CONSUMER DEBT, GROWTH AND INCOME DISTRIBUTION

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March 2003

This paper develops a post Keynesian model of growth and income distribution with long-run growth determined by aggregate demand, in which workers can borrow to finance their consumption, but are subject to credit constraints. The model is used to show that an expansion in borrowing due to the easing of credit conditions will lead to an expansion in economic activity and an improvement in income distribution in the short run, and to an increase in growth beyond the short run. However, the long-run impact of the expansion of borrowing on growth and income distribution is ambiguous. The model is used to examine conditions under which the expansion in borrowing and debt is more likely to have positive effects on growth and income distribution. For instance, it is shown that a high level of autonomous investment is likely to imply positive effects and a high interest rate is likely to imply negative effects.

* I am grateful to seminar participants at the University of Notre Dame and the Indian Institute of Management, Kolkata, especially to Jaime Ros, for their comments and suggestions.

1. Introduction

There has been a significant rise in consumer indebtedness in many countries. In the US, the ratio of consumer debt to income has increased over the last fifty years or so. As shown in Figure 1, the expansion was particularly large from the early fifties, when consumer debt was 12.5% of personal disposable income and 8.5% of GDP, to 1965, when these figures were 19.5% and 13.5%, and again from 1992 to 2001, when the ratios increased from 16.8% to 23.0% and from 12.9% to 16.9%.[1] Between 1984 and 1999, average household balances on unsecured loans doubled in real terms,[2] and outstanding balances on credit cards more than tripled between 1983-98 (see Sullivan, 2002). This phenomenon has afflicted several other advanced countries as well, although by no means all of them. Increases in the cousmer debt (excluding

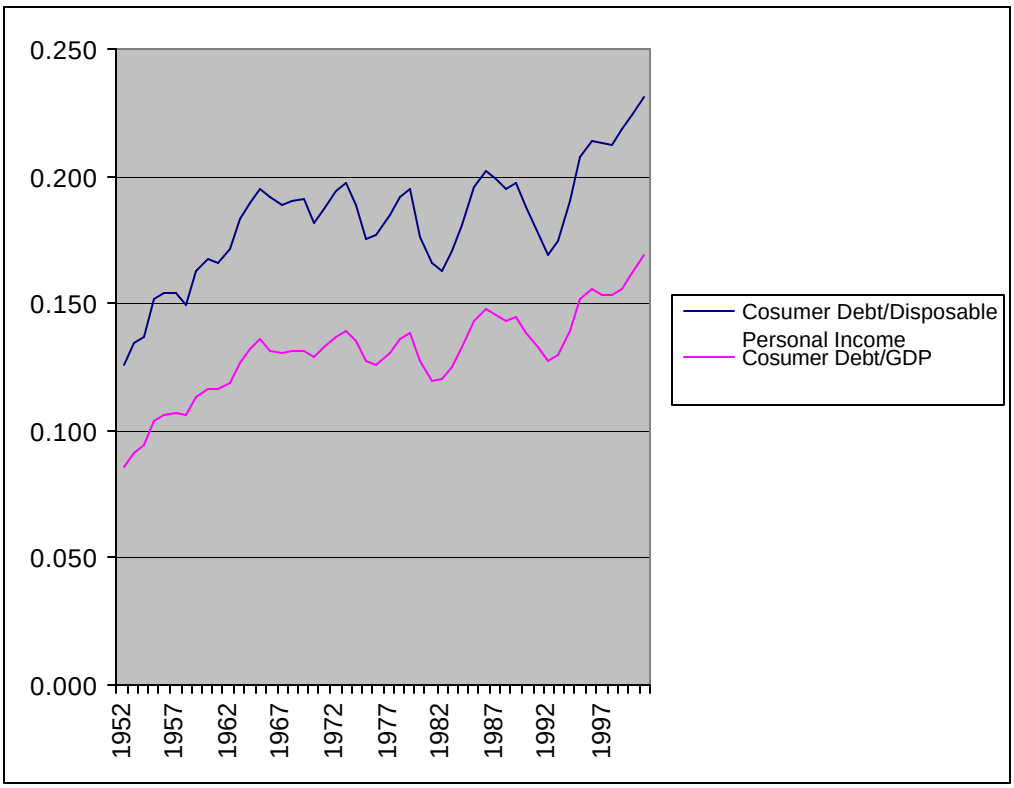

Figure 1 Consumer debt to income ratio for the US

home mortgages) to personal disposable income since the late 1980s are observed for Canada, France and Germany, with rough constancy in Japan and a small decline in the UK. There is some evidence that several semi-industrialized countries such as India have also experienced increases in consumer indebtedness with the spread of credit cards, although hard time series data are harder to come by.

Views on the effects of this increase in consumer debt on the economy are mixed. Some argue that an increase in consumer debt, which is the result of borrowing which increases consumer demand, helps to keep aggregate demand and output buoyant, and therefore has a positive effect on growth. It is also argued that consumer debt allows the smoothing of consumption over cycles, and is therefore stabilizing

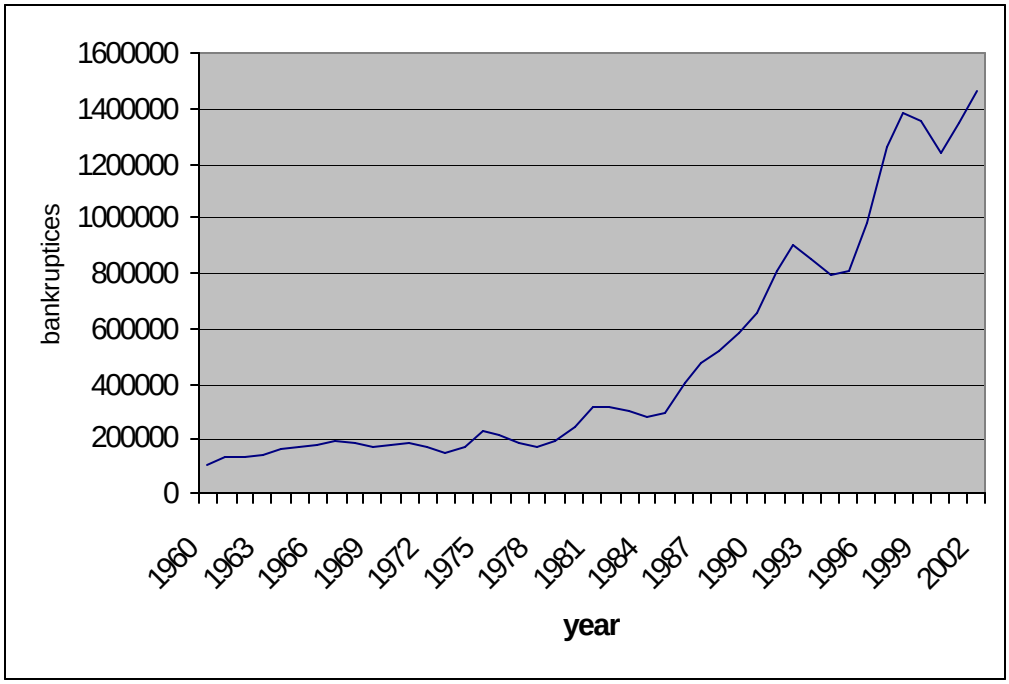

Figure 2 Number of Nonbusiness Bankruptcies in the US

for the economy and has a positive effect on consumer welfare. However, the more widespread view is that the accumulation of consumer debt will, at least in the long run, have a negative effect on growth by reducing saving and investment. This kind of analysis of short-run salutary effects which are not sustainable

in the longer run is also reflected in discussions of the 1990s expansion in the US. Thus, Papadimitriou, Shaikh, dos Santos and Zezza (2002) argue that the expansion was to a large part sustained by consumer borrowing, as reflected by an increase in the ratio of household debt to income. However, they argue that this expansion is not sustainable because although there was a rise in both liabilities and assets, the rise in indebtedness is accompanied by actual increases in flows of interest and repayments, while the rise on the asset side reflects expected earninings and illusions which can be and in fact was, affected by a financial meltdown.

At the level of the household, some argue that increases in consumer debt provide consumers – especially poor ones – with a safety net which allows them to keep up their spending when their income falls (see Bird, Hagstrom and Wild, 1999). It has been observed that the growth of credit card debt in the US has been most marked among households below the poverty line: between 1983 and 1995 average balances for poor households grew 3.8 times as compared to 2.9 times for all households (Bird, Hagstrom and Wild, 1999). However, it has also been pointed out that rising indebtedness has had an adverse effect on households by increasing the number of household banruptcies, as shown in Figure 2, which reveals that the number of nonbusiness bankrupticies in the US increased from about 300,000 in 1985, to an all-time high of 1.35 millin in 2001, according the data from the US Courts. This increase has far outstripped the growth in population.[3]

Relatively little work has been done in terms of formally modelling the effects on consumer debt on the macroeconomy, and on growth in particular, at least in comparison with the effort that has been devoted to analyzing the effects of government debt and the debt of firms. The attention that it has received has been mostly confined to analyzing the impact of consumer indebtedness during the business cycle. For

instance, Carroll and Dunn (1997) find empirical evidence that a runup of consumer debt in the US in the 1980s was partially responsible - along with a measure of consumer confidence - in explaining the surprising weakness of consumer spending (especially on durables) after the 1990 recession. They develop a model in which consumers maximize the present value of expected utility from the consumption of housesing services and nonhousing goods, taking into account the job loss dynamics derived from an exogenously given Markov transition matrix which captures different states of the economy, and allowing the consumer to buy or rent homes. To keep the dimensionality of the model manageable, mortgage debt (the only type of consumer debt they consider) is taken to be a constant ratio of home value rather than a state variable. The model is simulated to show how a recession causes consumers to postpone the purchase of houses, thereby showing how consumer indebtenessness reduces durables spending. In addition to not being a model which explicit analyzes the dynamics of debt, it does not examine the feedback effect of low consumer spending on the economy. The issue has also almost completely been neglected in the post Keynesian literature, with a few exceptions. This is an omission which seems more surprising, given the importance given in them to aggregate demand issues in the long run in that literature. One exception is a contribution by Palley (1994) which examines the implications of consumer indebteness with a series of difference equation models which takes into account the short-run expansionary effects of borrowing-financed consumer expenditure and the longer-run effects of higher indebtedness reducing expenditures.

These models, while focusing on cyclical issues, have little to say on the growth and distributional effects of the secular increases in the debt-income ratio found for the US and for many other countries. Carroll and Dunn (1997) do not address the issue of long run growth. Palley (1994) uses his difference

equation models to explore the possibilities of cycles and cumulative crises and contractions, rather than the effects of increases in the consumer debt-output ratio on long-run growth. Moreover, these models do not examine the income distributional consequences of increases in debt, despite the fact that, as noted earlier, the increase in the borrowing by the poor and the role of such borrowing in overcoming unemployment-related temporary income declines in the US has received some attention in the literature.

This paper attempts to fill this lacuna by developing a simple model of growth and income distribution with consumer debt. The model that is developed is one that can be described as a post-Keynesian one in the traditions of Michal Kalecki, Josef Steindl and Joan Robinson in which income distribution between wage income and non-wage income is rigid, long-run growth is determined by aggregate demand rather than by the supply of resources, and in the rate of interest is determined by the monetary authorities rather than being determined by the market.

In addition to the relevance of the subject of consumer debt for its empirical importance, there are at least two other reasons which make it interesting to analyse the implications of borrowing-financed increases in consumption.

The first is the phenomenon of increases in conspicuous consumption, which has received much attention in recent years. Frank (1999), in documenting and analyzing the effects of increases in consumption in the US, argues that the increases are caused mainly by efforts to increase consmption relative to others, and have the deleterious effect of reducing saving and slowing down growth, and of reducing the availability of useful public goods and leisure. Schor (1998) argues that the massive increases in consumption have been due to status motives and takes the form of conspicuous consumption, also

stresses the role of consumer indebtedness, and especially credit card debt, in this process. Both Frank and Schor decry these trends and call for personal efforts and government policies to curb consumption. This analysis is concerned more with the causes the rise in consumption, and the fact that consumer borrowing has made the increase in consumption possible, rather than in examining the macroeconomic consequences of these trends. In particular, there is little or no discussion of the effects of consumption and debt – especially that incurred by lower income groups – on saving, investment and growth, taking into account the market creating effects of higher levels of consumption. Frank (1999, p. 219) takes us back to the pre-Keynesian world of Say's Law when he writes that "any money that is not spent on consumption will instead be saved and invested. The result is that some of the people are a now employed to produce consumption goods will instead be employed to produce capital goods – which ... will increase the economy's productive capacity in the long run". Schor (1998, p. 171) appears to take Keynesian unemployment problems more seriously, but downplays its importance because in her opinion households will reduce their labor supply when they reduce consumption as downshifters. Clearly, a fuller analysis of the macroeconomic effects of conspicuous consumption is in order.

The second reason, which is more specific to post-Keynesian macroeconomic theory, relates to the relationship between spending on the one hand and income on the other, of different income groups. As is well known, Kalecki (1971) stated that workers spend what they earn and capitalists earn what they spend. Kalecki assumed that workers did not save; since they spent all of their income on consumption, the first part of the statement follows straightforwardly. Given that total income in the economy is equal to total spending, this implies that for capitalists, too, income must be equal to spending. However, captalists can borrow, so that their spending on consumption and especially investment is not limited by their earnings.

Thus, they can increase their spending by borrowing or by making use of past savings. This increase in spending increases output and income in the economy, increasing the income of capitalists as well (given that the distribution of income is determined primarily by the degree of monopoly). Consequently, in the Kaleckian system, capitalist spending determines capitalist income. Once we introduce borrowing by lower income groups, however, worker consumption is no longer constrained by worker income. Thus it is no longer appropriate to continue with the Kaleckian asymmetry between workers and capitalists. The macroeconomc implications of this change require analysis to see whether this change in the status of workers results in any fundamental changes in the Kaleckian theory of income determination, distribution, and growth.

The rest of this paper proceeds as follows. Section 2 examines some issues in modeling the macroeconomic consequnces of consumer debt. Section 3 examines the structure of the model. Section 4 examines the behavior of the model in the short run, showing how an increase in borrowing increases output while an increase in debt reduces it. Section 5, the crux of the paper, examines the long-run dynamics and equilibrium of the economy, to examine the long run consequences of an increase in borrowing by consumers. Section 6 concludes.

2. Modeling the macroeconomics of consumer debt

Two issues need to be addressed before we can theoretically examine the growth and distributional consequences of consumer debt. The first concerns the type of macroeconomic model we should use to examine the implications of a rise in consumer indebtedness. The second concerns with way we model the evolution of consumer debt itself.

Regarding the first issue, as noted in the introduction, we use a post-Keynesian model of growth

and income distribution. The analysis could instead have been conducted using neoclassical, "new" growth theory, or neoclassical-synthesis "Keynesian" models.

Neoclassical full employment models in the tradition of Solow (1956) are arguably unsuitable for analyzing the short-run and long-run effects discussed earlier because they allow no role for aggregate demand issues even for the short run (and cannot therefore show positive short-run effect) and have growth determined in the long run by labor supply growth and technological factors which are exogenous to the economy (and are therefore unable to examine the possible long-run adverse consequences of debt). "New" growth theory models, by endogenizing the rate of growth and making it depend on saving-related parameters, can capture the long-run deleterious effects of consumer debt if borrowing-financed consumption reduces the saving rate of the economy. However, since such models also ignores aggregate demand, they cannot capture the short-run market-creating effects of consumer borrowing.[4]

Neoclassical synthesis Keynesian models popularized in macroeconomics textbooks may be considered more suitable because they allow for short-run unemployment (or at least deviations from potential output or the natural rate of output) due to wage rigidity (or slow expectational changes which lead to misperceptions of the real wage on the part of workers). Given that wages (and expectations) are flexible in the long run, the economy returns to the potential level of output. These models, therefore appear well suited to showing the short-run expansionary effects of an increase in consumption driven by borrowing, which is reversed in the longer run as the economy returns to full employment and higher consumption occurs at the expense of lower investment and growth (though in the long run growth may be unaffected if it is determined as in the neoclassical growth model). I eschew these models for three reasons. First, the models rely on the stabilizing roles of interest rate (or Keynes) effect or the real balance effect and

ignore the destabilizing effects of wage cuts and wage flexibility stressed by Keynes (1936), the post-Keynesians, and in recent work from more mainstream Keynesians due to factors such as debt deflation and uncertainty.[5] Even if the stabilizing forces are indeed operative, their implications are well known and do not require further analysis. Second, the link between the short run and the long run can be maintained in these models by allowing the rate of technological change to respond positively to output changes due to learning by doing or increasing returns as in the endogenous growth models which allow short run deviations from the potential level of output (see Aghion and Howitt, 1998, pp. 236-9, Fatas, 2000). Thus, these neoclassical synthesis models do not necessarily imply crowding out in the long run, since short-run expansion can lead to a higher rate of long-run growth of potential output, a result which is operationally equivalent to that obtained in a post-Keynesian model in which output does not grow at its potential rate in the long run. Third, these models assume that the rate of interest is market determined, an assumption that can imply that short run expansion which increases the interest rate and chokes off the expansion in the longer run. Although this result occurs in the synthesis models because of wage price flexibility and full employment in the longer run, but may happen even in models in which there is unemployment. The notion that rising indebtedness can choke off an expansion due to a rise in the rate of interest is incorporated in standard models with government debt, and even in post-Keynesian models with firm debt, and can explain why indebtedness has deleterious effects in the long run. Apart from the fact that this mechanism may take too deterministic a view of interest rate movements which are in reality more dependant on the policy stance of the monetary authorities, it is well understood, and not specific to consumer debt. We therefore abstract from it in the model. However, by examining exogenous changes in the rate of interest in our model, we can informally examine the implications of what happens when debt accumulation actually increases the

interest rate.

Regarding the dynamics of consumer debt itself, we can model it in one of two alternative ways. One is to make some assumptions about how the level of consumption of borrowers is determined, and then determining borrowing and the accumulation of debt as the difference between consumption and income net of interest payment. The other is to make assumptions directly about the dynamics of debt, and determining consumption by borrowers by adding borrowing to income. In this model we use the latter route. Although this choice is primarily explained by reasons of convenience, it is also informed by an examination of the literature on the causes of the increase in consumer indebtedness.

Both supply- and demand-side explanations have been used to explain the increase in consumer indebtedness. Supply-side explanations point to institutional changes - such as deregulation of the financial system allowing home equity lending, adjustable-rate consumer loans, and securitization (repackaging of debts and selling as new securities), and technological changes in credit reporting in the US in the 1980s - which led to rapid growth in financial intermediation. Getter (1996) compares data from the early 1980s to the early 1990s and finds a significant decline in loan rejection rates in the US, including those for poorer, non-white and younger households. Demand-side explanations include greater borrowing due to the "necessitous demand for credit" due to declining income of low income consumers, increased consumer optimism, greater willingness to borrow to finance luxury consumption, and demographic changes. Pollin (1986) finds that the borrowing-income ratio (which determines the debt-income ratio) is unaffected by his measure of demographic changes, but it is affected by his measure of necessitous borrowing (the relative price of median homes), and by a broad measure of credit costs and bond yields (representing investment opportunities).

However, on balance the supply-side explanations appear to me to be more convincing. First, survey results do not show that there was an increased willingness to borrow to finance either luxury or necessity-type expenditures (Pollin, 1986). Second, econometric evidence suggests that lower-income households are usually in debt up to their credit limits and cannot borrow more during spells of unemployment (see Sullivan, 2002), and thus the necessitous borrowing argument is questionable, unless it reflects supply-side changes. Third, the price of homes measure may be an inadequate measure of the need for "necessitious" borrowing. Finally, the financial variables such as credit costs may well reflect supply-side factors.

Given that the supply-side explanations appear to be a more plausible explanation of the rise of consumer indebtedness, it seems more reasonable to assume that borrowing is determined by financial factors, so that consumption by borrowers can be determining by constraints imposed by income and borrowing. We therefore model the dynamics of debt accumulation by assuming that financial considerations determine a debt-income ratio desired by lenders, to which the actual debt-income ratio adjusts. This does not mean that demand considerations play no role in our model, or that our modeling choice necessarily rejects demand-side explanations behind increased indebtedness. First, demand-side considerations such as those explained by conspicuous consumption, or levels of income inadequate to meet consumption needs, can explain what makes borrowers go to the limit of what lenders will lend. Second, it is possible to interpret the desired debt-income ratio as one that is desired by borrowers, since there is evidence to suggest that borrowers borrow less when they are more in debt (see Tobin, 1957).

3. Structure of the model

Following Kalecki (1971), it is assumed that the representative firm is set the price by marking up variable costs, assumed for simplicity to be only labor costs, so that

$$P = (1+z)bW$$

where P is the price level, b the labor-output ratio assumed to be fixed, and W the money wage. The markup rate, z, is assumed to be a constant, representing Kalecki's degree of monopoly. Firms are assumed to adjust output in response to effective demand. The stock of capital at a point in time is taken to be fixed, and the firms are assumed to keep excess capacity. We assume that the supply of labor is exogenously given at a point in time and grows over time at an exogenous rate,[6] and that employment (determined by output and the fixed labor-output ratio) is less than full employment and the money wage is assumed to be fixed for simplicity. Assuming that there are only two factors of production - labor and capital - and that all non-wage income from production goes to profits, this equation implies that the profit share is given by

$$\Phi = z/(1+z).$$

Our model allows workers to borrow. We assume that workers finance a part of their consumption by borrowing (thereby departing from the Kaleckian assumption that workers spend what they earn), so that

$$C_W = (1-\Phi)Y - iD + dD/dt, \qquad (1)$$

and that capitalists receive the interest income, and save a constant fraction of their total income, s, so that

$$C_P = (1-s)\,[\Phi Y + iD], \qquad (2)$$

where D is the stock of debt in real terms, i the interest rate and C_W and C_P denote the consumption levels of workers and profit-recipients. It is assumed that profit recipients do not curtail their consumption when

they lend.[7] For simplicity, we assume that banks simply intermediate between lenders and borrowers, and that we do not take account of any other kind of debt in the economy to focus on consumer debt incurred by workers. Moreover, we assume that the real interest rate, i, is held constant by the Central Bank without further effects on aggregate spending (due to changes in money supply, for instance).

Assuming a closed economy and no government fiscal activity, the only other source of aggregate demand is investment demand. We assume that investment demand is exogenously fixed at a point in time. We denote the investment rate by

$$I/K = g \tag{3}$$

where I and K are real investment and the physical stock of capital. In the longer run we assume that firms adjust their investment rate to their desired rate of investment, which we formalize with the equation

$$dg/dt = \gamma\,(g_d - g), \tag{4}$$

where γ is a positive constant and where g_d is the desired rate of investment. Following Robinson (1962), Kalecki (1971), and especially Steindl (1952) we assume that desired investment depends positively on the rate of profit and on the rate capacity utilization, which we measure as $u=Y/K$. Since the profit share, π, is constant as long as the markup, z, is constant, the profit share is proportional to the rate of capacity utilization. For simplicity we therefore write the desired investment function as

$$g_d = \zeta_0 + \zeta_1 u - \zeta_2 i, \tag{5}$$

where ζ_i are positive investment parameters and where we also make the standard assumption that the interest rate has a negative effect on desired investment.

As noted earlier, we assume that the stock of debt, D, is given at a point in time, and that over time it adjusts according to

$$dD/dt = \sigma (D_d - D), \tag{6}$$

where σ is a positive constant, and where the desired level of debt is given by

$$D_d = \zeta [(1-\phi)Y - iD]. \tag{7}$$

The desired level of debt can be interpreted as a determined by lenders, although it could also be interpreted to be determined by borrowers or by both, taking into account the income of borrowers net of interest payments in deciding how much to debt to hold.[8] Changes in the level of ζ will be interpreted to be due to changes in lending practices, since given the urge for competitive consumption and for other needs it can be assumed that workers spend up to the limit of their borrowing capacity.[9]

4. The short run

In the short run we assume that the level of output adjusts to clear the goods market, given the levels of debt, capital stock and investment. In short-run equilibrium we have

$$Y = C_W + C_P + I. \tag{8}$$

Substituting from equations (1) through (3), (6) and (7) and dividing through by K we get

$$u = (1-\phi)u - i\lambda + \sigma\{\zeta[(1-\phi)u - i\lambda] - \lambda\} + (1-s)(\phi u + i\lambda) + g, \tag{8'}$$

where $\lambda = D/K$ is the consumer debt to capital stock ratio. Solving for u from this equation we get its short-run equilibrium value, which is

$$u = \{g - [si + \sigma(1+i\zeta)]\lambda\}/\varepsilon', \tag{9}$$

where $\varepsilon' = s\phi - \sigma\zeta(1-\phi)$. This expression shows the impact on saving of an increase in capacity utilization: the first term shows the additional saving by profit recipients, and the second term shows the additional consumption (or dissaving) financed out of borrowing by workers. Assuming that output (and capacity utilization) adjusts in response to the excess demand for goods, the stability of short-run equilibrium requires

that $s' > 0$, that is, that saving increases with total income or that the increase in saving by profit recipients more than offsets the increase in consumption due to borrowing by workers. We assume that this condition is satisfied, and moreover, that we always have $g > [si+\sigma(1+i\beta)]\pi^*$ to ensure a positive output level.

We may now examine the effects on the short-run equilibrium level of output of changes in the parameters and the short-run givens of the model. We confine our attention to changes in π^*, g, β, i and ϕ. Total differentiation of equation (8') implies

$$s' \, du = dg - [si+\sigma(1+i\beta)] \, d\pi^* + \sigma[(1-\phi)u - i\pi^*] \, d\beta - (s+\sigma\beta)\pi^* \, di - (s+\sigma\beta)u \, d\phi,$$

where, as defined earlier, $s' > 0$. An increase in the desired debt to net income ratio, β, increases u provided that $(1-\phi)u - i\pi^* > 0$, or that the net income of workers is positive, which we always assume to be the case. Thus, higher consumption financed by more borrowing is expansionary. An increase in the debt-capital ratio, π^*, however reduces u. This contractionary effect occurs because: first, it redistributes income from workers-borrowers to capitalists-lenders who save a higher fraction of their income; second, it reduces the desired level of debt by increasing interest payments; and third, the higher level of debt reduces the propensity to increase debt given the desired level of debt. The last two effects operate by reducing the level of borrowing-financed consumption by debtors. A rise in investment, or g, increases demand and output with a multiplier – $1/s'$ – larger than in the model without borrowing ($1/s\phi$), because there is a borrowing-induced increase in consumption. A rise in the rate of interest, i, reduces the degree of capacity utilization because of the redistribution of income from borrowers to lenders and because it reduces the net income of borrowers, the desired level of debt, and hence the increase in indebtedness which finances consumption out of borrowing. Note that the short-run contractionary effect of the rise in the interest rate is not brought about by a fall in the level of investment, which is taken to be exogenously given in the short

run. If the rise in the interest costs is passed on to consumers in the form of a higher price, so that the markup rate, z, increases, there will be a rise in Φ, which has a further contractionary effect by redistributing income to profit recipients, and by reducing the net income of workers which reduces borrowing-financed consumption. In what follows we will write the derivatives of u with respect to the parameters and state variables of the model with subscripts. Thus, for instance,

$$u_2 = \Sigma[(1-\Phi)u - i^*]/\Psi .$$

We can summarize the discussion on comparative statics by noting that $u_g > 0$, $u_* < 0$, $u_2 > 0$, $u_i < 0$ and $u_\Phi < 0$.

Changes in the rate of capacity utilization, u, have no effect on the rate of growth of the economy in the short run which, as assumed, is taken to be fixed. However, the changes do have an effect on the distribution of income in the economy which we can measure by the ratio of the income of profit-cum-interest recipients to the net income of workers-borrowers,

$$\Omega = (\Phi u + i^*)/[(1-\Phi)u - i^*], \qquad (10)$$

which is an index of inequality. Other things constant, an increase in the rate of capacity utilization reduces the extent of inequality. An increase in capacity utilization implies a rise in total income from production without changing interest income or interest payments. Since the share of production income going to the workers and profit recipients is constant, the income of both groups increases, but by a smaller proportion of total income for those who also have interest income than those who have interest payments. Since a rise in the investment rate increases capacity utilization in the short run with no direct effect on Ω, a rise in g reduces inequality in the short run. A rise in borrowing represented by a rise in Ξ has the same effect as the rise in investment, that is to increase capacity utilization (and employment) and reduce inequality. Not

only are poor workers helped by being able to consume more, but they are also helped by the expansion in employment. A rise in the debt-capital ratio reduces u and increases interest payments represented by i^*, so that income distribution worsens as a result. A rise in the rate of interest has the same effect as the rise in *, reducing u and increasing interest payments. A rise in the markup or a fall in the real wage, represented by a rise in F, has the effect of increasing inequality for a given u by changing the distribution of production income, an effect that is exacerbated by the reduction in capacity utilization.

5. The long run

In the long run we assume that D, K and g can change over time. We examine the dynamics of the economy by focusing on the dynamics of g, which are given by equation (4), and of *. From the definition of * we see that

$$\hat{}^* = \hat{}D - \hat{}K,$$

which implies, using equations (3), (6) and (7),

$$\hat{}^* = S2(1-F)(u/^*) - S(1+i2) - g. \tag{11}$$

Substitution from equation (9) then implies

$$d^*/dt = S2(1-F)\{[g-(si+S(1+i2)^*)]/'\} - S(1+i2)^* - g^*. \tag{12}$$

Substitution of equation (5) into (4) implies

$$dg/dt = 7\,[\,(_0 + (_1 u - g], \tag{13}$$

which, substituting from equation (9) then implies

$$dg/dt = 7\,\{(_0 + (_1\{g - [si+S(1+i2)]^*\}/'\} - g\}. \tag{14}$$

Equations (12) and (14) comprise a dynamic system in the variables * and g, which we can analyze in terms of a phase diagram. The $d^*/dt = 0$ isocline is shown in Figure 1, where $^{*+} = S2(1-F)/' > 0$ and

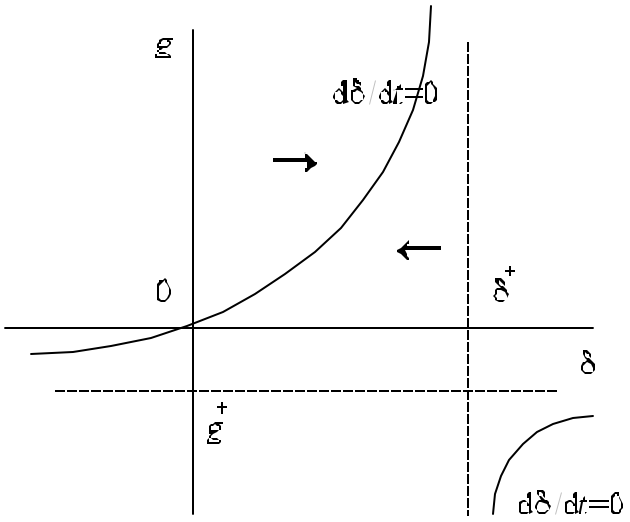

Figure 1 Dynamics of the debt-capital ratio

$g^+ = -sS(F+i2)/' < 0$. Since we are interested only in the region with $g>0$, which is required for $u>0$ with $* \geq 0$, we confine our attention to the area above the horizontal axis. In that area the horizontal arrows show the movement of $*$ off the relevant part of the $d*/dt=0$ isocline. This part of the diagram is reproduced in Figure 2, which also shows the $dg/dt=0$ isocline obtained from equation (14), the equation of which is given by

$$g = [(_0\ '/(' - (_1)] - [(_1(si+S(1+i2))/(' - (_1)]*.$$

If $' > (_1$, which states that the responsiveness of saving to changes in capacity utilization exceeds the responsiveness of investment, the $dg/dt=0$ isocline will be a negatively sloped line with a positive vertical intercept, as shown in Figure 2. Equation (14) explains the directions of the vertical arrows.

Long-run equilibrium is attained at the intersection of the $dg/dt = 0$ and $d*/dt=0$ isoclines, at E. As the arrows show, the economy will oscillate around E in a clockwise manner, approaching it; it can be shown that the equilibrium is a stable one (see Appendix).

The economy must always remain above the $0F$ line, which represents the equation $g =$

[*si*+S(1+*i*2)]*, to ensure *u*>0. Our assumptions are enough to determine whether the OF line is flatter than, or steeper than the d*/d*t* = 0 locus at the origin. The slope of the d*/d*t* = 0 locus at the origin is d*/d*t* = 0 locus at the origin is *s*(F+*i*2)/2(1-F), while the slope of the *OF* line is [*si*+S(1+*i*2)]/ ' (see equation (9)). It can be shown that the latter locus at the origin will have a steeper slope than the OF line if *s*F>S2(1-F), which is the condition that ' >0.

Starting from a position directly to the left of the long-run equilibrium position at *E*, we have the actual investment rate less than the desired one, which implies that firms raise their investment rate. This adds to aggregate demand and output, and therefore increases the desired level of debt of households. With actual debt at a relatively low level, this leads to an increase in the level of consumer debt which also

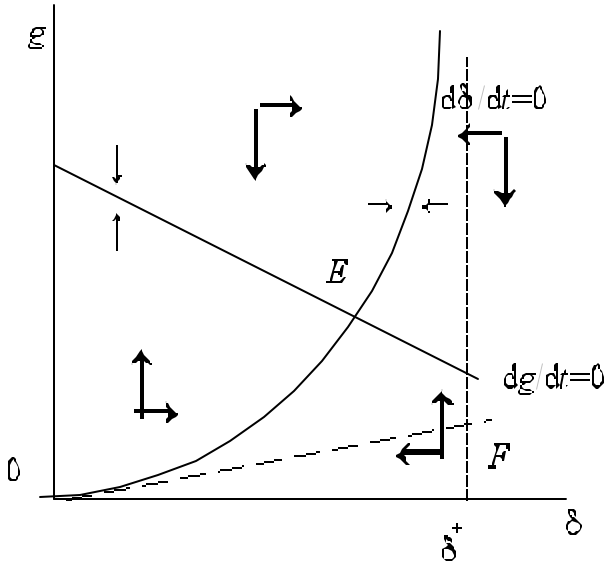

Figure 2 Phase diagram for the long run

increases consumer spending, demand and income. Initially this increase in debt is higher than the rate of increase in capital accumulation, which increases the debt-capital ratio. As the actual rate of investment

rises, it eventually overshoots the desired level, which leads to a fall in it. Meanwhile, the increase in debt increases interest payments and reduces the desired level of debt, and this, together with the rise in the actual level of debt, implies that actual debt-income ratio exceeds the desired debt-income ratio, so that the level of debt begins to fall. Since consumption spending slows down in consequence, this reduces demand and capacity utilization, reducing the desired level of investment. The fall in the desired rate of accumulation leads to a fall in the actual rate of accumulation. The fall in debt accumulation reduces interest payments and makes desired debt higher than actual debt, causing debt to increase again. The fall in the actual rate accumulation reduces its level below the desired one, and the stage is then set for a new cycle. It should be noted that although our phase diagram shows cycles in the debt-capital ratio and the investment rate, it also implies cycles in the debt-GDP ratio, which can be measured by $^*/u$, which depends on both g (negatively, by positively affecting u) and * (positively, directly and by negatively affecting u).

It should also be note that cycles occur in this model due to the slow adjustments of both actual investment to desired investment and actual debt-income to desired debt-income ratio, and would not occur if the adjustments were infinitely fast. For instance, if the adjustment of actual to desired accumulation is very fast in comparison with the change in the debt-capital ratio, the economy would always be on the $dg/dt=0$ curve, and the economy would converge along that curve without oscillation to the long-run equilibrium at E.

The long-run impact of changes in the parameters of the model can now be examined by considering the effects of such changes on the position of the long-run equilibrium. We confine our discussion to changes in autonomous investment, the desired debt-income ratio, the interest rate, and the distribution of income from production. Our real concern is to examine the long-run effects of increased

borrowing - represented by an increase in 2 - on growth an income distribution, and this is what we will examine in detail. The effects of the other parametric changes on growth will be relevant for understanding the nature of the response of changes in borrowing on growth and income distribution, and so we will study these effects in less detail, focusing mainly on their growth impact.

An increase in autonomous investment captured by an increase in $(_0$ represents an upward shift in the desired investment function. The effect of this change on the growth rate is easy to analyze because it shifts the dg/dt=0 isocline upwards without shifting the d*/dt=0 isocline. This implies that the long-run equilibrium of the economy moves up along the d*/dt=0 isocline, increasing the long-run equilibrium values of both g and *. The effect on capacity utilization and income distribution is somewhat more complicated. On the one hand, the increase in * implies a long-run redistribution of income from workers to profit (and interest) recipients given capacity utilization, and it also implies a fall in u, as discussed earlier. On the other hand, the increase in g tends to increase u. It turns out that given our assumptions the positive effect

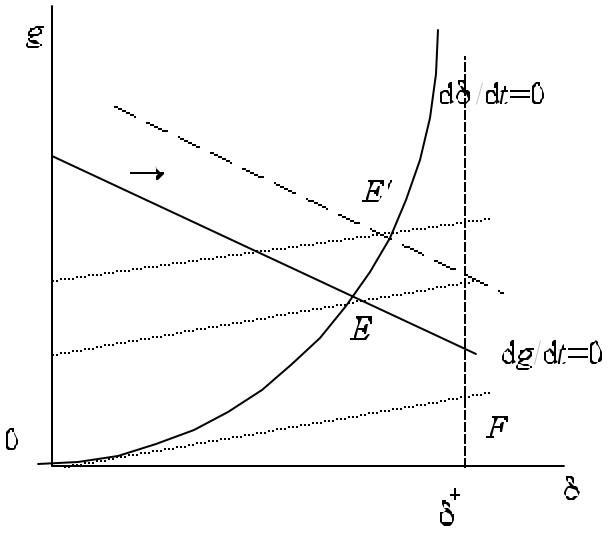

Figure 3 Effect of an increase in autonomous investment

dominates. To see this, note that we can draw iso-utilization lines in the phase diagram to show combinations of g and ρ which imply the same level of capacity utilization, the slope of which is given by $[si+\sigma(1+i\beta_2)]/\theta$ (see equation (9)). Since the slope of the $d\rho/dt = 0$ locus increases as ρ increases, and its slope at the origin has already been shown to exceed the slope of the iso-utilization line, the economy is found to move to a higher iso-utilization curve as it moves up the $d\rho/dt=0$ curve, as shown in Figure 3. The increase in u has the effect of reducing inequality, as shown by equation (10), while the increase in ρ has the effect of increasing it. The overall effect is ambiguous.

An increase in β_2, which represents an increase in borrowing, as we saw earlier, implied a rise in u and g in the short run. To analyze the long-run effects we note that a rise in β_2 shifts both $dg/dt=0$ and $d\rho/dt=0$ curves. The increase, by increasing u, increases the desired rate of accumulation g_d, thereby pushing the $dg/dt = 0$ isocline in the phase diagram upwards. Equation (12) can be used to show that as long as workers have a positive income net of interest payments (which was required for the positive short-run effect of increased borrowing on capacity utilization), $d\rho/dt$ will rise for given values of ρ and g when β_2 rises: increased borrowing leads to faster debt accumulation. The $d\rho/dt=0$ isocline will therefore move downwards and to the right. The long-run equilibrium effect on ρ is therefore positive, and on g, ambiguous. It is shown in the Appendix that the sign of the effect on g depends on whether g exceeds, or is less than, si. This ambiguity regarding the effect on the growth rate arises because, despite the increase in demand caused by borrowing, a higher debt burden in the long run shifts income from borrowers to debtors who have a lower propensity to consume, and thereby reduces the rate of capacity utilization, and hence, accumulation. The higher is si the higher is the reduction in aggregate demand due to increased borrowing. The higher is g the higher is the increase in aggregate demand to to the increase in borrowing

and the debt (with the debt-capital ratio being constant in long-run equilibrium).

It should be stressed that this result is not due to usual the neoclassical synthesis result that increasing demand can increase output in the short run but have no effect in the long run due to interest rate and wage-price adjustments. In the model developed here the interest rate is not pushed up by an increase in borrowing. Moreover, wage price adjustments do not take the economy to full employment or to full capacity utilization in the long run. In fact, as we shall see, if the real wage falls due to unemployment, the economy can actually travel further away from full employment due to reductions in consumption demand.

Since the increase in 2 increases * and can increase or reduce *g*, and since in this case *u* changes in the same direction as *g*, equation (10) implies that the effect on inequality is also ambiguous. If $g<si$, so that *g* falls with an increase in 2, the effect is to increase inequality. If $g>si$, *g* increases with 2, and so does *u*, so that it is possible for inequality to fall. However, since * increases, it is not necessarily the case that inequality must fall.

An increase in the rate of interest, as we saw earlier, reduces the rate of capacity utilization in the short run. This reduction, and also the direct effect of the increase in *i*, reduces the desired rate of investment, which implies a leftward shift in the $dg/dt=0$ locus. The fall in capacity utilization and the increase in the interest rate reduces the net income of borrowers and therefore reduces the desired debt and borrowing, which implies a fall in the rate of change in the debt-capital ratio. The $d*/dt=0$ locus therefore shifts to the left. It seems from these shifts that the long-run equilibrium * goes down, while the change in *g* is ambiguous: the increase in the interest rate reduces investment, but can reduce *, redistribute income from creditors to debtors (despite the increase in the interest rate), increase consumption, and

therefore increase the rate of accumulation. The Appendix, however, shows that the effect on g is unambiguously negative due to the effect on investment and the direct effect of redistributing income to creditors who have a lower consumption propensity.

Finally, we consider the effects of a change in the distribution of production income represented by an increase in π. As noted in the previous section, this reduces capacity utilization in the short run. Consequently, it reduces the rate of desired accumulation, shifting the $dg/dt=0$ curve to the left.[7] The increase in π and the consequent reduction in u reduces the income of borrowers, and therefore reduces the desired debt-income ratio. It therefore reduces borrowing and shifts the $d\theta^*/dt=0$ curve to the left. The diagram implies that the long-run equilibrium value of θ^* falls and the value of g may rise or fall. The negative effect of a shift in income distribution to profit and interest recipients with a lower propensity to consume tends to depress accumulation, whereas the positive effect of the lower debt burden tends to increase it. However, the Appendix shows that our assumptions imply that g definitely falls, the negative effect outweighing the positive one.

6. Conclusion

This paper has developed a simple post-Keynesian model of consumer debt, growth and distribution which incorporates consumer borrowing into a Kaleckian model of markup pricing, endogenous capacity utilization and demand-determined growth.

The model captures the short-run expansionary effects of increased borrowing, and the contractionary effects of debt accumulation. It also provides an explanation of cycles due to slow adjustments in the adjustment of the actual rate of accumulation to the desired rate and of the actual debt-income ratio of borrowers to the actual rate. Finally, it examines the determinants of long-run equilibrium

and the consequences of changes in parameters for the long-run equilibrium position.

The main conclusion of the paper is that an increase in the debt-income ratio of borrowers, perhaps due to financial innovations which increase the supply of loans to borrowers, has a short-run expansionary effect on the economy, increasing capacity utilization, and also increases the rate of accumulation just beyond the short run. It also has a favorable effect on income distribution by increasing capacity utilization. However, more rapid debt accumulation due to more borrowing also increases the debt burden of borrowers, and this has an ambiguous effect on both the rate of accumulation and income distribution in the long run. The effect on growth and distribution will be negative if the product of the saving rate of the rich and the interest rate exceeds the rate of accumulation (investment to capital ratio). In this case the contractionary redistributive effect of higher debt will more than offset the possible positive effect on accumulation. If, on the other hand the rate of accumulation exceeds the product, increased borrowing will increase the rate of growth. Income distribution can still worsen, but it possible to even have an improvement on this score as well.

The rate of accumulation in the model, of course, is endogenous. The model has some interesting implications regarding conditions under which the long-run expansionary effects of consumer borrowing are more or less likely. A higher interest rate, both by increasing the product of the interest rate and the capitalist saving rate, and by reducing the rate of accumulation, makes a contractionary effect more likely. A higher level of autonomous investment (represented by $(_0$), by increasing the rate of accumulation, is more likely to result in an expansionary effect. A higher share of profits out of production income, by reducing the rate of accumulation, is more likely to result in a contractionary effect.

It bears repeating that these conclusions follow under the assumption that the interest rate is held

constant. If the interest rate increases when the debt-capital ratio rises, then the contractionary impact of increased borrowing becomes more likely. Furthermore, if the rise in the interest rate results in a rise in the markup (to cover higher interest costs) and increases the share of profits in production income, the contractionary effects become every more likely. However, although it is possible that borrowing and debt can affect the interest rate, it is not at all clear that such a relation necessarily exists. The interest rate probably depends on the monetary policy stance of the Central Bank, and is more appropriately held constant, as we have done in the model.

Finally, it is worth stressing that the possible contractionary effects of increased borrowing occur in a demand-constrained model in which there are no mechanisms which necessarily take the economy to full employment in the long run and which makes borrowing-financed consumption crowd out investment. Indeed, in the model used here real wage flexibility can reduce the rate of growth of output and employment, and exacerbate the problem of unemployment. But it is also true that our result that borrowing-financed consumption can have a positive on growth and income distribution does not require a model in which there is unemployment in the long run. Even if the economy eventually reverts to a position of full employment, a temporary expansion in aggregate demand and output which speeds up technological change due to learning by doing can imply that borrowing-induced expansions can have a long-run expansionary effect.

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APPENDIX

The Jacobian of the dynamic system given by equations (11) and (13) is given by

$$\boldsymbol{J} = \begin{matrix} \gamma(\alpha_1 u_g - 1) & \gamma \alpha_1 u_* \\ \sigma\nu(1-\phi)u_g - \rho & \sigma\nu(1-\phi)u_* - \sigma(1+i\nu) - g \end{matrix}$$

Conditions for the local stability of the dynamic system are Trace $\boldsymbol{J} < 0$ and $\rho\boldsymbol{J}\rho > 0$. Since $\sigma\nu(1-\phi)u_* - \sigma(1+i\nu) - g < 0$ for $g > 0$, a sufficient condition for the trace being negative is $\alpha_1 u_g < 1$, which is equivalent to $s\phi - \sigma\nu(1-\phi) - \alpha_1$, which is the familiar stability condition that saving is more responsive to changes in capacity utilization than is investment. Since we are confining ourselves to positive values of g and ρ, as seen in the text, we assume $\rho < \sigma\nu(1-\phi)/\theta'$, so that $\sigma\nu(1-\phi)u_g - \rho > 0$. Moreover, since $u_* < 0$, we have $\gamma \alpha_1 u_* < 0$, so that the determinant of $\boldsymbol{J}$ is also positive.

Total differentiation of the dynamic system given by equations (11) and (13) implies that

$$\boldsymbol{J}\begin{matrix} dg \\ d\rho \end{matrix} = -\begin{matrix} \gamma \alpha_1 u_\nu \\ \sigma[(1-\phi)u - i\rho + \nu(1-\phi)u_\nu] \end{matrix} d\nu - \begin{matrix} \gamma \\ 0 \end{matrix} d\alpha_0 + \begin{matrix} \gamma(\alpha_2 - \alpha_1 u_i) \\ \sigma\nu[\rho - (1-\phi)u_i] \end{matrix} di + \begin{matrix} -\gamma \alpha_1 u_\phi \\ \sigma\nu[u - (1-\phi)u_\phi] \end{matrix} d\phi$$

From this equation, using Cramer's rule, we obtain:

$$dg/d\nu = \{\sigma\gamma\alpha_1[(1-\phi)u - i\rho]/\rho\boldsymbol{J}\rho\}(g - si)$$

$$dg/d\alpha_0 = -\gamma[\sigma\nu(1-\phi)u_* - \sigma(1+i\nu) - g]/\rho\boldsymbol{J}\rho > 0$$

$$dg/di = [\gamma/\rho\boldsymbol{J}\rho]\{\alpha_2[\sigma\nu(1-\phi)u_* - \sigma(1+i\nu) - g] + u_i[\alpha_1 g - (\sigma\alpha_1 s\rho/\theta')] < 0$$

$$dg/d\phi = -[\gamma\alpha_1/\rho\boldsymbol{J}\rho][(\sigma s u/\theta') - g u_\phi] < 0.$$

NOTES

1. These figures on consumer debt do not include residential mortgage debts, but only those arising from consumer credit. Mortgage debts have been excluded because it can be argued that such debts do not really represent true net liabilities because they are balanced by housing assets. The rise in consumer debt shows an upward movement even if we include mortgage debt.

2. Unsecured debt refers to debt not guaranteed by pledge of any collateral. In about half this debt is credit card debt.

3. Manning (2000) argues further that increasing indebtedness has vary other adverse social consequences, including poor health, a rise in divorce rates, and an increase in drug use.

4. See Dutt (2002) for a discussion of the absence of aggregate demand issues in new growth theory models. To be sure, a few endogenous growth models do yield some room to aggregate demand issues even in the long run in an indirect way, which will be discussed later.

5. Keynes's arguments are given in chapter 19 of Keynes (1936). Post-Keynesian ideas on the subject are reviewed in Dutt and Amadeo (1990). For an example of recent work by more mainstream Keynesians which suggest that wage flexibility may well be destabilizing see Hahn and Solow (1995). Long-run full employment can also be achieved through appropriate government fiscal and monetary policies if wage flexibility cannot do the job through the Keynes and real balance effects. However, it is not obvious that the government is willing (see, Kalecki, 1943) or able to achieve such an outcome. The discussion here relates to those neoclassical synthesis which rely on rigid wages in the short run. Models which rely on expectations rigidity assume wage flexibility and labor-market clearing even in the short run, and are therefore questionable on empirical grounds.

6. This implies that we do not take into account the effects of consumer behavior on labor supply, as noted by Schor (1998). It could, however, be extended to take such issues into account.

7. This is because while lending reduces the flow of cash available for consumption by them, it also increases their assets. It is being assumed that the consumption of the rich is not constrained by cash flows. If we do assume that profit recipients save a fraction of their available flow of resources, so that $C_P = (1-s)(\Phi Y + iD - dD/dt)$, the qualitative results of the analysis will not change, since borrowing increases consumption overall because borrowers use all of their loan for consumption.

8. This formulation follows Palley (1994) in some respects. The assumption that the growth in debt reflects differences between actual and desired debt is used in Palley's third model, and the assumption that desired debt is a fraction of the income of debtors and the interpretation given to this assumption also follows Palley, although in the formulation of the paper the income is taken to be net of interest payments (in contrast to Palley who takes it to be gross of interest payments), to reflect that borrowers and lenders take into account the negative effects of interest payments in their borrowing and lending

decisions. There are many other differences between Palley's formulation and the one developed below, which need not detain us here. The major difference is that Palley's models are discrete time models which examine cyclical issues using the multiplier-accelerator type difference equation framework, whereas the model developed here is in a continuous time framework which can examine cycles as well as long run equilibrium issues in a clearer way using phase diagrams.

9. We do not model bankruptcy explicitly. Bankruptices can be taken to imply that a part of the debt is cancelled, which implies that the interest rate actually incorporates within it a given bankruptcy rate (as a fixed ratio of the total debt). A fuller analysis will have to analyze the effects of changes in the bankruptcy rates on lending conditions.

7. This assumes that F does not directly affect the desired rate of accumulation. If, following Bhaduri and Marglin (1990) we assume that desired accumulation depends positively on F as well as on u, then it is possible that a rise in F can increase the desired rate of accumulation, and shift the $dg/dt=0$ curve to the right.