The Role of Income Distribution in Long Run Endogenous Growth.

by

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Introduction

Two somewhat intertwined questions seem to have been the central concern of almost all the theories of economic growth namely, what propels growth , and what limits it ? Posed this way neither question is very precise, and unsurprisingly, answers would vary considerably. However , if we look back at the great masters of Classical Political Economy , we might at least begin to understand the problem better. Adam Smith relied on the process of increasing division of labour driven by competition among the capitalists themselves as the main force propelling growth through rising labour productivity , while his observation that the extent of the division of labour is limited by the size of the market, suggests that he assigned to demand the role of setting the limit to productivity growth . In this scheme, the constraint of natural resources or primary factors of production have a limited role to play. David Ricardo looked at the problem from almost the opposite angle. For him, land, which we may consider as a symbol for all primary factors not produced within the system, sets the limit to growth . Being subject to diminishing returns, the share of rent in national income increases continuously at the expense of profit, as the margin of cultivation extends over time. This sets the limit to growth , and drives the economy towards its ultimate stationary state because Ricardo assumed that all profit but no rent will be saved, and automatically invested back for extending the margin of cultivation . Perhaps most interesting aspect of Ricardo's analysis was to suggest that the limit to growth is set by the limitation of some primary factor, but it operates through the changing distribution of income among the classes, which affects the saving of the economy. Consequently, the focus is on inter-class distribution rather than the Smithian intra-class competition driving the process of division of labour. Note also that ,unlike Smith who saw demand or the size of the market as an important constraint on the extent of division of labour, Ricardo's theory of growth was an exclusively supply side story that left no room for demand, because all profit as saving was assumed to be invested

It seems worthwhile to point out here that , what has come to be known as the neo-classical theory of growth (Solow,1956; Swan, 1956), seems to be largely a reinvention of Ricardo's growth story with most of its weaknesses, but little of its strength in incorporating the problem of inter-class distribution. Like in Ricardo's scheme, it makes no distinction between investment and saving, and is thus unable to assign to Keynesian problem of effective demand any role. Moreover, by postulating diminishing returns to 'capital' as a factor of production in an aggregate production function, the theory becomes logically insecure, if extended beyond a one-commodity world due to capital theoretic problems (Sraffa, 1960; Samuelson, 1966; Pasinetti, 2000). Thus, the assumption that saving and investment are one and the same decision reduces it a one agent model, while the depiction of the supply side through an aggregate production function makes it a one commodity model. In short, this neo-classical scheme   analyses growth by reducing it to a one individual, one commodity framework ! And, it is within this almost absurdly reductionist scheme that the Ricardian answer is rediscovered ,namely an exogenously given growth rate of the labour force rather than the zero growth rate of land in the Ricardian setting, imposes the ultimate limit to growth.

Karl Marx whose unique distinction it was to emphasise the importance of logico-historical categories in economic analysis, discussed capitalistic growth, rather than economic growth in general. Since commodity production for the market was the most basic feature of capitalism , the market had to absorb the surplus product (or 'surplus value' in Marx's scheme, a modern reader could also interpret it as saving) over and above what the workers produced. Thus, a growth theory for capitalism had to deal simultaneously with two related questions : how the surplus is generated, and how the market absorbs or utilises it. Marx's theory of exploitation was mostly intended to deal with the former , while his theory of expanded reproduction comes closest to analysing the latter issue in the context of growth. In his own analysis Marx did not seem to have quite succeeded in integrating these two aspects of the problem. He used mostly the former aspect of the exploitation of labour to argue that capitalistic growth is doomed in the long run in so far as a large reserve army of labour would not allow real wages to rise, while labour saving innovations and rising capital intensity would result in a falling rate of profit . We now know that this part of his argument has serious logical lacunae, and his political answer to the economic question as to what sets the limit to growth cannot be taken as logically consistent. However, at the same time, his scheme of expanded reproduction set out the conditions for steady growth to make clear how the entire surplus needs to be reinvested in each period in conformity with Say's law to make economic growth at a steady rate theoretically possible, but a most unlikely coincidence .

Following this line of argument, a most valuable insight of Marx was to have recognised that rising labour productivity, brought about by increasing division of labour aided by labour saving machinery and the organisation of production into the factory system , might simply widen the gap between labour productivity and real wage, to raise the potential surplus per worker at the micro-level. But for this surplus to be realised on a macroeconomic scale with the more favourable income distribution in favour of profit that it implies, there must be enough demand   either in the form of investment (i.e. through expansion of machine –producing Department 1, in his scheme of expanded reproduction), or in the form of capitalists' consumption (Kalecki, 1971), or consumtion by some other leisure class like Malthus's landlords or, through   exports in an expanding external market (as a ground for imperialist expansion according to Rosa Luxemberg). The failure to achieve these conditions to ensure adequate demand is not only the basis of recurring periodic crisis of under-consumption in Marx, but might become a long run tendency as the market structures evolve towards monopoly. It was developed l as the 'stagnationist' thesis (e.g. Steindl, 1952), as a continuation of the theory of effective demand of Keynes and Kalecki .Note that, by putting together Marx's discussion of exploitation of labour at the micro-level of the factory with his macro–view of the failure of the surplus to be realised due to under-consumption, we had perhaps for the first time in economic analysis an illustration of how microeconomic arguments may not necessarily be valid on the macroeconomic scale due to the fallacy of composition (Even today, the downsizing of individual corporations to increase labour productivity--- a favourite theme of corporate management---might run into a similar problem due to insufficient demand on the macro-scale). Recall that this line of argument was also used effectively by Keynes in formulating his 'paradox of thrift' or in the 'wage-cut controversy'. Unfortunately, this seems to be a forgotten lesson in 'modern' neo-classical macroeconomics entirely devoid of the problem of effective demand, in so far as it finds it good enough for growth theory to proceed on the basis of a single all-seeing optimising agent whose intertemporally optimal saving is automatically invested in each period.(e.g. Ramsey, 1928; Koopmans, 1965; Cass, 1965.) This literature had originally been developed in the context of normative planning theory. Its uncritical use for positive growth theory is a later development (see Romer, 1996 for a recent textbook exposition of this class of models). Alternatively, the overlapping generation models of growth (Samuelson, 1958;Diamond, 1965) , despite their more plausible sophistication on the saving side of the households , misses the same central point, namely that the savings plan of households cannot be realised macroeconomically without adequate investment (which generates enough income for those households via the multiplier mechanism). In short, unless we return to a pre-Keynesian framework of Say's Law where, by assumption, full employment is always maintained, because the full

employment level of saving in invested back in each period ,more sophistication of assumptions about saving behaviour of the houeseholds cannot even begin to handle a most basic problem of capitalistic growth, namely unemployment and lack of demand. By not leaving any room for the demand side, they would be pure supply side growth models, and that too logically flawed outside a one- commodity world due to the assumption of an aggregate production function in which the mechanism of substitution between capital and labour is a central part of the story for maintaining full employment.

We consider it therefore worthwhile to attempt to map out an alternative approach to analysing the problem of capitalistic growth. As I see it, it would require:

(a)The Smithian idea of division of labour or technical progress as being driven at least partly by intra-class competition among the capitalists to be combined with the Marxian notion that inter-class competition between capital and labour influences the nature of technical progress in such a way that labour productivity growth would not permit the wage share(rather than the real wage rate on which Marx had wrongly insisted) to rise continuously over time. Note that this results in the Harrod- neutrality of technical progress (Harrod,1942), which becomes purely labour- augmeting in the neo-classical production function.It is simply assumed in almost all neo-classical theories of endogenous growth, under the guise of 'human capital' .The further assumption of a Cobb- Douglas production function , also so pervasive in modern neo-classical growth theory, could be justified only on the ground that the observed wage share tends to remain constant. But both remain ad hoc assumptions, neither explained through an economic mechanism . By postulating that this is a consequence of inter-class competition, rather than merely convenient ad hoc assumptions, we at least offer an explanation of the observed phenomenon.

(b)While technical progress gets diffused in the economy through intra- and inter-class competition visualised by the Classical economists, in our model it also has the public good character of non-excludability to generate positive externalities of production and increasing returns. However, unlike existing neo- classical theories, we would not engage in the hopelessly heroic task of postulating various implausible production functions representing research technology, or how human knowledge is generated. We are satisfied with the more modest task of analysing the economic processes by which technology gets diffused in a capitalist economy.

(c)We bring to the forefront the problem of aggregate demand by separating investment decision from saving decision, as in the theories of Keynes and Kalecki. While very many different investment functions are plausible, and none fully satisfactory, this problem need not deter us completely, because our main aim is to highlight how effective demand plays a central role in explaining growth without the assumption of full employment. Similarly saving function can take

various plausible form, again none fully satisfactory. For reasons already mentioned, we stay away from the assumption of either intertemporally optimal saving by an immortal agent, saving as an always satisfied intertemporal contract among overlapping generations, irrespective of the state of demand. We bring into focus instead the neglected demand side into the analysis , inter- and intra-class competition and the role they plays in generating endogenous growth and income distribution, so that these underplayed aspects of the neo-classical models get the attention they deserve.

THE MODEL

Inverting the image of the Ricardian theory of differential land rent, we postulate that our industrial economy is subject to increasing returns due to the public good character of productive knowledge which gets diffused ,as the scale of output and employment expands . It entails that the labour employed by the firms at the cutting edge or 'margin' of new technological knowledge is more productive than the rest, i.e. the average productivity of labour. This assumes that the advanced or marginal firms have a sufficiently low weight in the total output produced. Note that this assumption cannot incorporate oligopolistic market structure). Assuming that competition among the firms, or what for the Classical economists was intra-class rather than inter-class competition, the technologically advanced, marginal firm would set its price (p_m) at a lower level according to its lower production cost compared to the ruling price (p) in the economy. Assuming the same mark-up (m) proportional to their direct variable labour cost is set by all firms we have

$p_m = (1+m).w.dL/dY and, p = (1+m).w.L/Y$, where

w = money wage rate, and L= employment , and Y= output.

Under classical competition, this puts downward pressure on prices as the technologically advanced firms with their lower marginal cost than the average in the economy with increasing returns assume the role of price leaders. As a result, average price falls over time approximately according to the adjustment equation,

(1) $\qquad dp/dt = \lambda(p_m - p).$

Note that (1)is a continuous time approximation to the fall in average price between ,say the beginning and end of a year.

Under dynamic increasing returns, the elasticity of employment with respect to output can be written as, $\dfrac{g_l}{g_y}$, so that equation 1 becomes on simplification,

(2) $g_x = -\lambda..g_x / g_y$

where g represents the proportional growth rate of the relevant variable denoted by the subscript, and

(3) $g_x = g_y - g_l$, a definitional equation between growth rates of labour productivity(x), output(Y) and employment (L).

The behaviour of the real wage will depend on how the money wage rate changes, while price changes according to (2).The simplest assumption in the context of this model is to assume that the percent change in the money wage rate is systematically related to the change in the unemployment rate $((du/dt)$, derived from a 'wage curve', used often in the literature recently in place of the more   traditional Phillipscurve.(e.g.BlanchflowerandOswald1994;1995;Card,1995;BratsbergandTurunen,1996;Graafl

and, 1992).Assuming this wage curve to have a constant negative elasticity of b, we have,

(4) $-b = (dw/dt/w)/(du/dt/u)$ where $n =$ the growth rate of labour supply, and   b>0 is the absolute value of the elasticity, adjusted by the initial unemployment rate(estimated to lie between –0.2 and –0.8 by Blanchflower and Oswald, 1995).Consequently, the percentage rise in real wage(v   ) is given from (2), (3) and (4) as,

(5). $dv/dt/v = g_v = \lambda.(g_x/g_y) + b(g_y - g_x - n)$

Unless labour productivity(x) rises at the same rate with the real wage rate in the longer run, the share of wages in income would continue to change which is not compatible not only with steady growth , but might even violate the feasibility condition that the share cannot exceed unity! Therefore labour productivity growth may be postulated to adjust in such a manner as to keep the wage share constant in the long run, yielding,

(6) $dg_x/dt = \beta.\left[\lambda.(g_x/g_y) + b(g_y - g_x - n) - g_x\right]$

where, β is some positive speed of adjustment.

Three observations are in order in connection with equation (6).First unlike in many neo-classical endogenous models of growth, we do not simply assume in an ad hoc manner that the technology depicted by the production is labour augmenting; instead the purpose here is to emphasise that this Harrod- neutrality(Harrod, 1942) of technology is the outcome of an economic process of inter and intra-class competition over wage share. Second, this views technological progress, at least its adoption and diffusion, prevents wage share from rising in the long run. This comes close to the Marxian notion in so far as it suggests that the course of technological development tends to keep the wage share rather than the real wage rate constant. Finally, it also

suggests that the so-called stylised fact of the relative constancy of wage share may be used to endogenise the growth of labour productivity. But, by implication it also rules out long run changes in income distribution as a crucial adjusting variable for sustaining steady growth which is a common feature of many post-Keynesian growth models (e.g Kaldor, 1956,; Pasinetti, 1962; Robinson, 1956; Marglin, 1984).

In contrast to the pre-Keynesian, neo-classical argument that saving is always automatically invested, we need to distinguish saving from investment decisions for introducing effective demand in the model. Analytically, this requires introducing an investment function which is different from the saving function; but for neither of these we can rely on a commonly agreed basis. Nevertheless, for expositional simplicity, we may start with a simple model, in which investment depends positively both on the current level of output, as a predictor of the future state of demand (under static expectations) as well as on labour productivity, in so far as it stimulates expected profitability However, note that according to equation (6), this expectation would not be satisfied in the steady state, because all such profit would be transient, and competed away through inter-, and intra-class competition(e.g.Schumpeter, 1961). Assuming firms focus on transient profit, as they must for drive classical competition through introducing new technology, this allows us to postulate the investment function as,

I = I (Y, x), which on simple manipulation reduces to,

(7) $\quad g_I = \eta_y g_y + \eta_x g_x$, where η_y, η_x are positive partial elasticities of investment with respect to output and productivity respectively.

Saving is treated as an increasing function of income, so that,

(8) $\quad g_s = \varepsilon_Y g_y$, where ε_y is the positive elasticity of saving with respect to income.(henceforth elasticities are assumed constant for simplicity).

Note that a constant average and marginal propensity to save would imply that $\varepsilon_Y = 1$, and the same would hold if the distribution of income does not change, as it would not in the steady state due to equation (6).

Assuming the economy starts from an initial condition of investment saving equality, we may postulate that the growth rate of output would adjust to the growth in excess demand, i.e. to a the discrepancy between the growth rate of investment and saving Using equations (7 and (8), this yields,

(9) $\quad dg_Y / dt = \alpha(g_I - g_S) = \alpha[-(\varepsilon_Y - \eta_Y)g_Y + \eta_x g_x]$, where α is the positive speed of adjustment in the growth rate of output.

Equations (6) and (9) form a coupled dynamical system in the two variables g_y, g_x which has a steady state solution,

(10) $g_Y* = (\lambda - bnz)/(1+b-bz)$;

$g*_x = (\lambda - bnz)/z(1+b-bz)$

and

$g_L = (z-1)(\lambda - bnz)/z(1+b-bz)$

where

$z = \eta_x /(\varepsilon_Y - \eta_Y)$

Provided the one- variable Keynesian output adjustment stability condition, $(\varepsilon_Y - \eta_Y) > 0$ holds, so that z>0 for $\eta_x > 0$,implying that for a positive growth rate of output, the employment growth rate would also be positive in the steady state. Moreover, if the elasticities satisfy the further condition of z >1 then, for positive growth rate in output, the corresponding labour productivity growth rate would also be positive, but lower than the growth rate of output in the steady state (c.f. (9)) so that the employment growth rate would also be positive from (3). However these conditions need not be satisfied in general, in so far as the relevant elasticities are governed by independent investment decisions of the firms, and saving decisions of the households. Thus, if $g_y* \le g_x*$, the economy would experience jobless, or even worse, negative growth in employment despite positive output and productivity growth, a situation which presumably would not be compatible for long with any steady state.

The condition that z>1, as well as the stability of the Keynesian one variable income adjustment require,

(11) $\eta_x > 0, and \ \eta_x + \eta_Y > \varepsilon_y > 0$

The stability of the of the steady state equilibrium requires the trace (T) of the relevant Jacobian matrix to be negative, and the determinant (D) positive, i.e.

(12) T<0, implying, $\alpha(\varepsilon_Y - \eta_Y) + \beta[(1+b) - (\lambda/g_Y*)] >$

and, (13) D>0, implying, $\alpha\beta(\varepsilon_Y - \eta_Y)(1+b-bz) > 0$ which is satisfied if b<1/(z-1), in view of (11).

Substituting the value of g_Y^* from(10) in the trace condition(12), it is satisfied provided,

(14) $\lambda > n(1+b)$

(15) while $g_Y^* > 0$, further requires $\lambda > bnz$.

Inserting from (14) a maximum value of $n = \lambda /(1+b)$ in (15), the latter inequality is seen to be sufficiently satisfied if, $(1+b-bz) > 0,$ i.e. the condition already contained in the conditions (13) and (14). Thus, the system seems capable of a stable configuration of steady, positive growth rates in output, productivity and employment given by condition (10) under the restrictions imposed by conditions (11) to (14).

In for as we wish to hold rigidly to the assumption that an exogenously given labour supply constraint has to be satisfied despite such real world possibilities as migration, longer hours of work etc, the long employment growth rate from (10) must also satisfy the condition,

(16) $g_L^* \leq n, reducing fr \, om(10) to \lambda \geq nz /(z-1)$

Diagram   I

λ...Degree of competition between rival firms over market shares
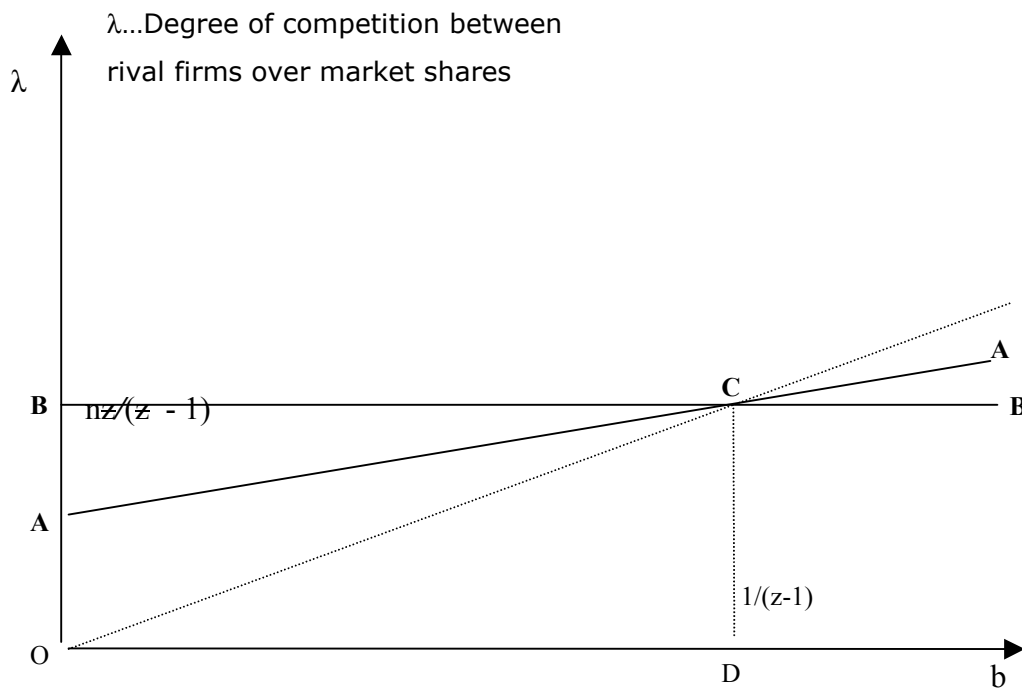
b…Degree   of   competition between capital and labour over wage   setting   in   the   labour market.

Since the model views inter – and intra-class competition as interrelated in driving endogenously wage and productivity growth, the values of the parametres b and λ, representing the two types of competition respectively, can be exhibited diagrammatically by taking simultaneously into account all the inequalities.   In diagram I, the two (in)equalities on the trace

and the determinant condition given by straight lines AC for (14) and OC for (15) respectively, intersect at a point C with co ordinates $1/(z-1)$ and, $nz/(z-1)$, which (as already seen) coincide with the maximum permissible values of b in (13) for a positive determinant, and of λ in (16) for satisfying the labour supply constraint. Thus, the area ABC represents the feasible set of values of b and λ compatible with the long run positive, stable, steady state.

As exhibited by diagram I, two points of particular interest emerge from this generla model.   Given any feasible value of b, the extent of intra-class price competition over market share, represented by λ has to lie within a certain range for attaining stable and positive long run growth, i.e. in the area of feasibility ABC. Since g_Y^* is seen to be monotonically increasing in λ in (10), according to our model fiercer competition among the firms tends to stimulate growth; but it also has the potential of destabilising the growth path by violating the long run labour supply constraint.   In short, intra-class competition is a double-edged weapon in promoting long run economic growth on the one han, but destabilising it on the other.

Second, g_Y^* attains its maximum feasible value, as λ reaches its upper bound of full-employment at $\lambda = OB = nz/(z-1)$. Substituting   this highest value of λ in (10), we obtain the maximum growth rate in   output as,

(17) g_Y^* $= n.z/(z-1)$, $z>1$.

Thus,   the maximum, feasible long run equilibrium growth rate of output in (17) is seen to exceed the exogenous growth rate n of labour supply, because it is is influenced by both investment and saving decisions, captured by the value of the parametre z. Therefore, we achieve one of the main objectives of neo-classical endogenous growth theory(cf.Arrow,1962; Frankel,1962; Romer,1986, Lucas,1988; Barro and Sala i Martin,1995) of freeing the long run growth rate from the constraint of an exogenous labour supply growth, while incorporating the influences of saving and investment on the growth rate. Note also that it is not only problematic from a capital theoretic point of view (cf.Pasinetti, 2000; Robinson, 1956; Sraffa,1960),but seems unnecessary to take recourse to the concept of a non-decreasing marginal product of 'composite' capital to achieve this result.

Perhaps , more important is a feature of our model which presents a different view in so far as the <u>stability</u> of the long run growth path is concerned. It suggests that stabitity cannot be assured generally, once the problem of aggregate demand is recognised by separating agents (firms) who invest from agents (households)who save.At the same time, the   mechanism of capital-labour

substitution through an aggregate production function has also to be abandoned as problemaic on both capital theoretic ground, and as quantitatively unimportant (Solow, 1957,also, Shaikh,1980) . The separation of investment from saving decision requires giving up the assumption of a single agent framework;while the view of 'capital' as a factor of production being logically untenable outside a one-commodity world has to be abandoned if we wish to generalise the analysis. Thus, while Harrod (1939) might have overstated his case for instability, models in the neo-classical tradition of Solow and Swan certainly overstate the case for stability by relying on an one-agent, one-commodity framework.

Finally, the present approach to the theory of endogenous growth suggests an interesting line of enquiry which needs further exploration. It emphasises that the growth of real wages have a dual role to play in a capitlist economy. This is now understood that higher wage adds to demand on the one hand, but raises the costs of production on the other, leading to the possibilities of wage – and profit- led regimes of growth (cf. Bhaduri and Marglin, 1990). But in the longer run, growth in real wage , while expanding consumption demand, also poses the challenge to the firms to raise labour productivity through higher investment. This perhaps is quite central to story of successful capitalistic growth in the longer run, through what Galbraith had once called the 'counterveiling power' of labour. When capitalism fails to meet this challenge of the counterveiling power of labour through technical progress, and seeks a solution instead through only through wage restraint, the so-called greater 'flexibility' of the labour market, it is unlikely to turn out to be a success storyin the longer run. It is this idea only hinted at by the present model which needs further research.

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