

A Sraffian Supermultiplier Model of Austerity and Private Debt: A Distributional Analysis of Debt-Led Growth Models

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Abstract

This paper develops a theoretical model to investigate the macroeconomic consequences of austerity — with a particular emphasis on its consequences of welfare services provisions — in the so-called credit-financed consumption-led growth models, where private debt is the main channel supporting aggregate demand. In the last decades, such economies have been characterised by a simultaneous retrenchment of the welfare state and a rise in household indebtedness, particularly among low- and middle-income classes. The paper argues that these two trends are not merely concurrent but causally related, and formalises this relationship through a substitution mechanism between public expenditure and private household credit, embedded into a Sraffian Supermultiplier framework.

The model considers a closed economy populated by two classes — workers and capitalists — and a stylised financial sector owned by the capitalist class from which workers demand credit. Public expenditure is treated as an autonomous component of aggregate demand, while the demand for credit is made of two components: one autonomous and the other responding inversely to public expenditure. This specification reflects two related observations: first, that consumption behaviour is socially embedded and characterised by

downward rigidity; second, that when public expenditure falls, workers partly compensate for the income shortfall through private borrowing, rather than curtailing their consumption standards.

According to the Sraffian Supermultiplier framework, both public expenditure and autonomous credit demand drive output expansion, yet with markedly different implications for macroeconomic stability. The paper analyses the transitional dynamics of public and private debt ratios and derives the conditions under which each is stable. The key result is that these conditions are not always simultaneously satisfiable: a growth rate of public expenditure compatible with public debt stability may prove insufficient to prevent private debt from diverging.

The paper argues that austerity may operate in this direction, redistributing financial fragility from the public sector to the working class via the credit market. It further contends that this mechanism carries significant distributional implications: as private debt rises, workers' debt service payments erode their net disposable income, generating an upward transfer to capitalists — a dynamic that intensifies as public spending shrinks and the substitution mechanism operates. These results suggest that the scope of public spending in general, and of the welfare state in particular, should not be assessed merely in terms of fiscal balance, but recognised as a precondition for the financial stability and distributive fairness of the economic system.

1 Introduction

This paper develops a theoretical model to investigate the macroeconomic and distributional consequences of government spending cuts and fiscal austerity in a credit-financed consumption-led growth model (Baccaro and Pontusson, 2016; Stockhammer, 2015). Within the growth model perspective, a credit-financed consumption-led model—also referred to as a debt-led growth model—describes an economy in which growth is primarily driven by domestic consumption, while consumption itself is sustained by increasing reliance on household credit rather than by sustained wage growth.

The United States and the United Kingdom are commonly identified as prominent examples of this growth model, having experienced a substantial expansion of household indebtedness alongside the increasing importance of private consumption in sustaining aggregate demand. The United Kingdom is particularly relevant for the question addressed in this paper, as these features have coexisted with a prolonged period of fiscal consolidation and public spending retrenchment since the aftermath of the Global Financial Crisis.

Against this background, analysing the effects of fiscal austerity in credit-financed consumption-led economies is particularly relevant, since cuts in public expenditure may affect not only aggregate demand but also households' reliance on private credit.

For this reason, the paper seeks to capture a substitution effect between public expenditure and households' demand for credit. To formalise this mechanism, total credit demand is assumed to be partially endogenous to government expenditure: a higher level of public spending reduces households' reliance on private borrowing, while a reduction in public expenditure increases it. This specification relies on the simplifying assumption that part of government expenditure is directed towards goods and services that contribute to households' living standards and would otherwise have to be privately financed.

The economic rationale underlying this mechanism is that consumption behaviour is not determined solely by current income, but is deeply embedded in social norms and habits (Veblen, 1899). More recently, Cynamon and Fazzari (2008) and Barba and Pivetti (2009) emphasise that consumption levels, once established, tend to exhibit strong downward rigidity: households resist reducing their standard of living because consumption is tied to social identity and relative standing. As a result, when public provision is reduced, households may seek to preserve their standard of living by increasing their reliance on private borrowing rather than by proportionally reducing consumption.

This mechanism – whereby credit acts as a substitute for public welfare provision – has been discussed in the literature under the label of “privatised Keynesianism” (Crouch, 2009) and has been empirically documented in the context of financialised economies (Montgomerie, 2013; Montgomerie and Büdenbender, 2015;

Trumbull, 2012). The present model gives formal expression to this insight within a SSM framework.

The model therefore distinguishes between an autonomous component of household credit demand and a component that responds to government expenditure. Government spending and autonomous credit demand both contribute to aggregate demand and output growth, but they have different implications for household indebtedness. This allows the paper to investigate how changes in the composition of autonomous demand affect the dynamics of both private and public debt.

The analysis focuses in particular on the relative growth rates of government expenditure and autonomous credit demand. By studying the transitional dynamics of the two debt ratios, the paper derives the conditions under which private and public indebtedness remain stable. The central result is that these conditions need not coincide: a path of government expenditure that is compatible with public debt stability may still be insufficient to prevent the private debt ratio from rising.

The analysis also highlights an important interaction between debt dynamics and income distribution. Since workers are the borrowing class in the model, rising private indebtedness increases debt-service payments and reduces their disposable income, while interest payments accrue to the capitalist class. The distributional consequences of private debt therefore feed back into the macroeconomic dynamics of the model, linking the evolution of household indebtedness to the broader question of financial stability.

The remainder of the paper is organised as follows. Section 2 reviews the relevant literature and situates the paper within the debates on growth models, household indebtedness and the Sraffian Supermultiplier. Section 3 develops the theoretical model and derives the dynamics and stability conditions of private and public debt. Section 4 concludes.

2 Literature and theoretical background

The paper lies at the intersection of three strands of literature.

The first is the growth model approach developed within Comparative Political Economy literature. The Growth Models Approach (Baccaro and Pontusson, 2016, 2018) provides a useful framework for interpreting the patterns of growth that have emerged in advanced economies since the end of the post-war Golden Age. During the post-war decades, economic growth was supported by a broadly wage-led regime, characterised by real wages rising alongside productivity, relatively compressed income distribution, and an active role for the state in sustaining aggregate demand. From the 1970s onwards, however, this configuration progressively weakened, giving way to new growth patterns associated with the broader transition towards neoliberal capitalism.

Within this framework, two main growth models have been identified: the export-led growth model and debt-led, or credit-financed consumption-led, growth model (Baccaro and Pontusson, 2016; Stockhammer, 2015). The distinction rests on the demand component that provides the main contribution to economic expansion. In this sense, the Growth Models Approach shares with earlier Post-Keynesian contributions the view that aggregate demand plays a central role in determining economic growth (Dutt, 2006; Stockhammer, 2015).

The GMA focuses primarily on how the predominance of a particular demand component reflects the interaction between economic sectors, political institutions, and social and electoral constituencies that form a growth coalition and support a particular growth strategy (Baccaro and Pontusson, 2023). From this perspective, the capacity of a country to sustain a given growth model depends partly on the degree of coherence between the interests of the dominant growth coalition, the institutional setting, and the policies that reinforce the corresponding source of demand. Export-led economies rely primarily on external demand. A central requirement of this growth model is therefore the ability to preserve the competitiveness of domestic exports. In this context, wage moderation plays an important role, insofar as containing unit labour costs can support price competitiveness and sustain export performance. More broadly, the institutional and policy configuration of export-led economies tends to favour the conditions required for the expansion of the tradable sector and the maintenance of external competitiveness.

Debt-led economies, by contrast, depend to a greater extent on household consumption, increasingly sustained through private borrowing in a context of weak wage growth, relatively easy access to credit, financial liberalisation, rising asset prices—especially housing prices—and lending standards that facilitate household indebtedness. In this setting, financial institutions and credit-market arrangements play a central role in sustaining aggregate demand, as households are able to maintain consumption levels despite limited income growth by expanding their indebtedness.

For the purposes of the present paper, the debt-led growth model is particularly relevant because private indebtedness is not simply a financial consequence of the growth process, but forms part of the mechanism through which aggregate demand is sustained. The expansion of household credit compensates for weak income growth thereby supporting consumption and output. At the same time, this dependence on private borrowing raises questions concerning the sustainability of household balance sheets and the distributional effects associated with rising debt-service obligations.

A second strand of literature relevant to the present paper concerns the relationship between household consumption, private indebtedness, and welfare provision. A central issue in this literature is that household consumption cannot be fully explained by disposable income alone. Several theoretical approaches (Kim et al., 2019; Frank et al., 2014), going beyond the traditional life-cycle hypothesis (Ando and Modigliani, 1963), have sought to explain the persistence of high or rising consumption levels despite weak wage growth and limited increases in disposable income. One explanation focuses on households' increasing reliance on financial instruments. Easier access to credit, financial liberalisation, and the possibility of using housing wealth and other assets as collateral can allow households to sustain consumption even when current income grows slowly. In this sense, private borrowing can operate as a mechanism through which households smooth consumption and preserve previously attained living standards.

The idea that consumption decisions are shaped not only by individual income but also by social norms and relative standards of consumption has a long tradition, dating back to Veblen's theory of conspicuous consumption (Veblen, 1899) and

Duesenberry’s relative income hypothesis (Duesenberry, 1949). From this perspective, households evaluate their consumption partly in relation to socially established standards and the consumption patterns of relevant reference groups. More recent Post-Keynesian contributions have developed this line of analysis by focusing on consumption emulation and the phenomenon of *keeping up with the Joneses* (Setterfield and Kim, 2016; Kim et al., 2014), whereby households seek to preserve their relative consumption position even when their income does not increase accordingly. Such mechanisms help explain why consumption may display downward rigidity and why households may increasingly resort to borrowing when income growth is insufficient to sustain socially determined consumption standards. Related contributions by Cynamon and Fazzari (2008) and Barba and Pivetti (2009) similarly emphasise the role of habits, social norms, and previously attained standards of living in shaping household expenditure.

This literature has also increasingly connected household borrowing to the broader institutional environment in which consumption decisions take place. In particular, (Setterfield and Kim, 2024) link household borrowing behaviour and financial fragility to the configuration of welfare systems and financial regimes, showing that the extent and form of welfare provision can affect household indebtedness and, through this channel, macroeconomic resilience. Their contribution therefore provides an important bridge between analyses of household debt and consumption behaviour on the one hand, and the role of welfare institutions in shaping financial fragility on the other.

A related line of research on *privatised Keynesianism* has highlighted more directly how private credit can partly substitute for public welfare provision in financialised economies (Crouch, 2009; Montgomerie, 2013; Montgomerie and Büdenbender, 2015; Trumbull, 2012). From this perspective, household indebtedness is not only a response to weak income growth, but may also be shaped by institutional changes in welfare provision and by the extent to which social risks and consumption needs are transferred from the public to the private sphere.

Building on these insights, the present paper focuses specifically on the possibility of substitution between public provision and private household borrowing. If

part of households' living standards is supported through publicly provided goods and services, a reduction in such provision may increase the amount of expenditure that must be financed privately. In a context in which consumption standards are downwardly rigid, this may strengthen households' reliance on private credit rather than generating a proportional reduction in consumption.

Turning to the analytical framework of the paper, the model developed here builds on the Sraffian Supermultiplier (SSM) literature and, more specifically, on contributions that consider the coexistence of two autonomous components of demand. This strand of the literature is particularly relevant for our purposes, since the model combines public expenditure and autonomous credit-financed consumption as distinct drivers of demand and growth. A central issue in this literature concerns the long-run coexistence of autonomous demand components growing at different rates, as the fastest-growing component would otherwise tend to dominate total autonomous demand over time.

Allain (2022) addresses this problem explicitly, showing that, in a model with two autonomous demand components, no more than one component can remain fully exogenous in the long run. The remaining component must either adjust endogenously or the two components must mutually adjust, leading Allain to characterise them as *semi-autonomous* rather than strictly autonomous.

Subsequent contributions have explored whether financial and stock-flow relations may provide endogenous mechanisms through which multiple autonomous demand components can coexist. Di Bucchianico et al. (2024), for instance, develop a model in which growth is driven by workers' debt accumulation and rentiers' consumption out of interest income. They show that stock-flow consistent feedbacks can prevent the slower-growing component from disappearing even when long-run growth converges towards the growth rate of the more dynamic component. Woodgate et al. (2024), considering government expenditure and rentiers' consumption out of interest income, identify a related financial feedback mechanism through which the growth rates of the two autonomous components may become aligned endogenously in the long run. These contributions therefore highlight the importance of explicitly con-

sidering the financial stocks and flows associated with autonomous demand when analysing the coexistence of different growth drivers.

A related literature has focused more specifically on the interaction between autonomous demand, fiscal policy and debt dynamics. Freitas and Christianes (2020) develop a baseline Supermultiplier model for the analysis of fiscal policy and government debt, studying how both the growth rate and the composition of autonomous demand affect the government deficit and debt ratios. Morlin (2022), in an open-economy setting driven by government expenditure and exports, extends this concern to the financial sustainability of different autonomous growth drivers. In his model, the sustainability of the growth process depends on the dynamics of both public and external debt, while domestic autonomous expenditure can play a role in alleviating the external constraint. These contributions indicate that not only the overall growth rate of autonomous demand, but also its composition, may have important implications for the evolution and sustainability of the financial stocks supporting demand-led growth.

The contribution most closely related to the present paper is Pedrosa et al. (2023), who develop a stock-flow consistent Supermultiplier model with two debt-financed sources of autonomous demand: government expenditure and household consumption. Their analysis explicitly examines the effects of the growth and composition of autonomous demand on the indebtedness of households, firms and the government. In particular, they show that the model may generate financially unstable configurations and that government expenditure can contribute to stabilising household indebtedness. Their contribution therefore establishes an important connection between the composition of autonomous demand and the joint dynamics of public and private debt.

The present paper builds on this literature but addresses a different question. We investigate the implications of allowing government expenditure and autonomous credit-financed consumption to grow at different rates, with particular attention to the case in which government expenditure grows more slowly as a consequence of austerity policies. The model is therefore set within a debt-led growth framework

and examines how different growth patterns of the two autonomous components interact with income distribution and debt dynamics. By explicitly distinguishing workers and capitalists and modelling workers' autonomous consumption as credit-financed, the analysis traces how slower growth in government expenditure interacts with household borrowing, debt-service payments and the distribution of income, and how these mechanisms affect the evolution of both private and public debt.

3 The Model

3.1 Setup

Consider a closed economy populated by two classes: workers and capitalists. Output Y is determined by aggregate demand. The goods market equilibrium condition is:

$$Y_t = C_t^k + C_t^w + I_t + G_t \quad (1)$$

where C_t^k denotes capitalist consumption, C_t^w workers' consumption, I_t investment and G_t government expenditure.

Investment is induced:

$$I_t = h_t Y_t \quad (2)$$

The propensity to invest h_t follows a flexible accelerator mechanism (Freitas and Serrano, 2015), adjusting in response to deviations of the actual rate of capacity utilization μ_t from its normal level μ_n .

$$\dot{h}_t = h_t \gamma (\mu_t - \mu_n) \quad (3)$$

3.2 Financial sector and consumption Functions

The financial sector is highly stylized: it consists of a banking system owned by the capitalist class, whose sole function is to extend loans to workers. Consistent with the endogenous credit money approach (Lavoie, 2003), banks accommodate credit

demand based on creditworthiness criteria, and are not constrained by deposits. As a consequence, capitalists' consumption decisions are entirely independent of their lending activity: since credit is created **ex nihilo** when a loan is granted, lending does not reduce the resources available to capitalists.

We denote by D_t the stock of private debt accumulated by workers, by r the interest rate on loans (assumed constant), and by φ the rate of principal repayment.

Capitalists consume a fraction c^k of their disposable income, which consists of profit income net of taxes plus financial income from lending:

$$C_t^k = c^k [(1 - t)\pi Y_t + rD_t] \quad (4)$$

where π is the profit share, t the tax rate - which is uniform across classes - and rD_t the interest income earned on the stock of workers' debt. This last term is a distributive channel: private indebtedness generates financial income for the capitalist class at the expense of workers' net disposable income.

Workers consume a fraction c^w of their after-tax wage income, net of debt service payments, plus credit-financed consumption:

$$C_t^w = c^w [(1 - t)\omega Y_t - (r + \varphi)D_t] + CR_t \quad (5)$$

where ω is the wage share, and $(r + \varphi)D_t$ is the total debt service, comprising both interest payments and principal repayment. CR_t denotes credit-financed consumption, i.e. the additional consumption enabled by new borrowing in period t .

We assume $c^w > c^k$, consistently with the Post-Keynesian tradition (Kaldor, 1955): workers have a higher marginal propensity to consume than capitalists.

3.3 The demand for Credit function

Total demand for credit by workers is given by:

$$CR_t = CR_t^a - \chi G_t \quad (6)$$

where CR_t^a is the autonomous component of credit demand, growing at an ex-

ogenous rate g^{CR^a} , and $-\chi G_t$ captures the substitution effect between public expenditure and private credit demand by the working class. When G_t is sufficiently high, workers can rely more heavily on publicly provided goods and services to sustain their consumption standards, reducing their need to borrow. When G_t falls, workers compensate for the resulting shortfall in publicly provided consumption by increasing their demand for private credit. The parameter $0 < \chi < 1$ measures the degree of this substitutability.

It is important to distinguish between CR_t^a and total credit demand CR_t . The former should be interpreted as an underlying or baseline demand for credit-financed consumption, driven by structural factors that are taken as autonomous with respect to current income and government expenditure, such as consumption norms, credit-market conditions, and households' access to finance. It is therefore not intended to represent a separately observable flow of borrowing, but rather the autonomous component underlying households' demand for credit.

Actual credit demand is obtained once the role of public provision is taken into account. Insofar as government expenditure provides goods and services that would otherwise have to be privately financed, it reduces the portion of this underlying demand that translates into household borrowing. In this sense, CR_t^a represents the baseline credit demand prior to the offsetting effect of public provision, whereas CR_t is the effective flow of new household borrowing.

CR_t^a and G_t are the two autonomous components of aggregate demand, in the sense that neither depends on current income nor on firms' production decisions. However, total credit demand is not itself autonomous, since it responds negatively to government expenditure. Thus, while CR_t^a evolves independently of G_t , a change in government expenditure induces an opposite change in total credit demand:

$$\Delta CR_t = \Delta CR_t^a - \chi \Delta G_t. \quad (7)$$

Assuming that the autonomous component of credit demand grows at a constant rate, the substitution mechanism implies that, for a given growth path of CR_t^a , a reduction in G_t increases total credit demand, and vice versa.

3.4 Goods Market Equilibrium

Substituting equations (2), (4), and (5) into (1):

$$Y_t = h_t Y_t + c^k [(1-t)\pi Y_t + r D_t] + c^w [(1-t)\omega Y_t - (r + \varphi) D_t] + C R_t^a - \chi G_t + G_t \quad (8)$$

Collecting all terms in Y_t on the left-hand side:

$$Y_t [1 - h_t - (1-t)(c^k \pi + c^w \omega)] = (1 - \chi) G_t + C R_t^a + \Lambda_t \quad (9)$$

where we define

$$\lambda \equiv c^k r - c^w (r + \varphi), \quad (10)$$

and

$$\Lambda_t \equiv \lambda D_t. \quad (11)$$

The parameter λ captures the net effect of one unit of workers' debt on aggregate demand, while Λ_t captures the corresponding aggregate effect of the outstanding debt stock at time t . Specifically, Λ_t reflects the difference between two opposing forces: the positive effect of capitalists' consumption out of interest income, $c^k r D_t$, and the negative effect of workers' debt service burden, $c^w (r + \varphi) D_t$.

Since $c^w > c^k$, $r > 0$, and $\varphi > 0$, we have

$$\lambda = r(c^k - c^w) - c^w \varphi < 0. \quad (12)$$

Therefore, for $D_t > 0$,

$$\Lambda_t = \lambda D_t < 0. \quad (13)$$

This implies that the contractionary effect of workers' debt service on consumption exceeds the expansionary effect generated by capitalists' consumption out of interest income.

This is a first hint of the distributional dimension that the model aims to for-

malize: in a credit-led growth regime, a continuous process of income redistribution from workers to capitalists is embedded in the dynamics of credit expansion ¹ This distributional shift also affects the level of output.

We define the aggregate marginal propensity to save as:

$$s_t \equiv 1 - h_t - (1 - t) (c^k \pi + c^w \omega) \quad (14)$$

The equilibrium level of output is then:

$$Y_t = \frac{(1 - \chi)G_t + CR_t^a + \Lambda_t}{s_t} \quad (15)$$

Output is determined by the multiplier $1/s_t$ applied to autonomous demand, which consists of: the portion of government expenditure not offset by the reduction in credit demand, $(1 - \chi)G_t$; the autonomous component of credit demand, CR_t^a ; and the net distributive effect of the debt stock, Λ_t .

Both G_t and CR_t^a grow over time. In the present analysis, we do not impose or investigate the fully adjusted long-run equilibrium. Rather, we conduct a medium-run analysis, focusing on out-of-equilibrium dynamics that are relevant for understanding the behaviour of actual economies, which are continuously evolving rather than permanently located on a fully adjusted growth path.

We therefore do not impose a specific long-run relationship between g^G and g^{CR^a} . Instead, we explicitly investigate the out-of-equilibrium dynamics associated with the three possible configurations, examining how private and public debt evolve in each scenario.

- $g^G > g^{CR^a}$
- $g^G < g^{CR^a}$
- $g^G = g^{CR^a}$

¹We assume that credit demand is generated exclusively by workers, while capitalists are assumed not to borrow. Although the literature also documents credit demand among high-income households, we abstract from this dimension in order to isolate the specific mechanism through which workers' credit-financed consumption responds to changes in public expenditure.

3.5 Private Debt Dynamics

The stock of private debt evolves according to new credit-financed consumption net of principal repayments:

$$\dot{D}_t = CR_t - \varphi D_t = CR_t^a - \chi G_t - \varphi D_t, \quad (16)$$

where CR_t^a denotes the autonomous component of household credit demand, while total credit demand is given by

$$CR_t = CR_t^a - \chi G_t, \quad 0 < \chi < 1. \quad (17)$$

As discussed above, CR_t^a represents the underlying component of credit-financed consumption that evolves autonomously with respect to current income and government expenditure, whereas CR_t is the effective flow of new household borrowing once the substitutive role of public provision is taken into account. The autonomous component is assumed to grow at the constant exogenous rate g^{CR^a} .

Government expenditure therefore affects private indebtedness directly through the substitution mechanism. By providing goods and services that would otherwise have to be privately financed, higher public expenditure reduces households' reliance on private credit. Conversely, fiscal retrenchment increases total credit demand for any given level of CR_t^a .

3.5.1 Growth and composition of autonomous demand

Recall from the goods-market equilibrium that total autonomous demand is defined as

$$Z_t \equiv (1 - \chi)G_t + CR_t^a, \quad (18)$$

so that output is given by

$$Y_t = \frac{Z_t + \lambda D_t}{s_t}, \quad (19)$$

where λ captures the net effect of private indebtedness on aggregate demand.

The growth rate of autonomous demand is

$$g_t^Z = \frac{(1 - \chi)G_t}{Z_t} g^G + \frac{CR_t^a}{Z_t} g^{CR^a}. \quad (20)$$

Define the share of autonomous credit in total autonomous demand as

$$\alpha_t \equiv \frac{CR_t^a}{Z_t}. \quad (21)$$

Since

$$\frac{(1 - \chi)G_t}{Z_t} = 1 - \alpha_t, \quad (22)$$

the growth rate of autonomous demand can be written as

$$g_t^Z = (1 - \alpha_t)g^G + \alpha_t g^{CR^a}. \quad (23)$$

Thus, g_t^Z is a weighted average of the growth rates of its two autonomous components. The composition of autonomous demand evolves according to

$$\frac{\dot{\alpha}_t}{\alpha_t} = (1 - \alpha_t) (g^{CR^a} - g^G). \quad (24)$$

Hence, when $g^{CR^a} > g^G$, autonomous credit progressively increases its weight in autonomous demand; when $g^{CR^a} < g^G$, its relative weight declines; and when $g^{CR^a} = g^G$, the composition of autonomous demand remains constant.

It is important to distinguish the growth of autonomous demand from the growth of total output. Since the stock of private debt itself affects aggregate demand, output growth is not in general given simply by the weighted growth rate of G_t and CR_t^a . Taking the growth rate of the goods-market equilibrium condition gives

$$g_t^Y = g_t^Z + \frac{\lambda D_t}{Z_t + \lambda D_t} (g_t^D - g_t^Z) + \frac{\dot{h}_t}{s_t}. \quad (25)$$

Output growth therefore reflects three distinct forces: the growth of autonomous

demand, the feedback generated by the accumulation of private debt, and the adjustment of induced investment.

3.5.2 The growth rate of private debt

The dynamics of the stock of private debt can also be expressed in terms of its growth rate. From

$$\dot{D}_t = CR_t - \varphi D_t, \quad (26)$$

we obtain

$$g_t^D \equiv \frac{\dot{D}_t}{D_t} = \frac{CR_t}{D_t} - \varphi. \quad (27)$$

Following Pariboni (2016), the growth rate of the debt stock adjusts endogenously to the growth rate of the credit flow. Differentiating the previous expression yields

$$\dot{g}_t^D = (g_t^D + \varphi) (g_t^{CR} - g_t^D). \quad (28)$$

Provided that total credit demand is positive, $CR_t > 0$, we have $g_t^D + \varphi > 0$. Hence,

$$g_t^D < g_t^{CR} \quad \Rightarrow \quad \dot{g}_t^D > 0, \quad (29)$$

while

$$g_t^D > g_t^{CR} \quad \Rightarrow \quad \dot{g}_t^D < 0. \quad (30)$$

Thus, the growth rate of the debt stock tends to adjust towards the growth rate of total credit demand. This mechanism parallels the one identified by Pariboni (2016) for debt-financed autonomous consumption, while in the present model the relevant credit flow is endogenously affected by government expenditure.

3.5.3 The private debt-to-income ratio

Since the sustainability of private indebtedness depends on the evolution of debt relative to income rather than on the debt stock alone, define

$$d_t \equiv \frac{D_t}{Y_t}. \quad (31)$$

Its dynamics are given by

$$\dot{d}_t = \frac{\dot{D}_t}{Y_t} - d_t g_t^Y, \quad (32)$$

and therefore

$$\dot{d}_t = \frac{CR_t}{Y_t} - (\varphi + g_t^Y)d_t. \quad (33)$$

To express credit demand relative to output, define

$$q_t \equiv \frac{CR_t}{Z_t}. \quad (34)$$

Using the definitions of CR_t , Z_t , and α_t , we obtain

$$q_t = \frac{\alpha_t - \chi}{1 - \chi}. \quad (35)$$

Provided that $CR_t > 0$, we have $q_t > 0$, which requires $\alpha_t > \chi$.

From the goods-market equilibrium,

$$\frac{Z_t}{Y_t} = s_t - \lambda d_t, \quad (36)$$

and therefore

$$\frac{CR_t}{Y_t} = q_t(s_t - \lambda d_t). \quad (37)$$

The debt-ratio dynamics can thus be written as

$$\dot{d}_t = q_t(s_t - \lambda d_t) - (\varphi + g_t^Y)d_t. \quad (38)$$

3.5.4 Partial stability analysis

We now investigate the stability of the private debt-to-income ratio generated by the interaction between autonomous demand and private indebtedness. To isolate this mechanism, we abstract from the adjustment of induced investment and impose

$$\dot{h}_t = 0. \quad (39)$$

Since $\dot{s}_t = -\dot{h}_t$, this implies

$$s_t = s. \quad (40)$$

The following results should therefore be interpreted as a partial stability analysis, conditional on a constant investment propensity.

Under this assumption, output growth becomes

$$g_t^Y = g_t^Z + \frac{\lambda d_t}{s} (g_t^D - g_t^Z). \quad (41)$$

From the private debt accumulation equation,

$$g_t^D = \frac{CR_t}{D_t} - \varphi = \frac{q_t(s - \lambda d_t)}{d_t} - \varphi. \quad (42)$$

Substituting this expression into the output-growth equation and then into the dynamics of the debt ratio yields

$$\boxed{\dot{d}_t = \frac{s - \lambda d_t}{s} [q_t s - d_t (\varphi + g_t^Z + q_t \lambda)]}. \quad (43)$$

This equation constitutes the core of the private-debt stability analysis. The evolution of the debt-to-income ratio depends on the growth and composition of autonomous demand, the rate of principal repayment, and the effect of accumulated private debt on aggregate demand captured by λ .

3.5.5 The case $g^{CR^a} > g^G$

Consider first the case in which autonomous credit demand grows faster than government expenditure:

$$g^{CR^a} > g^G. \quad (44)$$

The share of autonomous credit in total autonomous demand then increases over time. Asymptotically,

$$\alpha_t \rightarrow 1, \quad q_t \rightarrow 1, \quad g_t^Z \rightarrow g^{CR^a}. \quad (45)$$

The debt-ratio dynamics therefore converge to

$$\dot{d}_t = \frac{s - \lambda d_t}{s} [s - d_t (\varphi + g^{CR^a} + \lambda)]. \quad (46)$$

Define

$$K \equiv \varphi + g^{CR^a} + \lambda. \quad (47)$$

If

$$K > 0, \quad (48)$$

the asymptotic system admits the positive stationary debt ratio

$$d^* = \frac{s}{K}. \quad (49)$$

Under the economically relevant condition $\lambda < 0$ and assuming $s > 0$,

$$\frac{s - \lambda d_t}{s} > 0 \quad (50)$$

for all positive values of d_t . The sign of $\dot{d}_t$ is therefore determined by $s - Kd_t$. Hence,

$$d_t < d^* \Rightarrow \dot{d}_t > 0, \quad (51)$$

whereas

$$d_t > d^* \Rightarrow \dot{d}_t < 0. \quad (52)$$

The stationary debt ratio is therefore stable within the economically relevant positive domain.

In the knife-edge case

$$K = 0, \quad (53)$$

no finite positive stationary debt ratio exists. The debt dynamics reduce to

$$\dot{d}_t = s - \lambda d_t. \quad (54)$$

Since $\lambda < 0$, it follows that

$$\dot{d}_t > 0 \quad (55)$$

for all $d_t > 0$, and the debt-to-income ratio grows without bound. The resulting divergence is exponential.

A stronger form of instability arises when

$$K < 0, \quad (56)$$

or equivalently,

$$\varphi + g^{CR^a} + \lambda < 0. \quad (57)$$

Since $\lambda < 0$, this condition implies that the contractionary effect of private indebtedness on aggregate demand is sufficiently strong to more than offset the stabilising effects associated with principal repayment and autonomous-demand growth. In this case,

$$\dot{d}_t > 0 \quad (58)$$

for all positive values of the debt ratio. For sufficiently large d_t ,

$$\dot{d}_t \sim \frac{|\lambda||K|}{s} d_t^2, \quad (59)$$

so that the mathematical system displays explosive debt-ratio dynamics. This divergence should be interpreted as the economy entering an unsustainable private-debt regime rather than as a literal prediction of an infinite debt ratio.

These results also clarify the role of the negative debt feedback captured by λ . A negative value of λ does not by itself imply an unstable debt ratio. A finite and stable stationary ratio exists as long as the contractionary effect of private debt is more than offset by principal repayment and autonomous-demand growth:

$$\varphi + g^{CRa} + \lambda > 0. \quad (60)$$

At the boundary,

$$\varphi + g^{CRa} + \lambda = 0, \quad (61)$$

the debt ratio grows without bound but does so exponentially. When instead

$$\varphi + g^{CRa} + \lambda < 0, \quad (62)$$

the negative debt feedback dominates the two stabilising forces and the system displays the stronger explosive dynamics described above.

3.6 Public Debt Dynamics

The stock of public debt evolves according to the government budget constraint. The government collects taxes at rate t on total income and spends G_t , while the deficit is financed by issuing debt at the interest rate r^G :

$$\dot{B}_t = G_t - tY_t + r^G B_t. \quad (63)$$

For simplicity, at this stage we assume that the central bank absorbs the issuance of public debt, so that the government can finance its deficit without facing a binding constraint on the demand for government bonds. Public debt is treated as a perpetual roll-over: the government does not repay the principal, but continuously rolls over the outstanding stock of debt and pays only the interest on it.

We work with the public debt-to-income ratio $b_t \equiv B_t/Y_t$. Taking the time derivative gives:

$$\dot{b}_t = \frac{\dot{B}_t}{Y_t} - b_t g_t^Y, \quad (64)$$

and therefore:

$$\dot{b}_t = z_t - t - (g_t^Y - r^G)b_t, \quad z_t \equiv \frac{G_t}{Y_t}. \quad (65)$$

The dynamics of public debt are therefore determined by the relationship between output growth, the interest rate on public debt, and the fiscal balance. Both autonomous components of demand affect public debt indirectly through their effect on output and hence on tax revenues:

$$G_t, CR_t^a \Rightarrow Y_t \Rightarrow T_t = tY_t. \quad (66)$$

Thus, faster growth of either autonomous component increases the tax base and, other things equal, supports public debt sustainability².

The sustainability condition for public debt is given by the standard Domar stability condition (Domar, 1944). In particular, a stable public debt-to-income ratio requires output growth to exceed the interest rate on public debt:

²Under the current tax structure, the relative growth rates of G_t and CR_t^a do not generate an additional direct fiscal channel: their effects on public debt operate through output growth and the resulting tax revenues.

$$\boxed{g^Y > r^G}. \quad (67)$$

If instead $g^Y \leq r^G$, the interest burden on public debt grows at least as fast as output, preventing the debt-to-income ratio from converging to a stable value under the current fiscal structure.

Since output growth is determined by the relative dynamics of the two autonomous components, both G_t and CR_t^a contribute to the growth rate relevant for public debt sustainability.

3.7 Joint Debt Stability and the Policy Trade-off

The previous analysis shows that the sustainability of public and private indebtedness is governed by distinct, although interdependent, mechanisms. Government expenditure and autonomous credit demand jointly determine the composition and growth of autonomous demand, thereby affecting output growth and the evolution of both debt-to-income ratios. However, the conditions ensuring the stability of public and private debt do not necessarily coincide.

For private debt, the analysis above shows that a shift in the composition of autonomous demand towards credit-financed expenditure does not by itself imply instability. In the case $g^{CR^a} > g^G$, autonomous credit progressively gains weight in total autonomous demand, so that asymptotically

$$\alpha_t \rightarrow 1, \quad q_t \rightarrow 1, \quad g_t^Z \rightarrow g^{CR^a}. \quad (68)$$

The private debt ratio admits a finite and stable stationary value as long as

$$\varphi + g^{CR^a} + \lambda > 0. \quad (69)$$

By contrast, no finite stable stationary debt ratio exists when

$$\varphi + g^{CR^a} + \lambda \leq 0. \quad (70)$$

At the boundary $K = 0$, the debt ratio grows without bound, while $K < 0$ generates the stronger explosive dynamics described above. Thus, greater reliance on credit-financed autonomous demand increases the relevance of the private-debt feedback mechanism, but does not necessarily make the debt ratio unstable. Private debt fails to stabilise only when the contractionary effect of accumulated debt is sufficiently strong to offset or dominate the stabilising effects of principal repayment and autonomous-demand growth.

Public debt sustainability is instead governed by the interaction between the fiscal balance and the relationship between output growth and the interest rate on public debt. Consequently, a fiscal path that is compatible with public debt stability need not simultaneously ensure the stability of private indebtedness.

This creates the possibility of a policy trade-off. Fiscal retrenchment may reduce the relative contribution of government expenditure to autonomous demand while increasing households' reliance on private credit through the substitution mechanism. Whether this shift results in private debt instability depends on the strength of the debt feedback captured by λ . Hence, fiscal consolidation does not necessarily eliminate financial fragility: under specific conditions, it may alter its sectoral distribution.

The case $g^G = g^{CR^a}$ provides a useful benchmark in which the composition of autonomous demand remains constant. This condition alone, however, is not sufficient to guarantee the stability of either debt ratio, which continues to depend on their respective stability conditions.

Finally, the case $g^G > g^{CR^a}$ requires some qualification. Under the linear specification

$$CR_t = CR_t^a - \chi G_t, \quad (71)$$

a permanently higher growth rate of government expenditure would eventually imply negative total credit demand. This configuration should therefore be interpreted as a transitional case unless an explicit non-negativity constraint on credit demand is introduced.

The interaction between the two stability conditions allows us to distinguish three analytically relevant regions. Focusing on the case in which autonomous credit demand grows faster than government expenditure, $g^{CRa} > g^G$, the private-debt stability condition is

$$K \equiv \varphi + g^{CRa} + \lambda > 0, \quad (72)$$

while public-debt stability is associated with the standard Domar condition

$$g^Y > r^G. \quad (73)$$

The resulting configurations can therefore be summarised as follows:

$$\begin{aligned} \textbf{Region I:} \quad & g^Y > r^G, \quad K > 0 \implies \text{public and private debt can both remain stable,} \\ \textbf{Region II:} \quad & g^Y > r^G, \quad K \leq 0 \implies \text{public debt potentially stable, private debt unstable,} \\ \textbf{Region III:} \quad & g^Y \leq r^G \implies \text{public debt unstable.} \end{aligned} \quad (74)$$

Region II captures the policy trade-off that is central to the paper. A fiscal configuration may remain compatible with public-debt stability while the private debt-to-income ratio fails to converge. Importantly, the shift in the composition of autonomous demand towards credit-financed consumption is not sufficient by itself to generate this outcome. It increases the relevance of the private-debt channel, while instability arises only when the negative demand effect associated with accumulated debt is sufficiently strong relative to principal repayment and autonomous-demand growth.

3.8 Possible Extension: Distributional and Fiscal Feedback

The baseline model highlights a distributional channel associated with the accumulation of private debt. As D_t rises, workers devote a larger share of their disposable income to debt service. Interest payments rD_t accrue to capitalists, while principal

repayments φD_t further reduce the resources available to workers for consumption. Given the different propensities to consume of the two classes, this redistribution contributes to the negative effect of private indebtedness on aggregate demand captured by λ .

A possible extension of the model would introduce differentiated taxation of labour and capital income together with a fiscal policy rule linking government expenditure to fiscal indicators. If capital income is taxed at a lower rate than labour income, a redistribution of income towards capitalists generated by rising private indebtedness could weaken tax revenues relative to a situation in which the same level of demand is supported by labour income or public expenditure. If government expenditure is in turn constrained by public debt or deficit targets, this may generate an additional feedback between private indebtedness and fiscal retrenchment.

The mechanism can be represented schematically as

$$G_t \downarrow \Rightarrow CR_t \uparrow \Rightarrow D_t \uparrow \Rightarrow \text{redistribution towards capital} \Rightarrow T_t \downarrow \Rightarrow B_t \uparrow \Rightarrow G_t \downarrow. \quad (75)$$

Only the first part of this sequence is formalised in the baseline model through the substitution mechanism

$$CR_t = CR_t^a - \chi G_t. \quad (76)$$

The subsequent fiscal feedback would require both differentiated tax rates across income sources and an explicit fiscal policy rule, and is therefore left for future extensions of the model. Nevertheless, it points to a potentially relevant mechanism through which the distributional consequences of private indebtedness could feed back into public finances and reinforce fiscal retrenchment.

This extension may be particularly relevant in credit-financed consumption-led economies, where the expansion of household credit is supported by an institutional configuration favourable to financialisation and private borrowing. Financial liberalisation, easier access to credit, and policies favourable to asset ownership are part

of the institutional environment sustaining this growth model. Fiscal institutions may reinforce the same configuration when income accruing to capital and financial assets is subject to a lower effective tax burden than labour income. In this sense, the distributional consequences of household indebtedness may interact with the institutional features that sustain the debt-led growth model itself.

Introducing differentiated taxation therefore opens an additional channel through which private indebtedness may affect public finances. If labour income is taxed at a higher effective rate than capital income, $t^w > t^k$, the redistribution generated by rising household debt may shift income towards a relatively less taxed source. Other things equal, this would reduce tax revenues relative to a configuration in which the same level of income accrues to workers. The financial transfer associated with household indebtedness would thus have not only a distributive effect, but also a potential fiscal effect.

4 Conclusion

This paper has developed a Sraffian Supermultiplier model to investigate the consequences of fiscal austerity in credit-financed consumption-led economies. The central mechanism introduced in the analysis is a substitution effect between public provision and household borrowing: when government expenditure falls, households partly compensate for the reduction in publicly provided goods and services by increasing their reliance on private credit.

The model shows that government expenditure and autonomous credit-financed consumption jointly determine the growth and composition of autonomous demand. When autonomous credit demand grows faster than government expenditure, credit-financed consumption progressively gains relative importance. This shift, however, does not by itself imply private-debt instability. The stability of the private debt-to-income ratio depends on the interaction between autonomous-demand growth, principal repayment and the contractionary effect of accumulated private debt on aggregate demand.

The latter mechanism gives the model its distributional dimension. Household

indebtedness generates interest payments from workers to capitalists while debt servicing reduces workers' disposable resources. Because workers have a higher propensity to consume, the resulting distributive effect depresses aggregate demand and output. The distributional consequences of private indebtedness therefore feed back into its macroeconomic sustainability.

Public and private financial stability are consequently governed by different conditions. The standard condition supporting public-debt stability does not necessarily ensure the stability of household indebtedness. Fiscal consolidation can therefore increase the relative importance of private borrowing even when public debt indicators improve. The main implication of the analysis is thus not that austerity necessarily produces private-debt instability, but that it may relocate financial fragility towards households and make the stability of the growth process increasingly dependent on private balance sheets.

Several extensions remain open. A complete analysis could restore the endogenous adjustment of induced investment, introduce explicit non-negativity constraints on credit demand, allow for a richer financial sector, and endogenise the interaction between income distribution and fiscal policy. In particular, differentiated taxation and fiscal rules may generate an additional feedback through which the redistribution associated with household indebtedness affects tax revenues and future government expenditure. These extensions would provide a broader framework for assessing the relationship between welfare provision, private indebtedness and the financial sustainability of debt-led growth models.

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