Growth, Distribution, Stability and Government Budget Surplus: The Extended Cambridge Equation Revisited

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Abstract

In the late 80's Pasinetti showed that the essential feature of the Cambridge Equation is preserved in his model of growth and income distribution with balanced or unbalanced budget. He did not work out both the share of incomes and the conditions of stability and was not formally concerned with a permanent budget surplus. The present paper deals with the case of a closed economy in which, besides direct taxation, indirect taxation on government's own expenditures is explicitly considered and the government saves permanently at a given rate. The extended Cambridge Equation and the share of profits are obtained. It is also shown that the stability result requires additional assumptions. Boundary conditions are introduced and the long-run local stability result is attained, thus corroborating the generality and robustness of Pasinetti's original insight

Keywords: Budget Surplus, Cambridge Equation, Growth, Distribution, Stability

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Resumo

Em 1989 Pasinetti mostra que a característica essencial da Equação de Cambridge é preservada independentemente do orçamento governamental ser equilibrado ou desequilibrado. Ele inclui o caso onde o governo taxa seus próprios dispêndios, mas não trata formalmente do orçamento superavitário. No presente artigo admite-se uma taxa de poupança governamental constante e positiva e considera-se tanto taxação direta quanto indireta. Nesse contexto obtém-se a Equação de Cambridge Estendida. Então analisamos a repartição dos lucros e a estabilidade local de longo prazo (dadas condições plausíveis de contorno). Fica clara a validade, generalidade e robustez do *insight* original de Pasinetti também para o caso de superávit permanente.

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1. Introduction

Pasinetti (1989) pointed out his surprise indicating that, till then, the many extensions of the Cambridge Equation have paid little attention to the role of government taxation and expenditure, though the literature on such result had grown immensely. His aim was to explore further the 'Keynesian' theory of income distribution between capitalists and workers when balanced or unbalanced government budget are considered. He shows that the essential feature of the Cambridge Theorem is preserved in such extensions on Kaldor's celebrated profit and distribution theory.

It is interesting to notice that Pasinetti (1962) raised a comment according to which Kaldor (1955-56) overlooks the point that when workers save they become gradually owners of part of the capital (according to their accumulated savings lent to capitalists) and, as such, they receive profits and wages as income. In this vein he corrected Kaldor's 'logical slip', and showed that, despite this, in a long-run equilibrium-growth path with full employment and with two categories of savers (the capitalists and the workers) the rate of profits (r) is determined by the natural rate of growth [1] (g_n) divided by the capitalists' propensity to save (s_c), independently of anything else, and, in particular, independently of technology and of the workers' propensity to save (s_w). This is the Cambridge Theorem and his conclusion involves well know restrictions. [2] Fundamentally, Pasinetti (1962) is concerned with the nature of the ultimate long-period steady-state equilibrium when the ratio of property owned by capitalists to that owned by workers tends to its final value in the context of a closed economy without government participation.

The explicit assumptions used to attain the Cambridge Result are:

i) equality, in the long period, between the rate of profit earned by capitalists (r) and the rate of interest earned by the workers on their accumulated savings;
ii) the share of capital stock of each class is proportional to its share of accumulated savings;
iii) capitalists save a constant proportion of their profit income and workers save the same proportion out of wages as they do out of any profits, with $1 > s_c > s_w > 0$, where s_c and s_w are exogenously given;
iv) in equilibrium, total savings equal investment, the latter being the amount required to balance exogenously given rates of population growth and technical progress.

From this set of conditions, using the standard notation, the Cambridge Result follows:

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[1] It represents the maximum sustainable rate of growth that technical conditions make available to the economic system as a whole. According to Harrod (1948), $g_n = n + \lambda$, where n is the percentage rate of growth of the labour force and λ is the percentage rate of growth of productivity (labour saving).

[2] For an evaluation and controversies on this subject see Harcourt (1972) and Oreiro (2005). The expressions Cambridge Theorem, Cambridge Result, Pasinetti's Result and Cambridge Equation are interchangeable.

$$r = P/K = (P_c/K)/(K_c/K) = (P_c/K)/(S_c/S) = (P_c/K)/(s_c P_c/I)$$
$$= (1/s_c)(I/K) = g_n/s_c$$

If capitalists save their entire income (that is, if $s_c = 1$) the relation above boils down to $r = g_n$. This is the famous 'golden rule' of accumulation introduced by von Neumann (1945-46). Furthermore, multiplying both sides of the Cambridge Result by the capital-output ratio (v) leads to the conclusion that the distribution of income between profits and wages in full employment, is given by $P/Y = vg_n/s_c$. Therefore, it is independent of workers' saving behaviour. In same paper Pasinetti also deals with the stability conditions.

Pasinetti's (1962) approach implies that classes are intergenerational stable with a rigid segmentation between capitalists and workers, each with a distinct saving behaviour. Granted that social mobility is usually limited, the model captures some important elements of class conflict. Of course the conditions above are simplified assumptions that at a closer look might be questioned as being too unrealistic. However, most of the criticism misses the point that he deals with a self-constrained set of theoretical issues – a world of certainty, with only two social classes, and the long-run performance of a non-monetary economy in the sense that the only available stores of value are readily reproducible (resource-using) durable goods.

In order to guarantee the existence of a two-class economy, Pasinetti includes the condition $s_c > I/Y > s_w$, which I keep all along this paper. I am also respecting Steedman (1972) view that when account is taken of taxation and government spending, in general a Meade (1966) equilibrium based on the constraint $s_w = I/Y$ is ruled out. In the same vein, Samuelson and Modigliani (1966) alternative balanced growth path (or anti-Pasinetti theorem) can be seeing as a simple attempt to resurrect the marginal productivity theory, given that their parameters magnitudes to attain the dual result are far way from reality [see Faria and Teixeira (1999)].

Pasinetti, in his 1989 article, deals with a closed economic system, with direct and indirect taxation, government expenditures and considers the equilibrium-growth paths on which all magnitudes grow steadily and indefinitely. In other words, paths on which s_g (a sort of propensity to save of the government) may be negative (deficit), positive (surplus), or zero (balanced budget). In a typical Keynesian-Kaleckian manner, investment, or rather the ratio of investment to output is treated as an independent variable, reflecting the view that the direction of causality runs from investment to savings. Such amount of investment is the one that keeps full employment over time.

The simplest case of balanced government budget presents no difficulties. He shows that the result is consistent with his original contribution concerning the irrelevance of workers' rate of savings. After, he analyses formally the case of a permanent government deficit (a case that cannot be dismissed on empirical grounds) not only to show that it can be consistent with Cambridge Result of growth and distribution, but also to point out that in this model there arises a "way of conceiving of the meaning and consequences of public debt" which

goes back to Ricardo (p. 33). His approach is significantly different from the interpretation of the 'Ricardian Equivalence' proposed by Barro (1974) and by other modern neoclassical authors. In other words, Pasinetti considers the case of a permanent budget deficit to study the Ricardian Equivalence in Cambridge Models and to reject the possibility that such Equivalence can there be transformed into 'Neutrality Theorem'. For this reason he leaves aside the case of a permanent budget surplus.

The above consideration justifies his modelling hypotheses. However, he also argues that a systematic government surplus is "hardly justifiable as a long-run policy, and (...) it is in any case symmetrical (...) to the case of a government systematic deficit" [Pasinetti (1989, p. 30)].

I have been puzzled by part of Pasinetti's view on two points. Firstly, I am not convinced that a permanent budget surplus makes no sense. Further reading has made me shade his understanding on this issue since budget surplus may promote macrodynamic capability. [3] Secondly, from the theoretical standpoint the argument concerning a permanently positive propensity to save of the government may somewhat be analogous to the one applied by Pasinetti to Kaldor's 'logical slip'. Provided that the government systematically spends less than it rises from taxation, it will gradually become owner of part the capital stock and, therefore, will receive both profits and taxes as income.

A proviso I could make is that if the budget-surplus affects the level of activity and this has and adverse effect on the "animal spirits" of business people, so that the rate of planned accumulation falls, there will not be as much demand for government finance from the capitalists as otherwise would have occurred. Kalecki (1971, p. 139) analysed the suspicion and opposition from 'industrial leaders' to government activities. A certain "dislike of the social and political changes resulting from the *maintenance* of full employment". But he only considered the case of government deficit spending financed by loans.

It could also be pondered that, actually, governments neither do nor fix *a priori* their own rate of saving. To this I would argue that in many countries Sg is greater than zero, as a form of forced saving, whose virtue is to 'channel' those savings into 'socially good' projects. Something like the concept of a National Bank of Social-Economic Development, a kind of BNDES in Brazil. Reactions to this depend in large part, I think, on whether society trusts the government to invest well in socially beneficial way (broadly defined). [4]

[3] According to Mollo and Teixeira (2008, p. 271), macrodynamic capability is the process of preparing or enhancing the environment of a country or region in the sense of stimulating and assuring the possibility of investment, innovation, growth, etc. The State plays a special role on such process in order to strengthen the fundamental balances of economic policy, something that involves: i) an appropriate real interest rate, ii) an inflation rate close to those of its trading partners, iii) a competitive and predictable exchange rate, and iv) long-term strategies for public investment projects. These goals need to be consistent with both internal and external equilibrium, so that a policy of self-sustaining growth, based essentially on productive investment, can become viable in an open economy. It must be stressed, however, that in the present paper I am dealing only with a closed economy.

[4] For the sake of illustration it is interesting to mention that "semi permanent" budget surplus has been a part of economic and political history. There are important examples of countries forcing the

Furthermore, from a point in time if the government has a systematic budget surplus, this would mean reducing its public debt, and hence the financial capital owned by the public (similar to Pasinetti's objection to Kaldor not paying attention to what workers do with their accumulated saving). It may plausibly be assumed that a reduction in public debt falls on the workers owning interest-bearing financial assets. What these considerations mean for the steady state with Pasinetti type interior solution, rather than Samuelson and Modigliani (1966) type corner solution, is not clear.

Government's accumulated investment (capital accumulation) earns profits that, added to taxation, make the income of the 'public sector'. Total savings is now composed by capitalists' savings, workers' savings and government's savings. This raises some interesting issues. Notice that, like Pasinetti, besides direct taxation, I am explicitly considering all indirect taxation, including government's own expenditures – an issue which requires a careful attention in order to remove the possibility of double counting.

Let me advance the view that concerning the extended Cambridge Equation for the case of a budget surplus, as expected, I obtained Pasinetti's (1989) Result. This, once again, shows that the workers' propensity to save is irrelevant in determining the equilibrium rate of profit, corroborating the validity, robustness and generality of the Cambridge Theorem. However, in the mentioned paper, Pasinetti did not work out formally the shares of incomes. Dealing with balanced budget, he mentions (p. 29, footnote) that the income distribution – shares of workers income and capitalists' income – is more complicated to derive when taxation is introduced. He indicates two of his own papers that can be used to get such results but he did not produce them and did not mention the stability conditions.

Here the share of profits is shown and the stability condition is examined for the case in which the government is allowed to save permanently at a given fraction of its income. In order to attain long-run local stability a set of boundary conditions are included and the stability result obtained. After this introduction, section 2 formalizes the case of a systematic government surplus, the extended Cambridge Equation, distribution and stability. Section 3 hints to some potential macrodynamic implications of the approach I have tackled and concludes with new challenges.

2. Taxation, Budget Surplus and the Stability Conditions

Pasinetti's analysis to government revenues from taxation (T) captures both direct (T_d) and indirect (T_i) taxes. The latter applies to all consumption

accumulation of foreign exchange and then unload to secure financial supremacy (U.S and France did it to dislodge Britain in 1961 from Gold Standard base supremacy; China might to this in not to distant a future. However, such argument is only valid if an open economy is considered. Notice that in an accounting sense, assuming other agents are in balanced position, government surplus would equal trade surplus and this can be mentioned with the warning that this is not to be interpreted as a causal relation.

expenditure of workers, capitalists and the government itself. According to the conventional notation and the usual assumptions regarding the parameters, it follows that: [5]

$$T = t_w W + t_p P_w + t_p P_c + t_i[(1-s_w)(1-t_w)W + (1-s_w)(1-t_p)P_w + (1-s_c)(1-t_p)P_c + C_g \quad (2.1)$$

Moving from balanced government budget to the case of systematic deficit (surplus) he introduces a conventional government's expenditure function:

$$C_g = (1-s_g)T \quad (2.2)$$

However, if the government is allowed to save (S_g), we should expect the existence of an additional variable, namely the government profits (P_g), to be included as part of its income (Y_g). Accordingly, if the unique saving rate (s_g) applies to both categories of income (profits and taxation), it is readily seen that:

$$S_g = s_g Y_g = s_g(P_g + T) = s_g(P_g + T_d + T_i) \quad (2.3)$$

Now I will departure, somewhat, from Pasinetti's approach. Notice that T_i contains a fraction of the government profit which is counted twice – the indirect taxes associated to the government's consumption expenditure (T_{ig}) itself. [6] Thus:

$$T_{ig} = t_i(1-s_g)P_g + t_i(1-s_g)T_d + t_i(1-s_g)T_i \quad (2.4)$$

To eliminate this double counting I need to subtract the mentioned fraction from the government's profits and thus I have a new variable (P_g^*). It follows that:

$$C_g = (1-s_g)(P_g^* + T), \text{ where } P_g^* = [1 - t_i(1-s_g)]P_g \quad (2.5)$$

is the net government profit.

Substituting (2.5) in (2.1), expression (2.6), the proper government's saving function [Teixeira (1999, p. 82)], as a proportion of the corrected public revenue (R_g) is:

$$S_g = s_g R_g = s_g \alpha\{[t_w + t_i(1-s_w)(1-t_w)]W + [t_p + t_i(1-s_w)(1-t_p)]P_w + [t_p + t_i(1-s_p)(1-t_p)]P_c\} + s_g[(\alpha-1)t_i(1-s_g)+1]P_g \quad (2.6)$$

where $\alpha = [1 - t_i(1-s_g)]^{-1}$ is the "correction factor" due to fact government taxes its own expenditure. (2.6) excludes the double counting. So, the total saving ($S = S_w + S_c + S_g$) is given by:

[5] Notice that t_w is the proportional (direct) tax on wages and t_p is proportional (direct) tax on profit. I am assuming that $0 < t_p < t_w < 1$, differs from Pasinetti (1989). Direct taxes may changes savings propensities (s_w, s_c). I am disregarding such possibility. This is reason why $s_c' > s_{wc}' > s_{ww}'$ in expressions (2.8, 2.9 and 2.10) which is crucial for later argument following (2.22).

[6] This point was first raised by Teixeira and Araújo (1991a) in their appraisal of Dalziel's (1989) model of long-run distributive equilibrium. For further comments on this topic see Teixeira (1991), where the Cambridge Result and the long-run income distribution were derived. Some rewriting has been necessary in order to keep the track in the present paper. International trade is also discussed there but not reproduced here.

$$S = s'_{ww}W + s'_{wc}P_w + s'_cP_c + s_g[(\alpha - 1)t_i(1 - s_g) + 1]P_g \tag{2.7}$$

where

$$s'_{ww} = s_w(1 - t_w) + s_g\alpha[t_w + t_i(1 - s_w)(1 - t_w)] \tag{2.8}$$

$$s'_{wc} = s_w(1 - t_p) + s_g\alpha[t_p + t_i(1 - s_w)(1 - t_p)] \tag{2.9}$$

$$s'_c = s_c(1 - t_p) + s_g\alpha[t_p + t_i(1 - s_c)(1 - t_p)] \tag{2.10}$$

The last three definitions are the same as indicated by Pasinetti (1989, p. 30), but my saving function (2.7) contains an additional term $s_g[(\alpha-1)t_i(1-s_g)+1]P_g$ to capture the amendment above proposed due to the government's taxation of its own expenditure.

The long-run rate of profit (r) is obtained from the usual hypothesis:

i) proportionality between savings and capital stocks ($S/K = S_c/K_c = S_w/K_w = S_g/K_g$, where $K = K_c + K_w + K_g$);
ii) equalization of the different rates of profits ($P/K = P_c/K_c = P_w/K_w = P_g/K_g = r$); and
iii) equilibrium between investment (I) and saving (S), with $I \to S$.

From (iii): $I = S \to I/K = S/K$.
From (i): $I/K = S_c/K_c = s'_cP_c/K_c = s'_cP/K \therefore I/K = g_n/s'_c$, since $I/K = g_n$ is the natural rate of growth.
From (ii): $r = P/K = P_c/K_c = g_n/s'_c$.

It follows that the extended Cambridge equation is identical to that obtained by Pasinetti (1989):

$$r = \frac{P}{K} = \frac{g_n}{s_c(1 - t_p) + s_g\alpha[t_p + t_i(1 - s_c)(1 - t_p)]} \tag{2.11}$$

This characterizes the generality of his result. Even if workers are allowed to save, they have no influence on the long-run rate of profits.

The long-run income distribution (P/Y) is obtained directly from $P/K = (P/Y).(Y/K) \to P/K = (1/s'_c)(\frac{I}{Y})$. Therefore:

$$\frac{P}{Y} = \frac{1}{s_c(1 - t_p) + s_g\alpha[t_p + t_i(1 - s_c)(1 - t_p)]}\left(\frac{I}{Y}\right) \tag{2.12}$$

That is, again, as in the original version, the long-run distribution of income in full employment is independent of workers' saving behaviour. Given this result it would be interesting to find the conditions on the relevant savings rates that guarantee that the government would not accumulate asymptotically all the capital and sweep both capitalists and workers away from the system. In Pasinetti (1974, p. 130) the condition s_w is found that prevents workers from sweeping capitalists away from the system. In the case of government sustained budget surplus the condition required to attain the 'euthanasia' of the capitalist is far from real world magnitudes.

Now I will deal with the conditions of stability of the long-run income distribution. Naturally, the foregoing analysis would be incomplete if it did not

includes the limits within which the result above has economic meaning in long-run equilibrium and conditions under which it is stable. Pasinetti (1989) does not produce such analysis. The equilibrium will be locally and dynamically stable if $d(S/Y)/d(P/Y)$ is positive. [Teixeira (1999, p. 83)]. Hence:

$$\frac{d}{d(\frac{P}{Y})}\left\{s'_{ww}(\frac{W}{Y})+s'_{sc}(\frac{P_w}{Y})+s'_c(\frac{P_c}{Y})+s_g\left[(\alpha-1)t_i(1-s_g)+1\right](\frac{P_g}{Y})\right\}>0 \tag{2.13}$$

However, the only derivative whose sign is known is $d(W/Y)/d(P/Y)$, which is negative. Expressing P_c in terms of P, P_w and P_g, there still remain two derivatives needing additional assumptions concerning their sign; that is $d(P_w/Y)/d(P/Y)$ and $d(P_g/Y)/d(P/Y)$. Otherwise the stability result is inconclusive. As matter of fact, the local stability of the equilibrium depends on the effects that income changes may have in the distributive variables, and these effects are not (and cannot) be specified through an equilibrium analysis without additional assumptions. [7] Here I follow the approach introduced by Pasinetti (1962). His stability analysis assumes that full employment output is maintained continuously and the disequilibrium between investment and saving as share of the gross domestic product is adjusted by share of profit.

Notice that the approach to the equilibrium is accelerated in this version of the Kaldor-Pasinetti process where the State earns profits and indirect taxation on government expenditures is properly considered. This conclusion derives from the assumptions, $0 < s_g < 1, P_g > 0, 0 < t_i < 1$, and thus $\alpha > 1$. Furthermore, (2.13) is a monotonically increasing function of s_g.

As pointed out by Pasinetti (1974, p. 114), "as time (t) goes on, the profit margins, and therefore the share of total profits, remain constant, increase or decrease according as to whether total savings produced by the system tend to be equal, smaller, or greater than total investment". Now, I am in a position to examine the conditions of stability following the Kaldorian hypothesis that the prices and the profit margins are flexible in the long-run in relation to the variable units' costs. This approach allows me to describe the adjustment mechanism of distributive equilibrium according the so called *tatônnement*, i.e., through the excess demand function, $E(P/Y)$, bellow: [8]

$$E\left(\frac{P}{Y}\right)=\frac{I}{P}\left(\frac{P}{Y}\right)-\frac{S}{Y}\left(\frac{P}{Y}\right) \tag{2.14}$$

[7] In order to study the local stability Faria and Teixeira (1999) assume that the technology can be described by a well-behaved neoclassical production function with Pasinettian saving behaviour but such approach raises methodological controversies.

[8] Notice that $0 < s'_{ww} < s'_{wc} < s'_c < 1$ besides the restrictions $0 < s_w < s_g < I/Y < s_c < 1$ in order to limit the validity of the present formulation to the range in which the model has an economic meaning. Pasinetti (1989, p. 30) assumes $s'_{wc} < s'_{ww}$. The local stability argument bellow follows strictly Pasinetti (1962). Instead, I could just take the derivative of (2.14). If the single variable phase diagrammed in P/Y, i.e. the slope of $d/dt(P/Y)$ with respect to P/Y has a negative slope at equilibrium, which boils down to condition (2.21) the system is stable.

If $(P/Y)^*$ is the level of distributive equilibrium, than $(I/Y) = (S/Y)$ and thus $E(P/Y)^* = 0$. On the other hand, changes in (P/Y), as time goes on, are in direct proportion to the excess of demand. Therefore:

$$\frac{d}{dt}\left(\frac{P}{Y}\right) = f\left[E(P/Y)\right], f' > 0, f(0) = 0 \tag{2.15}$$

The equilibrium will be locally stable if:

$$\lim_{t\to\infty}\left(\frac{P}{Y}\right)_t = \left(\frac{P}{Y}\right)^* \text{ given } \left|\left(\frac{P}{Y}\right)_{t=0} - \left(\frac{P}{Y}\right)^*\right| < \delta \tag{2.16}$$

where $|(P/Y)_0 - (P/Y)^*|$ is the Euclidian norm in the space P/Y and δ is a real number small enough, describing the neighbourhood around $(P/Y)^*$.

In order to obtain the local dynamic stability conditions it is sufficient to consider $f[E(P/Y)]$ according to the Taylor expansion around $(P/Y)^*$. Then, taking only the first-order term of the Taylor series, given that $d(P/Y)^* = f(0) = 0$, it follows:

$$\frac{d}{dt}\left[\left(\frac{P}{Y}\right) - \left(\frac{P}{Y}\right)^*\right] = f'(0)m\left[\left(\frac{P}{Y}\right) - \left(\frac{P}{Y}\right)^*\right] \tag{2.17}$$

where $m = \left[\frac{d(I/Y)}{d(P/Y)} - \frac{d(S/Y)}{d(P/Y)}\right]_{(P/Y)^*}$

Expression (2.17) is a simple linear differential equation of the first order. As, by definition, $f'(0) > 0$, the solution will converge to $(P/Y)^*$ provided that $m < 0$.

Since investment is exogenously determined as that amount "which has to be undertaken in order to keep full employment over time" [Pasinetti (1974, p. 114)], the local dynamic stability condition is reduced to:

$$\left|\frac{d(S/Y)}{d(P/Y)}\right|_{(P/Y)^*} > 0 \tag{2.18}$$

After substituting from the savings function, it follows that the long-run income distributive equilibrium expressed in (2.13) will be locally (dynamically) stable if:

$$\frac{d(S/Y)}{d(P/Y)} = \frac{d}{d(P/Y)}\Big\{s'_{ww}\left(\frac{W}{Y}\right) + s'_{wc}\left(\frac{P_w}{Y}\right) + s_c\left(\frac{P_c}{Y}\right) + s_g\left[(\alpha-1)t_i(1-s_g)+1\right]\frac{P}{Y}\Big\} > 0 \tag{2.19}$$

According to the original version of Pasinetti (1974) on this matter, in the short-run, $d(P_w/Y)/d(P/Y) = 0$. Besides, since in his model Y is entirely shared between wages and profits, i.e., $d(W/Y)/d(P/Y) = 1$, it follows that (2.19) can be expressed as: $s'_c > s'_{ww}$.

This result shows that from the standpoint of the condition of short-run local stability, it is necessary to add to the original model of Pasinetti (1974) the "correction factor" due to the fact that government taxes its own expenditure as I am dealing with the case of unbalanced budget. It follows that the possibility

of the government to sustain permanently a budget surplus (or deficit) affects not only the condition of existence of the distributive equilibrium but also the short-run equilibrium.

The local condition of long-run dynamic stability in the case of exponential growth depends of the 'fundamental relation between profits and savings', $(P_w/S_w) = (P_c/S_c)$, shown by Pasinetti (1974, p. 110), no matter how many categories of participants in the economy is considered. In our case $(P_w/S_w) = (P_c/S_c = (P_g/S_g)$. Thus:

$$\frac{P_w}{s'_{ww}W + s'_{wc}P_w} = \frac{P_c}{S_c} = \frac{P_g}{S_g} \tag{2.20}$$

$$\therefore S_w = s'_{ww}W + s'_{wc}P_w = s'_cP_w \tag{2.21}$$

Notice that (2.21) holds since government saving propensity does not enter into the mentioned expression. In this vein the total saving function, as proposition of Y, become:

$$\frac{S}{Y} = s'_c\left(\frac{P}{Y}\right) = \{s_c(1-t_p) + s_g\alpha\left[t_p + t_i(1-s_c)(1-t_p)\right]\}\left(\frac{P}{Y}\right) \tag{2.22}$$

Therefore, the long-run distributive equilibrium will be locally and dynamically stable if the expression (2.7) attends the condition $s'_c > s'_{wc} > s'_{ww} > 0$. No doubt my approach follows perhaps to narrowly the economic logic of Pasinetti (1962). Teixeira and Araújo (1991b) show that distributive equilibrium is stable if the saving ratio, S/Y, is more positively inclined than the investment ratio, I/Y, exogenously given. It is not difficult to see that if the derivative of (2.14) is taken, provided that the single variable phase diagram in P/Y, i.e. the slope of $d(P/Y)/d_t$ with respect to P/Y has a negative slope at equilibrium, which boils down to condition (2.18), the system is stable.

My long local stability argument is correct, like Pasinetti (1962). However, I suspect that such problem (local stability) can only be properly solved in richer dynamic systems considered from different angles. Actually, on this technical issue, the problem is somewhat complex when both output and profit share adjust simultaneously to excess demand (Bhaduri 2008). In Pasinetti (1962) only the latter does.

3. Final Remarks

In his 1989 paper on the theory of profit and income distribution, Pasinetti is concerned with the role of government taxation and expenditures. Dealing with both balanced and deficit budgets he obtains a Cambridge Equation, which represents a fine result, but he neglects the case of sustained superavit and does not work out both the distribution of income and the stability conditions. As I have shown, it is possible to extend his approach to the case of a budget systematic

surplus in a way that regards indirect taxation on government's own expenditures explicitly, and the existence of public capital stock according to the government's accumulated savings. This was done in a framework of a closed economy and both the long-run rate of profit and the share of profits were established. The extended Cambridge Equation I have obtained is the same obtained by Pasinetti. This characterizes the generality of his main result: even if workers are allowed to save, they have no influence on the long-run rate of profit, despite the complex institutional set-up here.

As I have also shown how taxation and government permanent budget surplus affect the distributive equilibrium it is interesting to notice that the stability conditions become indeterminate. This is due to the fact that some of the derivatives involved have undefined signs. Thus, additional hypotheses were needed to ensure stability otherwise no definitive results can be obtained.

The Kaldor-Pasinetti process is an area of economic theory that provides stimulating research since it raises some important issues towards macroeconomic perspectives. It may suggest, in broad outline, shrewd conjectures concerning sustained growth, distribution, full employment and macrodynamic capability. Actually, because of their power to tax, governments quite frequently do things that optimizing agents would not do and this can persists long after private enterprises have been forced to halt due to a lack of resources.

I would like to point out that I have started this paper with a polemical puzzle (and new paradigm) on a systematic government budget surplus. Someone may feel that such concern is of little relevance for a discussion of what determines the long-run rate of profit in a capitalist economy. I do not believe that I am dealing with an esoteric issue, quite the contrary. As Harcourt (1971, p. 28) argues: "For if economic theory, no matter how beautiful and pure its abstract logic may be, does not deal with real puzzles and real people it quickly ceases to have a life of its own and withers and dies".

To conclude, as indicated by Teixeira (1998, p. 280), lines of research such as international trade and foreign debt, different rates of interest and profit for public and private assets, monetary sector, Ricardian debt/taxation equivalence, inter-generational wealth accumulation are some of the challenges being tackled. These contributions have tended to show that the essential features of the Cambridge Result are not invalidated under a wide range of general assumptions, thus corroborating the generality and robustness of Pasinetti's original insight. [9] Thus, extensions of such heterodox branch of the theory of growth and distribution are alive and flourishing. It presents newer challenges and promises for a more enlightened tomorrow, questioning propositions which rule most of the academia, the policy makers, the media and international institutions. Also chartering out

[9] Teixeira (1999) validates the Cambridge Theorem and considers some implications of the rate of profit for stability when unbalanced government budgets and non-zero balance of payments prevail. Baranzini (1991) covers a broad range of topics in the theory of wealth distribution and accumulation, including inter-generational analysis.

new roads ahead in order to encourage that all citizens of the world live with dignity. [10] Of course much needs to be done to ensure this vision.

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[10] For an alternative approach to development with dignity see Bhaduri (2005). It contains a major input into the current debate regarding the feasibility of employment to all; i.e, a case for full employment.

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