution of endowments (in short, on *consumer-demand* factors), and (2) technology and production costs. At one time or another, Adam Smith (very briefly), David Ricardo, and Frank Knight (briefly), have tried to concentrate on subcases of

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reality where competitive prices (price ratios, and goods prices relative to factor prices) can be determined *autonomously* in terms of technology and costs alone: the one-leg case. What is consistent throughout the lifeline of Piero Sraffa – in 1925, 1926, between 1926 and 1930, in 1951 and 1960 – is the attempt to emphasise the singular cases in which the theory of value happens to be dependent only on technology and costs independently of the composition of demand (Samuelson, 1991, p. 570).

But also Joan Robinson writes:

We are concerned with equilibrium prices and a rate of profit uniform throughout the economy, but we are given only half of an equilibrium system to stand on. We need a fence to prevent us plunging off into the abyss (Robinson, 1961, p. 54).

In order to set-up Sraffa's theoretical framework within the realm of classical political economy, and to outline the main characteristics of this approach it is useful to adopt the device proposed by Pierangelo Garegnani, who enucleated a 'core' of these theories, which consists in a subset of relations (equations) such that, given the value of some economic magnitudes which are provisionally considered as independent variables (also called 'intermediate data'), the remaining variables are determined as dependent or endogenous variables.

In 'old' classical economists (Smith, Ricardo and Marx) the intermediate data are:

(i)   the social product, $\mathbf{x}$,

(ii)   the real wage rate, $\mathbf{w}^T = [w_1, ..., w_C]$, i.e. a bundle of commodities,

(iii)   the technology of the system, $\mathbf{A}$;

the relations belonging to the 'core' determine the following dependent variables:

(a) labour employment, $E^* = \boldsymbol{\ell}^T\mathbf{x}$,

(b) the shares other than wages; in our case where rents are not considered, profits, whose rate is given by[6] $\pi = (1 - \lambda_M)/\lambda_M$,

(c) the price system, $\mathbf{p}^T = \mathbf{p}^{*T}$,

where λ_M and $\mathbf{p}^{*T}$ are the dominant eigenvalue end the corresponding eigenvector of $\mathbf{A} + \mathbf{w}\boldsymbol{\ell}^T$.

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[6] In this case the price system becomes $\mathbf{p}^T = (1 + \pi)\mathbf{p}^T(\mathbf{A} + \mathbf{w}\boldsymbol{\ell}^T)$ (in coherence with old classical economists, wages are supposed to be paid in advance). The ensuing rate of profit is $\pi = (1 - \lambda_M)/\lambda_M$, where λ_M is the dominant eigenvalue of matrix $\mathbf{A} + \mathbf{w}\boldsymbol{\ell}^T$; the ensuing price system is its left-hand eighenvector $\mathbf{p}^{*T}$ associated to λ_M.

The attitude of 'modern' classical economists, since Sraffa (1960, § 44), is that to consider as the independent distributive variable the rate of profit instead of the wage rate. Hence in this case the intermediate data are

(I)   the social product, **x**,

(II)   the rate of profit, π,

(III)   the technology of the system, **A**;

the relations belonging to the 'core' determine the following dependent variables:

(A) labour employment, $E^* = \boldsymbol{\ell}^{\mathrm{T}}\mathbf{x}$,

(B) the wage rate, $w^* = 1 - \pi/R$,

(C) the price system, $\mathbf{p}^{*\mathrm{T}} = w^*[\mathbf{I} - (1 + \pi)\mathbf{A}]^{-1}$.

This distinction makes clear that the relations of the 'core' of the system can be adequately expressed by 'necessary quantitative relations' (Garegnani, 2007, p. 186), i.e. by equations and formal relations. On the contrary, the magnitudes which are takes as given in the core, i.e. the intermediate data, are determined by forces that are less susceptible to be represented by means of formal relations.

This is a methodological choice. Obviously, no one in the surplus approach denies that there are influences and feedbacks among the various intermediate data and between the dependent variables on the one hand and the intermediate data on the other hand. But these influences have not the same level of generality and unambiguousness: they may change significantly according to the institutional circumstances and may go in both directions, partially compensating one another. These relations are thus better studied outside the 'core' of the system, and sometimes in a partially different way: other disciplines, like political or social sciences, economic history, etc., can in this case support the economic investigation.[7] For example it is obvious that relative prices affect the composition of final output by affecting the demand of the various commodities.[8]

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[7] As we will see later, Luigi Pasinetti has proposed an analogous, although not coincident, 'separation' between a theoretical stage of analysis (to be faced by the deductive methods of pure economic theory) and an institutional stage, (to be faced with the support of other disciplines).

[8] Interesting enough is a letter on this issue sent by Sraffa to Arun Bose (SP, C32/3). I reproduce it here integrally.

<div align="right">Cambridge,
9th December, 1964</div>

Dear Arun,

But these effects may change according to the historical or social circumstances; the can go in directions that are non univocal, and can partially compensate each other. For all these reasons it is preferred to consider them as given when one is studying the forces that determines the endogenous variables of the 'core': (a), (b) and (c) in old classical political economy or (A), (B) and (C) in modern classical political economy.

There are cases where some specific institutional problems could be analysed in a formal way: for example the study of the gravitation of market prices around production prices, or the study of the accumulation process in Ricardian frameworks. But, again, the formalization concerns the specific problem at hand, not the working of the entire economic system. Hence, in these stages of analysis other variables are kept frozen at some given levels: for example, the wage rate is taken as given when one studies how market prices gravitate around natural prices in consequence of capital mobility (see, for example, Boggio, 1990, p. 48, or Duménil and Lévy, 19xx, pp. xx-yy, or Garegnani, 1990, p. 333); again, the level of the wage rate is taken as given when one studies how profits are accumulated and new plots of land are cultivated (see Bellino, 2014, in particular § 3 and Kurz and Salvadori, 2006, pp. 110-1).

This attitude to analyse the working of an economic system in different stages, each for a specific problem or situation, sometimes in formal terms, in other cases by using the instruments of social, historical and institutional analysis, is in sharp contrast

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I am sorry to have kept your MS so long – and with so little result.

The fact is that your opening sentence is for me an obstacle which I am unable to get over. You write: "It is a basic proposition of the Sraffa theory that prices are determined exclusively by the physical requirements of production and the social wage-profit division, with consumers demand playing a purely passive role."

Never have I said this: certainly not in the two places to which you refer in your note 2. Nothing, in my view, could be more suicidal than to make such a statement. You are asking me to put my head on the block so that the first fool who comes along can cut it off neatly.

Whatever you do, please do not represent me as saying such a thing.

This initial and to me quite maddening obstacle has prevented me, in spite of many attempts, from reading understandingly your article. You must find a more detached reader to advise you about it. I am very sorry to seem so unhelpful, but I have spent quite a lot of time upon your work, to no purpose. I do not think that it would be any good keeping it longer, so I now return it to you.

Yours sincerely,

with the attitude followed by neoclassical economists, which normally refer to a *general* model, at least in the back of their mind.[9]

3. Structural Economic Dynamics

Luigi Pasinetti is probably the scholar that more than other succeeded in making a sort of bridge between the Keynesian major instances and the modern classical reappraisal led by Sraffa. Pasinetti's model of structural change grounds in fact on Keynes principle of effective demand and on classical value theory of distribution and value. He presented this model his PhD dissertation in 1963; then it was published in various versions in (1965, 1981, and 1993).

This analysis has a twofold objective:

i)   to study the *consequences* of structural change of technology and of final demand on output, value and employment;

ii)   to study the conditions that *have to be satisfied* in order to accomplish the potential of the system concerning growth, employment and the satisfaction of final wants.

In brief, we could say that objective i) is descriptive, while objective ii) is normative. Objective i) starts from the description of the working of a capitalistic system provided by the modern classical approach and analysed in the previous section, but extends the analysis to the case of an economic system which undergoes a process of structural change, i.e. a change in the proportions of the various industries. Hence, some of the magnitudes that have been kept as given in the 'core' of surplus theories, here *must* be left free to change. But, as we will see immediately, this extension is done in line with the methodological requirements imposed by the logical structure of surplus theories.

At the basis of the model there is a Leontief closed system as regards the quantity side, and a Sraffa system as regards the price side. Start from this latter. In extended matrix form it appears as

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[9] This is, probably, one of the reasons that explains the difficulties in communicating between the two approaches. In principle, however, also Neoclassical theory adopts *the same* methodological choice to consider some (other) magnitudes as given when it studies how its endogenous variables are determined: in general equilibrium analysis, for example, preferences, endowments, technology and property rights are taken as given when prices and allocations are determined. The obvious links between these groups of variables are intentionally *not* analysed in this framework.

$$
\begin{bmatrix}
0 & \cdots & 0 & \pi+\delta_1 & \cdots & 0 & l_1 \\
\vdots & \ddots & \vdots & \vdots & \ddots & \vdots & \vdots \\
0 & \cdots & 0 & 0 & \cdots & \pi+\delta_C & l_C \\
0 & \cdots & 0 & 0 & \cdots & 0 & \lambda_1 \\
\vdots & \ddots & \vdots & \vdots & \ddots & \vdots & \vdots \\
0 & \cdots & 0 & 0 & \vdots & 0 & \lambda_C \\
c_1 & \cdots & c_C & j_1 & \cdots & j_C & 0
\end{bmatrix}
\begin{bmatrix}
p_1 \\ \vdots \\ p_C \\ v_1 \\ \vdots \\ v_C \\ w
\end{bmatrix}
=
\begin{bmatrix}
p_1 \\ \vdots \\ p_C \\ q_1 \\ \vdots \\ q_C \\ w+\pi\sum_{c=1}^{C} v_c c_c
\end{bmatrix}
\qquad (6)
$$

We are considering an economic system where C final commodities are produced. 1 unit of commodity c requires ℓ_c units of labour and 1 unit of a capital good, specific to the commodity, $c = 1, ..., C$ (for this reason we will call briefly 'capital good c' the capital good employed in the production of commodity c);[10] in each production period a *constant* proportion, δ_c, of capital good c wears out. 1 unit of capital good c is produced by λ_c units of labour. Let c_c be the units of final good c required by each individual as final consumption; let j_c be the individual demand of capital good c by the final sector (net investment). Let p_c and q_c be the prices of commodity c and of its specific capital good. System (6) contains $2C + 1$ equations in $2C + 2$ unknowns: $p_1, ..., p_C, v_1, ..., v_C, w$ and π. The first $2C$ equations can be written as:

$$p_c = (\delta_c + \pi)v_c + w\ell_c \qquad\qquad c = 1, ..., C, \qquad (6p)$$

$$v_c = w\lambda_c \qquad\qquad c = 1, ..., C. \qquad (6v)$$

After having chosen one commodity as *numéraire*, it remains one degree of freedom which express, as usual, the fact that income distribution is determined outside the price equations. If we chose commodity '1' as *numéraire*, i.e. if we set $p_1 = 1$, we obtain after substitution $1 = p_1 = (\delta_1 + \pi)w\lambda_1 + w\ell_c$, which originates the following inverse relation between the rate of profit the wage rate expressed in terms of commodity '1':

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[10] Following Pasinetti, the capital good used to produce 1 unit of commodity c can be considered as a *composite commodity*, that he calls 'productive capacity of final good c'. In this way we can denote by *the same* single magnitude a set of heterogeneous means of production. The advantage of this procedure is that a change of the *composition* of productive capacity of a final commodity, induced for example by technical change, can be reduced ultimately to a decrease in quantity of vertically integrated labour necessary to produce the commodity (for further details, see Pasinetti, 1973, § 15).
which changes its *physical* form (its composition) as a consequence of technical progress.

　　Moreover, here we are considering the case where capital goods are produced just by labour. The general case, where capital goods are produced by labour and other capital goods, is contained in (Pasinetti, 1981, chp. II, sect. 7).

$$w = \frac{1}{(\delta_1 + \pi)\lambda_1 + \ell_1}.$$

There remain, however, a further equation in system (6), the last one,

$$\mathbf{p}^T\mathbf{c} + \mathbf{v}^T\mathbf{j} = w + \pi\mathbf{v}^T\mathbf{c} \tag{6N}$$

which expresses the condition that all incomes (wages + profits) are entirely spent in order to ensure the full employment of the available quantity of labour. The interesting point is that it is an equation independent of the first $2C$ equations; in this way, when added to them we see that the entire system (6) identifies that configuration of income distribution. i.e. a coupe (w^*, π^*), that guarantees the obtainment of full employment of labour force. We know that there are *no reasons* to expect that this condition is fulfilled *automatically*. On the contrary, it will be one goal of economic policy the enforcement of such a condition. This means that: i) there are no reasons to expect that the system will assume spontaneously the income distribution configuration which ensures the full employment of labour force; ii) system (6) provides a *normative* indication for income distribution policies.

In addition to the price system we have also a quantity system. Let x_c and k_c be the quantities produced of final good c, and of its productive capacity; let x_N be the quantity of labour employed in all production activities. The quantity system, in matrix form, is

$$
\begin{bmatrix}
0 & \cdots & 0 & 0 & \cdots & 0 & c_1 \\
\vdots & \ddots & \vdots & \vdots & \ddots & \vdots & \vdots \\
0 & \cdots & 0 & 0 & \cdots & 0 & c_C \\
\delta_1 & \cdots & 0 & 0 & \cdots & 0 & j_1 \\
\vdots & \ddots & \vdots & \vdots & \ddots & \vdots & \vdots \\
0 & \cdots & \delta_C & 0 & \cdots & 0 & j_C \\
l_1 & \cdots & l_C & \lambda_1 & \cdots & \lambda_C & 0
\end{bmatrix}
\begin{bmatrix}
x_1 \\ \vdots \\ x_c \\ k_1 \\ \vdots \\ k_C \\ x_N
\end{bmatrix}
=
\begin{bmatrix}
x_1 \\ \vdots \\ x_c \\ k_1 \\ \vdots \\ k_C \\ x_N
\end{bmatrix} . \tag{7}
$$

System (7) contains $2C + 1$ equations in $2C + 1$ unknowns: $x_1, ..., x_C, k_1, ..., k_C, x_N$. It is a homogeneous system; once the condition to ensure not-trivial solution is satisfied[11] we have one degree of freedom; the quantity which is more adapt to be fixed from outside is the employment level, x_N; if we want to guarantee full employment we fix

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[11] For details see Pasinetti (1981, chp. II, § 3).

$$x_N = N,$$

where N is the amount of the labour force.

Pasinetti assumes that all magnitudes entering as 'parameters' in the description of the industrial system of the previous section are now allowed to change. In particular, Pasinetti supposes that technical coefficients, final demand coefficients and population vary according to the following exponential functions

$$\ell_c(t) = \ell(0)\,e^{\rho_c t}, \quad \lambda_c(t) = \lambda(0)\,e^{\rho_{j_c} t}, \quad c_c(t) = c(0)\,e^{r_c t}, \quad N(t) = N(0)\,e^{nt}. \qquad (8)$$

There remains a set of coefficients in the quantity equations (7) whose dynamics has not yet been specified: they are the coefficients of net investment in capital good c, k_{cN}. In coherence with his normative attitude, Pasinetti fix them in such a way that the productive capacity of each commodity increases in line with the evolution of final demand for that commodity. This amount to fix[12]

$$k_{cN}(t) = (n + r_c)c_c(t). \qquad (9)$$

The dynamics of parameters envisaged by equations (8) and (9) entails a *structural change* for the endogenous variables of the system considered: for prices, for sectoral output, for sectoral employment, as well as a macro-dynamic for the aggregate level of employment. This is a relevant result for a growth model. We do not enter here into details (see Pasinetti, 1981, chp. V).

There is another important goal pursued by Pasinetti in this investigation. It derives from an interpretation of the equilibrium conditions just as relation describing an ideal (efficient) situation, where the 'potential' of the economic system concerning growth, employment and satisfaction of final wants is realized at best, independently of the study of the forces that will take care to realize these conditions in an actual economic system. This allows him to 'separate' a level of analysis where the various conditions that must be satisfied in the ideal or 'natural' configuration of the economic system are described and a level of analysis where the institutional mechanisms to

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[12] For details see Pasinetti (1981, chp. V, sect. 4).

achieve these conditions are described and compared.[13] We could summarize the relations that must be satisfied in the 'natural' system in 5 points as follows:

(**N**1) a price system which guarantees the reproducibility of the various commodities, identified by the first $2C$ equations of system (6);

(**N**2) a set of output levels which satisfy the final demand of each commodity, identified by the first $2C$ equations of system (7);

(**N**3) the 'macro–economic condition', i.e., the last equation of system (6) or of system (7), which guarantees full employment of labour force;

(**N**4) an income distribution configuration which guarantees the growth of the productive capacity in each sector in line with the growth of the final demand of the respective commodity. Pasinetti envisages the fulfillment of this goal by a set of *differentiated* rates of profit, called 'natural rates of profit', determined by the total rate of growth of the final demand of the correspondent commodity ($\pi_c = n + r_c$, $c = 1, ..., C$); it is possible to prove that in this case each individual receives a fraction of the net product equal to the proportion of the quantity of labour he contributes with respect to the total labour of the system ('labour principle' of income distribution);

(**N**5) a natural rate of interest, which guarantees that the debt and credit relationships among individuals do not distort the income distribution process from its 'labour principle'.

The connection of the 'natural' relations with actual systems is seen by Pasinetti as an 'institutional' problem. In particular, as regards the achievement of goals listed above as (N1)-(N5) we can observe[14] that goals (N1) and (N2) are normally fulfilled in capitalistic systems: free competition ensures that prices tend towards their normal

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[13] It is interesting to observe that a similar perspective has been suggested by Sraffa himself in a note written in 1942:

> This paper deals with an extremely elementary problem; so elementary indeed that its solution is generally taken for granted. The problem is that of ascertaining the conditions of equilibrium of a system of prices & the rate of profits, independently of the study of the forces which may bring about such a state of equilibrium. Since a solution of the second problem carries with it a solution of the first, that is the course usually adopted in modern theory. The first problem however is susceptible of a more general treatment, independent of the particular forces assumed for the second; & in view of the unsatisfactory character of the latter, there is advantage in maintaining its independence (D3/12/15: 2).

[14] For further details see Pasinetti (1981) and Bellino (2011).

levels while the Keynesian principle of effective demand aligns the output of each commodity to its demand. On the contrary, goal (N3) is not automatic in modern capitalistic economies: it can be pursued by means of several policies, according to the specific situation of the system (introduction of new goods, search of new markets, public investments, monetary policies, etc). Goals (N4) and (N5) are probably never feasible, or only partially feasible, in capitalistic systems; nevertheless, they may represent a sort of benchmark levels, to evaluate how far an actual system is far from its 'natural' configuration.

4. Two directions, one framework

To carry out our comparison between the structural dynamics and the surplus approach research programmes it is convenient to start from a (quite long) quotation from

> In the previous chapters, the analysis has been concentrated on the theoretical scheme of what has been called the 'natural' economic system of a simple [...] production economy. The natural economic system represents so to speak the framework skeleton of the present theoretical construction. It is a set of relations that possess characteristics of analytical relevance and logical consistency, with strong normative properties.
>
> But the natural economic system does not come into existence automatically. For any actual economic system, the problem arises of inventing and setting up those organizational devices – in other words those 'institutions' – which put into motion processes actually able to bring the natural economic system into existence. [...] The institutional problem does not need to have a unique solution, nor does it emerge once for all. By being a problem of construction of organizational devices (the institutions) in order to achieve certain results (the natural economic system), it is obviously susceptible of being faced in different ways, from place to place, from time to time, and at the variation of many external circumstances, without mentioning that the organizational field is itself subject to continuous evolution and innovation.
>
> Moreover, an economic system does not come about in a vacuum. It presupposes a complex network of political, juridical, and legal institutions. These institutions may have been shaped through different historical processes or according to different traditions in different countries, sometimes with even stronger requirements than those behind economic institutions. With this wider institutional framework, the economic institutions must merge and intermingle, while carrying out the task entrusted to them (Pasinetti, 1993, pp. 117-8).

A first element is that the 'separation' of the analysis proposed by Pasinetti in the study

1) of the relations that identify the *natural system*,

2) and the institutional mechanisms that achieve or aproximate the actual system to the natural configuration,

cannot be overlapped with the Garegnani 'isolation' of

i) a *core* of the economic system

ii) and the relation 'outside of the *core*'.

Pasinetti's natural system is a theoretical construction that includes the essential relations among sectoral outputs, relative prices, employment and wages, profits and interest that must be satisfied in an economic system in order to exploit at best its potential, *independently of the institutional set-up* to enforce these relations. Garegnani's core is a subset of relations among the same set of magnitudes in the case of a specific institutional set-up: capitalism.

Core of a capitalistic system (Garegnani)		*Natural system* (Pasinetti)	
(intermediate) data	*dependent variables*	*(changing) data*	*dependent variables*
social product ($\mathbf{x}$)	employment, ($\boldsymbol{\ell}^T\mathbf{x}$)	population (x_N)	sectoral output ($\mathbf{x}$)
rate of profit (π)	wage rate (w)	final consumptions ($\mathbf{c}$)	employment ($\boldsymbol{\ell}^T\mathbf{x} + \boldsymbol{\lambda}^T\mathbf{j}$)
technology ($\mathbf{A}$)	prices ($\mathbf{p}$)	technology ($\ell_i, \lambda_i, \delta_i$)	wage rate, profit rate(s) (w, π_c)
			prices ($\mathbf{p}$)

The purposes of these logical constructions are different; hence, they are *not alternative* but *complementary* one another: the core is a *descriptive* device, the natural system has a *normative* purpose. Yet, there are two fundamental characteristics that are *common* to both the approaches:

1) the study of the relations among the magnitudes belonging to the 'core' as well as those belonging to the natural system are carried out, in both cases, by 'necessary quantitative relations' (i.e. equations), while the relations outside of the core as well as of the institutional system are better studied in connection with social, historical, political disciplines;

2) *all parameters* considered *as given* by Sraffa (see the previous quotation from Sraffa, 1960, p. 5) are supposed to change in Pasinetti's model. But, there is a peculiarity, that avoids that these changes let enter by the back door what was left out of the front door: the co-determination of prices and quantities and, consequently, the return to a 'mechanical' determination of income distribution based on supply and demand forces. The return is

prevented by the choice to assume that the rates of change of labour inputs, of final demand and of population (n, ρ_c, ρ_{j_c} and r_c) are *independent of* any other endogenous variable of the model. The methodology of 'given quantities' and 'given technology' is thus now extended to the case of an evolving economy: final consumption and technical coefficients are assumed to evolve according to a *given* pattern of evolution. This is a methodological aspect determined by a specific theoretical need. On this point Pasinetti highlights that

> The [...] innovative methodological line of research consists in separating sharply the distinction between variables and constants from the distinction between unknowns and data. In traditional economic analysis these two distinctions tend to coincide because of the essentially static approach which is adopted: those magnitudes which are considered as unknowns are also considered as variables, and those magnitudes that are considered as data are also considered as constants. But in a dynamic context, to insist upon this coincidence makes no sense. Or rather, to insist on this coincidence is equivalent to frustrating the purpose of any investigation into dynamics (Pasinetti, 1993, p. 11).

In solving a particular problem there is thus no contradiction in considering as given some magnitudes, even though they may change as time goes by—as in Pasinetti's structural change model—or they may be affected by changes of the endogenous variables they concur to determine—as in the core of the surplus approach: this kind of feedbacks can be disregarded when there are reasons to think that they are non-univocal, non-systematic or non-persistent.

In conclusion, the notions of 'core' and of 'natural system' are different and have been conceived independently, for different purposes. Yet, they display some common analytical and methodological characteristics which make them complementary elements of a more general theoretical framework: the modern classical approach.

5. Nine main characteristics of Classical-Keynesian analysis

In a recent work of his Pasinetti has listed what he considers the characteristic features of the entire 'Cambridge Keynesian School' (see Pasinetti, 2007, 217-37). The list is quite long (9 items) and very detailed. I report here for convenience:

1. *Reality (and not simply abstract rationality) as the starting point of economic theory.*

2. *Economic logic with internal consistency (and not only formal rigour).*

3. *Malthus and the Classics (not Walras and the Marginalists) as the major inspiring source in the history of economic thought.*

4. *Non-ergodic (in place of stationary, timeless) economic systems.*

5. *Causality vs. interdependence.*

6. *Macroeconomics before microeconomics.*

7. *Disequilibrium and instability (not equilibrium) as the normal state of the industrial economies.*

8. *Necessity of finding an appropriate analytical framework for dealing with technical change and economic growth.*

9. *A strong, deeply felt social concern.*

It is evident how the overwhelming majority of these characteristics is shared in deep by the group of scholars leaded by Pierangelo Garegnani that developed and systematized the modern version of surplus approach.

1. *Reality*: the pure logic which supports the Sraffa framework is never conceived as an exercise for its own sake; Sraffa's idiosyncrasy against mathematical formalism are known to any reader of *Production of Commodities*.[15] Additionally, the interpretation of Sraffa prices as the 'normal positions' of the economy is a clear attempt to establish a correspondence between theoretical and observable variables (on this, see Garegnani, 2007).

2. *Internal consistency*. Self-evident!

3. *Classics, not the Marginalists*. Self-evident!

4. *Non-ergodicity*. The interpretation of Sraffa's framework as a 'steady state' has been rejected in several occasions: for example, the assumption of uniformity of the rate of profit describes the normal position around which

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[15] A simple but meaningful example is the case of self-reproducing non-basics having a physical rate of surplus *lower* than that of the average of the other (basic) commodities. Newman (1962) was inclined to consider this case as symmetrical to the case of a self-reproducing non-basic commodity with a physical rate of surplus *higher* than the average. Sraffa, in his reply, argued how the former situation can be regarded as exceptional, on the basis of 'reality' arguments (for the entire exchange between Sraffa and Newman see Sraffa, 1970).

actual (marker) prices 'gravitate'. This does not exclude the possibility to conceive a *dynamics* of normal positions (on this see, for example, Cesaratto, 1995).

5. *Causality*. The logical structure of surplus theories is essentially based on a set of relations whose formal representation provides the interaction of *causal* and of interdependent relations (see above, Section 2). Causality and interdependence are here to be understood as formal properties of the models by which we represent the economic phenomena rather than ontological properties of the relations described. For further details see Bellino-Nerozzi (2014).

6. *Macroeconomics before microeconomics*. The distinction between macro- and micro-economics is extraneous to the classical tradition. Pasinetti's intention, however, is that of recalling that

> [t]he Cambridge economists caught very clearly the principle that the behaviour of the economic system as a whole is not reducible to, in the sense that it does not emerge as the exclusive result of, the sum of its single individual parts [...] [t]here are many examples of fallacy of composition that the Cambridge School have highlighted, as against the attempts to extend what is true for the single individual to the behaviour of the economic system as a whole (Pasinetti, 2007, pp. 227-8).

The works of Garegnani's and of other surplus theorists evidently fulfil this characteristic.

7-8. *Disequilibrium and instability + technical change and economic growth*. These are, probably, two points where the methodology of modern surplus theorists diverges but – I argue – only partially from that of the other members of the 'Cambridge Keynesian School'. It is undeniable the preference of surplus theorists for the Marshallian 'short chains of reasoning', to investigate "economic change step by step" (Cesaratto, 1995, p. 274). On the contrary Pasinetti, on the basis of Frish's (1935-36) notion of 'moving equilibrium'[16], has studied how an equilibrium configuration changes as a consequence of a change in one or more parameters. As we saw (see Section 3 above) the relevant parameters (population, technology

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[16] I owe this reference to Ariel Wirkierman: Pasinetti quotes Frisch's paper only in his mathematical formulation of Ricardo's system (Pasinetti, 1960, p. 84, fn. 3).

and final demand) are supposed to change as time goes. The possibility to slip into a model of full interdependence (like a Walrasian model) where all variables are mechanically determined is probably the main risk that the surplus approach scholars want to avoid. Yet, the caution to specify the dynamics of these parameters on the basis of a *given* pattern, which replicates in a reasonable way a long-term historical tendency – like the supposition of *reducing* labour input coefficients due to technical change, or an evolution of final demand coefficients as that described by Engel – and not on the basis of some 'rational' behaviour endogenously determined by the rest of the model prevents from transforming it into one of a full-interdependent kind and, at the same time, contextualizes the results of the theory into the more realistic situation of a changing economic system.

9. *Social concern*. Self evident!

The fundamental characteristics of the 'Cambridge Keynesian School' seem thus to be substantially satisfied by the surplus approach theory.

6. Some 'opening' concluding remarks

When faced with different approaches, historian of economic thought normally present them by underlining the differences and the incompatibilities among the various positions of the scholars involved in these approaches. This is often a useful device to help the reader to catch the main characteristics of the approaches. Here, I have not operated as an historian; I followed the opposite direction: I have tried to select the elements that are common to the surplus approach and to the analysis of structural change in the classical-Keynesian perspective, sometime forcing the interpretation in order to outline a unifying framework. Pasinetti recently expressed his concern for a negative attitude developed by the scholars belonging to this group, which he called "Cambridge *prima donna* syndrome" (Pasinetti, 2007, p. 46, fn. 18), whose members ended up to disregard or to ignore the works of the others, often too worried to propose the peculiarities of their own contributions.

Without disregarding the differences and the specificity of each approach, I hope that my work may help to re-address all these researches towards a common *modern classical-Keynesian school*.

Appendix – The relations with Keynes' analysis

It seems here the right place where to hint at a further issue, which has often seemed to be an obstacle to the integration of the approaches here discussed: the role given to Keynes's analysis. On the one hand the role of the Keynesian principle of effective demand is recognized by all the members of the modern classical approach: Pasinetti devoted an entire essay to explain it in its 'pure' version, i.e. not contaminated by the Walrasian interpretation based contained in the Neoclassical synthesis (see Pasinetti, 1974, Essay II), while Garegnani based upon it a theoretical and empirical research concerning the Italian post-war system (see Garegnani, 1962[17]). There are however two aspects that see the surplus approach scholars on one side of the debate and the post-Keynesian growth theorists on the other side.

The first aspect concerns the theory which is behind Keynes' marginal efficiency of capital curve. Garegnani underlines how this curve is deeply rooted in the theory of marginal productivity:

> [h]owever, the price which Keynes has to pay for the traditional strand in his thought becomes clear with respect to the schedule of the marginal efficiency of capital (Garegnani, 1964-65, part II, p. 78).

For Garegnani this link has significantly reduced the importance of Keynes' critique to the traditional theory of employment.

> The critique of the traditional theory of interest becomes then the key to an acceptance of Keynes' arguments—and the concept of the marginal efficiency of capital proves to be the Achille's heel of that very critique (Garegnani, 1964-65, part II, p. 78)

The critique would have been more effective if it had been paired with one of the fundamental results of the capital debates of the Sixties, i.e. the non-existence, in general, of a monotonic and inverse relation between the rate of profit and the capital-labour ratio. This result would have contributed to disprove the misleading idea that

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[17] The theoretical part of this work has been published in Italian in Garegnani (1964-65).

Keynes results were essentially due to rigidities and that a suitable flexibility of price factors (wages and profits) is sufficient to restore full-employment.

On the other hand Pasinetti is more possibilist and maintains that:

> the marginal-efficiency-of-capital schedule, which might, at a first superficial look, appear as belonging to the marginal economic analysis, when examined more deeply turns out to have a rather different origin. Keynes' ranking of all invsetment projects in a decreasing order of profitability is mora akin to Ricardo's ranking of all lands in a decreasing order of fertility than to any marginal economic elaboration. *And in any case, there is absolutely no need to consider Keynes's marginal-efficiency-of-capital schedule as an expression of the marginal productivity theory of capital* (Pasinetti, 1974, p. 43, emphasis added).

More recently Pasinetti returned on the issue specifying his position:

> Keynes was not able, or was not in time, to take advantage of Sraffa's ongoing critical elaborations. But we are in a position now to state the results of the critique of the neoclassical production function, which would have been needed to debunk the demand-for-investment side of the orthodox theory. [...] The conclusions [of the reswitching of techniques controversy] are strictly logical and devastating. The downward-sloping investment-demand function, *to the extent* that it relies on a continuous process of substitution of capital for labour, as the rate of interest falls, is theoretically unsound; it has no logical foundations. [...] The 'reswitching' result only means that, if such a downward-sloping relation exists, it cannot be explained by a process of substitution of capital for labour (i.e. by a neoclassical production function); it cannot be explained by more and more capital-intensive techniques as the rate of interest falls. Such a relation, if it exists, must be explained by something else – by some *other* theory or circumstance.
>
> It is to this effect that we must logically search for a meaning (non-orthodox meaning) of Keynes's notion of the 'marginal efficiency of capital' (Pasinetti, 1997, pp. 203-4, emphasis in the original).

As we can see the disagreement between Garegnani and Pasinetti on this point is essentially based on an interpretative issue concerning the origin of the investment function in Keynes and does not undermine the acceptance of the principle of effective demand.

The second disagreement concerns the result entailed by the Cambridge equation; the critical position was expressed in particular by Pierangelo Garegnani and Ferdinando Vianello, which argues against the compulsory negative relationship that the Cambridge equation establishes between the growth rate and the real wage rate. They aim to break the idea that a higher growth rate entails a lower real wage. Such a definite link between distribution and growth is clearly stated, for example, by Kaldor:

> The theory thus serves to explain the long-observed fact [...] that distributive shares are constant over long periods whilst they fluctuate over shorter periods [...] *as well*

as the fact that in fast-growing economies the share of profits is generally appreciably greater than in economies which grow at a relatively slow rate (Kaldor, 1966, p. 561, emphasis added).

The idea of a trade-off between growth and wages is emphasized more clearly in the following quotation by Marglin:
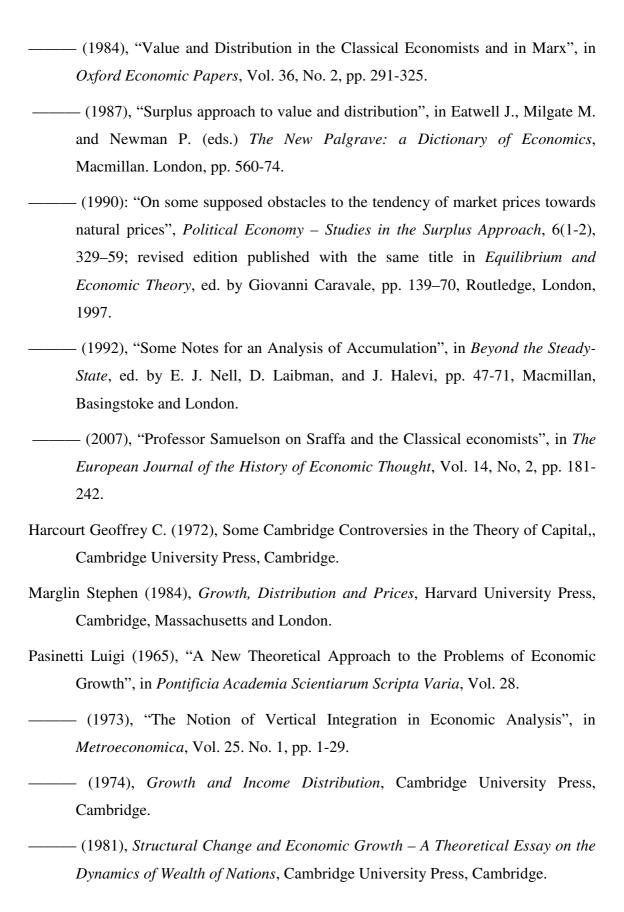
> In the short run, fluctuations in investment demand are reflected in fluctuations in output; the rate of capacity utilization changes in accordance with aggregate demand. The distributional conflict between capitalists and workers is, as it were, a non-zero-sum game. [...] But in the long run, the period with which neo-Keynesian analysis concerns itself, there is no excess capacity to accommodate investment demand. Distribution must bear the brunt of adjusting aggregate demand to supply. In contrast with the short period, the long-run conflict is a zero-sum game—at least in the absence of technological substitution or technological change (Marglin, 1984, pp. 474-5).

The surplus approach school envisages in the variations of the rate of capacity utilization the additional resources for accumulation: this is possible because the productive capacity of firms is never fully utilized, even in the long run (entrepreneurs prefer to leave a margin of available productive capacity, to face unexpected peaks in demand). Hence, a higher rate of accumulation need not require higher profits (and lower wages) as long as the degree of utilization of productive capacity can be increased: the emphasis is thus placed on the *forces of demand* for their activating power in creating *new* and *permanent* increments of income along purely Keynesian lines (see, Vianello, 1985, 1996 and Garegnani, 1992).

Undoubtedly this is a point of view in opposition to that expressed by Kaldor and, mainly, by Pasinetti. Nevertheless, there are no observable reasons which prevent the integration of the possibility to vary the degree of utilization of productive capacity into the post-Keynesian theories of income distribution. Moreover, the normative meaning given by Pasinetti to the Cambridge equation allows one to read it along two perspectives: i) it sets a minimal level under which the profit rate cannot fall, i.e. a maximum level that the wage rate cannot exceed if the economic system has to growth at a given rate; ii) it identifies a reference level for the rate of profit: it identifies a threshold level to evaluate when a rate of profit is no more justifiable on the basis of the accumulation needs of the system.

References

Baranzini Mauro and Mirante Amalia (2014), "The Anglo-Italian Economics School at Oxford and Cambridge: On Some Research Programmes", mimeo.

Bellino Enrico (2011), "Employment and Income Distribution from a Classical-Keynesian Point of view – Some Tools to Ground a Normative Analysis", in Brancaccio E. and Fontana G., *The Global Economic Crisis – New Perspectives on the Critique of Economic Theory and Policy*, Routledge, Abington, pp. 298-315.

——— (2014), "Accumulation of Capital", entry written for Heinz D. Kurz and Neri Salvadori (eds.), *Elgar Companion to David Ricardo*, Edward Elgar, Cheltenham, UK, Northampton, MA, USA (forthcoming).

Bellino Enrico and Nerozzi Sebastiano (2014) "Causality and interdependence in Pasinetti's works and in the modern classical approach", Centro Sraffa Working Paper, forthcoming.

Boggio Luciano (1990), "The Dynamic Stability of Production Prices: a Synthetic Discussion of Models and Results", *Political Economy – Studies in the Surplus Approach*, 6(1-2), 47-58.

Cesaratto Sergio (1995), "Long-period Method and Analysis of Technological Change: Is There any Inconsistency?, *Review of Political Economy*, Vol. 7, No. 3, pp. 249-78.

Frisch Ragnar (1935-36), "On the Notion of Equilibrium and Disequilibrium", *The Review of Economic Studies*, Vol. 3. No. 2, pp. 100-5.

Garegnani Pierangelo (1962) "Il problema della domanda effettiva nello sviluppo economico italiano" (mimeo), SVIMEZ, Roma.

——— (1964-65), "Note su consumi, investimenti e domanda effettiva", *Economia internazionale*, Part I (1964) and Part II (1965). English Translation: "Notes on Consumption, Investments and Effective Demand", *Cambridge Journal of Economics*, Part I (1978), pp. 335-353, and Part II (1979), pp. 63-82.

——— (1984), "Value and Distribution in the Classical Economists and in Marx", in *Oxford Economic Papers*, Vol. 36, No. 2, pp. 291-325.

——— (1987), "Surplus approach to value and distribution", in Eatwell J., Milgate M. and Newman P. (eds.) *The New Palgrave: a Dictionary of Economics*, Macmillan. London, pp. 560-74.

——— (1990): "On some supposed obstacles to the tendency of market prices towards natural prices", *Political Economy – Studies in the Surplus Approach*, 6(1-2), 329–59; revised edition published with the same title in *Equilibrium and Economic Theory*, ed. by Giovanni Caravale, pp. 139–70, Routledge, London, 1997.

——— (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.

——— (2007), "Professor Samuelson on Sraffa and the Classical economists", in *The European Journal of the History of Economic Thought*, Vol. 14, No, 2, pp. 181-242.

Harcourt Geoffrey C. (1972), Some Cambridge Controversies in the Theory of Capital,, Cambridge University Press, Cambridge.

Marglin Stephen (1984), *Growth, Distribution and Prices*, Harvard University Press, Cambridge, Massachusetts and London.

Pasinetti Luigi (1965), "A New Theoretical Approach to the Problems of Economic Growth", in *Pontificia Academia Scientiarum Scripta Varia*, Vol. 28.

——— (1973), "The Notion of Vertical Integration in Economic Analysis", in *Metroeconomica*, Vol. 25. No. 1, pp. 1-29.

——— (1974), *Growth and Income Distribution*, Cambridge University Press, Cambridge.

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

————— (1993), *Structural Economic Dynamics – A Theory of the Economic Consequences of Human Learning*, Cambridge University Press, Cambridge.

————— (1997), "The Marginal Efficiency of Investment", in G. C. Harcourt and P. A. Riach (eds.) *A 'Second edition' of The General Theory*, Routledge, London and New York, Ch. 11.

————— (2007), *Keynes and the Cambridge Keynesians: A 'Revolution in Economics' to Be Accomplished*, Cambridge University Press, Cambridge.

Kaldor N. (1966), "Distribution, Theory of", in *Chambers's Encyclopedia*, new revised edition, Oxford, New York, etc., Pergamon.

Kurz Heinz D. and Salvadori Neri (2006), "Endogenous Growth in a Stylised 'Classical' Model", in Stathakis George and Vaggi Gianni (eds.) *Economic Development and Social Change – Historical Roots and Modern Perspectives*, Abington and New York: Routledge.

Newman Peter, (1962), "Production of Commodities by Means of Commodities", *Schweizerische Zeitschrift für Volkswirtschaft und Statistik*, Vol. XCVIII, pp. 58-75.

Robinson Joan (1961) "Prelude to a Critique of Economic Theory", *Oxford Economic Papers*, Vol. XIII, pp. 53-8.

Samuelson Paul A. (1991), "Sraffa's Other Leg", *The Economic Journal*, Vol. 101, No. 406, pp. 570-4.

Smith Adam (1776), *An Inquiry into the Nature and Causes of the Wealth of Nations*, Edition edited by R. H. Campbell and A. S. Skinner, Liberty Fund, Indianapolis.

Sraffa Piero (1951), "Introduction", in *The Works and Correspondence of David Ricardo* ed. by Piero Sraffa with the collaboration of Maurice H. Dobb, Cambridge University Press, Cambridge, Vol. I,, pp. xiii-lxii.

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

————— (1970) "Correspondence between Sraffa and Newman", first published as an appendix to Bharadwaj K., "On the Maximum Number of Switches Between

Two Production Systems", *Schweizerische Zeitschrift für Volkswirtschaft und Statistik*, Vol. 106, No4, pp. 409-29; reprinted in Kurz H. D. and Salvadori N. (eds.), *The Legacy of Piero Sraffa*, Vol. II, Edward Elgar, Cheltenham, UK, Northampton, MA, USA, 2003, pp.~11--15;

Stirati Antonella (2011), "Interpretations of the classics – The theory of wages", in Ciccone R., Gehrke C. and Mongiovi G. (eds.), *Sraffa and Modern Economics*, Volume I, Abington and New York: Routledge.

Vianello F. (1985), "The Pace of Accumulation", *Political Economy – Studies in the Surplus Approach*, 1, pp. 69-87.

——— (1996), "Joan Robinson on the Normal Prices (and the Normal Rate of Profits), in Maria Cristina Marcuzzo, Luigi L. Pasinetti and Alessandro Roncaglia (eds.), *The Economics of Joan Robinson*, Routledge, London and New York, pp. 112-20.