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State Policies and the Warranted Growth Rate

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Introduction

As is well known, the collapse of the Bretton Woods system and the subsequent worldwide economic crisis of the 1970s brought about the demise of Keynesian policies and the gradual replacement of state interventionist policies by the doctrine of *laissez faire* . While the post-Bretton Woods conventional wisdom consists of a variety of policy prescriptions, one of its key elements is that of fiscal retrenchment. In contrast to the Keynesian fine tuning policies of an earlier generation, the new view is that the only way to raise long-run growth is to role back the state in general and lower the government spending ratio in particular.[1]

This new conventional wisdom has, however, not gone unchallenged. Authors in the Keynes-Kalecki tradition have provided the most coherent critique and recommend the exactly opposite policies: in periods of economic crisis the government should pursue expansionary polices, such as higher budget deficits, to raise effective demand. Some authors such as Godley (1999) even stress the *indispensable* role of government spending under normal circumstances in bringing about growth in a closed economy.

Two elements are central to the Keynes-Kalecki perspective. First, it rejects the spontaneous full employment assumption of neoclassical economics. Second, it treats as exogenously given by the "animal spirits", the state of long-term expectations, or autonomous demand. Thus firms are assumed to ignore the capacity-creating effects of investment. The multiplier relationship, which is central to the Keynes-Kalecki tradition, enables any increase in government spending to raise output. Some authors such as Taylor (1985) and Lavoie (1995), inspired by Kalecki, propose investment functions such that excess capacity exists even in the long run. Thus, for these models also, government spending has an unambiguously positive effect in the long run.

On the other hand, the multiplier was only part of the story for Harrod and Domar who argued that, while firms might ignore the capacity effects of investment in the short run, in the long run they would adjust investment to eliminate the under-- or over--utilization of capacity. Thus, in the Harrod-Domar view the multiplier relationship is a short-run one. Over the long run the economy would grow along the warranted path at the normal rate of capacity utilization. Government spending and taxation policies in such a context are more complex than they are in the short-run multiplier story. For example, as Harrod (1973) shows, an increase in government spending accelerates output in the short run while lowering the warranted growth rate.

The purpose of the current paper is to extend Harrod's work by situating tax-and-expenditure policies within the context of the warranted growth path.[2] The paper shows that, in contrast to both the Keynes-Kalecki and neoclassical perspectives, the Harrod-Domar *weltanschaung* provides an alternative way of modeling fiscal policy.

The paper begins with a discussion of the key issues in Harrod's *Economic Dynamics* (1973), especially chapter seven, entitled "Problems and Conflicts." A key issue pertains to the role of the social savings rate[3] which, given the capital-capacity ratio, regulates the warranted growth rate. An explanation of the reasons why the social savings rate has a positive effect on the warranted growth rate in a context in which neither Say's law nor the loanable funds doctrine holds is also provided. The second section shows, however, that the crucial role of the social savings rate does not imply the pursuit of fiscal austerity policies. A version of the taxation function derived by Pasinetti (1989) is deployed to show how tax policy can modulate the social savings rate, and thereby allow an increase of both government spending and the warranted growth rate. A public investment function is introduced that shows that the composition of government spending matters as far as the slope of the warranted growth rate is concerned. An increase in the proportion of capacity-augmenting public investment raises the warranted growth rate. Together, both tax and public investment policies give policymakers two instruments with which to attain full employment.

THE PITFALLS OF EXPANSIONARY FISCAL POLICIES

Harrod's Central Paradox
The Harrod-Domar perspective can be distinguished from the Keynes-Kalecki one in two vital respects (Harrod 1973; Kregel 1980; Besomi 2000). The first feature pertains to the treatment of investment. While acknowledging its demand-creating effects, the former authors also recognized the capacity-creating effect of investment spending. For Harrod-Domar, investment spending would only be self-validating if output (demand) kept pace with potential output. That is, investment would respond endogenously to eliminate discrepancies between actual and potential output. The *normal capacity* [4] path thus generated is the warranted growth path. The recognition of this dual effect of investment differed from *The General Theory* where Keynes took capacity as given and focused only on the demand effects of investment on the level of output (Asimakopulos 1986).

The second feature pertains to the endogenous nature of growth. In the Harrod-Domar framework, since firms adjust their investment

spending endogenously so as to balance output with capacity, growth is endogenous. Autonomous expenditures are not needed to either to determine or raise this path (Trezzini 1995). On the other hand, growth can be introduced into the basic multiplier story only by assuming that all components of demand grow at exogenously-given rates so that any increase in, say, the growth of government spending is *required* in order to raise output growth. Thus, in this case, growth is exogenous.

Harrod's policy analysis, in particular, essentially revolves around two types of cycles. The first, a relatively short-run cycle, entails the fluctuations of the actual growth rate (G_a) around the warranted growth rate (G_w). Capacity utilization may be different from the normal rate in the former while it is at the normal rate in the latter. There may be varying degrees of unemployment at both growth rates, although full employment is not ruled out. The second cycle, a relatively long one, entails the fluctuations of the warranted around the natural growth rate (G_n), which is determined by the growths of population and productivity. Capacity utilization is at the normal level along G_n, which Harrod also takes as the full employment growth path.

Harrod devotes the core aspects of the policy implications of his growth framework in chapter seven (entitled "Problems and Conflicts") of his *Economic Dynamics* (1973). His main concern is with the relationship between G_a, G_w, and G_n. The contradictory effects of expansionary fiscal policies can be summarized as follows:

> Measures calculated to influence actual growth rates upwards or downwards have the opposite effect, to the extent that they have any effect, on the normal warranted growth...Any rise in the savings ratio raises the warranted growth rate, while, of course, tending to depress the actual one...On the fiscal side a shift towards reducing a budget surplus or increasing a deficit will assuredly reduce the warranted growth rate, while raising the actual one (Harrod 1973, p. 102)

This is what he calls the *central paradox* (ibid., p. 102) of expansionary policies.

Suppose that the warranted growth rate is above the natural growth rate but the actual growth rate is below the former ($G_w > G_a > G_n$). In this situation, the desired social savings rate (which determines the warranted growth rate) exceeds that rate which is necessary to bring about full employment. Harrod calls this the *oversaving scenario*. Quite simply, the economy has more savings than it needs in order to employ all its workers. Harrod says that in this situation, an increase in the budget deficit is unambiguously beneficial in the long run since it raises the actual growth rate even though, by decreasing the social savings rate, it lowers the warranted rate toward the natural rate. Provided the system is stable, the actual growth rate will also fall in the long run. Harrod also calls this the paradox of thrift effect in a dynamic context.

However, suppose the warranted growth is less than the natural growth rate ($G_n > G_w > G_a$). This is what Harrod calls the *undersaving scenario*. An increase in the budget deficit will be beneficial for the actual growth rate since it will raise it above the warranted rate but, by lowering the social savings rate, it will lower the warranted growth and thus drive the economy further away from the full employment growth path.

The Paradox of Stability

From a Keynesian perspective, it may seem peculiar that the social savings rate should play such a vital role in the long run in a context which neither accepts Say's law nor the loanable funds doctrine. How may one reconcile this apparent paradox?

As argued above, the key issue that separates the traditional Keynes-Kalecki perspective from the Harrod-Domar one is the treatment of investment.[5] Suppose that the private savings rate(s) rises. If *both* the levels of government spending and investment are taken as autonomous (G^* and I^*, respectively) then from the multiplier, $Y = (G^* + I^*)/(s + \theta)$, the level of output will fall. Since I^* continues unabated, the economy's capital stock and capacity will continue to expand. This implies that the higher s will have lowered the rate of capacity utilization. This is a familiar result from the traditional Keynes-Kalecki perspective.

Harrod and Domar would, however, take the analysis one step further. Assuming that capacity utilization was initially at the normal level, the appearance of excess capacity would make investment react to eliminate it (Harrod 1952; Domar 1957). Investment would have to decline, so that the resulting fall in the capital stock would also have to reduce potential output. The Harrod-Domar story reaches a crucial point here. If the falling actual and potential outputs continue to lower capacity utilization and investment, then we have the knife-edge problem. Yet, Harrod in particular was not sympathetic to this view of instability, arguing instead that the instability is of a bounded type. Certainly, Harrod's analysis discussed above implicitly assumed instability of this last kind because of the effects on the warranted path. If, on the other hand, Harrod had subscribed to the knife-edge view, this policy analysis would be irrelevant since the economy would never be on the warranted path. In this situation, while unstable, the economy would also behave in the traditional Keynesian fashion, since actual output would always respond to changes in s or G^* as predicted by the multiplier.

On the other hand, if some process stabilizes the cycle around the trend, then in the above example, sooner or latter, potential output would have to fall *more* than the fall in actual output, thereby arresting the fall in the rate of capacity utilization. A turn around in the capacity utilization rate would make the economy converge to a new warranted path corresponding to the higher savings or tax rate. Take, for example, Harrod's version of the warranted growth rate[7] which is given by

(1) $G_w = [s(1 - \theta) + (\theta - g)]/v$

where G_w = warranted growth rate, s = private savings rate, θ = tax rate, g = government spending/GDP, and v = capital-capacity ratio. Thus the higher savings rate translates into

a higher warranted growth rate. An equivalent way of understanding the above mechanism is in terms of injections and leakages, which are equal to one another along the warranted growth path. If leakages rise as a consequence of an increase in the social savings rate, then injections will have to rise too in order to maintain equilibrium. Given government spending, this implies that investment will have to rise equivalently.[8] One may call this a *paradox of stability* , since stability confers an importance an importance to the social savings rate even though Say's law is not assumed.

In the absence of Say's law, the key issue pertains to the question of the stability of a disequilibrium growth path. The Shaikh (1989) framework has as its point of departure disequilibria between investment and savings as well as actual output and potential output. Using debt dynamics and the interactions of circulating and fixed investments, he shows that these disequilibria are cyclically stable. In this perspective, the warranted path arises in a gravitational sense along which the rate of capacity utilization is approximate equal to one. It can be shown that a fall in the savings rate raises the capacity utilization rate while it lowers the warranted path so that it exhibits both the paradox of thrift and the paradox of stability. That is, it also produces Harrod's central paradox.

In the current paper it will be assumed that the warranted path is stable so that the short-run fluctuations around it will be ignored. Its goal is to tackle the issue of raising the warranted path via appropriate policies.

POLICY ANALYSIS IN A STABLE GROWTH CONTEXT[10]

Taxation Policy
Suppose we begin with the simplest scenario in which only capitalist households and the government save and the tax rate on the former, t_p is the only tax category. Then equation 1 becomes

(2) $G_w = [s(1 - t_p) + (t_p - g)]/v = s^*/v$

where s^* = social savings rate. Assume first a balanced budget increase in government spending so that $\partial G_w/\partial t_p < 0$ (Marglin 1984). On the other hand, if the budget is not in balance, $\partial G_w/\partial t_p > 0$.[11] This is a somewhat surprising result since it shows that a higher tax rate on capitalist income is actually beneficial for growth.[12] However, it is consistent with the requirement that the warranted growth rate is regulated by the social savings rate. A higher tax rate reduces capitalist savings although it raises public savings by a greater amount. As discussed above, the higher leakage rate brought about by the higher tax rate brings about an initial drop in the actual growth rate with a longer run acceleration of growth as injections have to equal leakages.

Of course, it may well be the case that a higher tax rate on profits may lower business optimism ("animal spirits") and provoke either an "investment strike" or, in an increasingly integrated global environment, a capital outflow. The question is, if in the throes of an economic crisis a country's capitalist class *requires* that its tax rate be lowered so that it invests in that country, what options do its policymakers face if no other political options are available? Are cutbacks in the government spending ratio inevitable in such a situation so as to reduce budget deficits and the national debt and raise long-run growth?

To answer this question, a more elaborate tax function is introduced so that other categories of taxes become available to policymakers. We will use for this purpose a simplified version of the tax function proposed by Pasinetti (1989). The two simplifications are: (1) profits, P, accrue only to capitalists while wages, W, accrue to workers, and (2) government spending G is some fraction g of output Y: $G = gY$.[13]

Beginning with the national income identity, $Y = C + I + G$, we subtract taxes, T, and rearrange to give:

(3) $(Y - T - C) + (T - G) = I$

so that

(4) $S_p + S_g = I$

where S_p = private savings and S_g = government savings. Let S_w = workers' saving and S_c = capitalist saving so that $S_p = S_w + S_c$. Thus

(5) $S_w + S_c + S_g = S^* = I$

where S^* = social savings:

(6) $S^* = S_w + S_c + S_g$

Each of these three types of savings is given by the following savings functions:

(7) $S_w = s_w(W - t_wW)$

(8) $S_c = s_c(P - t_p$ (9) $S_g = T - G$

where s_w and s_c are the pre-tax savings rates of workers and capitalists, respectively, and t_w ($0 \leq t_w < 1$) and t_p ($0 \leq t_P < 1$) are the proportional tax rates borne by workers and capitalists, respectively.

Pasinetti's taxation equation includes both direct and indirect taxes. The direct tax rates are t_w and t_P while t_i $(0 \leq t_i < 1)$ is a proportional (direct) tax on all consumption expenditures of the private and public sectors. The taxation function T is given by:

(10a) $T = t_w W + t_P P + t_i[(1 - s_w)(1 - t_w)W + (1 - s_c)(1 - t_p)P + G]$

Dividing through by Y and letting $\alpha = W/Y$, $\beta = P/Y$, and $g = G/Y$ the tax rate θ is given by

(10b) $\theta = t_w \alpha + t_P \beta + t_i[(1 - s_w)(1 - t_w)\alpha + (1 - s_c)(1 - t_p)\beta + g]$

where $\partial\theta/\partial t_w > 0$, $\partial\theta/\partial\theta/\partial t_i > 0$.

Substituting G = gY and equation 10a into equation 9 and then equations 7, 8, and 9 into equation 6, we get the following expression for social savings:

(11) $S^* = s_w(1 - t_w)W + t_w W + t_i(1 - s_w)(1 - t_w)W + s_c(1 - t_p)P + t_P P +$

$t_i(1 - s_c)(1 - t_p)P + (t_i - 1)gY$

Let $s^* = S^*/Y$. Then dividing equation 11 through by Y, we get

$s^* = [s_w(1 - t_w) + t_w + t_i(1 - s_w)(1 - t_w)]\alpha + [s_c(1 - t_p) + t_p + t_i(1 - s_c)(1 - t_p)]\beta + (t_i - 1)g$ (12)

Equation 5, written as a proportion of Y is $s^* = I/Y$, so that, after incorporating equation 12, the warranted growth rate $G_w = I/v = s^*/v$ (where v = capital-capacity ratio) is given by:

(13) $G_w = s^*/v = \{[s_w(1 - t_w) + t_w + t_i(1 - s_w)(1 - t_w)]\alpha$
$+ [s_c(1 - t_p) + t_p + t_i(1 - s_c)(1 - t_p)]\beta + (t_i - 1)g\}/v$

Equation 12 has the following properties:

(14) $\partial s^*/\partial t_i = (1 - s_w)(1 - t_w)\beta + (1 - s_c)(1 - t_p)\beta + g > 0$
(15) $\partial s^*/\partial t_w = (1 - s_w)(1 - t_i)\beta > 0$
(16) $\partial s^*/\partial t_p = (1 - s_c)(1 - t_i)\beta > 0$
(17) $\partial s^*/\partial g < 0$

Equations 13-17 show that an increase in any kind of tax rate will raise the social savings rate and the warranted growth rate while an increase in the government spending ratio will have the opposite effect.[14] Together, these results suggest that there may be an optimal tax and spending policy such that an increase in the government spending is accompanied by a greater increase in any one or all of the three tax rates. By increasing the social savings rate, s^*, this policy would also raise the warranted growth rate.

Figure 1 shows an increase in the aggregate tax rate, θ, caused by raising the indirect tax rate, t_i, from 0.1 to 0.14 while the government spending ratio, g, is increased from 0.3 to 0.33.[15] The warranted growth rate rises and this increase is accompanied by an increase in the social savings rate and a fall in the budget deficit (not shown) since the tax rate rises more than the government spending ratio does.
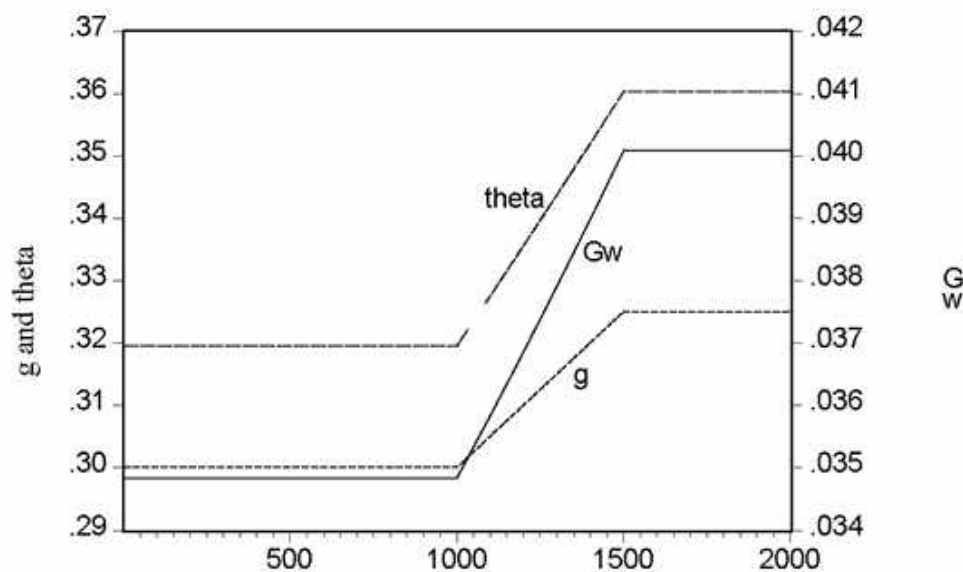
Figure 1. An increase in the warranted growth rate accompanied by an increase in the government spending ratio and the aggregate tax rate.
Note: Gw = warranted growth rate, g = government spending/GDP and theta = aggregate tax rate

One of the surprising implications of equation 13 is that all the tax rates are equivalent in terms of their effect on growth. This was, however, anticipated by R.F. Kahn (1959) who noted the positive effect on growth of higher taxes on profits and the relationship between all three types of tax rates, the social savings rate, and economic growth. As did Joan Robinson with regard to the 'bastard golden age' (Robinson 1970, p. 139), Kahn also recognized the importance of the social savings rate for the growth rate (Kahn 1970, pp. 152--153) in the event that the wage share does not fall so as to raise the growth rate.[16] Using Joan Robinson's growth framework, Kahn concluded the following about taxation policy and the savings rate:

> There is a practical reason why it is important to consider the implication of the degree of thriftiness. In the usual models of economic growth, such as Mrs. Robinson's golden age, the State is left out of the picture and in particular there is no room for saving by the State. Now, an economy might be developing as a golden age *but, thriftiness being low, the methods of production are often so primitive, as a result of the scarcity of capital, that the word 'golden' is a mockery.* The practical question which then arises is whether the economy would not be in a happier condition if the State were contributing to saving out of the proceeds of higher taxes. For the purpose of the analysis one can regard such State saving as assimilated into the simpler model which disregards it. *For in so far as it is financed by taxation of profits its effects are the same as those of a higher capitalists' savings coefficient; in so far as it is financed by indirect taxation, it is equivalent in its effects to those of higher savings coefficients for both capitalists and wage-earners, to the extent of their consumption of taxed commodities* (Kahn 1970, p. 148. Emphasis added).

One may, in fact, substitute the budget deficit into Kahn's derivation of Robinson's model (ibid., pp. 141--142) to illustrate his point.

The virtue of a tax function such as equation 10a is that it can incorporate an appropriate tax policy mix, including if necessary a cut in profits taxes, which is *consistent with an increase in the social savings rate, government spending ratio and a higher warranted growth rate*. On the other hand, it is far from obvious that modest increases in taxes out of profits (whether business taxes or higher taxes on capitalist household income) will inevitably affect private investment adversely. Certainly, if such a policy were accompanied by a broad array of "investment friendly" policies,[17] private investment might even be boosted.

The tax function equation is fairly parsimonious in that it includes only three types of tax rates. One could make it more complex by adding other types of tax rates.[18] Furthermore, policymakers can exploit an additional degree of freedom if the indirect tax rate, t_i, is disaggregated into separate taxes on capitalist household consumption ("luxury" consumption) and working class consumption, respectively. In contrast to IMF-style "austerity" programs which entail across-the-board increases in sales taxes, this last policy could involve further manipulations of the tax rates in order to couple increases in the government spending/output ratio with a higher warranted growth rate.

An important implication of these particular policy outcomes is that there does not have to be a trade-off between long-run grown economic growth and increased government expenditures, say on social spending. This trade-off is crucial to neoclassical policies (Atkinson 1999). Further, in contrast to neoclassical concerns (Drèze and Malinvaud 1994), such policies can also be consistent with a falling budget deficit ratio and the national debt/GDP ratio.

Public Investment in Keynes/Harrod/Domar

The taxation policy discussion abstracted from the *type* of government spending. However, for Keynes (1936), Harrod (1973), and Domar (1957) an important element of fiscal policy was the composition of government spending, i.e., the relative proportions of public investment and consumption spending in total government spending. Especially with regard to the long run, Keynes came out in favor of a "comprehensive socialization of investment" (Keynes 1936, p. 378) since for him it was not just a question of *any* type of demand injection but rather one that was productive:

> I have been advocating government expenditure without much reference to the purpose to which the money is devoted. The predominant issue, as I look at the matter, is to get the money spent...*[b]ut productive and socially useful expenditure is naturally to be preferred to unproductive expenditure*," (Keynes 1982; cited from Smithin 1989. Emphasis added).

Domar (1957, p. 60) also emphasizes that public spending be preferably of the productive kind.

In the final sections of chapter seven in *Economic Dynamics* (1973) Harrod argues that in the undersaving scenario when private saving is inadequate,

> ...it should be supplemented by official saving *and* official investment of like amount. A mere Budget surplus will not cause countries in these countries to move in the right way. A parallel increase of investment is also required. In the foregoing, I have referred to this investment as investment by the official authorities. (ibid., p. 115)

In other words, Harrod is relating an increase in public investment expenditures to a decrease in public consumption. This proposal was the same as Keynes' proposals regarding the composition of the government budget. In fact, as some authors (Smithin 1989; Kregel ,1993; Brown-Collier and Collier 1995) have pointed out, Keynes was not "a wild-eyed deficit spender" (Kregel 1993, p. 436) but had in fact a very different kind of fiscal policy in mind. Keynes' proposed an 'ordinary' (or current) budget and a capital budget for the public sector; in the long run the current budget was to be either in balance or in surplus. The savings generated from the current budget would be used to finance public investment and/or paid down the public debt. For Keynes, public investment, rather than fine tuning from budget deficits, was the key to the achievement of full employment in the long run. Keynes stressed that public sector firms would need to operate on a profitable basis and, as with private firms, would finance their investments both by the surplus on the current budget and by borrowing. The profits generated in this sector would pay back the interest and principal on this debt (Kregel 1993, p. 437).

The question is, how is public investment supposed to raise output and employment? The answer appears to be quite obvious from the standpoint of Keynes' multiplier: public investment constitutes an additional source of demand. However, provided there is excess capacity, *any* type of government spending would do the job and the composition of the latter is irrelevant. This would explain why in Keynesian models (Godley 1999) public investment plays no special role and is subsumed under general government expenditures. And yet, how can this unimportant role of public investment within the multiplier framework be reconciled with Keynes' emphasis that it plays a major part in regulating long-run output and employment? This latter policy prescription was, after all, the social philosophy towards which Keynes wanted *The General Theory* to lead to.

The puzzle about public investment becomes no clearer when one examines Harrod's proposals. Although, as stated above, Harrod (1973) came out in favor of this type of investment, in Harrod (1939) he showed that it actually *lowers* the warranted growth rate.[19] Harrod modeled public investment as completely autonomous spending so that it neither responds to current demand nor adds to capacity.[20] If it is denoted as I_g^{aut} and public consumption $= C_g$ (so that total government spending $G = C_g + I_g^{aut}$), then it can be shown that the warranted growth rate becomes:

(18) $G_w = (s_p + \theta - c_g - I_g^{aut}/Y)/v$

where s_p = private savings rate and $c_g = C_g/Y$. Thus, other things held constant, an increase in I_g^{aut}/Y will absorb a greater proportion of the savings corresponding to the warranted growth rate and will lower it.

The only way to reconcile this *impasse* would be to split up public investment into two components.[21] One component would be I_g^{aut}, as above, and other would be the induced investment undertaken by public sector firms, I_g^{ind}, which would respond to demand via the accelerator and add to capacity. That is, the following *public sector investment function* is proposed:

(19) $I_g = I_g^{aut} + I_g^{ind} = I_g^{aut} + v_g(Y_t - Y_{t-1}) = I_g^{aut} + v_g \Delta Y$

where v_g = public sector's acceleration coefficient (capital-capacity ratio) and $I_g^{ind} = v_g \Delta Y$.

Thus total government spending is now split up into three components. One portion is public consumption and the other one comprises two types of investment, only one of which adds to capacity.

(20) $G = C_g + I_g^{aut} + I_g^{ind}$

The national income identity now becomes:

(21) $(I_p + I_g^{aut} + I_g^{ind}) = S_P + (T - C_g)$

where I_p = private business investment and $(T - C_g)$ = public savings. If v_p = capital-capacity ratio of private sector firms and v_g = capital-capacity ratio of public sector firms then $I_p = v_p \Delta Y$ and $I_g = v_g \Delta Y$. Substituting these last two expressions into equation 21, dividing through by Y and setting $G_w = \Delta Y / Y$ we get

(22) $G_w = (I_p/Y + I_g^{ind}/Y)/(v_p + v_g) = [s_p + \theta - c_g - I_g^{aut}/Y]/(v_p + v_g)$

where $s_p = S_P/Y$, $\theta = T/Y$, and $c_g = C_g/Y$.

Let $i_g^{aut} = I_g^{aut}/Y$, $i_g^{ind} = I_g^{ind}/Y$, θ^* = taxation rate net of interest payments by the government, ΔD_g = flow of government borrowing and, by dividing equation 20 by Y, $g = c_g + i_g^{aut} + i_g^{ind}$, Then if the flow of borrowing relative to output is given, the government budget restraint relative to output is given by

(23) $g - \theta^* = i_g^{aut} + i_g^{ind} + c_g - \theta^* = \Delta D_g/Y$

Given θ^* and $\Delta D_g/Y$, a relative decline in c_g and/or i_g^{aut} would entail an increase in i_g^{ind} which, from equation 22, would raise the warranted growth rate. *It should be noted that this policy does not entail an additional injection of demand* but rather one which involves a compositional change of government spending. It should be emphasized that a decrease in c_g and/or i_g^{aut} does not have to entail dramatic cutbacks in these types of spending, but rather slower growth rates of the level variables, C_g and I_g^{aut} respectively, relative to output growth. Finally, following section 2.1, the tax rate could be raised so as to finance an increase in i_g^{ind}, given c_g and/or i_g^{aut}.

It is noteworthy to point out that this policy stance of separating out the government budget into a current and capital account has never been implemented by any country (Kregel 1993). Many countries have also in recent years pursued either fixed budget deficit or balanced budget targets. These two features of fiscal policy, along with the fact that some elements of spending are exogenously fixed, imply that the state has relatively little margin of manoeuvre under current policy arrangements. When the pace of economic activity produces large and unsustainable budget deficits, the tendency has been either to reduce public investment so as to allow room for greater spending on the current budget or to cut all types discretionary public expenditures. Not surprisingly, austerity policies have become the common economic agendas of both right-wing and left-wing political parties (Mishra 1999).

CONCLUSION

Four implications follow from this paper. First, it uses state policies to provide a solution to an important problem that the growth literature confronted after Harrod's formalization of the warranted growth path framework (Sen 1970). The problem can be posed as follows. Assume that n = growth rate of the labor force and m = growth rate of productivity so that the natural growth rate equals n + m. In the absence of the budget deficit the warranted growth rate equals s_p/v. The problem is summarized as follows by Sen (1970, p. 15):

> If the warranted growth rate...and the natural growth rate...equal each other, people live happily ever after; but what if the rates don't? If the economy is having steady growth at the warranted rate and if that rate exceeds the natural rate, the full-employment barrier will be encountered once the initial slack is absorbed and the economy would no longer be able to grow at the warranted rate...On the other hand, if the warranted growth rate falls short of the natural rate, then a growing proportion of unemployment will emerge. Equilibrium growth at full employment has to go, it seems, along a narrow path in between the twin dangers of Scylla and Charybdis...Are there any adjustment mechanisms that can bring the 'natural' rate closer to the 'warranted' so that the economy can grow at full employment (or at a constant rate of unemployment)?

Clearly, since the condition

(24a) $s_p/v = n + m$

needs to be satisfied, all four variables can be made to adjust to produce the full employment growth rate. The contribution of the subsequent growth literature has been to propose a variety of mechanisms that would make these variables adjust so as to bring about the above equality.[22] One such method would be via a worsening of income distribution. Growing unemployment when the warranted growth rate, G_w, is less than the full employment growth rate, G_n, would entail a decrease in the wage share and an increase in the profit share. Given the capital-capacity ratio, the higher profit rate would eventually raise G_w to G_n. In the current paper, it is assumed that the state authorities are not willing to let the wage share fall and unemployment exist for an extended period. By introducing state policies, this paper has proposed two policy mechanisms by which the equality

(24b) $s^*/v = n + m$

could be satisfied where s^* is the taxation-adjusted social savings rate. As with the so-called Cambridge models discussed by Sen, the

convergence to the full employment growth path requires modulations of the savings and investment ratios by appropriate policies.

Second, Harrod's *central paradox* raises questions about straightforward expansionary fiscal policies based on the multiplier. Clearly, the main question here pertains to the length of the short run. In other words, for how long are firms willing to ignore any discrepancies between capacity and demand? Traditional models in the Post Keynesian perspective either leave this question unanswered (Palley 1996; Godley 1999) or assume that excess capacity is persistent (Taylor 1985; Lavoie 1996). This was not the view of Harrod and Domar. It is also noteworthy to point out that it was not the view of Keynes either who argued, as a criticism of Kalecki that he was

> ...still innocent enough to be bewildered by the idea that the assumption of all firms always working below capacity is consistent with a long-run problem (Keynes 1983; cited from Lavoie 1996).

Future research has to gauge the length of the short run empirically, so as to allow policymakers to pursue the traditional Keynesian expansionary policies, based on the multiplier), when necessary. On the other hand, it has also been shown that reliance on the social savings rate in the long run does not imply the relevance of austerity measures. Judicious tax and expenditure policies provide the basis for increases in government spending, including a greater degree of capacity-augmenting public investment.

Third, the role of the social savings rate in the Harrod-Domar framework is not surprising since it reflects the view that capacity utilization is at the normal level in the long run. As Lavoie (1995) points out, this view of the long run was a common feature of the early Post Keynesian models of growth, including those of Robinson (1962) and Kaldor (1957). New models in the Post Keynesian tradition are more Kaleckian in nature, since they assume the persistence of excess capacity. This schism suggests that the policy implications in the long run are also different in these two strands of the Post Keynesian tradition.

Fourth, and finally, the paper has implicitly distinguished between a *conventional* and an *unconventional* scenario. In the former, following current practice, the government's expenditure has not been split up into a current and capital budget. Taxation policy is also fairly conventional, entailing increases in indirect taxes and/or wage taxes (Mishra 1999) and possibly cuts in business taxes. It is shown that even within this scenario the higher aggregate tax rate allows room for the government spending ratio to increase, so that the higher warranted growth rate produces lower budget deficit and national debt ratios.

The unconventional scenario is such for two reasons. First, it proposes an expansion of investment by public sector firms to supplement private investment and, as Kahn (1959) recognized, an increase in the tax rate on profits. This goes clearly against neoliberal stabilization policies. Second, following Keynes, it proposes that the government budget be split up into an 'ordinary' or current budget and a capital budget so that public investment projects would be financed through some combination of debt finance and a surplus on the current budget. The latter could be achieved via a mix of a higher tax rate and limits on certain types of public consumption expenditures.[23] Capacity-enhancing public investment thus provides policymakers with an additional tool to raise the warranted growth towards the natural rate when private investment is insufficient.

The current state of the debate on fiscal policy either assumes long-run full employment or long-run excess capacity. This paper does not raise questions about the latter way of modeling the long run. Instead, following Harrod-Domar and the early Post Keynesian models, it pursues a more conventional way of modeling the long run in which unemployment coexists with a normal rate of capacity utilization. It shows that such a vision of the long run requires policies that go beyond austerity measures or simple demand management strategies, even though it allows for the latter as short-run measures. We can conclude that a broadly based heterodox policy program, by allowing for both excess and normal capacity, has to be flexible and adaptable to different circumstances.

> The prime aim of Keynes was to persuade economists that demand, not supply, determined output and employment...in that he was dramatically successful. But when one considers more closely the possible dynamical consequences, problems arise. *From any continuing alteration in public spending and taxing there will occur first acceleration, then to be followed by deceleration* ...Harrod, who had followed the development of *The General Theory* , saw clearly that its basic shortcoming lay in the dynamical problem...To lift employment to any desired degree of fullness and maintain it, then requires a very ambitious, dynamically variable policy (Goodwin 1997, pp. 162--163. Emphasis added).

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NOTES

1 The government spending or budget deficit ratio refers to these variables relative to output.

2 Note that for the sake of convenience the bulk of the paper draws mainly on Harrod's growth equation although its properties are the same as those of Domar (Domar 1957). Further, in contrast to Domar, the policy extensions proposed in this paper follow quite naturally from Harrod's key publications such as his *Economic Dynamics* (1973).

3 Defined as the private savings/GDP + government savings/GDP.

4 The normal rate of capacity utilization includes some degree of reserve capacity in order to absorb demand fluctuations.

5 See Shaikh (2001) for a discussion about the significance of the different ways that investment is modeled in Keynes and Harrod, the theoretical links between Keynes's multiplier and Harrod's warranted growth model and some policy implications of the latter.

6 "Being on a knife-edge is an extreme case of unstable equilibrium. I never suggested that the warranted growth rate had an extreme instability of this sort...I have to protest against the knife-edge nomenclature, because it sounds utterly unrealistic and even a trifle ridiculous, and might distract the reader's mind from giving serious attention to what I have to say about instability" (Harrod 1973, p.33).

7 Let C = private consumption, G = government (consumption), I = private investment, and T = tax revenue. Then from the national income identity Y - T - C = I + G - T so that S = I + G - T. Let S = s(Y - T) so that s(Y - T) = I + G - T. Dividing through by Y and remembering that the warranted growth rate is G_w and that θ = T/Y we get G_w = [s(1 - θ) + (θ - g)]/v where v = capital-capacity ratio. This derivation uses a tax function (T = θY) of the simplest kind in order to make the point. See later for a more elaborate tax function in order to investigate various policy options.

8 See Duménil and Lévy (1999) who show that expansionary policies yield Keynesian results in the short run and classical ones in the long run.

9 The directly proportionate relationship between the savings rate and the warranted growth path is, however, missing in Kurz's (1992) discussion. Kurz begins with the growth equation
$g_K = s_c ru$ (a)
where gK = growth rate of capital, sc = capitalists' savings rate, r = actual profit, and u = capacity utilization rate. Kurz argues that cost minimization by firms requires that u = 1 in the long run so that the warranted growth rate is
$g_K = s_c r^*$ (b)
where r^* = normal rate of profit. Given income distribution and technology, a fall in s_c will lower the warranted growth rate. Kurz, however, does mention this implication of the requirement that u = 1.

10 In both policy options, it will be assumed that the undersaving scenario holds.

11 This latter possibility, not discussed in the Marglin (1984) paper, is also evident from equation 33 in his paper, which is the classical savings function adjusted for government expenditure and a tax rate on capitalist income.

12 However, this relationship was recognized by Kalecki (1937) within a business cycle context. Using a Kaleckian framework, Laramie and Mair (1996) discuss several scenarios in which raising taxes on profits stimulates investment.

13 In Pasinetti's original model, a portion of profits also accrued to workers. Pasinetti's original model also began with a government consumption function, G = (1 - s_T)T, where s_T is the government's savings propensity and can be greater than or equal to or less than zero. Given s_T, this, however, makes the government spending ratio, g, change endogenously in the same direction when the tax rate, θ, changes. The goal of the current paper is to explore the possibility of changing g independently of θ so that policymakers have two

policy instruments to raise alter the warranted growth rate. Thus, the function $G = gY$ is used. The government spending ratio is implicitly or explicitly treated as an exogenous parameter in all the early Keynesian growth models, such as those of Harrod, Domar, and Robinson (Sen 1970).

14 Equation 14 also shows that the higher is the level of g, the more responsive will s^*-and thus the warranted growth rate-be to a given increase in t_i.

15 The parameter values are as follows: $\alpha = 0.8$, $\beta = 0.2$, $s_w = 0.1$, $s_c = 0.15$, initial value of $t_i = 0.1$, $t_W = 0.2$, $t_P = 0.3$, initial value of $g = 0.3$, and $v = 3$.

16 Referring to the so-called bastard golden age, he said "[I]t is the shortage of capital which is the cause of such unemployment and the remedying of the shortage depends on the readiness of those who are in employment to make a temporary sacrifice on their real wage rate. And of course thrift here again operates as an influence on the rate of growth-the greater the savings propensities, the more rapidly will the shortage of capital be overcome and unemployment be eliminated (Kahn 1970, p. 153)

17 Including increased government expenditures on health, education, and R&D all of which would probably raise productivity and lower business costs. "Since government is absorbing a part of savings, it is of course desirable that its expenditures be productive...If healthier people are more productive, expenditures on public health satisfy these requirements. The same holds true for expenditures on education, research, flood control, resource development, and so on" (Domar 1957, p. 61).

18 An example might be a "Tobin tax" on foreign exchange transactions (Arestis and Sawyer 1999), which could be manipulated in order to produce the above outcomes. See Pechman (1989) about other types of taxes.

19 As Trezzini (1995) argues, *any* kind of spending that does not create capacity has this property of lowering the warranted growth path.

20 Public investments of this type might correspond to the long-term "nation building" needs of a society.

21 See Sardoni and Palazzi (2000) for an interesting application of capacity augmenting public investment spending within the context of Domar's growth model.

22 See Sen (1970) for the references to this literature.

23 As Kregel (1993, p. 444) suggests: "A positive impact could be achieved by reversing the trend towards increasing transfer payments and offsetting this with increased capital expenditures. The possible decline in defense expenditure should make this possible."