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Harrod versus Thirlwall:
A Reassessment of Export-Led Growth

by
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INTRODUCTION

Global economic integration and the gradual dismantling of barriers to trade and capital mobility have raised important questions in several circles about macroeconomic policy. These questions about the role of economic policy in this period of global *laissez faire* are of special relevance now given the contemporary worldwide economic stagnation and mass unemployment. Persistent trade imbalances in many countries have added a certain measure of urgency to these discussions, not only because of the question of the stability of foreign debt/GDP ratio but also because these imbalances have direct and indirect impacts on domestic interest rates, investment, output, and employment. The economic crisis that has ravaged East Asia in recent years highlights the gravity of these issues. The significance of global *laissez faire* can not only be discerned in academic conferences (Eatwell, 1995) and in the concerns of the labor movement, but also in discussions amongst certain sections of the business class which, whatever their motivations, are beginning to voice their own concerns about the impact of globalization.(1)

The critical problems that plague many countries in the contemporary world economy are mass unemployment, economic stagnation, and large trade deficits. The orthodox policy prescriptions that are used to rectify these problems have as their basis the open economy extension of the ISLM model (the Mundell-Fleming model) or the monetary approach to the balance of payments (Dernberg, 1989). These models make the usual neoclassical assumptions with regard to the law of comparative advantage, the exogeneity of money, and full employment although the Mundell-Fleming model does allow for short-run unemployment. On the whole, the orthodox perspective holds that the removal of market "rigidities" and imperfections, along with contractionary fiscal and monetary policies and exchange rate devaluations would bring about appropriate price movements that would raise the long-run growth rate, restore full employment, and correct all trade imbalances.(2)

In the heterodox literature, open economy models in the Keynes/Kalecki tradition have provided the most significant alternative to those of the neoclassical tradition. The key feature of these models is the assumption that unemployment and excess capacity are structural features of the capitalist economy. Thus, in contrast to neoclassical models, exogenous demand growth from exports plays a central role in the accumulation process. Pioneering work on export-led growth was done by Beckerman (1962) and Lamfalussy (1963).(3) Thirlwall's famous model (Thirlwall, 1979; Thirlwall and McCombie, 1997) is the contemporary extension of the earlier work in this tradition. In fact, the so-called Thirlwall's law is *the* model of export-led growth that is used the most widely in the heterodox literature; in some sense, it has become the workhorse of heterodox analyses of open economy macrodynamics.

This paper seeks to investigate the effects of foreign trade within a new context. It has its roots in the dynamic perspectives of Quesnay and Marx which in the modern times was revived by Harrod in his seminal work on growth and cycles (Eltis, 1998). Its central purpose is to demonstrate that an endogenous growth and cycles model which is in this classical-Harrodian tradition offers a number of insights which show the importance of *both* demand- and supply-side factors.(4)

The first part of the paper analyzes Thirlwall's model. It is followed by a discussion of Harrod's approach to open economy macrodynamics, drawing especially on his last book, *Economic Dynamics* (1973). The aim of the discussion on Harrod is to show that his approach to export-led growth was, in some fundamental ways, very different from that of Thirlwall. It is shown in this section that Harrod's perspective differs from Thirlwall in three fundamental ways. This distinction reflects that between Keynes' static perspective and the dynamic tradition of the Physiocrats, Marx, von Neumann, and Harrod (Kregel, 1980; Chakravarty, 1989; Eltis, 1993, 1998).

To begin with, Harrod's was a dynamic perspective in which the balance between aggregate demand and supply defined a path, rather than a level, of output. Further, by recognizing that investment has both a productive capacity-enhancing effect as well as an aggregate demand-creating one, Harrod was able to derive an endogenously generated growth path. Unlike Post Keynesian models such as those of Thirlwall or Godley (1999), government spending or net exports are not fundamental to the growth process in Harrod.

Finally, as in classical economics, the rate of capacity utilization in Harrod along the warranted path is at the normal level. In contrast, Post Keynesian models assume that excess capacity is persistent. Normal capacity growth necessarily implies that, given the capital-output ratio, the long-run growth path is regulated by the social savings rate, s - (g - t) - (x - m), where s is the aggregate private savings rate, (g - t) is the budget deficit -to -output ratio, and (x - m) is the trade balance -to-output ratio. Contrary to the Post Keynesian view (Thirlwall, 1998), a supply-side constaint does not at all imply an economy which is resource-constrained at the full employment level. In fact, the focus of Harrod's policy analysis in *Economic Dynamics* was to lower the rate of unemployment by modulating the warranted growth path with appropriate expansionary policies.

The final two sections of the paper deal with empirical and policy issues. Data and Granger causality tests on the open economy social savings rate and GDP growth are presented for a number of OECD countries. While further econometric studies are carried out in Moudud (2000b), this preliminary work points to the importance of the social savings rate, as one would expect from the classical and Harrodian perspectives. The policy implications that follow are in some ways distinct from both the Post Keynesian and neoclassical perspectives. Thus, the paper concludes that Harrod's approach was very different from the Post Keynesian one. In this respect, this central proposition is diametrically opposed to the assertions of Thirlwall (1998) and McCombie (1998) who claim that their framework is consistent with Harrod.

THIRLWALL'S EXPORT-LED GROWTH MODEL

In his balance of payments constrained growth model (Thirlwall, 1979), Thirlwall argues that countries grow at different rates because demand grows at different rates. The principal reason why constraints on demand exist in open economies is the balance of payments. If demand grows at a rate which makes the country run into balance of payments difficulties before the short-term capacity growth rate is reached, then demand has to be curtailed and supply will not be fully utilized. This leads to a fall in investment and a slow down of technological progress. By adversely affecting productivity, the country loses its competitive edge, leading to a worsening of its balance of payments. It enters a vicious cycle.

Conversely, if demand in a country can rise up to the level of existing capacity, without encountering balance of payments difficulties, the pressure of demand upon capacity can actually produce a rise in the capacity growth rate. This could happen by investment in capital stock and increasing technical progress.

Thirlwall argues that this is in essence the rationale for export-led growth since the expansion of exports stimulates growth without at the same time leading to a deterioration of the balance of payments. Furthermore, the same rate of export growth among different countries will not necessarily produce the same rates of domestic growth since they are likely to have different import elasticities of demand. Thus some countries will have to restrict demand and growth so as to obtain equilibrium in their balance of payments.

Thirlwall derives his formal model by assuming balance of payments equilibrium in the current account:

1. $pX = p^{*}M\epsilon_{n}$

where X and M are the quantities of exports and imports respectively, p is the price of exports in domestic currency, p^{*} is the price of imports in foreign currency and ϵ_{n} is the nominal exchange rate. In growth form,

2. $$\frac{p'}{p}+\frac{X'}{X}=\frac{p^{*\prime}}{p^{*}}+\frac{M'}{M}+\frac{\varepsilon_{n}'}{\varepsilon_{n}}$$

Equation 2 defines the condition which is necessary for Thirlwall's balance of payments equilibrium growth rate g_{YB}, i.e., that growth rate at which the growth of the value of exports equals the growth of the value of imports.

After specifying the demand functions of exports and imports as multiplicative functions of the prices of exports and imports, domestic and foreign incomes, he derives the following equation for the balance of payments equilibrium growth rate:

3. $$g_{YB}=[g_{p}(1+\varphi-\Phi)-g_{p^{*}}(1-\delta+\Gamma)-g_{\varepsilon_{n}}(1+\varphi+\Gamma)+\psi g_{Y^{*}}]/\pi$$

Here Γ = own price elasticity of demand for imports ($\Gamma < 0$); Φ = cross elasticity of demand for imports ($\Phi > 0$); π =

income elasticity of demand for imports ($\pi > 0$); φ = own price elasticity of demand for exports ($\varphi < 0$); δ = cross elasticity of demand for exports ($\delta > 0$); ψ = income elasticity of demand for exports ($\psi > 0$); g_{En} = percentage change in the nominal exchange rate; g_p = growth rate of domestic prices; g_{p*} = growth rate of foreign prices and g_{Y*} = growth rate of world income.

Thirlwall then makes two assumptions: (1) without providing a rationale, he assumes that own and cross elasticities of prices are equal to each other ($\Gamma = \Phi$ and $\varphi = \delta$) (2) over the long run relative international prices are stable ($g_p - g_{p*} - g_{En}$) 0. Using these assumptions we finally come to the most important relationship in his theory,

4. $g_{YB} = g_X / \pi = \psi g_{Y*} / \pi$

This equation describes the long-run balance of payments equilibrium growth rate g_{YB} which is determined by the growth rate of exports g_X divided by the income elasticity of demand for imports π. In other words, the balance of payments equilibrium growth rate of a country is determined by the ratio of world income elasticity of demand for its exports to its income elasticity of demand for imports multiplied by the growth of world income.

Thirlwall's model has the following implications. First, a higher foreign income elasticity of demand for exports relative to the domestic income elasticity of imports will raise the growth rate. Second, the domestic growth rate will increase with the foreign growth rate. Third, in the absence of imperfect markets, a continuous nominal exchange rate depreciation will boost exports and improve the growth rate. Purchasing power parity (PPP) is assumed to hold in the long run.

Why is primacy given to net exports in Thirlwall's model? How about the other components of demand? By assuming that the real terms of trade are fixed and that over the long run trade is in balance, equation 4 can be shown to be the dynamic equivalent of the Harrod foreign trade multiplier or the Hicks super-multiplier (Thirlwall and McCombie, 1997; McCombie, 1998). McCombie (1998) shows that equation 4 is equivalent to the working of the Hicks supermultiplier:

5. $g_{yB} = (\frac{1}{k})(xg_x + ag_a) = g_x/\pi$

where x = export share, a = autonomous expenditures share, g_a = growth rate of autonomous expenditures, and k = 1/(1 - c + t_d + t_i - h + i) where c = marginal propensity to consume, t_d and t_i are the marginal propensities to tax (direct and indirect), h = marginal propensity to invest and i = marginal propensity to import. This equation shows all the sources of demand. However, primacy is given to exports as they constitute the only demand source that simultaneously relaxes the balance of payments constraint while stimulating income growth. All the domestic sources of demand would worsen the balance of payments because the higher income growth would raise imports.

As Harrod was to argue with Keynes (Kregel, 1980), Thirlwall's is basically a *static* approach since the assumed equilibrium between aggregate demand and supply defines a level, rather than a path, of output. Not surprisingly, growth takes place only via the growth of exogenous demand, which is a standard feature models in the Keynes/Kalecki tradition.

Finally, Thirlwall's model raises the following two issues. First, his basic thesis is that if a country is able to expand demand without running into balance of payments difficulties then the pressure of demand upon capacity will raise the growth rate of capacity. If it is true that his is a model of long-run growth, what is assumed about long-run capacity utilization? If over the long run his system grows along the warranted path, how does it respond when the pressure of export growth raises capacity utilization above normal? It would seem that in the absence of any endogenous feedback loops, the model will exhibit the same dynamic knife-edge instability as Harrod's original model. Of course, it is also possible that Thirlwall's model maintains persistent excess capacity, as is typical of the Keynes/Kalecki tradition. But then this raises the question as to why investment does not slow down. The feedback between the level of capacity utilization and investment was central to Harrod's analysis of the interaction between the actual and warranted growth rates.

Second, there is an empirical issue. According to the model, an improvement in a country's trade performance, shown by an improvement in its balance of trade, will raise its long-run growth rate. Figure 1 plots the trade balances and growth rates for Japan and South Korea. In the case of Japan, the trade balance - to - GDP ratio improved continuously and yet GDP growth declined throughout this entire period. South Korea also experienced a steady improvement in its trade balance/GDP ratio in roughly the same period and yet GDP growth rate remained virtually unchanged, although it was very high. Closer examination of the South Korean case shows that the trade balance share was roughly constant in the 1960-70 period when the growth rate was increasing. Moreover, in the 1970-1988 period when the trade balance share improved continuously, on average the growth rate was constant (with a sharp drop in the 1975-80 period). None of these country experiences shows either a closing of the trade imbalance or that "in an open economy exports are the only true component of autonomous demand" (Thirlwall, 1998, p. 186). Similar patterns can also be found for other economies. Do these apparently perverse movements of growth and the trade balance imply that the improvement of the trade balance is of no benefit to an economy? Certainly not. Instead, one needs to ask whether there might not be additional or more fundamental factors driving growth. To deal with this issue, we need to first discuss Harrod.

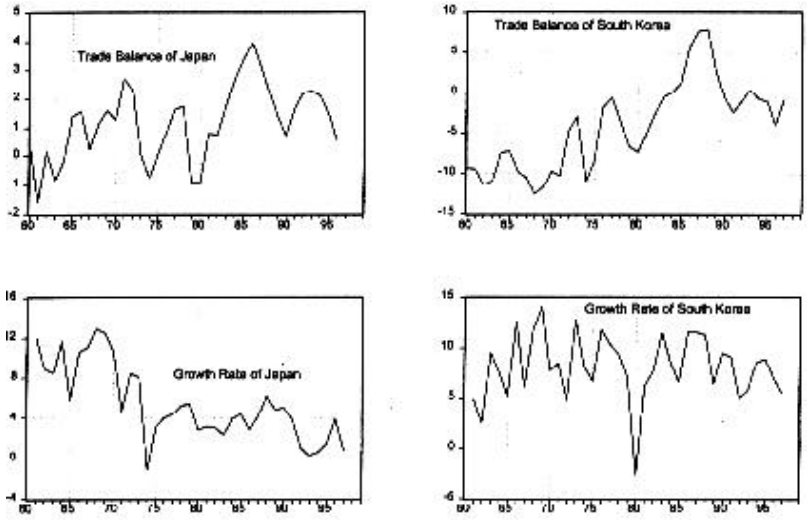


Figure 1. Growth Rates and Trade Balances of Japan and South Korea
(Source: World Development Indicators, World Bank)

OPEN ECONOMY MACRODYNAMICS IN HARROD'S CYLICAL GROWTH PERSPECTIVE

In order to better understand the context in which Harrod carried out his analysis of expansionist policies in general and net exports in particular, we must recapitulate his particular contributions to growth theory. Basing his discussion on the Harrod-Keynes correspondence (Keynes, 1973a, 1973b), Kregel (1980) summarizes the key differences between Harrod and Keynes (and his followers) with respect to growth. Harrod's central argument was that the economy should be characterized as one undergoing a rate of "steady advance" (Harrod, 1939), i.e. his view was that in a dynamic model of the economy output should be in terms of *rates of change at every point in time* rather than in levels. Furthermore, business cycles should be described as fluctuations around the trend rate of growth of output, i.e. his central concern was with growth cycles.

Of course, it is definitionally true that growth involves a time rate of change of output. The question is, how does this growth of output actually take place? For Keynes, the point of departure of a model of the economy was to be a given *level* of output and once-over changes in output levels were to be determined in the long-run. Keynes' view was that Harrod's was a different approach to growth:

> You have shown I think, that steady growth can easily occur as the result of a miracle or intense design. But this is essentially a long-period problem, *and steady growth a long-period conception* . As I have said above I do not see that the theory has any application worth mentioning to the trade cycle. The maintenance of steady growth is at all times an inherent improbability in conditions of *laissez faire* ...Both the boom and the slump, that is to say the whole of the cycle, are characterized, I should have thought, by none of the conditions of steady growth which you are assuming to be present. (Keynes, 1973a and 1973b, p. 173. Emphasis added)

Thus for Keynes, growth is both a long-run phenomenon and is exogenously determined. On the other hand, in addition to maintaining a continuous rate of change in output in the both the short- and the long-runs, growth in Harrod is endogenously determined via the normal investment and savings decisions of firms. Thus the basic characteristic of Harrod's growth model is that growth is both internally determined and financed *in a pure private sector closed economy* , an approach which is rooted in the dynamic tradition of the Physiocrats, Marx, Ricardo, and von Neumann (Chakravarty, 1989; Eltis, 1998). One can quite correctly conclude that the so-called "Keynesian revolution" completely abandoned this older and dynamic approach to output determination that one finds in the classical and Harrodian traditions.

Beginning with the balance I = ΔK = S = sY, Harrod derives the following equation for some general growth path:

$$6. \quad g_Y = \frac{\Delta Y}{Y} = \frac{s}{\kappa}$$

where is the incremental capita-output ratio and s is the private savings rate. Extended to an open economy with the government sector, the balance between injections and leakages implies that:

$$7. \quad g_Y = \frac{\Delta Y}{Y} = \frac{s-(g-t)-(x-m)}{\kappa}$$

It is interesting to note that in a dynamic specification of the economy, all variables get automatically introduced as *shares* of some other variable such as output or capital stock. One can see why this makes economic sense. Thus suppose x = X/Y. Then the steady state value dx/dt = 0 of a differential equation in x implies that either X and Y are growing at the same rates or that they are at some levels; the more general dynamic specification allows for both growth and stagnation. On the other hand, the solution dX/dt = 0 of a differential equation in X implies that X is not growing but is stuck at some level; thus the steady state is characterized by stagnation.

A further implication of the dynamic specification is that a one-time increase in the share of a variable will produce a long-run effect that will be different from a one-time increase in the level of that variable. This difference, while not analyzed by Harrod, is studied in Moudud (1999b) within the context of a classical-Harrodian model of cyclical growth. Furthermore, a fall in the share of a variable such as net exports is consistent with a *rise* in the level of net exports provided that this rate of increase takes place at a rate which is less that than the rate of increase of output or capital stock.

Harrod next discusses the characteristics of the *warranted growth path* g_Y^W which is the dynamic equilibrium growth path with normal capacity utilization along which all producers are satisfied with their production decisions. In the open economy case with the government sector, we get

$$8. \quad g_Y^W = \frac{s^d - (g - t) - (x - m)}{\kappa^d}$$

where s^d = desired private savings rate and ^{d} = desired capital-output ratio. An important implication of this equation is if the capital/output ratio is given, the warranted growth path is determined by the social savings rate $s^d - (g - t) - (x - m)$.

Harrod also introduces the *actual growth rate* g_Y which is determined by the actual savings rate and capital-output ratio. Thus the warranted growth rate is an *ex ante* concept since it is a reflection of the savings plans and production plans that are made with regard to demand expectations. On the other hand, the actual growth rate is an *ex post* concept reflecting what actually did take place (Harrod, 1939).

$$9. \quad g_Y = \frac{s - (g - t) - (x - m)}{\kappa}$$

Thus actual and warranted growths are equal when $s = s^d$ and $\kappa = \kappa^d$.(5)

Finally, Harrod also introduces the economy's *natural growth rate* g^n which is determined by the population growth rate λ and the rate of technological change τ:

10. $g^n = \lambda + \tau$

g^n is thus the maximum rate of growth allowed by population growth and technological change.

Harrod points out that along the warranted growth path, the desired savings rate is, so to speak, the "lord and master" whereas along the natural growth path savings is the "servant" since it is determined by population growth and technological change (Harrod, 1973, p. 100). The key to the analysis of open economy macrodynamics in Harrod is the relationship between the actual, warranted, and natural growth rates.

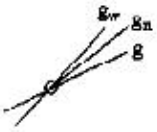
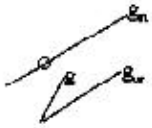
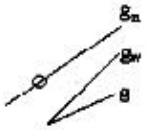
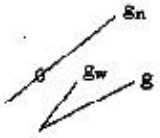
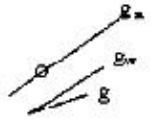
In Chapter 7, entitled "Problems and Conflicts", of *Economic Dynamics* (1973) Harrod discusses the relationship between these three growth rates and how expansionist policies affect them. Harrod argues that expansionist policies tend to have opposing effects on the warranted and actual growth paths: this is their "central paradox" (ibid. p. 102). Thus an increase in the trade surplus or the budget deficit will raise the actual growth rate while lowering the

warranted growth rate. Whether or not these results are good depends on what the natural growth rate is relative to the actual one.

Harrod argues that while the actual growth rate may from time to time exceed the natural growth rate, it cannot do so for any long period of time. On the other hand, the warranted growth rate may be less than, equal to, or greater than the natural growth rate. In the case that $g_Y^W < g^n$, the implication is that the economy's social savings rate is not high enough so that the warranted growth is lower than the optimal growth which is its natural growth rate. Harrod calls this situation the *undersaving scenario* which characterizes developing economies. On the other hand, if $g_Y^W > g^n$ then aggregate savings are excessive with respect to the growth rate which is necessary to maintain the economy at the natural rate of

growth. This is the *oversaving scenario* . Since the actual growth rate will be such that $g_Y^W > g^n > g_Y$, cumulative depressive forces will set in. Harrod calls the oversaving scenario the dynamized version of Keynes' stagnation thesis. We next turn to Harrod's analysis of the impact of foreign trade.(6)

Figure 2 illustrates the different growth scenarios. The slopes of these lines represent the relative magnitudes of the three growth rates. Cases 1- 3 describe the oversaving scenario since $g_Y^W > g^n$. An increase in the trade balance will lower the warranted growth rate case represents the problem faced by less developed countries. An improvement in the balance of trade will lower the warranted growth path, and thereby exacerbate long-run unemployment, even though it will raise the actual growth rate. The key issue is to raise the social savings rate. In all four cases, a potential for conflict exists between long-run unemployment, determined by the warranted path, and short-run unemployment which is determined by the actual growth path. In Case 4, an improvement in the trade balance raises the actual growth rate towards the natural one; however, this convergence towards full employment is accompanied by inflationary pressures and a higher rate of long-run unemployment. In Case 5, since $g_Y < g_Y^W$ the economy is in a recessionary situation so that a trade balance improvement will raise the actual growth rate towards the warranted growth path; short-run unemployment will fall without inflationary pressures, even though long-run unemployment will worsen. Cases 6 and 7 parallel Cases 4 and 5 respectively, save for the fact that the latter two cases begin with unemployment.

	Conflict or Harmony	1. Effect on full employment	2. Effect on full inflationary or deflationary pressure	3. Effect long-run growth equilibrium
	Harmony	Good	Good	Good
	Conflict	Good	Bad	Good
	Harmony	Good	Good	Good
	Conflict	Good	Bad	Bad
	Conflict	Good	Good	Bad
	Conflict	Good	Bad	Bad
	Conflict	Good	Good	Bad

To a reader whose framework of analysis is unambiguously the Keynesian short-period, it is understandable that there should be a certain degree of mental resistance to the argument that an improvement in the trade balance *by itself* would be bad for long-run growth. And yet this is an obvious implication for a growth path along which capacity utilization is at the normal level.

Two observations need to be made with respect to the relative movements of the actual and warranted growth paths. As discussed more explicitly in Harrod (1939), one implication is that a *worsening* of the trade balance will actually raise the warranted growth path! Harrod argues that this apparently paradoxical outcome makes sense if one remembers that a trade deficit involves an inflow of foreign capital or savings into the country to finance the deficit. However, this is clearly not a sustainable route to raising the warranted path since a growing trade deficit entails an increase in foreign debt. Two factors might inhibit the accumulation of this debt. To begin with, there is a well-known theorem in debt dynamics which states that in the event of a trade deficit, if the interest rate on the debt exceeds the country's growth rate the foreign debt/GDP rate will explode (Godley and Milberg, 1994). Further, even if this situation does not arise, the ability of the country to run the deficit will ultimately be determined by the willingness of foreigners to hold its liabilities, i.e. by their portfolio decisions. Thus the sustainability of the trade deficit will ultimately be regulated by whichever constraint arises first. One can thus conclude that there is a notion of a *balance of payments constrained growth path* in Harrod which, however, is distinct from that in Thirlwall because the theories of growth of the two authors are very different.

Second one needs to be cautious about the question of *stability* of Harrod's model. One has to commend Harrod for being one of the first authors to have formally shown the possibility of instability in the capitalist economy. However, the nature of this instability can be questioned. It is not particularly realistic to argue that departures of the actual from the warranted path will set into effect cumulative forces that will propel the economy towards positive or negative infinity. The capitalist economy does exhibit instability but there are endogenous forces within it that limit the extent of the instability. Thus, despite its obvious strengths, one may legitimately ask whether Harrod's knife-edge problem is, in fact, an accurate depiction of reality.

One may then ask, if the warranted path is basically unstable, of what use is Harrod's analysis for practical purposes? Compared to Thirlwall's model, it would appear that the illusory nature of the warranted path makes Harrod's framework of little more than academic interest. Indeed, if normal capacity growth is an impossibility then one would have to return to a stagnationist view of the economy in which growth can take place only via exogenous injections of demand. There is, however, room for optimism. The pioneering work done by Shaikh (1989, 1991, 1992) and their extensions by Moudud (1999a, 1999b, 1999c) stabilized Harrod's cyclical growth, and introduced a more elaborate financial structure. This research program has thus revived Harrod's growth project and makes it possible to study the effect of net exports in a dynamic context.

While the details of this *classical-Harrodian* perspective are discussed in Shaikh (1989) and Moudud (1999b, 1999c), two features should be mentioned here. First, the framework simulates two kinds of growth cycles, both of which are disequilibrium adjustments or processes. The *fast adjustment process* , or short run, involves the equilibration between aggregate demand and supply while the *slow adjustment process* , or long run, entails the equilibration between actual and normal capacity utilization. Second, two different mechanisms are used to stabilize the cycles. Business debt dynamics fuel the short-run cycle and retard deviations of the actual from the short-run growth path, while the interaction between fixed and circulating capitals ensures the stability of the long-run cycle.

Figure 3 - 5 show the stimulus given to the system when there is a jump in net exports.[(7)]

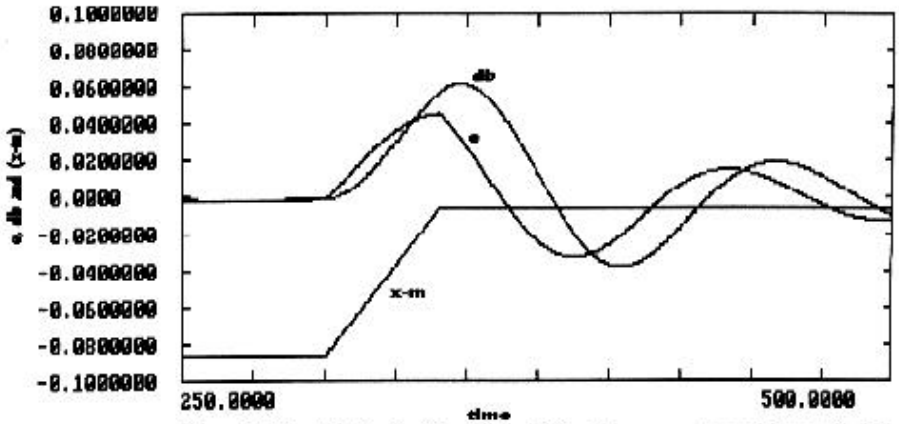


Figure 3. The Effect of a Rise in the Trade Balance on Excess Demand and Business Debt
(Note: This is a qualitative simulation, based on hypothetical data)

A rise in net exports raises aggregate excess demand, e, in the markets for goods and services. This stimulates investment and thus the demand for bank credit, d_B, by businesses. Thus money is injected via bank credit and directly from the net exports, because we are assuming a system of fixed exchange rates. The fast adjustment process is described by the *dual disequilibria* relationship:

11. $e = m_s - m_d$

where e = excess demand, m_s = money supply = $d_B + m_s^*$ (where d_B = bank credit to firms and m_s^* = money injected from the trade balance), and m_d = money demand ($\partial m_d/\partial i < 0$ where i is the interest rate). The cyclical effect in Figure 4 involves a disequilibrium adjustment between money supply and money demand so as to ensure that the cyclical variation of excess demand is not explosive. Figure 5 shows the effect of the stimulus on the actual growth rate of output.[(8)] In sum, the above simulations constitute the stable equivalents of Harrod's analysis of the relationship between the actual and the steady state growth paths.

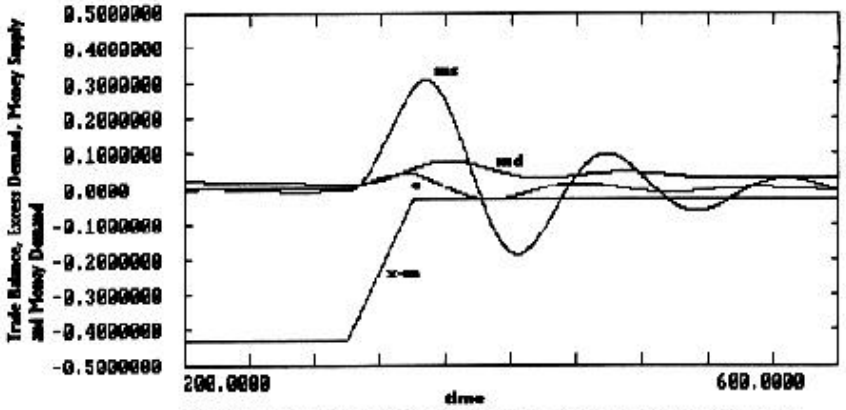


Figure 4. The Effect of a Rise in the Trade Balance on Excess Demand, Money Supply and Money Demand
(Note: This is a qualitative simulation, based on hypothetical data)

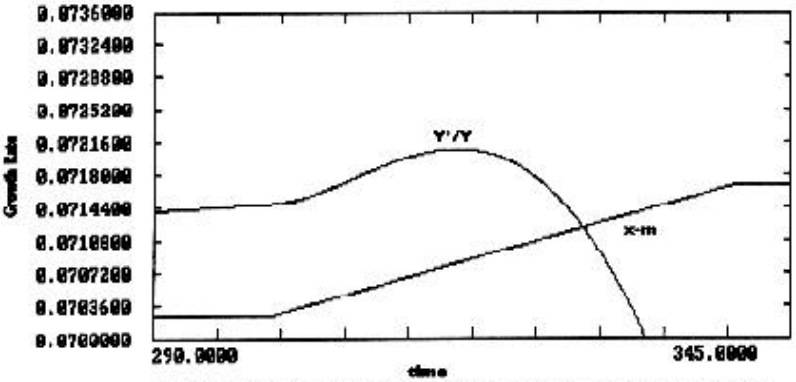


Figure 5. The Effect of a Rise in the Trade Balance on the Actual Growth Rate
(Note: This is a qualitative simulation, based on hypothetical data)

Figure 6 is the stable equivalent of Harrod's "central paradox" in which the warranted path is lowered because of an increase in net exports.

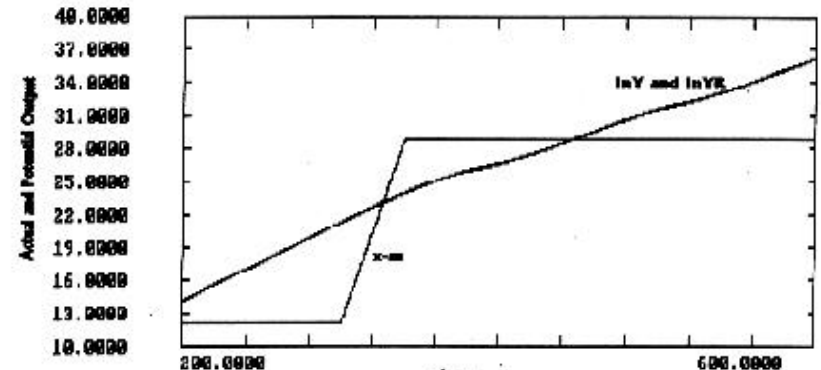


Figure 6. The Effect of an Increase in the Trade Balance on the Warranted Path
(Note: This is a qualitative simulation, based on hypothetical data.
YE = Y + E)

As Harrod emphasized, this may not be a bad thing if the warranted growth rate exceeds the natural growth rate.

However, suppose a country needs to boost net exports when the former is lower than the latter? In this situation, the closed economy social savings rate will have to rise at least as fast as the increase in net exports so as to either leave the warranted path intact or to raise it. The closed economy social savings rate may rise both endogenously and exogenously. Suppose there is a rise in net export demand. This would lead to a fall in business inventories as an immediate effect but, if the demand sustains, planned investment in circulating capital will rise. To finance it, firms would raise the retained earnings rate (they will also try to raise more finance from the stock market and from banks) to finance the higher planned investment. The upshot could be a rise in the private savings rate available for financing the investment which is equal to the rise in net exports. This would ensure the constancy of the open economy social savings rate so that while the country would benefit from a cyclical boom (actual growth > warranted growth), the warranted path would remain unaffected.

Alternatively, appropriate taxation policies could be used to raise the private savings rate (Moudud, 1999b; Moudud and Zacharias, 1999) and/or by lowering the budget deficit Again, if these measures ensure that the open economy social savings $s^{**} = s - (g - t) - (x - m)$ is constant then the warranted path would remain unchanged also. Conversely, if they entail an increase in s^{**} the warranted path would rise (Figure 7).

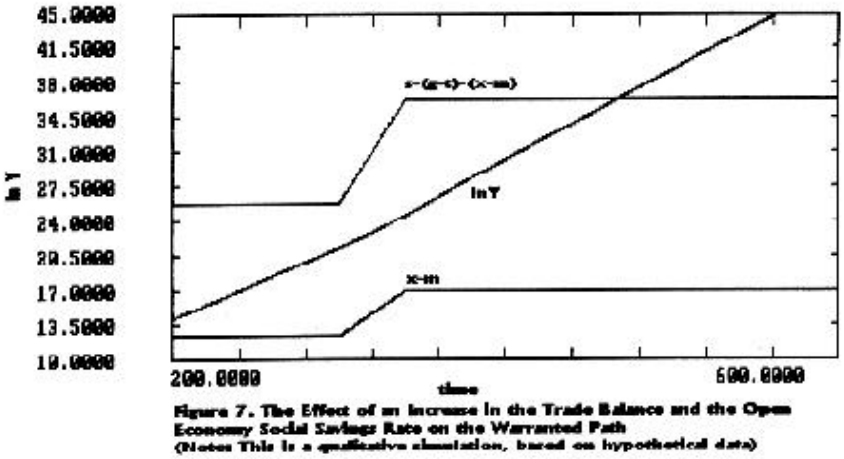


Figure 7. The Effect of an Increase in the Trade Balance and the Open Economy Social Savings Rate on the Warranted Path
(Notes: This is a qualitative simulation, based on hypothetical data)

Of course, in a dynamic context one has to be careful in distinguishing an increase in the *level* of the trade balance from an increase in its *share* . This distinction is not made in Harrod but it has a very important implication. Suppose that the trade balance level (X - M) rises but at a rate which is less than the growth rate of output or capital stock, then equation 8 shows that the trade balance share will fall and raise the warranted growth rate. That is, in such a scenario the country can benefit from an increase in foreign exchange earnings as well as a higher rate of growth.

While savings play a fundamental role both in Harrod and the classical-Harrodian perspective, it is worthwhile to point out that Harrod's discussion on savings does not appear to be derived from the surplus approach to value and distribution. In fact, a reading of the chapter on savings in *Towards a Dynamic Economics* (1948) with its discussion of time preferences and diminishing utility has a distinctly neoclassical flavor. What is one to make of this, if one were to reject the loanable funds doctrine? In other words, can one still uphold the importance of the social savings rate while rejecting the neoclassical view of savings and interest rates?

To answer these questions, we need to consider the way in which investment is financed. In the way that was pioneered by Godley (1999), one can obtain a budget constraint of the business sector from the capital account column in a social accounting matrix (SAM) in which all flows and changes in stocks are explicitly represented. This budget constraint shows that business investment is financed by the sum of (a) business savings less money and bond holdings, (b) equity finance, and (c) bank credit. Let the business sector be net holders of foreign bonds, BN^*.[(9)]

$$12.\ I = [S_f - (\Delta M_d + \Delta BN_G + \Delta BN^*)_f] + \Delta EQ + \Delta D_B$$

where S_f = business savings, ΔM_d = money holdings, ΔBN_G = government bonds, ΔBN^* = foreign bonds, ΔEQ = equity, and ΔD_B = domestic bank credit.[(10)]

Bank credit is not fundamental to either the classical or the Harrodian long-run growth path which is financed by business retained earnings and the portion of household savings that flows into the business sector when equity is purchased. Thus along the warranted path $\Delta D_B = 0$. Since aggregate excess demand along the warranted path also equals zero, it follows that because $s - (g - t) - (x - m) = a = I/Y$,

13. $s - (g - t) - (x - m) = [S_f - (\Delta M_d + \Delta BN_G + \Delta BN^*)_f]/Y + \Delta EQ/Y$

The warranted growth rate is given by

14. $$g_Y^w = \frac{s-(g-t)-(x-m)}{\kappa}$$

Thus one way of interpreting the Harrodian warranted path is that, all else equal, growth is determined by the flow of the *investable surplus* (Moudud, 2000) that flows into the business sector to expand the capital stock. In Marxian terms, the investable surplus represents the sum if the surplus value that flows into the circuit of industrial capital from the circuits of finance capital and revenue. It should be recalled that if S_h = household savings, and $(M_d + BN_G + BN^*)_h$ is the sum of the money, domestic bonds, and foreign bond holdings, respectively of the household sector then $EQ = [S_h - (M_d + BN_G + BN^*)_h]$. That is, equation 13 can be rewritten as

15. $s - (g - t) - (x - m) = [S_f - (\Delta M_d + \Delta BN_G + \Delta BN^*)_f]/Y + [S_h - (\Delta M_d + \Delta BN_G + \Delta BN^*)_h]/Y$

Thus, given $(S_f + S_h)/Y$, if the expression $[(\Delta M_d + \Delta BN_G + \Delta BN^*)_f + (\Delta M_d + \Delta BN_G + \Delta BN^*)_h]/Y$ were to fall because the private sector dishoarded or reduced its bond holdings, there would be an increased flow of money to finance real investment.

To conclude this section, once the knife-edge instability problem is solved and the role of the social savings rate is explained by taking into account the financing of investment, Harrod's perspective produces a policy which is different from Thirlwall. All else equal, long-run normal capacity growth in an open economy is not determined by net exports but by the open economy social savings rate. Put differently, if net exports rise the closed economy social savings rate, s - (g - t), will have to rise faster so as to increase the warranted growth rate. Otherwise, the increase in net exports will lower the open economy social savings, s - (g - t) - (x - m), and thus the warranted growth rate.

EVALUATING THE RIVAL PERSPECTIVES: SOME PRELIMINARY EMPIRICAL EVIDENCE

Figures 8 - 15 show the historical patterns of growth and social savings rates of several OECD countries from World Bank data. All these charts show that the open economy social social savings rate and the growth of GDP move roughly together, as one would expect from the Harrodian growth tradition.[(11)]

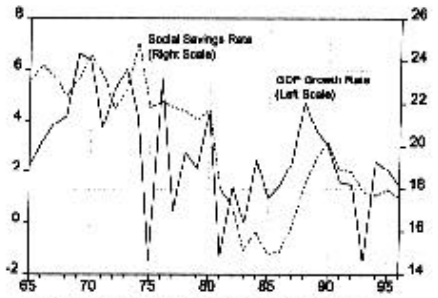


Figure 8a. Belgium's Growth Rate and Open Economy Social Savings Rate
(Source: World Development Indicators, World Bank)

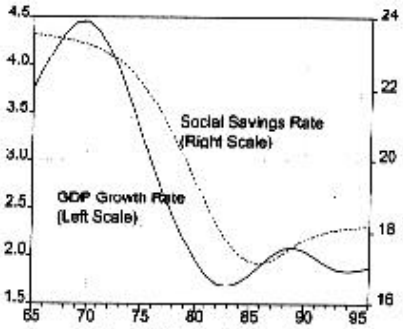


Figure 8b. Trends in Belgium's Growth Rate and Open Economy Social Savings Rate

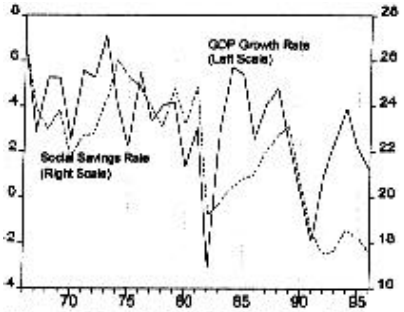


Figure 9a. Canada's Growth Rate and Open Economy Social Savings Rate
(Source: World Development Indicators, World Bank)

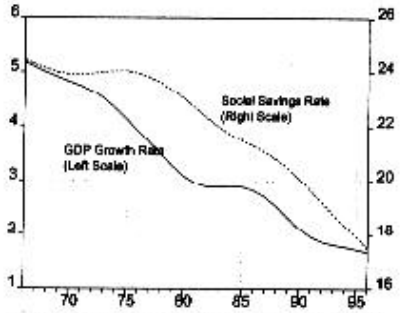


Figure 9b. Trends in Canada's Growth Rate and Open Economy Social Savings Rate

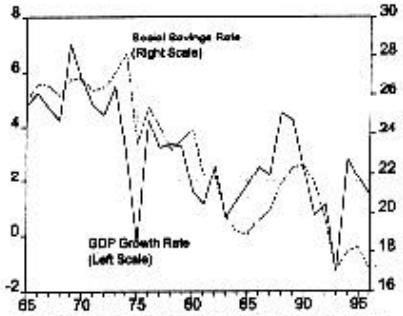


Figure 10a. France's Growth Rate and Open Economy Social Savings Rate
(Source: World Development Indicators, World Bank)

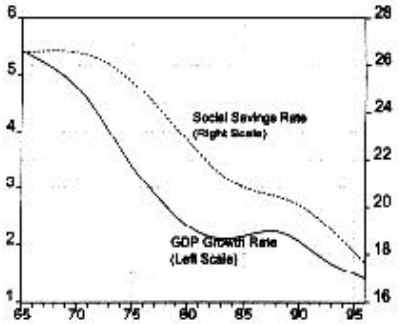


Figure 10b. Trends in France's Growth Rate and Open Economy Social Savings Rate

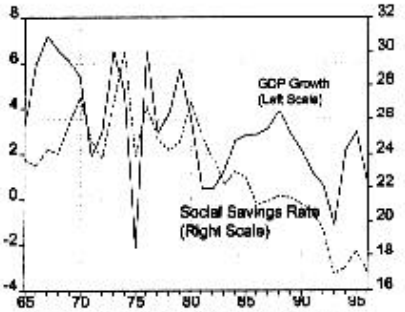


Figure 11a. Italy's Growth Rate and Open Economy Social Savings Rate
(Source: World Development Indicators, World Bank)

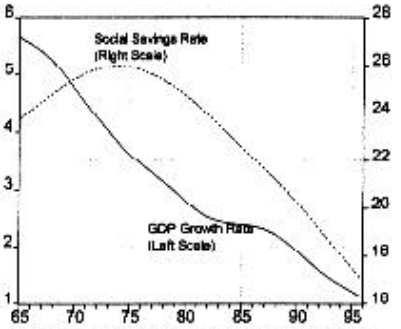


Figure 11b. Trends in Italy's Growth Rate and Open Economy Social Savings Rate

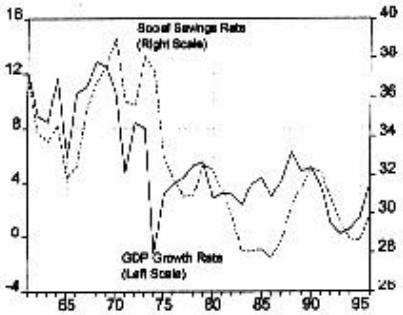


Figure 12a. Japan's Growth Rate and Open Economy Social Savings Rate
(Source: World Development Indicators, World Bank)

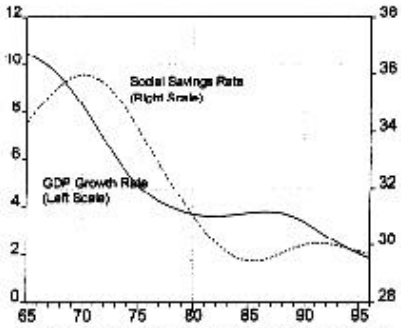


Figure 12b. Trends in Japan's Growth Rate and Open Economy Social Savings Rate

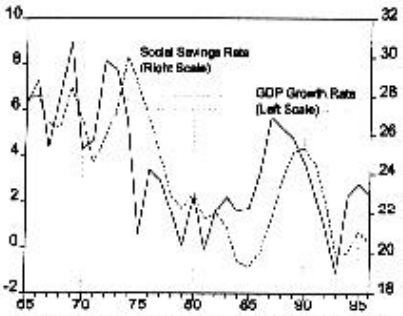


Figure 13a. Spain's Growth Rate and Open Economy Social Savings Rate
(Source: World Development Indicators, World Bank)

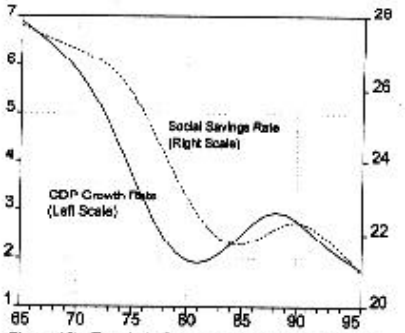


Figure 13b. Trends in Spain's Growth Rate and Open Economy Social Savings Rate

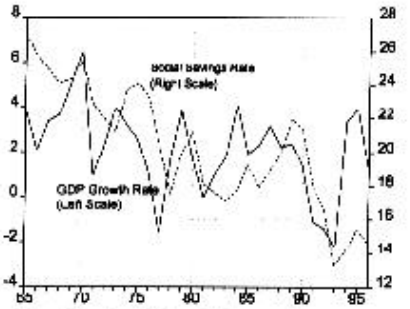


Figure 14a. Sweden's Growth Rate and Open Economy Social Savings Rate
(Source: World Development Indicators, World Bank)

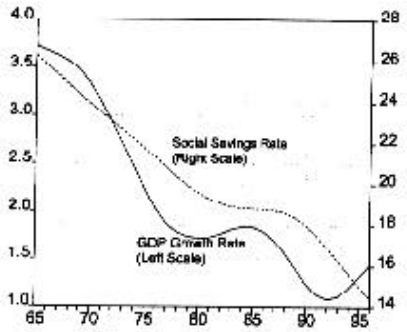


Figure 14b. Trends in Sweden's Growth Rate and Ope Economy Social Savings Rate

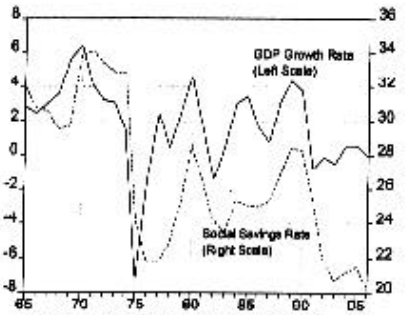


Figure 15a. Switzerland's Growth Rate and Open Economy Social Savings Rate
(Source: World Development Indicators, World Bank)

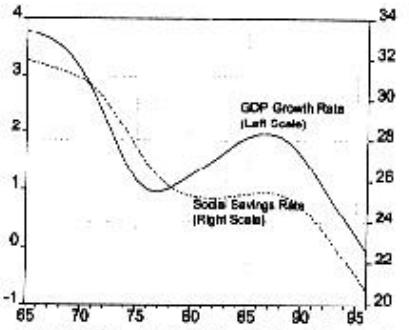


Figure 15b. Trends in Switzerland's Growth Rate and Open Economy Social Savings Rate

This is confirmed by the positive correlation coefficients relating these two series. The figures also show the trends of the two series, which were obtained by using a Hodrick-Prescott filter.

Aside from Harrod's original growth equation, another way to interpret the above patterns is to begin with Shaikh's (1989, 1991, 1992) theory of output. Following Leontief, Shaikh argues that investment in circulating capital I_c (raw materials and wages) expands output:

16. $\Delta Y = \mu I_c$

where μ is the input-output coefficient. Letting $a_c = I_c/Y$, the growth rate of output is given by

17. $g_Y = \Delta Y/Y = \mu a_c$

If a_f = fixed investment and a_v = inventory investment in finished goods then, when aggregate demand equals aggregate supply,

18. $a_c = s - (g - t) - (x - m) - a_f - a_v$

As shown in Moudud (1999a), the warranted growth rate is given by

19. $g_Y^W = X\ [s - (g - t) - (x - m) - a_{fn}]$

where X is a reaction coefficient incorporating μ and the desired inventory/sales ratio, v, and a_{fn} is fixed investment at normal capacity. Thus, since equation 19 follows from the basic input-ouput relationship, we would expect the open economy social savings rate to regulate output growth, other things equal.[(12)]

Nothing in the Harrodian framework rules out the possibility that the growth rate will also impact on the social savings by affecting the trade balance and the budget deficit. Thus, in the real world one is likely to find an interactive feedback effect between the growth rate and the social savings rate. Note that the relatively loose degree of correlation between these two series is understandable since, as equations 8, 8a, or 19 show, GDP growth has a number of other determinants in addition to the social savings rate. Thus the capital/output ratio, fixed investment, or the normal rate of profit (Moseley and Wolff, 1992; Shaikh, 1992) would have to be included in a complete model of the growth rate of GDP.

It is not clear, however, how one would interpret these patterns in the Post Keynesian perspective. Consider the standard investment function used in the Keynes/Kalecki literature (Taylor, 1985) in which investment is determined exogenously by "animal spirits" and demand. Assume for simplicity that the private savings rate is fixed. On the one hand, if "animal spirits" fall steadily, investment will also decline so that output will decrease steadily. This will tend to improve the trade balance and, possibly, raise the budget deficit. In other words, if one begins the Post Keynesian story by positing an exogenous drop in "animal spirits" the above pattern can be explained since the falling growth rate will coincide with a drop in the social savings rate.

The problem for the Post Keynesian perspective arises if one takes "animal spirits" as given and assumes that the social savings rate changes exogenously. We can study this scenario by considering equation 5, which is the key open economy growth equation that distinguishes the Post Keynesian perspective from the classical-Harrodian one:

5. $g_{yD} = (\frac{1}{k})(xg_x + ag_a) = g_x/\pi$

Ceteris paribus , an increase in the export share, x, will lower the open economy social savings rate and raise the growth rate. This last result is consistent with the paradox of thrift principle and is based on the assumption of persistent excess capacity (Foley and Michl, 1999). The problem is, it implies that the social savings rate and GDP growth will move in *opposite* directions.

Correlation does not, of course, imply causation. Table 1 reports the Granger causality tests for the relationship between the change in the open economy social savings rate and the change in real GDP growth for a number of OECD countries (Δ stands for the first difference).

Since the classical-Harrodian proposition is that a change in the open economy social savings Granger causes a change in the growth rate of GDP, I test the null hypothesis H_0:Δs^{**} does not Granger cause ($\not\Rightarrow$) Δg_Y along with the additional null hypothesis H_0 :$\Delta g_Y \not\Rightarrow \Delta s^{**}$ (s^{**} is the open economy social savings rate and g_Y is the growth rate of real GDP).

Country	Null Hypotheses	F Statistic	Probability	Number of Lags
Belgium	$s^{**} \not\Rightarrow g_Y$	545.775	0.0333	**10** (1 2 5 6 7)
	$g_Y \not\Rightarrow s^{**}$	68.206	0.0940	
Canada	$s^{**} \not\Rightarrow g_Y$	4.345	0.0251	**2** (1 3* 4* 5* 6*)
	$g_Y \not\Rightarrow s^{**}$	25.387	1.5e-06	
France	$s^{**} \not\Rightarrow g_Y$	7.366	0.0127	**8** (1 2 3 4 5 6 7 9*)
	$g_Y \not\Rightarrow s^{**}$	2.604	0.130	
Italy	$s^{**} \not\Rightarrow g_Y$	7.382	0.0127	**8** (1 2 3 4 5 6 7 9*)
	$g_Y \not\Rightarrow s^{**}$	1.275	0.3944	
Country	Null Hypotheses	F Statistic	Probability	Number of Lags
Japan	$s^{**} \not\Rightarrow g_Y$	14.696	0.0245	**9** (1 2 3 4 5 6 7 8)
	$g_Y \not\Rightarrow s^{**}$	4.297	0.1286	
Spain	$s^{**} \not\Rightarrow g_Y$	7.533	0.0120	**8** (1 2 3 4 5 6 7 9*)
	$g_Y \not\Rightarrow s^{**}$	6.021	0.0210	
Sweden	$s^{**} \not\Rightarrow g_Y$	3.277	0.0338	**5** (1 2 3 4 6*)
	$g_Y \not\Rightarrow s^{**}$	3.330	0.0320	
Switzerland	$s^{**} \not\Rightarrow g_Y$	3.473	0.0277	**5** (1 2 3)
	$g_Y \not\Rightarrow s^{**}$	3.136	0.0391	

Note: The figures reported here correspond to the lags shown in bold in the last column. The last column also states in parentheses the additional lags for which the null hypothesis $H_0 : \Delta s^{**} \not\Rightarrow \Delta g_Y$ can be rejected. Additional lags for which the null hypothesis $H_0 : \Delta g_Y \not\Rightarrow \Delta s^{**}$ can be rejected have not been reported. Lags with asterisks (*) correspond to the 90% level of significance; all others are at the 95% level. The values for s^{**} and g_Y are obtained from *World Development Indicators, World Bank , 1999* . The open economy social savings rate is calculated by subtracting the share of net exports in GDP from the gross domestic savings rate, where gross domestic savings = GDP - total public and private consumption.

The tests were carried out on the trends of the two variables, so as to capture the long-run interactions between them. While not reported here, other OECD countries(13) as well as various non-OECD countries such as Pakistan, India, Mexico, Brazil, and South Korea also yield results that allow one to reject the null hypothesis $H_0 : \Delta s^{**} \not\Rightarrow \Delta g_Y$, with several countries also showing evidence of bidirectional causality. In addition, the tests were carried out on the original series and also gave evidence of bi-directional causality.

Clearly, the above statistical evidence is only of a preliminary nature. It does, however, indicate the importance of the social savings rate for long-run growth. Additional econometric modeling involving the use of both OLS on the first differences of the above variables and a cointegration technique on their levels provide evidence which gives support to the argument that the open economy social savings rate has a positive effect on growth (Moudud, 2000b).

SOME POLICY IMPLICATIONS

Harrod's perspective thus suggests that if it is desired to increase long-run growth while attempts are made to improve the trade balance, the closed economy social savings rate has to rise faster than the trade balance. Of course, there is no implication in Harrod's perspective that an increase in the warranted growth is always desirable in all countries. As Harrod argued (see Figure 1), should the warranted growth rate exceed a country's natural growth rate, there are very good reasons to pursue expansionist policies (raise the trade surplus and/or the budget deficit) so as to both raise the actual growth rate (i.e. to raise the economy's excess demand) and lower the warranted rate. This dynamic version of the "excess savings" thesis (i.e. desired savings exceed the amount necessary to maintain the economy at its maximum growth rate) would ensure that the warranted growth path is brought down to the level of the maximum growth path.

Alternatively, if a developed economy finds that its warranted path is less than the natural growth, taxation policies can be used to channel profits into the business sector (see Moudud and Zacharias, 1999). For example, since there is empirical evidence that retained earnings constitute the most important source of finance for investment (Corbett and Jenkinson, 1995) and that corporations tend to lower the dividend payment rate when wealthy households' marginal tax rates are high (Feldstein, 1983; Pechman, 1987), the latter could be raised relative to corporate taxes to increase investment. Thus a greater degree of household income equality could be achieved with faster economic growth.

What of developing countries with inadequate savings in which it is necessary to raise the warranted path? In manner discussed by Harrod, the key is to raise the social savings rate. Since developing countries are in need of hard currencies such as the U.S. dollar to accelerate the process of industrialization, they face a very compelling necessity to improve the balance of trade using activist policies such as those suggested by Amsden (1989) and Shaikh (1995a) to improve competitiveness. By holding the share of government spending in output, g, constant at some level which is economically necessary and socially imperative, the rate of taxes on wealthy households should be increased. This will not harm the process of capital accumulation a large section of the "leisured classes" in these countries engage in purely unproductive activities (such as real estate speculation, conspicuous consumption, black marketeering etc.) that do not add to the wealth of the nation. Such a fiscal policy would have the triple advantage of allowing net exports to rise, raising the warranted growth and thus lowering unemployment, and lowering income inequality.

Finally, improvement in the trade balance along with expansionary monetary policies would increase the liquidity of the banking sector and would lower interest rates. This would make credit cheaper and raise the cyclical stimulus from the improvement in the trade balance. Further, given the stock market rate of return(14), such a general fall in interest rates would tend to lower the rate of return on private holdings of money and government bonds and bring about a greater flow of business and household savings into the business sector (see equations 14 and 15).

CONCLUSIONS

The Harrodian growth tradition provides an important synthesis of both demand-side and supply-side factors in the determination of output and employment in an open economy. Because of its classical roots, I would argue that Harrod's growth's growth perspective can be combined with the classical school so as to create a *classical-Harrodian synthesis* whose dynamic disequilibrium approach has policy implications that are in some ways quite distinct from both the Post Keynesian and neoclassical schools (Shaikh, 1989, 1991, 1992; Moudud, 1999a, 1999b).

As illustrated in Figure 2, the classical-Harrodian growth cycles allows a study of export-led within the context of the warranted, actual, and the natural growth rates. As Di Matteo (1998) points out in his comments to McCombie (1998), it is striking that an analysis of the interrelationships between these different types of growth paths is missing in the discussion of Thirlwall's law. Neither in *Economic Dynamics, Trade and Growth: Essays on Harrodian Themes* (1998) nor in *Economic Growth and the Balance of Payments (1994)* are any of these links made.[(15)] In contrast to the neoclassical tradition which does not allow for export-led growth at all because of the continuous full employment assumption, Thirwall's model is important since it introduces the role of demand. But, as a long-run theory of growth (Thirlwall and McCombie, 1994, p. 234; Thirlwall, 1998, p. 187), it is very vague about what the meaning is of this long-run. Is the long-run consistent with excess or normal capacity? If it is the former, what is the economic rationale for firms to maintain *persistent* idle capacity when sales are inadequate to justify the costs of maintaining idle plant and equipment?

One important reason for the assumption of permanent excess capacity in the Post Keynesian tradition might be its particular approach to the long run. Authors in this tradition typically assume that the long run is the sum of a series of short runs (Lavoie and Godley, 2000). Thus short-run underutilized capacity becomes a long-run phenomenon, given this *additive theory* of the long run. Put differently, while models in this tradition assume short-run equilibrium (since their point of departure is the national income identity, which assumes that aggregate demand and supply are equal) they assume permanent long-run *disequilibrium* . Quite naturally, demand comes to play a central role in this view of the world.

Monopolistic competition as the reason for persistent excess capacity is yet another weapon in the Post Keynesian arsenal. Monopolies are said to maintain excess capacity as a weapon against weaker firms (Taylor, 1985). However, in this situation it is not clear why demand would raise output and employment when monopolists could raise prices instead.

In the classical tradition, both competition and the long run are described in very different ways. Whether one refers to Adam Smith's "invisible hand" or Karl Marx's "laws of motion", the long run is characterized as a dynamic and turbulent process in which inter-industrial capital mobility negates excess demands and excess capacity utilization rates in the different industrial sectors. Underpinning this process is a view of market competition which is quite distinct from perfect and imperfect competition (Semmler, 1984; Botwinick, 1993).

As part of the Oxford Economists' Research Group, Harrod (1939, 1952) had made some important contributions to pricing theory. However, his approach to industrial pricing differed from the standard imperfect competition models in significant ways. As Eltis (19xx) summarizes, Harrod argued that firms set their prices low enough so as to expand their market shares, prevent the entree of new firms, and thus maximize their long-run profits. In sharp contrast to the models of Chamberlin and Joan Robinson, this kind of pricing behavior led to the elimination of excess capacity over the long run. In fact, terminological differences aside, Harrod's pricing model has much more in common with the classical theory of competition.

Thus, the methodological approach of the classical tradition with its emphasis on persistent long-run forces (Eatwell, 1983) must have shaped Harrod's view of the economy since it is implicit to the short run versus long run dichotomy in his perspective. In such a view of the world, there is no question of splicing together successive short runs to produce the long run.

The persistence of excess capacity in Post Keynesian models raises some further issues. Why does the excess capacity not provide a negative feedback to investment? This issue was central to Harrod's analysis. Along Harrod's warranted growth path, the growth rate of demand (and thus supply) equals the growth rate of capacity so that the rate of capacity utilization is constant. However, if the actual rate of capacity utilization is below that which is economically *desired* by firms, they will slow down their rate of investment which will then slow down the rate of growth of capacity and so on so that the economy would fly away from the warranted path. Thus the stagnationist perspective of the Post Keynesian school would imply instability in the Harrodian sense.

Implicit to the classical and Harrodian long-run perspective is a distinction between *reserve* and *redundant* capacity (Shaikh and Milberg, 2000). What is called normal capacity includes reserve capacity which acts as a buffer in absorbing normal demand fluctuations. It is a *desired* level of capacity utilization since it is the most profitable one. On the other hand, redundant capacity corresponds to that which is in excess of reserve capacity. The appearance of positive or negative excess capacity corresponds precisely to this situation and it is this deviation of redundant from reserve capacity that triggers an appropriate investment response (Shaikh, 1991).

While not explicitly represented in his model, an investment function of the form $I/K = f(u...)$ must be underpinning Thirlwall's model (I = investment, K = capital stock and u = capacity utilization) as it must other models in the Keynes/Kalecki tradition such as Godley (1999) which assume exogenous demand as the driver of long-run growth. This investment function is standard in the stagnationist literature (Taylor, 1985). And yet this equation has the peculiar implication (Shaikh and Milberg, 2000) that if capacity utilization is, say 40%, and demand rises exogenously, firms will add to their capacity *despite considerable excess capacity to begin with* ! Thus investment seems to be immune to the level of capacity utilization. On the other hand, the classical-Harrodian perspective suggests an investment function of the form $I/K = f(u - u_n...)$, where u_n is the normal level of capacity utilization. This functional form has the virtue that

investment is determined both by the level and the deviation from the trend of the rate of capacity utilization.

One important reason why Post Keynesian authors such as Thirlwall reject the importance of supply-side factors under "normal circumstances" when there is unemployment is possibly due to the particular assumption they make about the relationship between unemployment and capacity utilization. In neoclassical economics, full/normal capacity utilization is synonymous with full employment; thus demand plays no role. Authors in the Keynes/Kalecki tradition, by quite sensibly rejecting the full employment assumption, also reject the full/normal capacity assumption.

Thus, implicitly, authors in the Keynes/Kalecki tradition assume the neoclassical view of full/normal capacity utilization, i.e., it coincides with full employment. On the other hand, in the classical-Harrodian approach, normal capacity utilization *is consistent with unemployment* .(16)

As in a closed economy, the classical-Harrodian perspective suggests that, if the rate of profit is given, then in order to raise the warranted growth path the total flow of the economy's investable surplus or finance has to increase, i.e. the open economy social savings rate has to rise to augment the flow of retained earnings and equity finance into new investment.(17) Of course, as Harrod's analysis suggests, one does not want to raise the warranted growth if it exceeds the natural growth: in such an "excess savings" scenario expansionist policies are necessary to bring the former down to the latter rate. However, for those countries seeking to both expand exports and raise the warranted path, the key policy is ensure that the closed economy social savings rate rises faster than net exports. The classical-Harrodian growth cycles perspective suggests that it is export-*oriented* rather than export-*led* growth which drives accumulation in an open economy.

REFERENCES

Amsden, A. *Asia's Next Giant: South Korea and Late Industrialization* . Oxford: Oxford University Press, 1989.

Beckerman, W.H. "Projecting Europe's Growth." *Economic Journal* 72, 1962, pp. 912-925.

Botwinick, Howard. *Persistent Inequalities: Wage Disparities under Capitalist Competition.* Princeton, N.J.:Princeton University Press, 1993.

Chakravarty, S. "John von Neumann's Model of an Expanding Economy: an Essay in Interpretation." In M. H. I. Dore, S. Chakravarty, and R. M. Goodwin (eds.), *John von Neumann and Modern Economics.* Oxford: Clarendon Press, 1989.

Corbett, J., and Jenkinson, T. "The Financing of Industry, 1970-1989: An International Comparison." *Journal of Japanese and International Economies* , 1995.

Dernburg, T. F. *Global Macroeconomics* . New York: Harper Collins Publisher, 1989.

Dow, S.C. *Money and the Macroeconomic Process.* Aldershot: Edward Elgar, 1993.

Eatwell, John. "Theories of Value, Output, and Distribution." In J. Eatwell and M. Milgate (ed.), *Keynes's Economics and the Theory of Value and Distribution* . London: Duckworth, 1983.

Eatwell, John (ed.). *Global Unemployment: Loss of Jobs in '90s.* Armonk, N.Y.: M.E. Sharpe, 1995.

Eltis, Walter. *Classical Economics, Public Expenditure, and Growth.* Aldershot: Edward Elgar Press, 1993.

Eltis, Walter. 'The Harrod-Domar Equation from Quesnay to Marx to Harrod and Domar.' In G. Rampa et al. (eds)., *Economic Dynamics, Trade, and Growth: Essays on Harrodian Themes* . New York: St. Martin's Press, 1998.

Feldstein, M. *Capital Taxation.* Cambridge, Mass.: Harvard University Press, 1983.

Foley, Duncan, and Michl, T. *Growth and Distribution* . Cambridge, M.A.: Harvard University Press, 1999.

Godley, W. "Money, Finance and National Income Determination: An Integrated Approach." Working Paper No. 167, Annandale-on-Hudson, N.Y.: The Jerome Levy Economics Institute, 1996.

Godley, W. "Macroeconomics without Equilibrium or Disequilibrium." Working Paper No. 205, Annandale-on-Hudson, N.Y.: The Jerome Levy Economics Institute, 1997

Godley, W. "Money and Credit in a Keynesian Model of Income Determination." *Cambridge Journal of Economics* 23, 1999: 393-411.

Godley, W., and Milberg, W. "Debt Dynamics and International Adjustment: Strategic Problems Facing the US Economy." Mimeo, The Jerome Levy Economics Institute of Bard College, 1994.

Goodwin, R.M. "A Growth Cycle." In *Socialism, Capitalism, and Economic Growth* (Essays Presented to Maurice Dobb). Cambridge: Cambridge University Press,1967.

Harrod, Roy. "Price and Cost in Entrepreneur's Policy." *Oxford Economic Papers* 2, May, 1939: 1-11.

Harrod, Roy. "Theory of Imperfect Competition Revised." In R.F. Harrod (ed.), *Economic Essays.* London and New York: Methuen, 1952.

Harrod, Roy. *Economic Dynamics.* London: MacMillan, 1973.

Harrod, Roy. "An Essay in Dynamic Theory." *Economic Journal* 49, 1939, pp. 14-33.

Harrod, Roy. *Towards a Dynamic Economics* . London: MacMillan, 1948.

Keynes, J. M. *The Collected Writings of John Maynard Keynes* , Vol. XIII. D. Moggridge (ed.) London, PUBLISHER? 1973a.

Keynes, J. M. *The Collected Writings of John Maynard Keynes,* Vol. XIV. D. Moggridge (ed.). London, PUBLISHER1973b

Kregel, J.A. "Economic Dynamics and the Theory of Steady Growth: An Historical Essay on Harrod's 'Knife-Edge'." *History of Political Economy* 12, 1, 1980: 97-123.

Krugman, P., and Taylor, L. "Contractionary Effects of Devaluation." *Journal of International Economics* 8, 1978: 445-456.

Lamfalussy, A. "Contribution à une theorie de la croissance en économie ouverte." Recherches Economiques de Louvain 29, 1963: 715-734.

Lavoie, Marc, and Godley, W. "Kaleckian Models of Growth in Stock Flow Monetary Framework: A Neo-Kaldorian Model." Working Paper No. 302, Annandale-on-Hudson, N.Y.: The Jerome Levy Economics Institute, 2000.

Massimo, Di Matteo. "Discussion." In G. Rampa et al, (eds)., *Economic Dynamics, Trade, and Growth: Essays on Harrodian Themes* . New York: St. Martin's Press, 1998.

McCombie, J. S. L. 'Harrod, Economic Growth, and International Trade.' In G. Rampa et al, (ed.), *Economic Dynamics, Trade, and Growth: Essays on Harrodian Themes* . New York, N.Y.: St. Martin's Press, 1998.

McCombie, J. S. L. and Thirlwall, A. P. *Economic Growth and the Balance of Payments Constraint* . New York: St. Martin's Press, 1994.

Milberg, W. 'Is Absolute Advantage *Passé* ? Towards post-Keynesian/Marxian Theory of International Trade.' In M. A. Glick (ed.), *Competition, Technology, And Money: Classical and Post-Keynesian Perspective* . Aldershot: Edward Elgar, 1994.

Moseley, F., and Wolff, E. (eds.) *International Perspectives on Profitability and Accumulation* . Aldershot: Edward Elgar, 1992.

Moudud, Jamee K. *Endogenous Growth Cycles and Money in an Open Economy: A Social Accounting Matrix Approach* . Ph.D. dissertation, New School for Social Research, May 1998.

Moudud, Jamee K. "Finance in a Classical and Harrodian Cyclical Growth Model," Working Paper No. 290. Annandale-on-Hudson, N.Y.: The Jerome Levy Economics Institute, 1999a.

Moudud, Jamee K. "Crowding In or Crowding Out? A Classical Perspective." Paper presented at the Fourth Annual Postgraduate Conference, Leeds (U.K.), Nov. 12, 1999b.

Moudud, Jamee K. "Open Economy Macrodynamics: A Social Accounting Matrix Approach." Forthcoming, 2000a.

Moudud, Jamee K. "International Growth Rate Differences: Testing a classical-Harridan Perspective Empirically." Forthcoming, 2000b.

Moudud, Jamee K., and Zacharias, Ajit. "The Social Wage, Welfare Policy and the Phases of Capital Accumulation." working Paper 299. Annandale-on-Hudson, N.Y.:The Jerome Levy Economics Institute Working Paper Series, 1999.

Pechman, Joseph. *Federal Tax Policy* . Washington, D.C.: The Brookings Institution, 1987.

Rampa, G., Stella, L. and Thirlwall, A.P. *Economic Dynamics, Trade, and Growth: Essays on Harrodian Themes.* New York: St. Martin's Press, 1998.

Ruggles, N. and Ruggles, R. "Household and Enterprise Saving and Capital Formation in the United States: A Market Transactions View." *Review of Income and Wealth* , 38, no. 2, June 1992.

Semmler, W. *Competition, Monopoly, and Differential Profit Rates* . New York: Columbia University Press, 1984.

Shaikh, A. "The Current Economic Crisis: Causes and Implications." In *The Imperiled Economy* , Book 1. New York: URPE, 1987.

Shaikh, A. "Accumulation, Finance, and Effective Demand in Marx, Keynes, and Kalecki." In W. Semmler (ed.), *Financial Dynamics and Business Cycles: New Perspectives* . Armonk, N.Y.: M.E. Sharpe, 1989.

Shaikh, A. "Wandering Around the Warranted Path: Dynamic Nonlinear Solutions to the Harrodian Knife-Edge." In E.J. Nell & W. Semmler (eds.), *Nicholas Kaldor and Mainstream Economics.* New York: St. Martin's Press, 1991.

Shaikh, A. "A Dynamic Approach to the Theory of Effective Demand." In D. Papadimitriou (ed.), *Profits, Deficits and Instability* . London: Macmillan, 1992a.

Shaikh, A. "The Falling Rate of Profit as the Cause of Long Waves." In A. Kleinknecht, E. Mandel, and I. Walerstein (eds.), *New Findings in Long-Wave Research* . New York : St. Martin's Press, 1992b.

Shaikh, A. "Free Trade, Unemployment and Economic Policy." In J. Eatwell (ed.), *Global Unemployment : Loss of Jobs in the 90's* . Armonk, New York: M.E. Sharpe, 1995a.

Shaikh, A. "The Stock Market and the Corporate: A Profit-Based Approach."Working Paper 146. Annandale-on-Hudson, N.Y.: The Jerome Levy Economics Institute Working Paper series, 1995b.

Shaikh, A. and Milberg, W. "Lectures on Growth Theory." *Historical Foundations of Political Economy* , lecture notes, New School for Social Research, Spring 2000.

Sraffa, P. *Production of Commodities by Means of Commodities.* Oxford: Oxford University Press, 1960.

Taylor, Lance. "A Stagnationist Model of Economic Growth." *Cambridge Journal of Economics* 9, 1985: 383-403.

Thirlwall, A. P. "The Balance of Payments Constraint as an Explanation of International Growth Rate Differences." *Banca Nazionale del Lavorro Quarterly Review,* No. 128, March 1979: 45-53.

Thirlwall, A.P. "The Balance of Payments and Growth: From Mercantilism to Keynes to Harrod and Beyond." In Rampa et al (eds), *Economic Dynamics, Trade, and Growth: Essays on Harrodian Themes.* New York, NY: St. Martin's Press, 1998.

Thirlwall, A.P., and McCombie, J.S.L. "Economic Growth and the Balance of Payments Constraint Revisited." In P. Arestis, G. Palma, and M. Sawyer (eds.), *Market, Unemployment, and Economic Policy.* London and New York: Routledge, 1997.

World Bank. *World Development Indicators* , 1999.

1. See for example the recent article by George Soros in *The Atlantic Monthly* (vol. 279, no. 2, 1997) entitled "The Capitalist Threat." George Sanger in *The New York Times* (April 6, 1997) reports: "Perhaps fearful that the side effects of economic globalization are more severe than anyone thought, or that they could spin out of control, prominent members of the monied classes and their conservative allies are questioning whether markets have become too unfettered....Evidence of this rethinking is everywhere. The latest meeting of the World Economic Forum in Davos, Switzerland - which views itself as the world-class assemblage of the free-market elite - was devoted to ameliorating the worst consequences of economic competitiveness."

2. Because of its workhorse role in neoclassical thinking, the Mundell-Fleming model does provide a justification for some degree of expansionary policy because of short-run unemployment. Hence the U.S. government's endorsement of Japanese expansionary fiscal policies to revive that country's moribund economy.

3. Lamfalussy's model also incorporates the productivity enhancing effects of exports.

4. A formal model of export-led growth in a classical-Harrodian framework is derived in Moudud (1999c).

5. Harrod (1973, p. 18) states that κ becomes κ^d when "...people find that the amount of capital goods in hand, fixed and circulating, is just what they find convenient, neither too much nor too little. Expressing capital on hand in this way, carries the suggestion that the quantity of capital desired has a definite relation to the increase in the turnover of goods".

6. Harrod carries out his analysis in terms of expansionist policies in general. However, because of the comparison with Thirlwall in the current paper, I will be referring to the trade balance.

7. The system of nonlinear differential equations which forms the basis of these simulations is the same as that in Moudud (1999a).

8. See Dow (1993) for a Post Keynesian analysis of the effect of foreign trade on business cycles, which is somewhat similar to these simulations.

9. Alternatively, if ΔBN^* were net foreign borrowing of the business sector then equation 12 would have been written:
$I = [S_f - (\Delta M_d + \Delta BN_G)] + \Delta EQ + \Delta D_B + \Delta BN^*$

10. Equation 12 is a theoretical relationship relating investment to its different types of finance sources. However, empirically, business retained earnings constitute the single most important source of investment finance, at least for OECD countries (Ruggles and Ruggles, 1992; Corbett and Jenkinson, 1995; Blecker 1997).

11. Note that, over the long run the actual and warranted growth paths are going to be equal to each other approximately, $g_Y \; g_Y^W$. Further, normal capacity utilization over the long run implies that ^{d} where ^{d} is the desired long-run rate of capacity utilization. These two equalities in turn imply that the desired open economy social savings rate $s^d - (g - t)^d - (x - m)^d$ actual social savings rate $s - (g - t) - (x - m)$. Thus one can use the data, all of which is in *ex post* terms, to study Harrod's warranted path equation.

12. Equation 8 and 19 are similar to the classical version of the "Cambridge" equation in so far as the social savings rate is important:
8a. $g_Y^W = [s - (g - t) - (x - m)]r_n$
where r_n = normal rate of profit. Note that, given the social savings rate, increases in the capital-output ratio have the same effects in all three equations. In equation 8, output growth falls directly while in equations 8a and 19 the normal rate of profit falls, thereby lowering output growth (Shaikh, 1992b). Because of the parallels between these three growth equations, the expressions "the classical-Harrodian perspective" and "the Harrodian growth tradition" are used synonymously.

13. The U.S. does not present such a clear-cut picture. However, the pattern cannot be explained by the Post Keynesian perspective. In fact, once one accounts for the profit rate, the relative movements of the growth rate and social savings rate can be explained quite well. See Moudud (2000b) for this analysis.

14. Which is itself determined by corporate profitability (Shaikh, 1995b).

15. In fact, the latter book which is jointly written by Thirlwall and McCombie, dedicates two chapters to discussing alternative growth theories without even mentioning Harrod's contribution to this field.

16. In fact, as Goodwin (1967) showed in his famous growth cycles model, even the natural growth rate in the classical-Marxian tradition is consistent with unemployment since the equality of the growth of labor demand and supply allows for the level of labor supply to exceed labor demand.

17. With a non-zero debt/output ratio along the warranted path, the latter can also be raised by increasing the flow of bank credit. This, however, raises the debt burden of the business sector and increases systemic financial fragility.