

Finance, Income Taxation and Employment:

A Post Keynesian-Kaleckian Analysis

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Abstract

In a world where financialization and neoliberal policies dominate every aspect of economic activity, the unprecedented levels of unemployment and economic slowdown seem to be unreasonable. On these conditions the absence of any essential role for demand side, induces the necessity for reconstructing the framework into which economies operate and its policy suggestions as well. By setting at the centre of our analysis the problem of unemployment, the purpose of this paper is to contribute to Post Keynesian-Kaleckian literature. A three-income class macroeconomic model is developed to explore the way that external finance affects income distribution and economic growth when fiscal policy is active. It is argued that the presence of rentiers, except that of capitalists and workers, in conjunction with the introduction of progressive income taxation can change the whole economic process without constraining it.

Key Words: Capital Stock, Investment, Unemployment, Income Distribution, Efficiency, Optimal Taxation

JEL Classification: E22, E24, E12, H21

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1. Introduction

The burst of current economic crisis and its severe consequences on economic growth, brought to the fore the need to face it at its core. For a number of policymakers and economists a sorting of financial products, institutions and practices could accelerate economic activity efficiently; a perspective that provides only ostensibly solutions since the consequences of economic crisis do not just concern the financial sector but the real economy. Besides, if it were not the implementation of neoliberal policies and their concentration on regulating and liberalizing labour and financial markets; reducing government intervention and redistributing income at the expense of wages the last years, neither increasing income inequality nor rising imbalances would have ever been appeared (Stockhammer, 2010; Hein, 2011; Hein and Truger, 2010; Smithin, 1996). The gradual dominance of financial sector in economic activity and the strengthening of rentiers' income class have been generally summarized at the term financialisation (Epstein, 2002; Palley, 2007; Stockhammer 2004c). In particular financialisation concerns: *“the increasing importance of financial markets, financial motives, financial institutions, and financial elites in the operation of the economy and its governing institutions, both at the national and international level “*, (Epstein, 2002, p.1).

Despite the general agreement about the macroeconomic instability in both capital (direct) and labour (indirect) markets that stem from financialisation, mainstream macroeconomics indicate that the degree of financial intermediation is positively associated with sustainable growth. More specifically, it is believed that financialisation creates the appropriate conditions for taking on investment plans and setting consumption expenditures as the driving force when workers improve their gains and their credit positions. These suggestions contradict the majority of Post Keynesian- Kaleckian literature (e.g. Epstein and Power, 2003; Stockhammer, 2007, Hein, 2006, 2010; Hein and Truger, 2010; Hein and van Treeck, 2007, 2008; Van Treeck, 2008; Onaran et al., 2011) for which the finance-led regime as the

fundamental source of capital decumulation and economic instability¹. More specifically, Post Keynesians by using Keynes' program of "monetary theory of production"² have developed models, either on the tradition of Kaldor (1956, 1957) and Robinson (1962) or on the tradition of Kalecki (1954) and Steindl (1952)³, that examine the effects of monetary factors on income distribution, aggregate demand and growth into a credit economy where money is endogenously determined (see e.g. Amadeo, 1986a, 1986b, 1987; Taylor, 1985; Dutt, 1984, 1987, 1989, 1992; Rowthorn, 1981; Lavoie, 1992, 1995; Dutt and Amadeo, 1991; Hein, 1999, 2006, 2007, 2011; Lavoie et al., 2004). The main characteristic of these models is the treatment of finance-led regime as the fundamental source of economic instability.

In addition, the presence of imbalances either in a specific economy or in a complex of economies is regarded as an additional negativity deriving from current crisis. However, in a world where financial sector dominates but monetary authorities are prevented from taking advantage of financial flexibility, any obsession with balanced budgets is likely to squeeze down economic growth and increase the degree of financial instability (Hein and Truger, 2006)⁴. In particular, their presence is opposed to neoliberal implications which assert economic growth through automatic mechanisms so as economies to operate at balanced budget consistent with full employment levels. On the contrary, within Post Keynesian-Kaleckian perspectives imbalanced budgets⁵ do not seem to be a problem as long as their presence is attributed to the fact that investment and saving are separate activities, which equality would be reconciled unless both of them, either through income distribution or investment encouragement, were suppressed at a specific level (Sawyer, 2011).

Hence imbalance budgets (deficits during slowdowns and surpluses during upswings)⁶ should be treated not as numerical targets but as an opportunity to abandon economic stagnation and corporate government with private sectors. Besides, with respect to Post Keynesian Kaleckian implications the degree of budget is determined by the underlying economic activity (propensities to save, invest and

¹This is easily understood by considering either the determination of investment by external finance (e.g. van Treeck, 2008) or the consumption generated by wealth-based and debt-finance consumption (e.g. van Treeck, 2009).

²This results in characterizing Keynes as the founding father of monetary analysis (Hein, 2006).

³Among these traditions Passinetti's (1974) implications are excluded, since are based on a positive relation between normal rates of profits and interest rates, provided that the level of the latter is lower than former, are excluded (Hein, 1999, 2006, 2007).

⁴It is generally argued that deficits usually derive from monetary authorities' concentration on inflation targeting and their attempt to restore public finance by orientating it on productive investment and not from the adoption of Keynesian fiscal policies (Hein and Truger, 2006). Moreover, the coexistence of large budget deficits with expansionary monetary policies affect economic activity negatively, especially when economies are open, since instead of concentrating on production economies prefer to import capital. In this case, economies can be stimulated when there is import acceleration and hence trade deficit (Eisner, 2003).

⁵In particular and in accordance with the national income identity in the case of a closed economy, when government 'runs' instance surpluses (i.e. be a saver), the private sector is required to 'run' sustained deficits (i.e. be a borrower) and respectively for the opposite case (Sawyer, 2007a, 2007 b; Larmarie, 1991).

⁶Whether budgets are balanced or not, depends on the adopted targets and policy practices as well as on government's ability to provide continuous and accurate forecasts about the effects of adopted policies (Larmarie, 1991).

exports and imports); its role is to mop up excess private savings (over investment) and the counterpart budget surplus used when investment expenditure exceeds savings (at the desired level of economic activity), while if economic activity was at relative high levels there would not be any need for it (Arestis and Sawyer, 2010; Sawyer, 2007a, b, 2012)⁷. Moreover, Kalecki (1944) suggests that such imbalances not only correct the deficiency of aggregate demand, but do also “finance themselves” (budget deficits) by redistributing income in a way that increasing saving match the deficit and provide the funds for government borrowing⁸ (Arestis and Sawyer, 2003, 2004, 2006; Sawyer, 2007b). This is why he (Kalecki) sets the achievement of full employment “*either on a long run budget deficit policy or on the redistribution of income*”⁹ (Kalecki, 1944; Sawyer, 2007a, 2007b; Sawyer, 2011).

On these conditions governmental intervention through fiscal policy is proved to be the most reliable instrument to underpin and stabilize economy in terms of capacity and demand growth rates without causing problems (Kalecki, 1944; Sawyer, 2007a, 2007b); further if it is combined appropriately with monetary policy its success is beyond any doubt. But the appropriateness of fiscal policy becomes unquestionable by considering its use as a way to protect the robustness of the financial system in ‘unstable’ economies against financial crises, debt deflations and deep depression (Arestis and De Antoni, 2007). In other words, fiscal policy seems to be the only way for affecting real economic magnitudes through its impact on income distribution (Kalecki’s microeconomic theory) and economic growth levels (Kalecki’s macroeconomy theory). What is only required in order for financial economies to be positively affected by fiscal policies is the consistency of their forms with actual conditions so as the relation between governmental and private sector to be in balance. Besides a globalized unstable financial environment where the production process is usually characterized by the coexistence of excess capacity with persistent unemployment and underemployment levels, any doubt about the need to face macroeconomic problems is casted down.

Bearing in mind all these, we develop a closed economy macroeconomic models into which three income classes-capitalists, workers and rentiers- determine economic activity in the presence of government intervention through progressive income taxation. Given the differences in saving, investment and consumption propensities of each of the employed income classes, we examine the way that economic activity -reflected upon capital accumulation and employment- is finally affected by

⁷This approach raises the issue of deficit sustainability which is not considered to be significant in this analysis. More information about it is provided in Arestis and Sawyer (2006)

⁸Opposing to this suggestion, Kalecki (1937b) in his study assumed a balance budget economy, whereas Keynes (1936) focused on long run balanced budgets in the sense this could provide economies against recessions (Brown- Collier and Collier, 1995).

⁹The duration of fiscal deficits is related with the degree of economy’s sustainability, which should be considered on purpose in order the effects of public expenditure to be incurred (Lamarie and Mair, 2003a, 2003b; Arestis and Sawyer, 2006).

external finance when government intervenes. By using the Post Keynesian growth models of Lavoie (1995) and Hein (2006, 2007) as a methodological guide and the implications of Kalecki (1937b), Asiminakopoulos and Burbidge (1974); Damaria and Mair (1992) and Blecker (2002), the remainder of this paper is organized as follows: Section 2 presents the basic equations and the development of a Post Keynesian-Kaleckian three-income class theoretical model. In a sequence, Sections 3 and 4 present the short and long run equilibrium analysis respectively, while Sections 5 and 6 discuss the way economic activity is behaved in the view of external finance and progressive income taxation. Finally Section 7 summarizes and concludes.

2. The structure of the model¹⁰

We assume a closed economy, which consists of capitalists; workers and rentiers, while government intervenes through progressive income taxation and a constant level of government expenditures¹¹. By using capitalists' labour and capital, only one type of commodity is produced that can be used for both investment and consumption purposes. The production process is assumed to take place given both technological and production conditions, while the constancy of the relations between employed volumes of labour (L) with real output level (Y) and the volumes of capital (K) with real output (Y), is also assumed. For simplicity reasons we also assume the absence of any overhead labour as well as any capital depreciation and technological change. Moreover, the labour coefficient (a) that is defined by the ratio of the level of employment (L) to real output (Y) and the labour productivity (λ), which equals to the ratio of real output (Y) to the level of employment (L) are hypothesized to be constant.

Considering the Kaleckian tradition into which our model falls, we assume that economy operates at conditions of excess capacity ($cu < 1$)¹² alongside with excess labour supply. So, the production process takes place subject to constant (approximate) average direct costs that constrain any possible future capacity expansion from being followed by costs and presumably price increases (Arestis and Sawyer, 2003). In addition we assume that the absence of any automatic mechanism to ensure the sufficient

¹⁰The structure of our model is a variation and extension of the models developed by Kalecki (1937b), Asiminakopoulos and Burbidge (1974); Damaria and Mair (1992) and Blecker (2002), while the methodological analysis is in accordance with Lavoie (1995) and Hein (2006b).

¹¹We concentrate our attention on income taxation policies, since the degree of their progressivity or regressivity in conjunction with the appropriate treatment of tax revenues create a chain of income expenditures by changing the expenditure and saving propensities of each income class (Blecker, 2002). In addition, the structure, the level and the direction of external finance, government expenditures as well as whether prices respond to tax or not, can enhance economic stabilization on grounds of equity and income distribution (Sawyer, 2007a, 2007b; Mott and Slattery, 1994).

¹²Capacity utilization is given by the ratio of actual to potential output level (Y / Y^*) that reflects the true utilization rate and the inverse ratio of potential output to capital stock (Y^* / K) that is defined as $1 / v$. Provided the absence of any change in technology, we can exclude the latter term without the outcome to be affected (Blecker, 2002).

level of aggregate demand to underpin a high level of economic activity is represented by imbalanced but not continuous deficits, without any debt to be carried from the past¹³. Since thereby economy is characterized by budget deficits, fiscal policy has an active role.

Considering that capitalist economies operate in an imperfect competitive environment, prices are set by a mark-up¹⁴; its level aims at covering all the average direct (labour and raw materials) costs that capitalists face so as their targeted profits to be achieved and their relative strength among income classes to be assured¹⁵ (e.g. Sen and Dutt, 1995; Blecker, 2002; Mott, 2002; Hein, 2006, 2007). By subtracting from raw materials we assume that capitalists set their prices (p) as a mark-up ($m > 1$) over the labour costs (aw); w denotes the nominal wage rate that workers receive:

$$(1) \quad p = \phi aw$$

For the purpose of our analysis we assume that the mark-up price is both interest- and tax- inelastic. An interest-inelastic mark up suggests the incapability of: (a) interest rate variations to influence mark-up; (b) the endogenous long run debt-to-capital ratio variations to affect either interest rates or mark-up level itself; hence income is redistributed between rentiers and capitalists through changes in debt-to-capital ratio and not through interest rate variations. On the other side, a tax-inelastic mark up prevents capitalists from passing the cost of income taxation on prices, since in accordance with Kalecki's theory (1937b) taxation on capitalists' profits is faced as a part of gross profits and not as a prime cost that prevents capitalists from maximizing their after tax profits. As a result, capitalists' decisions are to be made with respect to their after tax liquidity preferences¹⁶ (Lamarie, 1991). Clearly, Kalecki's theory about the degree of monopoly occupies a crucial role in his taxation theory because of the interdependence between distribution of national income among income classes and the determination of employment levels¹⁷.

From equation (1) the profit share of value added (h) is defined as:

¹³Continuous budget deficits that rise the level of debt imply government's borrowing to in order to pay back interest payments (Sawyer, 2012).

¹⁴The way the mark-up price is defined, reveals the independency between its level and those of investment, output and employment so as the constancy of income profit shares, in cases of drastic changes in economic conditions, to be assured. Consequently, shifts in income distribution and output are likely to be triggered as a response to changes in investment level (see Crotty, 1986).

¹⁵Although mark-up is assumed to be constant up to full utilization capacity output, Arestis (2005) suggests that its levels can be shifted due to changes in: the substitution effect of price changes; the market entry effects; the threat of administrative price controls and the strength of unions in their attempt to respond to price changes by increasing their nominal wages.

¹⁶According to Kalecki (1937b) there is no change in liquidity preferences so as a possible upward change in income tax to be accommodated by increases in the level of interest rates, since otherwise the net reward of lending would be dismissed.

¹⁷This is an issue that was never appreciated by Keynes adequately. For that reason, Kalecki's taxation approach is believed to be more preferable relative to that of Keynes (Lamarie and Mair, 1996).

$$(2) h = (p - aw) / p = 1 - 1/\phi = (\phi - 1) / \phi$$

In a sequence, the profit rate (r) is defined as the ratio of aggregate profit $((p - aw)Y)$ to capital stock (K) that in turn is determined by the profit share and the endogenously determined rate of capacity utilization:

$$(3) r = (p - aw)Y / K = [(\phi - 1) / \phi] cu = hcu, \quad cu < 1$$

Assuming that capitalists materialize their investment plans by hiring employees and making loans financed by rentiers¹⁸, their retained profits (Π^c) are defined as the difference between capitalists' aggregate profit $((p - aw)Y)$, workers' money income ($\Pi^w = wL$) that comes from their participation in the production process and rentiers' income ($\Pi^r = iD$) that is reflected on the interest payments; i denotes the long term exogenously given interest rate and D capitalists' debt¹⁹:

$$(4) \Pi^c = (p - aw)Y - wL - iD$$

As long as the mark-up indicates that a part of 'income pie' belongs to rentiers, the behaviour of interest rate affects both profit shares (directly) and profit rates (indirectly). Besides, according to the 'horizontalist' view, interest rate is assumed to be controlled by monetary authorities, while its level to be treated as an exogenous variable for production and accumulation. In a sequence, the quantities of credit and money are being treated as endogenous variables for production and accumulation determined by the accumulation process²⁰. Besides, the assumption of exogenously determined interest rate that allows monetary authorities (central banks) to behave as monopoly suppliers of legal tender is followed by a number of important macro analytical and policy implications; a higher exogenous interest rate induces a lower overall propensity to save that may imply higher profit and output growth rates (see Dutt and Amadeo, 1991). Following then Hein (2006, 2007) and Hein and Vogel (2007), we assume that central banks make their policy decisions with respect to the equality of real interest rate to its nominal level corrected by the inflation rate; thus, no feedback effects arise from capital accumulation process on interest rate, while the magnitude of real interest rate corresponds to different monetary regimes.

¹⁸Although in practice except borrowing, alternative sources of finance are usually considered to be: retained profits, bank borrowing and the creation of new shares and bonds, this study concentrates on the two initial sources of finance.

¹⁹For simplicity we assume that money wage and interest payment are the only income sources for workers and rentiers respectively.

²⁰See also Lavoie (1992, 1996) and Moore (1989).

Equation (5) reveals that employment rate (E) is directly determined by the product of labour coefficient (a) times capacity utilization (cu) times capital stock (K):

$$(5) E = acuK$$

Respectively the unemployment level is represented by the equality $U = (L_f - L)/L_f$, with L_f the full employment level and U the unemployment level. The definition of employment and unemployment levels is helpful not only in determining their equilibrium, but also in affecting labour unions' (workers) power in the labour market and the targeting level of nominal wages during the bargaining process.

The effects of monetary factors, government intervention and retained earnings on growth and distribution are reflected on the forms of investment and savings functions. More specifically, the accumulation process is assumed to be independently determined by savings since they precede income, but fundamentally contingent upon capitalists' investment decisions (Kalecki, 1937a). The presence of rentiers in production process signifies that investment is financed partially by capitalists' retained earnings and partially by external loans²¹; this is simply Kalecki's '*principle of increasing risk*'²². Thus investment is defined as a function of both past realized profits (internal savings) and changes in factors that influence the rate of profit, whereas monetary factors are reflected on interest rates and debt-to-capital ratio, affect negatively capitalists' profit rate and their internal funds²³.

Following then Kalecki's (1954) suggestions and the relevant Post Keynesian literature (see Bhaduri and Marglin, 1990, 1991; Rowthorn, 1981; Taylor, 1985; Dutt, 1984; 1987; Blecker, 2002), and considering the presence of income taxation, capital accumulation process ($g_i = I/K$) that is the ratio of aggregate investment to capital stock, is defined as a positive function of: a) the degree of capitalists' confidence to accumulate relative to the general economic conditions (b_0); b) the weight of internal funds (b_1) that are affected by after-tax income distribution and monetary variables; c) the degree of influence on investment from changes in the demand side of the economy (b_2)²⁴:

$$(6) g_i = b_0 + b_1(1 - t_c)(hcu - id) + b_2cu, \text{ where } b_i > 0, i = 0,1,2 \text{ and } cu < 1$$

²¹For simplicity we do not distinguish explicitly between creditors receiving interest income and shareholders receiving dividend income.

²²See Kalecki (1937a), Lavoie (1992), Mott (2002) and Dutt (1984, 1992).

²³Fazzari and Mott (1986) provide evidence about the impact of retained earnings on investment function. In Mott's (1989) view, the creation of debt to savers' claim is attributed to part of total profits, though it is not presumed the direct relation between the flow of savings and the level of debt or about the way that savings can affect interest rates.

²⁴The positive impact of capacity utilization on investment can be seen as a strong accelerator condition since it is the depressed effect of the reduction in utilization that dominates the stimulating effects of a rise in the profit share (Blecker, 2002; Bhaduri and Marglin, 1990).

As for the saving function, this is set in accordance with Kalecki's (1937a) argument that '*the capitalists get what they spend, the workers spend what they get*'. Provided that workers have a zero propensity to save out of their after-tax wages ($s_w = 0$), while both capitalists and rentiers have a positive propensity to save (s_c, s_r respectively) out of their after-tax incomes, the realized after-tax savings process that is the ratio of aggregate savings to capital stock ($g^s = S/K$) equals:

$$(7) \quad g_s = s_c(1-t_c)(hcu - id) + s_r(1-t_r)id$$

In order equilibrium to be determined, equations about government action should be introduced. For that reason, we consider that progressive income taxation is translated into the lowest possible level of tax on workers' income (t_w)²⁵ relative to that of capitalists (t_c) and rentiers (t_r), whereas the direction of inequality between capitalists and rentiers' level of income taxation is determined by the actual economic conditions and adopted policy targets. Since our intention is to 'release' the environment wherein accumulation and economic activity are materialized from external finance, it seems convenient to squeeze the role of rentiers down. For that reason, we levy rentiers' higher income tax relative to that of capitalists' ($t_r > t_c$). Besides, a progressive tax system can be treated as an automatic stabilizer in the sense that would redistribute income at the expense of richer income classes (Sawyer, 2011). Under these assumptions, the accumulation of realized income taxation receipts as a ratio to capital stock ($g_t = T/K$) is defined as the sum of revenue taxation on the income of each participant in the production process:

$$(8) \quad g_t = t_c(hcu - id) + t_r id + t_w wl^{26}$$

Finally, government expenditures are set in accordance with Blecker (2002), who assumes their constancy at a specific level. So, the accumulation of realized governmental expenditures ($g_g = G/K$) that is the ratio of government expenditures to capital stock is equal to:

$$(9) \quad g_g = c_g$$

²⁵Since workers are assumed to spend the whole of their income, it is suggested that income taxation triggers their consumption decisions directly.

²⁶The form of taxation function is determined by taking into account the corporate income tax that is fully integrated into the personal income tax revenue. However, we could determine the level of taxation revenue by following explicitly Asimakopoulou and Burdridge (1974), who embody the "double taxation" of income. In this case the form of equation (29) would be $T/K = t_c(hcu - id) + t_r(1 - t_c)id + t_w(wl)$ where rentiers' income double taxed is explained by the fact that their income profits comprise a part of capitalists' incomes.

Regarding the well known Keynesian investment-savings macroeconomic equilibrium and the fact that government intervenes, the short run equilibrium is achieved by the equality between the sum of private savings (g_s) and net taxation revenues (g_t) with that of private investment (g_i) and government purchases (g_g). In this case any shift (upward/downward) in savings must be accompanied by the appropriate shift (upward/downward) in investment level so as the equilibrium to be appropriately determined (fiscal deficit/surplus). The short run macroeconomic equilibrium identity is defined by considering the ratios of each magnitude to capital stock and is obtained by:

$$(10) \quad g_i + g_g = g_s + g_t$$

Regardless of whether economy is characterized by balanced budgets or not²⁷, the final effects of government intervention on macroeconomic magnitudes are determined by the way that each income class responds to shifts in taxation structure and the formation of government expenditures. Needless to say that, changes in the structure of taxes or their introduction once and for all cannot easily be achieved. In addition, any possible shift in structure of taxes should not be in favour or against employment or profits incomes so as to prevent any possibility of burdening the problem of unemployment, income distribution and economic expansion²⁸.

3. Short Run Equilibrium

The short run equilibrium indicates the appropriate adjustment of capacity utilization to the demand level of the goods market, under given capital and debt stocks. By substituting equations (6), (7) and (8), (9) into equation (10), the equilibrium values of capacity utilization, capital accumulation and employment are respectively:

$$(11) \quad cu^* = \frac{b_0 + c_g - t_w \Pi^w + id[(s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)]}{(h((s_c - b_1)(1 - t_c) + t_c) - b_2)}$$

$$(12) \quad g_i^* = b_0 + (b_1(1 - t_c)h + b_2) \frac{b_0 + c_g - t_w wL + id[(s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)]}{(h((s_c - b_1)(1 - t_c) + t_c) - b_2)} - idb_1(1 - t_c)$$

$$(13) \quad E^* = aK \frac{b_0 + c_g - t_w \Pi^w + id[(s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)]}{(h((s_c - b_1)(1 - t_c) + t_c) - b_2)}$$

²⁷Contrary to neoclassical approach wherein investment is stimulated by reducing marginal costs (user costs), in post Keynesian-Kaleckian framework- given the possible technical and technological changes- the way that the structure of taxation affects average incomes and investment is significant (Mair and Lamarie, 2003a, 2003b).

²⁸ See Appendix A for the analysis without the presence of government intervention.

Considering the short-run equilibrium value of capacity utilization, stability arises when the denominator is positively signed i.e $h((s_c - b_1)(1 - t_c) + t_c) - b_2 > 0$, which implicitly requires b_1, b_2 to be relative inelastic. In other words, the short run stability requires the induced increase in after-tax investment to be less than the induced increase in after-tax savings as capacity utilization level increases. Alternatively capitalists' internal funds should be restricted in order the goods market to be cleared. In addition, the numeration of expression (11) is needed to be positive in order the positive equilibrium value of capacity utilization to be ensured.

We now continue our analysis to the examination of the responses of the short run equilibrium values of each variable to a possible change in rentiers' income (id):

$$(14) \quad \partial cu^* / \partial id = \frac{(s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)}{(h((s_c - b_1)(1 - t_c) + t_c) - b_2)}$$

$$(15) \quad \partial g_i^* / \partial id = (b_1(1 - t_c)h + b_2) \frac{(s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)}{(h((s_c - b_1)(1 - t_c) + t_c) - b_2)} - b_1(1 - t_c)$$

$$(16) \quad \partial E^* / \partial id = aK \frac{(s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)}{(h((s_c - b_1)(1 - t_c) + t_c) - b_2)}$$

Also, provided the short run constancy of debt-to-capital ratio ($d = \bar{d} > 0$), we calculate the reaction of each of these variables to a shift in interest rate (i):

$$(17) \quad \partial cu^* / \partial i = \frac{d[(s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)]}{(h((s_c - b_1)(1 - t_c) + t_c) - b_2)}$$

$$(18) \quad \partial g_i^* / \partial i = \frac{d(b_2(s_c(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)) - b_1 h((1 - t_c)(t_r + s_r(1 - t_r))))}{(h((s_c - b_1)(1 - t_c) + t_c) - b_2)}$$

$$(19) \quad \partial E^* / \partial i = aK \frac{d((s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_v))}{(h((s_c - b_1)(1 - t_c) + t_c) - b_2)}$$

It is obvious that each of the above responses either to rentiers' income or interest variations are determined by: a) the relative relations between capitalists' and rentiers' propensities to save out of their after tax incomes and b) the weight of internal funds (b_1) that captures the distributional effect of external finance relative to the level of capitalists' after tax savings propensity (s_c). Given interest-

inelasticity of the mark-up, the level of debt-to-capital ratio affects only the extent of change; the lower its level, the smaller the effects from interest rate changes. But significant is the way that each income class adjusts its decisions to income tax.

Considering that both capitalists' and rentiers' saving propensities with respect to their after tax income are positive but lower than unity ($0 < s_c, s_r < 1$), when capitalists are characterized by higher after-tax propensity to save relative to that of rentiers ($s_c(1-t_c)+t_c > s_r(1-t_r)+t_r$); investment is negligibly affected by the distributional effect of external finance (b_1 relatively inelastic) and its value is relative low with respect to capitalists' propensity ($s_c - b_1 > 0$), higher interest rates affect capacity utilization and growth levels positively²⁹. This is defined by Lavoie (1995) as '*puzzling case*'³⁰. On the other hand, for the case where capitalists have a lower after-tax saving propensity comparable to that of rentiers ($s_c(1-t_c)+t_c < s_r(1-t_r)+t_r$) while simultaneously both the level of debt and the elasticity of investment with respect to internal funds are relative high (b_1 relative elastic), higher real interest rates affect the levels of capacity utilization, growth and so forth negatively. These conditions reflect the short run '*normal case*'.

In a sequence, we attempt to determine the finance growth regime that characterizes economy by estimating the partial derivatives of each of the short run equilibrium values with respect to debt-to-capital ratio(d):

$$(20) \quad \partial cu^* / \partial d = \frac{h[(s_c - b_1)(1-t_c) - s_r(1-t_r) - (t_r - t_c)]}{(h((s_c - b_1)(1-t_c) + t_c) - b_2)}$$

$$(21) \quad \partial g_i^* / \partial d = \frac{h[(s_c - b_1)(1-t_c) - s_r(1-t_r) - (t_r - t_c)] - h(b_1(1-t_c)(h((s_c - b_1)(1-t_c) + t_c)) - b_2)}{(h((s_c - b_1)(1-t_c) + t_c) - b_2)}$$

$$(22) \quad \partial E^* / \partial d = aK \frac{h[(s_c - b_1)(1-t_c) - s_r(1-t_r) - (t_r - t_c)]}{(h((s_c - b_1)(1-t_c) + t_c) - b_2)}$$

Undoubtedly even the determination of finance growth regime is determined by the relation between saving propensities of rentiers and capitalists as well as the elasticity of the parameter of internal funds. Hence, considering the response of short run capacity utilization to a change in the debt-to-capital ratio

²⁹Contrary to the general argument about the inflationary pressures stemming from high accumulation levels, in Kaleckian grounds higher growth rates are possible to diminish inflationary pressures (Dutt, 1992).

³⁰In practice the puzzling case is less likely to occur, since it requires a relative high negatively signed b_1 coefficient that suggests negative impacts from profitability on investment. Beyond that, it also requires capitalists to take their investment decisions by considering negative profitability.

(eq. (20)), it is implied that for the case where interest rates affect positively capacity utilization or when the short run *puzzling case* conditions stand, the *debt-led capacity utilization regime* is established; this is because increases in the debt-to-capital ratio and interest payments push upward consumption demand by increasing interest payments to households. On the other side, when interest rate changes affect negatively economic activity during the short run, i.e. *normal case* arises, economy is characterized by *debt-burdened capacity utilization regime*, since increases in the interest rate and debt-to-capital ratio restrains investment demand (Fujita and Sasaki, 2011; Nishi, 2011). Further, after examining equations (21) and (22) and that $h((s_c - b_1)(1 - t_c) + t_c) - b_2 > 0$, the behaviour of economic growth as represented by capital accumulation and employment rates is in tune with the capacity utilization finance regime.

Notwithstanding, in an imperfect competitive environment that operates under excess capacity conditions, shifts in consumption and investment affect economic activity and hence capitalists' and workers' priorities and decisions inversely. Thus aggregate demand can be expanded either through private consumption that requires relatively high levels of wages or through private investment, the stimulation of which at high levels requires the 'strong' response of investment towards upward profit shifts. Both of these magnitudes are closely related with workers' and capitalists' income shares or rates (wage and profit respectively)³¹. The distinction between wage and profit-led regimes allows for the characterization of economies as stagnationist or exhilarationist (Bhaduri and Marglin, 1991). More precisely, an economy can be characterized as an exhilarationist when higher profit mark up or profit share stimulate both aggregate demand and capacity utilization at relatively high levels. In other words, exhilarationism occurs when there is a strongly positive response of investment demand to profit rates³². On the other hand, an economy is characterized as stagnationist when higher real wages are followed by capacity utilization and employment expansion, whereas consumption and profit levels are simultaneously reduced; besides, a profit squeeze that results from higher real wages is the essence of an underconsumptionist regime.

³¹Although wages are treated as a production cost, the case of wage-led economies reflects a main source of economic activity expansion since if demand is high enough, the capacity utilization level will be high enough to cover the needs of both workers and capitalists. In addition, if the behaviour of demand is parallel with that of capacity utilization, as it is usually assumed, there will be a greater demand expansion and thus a higher profit rate but lower profit shares and a space for wage increases and economic expansion through consumption (Bhaduri and Marglin, 1990).

³²In the case of open economies, exhilarationism regime is attributed to international price competition as long as a wage reduction redistributes income towards profits and improves the degree of external competitiveness. Hence, if the resulting positive effect on the trade balance is large enough, it is possible for aggregate demand and economic growth to be increased, even if domestic expenditures are depressed (Blecker, 1989; Bhaduri and Marglin, 1990).

Bearing in mind all these, the distribution-growth regime derives by estimating the effects from a change in the profit share on the demand, growth and employment levels. Thus by differentiating equations (11)-(13) with respect to the profit share (h), it yields that:

$$(23) \quad \partial cu^* / \partial h = -\frac{1}{(h((s_c - b_1)(1 - t_c) + t_c) - b_2)^2} \left[((s_c - b_1)(1 - t_c) + t_c)(b_0 + c_g - t_w \Pi^w) + \right. \\ \left. id((s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)) \right]$$

$$(24) \quad \frac{\partial g_i^*}{\partial h} = \frac{1}{(h((s_c - b_1)(1 - t_c) + t_c) - b_2)^2} \left\{ \begin{aligned} & \left[(h((s_c - b_1)(1 - t_c) - b_1)) \left[\begin{aligned} & \left(b_0((s_c - b_1)(1 - t_c) + t_c) + (b_1(1 - t_c))(b_0 + c_g - t_w \Pi^w + id((s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c))) \right) \right. \\ & \left. - id b_1(1 - t_c)((s_c - b_1)(1 - t_c) + t_c) \right] \right] \end{aligned} \right\} \\ & \left[- \left[((s_c - b_1)(1 - t_c) + t_c) \left(\begin{aligned} & (b_0(h((s_c - b_1)(1 - t_c) + t_c) - b_2)) - (b_1(1 - t_c)h + b_2)(b_0 + c_g - t_w \Pi^w) + id((s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)) \right) \right. \\ & \left. - id b_1(1 - t_c)(h((s_c - b_1)(1 - t_c) + t_c) - b_2) \right] \right] \end{aligned} \right\}$$

$$(25) \quad \partial E^* / \partial h = -aK \frac{id((s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c))(h((s_c - b_1)(1 - t_c) + t_c) - b_2)}{(h((s_c - b_1)(1 - t_c) + t_c) - b_2)^2}$$

Expression (23) figures out that the stagnationist regime stands when b_0, b_1, b_2 take sufficiently high values while capitalists have lower saving propensity relative to that of rentiers, whereas unless capitalists savings propensity is relatively high relative to rentiers, i.e. $(s_c - b_1)(1 - t_c) + t_c > s_r(1 - t_r) + t_r$ and the value of b_1 is relative low the exhilarationist demand regime is established. As for the way that a change in profit share influences capital accumulation, this is determined by the relations into the bracket and the interrelations among the coefficients, taken as granted that $(h((s_c - b_1)(1 - t_c) + t_c) - b_2) > 0$ and $((s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)) > 0$. Equations (24) and (25) reveal that stagnationist regime tends to appear if debt-led capacity utilization regime stands, while exhilarationist if capacity utilization is of debt-burdened regime.

Apparently, the degree of external finance and economy's sensitivity to financial fragility depend on the level of capacity utilization used for investment and capitalists' internal funds that are determined after having paid income taxation. In general the effects from the introduction of monetary factors depend on the response of aggregate demand to changes in profit share, as well as on whether investment, consumption and saving decisions respond strongly or not to shifts in profit shares. It is worth indicating the indirect impact from interest rate shifts on equilibrium capacity levels and in turn on capital accumulation and employment³³. Besides at Kaleckian models, different regimes of

³³Epstein (2002) suggests three general alternative regimes deriving from interest rate shifts: the one that concentrates on interest rates effects on capitalists and rentiers and is opposed to workers; the one where the labour class would split

accumulation range from the usually expected adverse effects of interest rate variations on capacity utilization, capital accumulation and employment to positive effects throughout the equilibrium values of the system (e.g. Lavoie, 1992, 1995; Hein, 1999; Hein and Oschen, 2003). Hence there is no general valid statement about the consequences that interest rates changes may have on the magnitudes in question.

In all these, significant is the way that government intervenes, the structure of this intervention as well as the targets that are intended to be achieved. Significant it is then, the role of income taxation in determining marginal propensities to save and spend out of wages (workers) and profits (capitalists and rentiers) as well as of the possible equality or inequality between the levels of government expenditures and tax receipts. In other words, the level of balanced or imbalanced fiscal budgets as well as the degree at which each income class decides to take advantage from income distribution through government intervention determines employment essentially. Nevertheless the final outcomes also depend on the way that tax recipients are decided to be used, the levels of adopted targets about employment and capital accumulation as well as the sensitivity of economy on external finance³⁴. Since economy is assumed to be path dependent, governmental expenditures through taxation revenue are coincided with a rise in output and therefore employment levels with respect to the new after tax incomes. In any case, the interaction of the way that each income class adjusts its propensities and priorities to after tax incomes represents the structure of economic process.

However, the fact that workers' incomes remain almost ineffective creates the appropriate conditions for expanding aggregate demand. Besides, in Kalecki's (1937b) view, income redistribution via wage earning taxation within wage earning class would not be very interesting; whereas taxing wages for redistributing towards profit earners could be analyzed simply by introducing a tax below zero. Alternatively, the sustainability of economic activity cannot be reached only by improving the deterioration of capitalists and rentiers' income taxation conditions, precisely because of its dependence on the degree of government intervention and the level of each income class savings and investing propensities with respect to their after tax incomes (wages and profits). However, high levels of profit taxes can retard investment and in turn the whole economic expansion of most of financed constrained capitalist economies. Moreover by assuming that capitalists are usually characterized by high debt-to-capital ratios and low profit levels, a shift in the structure of income taxation is possible to be followed

against a united front of rentiers and entrepreneurs and finally the one into which capitalists and workers collude against rentiers. For each of these regimes the effects of interest rate changes on accumulation process, capacity utilization and employment differ since are depended upon specific assumptions about the relative coefficients in investment and savings functions and therefore on the effects stemming from shifts in income distribution.

³⁴According to Kalecki (1937b) the analysis becomes more interesting by introducing consumption and capital taxation, in the sense that capital tax is not a production cost.

by new investment attempts without the necessity for new government packages in favour of economic expansion. Besides a shift in taxation structure can be helpful for economic activity, as long as it is neither aggressive nor permanent; otherwise the results that come up are opposed to the expected.

Ultimately, what happens along any particular adjustment path during the short run cannot affect the long run levels of investment, output and employment growth. The final outcome from governmental intervention on economic activity cannot be reflected on a single period analysis, but requires the consideration of each income class expectations about future taxation.

4. Long Run Equilibrium

One of the fundamental assumptions upon which the short run Post Keynesian-Kaleckian analysis rests, suggests the constancy of capital stock ($K = \bar{K} > 0$) and debt-to-capital ratio ($d = \bar{d} > 0$); assumptions that shall be relaxed when we proceed in the long run analysis. Thus in the long run period capital stock varies, while the endogenously determined debt-to-capital ratio affects capacity utilization, capital accumulation and employment levels.

By assuming away any inflation and thereby any possibility for the price level to change, even if mark-up changes and then the debt-to-capital ratio to be affected by mark-up shifts, the capital ratio is determined by the difference between the growth rate of the debt level (\hat{D}) and the growth rate of capital stock (\hat{K}) that is equal to g_i^* given in equation (12):

$$(26) \hat{d} = \hat{D} - \hat{K} = \hat{D} - g_i^*$$

Given the short run analysis assumptions, the additional amount of financing investment is granted in each period by rentiers' after-tax savings (ΔD) without this being a precondition for credit and investment. Both rentiers' savings and capitalists' retained profits arise from latter investment plans that are initially financed by short term credit (Lavoie, 1992; Hein, 2007). Thus in each period the additional credit granted are given as:

$$(27) \Delta D = (1 - t_r) s_r i D$$

Consequently the growth rate of debt is the ratio of additional long run credit granted in each period (ΔD) to the level of debt (D):

$$(28) \hat{D} = \frac{\Delta D}{D} = \frac{s_r i (1 - t_r) D}{D} = s_r i (1 - t_r)$$

After integrating the required condition of debt-to-capital ratio constancy, i.e. $\hat{d} = 0$, and substituting equations (12) and (28) into (26), the long run equilibrium level of the endogenous debt-to-capital ratio equals:

$$(29) \quad d^* = \frac{s_r i (1-t_r) (h((1-t_c)(s_c-b_1)+t_c)-b_2) - b_0 h(s_c(1-t_c)+t_c) - (c_g - t_w \Pi^w) (b_1(1-t_c)h + b_2)}{i [b_2(s_c(1-t_c) - s_r(1-t_r) - (t_r - t_c)) - b_1 h(1-t_c)((1-t_r)s_r + t_r)]}$$

while the growth rate of debt-to-capital ratio is equivalently:

$$(30) \quad \hat{d} = \frac{s_r i (1-t_r) (h((1-t_c)(s_c-b_1)+t_c)-b_2) - b_0 h(s_c(1-t_c)+t_c) - (c_g - t_w \Pi^w) (b_1(1-t_c)h + b_2)}{[h((1-t_c)(s_c-b_1)+t_c) - b_2]} - \frac{id [b_2(s_c(1-t_c) - s_r(1-t_r) - (t_r - t_c)) - b_1 h(1-t_c)((1-t_r)s_r + t_r)]}{[h((1-t_c)(s_c-b_1)+t_c) - b_2]}$$

Following Lavoie (1995), the long run equilibrium stability is ensured by the negative response of growth rate of debt-to-capital ratio to changes in long run debt-to-capital ratio, i.e. $(\partial \hat{d} / \partial d < 0)$:

$$(31) \quad \partial \hat{d} / \partial d = - \frac{i [b_2(s_c(1-t_c) - s_r(1-t_r) - (t_r - t_c)) - b_1 h((1-t_c)(t_r + (1-t_r)s_r))]}{[h((1-t_c)(s_c-b_1)+t_c) - b_2]}$$

Given the short-run stability conditions, the hypothesized economy during the long run tends towards stability when capitalists' propensity to save out of their after tax income is higher than that of rentiers, $((1-t_c)s_c > (1-t_r)s_r)$, while investment decisions are very elastic with respect to capacity utilization changes (high values of b_2) but inelastic with respect to debt shifts (low values of b_1). It is simply implied the consistency of *long run stability* with the *short run puzzling case* and indirectly with the dominance of *debt-led finance regime*.

On the contrary, when rentiers' after tax saving propensity rests at a higher level than that of capitalists' $((1-t_c)s_c < (1-t_r)s_r)$ and combined with relatively inelastic investment decisions with respect to demand (capacity utilization) changes (b_2 inelastic) but very elastic with respect to debt (b_1 elastic), economy tends to be characterized by instability conditions in the long run $(\partial \hat{d} / \partial d > 0)$. In this case, the numerator of equation (31) is required to be of negative sign, while it is suggested the correspondence of *long run instability* to *short run normal case* and thereby with debt-burdened finance regime³⁵.

³⁵In this case possible deviations from equilibrium generate a long run debt-to-capital ratio of either unity or zero.

What becomes essential when the debt-to-capital ratio is endogenized is the way it reacts to interest rate changes:

$$(32) \quad \frac{\partial d^*}{\partial i} = \frac{1}{i} \left[\frac{s_r(1-t_r)(h((1-t_c)(s_c-b_1)+t_c)-b_2)}{[b_2(s_c(1-t_c)-s_r(1-t_r)-(t_r-t_c))-b_1h((1-t_c)(t_r+(1-t_r)s_r))]} - d \right]$$

Given the assumption about an interest-inelastic mark-up, income is redistributed between rentiers and capitalists through changes in debt-to-capital ratio and not through interest rate variations. Moreover, the debt-to-capital ratio turns to affect only the extent of changes in the equilibrium and not the direction. As a result, the effects of interest rate changes on debt-to-capital ratio and income distribution (indirectly) are determined by the initial value of debt-to-capital ratio. For that reason we distinguish the following cases:

Firstly, when the initial equilibrium level of debt-to-capital ratio is relatively high, upward interest rates shifts reduce the long run debt-to-capital ratio; economic expansion may follow:

$$(33) \quad \text{If } d^* > \frac{s_r(1-t_r)(h((1-t_c)(s_c-b_1)+t_c)-b_2)}{[b_2(s_c(1-t_c)-s_r(1-t_r)-(t_r-t_c))-b_1h((1-t_c)(t_r+(1-t_r)s_r))]}, \text{ then } \frac{\partial d}{\partial i} < 0$$

On the contrary interest rate increases affect the debt-to-capital ratio positively, when the initial equilibrium level of debt-to-capital ratio is relatively low; any possibility for economic expansion is cancelled out:

$$(34) \quad \text{If } d^* < \frac{s_r(1-t_r)(h((1-t_c)(s_c-b_1)+t_c)-b_2)}{[b_2(s_c(1-t_c)-s_r(1-t_r)-(t_r-t_c))-b_1h((1-t_c)(t_r+(1-t_r)s_r))]}, \text{ then } \frac{\partial d}{\partial i} > 0$$

Finally when the long run debt-to-capital ratio rests on its initial equilibrium, interest rate increases have neutral effects on it; the general economic activity remains unaffected:

$$(35) \quad \text{if } d^* = \frac{s_r(1-t_r)(h((1-t_c)(s_c-b_1)+t_c)-b_2)}{[b_2(s_c(1-t_c)-s_r(1-t_r)-(t_r-t_c))-b_1h((1-t_c)(t_r+(1-t_r)s_r))]}, \text{ then } \frac{\partial d}{\partial i} = 0$$

However, when long run instability conditions stand, then an interest rate shift triggers the long run debt-to-capital ratio directly:

$$(36) \quad \frac{\partial d^*}{\partial i} = \frac{1}{i} \left[\frac{s_r(1-t_r)(h((1-t_c)(s_c-b_1)+t_c)-b_2)}{[b_2(s_c(1-t_c)-s_r(1-t_r)-(t_r-t_c))-b_1h((1-t_c)(t_r+(1-t_r)s_r))]} - d \right] < 0$$

The significance of all these is reflected on the fact that the response of the rest variables on interest rate changes will be contingent upon the reaction of the endogenized debt-to-capital ratio on interest rate shifts.

Before examining this, we should estimate the long run equilibrium value of employment that derives after substituting equation (12) in (5):

$$(5') \quad E = \frac{a}{[h((s_c - b_1)(1 - t_c) + t_c) - b_2]^2} \left[\begin{array}{l} (b_0 + c_g - t_w \Pi^w)(b_0 h(s_c(1 - t_c) + t_c) + (c_g - t_w \Pi^w)(h(1 - t_c)h + b_2)) \\ \left. \begin{array}{l} (b_0 + c_g - t_w \Pi^w)(b_2(s_c(1 - t_c) - s_r(1 - t_r) - (t_r - t_c))) - b_1 h((1 - t_c)(t_r + (1 - t_r)s_r)) \\ (b_0 h(s_c(1 - t_c) + t_c) + (c_g - t_w \Pi^w)(h(1 - t_c)h + b_2)) \\ ((s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)) \end{array} \right\} \\ + (id)^2 \left[\begin{array}{l} ((s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)) \\ (b_2(s_c(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)) - b_1 h((1 - t_c)(t_r + (1 - t_r)s_r))) \end{array} \right] \end{array} \right]$$

Considering now equations (11), (12) and (5') and given the stability conditions and the constancy of the endogenous debt-to-capital ratio ($d = \bar{d} > 0$), the response of each of them to interest rate changes yields:

$$(37) \quad \partial cu / \partial i = \frac{\left(d + i \frac{\partial d}{\partial i} \right) ((s_c - b_1)(1 - t_c) - s_r(1 - t_r) + (t_c - t_r))}{(h((s_c - b)(1 - t_c) + t_c) - b_2)}$$

$$(38) \quad \partial g_r / \partial i = \frac{\left(d + i \frac{\partial d}{\partial i} \right) [b_2(s_c(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)) - b_1 h((1 - t_c)(t_r + (1 - t_r)s_r))]}{(h((s_c - b_1)(1 - t_c) + t_c) - b_2)}$$

$$(39)$$

$$\partial E / \partial i = \frac{a \left(d + i \frac{\partial d}{\partial i} \right)}{(h((s_c - b_1) - t_c(s_c - b_1 - 1) - b_2))^2} \left[\begin{array}{l} \left[\left[(b_0 + c_g - t_w \Pi^w)(b_2(s_c(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)) - b_1 h((1 - t_c)(t_r + (1 - t_r)s_r)) \right] \right] \right\} \\ \left[\left[(b_0 h(s_c(1 - t_c) + t_c) + (c_g - t_w \Pi^w)(h(1 - t_c)h + b_2))((s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)) \right] \right] \right\} \\ + 2 \left[\left[(s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c) \right] [b_2(s_c(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)) - b_1 h((1 - t_c)(t_r + (1 - t_r)s_r))] \right] \right] \end{array} \right]$$

As for the reaction of each of the endogenously determined variables when the debt-to-capital ratio changes, given the constancy of the interest rate ($i = \bar{i} > 0$), this remains the same as in the short run analysis when we refer to capacity utilization and capital accumulation (eq. (17), (18)). But when we refer to the response of long run employment level, this yields that:

$$(40) \quad \frac{\partial E / \partial d}{[h((s_c - b_1)(1 - t_c) + t_c) - b_2]^2} = \frac{ai}{\left[\begin{array}{l} \left\{ \left((b_0 + c_g - t_w \Pi^w)(b_2(s_c(1 - t_c) - s_r(1 - t_r) - (t_r - t_c))) - b_1 h((1 - t_c)(t_r + (1 - t_r)s_r)) \right) \right. \right. \\ \left. \left. + (b_0 h(s_c(1 - t_c) + t_c) + (c_g - t_w \Pi^w)(b_1(1 - t_c)h + b_2)) \right. \right. \\ \left. \left. \left((s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c) \right) \right. \right. \\ \left. \left. + 2 \left[\begin{array}{l} ((s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)) \\ (b_2(s_c(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)) - b_1 h((1 - t_c)(t_r + (1 - t_r)s_r))) \end{array} \right] \right. \right. \end{array} \right]}$$

Obviously essential in determining the behaviour of economic activity is the role of: a) the parameters of the saving and the investment functions; b) the initial equilibrium conditions of debt-to-capital ratio and the level from which interest rates start to change (eq. (31)-(34)); c) whether economy is characterized by long run stable or instable conditions; d) the effect from income taxation on economic behaviour of each income class.

Insofar the introduction of progressive taxation affects negatively the available incomes of each income class and compels them to adjust their investment, savings and financing decisions.

5. Case Study: does economic growth exist?

Bearing in mind the above analysis, our main intention is to examine the short run and the long run behaviour of economic activity to interest rate changes as well as the role that income taxation may have.

Given the progressivity of income taxation ($t_r > t_c$) and the short run stability in goods market, long run stability conditions are transmitted into low rentiers' after tax saving propensity relative to that of capitalists, as well as elasticity of investment plans with respect to capacity utilization changes (high values of b_2) but inelasticity of these with respect to debt shifts (low values of b_1). These conditions indicate a sense of equitable after tax income distribution of financial wealth, since rentiers have relative low saving propensity, as well as the insurance about rentiers and capitalists' willingness to expand economic activity without facing constraints. In other words, though capacity has a defining role in determining investment decisions, the role of internal funds is inconsequent. On these grounds an upward shift in interest level during the short run, given the debt-to-capital level, would increase the rate of capital accumulation in the long run. Due to long run stability, the responses of debt-to-capital ratio and then of capital accumulation (eq. (38)) and employment (eq. (39)) to interest rate changes are to be determined with respect to the initial levels of debt-to-capital ratios (eq. (33)-(35)). Considering both the direct and indirect effects from interest rate changes, the level of accumulation will rise in the long run; this is to be attributed to the assumption that ensures the long run stability and requires the positive sign of the numerator in equation (29). As a result, the positive responses of capital accumulation and employment rate to debt-to-capital changes (eq. (28) and (13)) as well as to

interest rate shifts (eq. (38) and (39)) are ensured. Hence, when long run conditions cope with short run puzzling conditions, any upward shift in interest rates is accompanied with economic expansion.

Nevertheless in the real world, rentiers' behaviour makes the possibility for the dominance of instability during the long run, stronger. Such conditions appear when rentiers' after tax saving propensity is above to capitalists', while investment decisions are relative inelastic to capacity utilization changes but elastic to debt shifts. On these grounds, any increase in interest rates triggers debt-to-capital ratio downward (eq. (36)) and creates the appropriate conditions for economic expansion. But such long run instability ensures not only the dominance of financialisation but also the inequitable income distribution at the expense of production classes (capitalists and workers) in addition to constrains against economic activity by both rentiers and capitalist. In this case, internal funds but not capacity utilization affects investment expansion. So when interest rate increases in the short run, taking for granted the constancy of debt-to-capital ratio, the level of capital accumulation will be reduced. In a sequence, since instability characterizes the long run period, an increase in interest rate depletes the long run debt-to-capital equilibrium ratio and this raises the levels of both capital accumulation and employment during the long run. Hence, even when long run instability appears, economic activity still expands.

When long run instability conditions stand attention should be paid on the possibility monetary authorities to reduce real interest rates when the initial equilibrium value of debt-to-capital ratio is relatively high; such a decision represents an attempt to push the debt-to-capital ratio towards its equilibrium. Despite the shrunk of the debt-to-capital ratio, its incompatibility with economic expansion is possible because of the initially high level of debt-to-capital ratio. Clearly, such policy prepares economy for the co-existence of continuous capital accumulation deterioration and continuous increases in debt-to-capital ratio, at least until the level of debt-to-capital ratio equals to unity. This is what is defined by Lavoie (1995) and Hein (2006) as the "*paradox of debt*". In all these, it should be considered the possibility interest rate reductions to be adopted when debt-to-capital ratio is relatively high, while there are contemporaneous continuously increases in accumulation rate and declinations in debt-to-capital ratio. Besides, according to Lavoie (1992) a further interest rate reduction is possible since: "*there are no inexorable forces that propel up real interest rates whenever accumulation is speeded up*"³⁶ (pp.197-203). What is however questionable is whether the rising accumulation is associated with rising interest rates and therefore debt burden or not. In general, if long run equilibrium tends to be unstable, rising interest rates will always reduce the debt-to-capital ratio that is consistent with accumulation and employment expansion.

³⁶This suggestion rests on the causality running from investment savings as well as on money endogeneity.

Apparently economic growth depends not only on the rate of rentiers' savings propensity and the interaction among income classes, but also on the level and the structure of income taxation. Given the progressivity of income taxation in favor of economic expansion, after integrating equation (32) into (38) and (39), regardless of whether economy is characterized by stable or instable conditions in the long run, the responses of capital accumulation and employment to interest rate shifts are positive³⁷:

$$(41) \quad \frac{\partial g}{\partial i} = s_r(1-t_r) > 0$$

$$(42)$$

$$\frac{\partial L}{\partial i} = \frac{as_r}{(h((s_c - b_1) - t_c(s_c - b_1 - 1) - b_2))^2} \left[\begin{array}{l} \left[\left[(b_0 + c_g - t_w \Pi^w)(b_2(s_c(1-t_c) - s_r(1-t_r) - (t_r - t_c)) - b_1 h((1-t_c)(t_r + (1-t_c)s_r))) \right] \right. \\ \left. + \left[(b_0 s_c h(s_c(1-t_c) + t_c) + (c_g - t_w \Pi^w)(b_1(1-t_c)h + b_2))(s_c - b_1)(1-t_c) - s_r(1-t_r) - (t_r - t_c) \right] \right] \\ \left. + 2 \left[(s_c - b_1)(1-t_c) - s_r(1-t_r) - (t_r - t_c) \right] \left[b_2(s_c(1-t_c) - s_r(1-t_r) - (t_r - t_c)) - b_1 h((1-t_c)(t_r + (1-t_c)s_r)) \right] \right] \end{array} \right] > 0$$

What is of exceptional importance is the way that a possible change in the profit share would affect the endogenize equilibrium of debt-to-capital ratio and thereby the whole economic activity. This can be examined by estimating the partial derivative of the equilibrium level of debt-to-capital ratio with respect to profit shares:

$$(43)$$

$$\frac{\partial d^*}{\partial h} = \frac{1}{\left[(b_2(s_c(1-t_c) - s_r(1-t_r) - (t_r - t_c)) - b_1 h(1-t_c)(1-t_r)s_r) + t_r \right]^2} \left[\begin{array}{l} \left[(s_r h(1-t_r)((1-t_c)(s_c - b_1) + t_c) - b_0(s_c(1-t_c) + t_c)) \right. \\ \left. - (c_g - t_w \Pi^w)(b_1(1-t_c)) \right] \\ (h(b_2(s_c(1-t_c) - s_r(1-t_r) - (t_r - t_c)) - b_1 h(1-t_c)(1-t_r)s_r) + t_r) \\ - (b_1 h(1-t_c)(1-t_r)s_r) + t_r \left(\begin{array}{l} b_0 h(s_c(1-t_c) + t_c) - s_r h((1-t_c)(s_c - b_1) + t_c) - b_2 \\ + (c_g - t_w \Pi^w)(b_1(1-t_c)h + b_2) \end{array} \right) \end{array} \right]$$

By assuming that the short run equilibrium is dominated by the exhilarationist demand regime (i.e. $(s_c - b_1)(1-t_c) + t_c > s_r(1-t_r) + t_r$ and a relative low value for b_1), given the positive sign of denominator, the way that a shift in profit share will affect the endogenously long run debt-to-capital ratio is not clear; it is determined by the relations of variables within the brackets. For the case where this partial derivative is positively signed, it is implied capitalists' intention to expand their activity without being

³⁷These results can be alternatively reached by assuming the constancy of the growth rate of debt to-capital ratio ($\hat{d} = 0$), without implying the dependency of long run equilibrium level of debt-to-capital ratio on the interest rate.

released from external finance. Hence, though economic growth will be achieved, future interest payment will be raised.

For the case where the short run equilibrium is characterized by stagnationist regime (i.e. $(s_c - b_1)(1 - t_c) + t_c < s_r(1 - t_r) + t_r$ and coefficients b_0, b_1, b_2 take relatively high values), provided the positive sign of denominator, any shift in profit share reduces the long run debt-to-capital ratio while both growth and employment levels are positively affected. In this case, the inside dynamics of economy will be fuelled and external finance will be constrained; the implied growth will be essential considering the use of government expenditures in asserting high levels of economic activity and the active role of income wages in determining economic activity.

The question we have to answer now, concerns the form of economic growth we intent to achieve or alternatively which of stagnationist or exhilarationist regimes is more preferable for sustaining economic activity. As long as our target is the 'release' of economic activity from external finance, it is of minor importance which of the above regimes will dominate; what it is required is economy's preparation to face their consequences. Most of the studies at the Post Keynesian-Kaleckian grounds based on Bhaduri and Marglin (1990) model prove that a wage-led economy is preferable, though Hein and Kramer (1997) and Naastepad and Storm (2006) have proved that most of capitalist economies during 1960s and 1980s were wage-led but profit-led and demand constrained since 1980s. In addition, Hein and Vogel (2007) have empirically proved that larger but less open economies tend to be wage led, whereas small and closed economies are proved to be profit led; results that are only partially confirmed by Bhaduri and Marglin's (1990) theoretical conclusion about the degree of feasibility of wage led growth when the effects of distribution on foreign trade are taken into account³⁸. Moreover, Hein and Tarassow (2008) claim that medium sized but open economies are characterized as profit led, whilst small open economies usually tend to be profit led; results that are generally accepted in post Keynesian grounds, i.e. Bowles and Boyer (1995), Gordon (1995a,1995b), Naastepad and Storm (2006).

Nowadays with increasing globalization, openness and integrated markets, income distribution is usually in favour of profits though in these conditions international competitiveness and rising net exports is supposed to encourage the development of aggregate demand. According to Taylor (1996) it

³⁸According to Stockhammer (2004a,2004b) profit-led economies are inconsistent with NAIRU in the sense that unemployment can be reduced through increasing flexibility of wages and reductions in workers' bargaining power, although the equilibrium level of unemployment rate depends on aggregate demand. On the other hand wage led demand conditions in conjunction with the inverse real balance effects imply an unstable equilibrium, since increases in wage and employment growth improve workers' labour position so that the possible deviation from equilibrium is self fulfilling. As a result, Kalecki's (1937a) view that the long run is only a recession of short run equilibrium is proved.

is proved that industrialized economies are usually profit-led economies, whereas developing economies turn out to be wage-led; suggestions that are opposed to Hein and Kramer (1997) who denote that advanced capitalists' economies are usually wage-led. In particular the differences among these results and implications are directly affected by investigation periods, data and estimation methods. But since financialisation is proved to be the core of the problem of stagnation, the conjunction of either wage or profit led with the appropriate form of fiscal stance, seems to be the most preferable way to constrain targets without raising harmful social side effects.

6. Income taxation and economic activity

The above analysis rests upon assumptions about specific structure and progressivity of income taxes and government expenditures. The question we have to face concerns the way income taxation affects economic activity. In the analysis above we have just assumed the inequality of income taxation among income classes and the appropriate adjustment of their behaviour in order to examine whether economic activity is stable or not during the short and the long run period. What is interesting is to examine the conditions that would arise if by relaxing assumptions both capitalists and rentiers were allowed to take advantage of tax progressivity.

First of all, the introduction of higher income taxation for rentiers relative to that of capitalists makes clear the intention to reduce external finance in economic activity and create the opportunities for capitalists to take up new investment plans, which success would allow them to limit their future interest obligations. In the view of such tax inequality, it is highly possible rentiers' saving propensity to be skyrocket; besides their savings is the source for providing loans, without this being indispensable. On the other hand, the direction to which capitalists will adjust their saving behaviour is determined by whether put aside their personal advantage or not. Regardless of which of rentiers or capitalists' saving propensity is higher, if both of them increase their saving propensities, in the short run the conditions of puzzling case arise, which suggest the positive influence from monetary factors on economic activity and its compatibility with long stability and economic expansion.

Undoubtedly however, government's decision to intervene by income taxation and introduce such inequality signals its intention to promote investment plans by limiting at the lowest possible level the participation of external finance on economic activity. Assuming that capitalists in the view of low income tax, reduce their saving propensities at levels lower than rentiers, the short run normal case conditions are raised; conditions that are compatible with the long run instability conditions. Now capitalists together with workers attempt to stabilize economic activity and enrich its inside dynamic form. All these conditions would stand under the assumption that rentiers leave their interest

payments unchanged³⁹; such change influences even the incidence of taxation explicitly and raise the possibility for the development of crisis (Asimakopoulou and Burbidge, 1974).

The whole analysis would differ if the degree of tax progressiveness was transmitted in higher income tax for capitalists relative to rentiers ($t_c > t_r$), while workers still were facing the lowest possible. If the saving propensities were adapted so as the analysis of the previous sections to be ensured; what would only change would be the inside dynamics of the economy, since capitalists would now cope with lower after-tax retained profits without being able to compensate it to prices. On these conditions, a possible economic slowdown due to capitalists' lower retained profits could be tided over by workers and rentier if the latter in the view of higher after tax income improve either their consumer or investment decisions in favor of economic expansion. In particular, such tax inequality not only creates conditions against the undertaking of new investment, it does also push capitalists to reduce their saving propensity in their attempt to keep their behaviour unchanged. In this case, had rentiers keep their saving propensity unchanged or rentiers increase it, the finance-led regime would dominate. This suggests the presence of short run normal case that is consistent with long run instability and all its consequences, which will finally stagnate economic activity.

The most interesting case though is when contemporaneously with capitalists' decision to reduce their saving propensity, rentiers adapt their own upward. Such decision initially implies the corresponding adjustment of after tax retained profits and interest incomes for consumption and investment respectively. Considering that capitalists concentrate their attention on sustaining their retained earnings and in turn economic activity whereas rentiers are willing to enhance their position in economic activity, the level of economic activity is determined⁴⁰ by the interaction of their decisions. Even in this case it is highly possible the dominance of external finance, in the view of which capitalists will be unable to amortize their debt due to its continuous expansion. Regardless of the degree of progressiveness or regressiveness of income taxation system and the reaction of rentiers and capitalists to it, the fact that workers' incomes are negligible affected, persuades us that their behaviour as consumers may improve conditions for economic growth.

Notwithstanding, the final conclusions about the growth regime and extension of economic activity are essentially determined by the influence of government spending on aggregate demand. More precisely, the gap that is created in economic process due to capitalists' pressures on their investment

³⁹In a number of empirical studies such as Epstein and Power (2003); Argitis and Pitelis, 2001, 2006; Hein and Oschen, 2003; Hein and Schoder (2011); Hein (2011) it is confirmed that increases in interest payments, strengthens rentiers' position in economic process by redistributing income at the expense of labour income.

⁴⁰ It should be mentioned that the results are independent on the elasticity degree of b_1, b_2 .

plans is fulfilled either by workers' consumption or government intervention through the appropriate use and structure of its expenditures. In the sense that government spends its receipts in favour of formative plans aiming at employment expansion, make possible the recovery of reduction in economic activity because of changes in the structure of taxation. In particular, the introduction of income taxation and government expenditures and their between interrelation as well as the degree of balanced or imbalanced deficit is converted to long run terms and affects aggregate national income and the whole economic activity certainly.

7. Conclusion

The introduction of monetary factors in post Keynesian/Kaleckian models is an ongoing process. The most representative attempt in these grounds is Lavoie's (1995) "Minsky-Steindl model" and Hein's (2006, 2007) models. Using these studies as our starting point and assuming an active role for fiscal policy through progressive income tax and constant government expenditures, we developed a theoretical model and focused on the explicitly relation between employment and monetary factors, when both capitalists and rentiers through their saving, financing and investing in the presence of progressive income tax. According to the results, it is undeniable the significance of rentiers and capitalists' saving propensities; the degree of tax progressivity as well as the sensitivity of investment decisions from shifts in external finance and capacity utilization and the initial equilibrium conditions of debt-to-capital ratio in determining the final effects of debt-to capital ratio on economic activity.

Opposing to what current economic tendencies suggest a viable recovery of the general globalized stagnation would be to treat the core problems of economic activity as its main targets. Considering that finance-led regime has to be constrained, whether stagnationist or exhilarationist regime would stance it turns to be of minor importance; what should be the main concern is the regulation if not the reconstruction of financial sector fundamentally as well as the smoothness of income inequality and imbalances across globalized economy. Thus, instead of setting specific inflation targets, policymakers should concentrate their attention to achieve full employment of available labour supply in order the demand side of economy to be fuelled and the appropriate conditions to underpin the desired level of output to be created.

In order these targets to be achieved at the lowest possible cost, Kalecki's (1944) suggestions should be followed. In this vein, there are three ways in favour of full employment: (i) sustained budget deficits; (ii) stimulation of investment level; (iii) redistributing income in an egalitarian way. If these ways are adopted, the introduction of progressive income taxation will not only reduce income inequalities but will also lead each income class to adjust its economic behaviour appropriately; in this

case it is certain economic activity to rest upon its own sources and not to be depended upon financialisation. The achievement of these targets will be easier if fiscal policy is coincided appropriately with monetary policy i.e. its interest rate policies to concern real rather than nominal interest rate so as any expectations around inflation to be satisfied (Sawyer, 2012; Hein, 2011; Hein and Trugger, 2011). In this manner attention should be concentrated on ensuring increases at profit and wage levels with an interest rate policy that would secure economic stability. Provided that workers do not change their saving properties and capitalists respond strongly through investment increases towards upward profit shifts, such a policy package would reduce income inequalities and modify economic environment, since capitalists would be casted off any fear about interest rate variations or deterioration of their debts.

Ultimately, any policy suggestion should be made by considering the required time for its implications to arise, the availability of policy instruments and mainly the actual economic conditions that determine both the realization and coherence of policy suggestions. In practice, since the interrelation of dominated financial markets with the real sector (capital and labour markets) is unquestionable, while the correct use of fiscal policy can rearrange this relation without inflicting further austere conditions, macroeconomic policies should be set with respect to their specific behaviour and characteristics.

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