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Macroeconomic implications of financialisation

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A growing literature suggests that 'financialisation' may weaken the performance of non-financial corporations and constrain the growth of aggregate demand. This paper uses two alternative approaches—one derived from Skott and one from Lavoie and Godley—and two different settings—a labour-constrained setting and a dual-economy setting—to evaluate some of the claims that have been made. Our analysis, which pays explicit attention to financial stock–flow relations, suggests that the qualitative effects of 'financialisation' are insensitive to the precise specification of household saving behaviour but depend critically on the labour market assumptions (labour-constrained versus dual) and the specification of the investment function (Harrodian versus Kaleckian).

Key words: Financialisation, Stock-flow consistency, Retention rate, External finance, New issue
JEL classifications: E12, E21, E44

1. Introduction

Along with neoliberalism and globalisation, financialisation has become a buzzword in recent years.[1] The precise definition is not always clear but in a broad sense the term refers to 'the increasing role of financial motives, financial markets, financial actors and financial institutions in the operation of the domestic and international economies' (Epstein, 2005, p. 3). More specifically, financialisation has been associated with a number of developments. These developments include shifts in central bank policy toward a near-exclusive focus on price stability, large increases in financial flows both internationally and in domestic financial markets, improved financing for households and elements of consumption/credit driven growth, changes in corporate governance and attempts to align managerial incentives with shareholder interests via stock option plans, and an increased influence of financial institutions and institutional investors. Financial pressures, it is

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[1] Eatwell and Taylor (2000), Blecker (1999), Crotty (2005), Stockhammer (2004, 2006), Duménil and Lévy (2001), Boyer (2000), Aglietta and Breton (2001) and Froud *et al.* (2000) are among the contributions to the growing literature on financialisation. An International Working Group on Financialisation has also been set up with the aim of bringing together 'an interdisciplinary network of researchers and practitioners interested in financialisation and all the issues around relations between the capital market, firms and households' (http://www.iwgf.org/Events.htm).

argued, have induced changes in management strategy from 'retain and invest' to 'downsize and distribute' (Lazonick and O'Sullivan, 2000, p. 18) and have affected firms' dividend, new issue and debt finance policies. In some accounts non-financial corporations have been 'forced to fund most of their capital investment externally in the neoliberal era' (Crotty, 2005, p. 99).

These various changes associated with financialisation may have implications for macroeconomic performance. Crotty (2005) has argued that financialisation weakens non-financial corporations and constrains the growth of aggregate demand. In a similar vein, Duménil and Lévy (2001) suggest that financialisation leads to instability and undermines growth and employment. Meanwhile, most of mainstream economics has been praising the potential benefits of financial liberalisation, and some non-mainstream contributors have also seen financialisation as a spur to growth. Thus, Boyer (2000) has suggested the potential for finance-led growth regimes as an alternative to the defunct Fordist regime.

Although most of the existing literature on financialisation has been descriptive and empirical, more precise analytical treatments of some of the macroeconomic linkages have been presented by Boyer (2000), Aglietta and Breton (2001), Dutt (2005), Stockhammer (2004, 2006) and Hein and van Treeck (2007).

According to Aglietta and Breton 'growing financial liberalisation has profoundly changed the connections between finance and the rest of the economy' (2001, p. 434). Their analysis, however, is hard to follow, and the formal model does little to elucidate the mechanisms that could support the claims that are being made in the paper.[1] Boyer's model of finance-led growth basically boils down to profit-led/exhilirationist regimes with a profit–wealth-consumption nexus as a driving force. Given the centrality of this nexus, however, a more careful modelling of the stock–flow relations and of the effects of financialisation on wage formation would have been desirable. Boyer, for instance, assumes an exogenously given, constant q-ratio. This constancy assumption with respect to a key financial variable seems particularly unsatisfactory in a model that addresses the effects of financialisation. The mechanism through which an increase in the 'profitability norm' generates a decline in the wage bill (for given values of output and the capital stock) is also unclear, as is the determination of the 'profitability norm'.[2]

The Stockhammer and Dutt papers do not suffer from weaknesses of the same kind. Stockhammer's 2004 analysis, however, is partial and his 2006 model is rudimentary in its treatment of the financial system; Dutt's analysis focuses exclusively on the relaxation of households' credit constraint and considers neither capital gains nor firms' financial decisions and balance sheets. Hein and van Treeck, finally, analyse the effects of changes in firms' financial behaviour in a Kaleckian model. They assume, however, that these changes

[1] It is difficult, for instance, to justify their assumption of an exogenously given and constant (average) net rate of return ($E(\rho)$). Also, the firm's credit constraint is peculiar, as is the assumption that a risk premium is added to the risk-free interest rate *only* if the quantity constraint is binding. This problem has implications for the analysis of the firm's optimisation problem. In this analysis, the crucial first order condition with respect to the debt ratio d overlooks the dependence of the interest rate r on the debt ratio. Intuitively, why would any firm ever want to choose $d = d_{max}$ if by reducing its debt ratio marginally the interest rate on its debt drops by a finite amount? The calculation of solutions for r and d_{max} in the constrained regime is also wrong since it overlooks the fact that the default probability is itself a function of r (aside from this important point, the expressions for r and d_{max} also contain a minor error).

[2] Is this norm fixed without any feedback from actual profit rates? On p. 124 it is suggested that, as an extension, the norm could be determined 'using an adaptive process taking into account the past record of the achieved rate of profit', but this extension is not pursued in the paper and it would seem to undermine the exogenous 'financialisation' argument.

have no effect on the debt–capital ratio, the equity–capital ratio and the accumulated earnings–capital ratio. Since changes in financial behaviour will, in general, lead to movements in these ratios, their analysis appears to be confined to the very short run.

In this paper we explore the macroeconomic implications of changes in firms' financial decisions (retention rate, new equity issues, debt finance), 'animal spirits' (shifts in the investment function), household financial behaviour (saving and portfolio decisions), and the level of interest rates. These changes are among the ones that have been highlighted by the financialisation literature but clearly make up only a small subset of the issues that have been raised.

Three further limitations should be emphasised at the outset: (i) we limit ourselves to a closed economy, (ii) the emphasis is on the medium- and long-run effects with little or no attention to questions of stability and short-run fluctuations, and (iii) we ignore fiscal policy altogether and our treatment of monetary policy is kept almost embarrassingly simple. We limit the analysis in this way partly to keep it tractable, but also because many of the arguments advanced by the financialisation literature concern the medium- and long-run effects of the changes in financial behaviour and appear to be unrelated to open-economy complications or government policy. Thus, our simplifications may be justified by the limited objective of our analysis: to examine the logic underlying some of the claims that have been made in the financialisation literature.

The specification of expectations would be critical in a full dynamic analysis of the trajectory of the economy but, given our focus on the medium and long run, we simply assume that expectations are being met. If the economy follows a steady growth path, this assumption will be satisfied for any standard process of expectations formation. More generally, fluctuations around a steady growth path will be associated with an approximate consistency between average expectations and average outcomes. It should be noted, however, that financialisation may affect the properties of cyclical fluctuations, leading perhaps to an increase in the amplitude of fluctuations, and our analysis is clearly incomplete since we ignore these effects on the higher moments of the variables. A more radical perspective may regard increasing financialisation as merely a phase in a long cycle of endogenous changes in financial behaviour and Minskian fragility. From this Minskian perspective our focus in this paper may be misleading and our neglect of the dynamic interactions underlying the observed changes in financial behaviour represents a major limitation.[1]

Two different settings are examined. The economy may be 'mature' in Kaldor's (1966) terminology and have a growth rate that is constrained by the available labour force. Alternatively, in the 'dual-economy' setting, the labour supply to the modern/capitalist sector of the economy is perfectly elastic. Both of these settings are analysed using two alternative models of household behaviour: one is derived from Skott (1981, 1988, 1989A) and the other from Lavoie and Godley (2001–02). Both of the models are in a broadly structuralist/post-Keynesian tradition and both pay explicit attention to balance sheets and financial stock–flow relations. The two models differ in a number of respects. Interestingly, however, the differences with respect to the specification of financing, saving and portfolio decisions have little effect on the qualitative results. By contrast, the effects of financialisation depend critically on the labour market assumptions (labour-constrained versus dual) and the specification of the investment function (Harrodian versus Kaleckian).

[1] Minskian models of endogenous movements in financial fragility have been presented by, among others, Taylor and O'Connell (1985), Lavoie (1986/87), Delli Gati and Gallegati (1990), Semmler (1987) and Skott (1994).

The rest of the paper is structured as follows. In Section 2 we discuss some of the stylised facts relating to financialisation and comment on the dangers of a purely partial analysis. Section 3 outlines our general framework, and Sections 4 and 5 consider the implications of changes in key financial variables in the context of the different models. Section 6, finally, discusses the main results and offers a few concluding comments and suggestions for further research.

2. Evidence

2.1 Some stylised facts

The stylised facts are largely well-known, and we confine ourselves to a brief description of some US data. The retention rate has declined from around 85% in the 1970s to about 73% (Figure 1). It is worth pointing out that this change marks a return to retention rates that are at or not much below the levels of the 1950s. Looking at the whole period since 1950, the aberration may have been the high retention rates of the 1970s and 1980s.

The behaviour of non-financial corporations with respect to new equity issues shows a clearer picture. Whether measured in terms of the value of new issues divided by the market value of outstanding equities (Figure 2) or, alternatively, by the share of new investment financed by new equity (Figure 3), there has been a significant decline in new issues. In the 1950s–1970s a small positive fraction of gross investment—on average about 5%—was financed by new issues. Since 1980, however, the rate of net issues has been negative in most years and, on average, non-financial corporations have spent an amount equal to about 12% of their gross fixed investment to buy back equity.

Debt finance has become increasingly important. As shown in Figure 4, the ratio of debt to the replacement value of capital has increased from a level just above 30% in the 1950s to about 60%. The ratio increased steadily in the 1950s and 1960s, reaching about 50% in the early 1970s before dropping back to about 35% around 1980. Thus, the increase has

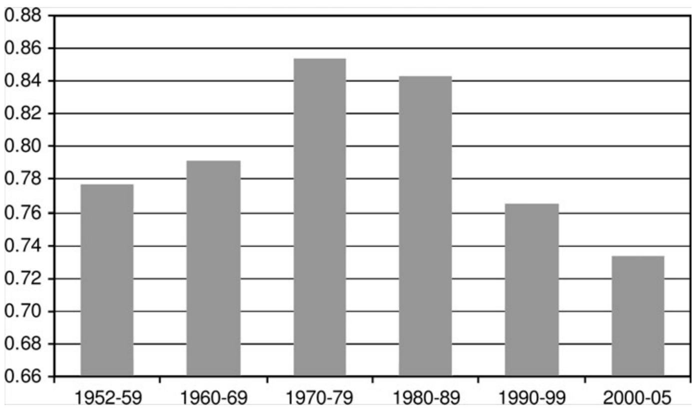

Fig. 1. *The retention rate (1952–2005). The retention rate adjusted for inflation = 1 – {net dividends ÷ (US internal funds + net dividends + inflation rate × net liabilities)}. The inflation rates are based on the consumer price index and net liabilities refer to nonfarm nonfinancial corporate net liabilities. US internal funds = profit (before taxes and after net interest payments) – taxes on corporate income – net dividends + consumption of fixed capital + capital consumption adjustment.* Sources*: Federal Reserve Board,* Flow of Funds Accounts of the United States*, table F.102 and table B.102; Bureau of Labor Statistics,* The Consumer Price Index. *Authors' calculations.*

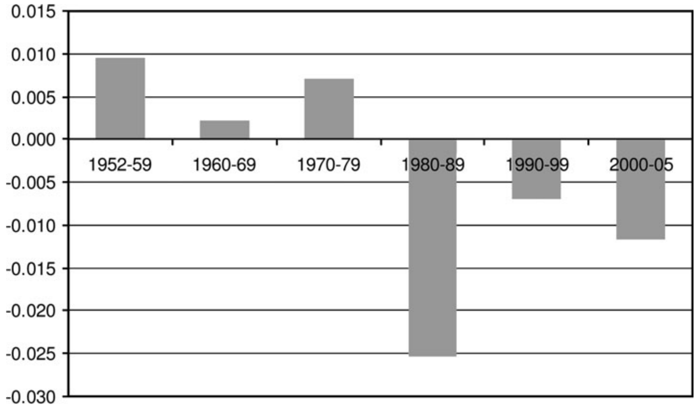

Fig. 2. *The rate of net issues of equities (1952–2005). Net issues of nonfinancial corporate equities divided by the market value of nonfinancial corporate equities outstanding.* Sources*: Federal Reserve Board,* Flow of Funds Accounts of the United States*, table F.213 and table B.102. Authors' calculations.*

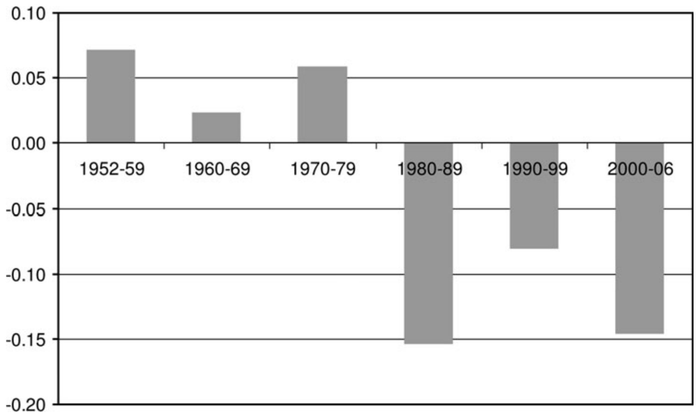

Fig. 3. *The ratio of net issues of equities to fixed investment (1952–2005). Net issues of nonfinancial corporate equities divided by nonfarm nonfinancial corporate (gross) fixed investment quarterly data.* Sources*: Federal Reserve Board,* Flow of Funds Accounts of the United States*, table F.213 and table F.102. Authors' calculations.*

been very steep over the last 25 years. It should be noted, however, that Figure 4 depicts gross debt. Insofar as non-financial firms hold increasing amounts of financial assets, the movements in net debt could be very different. Data issues make it difficult to get a clear picture of changes in net debt.

Real rates of interest have fluctuated substantially (Figure 5). The early 1980s saw historically very high interest rates, but rates gradually decreased in the late 1980s and early 1990s and, after another increase in the mid 1990s, are now at, and in some cases below, their historical average. Thus, there is little support for the common view that financialisation has led to persistently high real rates of interest.

Turning now to household behaviour, the well-known rise in the ratio of personal consumption to disposable personal income comes out clearly in Figure 6. The ratio of

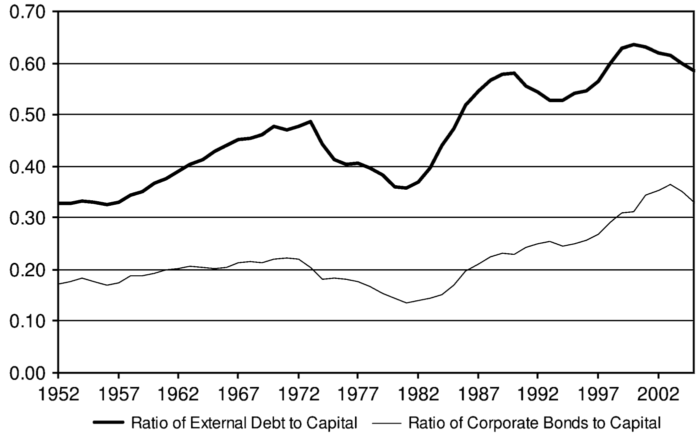

Fig. 4. *The ratio of gross debt to capital: nonfarm nonfinancial corporations (1952–2005). Gross debt = commercial paper + municipal securities + corporate bonds + bank loans + other loans and advances + mortgages. Capital = replacement cost of structures + replacement cost of equipment and software.* Sources*: Federal Reserve Board,* Flow of Funds Accounts of the United States*, table B.102. Authors' calculations.*

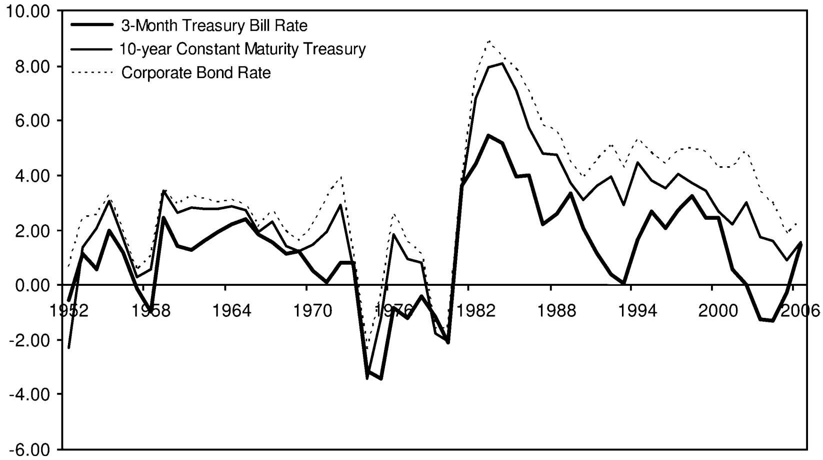

Fig. 5. *Real rates of interest (1952–2006). Nominal rates minus consumer price index inflation rates.* Sources: *Federal Reserve Board,* Federal Reserve Statistical Release*; Bureau of Labor Statistics,* The Consumer Price Index. *Authors' calculations.*

households' net financial wealth to disposable income, however, has shown much more stability (Figure 7). The stock market boom of the 1990s shows up in this ratio, but the value of the ratio is now back at the level that characterised the 'golden age' of the 1950s and 1960s. The effects of stock market fluctuations, finally, show up strongly in the ratio of capital gains to disposable income in Figure 8. The distribution of these gains has been very unequal, but as an average for the household sector the capital gains (and losses) on financial assets have been very significant in some periods.

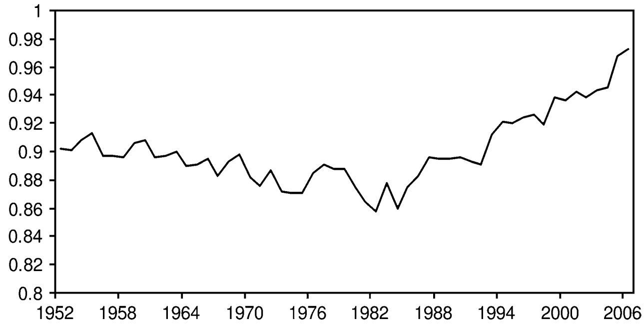

Fig. 6. *The ratio of personal consumption expenditures to disposable personal income (1952–2006).* Sources*: US Department of Commerce, Bureau of Economic Analysis,* National Income and Product Accounts*, table 2.9. Authors' calculations.*

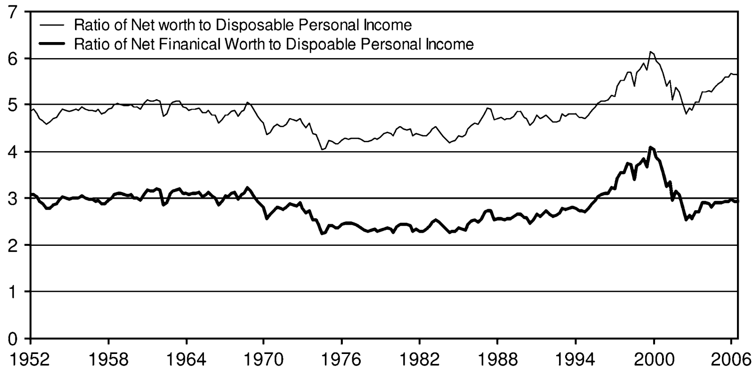

Fig. 7. *The ratio of households' net financial worth to disposable personal income (1952–2006). Net financial worth = households' net worth – households' tangible assets. In other words, the gap between the two graphs shown in the figure represents households' tangible assets divided by disposable person income.* Sources*: Federal Reserve Board,* Flow of Funds Accounts of the United States*, table B.100. Authors' calculations.*

2.2 Dangers of a partial analysis

While the stylised facts of changes in financial variables are (relatively) clear, the interpretation and importance of these changes for the performance of the economy may not be obvious, and many of the arguments that have been advanced by the financialisation literature have a partial flavour. As a case in point we may consider Stockhammer (2004). This paper, with its combination of theoretical argument and econometric work, presents a clear and interesting analysis. The partial nature of the analysis, however, is a limitation.

Financialisation, Stockhammer argues, has generated a shift in firms' behaviour from growth objectives toward shareholder interests. He formalises this argument by assuming that the representative firm faces a growth–profit tradeoff. Managers pick some point on this frontier, and an increased emphasis on shareholder interests (partly because of increased takeover threats and partly because of changes in managerial pay structures) moves the optimal position in the direction of higher profit rates and lower growth.

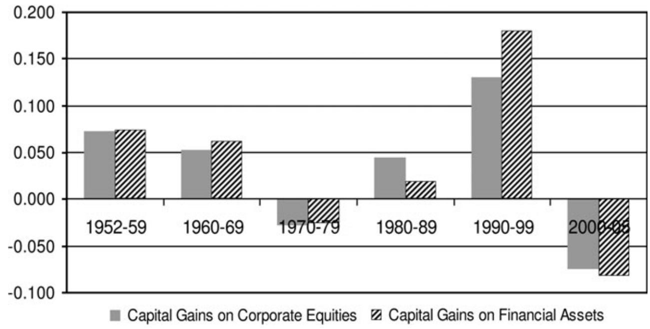

Fig. 8. *The ratio of capital gains on financial assets to disposable personal income: households and nonprofit organisations (1952–2005). Capital gains on corporate equities = (holding gains on corporate equities – inflation rate using the consumer price index × corporate equities outstanding held by households and nonprofit organisations)/disposable personal income. Capital gains on financial assets = (holding gains on all financial assets – inflation rate using the consumer price index × all financial assets held by households and nonprofit organisations)/disposable personal income.* Sources*: Federal Reserve Board,* Flow of Funds Accounts of the United States, *table B.100 and table R.100; Bureau of Labor Statistics,* The Consumer Price Index. *Authors' calculations.*

The macroeconomic implications of this microeconomic analysis are not as straightforward as they may seem. Stockhammer does not specify firms' finance constraint or discuss firms' financing decisions in any detail. Presumably, however, the movements along a frontier must be reflected—via the finance constraint—in changes in retention rates, external finance or the rate of new share issues. The changes in investment and firms' financial decisions interact with household and government behaviour, and these macroeconomic interactions—equilibrium conditions for financial and goods markets—are ignored in the analysis. Putting it differently, an individual firm may face a perceived tradeoff but this perceived tradeoff does not extend to the macroeconomic level: changes in accumulation and financial behaviour affect aggregate demand and thereby the position of the frontier. Thus, the micro tradeoff may not be stable.

Stockhammer tests the theory by estimating an investment function that includes 'rentiers' share of the non-financial business sector' as an explanatory variable. It is unclear, however, how one should interpret the results. One might have thought that a shift in firms' accumulation behaviour would imply changes in the parameters of the investment function. Stockhammer does not consider this possibility. Instead, he argues, the behavioral shift is captured by an increase in the 'rentiers' share', and a negative coefficient on this variable is seen as lending support to the theoretical argument. Even assuming, however, that an increase in the 'rentiers' share' captures financial implications of a behavioral shift, a negative coefficient on this variable in the empirical work does not necessarily imply that the changes in financial behaviour have had a negative effect on accumulation.[1] Aggregate demand and,

[1] In fact the coefficient on rentiers' share is not negative in all specifications and it is insignificant in many. Moreover, there may be several explanations for a negative coefficient. First, net financial income is included in the gross profit share and for any given profit share, an increase in financial income implies a reduction in operating profits, which presumably reduces the incentive to accumulate fixed capital. Second, as noted by Stockhammer, an increase in gross financial income may mirror an increase in the cost of capital. Firms have both financial assets and liabilities and if the return on these move together, a rise in the cost of capital will be associated with an increase in gross financial income. This correlation becomes particularly important if the cost-of-capital variable that is included in the analysis provides a poor approximation to the actual cost of capital.

thereby, the values of other explanatory variables in the regression may have been affected by the changes in financial behaviour, and these indirect effects need to be taken into account.

Unlike in the 2004 paper, the macroeconomic dimension of shareholder-induced shifts in firms' investment behaviour is also analysed by Stockhammer (2006) but this happens in a setting without differentiated financial assets and explicit stock–flow relations.

3. General framework

3.1 Firms, banks and households

This section presents our general framework. The framework leaves out open economy issues, there is no analysis of the short run and stability issues, and very limited attention is given to government policy. The purpose is to look at the interaction between firms and households across labour, goods and financial markets. Firms, it is assumed, make decisions concerning pricing/output, accumulation and financing; households receive a return on their financial assets as well as wage income, and they make consumption and portfolio decisions; banks accept deposits and make loans. There are only two types of financial assets—equity and bank deposits—and banks are the only financial institution in the model.[1]

This framework—which generalises that described by Skott (1988, 1989A)—covers a number of special cases, including Harrodian specifications with or without labour constraints and Kaleckian models.

3.1.1 Firms The finance constraint. Consider first the finance constraint facing a single firm. The firm invests in real capital and pays out dividends and interest on its debt (bank loans). These expenses have to be matched by income flows and the proceeds from new issues of equity and new debt. As argued by the financialisation literature, the firm may hold equity in other firms and own other financial assets (bank deposits). Income flows therefore include both profits and the interest and dividend income from the firm's current holdings of financial assets. Algebraically, the finance constraint can be written

$$pI_j + Div_j^L + iM_j^L + v\dot{N}_j^A + \dot{M}_j^A = \Pi_j + v\dot{N}_j^L + \dot{M}_j^L + iM_j^A + Div_j^A$$

where I, Π, Div, M and N denote real investment, nominal profits, dividends, bank loans/deposits and the number of shares. Subscripts j indicate firm, and superscripts denote assets (A) and liabilities (L); thus M_j^A is firm j's bank deposits and M_j^L the firm's bank loans. Bank loans and deposits carry the same nominal interest rate (i), the price of investment goods (p) equals the general price of output in this one-sector model and, for simplicity, it is assumed that all shares have the same price, v. A dot over a variable is used to denote a time derivative ($\dot{x}=dx/dt$).

If we aggregate across firms, the cross holdings of financial assets net out, and the aggregate finance constraint for the firm sector simplifies to:

$$pI + Div + iM = \Pi + v\dot{N} + \dot{M}$$

where I, Π, Div, M and N, without sub- and superscripts, denote aggregate investment and aggregate profit, net dividend payments from firms to other sectors, net debt to other sectors, and the aggregate number of shares held by other sectors.

[1] The liquid asset could also be interpreted as a short bond.

We assume that dividends are given by

$$Div = \left(1 - s_f\right)(\Pi - rM) \tag{1}$$

where r is the real rate of interest, $r = i - \hat{p}$ and s_f is the retention rate out of profits net of interest payments. This specification is used by, among others, Lavoie and Godley (2001–02) and Dos Santos and Zezza (2007),[1] but clearly, other specifications are possible. Skott (1989A), for instance, assumes $Div = (1 - s_f)\Pi$ and another alternative would be to assume that dividends are set so as to leave sufficient retained earnings to cover some fraction of current investment. These specifications all imply that real dividend payments will be unaffected by a change in the rate of inflation, keeping the real rate of interest constant. This 'inflation neutrality' ceases to hold if the real rate of interest is replaced by the nominal rate in equation (1) since in this case an increase in inflation reduces the ratio Div/Π of dividends to profits.[2] As long as the inflation rate is constant, however, the switch to a nominal interest rate in equation (1) would not affect any of the qualitative results.

Using equation (1), the finance constraint can be rewritten

$$pI = s_f(\Pi - rM) + vN\hat{N} + M\left(\hat{M} - \hat{p}\right) \tag{2}$$

where a hat over a variable denotes the growth rate of the variable ($\hat{x} = \dot{x}/x = (dx/dt)/x$). The finance constraint (2) shows that, given the levels of investment and profits and the inherited debt, firms cannot choose the retention rate, the rate of new issues and the amount of new debt independently. One of these three variables will have to accommodate so as to ensure that the finance constraint is being met. In reality, of course, there may be dynamic feedback effects: an unexpected need for external finance in one period, for instance, may influence firms' retention and/or new issue policies in subsequent periods.

Our purpose in this paper is to examine the comparative statics of changes in financial behaviour and from this perspective it does not matter much which financial variable is designated as residual. In the analysis below we describe firms' financial behaviour in terms of their retention rate (s_f). New issue policies can be captured by the growth of the number of shares ($\hat{N}$) or by the share of investment that is being financed by new issues. Skott uses the former and Lavoie-Godley the latter parameterisation, and we follow these different parameterisations in the respective versions of the model.[3]

Pricing/output: the growth function. It is often assumed that firms set prices and that output adjusts instantaneously and costlessly to match demand. The empirical evidence in favour of significant price rigidity is quite weak, however,[4] and output does not adjust

[1] Both Lavoie and Godley (2001–02) and Dos Santos and Zezza (2007) assume a constant price level, but Lavoie and Godley's discussion on p. 300 of changes in interest rates indicates that they view the real interest rate is the relevant rate in the case of inflation.

[2] As shown in Figure 1, the ratio $(\Pi - rM - Div)/(\Pi - rM)$ increased in the high inflation years of the 1970s. Inflation effects of this kind may have contributed to this increase.

[3] One could also, following Eichner (1976) and Wood (1975), assume that firms set the shares of investment that are to be financed by the three different sources, with both s_f and $\hat{N}$ varying in response to changes in accumulation. This case is considered in Skott (1989A, ch. 7); it is also the approach used in Godley and Lavoie (2007)

[4] The study by Levy *et al.* (1997) of menu costs in five supermarkets is often cited in support of menu costs and price stickiness (e.g. Romer, 2001, pp. 315–16). This study found that, on average, 16% of all prices were changed each *week*. These frequent changes in prices were not costless but the finding that menu costs constitute a significant proportion of net profits is largely irrelevant for an evaluation of price flexibility. With prohibitively high menu costs there would be no price changes and the share of menu cost in revenue would be zero; negligible menu costs on the other hand may allow firms to change prices frequently as part of their marketing strategies, and the observed share of menu costs in net profits could be very high in this case.

instantaneously. Production is subject to a production lag, and increases in production and employment give rise to substantial search, hiring and training costs; firing or layoffs also involve costs, both explicit costs like redundancy payments and hidden costs in the form of deteriorating industrial relations and morale.

In a continuous-time setting one may approximate the effects of lags and adjustment costs by assuming that output is predetermined at each moment, that firms choose the rate of growth of output at each moment, rather than the level of output, and that this choice is made so as to balance the costs of changes against the benefits of moving toward a preferred level of output and employment. These costs and benefits are determined by demand signals from output markets and cost signals from input markets.

The demand signal can be captured by the prevailing profit share if prices are fully flexible. By assumption, the level of output is predetermined, and with flexible prices a rise in demand leads to an increase in the price of output. Wage contracts are cast in terms of money wages and, in the absence of perfect foresight or instantaneous feedbacks from output prices to money-wage rates, the real wage rate and the share of profits in income respond to unanticipated movements in prices: a positive demand shock generates a rise in the profit share.

The assumption of fully flexible prices is extreme, of course. Our reading of the evidence suggests that prices are less sticky than output, but in general there will be some stickiness in both prices and output, leaving changes in inventories and/or quantity rationing as accommodating variables. For the aggregate economy, however, quantity rationing is insignificant and movements in inventories tend to amplify fluctuations in other demand components—even in the short run—and thus do not obviate the need for price adjustments. For simplicity, we therefore disregard movements in inventories and assume that the demand signal is reflected in the profit share.

Turning to the signals from input markets, we leave out intermediate inputs and take labour to be the only input that is variable in the short run; changes in the capital stock take longer to implement and, partly because of that, firms typically maintain excess capital capacity. As far as production decisions are concerned, the labour market therefore provides the relevant signal, and we use the employment rate as the indicator of the state of the labour market. The rate of employment influences the costs of changing output through its effects on the availability of labour with the desired qualifications. High rates of employment increase the costs of recruitment, and since the quit rate tends to rise when labour markets are tight, the gross recruitment needs associated with any given rate of expansion increase when low unemployment makes it difficult to attract new workers. High employment and high turnover of the labour force, on the other hand, may allow firms to contract production and employment more rapidly without significant redundancy costs. These standard microeconomic effects may be reinforced by broader Marxian effects on the social relations of production. A high rate of employment may have a negative impact on firms' growth plans because it strengthens workers vis-a-vis management and may lead to increased shop-floor militancy.

The analysis suggests that the rate of growth of production will be positively related to the profit share (π) and negatively related to the employment rate (e). Thus, the pricing/output decisions can be described by the following 'growth function'[1]

$$\hat{Y} = h(\pi, e); h_{\pi} > 0, h_{e} < 0. \tag{3}$$

[1] Or 'output expansion function', using the terminology in Skott (1989A, 1989B). The behavioural foundations of the function are discussed in greater detail in Skott (1989A, ch. 4).

The case of unlimited labour supplies can be obtained by setting $h_e = 0$ and the growth function yields the standard Kaleckian assumption of a fixed profit share $\bar{\pi}$ (a fixed mark-up on wage cost) if we have both $h_\pi = \infty$ at $\pi = \bar{\pi}$ and $h_e = 0$. There is also an affinity between the growth function (equation 3) and Robinson's (1962, pp. 48–9) analysis of the rate of accumulation induced by a rate of profit. Since Robinson assumes that utilisation is at an exogenously given normal level, the profit rate and the profit share move together, and a constant utilisation rate implies that the accumulation rate is equal to the growth rate of output. Equation (3) generalises the relation between growth and profits by allowing for the influence of labour market conditions.[1] One may note, finally, that a static counterpart to equation (3) can be obtained by setting $\hat{Y}=0$. The equation then defines the profit share as an increasing function of the employment rate. A short-run equilibrium relation of this kind could be derived from profit maximisation if firms have monopsony power and the perceived elasticity of labour supply to the individual firm is inversely related to the aggregate rate of employment.[2]

Accumulation. With a fixed coefficient production function, a general specification of the investment function includes the rate of capital utilisation, the profit share and financial variables like the real rate of interest, the valuation ratio (Tobin's q), and the ratios of debt and retained earnings to the value of the capital stock. Algebraically,

$$\frac{I}{K} = f(u, \pi, r, q, m, c) \tag{4}$$

where $u = Y/K$ is a measure of utilisation, q is the valuation ratio ($q = \frac{M+vN}{pK}$), and m and c the ratios of debt and retained earnings to capital ($m = \frac{M}{pK}$, $c = \frac{s_f(\Pi - rM)}{pK}$).

There is no consensus in the structuralist/post-Keynesian literature concerning the long-run sensitivity of the accumulation rate to changes in the various arguments.[3] In the analysis below, we explore both Harrodian and Kaleckian specifications.

3.1.2 Banks Banks give loans to firms and accept deposits from households. Neither firms nor households hold cash. When banks provide a loan to a firm, the money therefore returns to the bank immediately, either as deposits from households or because other firms use their increased revenues to reduce their debt. The loan and deposit rates are equal and there are no costs involved in banking. Thus, banks make neither profits nor losses,[4] and the firm sector has a net debt (M) that must equal the total deposits of the household sector (= money demand, M^H):

$$M = M^H$$

[1] Comparing Robinson's analysis to our 'Harrodian dual economy' case below, the difference is that in Robinson's model competition and pricing decisions keep utilisation at the normal level while the profit share and the growth rate are determined by the equilibrium condition for the product market; the Harrodian dual economy case assumes that the long-run properties of the accumulation function pins down utilisation at the normal level, with the profit share and the growth rate determined by the 'growth function' in combination with saving behaviour.

[2] A positive relation between employment and the profit share could also arise from an inverse relation between the perceived demand elasticity and aggregate employment or as a result of a fixed markup on variable cost in a setting with overhead labour.

[3] See, among others, Auerbach and Skott (1988), Dutt (1997), Kurz (1986), Lavoie (1995) and Skott (2008)

[4] The share valuation of banks therefore is zero, and this simple version of the model does not capture the increasing share of the financial sector in gross domestic product and of financial-sector profits in total profits.

Banks determine the nominal interest rate. This nominal rate, however, will typically depend on inflation and, to simplify the exposition, we treat the real rate of interest $r(=i-\hat{p})$ as the variable that is set by the banking system (and kept constant in steady growth).

3.1.3 Households In analogy with firms, households face a budget (or finance) constraint. For the household sector as a whole it takes the form

$$pC + v\dot{N}^H + \dot{M}^H = W + Div^H + iM^H \tag{5}$$

Where C is consumption, W is wage income, N^H, M^H indicate household holdings of shares and deposits (money), and Div^H is dividend payments received by the household sector.

The steady-growth implications of household consumption and saving behaviour can be described in terms of stock–flow ratios of assets to income. Specifically, let

$$M^H = \beta(i, r, r_e, \pi, \ldots)pY \tag{6}$$

$$vN^H = \alpha(i, r, r_e, \pi, \ldots)pY \tag{7}$$

where the stock–flow ratios α and β may depend on a number of variables, including the real rates of return on deposits (r) and equity (r_e). Theories differ with respect to the determination of the (steady-growth) values of these stock–flow ratios, and in Sections 4 and 5 we examine different specifications. Some theories are cast in terms of flow–flow relations (e.g. consumption as a function of distributed incomes and capital gains, as in the Lavoie–Godley model) but even when this is the case, the specification of the flow–flow relations have implications for the steady-growth values of the stock–flow ratios, and the implied stock–flow ratios provide a clearer picture of the mechanisms behind the effects of changes in financial behaviour.

The relation between the stock–flow ratios and consumption is straightforward. Using the budget constraint (equation 5) and the dividend equation (1), the stock–flow relations of equations (6) and (7) imply the following consumption function:

$$\frac{C}{K} = u\left[1 - s_f(\pi - r\beta) + \beta\left(\hat{p} - \hat{M}\right) - \alpha\hat{N}\right] \tag{8}$$

4. Harrodian accumulation

In this section we follow the Harrodian tradition and assume that the degree of excess capital capacity is at (or near) where firms want it to be. Firms will typically want a reserve of excess capacity, but if the degree of excess capacity persistently exceeds the desired reserve, they reduce their accumulation rate; conversely, if they find themselves with less than the desired excess capacity, they will gradually increase their rate of accumulation. Thus, a steady growth path with a constant accumulation rate requires the consistency of desired and actual degrees of excess capacity, that is,

$$u = u^\star \tag{9}$$

where u is the output–capital ratio and $u^\star$ denotes the value of u when firms have the desired degree of excess capacity.[1] Equation (9) expresses the steady-growth accumulation

[1] The $u = u^\star$ condition is necessary but not sufficient. Firms must also make positive profits, cf. note following this.

function. The equation need not be satisfied outside steady growth, but a simple Harrodian specification implies that if $\hat{K}$ fluctuates within a relatively narrow band, the time-average of the output–capital ratio u must be approximately equal to $u^\star$ when the average is taken over a long period. To see this, consider a Harrodian investment function

$$\frac{d}{dt}\hat{K} = \lambda\left(u - u^\star\right); \lambda > 0$$

Integration implies that $\bar{u} - u^\star = \frac{\hat{K}_{t_1} - \hat{K}_{t_0}}{\lambda(t_1 - t_0)}$, where $\bar{u}$ is the average output–capital ratio over the interval $[t_0, t_1]$. If $\left|\hat{K}_{t_1} - \hat{K}_{t_0}\right|$ is bounded below some constant for all (t_0, t_1), it follows that $\bar{u}$ is close to $u^\star$ if the period is long ($\bar{u}$ converges to $u^\star$ for t_1–t_0 going to infinity).

4.1 A mature economy: labour-constrained steady growth

The growth rate in a mature economy is labour constrained and the employment rate is constant in steady growth. The growth rate therefore must be equal to the growth of the labour force and, for simplicity, we shall take this 'natural rate of growth' (n) to be an exogenously given constant. Thus, in steady growth

$$\hat{Y} = n \tag{10}$$

Using equations (9) and (10) the equilibrium condition for the product market can now be written

$$\frac{C}{K} + n = u^\star$$

or, using equations (6), (8), (9) and (10),

$$\left[1 - s_f(\pi - r\beta) - \beta n - \alpha\hat{N}\right] = \frac{u^\star - n}{u^\star} \tag{11}$$

The effects of changes in firms' financial behaviour (s_f, $\hat{N}$), bank policy (r), or household saving and portfolio behaviour can be derived from this equation. The qualitative results, however, depend on the properties of the α and β functions that describe household behaviour.

4.1.1 Inelastic stock–flow ratios Assume first that α and β are both independent of the various rates of return and other variables in the expressions relayed in equations (6) and (7). In this case α and β are parameters rather than functions and the constancy of the term on the right hand side of equation (11) implies that

$$\frac{\partial\pi}{\partial s_f} = -\frac{\pi - \beta r}{s_f} < 0 \tag{12}$$

$$\frac{\partial\pi}{\partial\hat{N}} = -\frac{\alpha}{s_f} < 0 \tag{13}$$

$$\frac{\partial\pi}{\partial r} = \beta > 0 \tag{14}$$

$$\frac{\partial\pi}{\partial\alpha} = -\frac{\hat{N}}{s_f}$$

$$\frac{\partial\pi}{\partial\beta} = \frac{s_f r - n}{s_f}$$

The signs of the effects of changes in s_f, $\hat{N}$ and r are unambiguous. If firms raise the retention rate or increase the rate of new issues, this will depress profitability, while an increase in the real interest rate raises the profit share.[1] The intuition is simple. An increase in s_f increases aggregate saving, given the share of profits, and to bring saving back into line with the steady-growth requirement, a reduction in the profit share is needed. An increase in the real interest rate (r) has the opposite effect since it reduces retained earnings and thus saving at any given share of profits. An increase in new issues ($\hat{N}$) like increases in the retention rate, raises aggregate saving but the mechanism may be a little less transparent. Saving goes up because the rise in $\hat{N}$ induces households to raise their saving. Share prices adjust so as to maintain a constant ratio ($=\alpha$) of the value of shares to income. The growth of real income is given, and if the rate of new issues has gone up, this means that real share prices will increase at a lower rate. Capital gains therefore are smaller and, as a result, households choose to save a larger proportion of their wage, dividend and interest income.

Financialisation has been associated primarily with increased dividends (a decline in s_f), a decrease in the rate of new issues ($\hat{N}$) and an increase in the real rate of interest (although, as shown in Section 2, the evidence for interest rates is questionable). Strikingly, in this model all of these changes unambiguously generate a rise in the steady-growth profit share and the steady-growth employment rate. The employment effect follows immediately from the growth function in equation (3): whenever the profit share goes up, the employment rate must do the same in order to keep the growth rate unchanged.[2]

So far we have taken the stock–flow ratios α and β to be constant parameters. Even leaving aside the functional dependence of these ratios on, inter alia, the rates of return, financialisation might generate a shift in the values of these parameters. Thus, it could be argued that financialisation increases the availability of consumer credit and thereby tends to reduce the ratio β. A reduction in β has two effects: it increases retained earnings (which tends to reduce consumption) but if the growth rate of income is positive it also reduces the amount of saving that households need to carry out in order to maintain the money-income ratio at the desired value. Depending on parameter values, the balance of these two effects can be positive or negative.[3]

[1] A capitalist economy would not be viable if the steady growth path implied that profits fell short of real interest payments on the debt. Thus, the condition $\pi - \beta r > 0$ must hold, otherwise accumulation would collapse.

[2] In this paper we do not consider nominal wage formation and inflation explicitly. The NAIRU literature is enormous; one of us has analysed reasons for the absence of a NAIRU in earlier work (Skott, 1997, 1999, 2005).

[3] Our results for changes in β are closely related to those of Dutt's (2005) analysis of changes in consumer debt. Using a Kaleckian (stagnationist) model, Dutt shows that the short-run effect of an increase in households' debt-income ratio (corresponding to a decrease in β in this model) is unambiguously positive. This short-run result is not surprising since the transition to a higher debt ratio is associated with extra consumption. The long-run effects on growth are ambiguous, however. In the long run, the debt ratio has increased (β has decreased), and this increase in the debt ratio implies a shift of disposable income from low-saving workers to high-saving capitalists. This contractionary effect may or may not be offset by a positive effect. Consumer debt grows at the same rate as output (and the capital stock) and this expansionary effect—consumers being allowed to increase their debt when output grows—depends on the growth rate. Thus, in Dutt's model, an increase in consumer debt will raise the growth rate if the initial growth rate is high while if output grows slowly, the increase in debt will reduce the growth rate. In this version of our model, the growth rate is exogenous but the analogous result in our model is that a decrease in β raises the profit share if the growth rate is high but reduces the profit share if the growth rate is small.

Changes in the α ratio are not usually seen as a key mechanism behind changes in economic performance.[1] Moreover, in this model the effects of autonomous shifts in α depend on the values of $\hat{N}$. This result is quite intuitive. The value of the equity–income ratio (α) simply does not affect saving if there are no new issues. Households can only save in the form of shares if other sectors (firms) are willing to sell shares. If that is not the case then an increase in the desire to own shares will simply generate higher share prices, and the desire will be met without any extra saving. With positive new issues, a higher valuation of shares (a higher α) implies an increase in household saving; with negative new issues, on the other hand, a higher valuation of shares implies that households receive higher revenues from their net sale of shares and their savings out of wages, dividends and interest income is reduced.

In addition to the changes in financial behaviour, financialisation may have been associated with a downward shift in the investment function. In this Harrodian setting, such a shift would be reflected in a rise in the desired output–capital ratio $u^{\star}$. This kind of change has the consequences that one would expect. Equation (11) implies that a rise in $u^{\star}$ leads to a decline in the profit share and, using the growth function in equation (3), a fall in employment. Thus, according to this model the changes associated with neoliberalism and financialisation have contradictory effects. The *net* effect may have been a deterioration of economic performance, but the negative impact comes from the shift in the investment function, rather than from the changes in financial behaviour that have been highlighted in the literature.

How general are these conclusions? The assumption of exogenous α and β ratios is clearly restrictive, but the qualitative results survive as long as α and β are relatively insensitive to changes in the financial parameters (s_f, $\hat{N}$, r) and the profit share (π).

Differentiating equation (11) totally, we get

$$-s_f d\pi - \pi ds_f + \left(s_f r - n\right)d\beta + \beta\left(s_f dr + r ds_f\right) - \alpha d\hat{N} - \hat{N} d\alpha = 0 \tag{15}$$

where

$$d\alpha = \frac{\partial\alpha}{\partial s_f}ds_f + \frac{\partial\alpha}{\partial\hat{N}}d\hat{N} + \frac{\partial\alpha}{\partial r}dr + \frac{\partial\alpha}{\partial\pi}d\pi \tag{16}$$

$$d\beta = \frac{\partial\beta}{\partial s_f}ds_f + \frac{\partial\beta}{\partial\hat{N}}d\hat{N} + \frac{\partial\beta}{\partial r}dr + \frac{\partial\beta}{\partial\pi}d\pi \tag{17}$$

s_f, $\hat{N}$, r and π may not influence α and β directly but they will do so indirectly via their effects on the various rates of return. Thus, the partial $\frac{\partial\alpha}{\partial s_f}$ includes the indirect effect on α of changes in rates of return generated by the change in s_f. The rate of return on equity, for instance, is given by $r_e = \frac{\left(1-s_f\right)(\pi-r\beta)pY}{vN} + \hat{v}-\hat{p} = \frac{\left(1-s_f\right)(\pi-r\beta)}{\alpha}+n-\hat{N}$ and an increase in s_f reduces r_e[2].

[1] One might consider the possibility that $u^{\star}$ depends on the valuation ratio (Tobin's q) and thereby on α and β. A high valuation ratio indicates a rate of profit that exceeds the cost of finance. The desired output–capital ratio may therefore be inversely related to the valuation rate. This expansionary impact of an increase on α and β is considered by Skott (1988, 1989A).

[2] Mathematically, perverse results are possible in which a rise in s_f increases the return. This could happen, for instance, if there is a strong inverse relation between α and r_e. The conditions that would give these perverse results can be ruled out on economic grounds.

Using equations (15), (16) and (17) we get

$$\frac{\partial \pi}{\partial s_f} = -\frac{\pi - \beta r - (s_f r - n)\frac{\partial \beta}{\partial s_f} + \hat{N}\frac{\partial \alpha}{\partial s_f}}{s_f - (s_f r - n)\frac{\partial \beta}{\partial \pi} + \hat{N}\frac{\partial \alpha}{\partial \pi}} \tag{18}$$

$$\frac{\partial \pi}{\partial \hat{N}} = -\frac{\alpha - (s_f r - n)\frac{\partial \beta}{\partial \hat{N}} + \hat{N}\frac{\partial \alpha}{\partial \hat{N}}}{s_f - (s_f r - n)\frac{\partial \beta}{\partial \pi} + \hat{N}\frac{\partial \alpha}{\partial \pi}} \tag{19}$$

$$\frac{\partial \pi}{\partial r} = \frac{s_f \beta + (s_f r - n)\frac{\partial \beta}{\partial r} - \hat{N}\frac{\partial \alpha}{\partial r}}{s_f - (s_f r - n)\frac{\partial \beta}{\partial \pi} + \hat{N}\frac{\partial \alpha}{\partial \pi}} \tag{20}$$

The signs of the partials of the profit share with respect to these three financial parameters are the same as in equations (12), (13) and (14) as long as

$$\pi - \beta r > (s_f r - n)\frac{\partial \beta}{\partial s_f} - \hat{N}\frac{\partial \alpha}{\partial s_f}$$

$$\alpha > (s_f r - n)\frac{\partial \beta}{\partial \hat{N}} - \hat{N}\frac{\partial \alpha}{\partial \hat{N}}$$

$$s_f \beta > -(s_f r - n)\frac{\partial \beta}{\partial r} + \hat{N}\frac{\partial \alpha}{\partial r}$$

$$s_f > (s_f r - n)\frac{\partial \beta}{\partial \pi} - \hat{N}\frac{\partial \alpha}{\partial \pi}$$

These 'inelasticity conditions' will automatically be satisfied if $(s_f r - n) = \hat{N} = 0$, irrespective of how sensitive are α and β to variations in their arguments. Empirically, both $s_f r - n$ and $\hat{N}$ are close to zero, having at times been positive and at times negative. In fact, setting $(s_f r - n) = \hat{N} = 0$ is arguably a reasonable empirical benchmark. Thus, the qualitative results in equations (12), (13) and (14) survive—at least as an outcome that holds for a range of empirically very plausible parameter values—in a more general model in which the stock–flow ratios are determined endogenously. It should be noted also that the different specifications used in Skott (1981, 1988, 1989A) are special cases of the general model with endogenous α and β ratios;[1] all of these special cases satisfy the inelasticity conditions for any reasonable set of parameters, as does the flow–flow specification used by Lavoie and Godley (2001–02) and the stock–flow specification in Godley and Lavoie (2007) (see below).

Overall, then, while the implications of assuming elastic stock–flow ratios are clear—the comparative statics will be reversed—inelastic ratios appear to be the more interesting and empirically relevant case.[2]

4.1.2 The Lavoie–Godley specification of consumption In the Lavoie–Godley model, consumption is a function of distributed income and capital gains. Thus, the consumption

[1] Skott (1989A), for instance, assumes that β is exogenous and that $vN = \alpha(\pi, u, r, \beta)pY = (\pi - \frac{\delta}{u} - r\beta)pY$ where δ is the rate of depreciation; thus, share valuation is proportional to profits net of depreciation and real interest payments.

[2] We use the terms 'inelastic' and 'elastic' to denote the cases when the conditions hold and fail to hold, respectively. Intermediate cases, in which some but not all of the conditions hold, are clearly possible; in these cases only some of the signs of the partials in equations (12), (13) and (14) will be preserved.

function is specified as a flow–flow relation. Using our notation, a general version of their consumption function can be written as:

$$\frac{C}{K} = \psi(y, \gamma), \ \ \psi_y > 0, \psi_\gamma > 0 \tag{21}$$

where y is households' distributed income and γ is capital gains, both variables as ratios of the capital stock ($y = \left[1 - s_f(\pi - r\beta) + \hat{p}\beta\right]u$ and $\gamma = \frac{vN\left(\hat{v} - \hat{p}\right)}{pK}$). The proportion of the investment expenditure that is financed by equity issues is denoted as x. Lavoie and Godley take this proportion as the parameter describing new issue policies (instead of $\hat{N}$). By definition

$$\frac{vN}{pK}\hat{N} = x\frac{I}{K} = xg$$

where g is the accumulation rate. Thus, the ratio of capital gains to capital can be written

$$\gamma = \alpha ug - xg$$

The equilibrium condition (11) is general and still holds in the Lavoie–Godley specification and—using the definition of x—the equation can be written

$$u^\star - n = u^\star\left[1 - s_f(\pi - r\beta) - \beta n - \frac{xn}{u^\star}\right] = \psi(y, \gamma) \tag{22}$$

The steady growth values of β and α are affected by the consumption/saving function and household portfolio decisions. In the Lavoie–Godley model these portfolio decisions are described by

$$\frac{M}{M + vN} \equiv \frac{\beta}{\alpha + \beta} = z(r, r_e, y, q), z_r > 0, z_{r_e} < 0, z_y > 0, z_q < 0 \tag{23}$$

where r_e is the rate of return on equities ($r_e = \frac{\left(1 - s_f\right)(\pi - \beta r)u + n(\alpha u - x)}{\alpha u}$) and q can be written as $(\alpha + \beta)u$.

For some functional forms of ψ in equation (22) and z in equation (23) it may be possible to obtain analytical expressions for α and β as in our general representation for the stock–flow ratios in equations (6) and (7); other specifications—including the ones used by Lavoie and Godley—may preclude explicit analytical expressions but the stock–flow implications can still be evaluated numerically.

With the relevant definitions, equations (22) and (23) determine the equilibrium values of π, α and β. Each exogenous variable (s_f, x, r, among others) affects the equilibrium stock–flow ratios α and β as well as the profit share, π, and we get expressions that are analogous to equations (18), (19) and (20):

$$\frac{\partial\pi}{\partial s_f} = -\frac{\pi - \beta r - \left(s_f r - n\right)\frac{\partial\beta}{\partial s_f}}{s_f - \left(s_f r - n\right)\frac{\partial\beta}{\partial\pi}}$$

$$\frac{\partial\pi}{\partial x} = -\frac{n - \left(s_f r - n\right)u^\star\frac{\partial\beta}{\partial x}}{s_f u^\star - \left(s_f r - n\right)u^\star\frac{\partial\beta}{\partial\pi}}$$

$$\frac{\partial\pi}{\partial r} = \frac{s_f\beta + \left(s_f r - n\right)\frac{\partial\beta}{\partial r}}{s_f - \left(s_f r - n\right)\frac{\partial\beta}{\partial\pi}}$$

The total effect on the profit share of each parameter can be decomposed into the effect for a given α and β, and the derived effect via changes in α and β. The first effect is clear and straightforward, as shown in Section 4.1.1. Our main concern here is whether 'the inelasticity conditions' for stock–flow ratios hold in the Lavoie–Godley specification.

Using Lavoie and Godley's values for the parameters,[1] we find that in the Harrodian mature economy, the indirect effects via changes in α and β are quite small, with the direct effects corresponding to constant stock–flow ratios explaining most of the total effects. Table 1 shows the numerical results. The numbers in Table 1 indicate the derivatives of the profit share with respect to each exogenous parameter, evaluated at the equilibrium associated with Lavoie and Godley's original values of parameters. A thorough examination of whether our 'inelasticity conditions' are robust with respect to reasonable variations in all parameter values has been left for future research; preliminary results, however, show robustness as we vary the parameters of the consumption function.[2]

Lavoie and Godley have changed their consumption function in recent work. Godley and Lavoie (2007) use a stock–flow specification with consumption as a linear function of income and wealth. This specification is closer in spirit to our analysis in Section 3.1.3 and, using their new specification and parameter values, our inelasticity conditions are still satisfied; Table 2 lists the derivatives of the profit share for this case.[3]

4.2. Dual economies: endogenous growth

We now turn to the case of dual economies, i.e. economies in which the labour force does not constrain the rate of growth. This case may correspond to economies with large amounts of hidden unemployment in backward, non-capitalist sectors, or it could depict the case where the labour supply to the capitalist sector is perfectly elastic for other reasons (immigration, women's participation rate, endogenous fertility or technical progress).

The growth function can be simplified in a dual economy of this kind. The employment rate no longer serves as a relevant signal and therefore drops out of the growth function. Hence,

$$\hat{Y} = h(\pi); h' > 0$$

In steady growth we still have $g = \hat{Y} = \hat{K}$ and $u = u^\star$, and the equilibrium condition for the product market takes the form

$$\left[1 - s_f(\pi - r\beta) - \beta h(\pi) - \alpha\hat{N}\right] = 1 - \frac{1}{u^\star}h(\pi) \tag{24}$$

[1] Lavoie and Godley (2001–02) did not report parameter values but have provided the values in private correspondence. These parameter values and our procedure of decomposition are given in the Appendix.

[2] Below we report some of the sensitivity results for the 'Kaleckian, dual economy' case, which is the case that is closest to Lavoie and Godley's own model.

[3] The numerical results in Tables 2, 4, 8, 9, and 10 are based on $\frac{C}{K} = c_1\{u - s_f(\pi u - rm)\} + c_2 q$ where $c_1 = 0.75$ and $c_2 = 0.064$, which is equivalent to that in Godley and Lavoie (2007) when there are no consumer loans, no bank profit and no inflation.

Table 1. *Harrodian mature economy I*

	Constant α and β regime	Variable α and β regime
The retention ratio	–0.238	–0.238
Equity issues	–0.386	–0.228
Real interest rate	2.589	2.575
Utilisation	–1.948	–1.634
Propensity to hold equity	–	0.0717

Numbers show partial derivatives of the profit share with respect to the parameters listed in the first column.
The structure and parameter values of the model are the same as in Lavoie and Godley (2001–02) including the specification of consumption, but the closure of the model is different.

Table 2. *Harrodian mature economy II*

	Constant α and β regime	Variable α and β regime
The retention ratio	–0.296	–0.296
Equity issues	–0.342	–0.261
Real interest rate	1.023	1.005
Utilisation	–1.102	–0.564
Propensity to hold equity	–	0.091

Numbers show partial derivatives of the profit share with respect to the parameters listed in the first column.
The structure and parameter values of the model are the same as in Lavoie and Godley (2001–02) except the specification of consumption and the closure of the model. The alternative specification of consumption is that found in Godley and Lavoie (2007).

4.2.1 Inelastic stock–flow ratios In the case with exogenous α and β ratios, equation (24) gives the following comparative statics:

$$\frac{\partial\pi}{\partial s_f} = -\frac{\pi - r\beta}{s_f + \left(\beta - \frac{1}{u^*}\right)h'(\pi)}$$

$$\frac{\partial\pi}{\partial\hat{N}} = -\frac{\alpha}{s_f + \left(\beta - \frac{1}{u^*}\right)h'(\pi)}$$

$$\frac{\partial\pi}{\partial r} = \frac{\beta s_f}{s_f + \left(\beta - \frac{1}{u^*}\right)h'(\pi)}$$

$$\frac{\partial\pi}{\partial\alpha} = -\frac{\hat{N}}{s_f + \left(\beta - \frac{1}{u^*}\right)h'(\pi)}$$

$$\frac{\partial\pi}{\partial\beta} = \frac{s_f r - n}{s_f + \left(\beta - \frac{1}{u^*}\right)h'(\pi)}$$

The signs of these partials depend on the magnitude of $h'(\pi)$. The expression $\beta - \frac{1}{u^*} = \frac{M-pK}{pY}$ is negative for any empirically reasonable specification, and it follows that, compared with the labour constrained case, the comparative statics are unchanged if h' is 'small' but reversed if h' is 'large'. The standard Kaleckian formulation with $\pi = \bar{\pi}$ corresponds to the limiting case with $h' \to \infty$. This may be an extreme case, but in the absence of labour constraints one would expect a high sensitivity of growth to variations in profitability. Thus, the large h' case with the reversal of comparative statics for the profit share seems the most reasonable.

Changes in the profit share influence the growth rate in a dual economy, rather than the employment rate as in the labour-constrained economy. Expressions for the growth rate effects are readily obtained in the limiting case with a constant markup formulation ($h'(\pi) \to \infty$ at $\pi = \bar{\pi}$). In this limiting case equation (24) can be rewritten

$$\left[1 - s_f(\bar{\pi} - r\beta) - \beta g - \alpha \hat{N}\right] = 1 - \frac{1}{u^\star} g$$

and

$$\frac{\partial g}{\partial s_f} = \frac{(\bar{\pi} - r\beta)u^\star}{1 - \beta u^\star} > 0$$

$$\frac{\partial g}{\partial \hat{N}} = \frac{\alpha u^\star}{1 - \beta u^\star} > 0$$

$$\frac{\partial g}{\partial r} = -\frac{s_f \beta u^\star}{1 - \beta u^\star} < 0$$

$$\frac{\partial g}{\partial \alpha} = \frac{\hat{N} u^\star}{1 - \beta u^\star}$$

$$\frac{\partial g}{\partial \beta} = \frac{(g - s_f r)u^\star}{1 - \beta u^\star}$$

The signs of the effects of changes in s_f, $\hat{N}$ and r are clear. If firms raise the retention rate or increase the rate of new issues, this will increase the rate of capital accumulation, while an increase in the real interest rate slows down accumulation. The intuition is simple. Since $u^\star$ and $\bar{\pi}$ are unaffected by changes in s_f, $\hat{N}$ and r, the effects on accumulation of changes in s_f, $\hat{N}$ and r derive exclusively from their direct impacts on saving and the amount of available finance. Given that $u = u^\star$ and $\pi = \bar{\pi}$, an increase in s_f or $\hat{N}$ must increase the amount of financial resources available to firms—raising the rate of capital accumulation—while a rise in r has the opposite effect on accumulation since it reduces the amount of retained earnings.[1]

4.2.2 The Lavoie–Godley specification of consumption As we have seen in Section 4.1.2, households' consumption/saving and portfolio decisions in Lavoie–Godley (2001–02) implicitly define the stock–flow ratios, α and β, as functions of a number of variables, and the accumulation rate becomes an additional influence on α and β in the dual

[1] It is easy to understand these comparative statics by looking at the closed-form solution for the rate of capital accumulation, i.e. $g = \frac{\left[s_f(\bar{\pi} - r\beta) + \alpha \hat{N}\right]u^\star}{1 - \beta u^\star}$.

economy. Analogously to the analysis in Section 4.1.2, we obtain the following comparative statics:

$$\frac{\partial g}{\partial s_f} = \frac{\bar{\pi} - r\beta - (s_f r - g)\frac{\partial \beta}{\partial s_f}}{\frac{1}{u^\star}(1 - \beta u^\star - x) + (s_f r - g)\frac{\partial \beta}{\partial g}}$$

$$\frac{\partial g}{\partial x} = \frac{\frac{1}{u^\star}g - (s_f r - g)\frac{\partial \beta}{\partial x}}{\frac{1}{u^\star}(1 - \beta u^\star - x) + (s_f r - g)\frac{\partial \beta}{\partial g}}$$

$$\frac{\partial g}{\partial r} = -\frac{s_f \beta + (s_f r - g)\frac{\partial \beta}{\partial r}}{\frac{1}{u^\star}(1 - \beta u^\star - x) + (s_f r - g)\frac{\partial \beta}{\partial g}}$$

We follow a decomposition procedure, similar to the one in Section 4.1.1, in order to check if the inelasticity conditions for the stock–flow ratios hold in Harrodian dual economies. Table 3 reports the numerical results based on Lavoie and Godley's parameter values.

The signs of the derivatives of g with respect to the parameters are the same in the variable α and β regime as in the constant α and β regime, that is, our 'inelasticity conditions' hold in Harrodian dual economies with a Lavoie–Godley specification of consumption and portfolio behaviour. However, the absolute values of the derivatives in the case of constant α and β are much greater than those in the case of variable α and β. Thus, the adjustment of α and β caused by changes in the parameters produce significant and partially offsetting effects on accumulation.

The implications of the alternative specification of the consumption function in Godley–Lavoie (2007) are given in Table 4. The inelasticity conditions are satisfied and the effects of the changes in α and β are more modest in this case.

5. A Kaleckian model

Our Kaleckian model differs from Harrodian models with respect to the specification of accumulation. Unlike in the Harrodian framework, the utilisation rate becomes an accommodating variable, and a shift in aggregate demand may generate a permanent change in utilisation.[1] The profit share, by contrast, is treated as exogenous, $\pi = \bar{\pi}$, and the labour supply is taken to be perfectly elastic (that is, the model describes the dual economy case). The Kaleckian model, finally, often imposes 'stagnationist' assumptions, which ensure that an increase in the profit share will reduce utilisation; most of our results for the comparative statics of changes in financial behaviour do not depend on these additional assumptions.

5.1 Inelastic stock–flow ratios

By using the definition of α and β, Tobin's q, the debt–capital ratio, and the ratio of retained earnings to capital can be written as:

[1] As pointed out by a referee, a steady growth path for the Kaleckian model may have utilisation at the normal or desired level, despite the accommodating changes in utilisation. This equalisation of actual and desired utilisation rates can be achieved if the desired utilisation rate itself adjusts to the actual rate (Dutt, 1997; Lavoie, 1995).

Table 3. *Harrodian dual economy I*

	Constant α and β regime	Variable α and β regime
The retention ratio	0.073	0.037
Equity issues	0.118	0.021
Real interest rate	–0.790	–0.396
Utilisation	0.595	0.348
Profit share	0.305	0.154
Propensity to hold equity	–	–0.011

Numbers show partial derivatives of the growth rate with respect to the parameters listed in the first column.
The structure and parameter values of the model are the same as in Lavoie and Godley (2001–02) including the specification of consumption, but the closure of the model is different.

Table 4. *Harrodian dual economy II*

	Constant α and β regime	Variable α and β regime
The retention ratio	0.101	0.081
Equity issues	0.117	0.071
Real interest rate	–0.349	–0.273
Utilisation	0.376	0.329
Profit share	0.341	0.272
Propensity to hold equity	–	–0.025

Numbers show partial derivatives of the growth rate with respect to the parameters listed in the first column.
The structure and parameter values of the model are the same as in Lavoie and Godley (2001–02) except the specification of consumption and the closure of the model. The alternative specification of consumption is that found in Godley and Lavoie (2007).

$$q = (\alpha + \beta)u$$

$$m = \beta u$$

$$c = s_f(\pi - r\beta)u$$

Thus, for given values of $\bar{\pi}$, α and β, the accumulation function, equation (4), becomes a function of utilisation only:

$$\frac{I}{K} = f(u, \bar{\pi}, r, q, m, c) = f\big(u, \bar{\pi}, r, (\alpha + \beta)u, \beta u, s_f(\bar{\pi} - r\beta)u\big) \equiv \phi\big(u; \alpha, \beta, r, \bar{\pi}, s_f\big)$$

From equation (8) and the product market equilibrium condition, we now have

$$\phi\big(u; \alpha, \beta, r, \bar{\pi}, s_f\big) = \big[s_f(\bar{\pi} - r\beta) + \beta\phi(u) + \alpha\hat{N}\big]u \tag{25}$$

We may interpret the terms in the bracket on the right hand side of equation (25) as the average saving rate. Following the Kaleckian tradition, we assume that the traditional Keynesian short-run stability assumption holds in the long run, too, that is, we assume that saving is more responsive than investment to changes in the utilisation rate. If the α and β ratios are exogenous, we then have

$$s_f(\bar{\pi} - r\beta) + \beta(\phi' u + g) + \alpha\hat{N} - \phi' > 0 \tag{26}$$

and—assuming positive autonomous investment, $\phi(0; \alpha, \beta, r, \bar{\pi}, s_f) > 0$—it can be shown that there is a unique positive solution for u in the interval $(0, \frac{1}{\beta})$.

For empirically reasonable magnitudes of the negative effect on capital accumulation of the debt–capital ratio, accumulation is increasing in the utilisation rate, i.e. $\phi'(u) > 0$[1] and we have the following comparative statics for the utilisation rate:

$$\frac{\partial u}{\partial \pi} = \frac{(1-\beta u)f_\pi + us_f\{(1-\beta u)f_c - 1\}}{s_f(\bar{\pi} - r\beta) + \beta(\phi' u + g) + \alpha\hat{N} - \phi'} \tag{27}$$

$$\frac{\partial u}{\partial s_f} = \frac{(\bar{\pi} - r\beta)u\{(1-\beta u)f_c - 1\}}{s_f(\bar{\pi} - r\beta) + \beta(\phi' u + g) + \alpha\hat{N} - \phi'} < 0 \tag{28}$$

$$\frac{\partial u}{\partial \hat{N}} = -\frac{\alpha u}{s_f(\bar{\pi} - r\beta) + \beta(\phi' u + g) + \alpha\hat{N} - \phi'} < 0$$

$$\frac{\partial u}{\partial r} = \frac{(1-\beta u)\left(f_r - f_c s_f \beta u\right) + s_f\beta u}{s_f(\bar{\pi} - r\beta) + \beta(\phi' u + g) + \alpha\hat{N} - \phi'}$$

$$\frac{\partial u}{\partial \alpha} = \frac{f_q(1-\beta u)u - \hat{N}u}{s_f(\bar{\pi} - r\beta) + \beta(\phi' u + g) + \alpha\hat{N} - \phi'}$$

$$\frac{\partial u}{\partial \beta} = \frac{\left(s_f r - g\right)u + (1-\beta u)\left(f_q + f_m - f_c s_f r\right)u}{s_f(\bar{\pi} - r\beta) + \beta(\phi' u + g) + \alpha\hat{N} - \phi'}$$

The stagnationist case is obtained if an increase in the profit share generates a decline in utilisation. Comparing equation (27) with equation (28) it is readily seen that in this stagnationist case an increase in the retention rate must depress the rate of utilisation: it follows, from equations (26) and (27), that $(1 - \beta u)f_c < 1$ is a necessary condition for $\frac{\partial u}{\partial \pi} < 0$. However, the determinate sign of the partial derivative of the utilisation rate with respect to the retention ratio can also be justified directly by the empirically mild assumption that $(1 - \beta u)f_c < 1$.[2] Given this assumption, an increase in s_f lowers the utilisation rate since, for a given u, saving rises more sharply than investment, and the utilisation rate must decrease in order to restore the product market equilibrium. Analogously—and independently of whether $\frac{\partial u}{\partial \pi} < 0$—the average saving rate rises as $\hat{N}$ increases since more household income goes to purchasing equities rather than buying consumer goods. This depresses the level of effective demand and results in a lower rate of utilisation.

[1] The mathematical condition for $\phi'(u) > 0$ is $\beta|f_m| < f_u + f_q(\alpha+\beta) + f_c s_f(\bar{\pi} - r\beta)$.

[2] It is difficult to see how an increase in retained earnings—keeping constant u, π, r, q, m—can lead to a more than one-for-one increase in investment, that is, one would expect $f_c \leq 1$.

The increase in the real interest rate has a negative impact on both saving and investment. It lowers the amount of corporate saving, and the decrease in retained earnings depresses accumulation for a given rate of utilisation. Saving falls more sharply than investment if the direct negative impact on investment of changes in r is not too large, i.e. $(1-\beta u)(f_r - f_c s_f \beta u) + s_f \beta u > 0$. Under this assumption, to restore the product market equilibrium, a higher utilisation rate is required. However, if $(1-\beta u)(f_r - f_c s_f \beta u) + s_f \beta u < 0$, the higher real interest rate requires a lower utilisation rate for the product market equilibrium. The effects of changes in α and β finally are ambiguous.

The effects on accumulation of changes in the financial variables are given by:

$$\frac{\partial g}{\partial \pi} = f_\pi + s_f u f_c + \phi' \frac{\partial u}{\partial \pi} \tag{29}$$

$$\frac{\partial g}{\partial s_f} = f_c(\bar{\pi} - r\beta)u + \phi' \frac{\partial u}{\partial s_f} \tag{30}$$

$$\frac{\partial g}{\partial \hat{N}} = \phi' \frac{\partial u}{\partial \hat{N}} < 0 \tag{31}$$

$$\frac{\partial g}{\partial r} = f_r - f_c s_f \beta u + \phi' \frac{\partial u}{\partial r} \tag{32}$$

The result for $\frac{\partial g}{\partial \pi}$ in equation (29) is parallel to Marglin and Bhaduri's (1990) analysis of wage- and profit-led growth in a stagnationist regime. The direct and positive effect on accumulation of an increase in the profit share may or may not be dominated by the effect of a decline in utilisation. A rise in the retention rate—equation (30)—also produces conflicting effects on accumulation. The first term in equation (30), $f_c(\bar{\pi}-r\beta)u$, captures a direct positive impact on accumulation from an increase in the amount of internal funds, but an increase in the retention rate also has a negative effect on accumulation by lowering the utilisation rate (the second term in equation (30), $\phi' \frac{\partial u}{\partial s_f}$, is negative). Which effect dominates is an empirical matter but—using the expressions for $\frac{\partial u}{\partial \pi}$ and $\frac{\partial u}{\partial s_f}$—it follows that in this model $\frac{\partial g}{\partial s_f} > 0$ is a sufficient condition for growth to be profit led.[1]

The effect on capital accumulation of an increase in the rate of equity issues is more clear-cut. An increase in $\hat{N}$ leads to a lower rate of utilisation, and the lower utilisation rate depresses capital accumulation.

Real interest rates have ambiguous effects. The direct effect on accumulation of a rise in the real rate of interest is negative but the derived effect on accumulation via changes in the utilisation may be positive: $f_r - f_c s_f \beta u$ in equation (32) is negative, but the sign of $\phi' \frac{\partial u}{\partial r}$ in equation (32) can be positive or negative, leaving unclear the sign of the total effect. The

[1] We have

$$\begin{aligned}
\frac{\partial g}{\partial \pi} &= f_\pi + s_f u f_c + \phi' \frac{\partial u}{\partial \pi} \\
&= f_\pi + s_f u f_c + \phi' \frac{(1-\beta u) f_\pi + u s_f \{(1-\beta u) f_c - 1\}}{s_f(\bar{\pi} - r\beta) + \beta(\phi' u + g) + \alpha \hat{N} - \phi'} \\
&= f_\pi + \phi' \frac{(1-\beta u) f_\pi}{s_f(\bar{\pi} - r\beta) + \beta(\phi' u + g) + \alpha \hat{N} - \phi'} \\
&\quad + \frac{s_f}{\bar{\pi} - r\beta}\left[(\bar{\pi} - r\beta) u f_c + \phi' \frac{(\bar{\pi} - r\beta) u \{(1-\beta u) f_c - 1\}}{s_f(\bar{\pi} - r\beta) + \beta(\phi' u + g) + \alpha \hat{N} - \phi'}\right] \\
&= f_\pi + \phi' \frac{(1-\beta u) f_\pi}{s_f(\bar{\pi} - r\beta) + \beta(\phi' u + g) + \alpha \hat{N} - \phi'} + \frac{s_f}{\bar{\pi} - r\beta} \frac{\partial g}{\partial s_f}
\end{aligned}$$

ambiguity that characterises the effects of changes in α and β on utilisation also carry over to the effects on the growth rate.

Financialisation, finally, may have been associated with a downward shift in the accumulation function, f (or ϕ). A downward shift of this kind leads to a lower utilisation rate, and this fall in utilisation exacerbates the decline in accumulation.

Strikingly, the comparative static results for a Kaleckian dual economy resemble those for the mature Harrodian economy. A fall in the rate of new equity issues is expansionary in both models. In the Kaleckian model it leads to a higher utilisation rate and a higher accumulation rate; in the Harrodian model profits and employment both increase. A decrease in the retention rate, moreover, may (but need not) increase both the utilisation rate and the capital accumulation rate in the Kaleckian model and it raises profits and employment in the Harrodian case.

5.2 The Lavoie–Godley specification of consumption and accumulation

In Lavoie and Godley (2001–02), the accumulation function is given by

$$g = \gamma_0 + \gamma_1 s_f(\bar{\pi}u - rm) - \gamma_2 rm + \gamma_3 q + \gamma_4 u$$

where γ_0, γ_1, γ_2, γ_3 and γ_4 are positive constants. Using the definitions of q, m, α and β, this accumulation function can be rewritten:

$$g = \gamma_0 + \left[\gamma_1 s_f(\bar{\pi} - r\beta) - \gamma_2 r\beta + \gamma_3(\alpha + \beta) + \gamma_4\right]u \tag{33}$$

If the α and β ratios are constant, we have a special linear version of our function $\phi(u)$ in the previous section, and the sensitivity of investment to the utilisation rate depends on the various parameters, including α and β. The Lavoie–Godley specification of consumption and portfolio behaviour, however, implies that the α and β ratios are endogenous and that the response of investment to changes in u will be affected by the endogenous adjustment of the stock–flow ratios α and β.

The consumption function and households' portfolio choice have been described already in Section 4.1.2. For convenience we reproduce the key equations (22) and (23) here:

$$u - g = u\left[1 - s_f(\bar{\pi} - r\beta) - \beta g - \frac{xg}{u}\right] = \psi(y, \gamma) \tag{34}$$

$$\frac{\beta}{\alpha + \beta} = z(r, r_e, y, q) \tag{35}$$

where $\gamma = \alpha ug - xg$, $y = \left[1 - s_f(\bar{\pi} - r\beta) + \hat{p}\beta\right]u$, $r_e = \frac{(1-s_f)(\bar{\pi}-\beta r)u + g(\alpha u - x)}{\alpha u}$ and $q = (\alpha + \beta)u$. Unlike in Section 4.1.2, g and u are endogenously determined while π is a parameter.

The system described by equations (33), (34) and (35) determines four endogenous variables, g, u, α and β (expression (34) contains two equations). This system is equivalent to the steady-growth system of Lavoie and Godley (2001–02).[1] It can be compared to one in which accumulation is described by equation (33), but in which α and β are assumed constant [that is, in which we drop equation (35) and the last equation in expression (34)].

Analytical solutions are hard to obtain, but using the original parameter values in Lavoie and Godley (2001–02) our inelasticity conditions for stock–flow ratios survive in this Kaleckian

[1] The only small difference between the Lavoie and Godley steady-state system and ours lies in the lag structure of variables. In our analysis, we make all level variables in each equation contemporaneous.

Lavoie–Godley system. Table 5 describes the numerical results. Qualitatively, the macroeconomic effects of financialisation on the steady state are the same in the fixed α, β system and the Lavoie–Godley model. In both models, the effects of an increase in the retention rate are negative for both utilisation and accumulation. Thus, given the parameter configuration, the direct positive impact of a rise in s_f on accumulation is dominated by its negative utilisation effect on accumulation. A rise in the share of investment financed by new issues has a contractionary effect on both utilisation and accumulation. An increase in the real interest rate on the utilisation rate has a positive effect on the utilisation rate, but this positive utilisation effect is offset by the negative effect of the higher interest rate on accumulation: accumulation slows down in the face of the higher real rate of interest.

The similarity between the systems with constant and endogenous α and β ratios is not just qualitative. The derivatives of u and g with respect to the various parameters are also similar in magnitude. Thus, the effects on u and g of induced adjustments of α and β are quantitatively small.[1] This result is not surprising since, as indicated in Table 6, the values of the α and β ratios appear to be rather insensitive to variations in the financial parameters (the parameter changes in the table are very substantial).

The sensitivity of the qualitative results to variations in parameters of the consumption function is shown in Table 7. The effect of changes in the real interest rate could not be signed unambiguously for the case with a constant α and β, and it is therefore not surprising that the effect of changes in r on utilisation may depend on the precise parameters. The effects that could be signed with a constant α and β are robust: the direction of the effects is preserved in the variable α, β case for all meaningful combinations of the consumption parameters. The violations in the top left corner of Table 7 arise when, as a result of low consumption, the model generates an outcome with low utilisation, high indebtedness, and an inability of firms to cover the real interest payments on their loans ($\pi - r\beta < 0$).

Turning, finally, to the alternative specification in Godley and Lavoie (2007), a similar picture emerges. Table 8 compares the effects of parameter changes using this specification

Table 5. *Kaleckian dual economy I*

	Utilisation		Accumulation	
Regimes	Constant α and β regime	Variable α and β regime	Constant α and β regime	Variable α and β regime
The retention ratio	–0.162	–0.186	–0.024	–0.028
Equity issues	–0.342	–0.352	–0.085	–0.087
Real interest rate	1.055	0.197	–0.163	–0.327
Profit share	–0.680	–0.780	–0.099	–0.118
Propensity to hold equity	–	0.296	–	0.092

Numbers show partial derivatives of the utilisation rate and the growth rate with respect to the parameters listed in the first column.
The structure and parameter values of the model are the same as in Lavoie and Godley (2001–02) including the specification of consumption.

[1] There is one possible exception: the quantitative effect of the real interest rate on utilisation differs substantially in the two systems. Our numerical exercises, however, show that the difference tends to decrease if we consider non-marginal, discrete changes in the interest rate.

Table 6. *Effects of changes in financial variables on stock–flow ratios in Kaleckian dual economy I*

	s_f 0.55	0.75	0.95	x –0.05	0.05	0.15	r 0.01	0.0275	0.05
α	1.951	2.079	2.179	2.040	2.079	2.075	1.814	2.079	2.660
β	2.426	2.589	2.717	2.537	2.589	2.587	2.226	2.589	3.377

Notes: 0.75(s_f), 0.05(x), 0.0275(r) and the values for the parameters other than s_f, x and r are the same as those used by Lavoie and Godley (2001–02).

Table 7. *Sensitivity analysis in Kaleckian dual economy I*

a_2	a_1 0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95
1000	Δ	Δ	Δ	Δ	○	○	○	○	□	□	□
100	Δ	Δ	Δ	○	○	○	○	○	□	□	□
10	Δ	Δ	Δ	○	○	○	○	○	□	□	□
7.5	Δ	Δ	Δ	○	○	○	○	○	□	□	□
4.5	Δ	Δ	Δ	○	○	○	○	○	□	□	□
3.0	Δ	Δ	○	○	○	○	○	○	□	□	□
1.5	Δ	○	○	○	○	○	○	○	□	□	□
1.0	Δ	○	○	○	○	○	○	□	□	□	×
0.5	○	○	○	○	○	○	□	□	□	□	×

The table is based on the consumption function in Lavoie and Godley (2001–02): C/K=a_1 {u - s_f (πu - rm)} + a_1/a_2 γ.

○, Cases where condition for the stock–flow inelasticity hold for the partial derivatives of u and g with respect to changes in s_f, x and r. $u_{s_f} < 0$, $u_x < 0$, $u_r > 0$, $g_{s_f} < 0$, $g_x < 0$ and $g_r < 0$.

□, As for ○ cases except that $u_r > 0$ in the case of fixed α and β, but $u_r < 0$ in the case of variable α and β.

Δ, As for ○ cases except that $u_{s_f} > 0$ and $g_{s_f} > 0$ for both fixed and variable α and β. However, in these cases, $\pi - r\beta < 0$.

×, No economically meaningful solution is obtained.

to the constant α, β case. Table 9 illustrates the sensitivity of α and β to variations in s_f, x and r, and Table 10 indicates the sensitivity of the inelasticity conditions to variations in the consumption parameters. All the results are in line with what we observed for the 2001–02 specification.

6. Conclusion

Financialisation is a shorthand expression for a number of developments over the last 30 years. The term is convenient but these developments may not have the coherence and unity suggested by the term and they may not signal the transition to some new 'regime'.

This paper is an attempt to show how the macroeconomic effects of some of the observed changes in financial behaviour can be analysed using existing theoretical frameworks. The models in Sections 4 and 5 differ along three dimensions: (i) the role of labour constraints (mature versus dual economies), (ii) accumulation regimes (Harrodian versus Kaleckian specifications), and (iii) the specification of household behaviour (elastic versus inelastic

Table 8. *Kaleckian dual economy II*

Regimes	Utilisation: Constant α and β regime	Utilisation: Variable α and β regime	Accumulation: Constant α and β regime	Accumulation: Variable α and β regime
The retention ratio	–0.470	–0.487	–0.076	–0.079
Equity issues	–0.806	–0.742	–0.186	–0.173
Real interest rate	0.587	0.154	–0.128	–0.223
Profit share	–1.592	–1.64	–0.257	–0.267
Propensity to hold equity	–	0.391	–	0.104

Numbers show partial derivatives of the utilisation rate and the growth rate with respect to the parameters listed in the first column.
The structure and parameter values of the model are the same as in Lavoie and Godley (2001–02) except the specification of consumption. The alternative specification of consumption is that found in Godley and Lavoie (2007).

Table 9. *Effects of changes in financial variables on stock–flow ratios in Kaleckian dual economy II*

	s_f			x			r		
	0.55	0.75	0.95	–0.05	0.05	0.15	0.01	0.0275	0.05
α	0.804	0.824	0.830	0.855	0.824	0.777	0.799	0.824	0.861
β	0.994	1.023	1.035	1.058	1.023	0.967	0.978	1.023	1.089

Notes: 0.75(s_f), 0.05(x), 0.0275(r) and the values for the parameters other than s_f, x and r are the same as those used by Lavoie and Godley (2001–02).
The structure and parameter values of the model are the same as in Lavoie and Godley (2001–02) except the specification of consumption. The alternative specification of consumption is that found in Godley and Lavoie (2007).

stock–flow ratios). All three dimensions are important when it comes to evaluating the effects of the behavioral changes that have been associated with financialisation.

Looking first at the third dimension, the comparative statics in the elastic stock–flow case are reversed compared to the case with inelastic stock–flow ratios. Phrased in this way, however, the result is not interesting since reversal of the results formed the basis for the definition of elastic stock–flow ratios. More interesting is the finding that all our specifications fall into the category of inelastic stock–flow ratios. We may not be able to conclude from this that all reasonable specifications are inelastic. We have shown, however, that a range of empirically plausible specifications will be stock–flow inelastic; it is striking, in particular, that models like that of Lavoie and Godley (2001–02), which have been built up from flow–flow relations also generate stock–flow ratios that are inelastic.[1]

[1] As pointed out by a referee, this insensitivity of the qualitative results to the precise specification of household saving and portfolio behaviour may provide 'a cautionary tale for those heterodox macroeconomists who, in their effort to grapple with the nature of the new neoliberal/post-Fordist/post-Golden Age growth regime, have placed increasing emphasis on finance to the neglect (relatively speaking) of the structure of the labour market and the employment relation.'

Table 10. *Sensitivity analysis in Kaleckian dual economy II*

c_2	c_1 0.45	0.55	0.65	0.75	0.85	0.95
0.003	Δ	Δ	○	○	□	□
0.005	Δ	○	○	○	□	□
0.01	○	○	○	○	□	□
0.02	○	○	○	○	□	□
0.04	○	○	○	○	□	□
0.06	○	○	○	○	□	□
0.08	○	○	○	○	□	□
0.10	○	○	○	○	□	□
0.20	○	○	○	□	□	□

The analysis is based on the consumption function in Godley and Lavoie (2007): $C/K=c_1\{u - s_f(\pi u - rm)\} + c_2 q$.
○, Cases where condition for the stock–flow inelasticity hold for the partial derivatives of u and g with respect to changes in s_f, x and r. $u_{s_f} < 0$, $u_x < 0$, $u_r > 0$, $g_{s_f} < 0$, $g_x < 0$ and $g_r < 0$.
□, As for ○ cases except that $u_r > 0$ in the case of fixed α and β, but $u_r < 0$ in the case of variable α and β.
Δ, As for ○ cases except that $u_{s_f} > 0$ and $g_{s_f} > 0$ for both fixed and variable α and β. However, in these cases, $\pi - r\beta < 0$.

Assuming inelastic stock–flow ratios, some of the main results for the other two dimensions are summarised in Table 11. Consider a change in new issue policies.[1] A decrease in new issues will be expansionary in the mature Harrodian economy as well as in the Kaleckian dual economy, but expansionary means different things in the two regimes: the growth rate is exogenously given in the mature economy and expansionary refers to an increase in the rate of employment; in the dual economy the labour supply is infinitely elastic (and the rate of employment ill-defined), and an expansionary effect is one that raises the growth rate.

The Harrodian dual economy produces the opposite result: a decrease in new issues reduces the growth rate.[2] Intuitively, the growth rate (along the steady growth path) is constrained by saving in the Harrodian dual economy, and a decrease in new issues reduces saving and thereby the growth rate. This argument is a straightforward generalisation of what happens in the textbook version of Harrod's model. In a mature economy, by contrast, the growth rate of output and the rate of accumulation will adjust to the natural rate. A decrease in new issues tends to reduce saving, and an increase in profits is needed to compensate for this reduction and maintain the rate of accumulation at the natural rate. An increase in profitability, in turn, must be offset by a rise in employment in order to keep the growth rate of output at the natural rate. Basically, moving from a mature to a dual-economy setting turns an expansionary change into a contractionary change.

Moving from a Harrodian to a Kaleckian economy also tends to reverse the comparative statics. This, again, generalises results that are well-known from comparisons of the textbook Harrod model with standard stagnationist formulations (e.g. Rowthorn, 1981;

[1] The effects of changes in retention rates are a little less clear in that—essentially for Marglin–Bhaduri reasons—the growth effects are ambiguous in the Kaleckian dual-economy case.
[2] The Harrodian dual economy could be split into two cases, depending on the sensitivity of the growth function with respect to changes in the profit share. We focus on the high-sensitivity case, cf. Section 4.1.2.

Table 11. *The effects of a decrease in the retention ratio or the rate of net issues of equities in different regimes*

	Mature economies	Dual economies
Harrodian	Profit share: increase Employment: increase	Growth: decrease
Kaleckian		Utilisation: increase Growth: ambiguous when $s_f \downarrow$ Growth: increase when $\hat{N} \downarrow$

Dutt, 1984). The only difference is that here we have expanded the models to include financial factors that are usually left out.

These comparisons between mature and dual-economy versions of the Harrodian model and between Harrodian and Kaleckian versions of the dual economy provide some intuition for the similarity between the mature Harrodian economy and the Kaleckian dual economy: these latter economies differ in two dimensions and the two reversals of the comparative statics offset each other.

The dependence of the comparative statics on the specification of the model is not surprising. One contribution of this paper, however, is to clarify the conditions under which the different results are obtained. Moreover, most studies of advanced capitalist economies by heterodox economists seem to be informed by either a Harrodian mature-economy perspective or by the Kaleckian dual-economy framework (our own preference lies with the former, but the majority view probably favours the latter). The two perspectives are quite different, but our results in this paper show that when it comes to an evaluation of the effects of the changes in financial behaviour over the last 30 years, the qualitative conclusions are rather similar. A downward shift of the accumulation function will—not surprisingly—be contractionary in both frameworks but, contrary to the fears among some heterodox economists, key developments associated with the process of financialisation have expansionary effects: decreases in retained earnings, a decline in new issues of equity and increased reliance on external finance tend to be expansionary in both frameworks.

Financialisation involves broader issues that go beyond the questions discussed in this paper. One set of issues concerns international capital flows and the constraints implied by these flows on the policy options of nation states. Leaving aside the international dimension, issues of power provide another example. It is often claimed that financialisation is associated with the increased power of financial institutions. Auerbach (1988), however, presents the case for an alternative view:

> The present relationships between banks and firms, far from signalling the growing dominance of financial institutions represent a precisely contrary development. They result from the efforts of financial institutions to accommodate themselves to a far more insecure environment, one made insecure by the activities of financial institutions in competition with each other and by the ever more stringent demands made upon them by their clients, especially their business customers. (p. 198)

Disregarding power issues, an increase in competition and insecurity may have implications for financial stability as well as for the time horizons used by both firms and financial institutions. A relatively recent but now largely forgotten literature questioned the relative merits of competitive, market-based Anglo-Saxon financial systems compared to

German–Japanese systems. The latter, it was argued, might help to alleviate a short-termist bias (e.g. Cosh *et al.*, 1990). More generally, a competitive financial system would not necessarily—even if it were fully 'efficient'—produce good macroeconomic results if the investment in physical and/or human capital gave rise to significant externalities (as suggested by traditional development theory, post-Keynesians like Kaldor, and recent endogenous growth theory). In the case of positive externalities, 'artificially low' interest rates may be desirable (Auerbach and Skott, 1992).[1]

One may note, finally, that concerns over the excesses and questionable benefits of the financial system have been voiced before and that even the extent of resources that are put into the financial system may cause concern. Thus, Tobin (1984; reprinted 1987) confessed

> to an uneasy Physiocratic suspicion, perhaps unbecoming in an academic, that we are throwing more and more of our resources, including the cream of our youth, into financial activities remote from the production of goods and services, into activities that generate high private rewards disproportionate to their social productivity. (1987, p. 294)

Tobin's conclusion was motivated in part by the fact that 16 out of an elite group of 46 executives whose earnings exceeded one million dollars in 1983 were officers of financial companies. He also noted that graduates from the School of Organisation and Management at Yale who took jobs in finance had starting salaries four times the poverty threshold for four-person families, and observed that the average holding period for shares was only 19 months and that the Department of Finance categories of Finance and Insurance generate 4.5–5% of gross national product (1987, p. 282). These numbers seem almost quaint by today's standards,[2] and developments over the last 20 years can only reinforce one's Physiocratic suspicions.

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[1] The relatively strong German and Japanese economic performance during the Golden Age could be explained, of course, by other factors, unrelated to the financial systems. Likewise, the relatively poor performance by the two economies in more recent years may not reflect a need for reforms of the financial and/or labour market systems, as claimed by the Organisation for Economic Cooperation and Development and other international organisations. See Nakatani and Skott (2007) for a discussion of the Japanese case.

[2] In 2005, among CEOs in the top 189 efficient firms classified by Forbes, 164 earned more than $2 million (or approximately $1 million in 1983 dollars) and 46 of them belonged to financial companies (diversified financials, banking and insurance). The average compensation of those 46 CEOs in financial companies was $9.6 million, or about 170 times the median US family income in 2004 (see *The State of Working America 2006/2007* published by Economic Policy Institute). In 2004, the average holding period for shares had dropped to 12.1 months (*NYSE Historical Statistics*, http://www.nysedata.com). Finance and insurance, as categorised by the Department of Commerce, accounted for 5.5% of employee compensation, about 5% of the employed labour force, 7.5% of after-tax corporate profits and about 3% of personal consumption in 1983; in 2005 those corresponding figures were 7.6%, 4.3%, 11.1% and 5.9%, respectively (calculated from US Department of Commerce, Bureau of Economic Analysis, *National Income and Product Account*).

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Appendix

Numerical results in sections 4.1.2, 4.2.2 and 5.2

In Sections 4.1.2, 4.2.2 and 5.2 we used numerical methods to examine the comparative statics of two models: one with constant stock–flow ratios, α and β, and the other with Lavoie–Godley specifications on consumption and portfolio choice and induced variations in the stock–flow ratios. The analysis was conducted in the context of Harrodian mature economies (Section 4.1.2), Harrodian dual economies (Section 4.2.2), and Kaleckian dual economies (Section 5.2) and the results summarised in Tables 1–10. In this Appendix, we present the procedure that was used to find the values of the derivatives of the endogenous variables with respect to financial and other parameters. We do this in the context of Kaleckian dual economies (see Table 5) where the model with variable stock–flow ratios is the same as the one in Lavoie and Godley (2001–02). The procedure in the other cases is similar and, in fact, less complicated. Note that Tables 1, 3, 5, 6 and 7 are produced based on the specification of consumption in Lavoie and Godley (2001–02)—the flow–flow specification represented by equation (38) below—while the other tables (Tables 2, 4, 8, 9 and 10) are produced based on that in Godley and Lavoie (2007). In the latter, the consumption function, equation (38), is replaced by $\frac{C}{K}=c_1\left\{u-s_f(\pi u-rm)\right\}+c_2 q$ where $c_1 = 0.75$ and $c_2 = 0.064$, keeping intact other equations and parameter values.

The Kaleckian dual economies with variable α and β—Lavoie and Godley (2001–2002)

$$g = s_f(\pi u - rm) + mg + xg \tag{36}$$

$$g = \gamma_0 + \gamma_1 s_f(\pi u - rm) - \gamma_2 rm + \gamma_2 q + \gamma_4 u \tag{37}$$

$$u - g = a_1\{u - s_f(\pi u - rm)\} + \frac{a_1}{a_2}\gamma \tag{38}$$

$$m = (1 - \lambda_0 + \lambda_1 r - \lambda_2 r_e)q + \lambda_3\{u - s_f(\pi u - rm)\} \tag{39}$$

where $r_e = \frac{(1-s_f)(\pi u - rm)+\gamma}{q-m}$ and $\gamma = g(q-m) - xg$.

The symbols used here are the same as the ones in the main text of this paper. The inflation rate is assumed to be zero. Equation (36) describes firms' finance constraint, equation (37) is the investment function, equation (38) describes the equilibrium condition for the product market where the right-hand side specifies households consumption behaviour as a function of household distributed income and capital gains. Equation (39) shows households' demand for money (portfolio choice). The following values are used by Lavoie and Godley (2001–02).

$\gamma_0 = 0.0075$ $\gamma_1 = 0.5$ $\gamma_2 = 0.5$ $\gamma_3 = 0.02$ $\gamma_4 = 0.125$
$s_f = 0.75$ $x = 0.05$ $\pi = 0.2498$
$a_1 = 0.8$ $a_2 = 4.5$
$\lambda_0 = 0.45$ $\lambda_1 = 0.2$ $\gamma_2 = 0.0133$ $\lambda_3 = 0.0001$ $r = 0.0275$

Given these parameters, equations (36), (37), (38) and (39) determine the steady-state values of u, g, q and m. The system has multiple solutions due to nonlinearities of some equations. The number of solutions is six but five of them can be discarded on economic grounds since at least one of the variables—including r_e—is negative. The positive numerical solution is:

$$u^\star = 0.188 \quad g^\star = 0.0545 \quad q^\star = 0.8789 \quad m^\star = 0.487 \tag{40}$$

The partial derivatives of the solutions for u and g with respect to s_f, x, r, π and λ_0 are evaluated at ($u^\star$, $g^\star$, $q^\star$, $m^\star$). The obtained values were reported in the third and fifth columns of Table 5.

Using the definitions of α and β, we obtain the following equilibrium values for α and β:

$$\alpha^\star = \frac{q^\star - m^\star}{u^\star} = 2.07936 \quad \beta^\star = \frac{m^\star}{u^\star} = 2.58914$$

Using these steady-state values of stock–flow ratios, we can transform the variable α and β regime to the constant α and β regime by dropping the consumption and portfolio choice functions.

Constant α and β regime

$$\begin{aligned}
g &= s_f(\pi u - rm) + mg + xg \\
g &= \gamma_0 + \gamma_1 s_f(\pi u - rm) - \gamma_2 rm + \gamma_3 q + \gamma_4 u \\
q &= (\alpha^\star + \beta^\star)u \\
m &= \beta^\star u
\end{aligned}$$

By construction, the above four equations must yield the same steady state values as in equation (40). Then, the partial derivatives of the solutions for u and g with respect to s_f, x, r, π and λ_0, again, are evaluated at ($u^\star$, $g^\star$, $q^\star$, $m^\star$). The second and fourth columns of Table 5 report these values.