

Government debt, growth and inequality in income distribution: a post Keynesian analysis

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1. Introduction

Since the 1970s an economic theory in favour of free competition and minimal government regulation has prevailed in the literature. Within the new growth theories, developed since the 1980s, the supremacy of this position has not precluded the analysis of the government sector. Yet this literature has played down the analysis of the effects of changes in government deficits and debt on the inequality in income distribution. It has replaced, in representative agent models, the traditional concept of debt sustainability with the assumption that the present value of the government debt must be equal to zero¹, pushing these models towards focussing on policies carried out with a balanced budget. Some works using overlapping generations models, however, have not followed this line and have reached the conclusion that an increase in government deficits and debt reduces the rate of growth, without examining, in any case, its effect on the inequality in income distribution.²

A greater interest in the connection between government intervention and distribution can be found in the Keynesian literature, which has recently seen an intense debate on how government policies, carried out with an unbalanced budget can be introduced within the post Keynesian theory of growth and distribution.³ This debate has focussed on the validity of the “Pasinetti” and “anti-Pasinetti” theorems and of the “Cambridge equation”. In some cases, it has also examined the possibility of reconciling the position on the determinants of distribution proposed by Kaldor and Pasinetti with that of the authors in favour of a monetary theory of distribution, where the money rate of interest determines the rate of profits. Yet, the analysis of how changes in government deficits and debt affect the differentials in the distribution of income and wealth among classes has been neglected by the Keynesian literature too.

¹ This change of perspective in the treatment of government debt can be originally found in Barro (1989; 1990).

² See Brauning (2002) and the works there referred to. This conclusion can be considered in line with the widespread belief that government intervention reduces the rate of growth of the economy because of the poor level of productivity performance of the government sector.

³ For a review of this literature see Commendatore (1994) and Panico (1997).

One important exception to this trend is the article by You and Dutt (1996). They move from the consideration that some economists close to the Keynesian positions have jumped on the bandwagon against government intervention and the accumulation of government debt, arguing that “tax revenues from the working class are used to pay for the interest on the government debt which is owned almost exclusively by a small minority of wealthy individuals, so that government debt contributes to income inequality” (p. 336). According to You and Dutt, this opinion is based on “impressionistic arguments” since “the connection between debt and income distribution mentioned above has largely escaped serious economic analysis” (p. 336). They thus try to fill this lacuna by examining a rigorous theoretical model belonging to the Kaleckian tradition.

In what follows a similar attempt to that of You and Dutt is made, by presenting a model belonging to the Kaldor-Pasinetti tradition, where two classes (workers and *rentiers*) participate in the process of production and distribution.⁴ The model considers an economy with similar features to that of You and Dutt. The main differences are that it introduces an explicit relation between the rates of interest and profit and allows the working class to save, so that the income of the workers consists of wages, interests and profits. The fact that a wide range of income sources accrues to each social group is considered by Atkinson (1997) an important feature of modern societies, a feature that, according to Atkinson, makes the analysis of the “personal” distribution of income the most significant way to study at present the phenomenon of income inequality.

The results achieved in what follows are clear-cut and present some differences with those of You and Dutt. They deal with the effects of government interventions on the distribution of both wealth and income and on the rate of growth. Those on the distribution of wealth are not examined by You and Dutt, owing to the assumption that workers have no wealth. The results achieved in the present paper show that a larger government deficit produces a higher government debt, an increase in the *rentiers*' quota of wealth and a reduction in the workers' quota. Moving to the effects on the distribution of income, a larger government deficit produces a higher government debt and an increase in the *rentiers*' total revenues, measured in terms of the net income of the economy. As to the effects on the total revenues of the working class, measured in terms of the net income of the economy, they are the following: if the rate is stabilised at a given level, the pre-tax total revenues

⁴ The approach proposed by Kaldor (1955-56), and further developed by Pasinetti (1962), studies the long-run relationship between effective demand, growth and distribution by assuming full or normal capacity utilization, flexible income shares and an exogenous rate of growth. This approach has been extended by Joan Robinson (1956) by introducing a functional relationship between the rate of growth and the rate of profit. The Kaleckian approach instead assumes under-utilised productive capacity, income distribution determined by firms' mark-up procedures and growth driven by profitability and by effective demand.

remain constant, while the after-tax ones increase, like those of the *rentiers*. Thus, a larger government deficit and debt makes both classes better off, as far as their earnings are concerned. Yet, income inequality increases, since the benefits received by the *rentiers* are greater than those received by the workers. On the other hand, if the rate of interest is not exogenously given, both the pre-tax and the after-tax revenues of the working class decrease. Finally, the model shows that an increase in the government deficit has a positive effect on the rate of growth, while a change in the rate of interest leaves the rate of growth constant.

The economic mechanisms through which the results on the effects on income distribution are achieved in the present model differ from those outlined by the analysis of You and Dutt. First of all, the constancy of the workers' pre-tax total revenues can be seen as a particular application of the Pasinetti theorem to the model here considered. Secondly, the increase in the workers' after tax total revenues is due to the reduction in the tax rate associated with the larger deficit. Thirdly, contrary to what is submitted by those Keynesian economists, mentioned by You and Dutt, who have jumped on the bandwagon against government intervention, the increased income inequality does not depend on the fact that the *rentiers* own a larger quota of government debt than the workers. It instead depends on the fact that the propensity to save of the *rentiers* is greater than that of the working class. The inequality increases, whatever the quota of wealth owned by the working class. Fourthly the stabilisation of the rate of interest at a given level is what allows an expanding fiscal policy to bring about benefits for the working class.

The paper is so organised. In Section 2 we present the model used to examine the issue under consideration. Section 3 analyses the solutions of the model. Section 4 considers the effects of changes in the government deficit and in the rate of interest on the rate of growth, and on the distribution of wealth and income between the two classes.

2. The model

The main difficulty in formulating an analytical model to study the problem under consideration is to increase the complexity of the economy represented without precluding the achievement of analytical results.

The economy considered is similar to that examined by You and Dutt. It is a closed economy with no inflation, two classes (workers and *rentiers*), and two assets (real capital and government bonds). Workers, unlike what is assumed by You and Dutt, have positive savings. They thus have a positive amount of wealth, invested in real capital and government debt, and earn, beside wages, profits and interests. *Rentiers* only earn profits and interests. The two classes have the same portfolio structure. The government collects taxes, demands goods and services, funds its deficits by issuing bonds, and pays interest on its debt. Another difference from the analysis of You and Dutt is that the rate of profits is related to the rate of interest: the two rates move together in the same direction. Finally, unlike You and Dutt, we follow Pasinetti's approach to the theory of growth and distribution and develop a steady growth analysis where the degree of capital utilisation is always at the same normal level. This analysis determines the "personal" distribution of income, which can be considered the most significant way to study the phenomenon of income inequality.

Let's introduce the model by describing the dynamic equilibrium conditions of the government sector and of the two classes:

$$gb = \mathbf{d} + R_b b \quad (1)$$

$$g\mathbf{a}(b+k) = s_r(1-t)\mathbf{p}_r \quad (2)$$

$$g(1-\mathbf{a})(b+k) = s_w(1-t)\mathbf{p}_w \quad (3)$$

$$\mathbf{p}_r = \mathbf{a}(r_k k + R_b b) \quad (4)$$

$$\mathbf{p}_w = 1 - r_k \mathbf{a} k + R_b(1-\mathbf{a})b \quad (5)$$

where:

g is the rate of growth of the economy;

b is the stock of government debt measured in terms of the net income of the economy;

\mathbf{d} is the government "primary" deficit, i.e. the deficit net of interest payments, measured in terms of the net income of the economy;

R_b is the rate of interest paid on government debt;

\mathbf{a} is the *rentiers'* quota of total wealth;

k is the stock of real capital measured in terms of the net income of the economy;

s_r is the propensity to save of the *rentiers* ($0 < s_r < 1$);

- t is the tax rate;
- p_r is the total revenues of the *rentiers*, measured in terms of the net income of the economy;
- s_w is the propensity to save of the working class ($0 < s_w < s_r < 1$);
- p_w is the total revenues of the working class, measured in terms of the net income of the economy;
- r_k is the rate of profits;

The investment demand function is described by the following equation, which extends the analysis traditionally proposed by Kaldor and Pasinetti by following the view of J. Robinson on this point:

$$g = a_0 + a_1(1-t)r_k \quad (6)$$

The rates of interest and profits are linked by the following equation, which maintains the analysis at a simplified level⁵ by following the views expressed by the classical political economists and by Marx, according to whom the rate of interest is a portion of the rate of profit:

$$r_k = bR_b \quad (7)$$

with $b > 1$

Following Kaldor we then assume that the capital – output ratio is constant

$$k = \bar{k} \quad (8)$$

Finally we assume that the authorities fix the rate of interest on government bond⁶ and the government deficit.⁷

⁵ A more complex description of this relationship, which takes for instance into account the investors' choices among different assets, makes it difficult to obtain explicit analytical solutions from the model.

⁶ Like You and Dutt (1996), owing to the lack of a monetary base issued by the monetary authorities, the assumption of an exogenous interest rate can only mimic the content of a large part of the post Keynesian literature on the endogeneity of the money supply and the hint given by Sraffa in *Production of Commodities*, subsequently developed by the works on the monetary theory of distribution. The introduction of central bank money as the third asset of the model hinders the achievement of explicit analytical solutions.

⁷ The case of a given primary deficit has also been considered. Moreover, the model has been alternatively closed by assuming an endogenous interest rate and an exogenous tax rate. In what follows, the results achieved with these different specifications will be sometimes compared with those derived by the model in the text.

$$R_b = \bar{R}_b \quad (9)$$

$$\mathbf{d} + R_b b = \bar{\mathbf{d}} \geq 0 \quad (10)$$

The previous ten equations contain ten unknowns, that is b , R_b , \mathbf{d} , r_k , g , k , \mathbf{a} , \mathbf{t} , \mathbf{p}_r , \mathbf{p}_w .

In the model, the “functional” distribution of income (i.e. the rate of interest, the rate of profits and the wage rate) is not affected by variations in the government deficit, which depend on changes in the tax rate and in the government demand for goods and services. These variations influence the net output of the economy and the “personal” distribution of income of the two classes, due to the effect on the tax rate and on interests and profits received on their wealth.

In the analysis of You and Dutt too, variations in the government deficit do not affect the “functional” distribution of income: the interest rate, the profit share and the wage share of income remain constant. The tax rates however are given, so that only variations in the government demand for goods and services produce a change in the government deficit and have a direct effect on the net output of the economy. Indirect effects may come about because of variations in the personal distribution of income. Yet, these effects only regard the personal income of the capitalist class and are due to the interest payments this class receives for its holding of government bonds.

3. Solutions of the model

To examine the solutions of the model we can start by presenting the previous 10 equations in a simplified form and then calculate the equilibrium values of the unknowns. From equations (3)-(9), we can obtain the following equalities, where the rate of growth, the after-tax interest rate, the primary deficit, the workers’ quota of total wealth and the total revenues of the *rentiers* only depend on the value of b , the government debt measured in terms of the net income of the economy:

$$g = g_0 \frac{\bar{k} \mathbf{b} + b}{\bar{k} \mathbf{b} (1 - \mathbf{I} b)} \quad (11)$$

$$\bar{R}_b(1-t) = \frac{g_0}{s_r} \frac{\bar{k} + b}{\bar{k} \mathbf{b}(1-\mathbf{I}b)} \quad (12)$$

$$\mathbf{d} = \bar{d} - \bar{R}_b b \quad (13)$$

$$1 - \mathbf{a} = \frac{s_w}{s_r - s_w} \frac{1 - \bar{k} \mathbf{b} \bar{R}_b}{(\bar{k} \mathbf{b} + b) \bar{R}_b} \quad (14)$$

$$\mathbf{p}_r = 1 + \bar{R}_b b - \frac{s_r}{s_r - s_w} (1 - \bar{k} \mathbf{b} \bar{R}_b) \quad (15)$$

where $g_0 \equiv \frac{a_0 s_r}{s_r - a_1}$ is the value of the rate of growth at $b = 0$ and $\mathbf{I} \equiv -\frac{s_r - a_1 \mathbf{b}}{\bar{k} \mathbf{b}(s_r - a_1)}$.

We assume that $s_r > a_1$, from which it follows that $g_0 > 0$ and that $\mathbf{I} \leq 0$ for $s_r / a_1 \mathbf{b}$. This assumption is in line with the post Keynesian literature (see Marglin, 1984, and Lavoie, 1992).

Moreover, always from equations (3)-(9), the following equality can be derived:

$$\mathbf{p}_w = \frac{s_r}{s_r - s_w} (1 - \bar{k} \mathbf{b} \bar{R}_b) \quad (16)$$

where the pre-tax total revenues of the working class, measured in terms of the net income of the economy, can be directly determined since they depend on the given interest rate, but not on the stock of government bonds.

The fact that the pre-tax income of the working class is invariant with respect to changes in the government deficit and in the stock of government bonds represents a first result of the analysis here developed. This result can be seen as an application of the Pasinetti theorem to the model here presented. According to this theorem, as equations (2) and (4) show, the savings of the economy are equal to the saving that the *rentiers* would generate if all interests and profits were paid to them. The dynamic equilibrium conditions thus imply that the workers' savings out of their wages must be equal to the additional savings that the *rentiers* would generate if the interests and the profits paid to workers were instead paid to them:

$$s_w(1-t)(1-r_k \bar{k}) = (s_r - s_w)(1-t)(1-\mathbf{a})(r_k \bar{k} + \bar{R}_b b) \quad (17)$$

From equation (17), taking into account equations (7) and (9), we can see that what is paid to the working class as interests and profits, i.e. the term $(1-\mathbf{a})(r_k k + R_b b)$, is constant. Thus, as long as the interest rate on government bonds is exogenously given, the pre-tax income received by the working class is not affected by variations in the government deficit and debt.⁸ This result, which is related to the dynamic equilibrium conditions, can be extended to more complex models. It can be extended, for instance, to models with inflation where government deficits are funded through the issue of bonds and money paying no return, provided that equations (7) and (9) on the relationship between the rates of interest and profits and the exogenous determination of the interest rate are confirmed.

In order to obtain the equilibrium value for the government debt, we substitute equations (9)-(11) into equation (1):

$$-\frac{g_0 b^2 + \bar{k} \mathbf{b} (\bar{d} \mathbf{1} + g_0) b - \bar{k} \mathbf{b} \bar{d}}{\bar{k} \mathbf{b} (1 - \mathbf{1} b)} = 0 \quad (18)$$

Equation (18) has two solutions. The non-negative one is

$$b^* = \frac{-\bar{k} \mathbf{b} (\bar{d} \mathbf{1} + g_0) + \sqrt{\Delta_b}}{2g_0} \quad \text{where} \quad \Delta_b \equiv \bar{k}^2 \mathbf{b}^2 (\bar{d} \mathbf{1} + g_0)^2 + 4\bar{k} \mathbf{b} \bar{d} g_0 \quad (19)$$

The model gives economically meaningful solutions for the other variables when $\mathbf{1} b^* < 1$. Moreover, to have $0 < \mathbf{a} < 1$, (i.e. to have an equilibrium with two classes), it must occur that $s_w - (s_r - s_w) \bar{R}_b b < s_r \bar{k} \mathbf{b} \bar{R}_b < s_r$.

4. The effects of government interventions on the rate of growth and on the distribution of income and wealth.

⁸ On the contrary, when the interest rate is endogenous, \mathbf{p}_w changes when there is a variation in the government deficit and in the government debt. See below.

By comparing different steady growth solutions, the analysis presented in the previous section allow us to evaluate how changes in government interventions affect the rate of growth of the economy and the distribution of income and wealth between the two classes.⁹

We consider, in the first place, how changes in the government deficit vary the stock of government bonds measured in terms of the net income of the economy, the tax rate, the rate of growth of the economy, the distribution of wealth and that of income. Subsequently, we examine how variations in the rate of interest on government bonds produce effects on the same variables.

By calculating the partial derivative of equation (19) with respect to the government deficit we obtain the following result, which indicates that the stock of government debt in terms of net output of the economy varies in the same direction as the government deficit:

$$\frac{\partial b^*}{\partial \bar{d}} = \bar{k} \mathbf{b} (1 - \mathbf{I} b^*) \Delta_b^{-1/2} > 0 \quad (20)$$

By calculating the partial derivative of equation (12) with respect to the government deficit, we can see that the tax rate moves instead in the opposite direction:

$$\frac{\partial (1 - \mathbf{t}^*)}{\partial \bar{d}} = \frac{\partial (1 - \mathbf{t}^*)}{\partial b^*} \frac{\partial b^*}{\partial \bar{d}} = \frac{g_0 (1 + \mathbf{I} \bar{k})}{s_r \bar{k} \mathbf{b} \bar{R}_b (1 - \mathbf{I} b^*)^2} \frac{\partial b^*}{\partial \bar{d}} > 0 \quad (21)$$

This result clarifies that an increase in the overall deficit brings about a reduction in the tax rate. If we specify the effect on the government expenditure too, we obtain that it is not determined, i.e. the sign of the partial derivative of this expenditure with respect to \bar{d} can be either positive or negative.

The rate of growth is positively related to the government deficit, as the partial derivative of equation (11) shows:

⁹ We have examined the local stability of the equilibrium for a simplified case in which the condition $r_k = \mathbf{b} \bar{R}_b$ is continuously satisfied, $s_w = 0$ and $s_r = 1$. The following results were reached: a) if the government uses variations in the tax rate in order to maintain the targeted deficit \bar{d} and uses variations in the its expenditure in order to equilibrate the goods market, the equilibrium is locally stable; b) if the government uses variations in the tax rate in order to maintain the equilibrium in the goods market and uses variations in the its expenditure in order to maintain the targeted deficit, the equilibrium is unstable. Since savings are more sensitive than investments to changes in the tax rate, the economy is on a razor-edge. Reduction in the tax rate to favour capital accumulation determines a larger increase in savings widening the gap between inputs and withdrawals. The government can stabilize the economic system only acting in a counter-intuitive fashion, by increasing taxation when overall savings exceed investments. The analysis of more general cases is left to further investigation.

$$\frac{\partial g^*}{\partial \bar{d}} = a_1 \mathbf{b} \bar{R}_b \frac{\partial(1-t^*)}{\partial \bar{d}} > 0 \quad (22)$$

The positive effect on the rate of growth is due to the reduction of tax rate induced by the fiscal policy.

Thus, in the model here presented an expanding fiscal policy favours growth, contrary to what is obtained by some recent articles using overlapping generations model within the new growth theories.¹⁰ Moreover, the result of expression (22) is confirmed when we take, as an alternative way to close the model, the tax rate as exogenously given and the rate of interest as an endogenous variable. In this case, an expanding fiscal policy generates a positive effect on R_b and r_k . This, in turn, produces again an increase in g .

Coming to the effects on the distribution of wealth and income, by calculating the partial derivative of equation (14) with respect to the government deficit, we can see that an expanding fiscal policy increases the quota of wealth owned by the *rentiers* and reduces that of the workers.

$$\frac{\partial(1-a^*)}{\partial \bar{d}} = -\frac{s_w(1-\bar{k}\mathbf{b}\bar{R}_b)}{\bar{R}_b(s_r-s_w)(\bar{k}\mathbf{b}+b^*)^2} \frac{\partial b^*}{\partial \bar{d}} < 0 \quad (23)$$

Expanding fiscal policies thus have a negative effect on wealth inequality.

The total revenue of the rentiers, measured in terms of the net income of the economy, also is positively affected by an expanding fiscal policy, as can be seen by deriving equation (15) with respect to the government deficit:

$$\frac{\partial \mathbf{p}_r^*}{\partial \bar{d}} = \bar{R}_b \frac{\partial b^*}{\partial \bar{d}} > 0 \quad \frac{\partial(1-t^*)\mathbf{p}_r^*}{\partial \bar{d}} > 0 \quad (24)$$

This positive effect applies to both the pre-tax and the after-tax total revenue of this class.

¹⁰ See Brauning (2002).

Finally, the effect of an expanding fiscal policy on the total revenues of the working class is null, if the pre-tax revenues are considered, and positive, if the after-tax revenues are examined. This is shown by the partial derivative of equation (16) with respect to the government deficit:

$$\frac{\partial \mathbf{p}_w^*}{\partial \bar{d}} = 0 \quad \frac{\partial (1-t^*) \mathbf{p}_w^*}{\partial \bar{d}} > 0 \quad (25)$$

The partial derivative on the left-hand side confirms what has been pointed out in the previous section 3. The invariance of the pre-tax revenues of the working class comes from the fact that the increase in the workers' holding of government debt is exactly compensated by the reduction of their quota of wealth. What this class receives as interests and profits, measured in terms of the net income of the economy, remains constant. At the same time, the partial derivative on the right-hand side shows that the reduction of the tax rate allows the workers to receive higher after-tax total revenues, measured in terms of the net income of the economy.

Thus, a higher government deficit increases the after-tax revenues of both classes. In relative terms, however, the benefits received by the *rentiers* are larger than those received by the workers, so that, although both classes are better off, income inequality increases, as shown by the following expressions:

$$\frac{\partial}{\partial b^*} \left(\frac{\mathbf{p}_r^*}{\mathbf{p}_w^*} \right) = \frac{s_r - s_w}{s_r} \frac{\bar{R}_b}{1 - k \mathbf{b} \bar{R}_b} > 0 \quad \frac{\partial}{\partial \bar{d}} \left(\frac{\mathbf{p}_r^*}{\mathbf{p}_w^*} \right) = \frac{s_r - s_w}{s_r} \frac{\bar{R}_b}{1 - k \mathbf{b} \bar{R}_b} \frac{\partial b^*}{\partial \bar{d}} > 0 \quad (26)$$

This result, contrary to what is submitted by those Keynesian economists who have jumped on the bandwagon against government intervention, does not depend on the fact that the *rentiers* own a larger quota of government debt than the workers. The inequality increases, whatever the quota of wealth owned by the working class, as long as $s_r > s_w$.

The assumption of a given interest rate on government bonds is relevant for the effects on the revenues of the workers. The stabilisation of the interest rate at a given level by the monetary

authorities prevents the increase in this rate and the occurrence of the negative effects on the pre-tax and after-tax revenues of the workers, which are clarified by the subsequent expression (30).¹¹

To complete the impact of government interventions on growth and distribution, we can now examine how changes in the rate of interest on bonds affect the other variables of the model. First of all, we can notice, by calculating the partial derivative of equation (19) with respect to R_b , that the stock of government debt, measured in terms of the net income of the economy, is not affected by this event:

$$\frac{\partial b^*}{\partial R_b} = 0 \quad (27)$$

This apparently counter-intuitive result is due to the fact that in the model here examined the government deficit is constant, so that, an increase in interest payment by the public sector is exactly compensated by a reduction in its primary deficit.¹²

An increase of R_b , on the other hand, increases the tax rate, as shown by the partial derivative of equation (12):

$$\frac{\partial(1-t^*)}{\partial R_b} = -\frac{g_0}{s_r} \frac{\bar{k} + b^*}{\bar{k} \mathbf{b} (1 - \mathbf{I} b^*) R_b^2} < 0 \quad (28)$$

The effect on the rate of growth of an increase in the rate of interest is:

$$\frac{\partial g^*}{\partial R_b} = 0 \quad (29)$$

The result is due to the negative effect on growth of higher tax rates counterbalancing the positive effect of higher rates of profits so that variations in the interest rate do not affect the after-tax rate of profits.¹³

¹¹ When the rate of interest is endogenous an increase in \bar{d} reduces both workers' pre- and after-tax income via an increase in R_b . This strengthens the effect on income inequality.

¹² As a matter of fact, when \mathbf{d} , the primary deficit, is exogenously given, we obtain an increasing effect of a rise in R_b on the stock of government debt.

The effects of changes of the rate of interest on the distribution of wealth and income are always in favour of the relative position of the rentiers. Their quota of wealth increases (thus reducing that of the workers), as shown by the partial derivative of equation (14):

$$\frac{\partial(1-\mathbf{a}^*)}{\partial \bar{R}_b} = -\frac{s_w}{(s_r - s_w)(\bar{k}\mathbf{b} + b^*)\bar{R}_b^2} < 0 \quad (29)$$

Moreover, both the pre-tax and after-tax total revenues of the working class undergo a reduction when R_b increases, as shown by the partial derivative of equation (16):

$$\frac{\partial \mathbf{p}_w^*}{\partial \bar{R}_b} = -\frac{\bar{k}\mathbf{b}s_r}{s_r - s_w} < 0 \quad \frac{\partial(1-\mathbf{t}^*)\mathbf{p}_w^*}{\partial \bar{R}_b} = -g_0 \frac{\bar{k} + b^*}{\bar{k}\mathbf{b}(s_r - s_w)(1-\mathbf{I}b^*)\bar{R}_b^2} < 0 \quad (30)$$

On the contrary, both the pre-tax and after-tax total revenue of the rentiers undergo an increase when R_b increases, as shown by the partial derivative of equation (15):

$$\frac{\partial \mathbf{p}_r^*}{\partial \bar{R}_b} = b^* + \frac{\bar{k}\mathbf{b}s_r}{s_r - s_w} > 0 \quad \frac{\partial(1-\mathbf{t}^*)\mathbf{p}_r^*}{\partial \bar{R}_b} = g_0 \frac{s_w(\bar{k} + b^*)}{\bar{k}\mathbf{b}s_r(1-\mathbf{I}b^*)(s_r - s_w)\bar{R}_b^2} > 0 \quad (31)$$

The increased income inequality occurring when the rate of interest rises is also confirmed by the following partial derivative:

$$\frac{\partial}{\partial \bar{R}_b} \left(\frac{\mathbf{p}_r^*}{\mathbf{p}_w^*} \right) = \frac{s_r - s_w}{s_r} \frac{\bar{k}\mathbf{b} + b^*}{(1 - \bar{k}\mathbf{b}\bar{R}_b)^2} > 0 \quad (32)$$

Thus, an increase in the rate of interest on government bonds increases the inequality in the distribution of both income and wealth between the two classes considered by the model. Moreover, unlike what happens when the government deficit rises, it reduces both the pre-tax and after-tax total revenues of the working class, measured in terms of the net income of the economy.

¹³ A rise in the rate of interest instead enhances growth when the primary deficit is exogenous. In this case, the effect of a change in R_b on the after-tax rate of profits is positive.

5. Conclusions

The analysis of the connection between government deficit, government debt, growth and distribution has been played down by the recent literature on endogenous growth. The post Keynesian literature has paid instead greater attention to this problem. Yet, it has not examined the effects of government interventions on income inequality. You and Dutt (1996) is an important exception. By using a Kaleckian model they have tried the view, recently shared by some Keynesian authors too, that a rise in government deficits and in the government debt increases income inequality by making the poorer sections of society pay more taxes to provide for the larger interests on government debt earned by the rich.

In this paper a post Keynesian model of growth and personal distribution, belonging to the Kaldor-Pasinetti tradition, has been presented to deal with the same problems examined by You and Dutt. The results achieved by this post Keynesian model present several differences with those of the Kaleckian one, starting with the fact that, unlike what occurs in the analysis of You and Dutt, the effects of government interventions on the rate of growth and on the distribution of wealth and income are not ambiguous. The results obtained can be so summarised:

- An increase in the government deficit has a positive effect on the rate of growth of the economy.
- A change in the rate of interest leaves the rate of growth constant. This result is related to the dynamic equilibrium conditions and to the fact that the rate of growth of the stock of government bonds remains unchanged, owing to the constancy of the government deficit.
- A higher government deficit increases wealth inequality. It produces a larger stock of government debt, an increase in the *rentiers'* quota of wealth and a reduction in the workers' quota on the distribution of wealth. These effects are not examined by You and Dutt, owing to their assumption that workers are not savers and have no wealth,
- A higher interest rate increases wealth inequality too.
- A higher government deficit produces an increase in the *rentiers'* total revenues, measured in terms of the net income of the economy.

- A higher interest rate increases the *rentiers'* total revenues, measured in terms of the net income of the economy too.
- A higher government deficit leaves the pre-tax total revenues of the working class, measured in terms of the net income of the economy, constant. This result is due to a particular application of the Pasinetti theorem to the model here considered.
- A higher interest rate reduces the pre-tax total revenues of the working class.
- A higher government deficit increases the after-tax total revenues of the working class, owing to the reduction in the tax rate.
- Although a higher government deficit makes both classes better off, income inequality increases, since the benefits received by the *rentiers* are greater than those received by the workers. The increased income inequality does not depend on the fact that the *rentiers* own a larger quota of government debt than the workers. It instead depends on the fact that the propensity to save of the *rentiers* is greater than that of the working class. The inequality increases, whatever the quota of wealth owned by the working class.
- A higher interest rate reduces the after-tax total revenues of the working class and thus increases income inequality.

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