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Multiplier effect, Credit, and Economic Cycle: a neo-Kaleckian model

Marina da Silva Sanches &
Gustavo Pereira Serra

Resumo | Abstract

[redacted]

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Keywords: fiscal multiplier, household debt, social benefits, demand-led growth

JEL: E12, E32, E51, E62

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Multiplier effect, Credit, and Economic Cycle: a neo-Kaleckian model

Marina da Silva Sanches[1] & Gustavo Pereira Serra[2]

Abstract

Considering the cumulative evidence indicating a stronger multiplier effect of social benefits, such as pensions, during the 2015-2016 crisis in Brazil, and noting that the consigned credit granted to retired workers exhibited significantly smaller fluctuations compared to that extended to active workers, some studies argue that social benefits served as a stabilizing force for income during the crisis. Building upon this finding, we develop a neo-Kaleckian theoretical framework to delve into the circumstances under which the multiplier effect is augmented during economic downturns. Our model incorporates two classes and household borrowing. We find that the countercyclical nature of both credit supply and demand contributes to a more pronounced countercyclical multiplier effect (for both transfer and autonomous government multiplier). Furthermore, we discuss some conditions under which the multiplier effect of social benefits is higher than that for autonomous expenditure, aligning with findings from the empirical literature. In essence, our model formalizes the notion that social benefits, when combined with credit mechanisms, constitute a significant element in income stabilization during economic contractions.

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1 Introduction

Econometric research examining the effects of fiscal shocks on economic output has underscored the likelihood of fiscal multipliers being contingent on the state of the economy. Studies employing non-linear econometric techniques to test this hypothesis have indicated that the fiscal multiplier, which reflects the influence of fiscal policy on economic output, is intricately linked to the economic cycle: it tends to be more pronounced during periods of recession (Auerbach and Gorodnichenko (2012); Fazzari et al.(2015); Riera-Crichton et al. (2015); Baum et al. (2012)).

Typically, these studies concentrate on OECD countries. For Brazil, Sanches and Carvalho (2022), examining the impact of the 2015-2016 crisis on fiscal multipliers using data from 1997 to 2018, discovered a higher multiplier effect in the sample 1997-2018 compared to the pre-crisis period (up to 2014) for two expenditure categories: social benefits and public investments. Orair et al. (2016) found similar results using data for 2002-2016 and a non-linear econometric approach. The authors highlight the higher multiplier effect during economic recessions of three types of expenditures: social benefits, public investments, and personal spending. Motivated by the results for social spending found by Orair et al. (2016) and Sanches and Carvalho (2022), Sanches and Carvalho (2023) found that social benefits have relatively larger multiplier effects in the sample that considers the 2015-2016 economic crisis, not only in terms of output response to shocks in social expenditure but also in terms of household consumption and private investment responses. The authors considered pensions, unemployment insurance, and conditional cash transfer programs, such as the *Programa Bolsa Família* and the *Benefício de Prestação Continuada*.

A theoretical model to represent the larger multiplier effect of fiscal policy during downturns was developed by Charles et al. (2015). Motivated by the studies for OECD countries mentioned above (such as Auerbach and Gorodnichenko (2012)), the authors build a model in which recessions lead to an increase in the propensity to save of rentiers. Then, they consider the capitalists' propensity to save to be pro-cyclical, which results in a countercyclical fiscal multiplier.

Furthermore, as an alternative, the empirical literature emphasizes the role of capacity constraints in explaining the larger fiscal multipliers during economic recessions (Fazzari et al., 2015). This article, however, proposes an explanation for different multipliers between recession and expansion that does not rely on the discussion of capacity constraints, and for that, we utilize a demand-led theoretical framework as in Charles et al. (2015). Inspired by the literature that finds a higher social expenditure multiplier effect in Brazil during economic downturns (Sanches and Carvalho, 2022; Sanches and Carvalho, 2023; Orair et al., 2016), we build a theoretical model to explain this higher multiplier effect by the stabilizing income effect that social benefits have in the economy. Social benefits, by allowing a higher household borrowing during recessions, play an important role for economic activity. The model explored here proposes a mechanism in which the fiscal multiplier of this type of expense is higher during recessions due to greater access to credit for families receiving social benefits.

The financial inclusion of the base of the pyramid in Brazil, as described by Carvalho and Rugitsky (2015), can be a justification for this indebtedness (from the perspective of banks' willingness to lend, as the risk of default is lower), especially after the institutionalization of consigned credit in 2004. Consigned credit is a type of loan where the installment deduction is made directly from the borrower's paycheck or social security benefit, which reduces the risk of default because the loan collateral is part of the salary or retirement benefit. The risk of default for banks in this modality is very low because the payment of installments is not a decision of the debtor but constitutes a compulsory charge (Brandão, 2019). This increases the willingness to offer credit on the lender's perspective, considering the possibility of reducing interest rates and extending terms.

The consigned credit modality contributed to the general population's democratization of access to credit. According to Carvalho (2018), while the accumulated balance of credit operations represented 25.5% of GDP in January 2002, by December 2012, this number reached 49.2%. Within this total, the balance of the portfolio of individual credit increased by ten percentage points relative to GDP - an increase driven by the modality of operations with free resources (which encompass consumer financing lines) - and, in particular, by consigned credit.

This can be seen in Figure 1, which illustrates the total balance of personal consigned credit

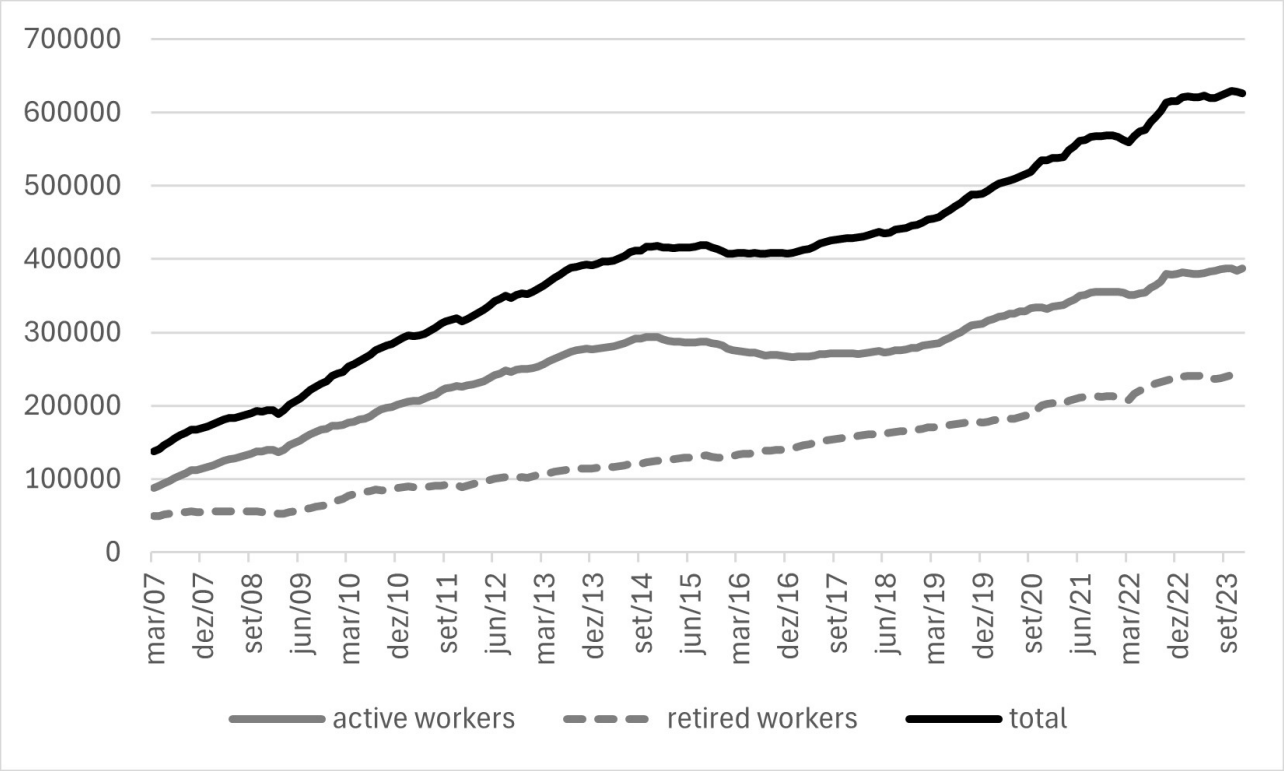

Figure 1: Total balance of personal consigned credit portfolio, in millions of December 2023 Brazilian reais (stock variable)

Source: Authors' elaboration using data from Central Bank of Brazil.

portfolio in millions of Brazilian reais, with monthly data adjusted for inflation by the Extended National Consumer Price Index (IPCA). There is a noticeable upward trend in total consigned credit, dating back to 2004 when it was regulated. There is also an emphasis on the post-2008 crisis period when public banks increased their credit offerings in this modality to prevent a decline in consumption (Brandão, 2019). Additionally, it is evident that during the crisis years, starting from 2014, there was a reversal of the increasing trend in total credit caused by reduced credit issuance for active workers and, to a much lesser extent, for retired workers.

However, the balance of the consigned credit portfolio is a stock variable. The flow variable - concession of consigned credit - is more suitable for reflecting credit supply. It can be seen in Figure 2, also obtained from the Central Bank of Brazil, in millions of Brazilian reais and adjusted for inflation by IPCA, presented in annual frequency. The Figure shows a decrease during the 2015-2016 crisis. However, for the retirees category, there was a certain stability in credit issuance. Despite a significant decline in 2015, as observed in Figure 2, this decrease in credit issuance was smaller than that of the active workers, and its recovery was much faster compared to credit issuance for active workers.

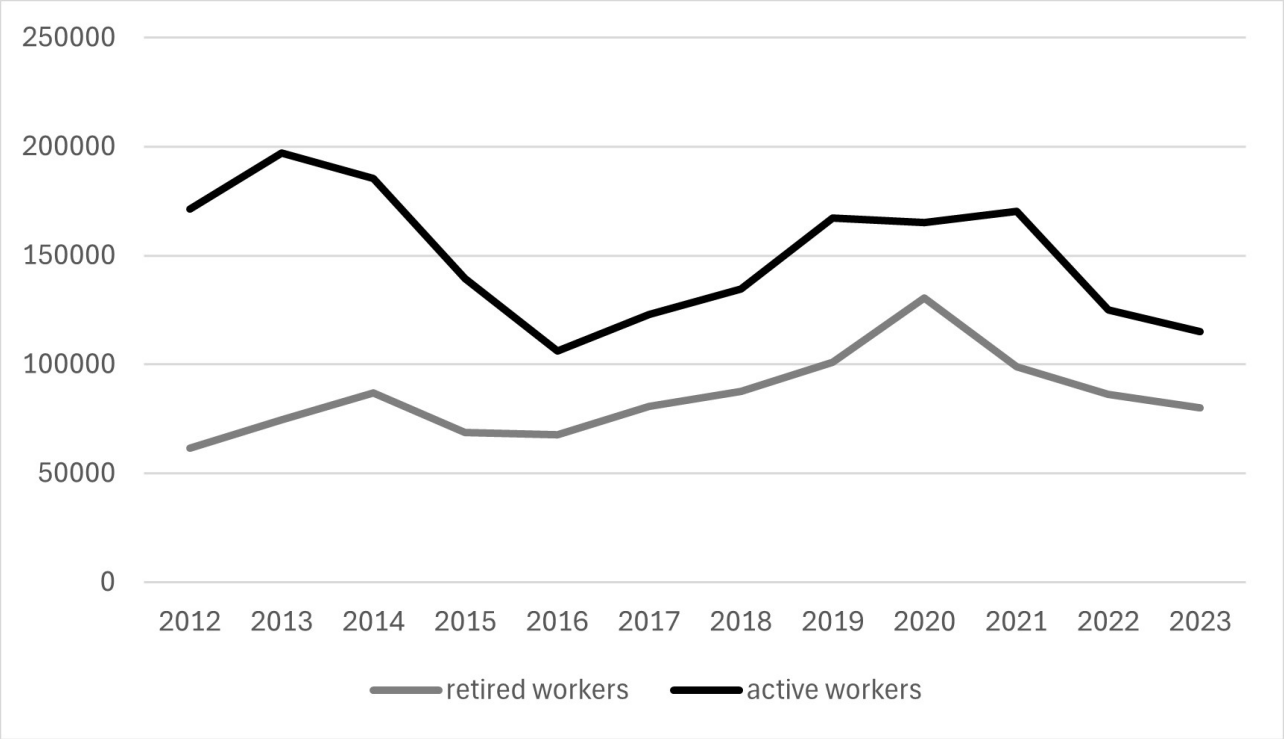

Figure 2: Concession of consigned credit, in millions of December 2023 Brazilian reais (flow variable)

Source: Authors' elaboration using data from Central Bank of Brazil.

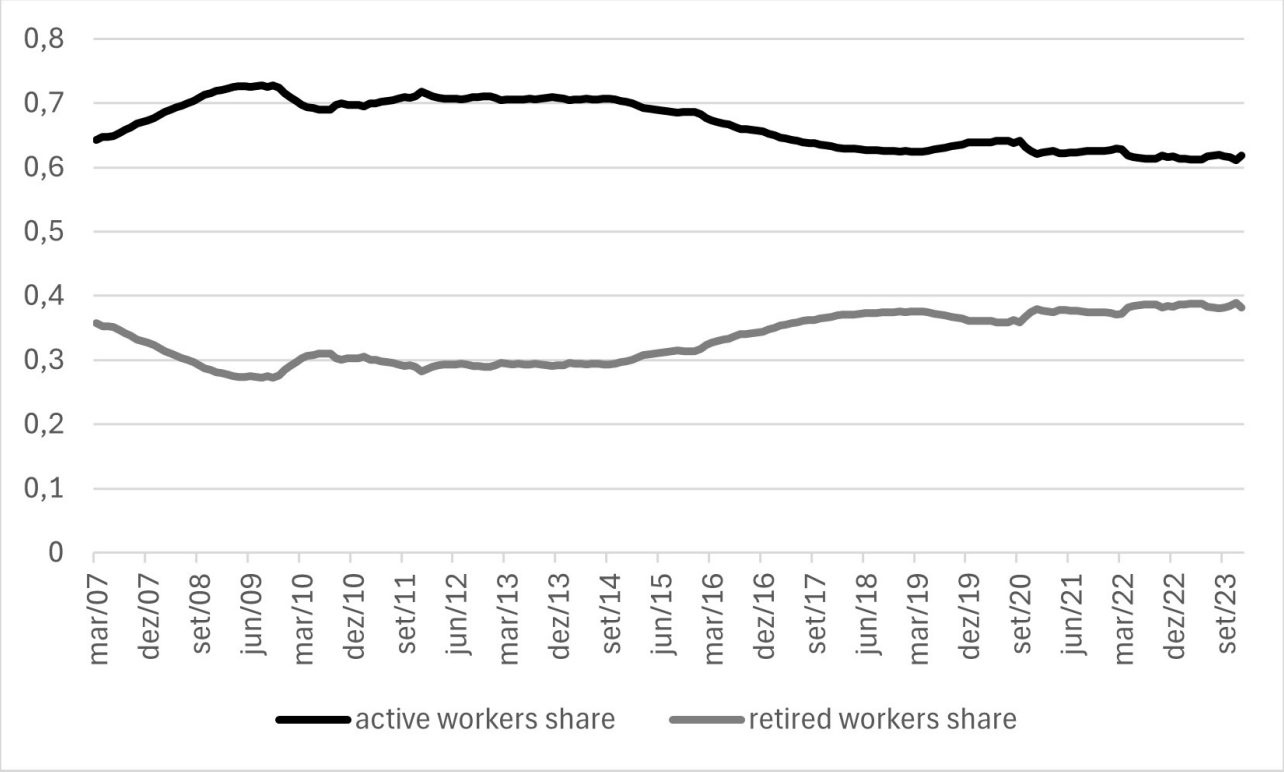

Figure 3: Shares in the total balance of personal consigned credit portfolio

Source: Authors' elaboration using data from Central Bank of Brazil.

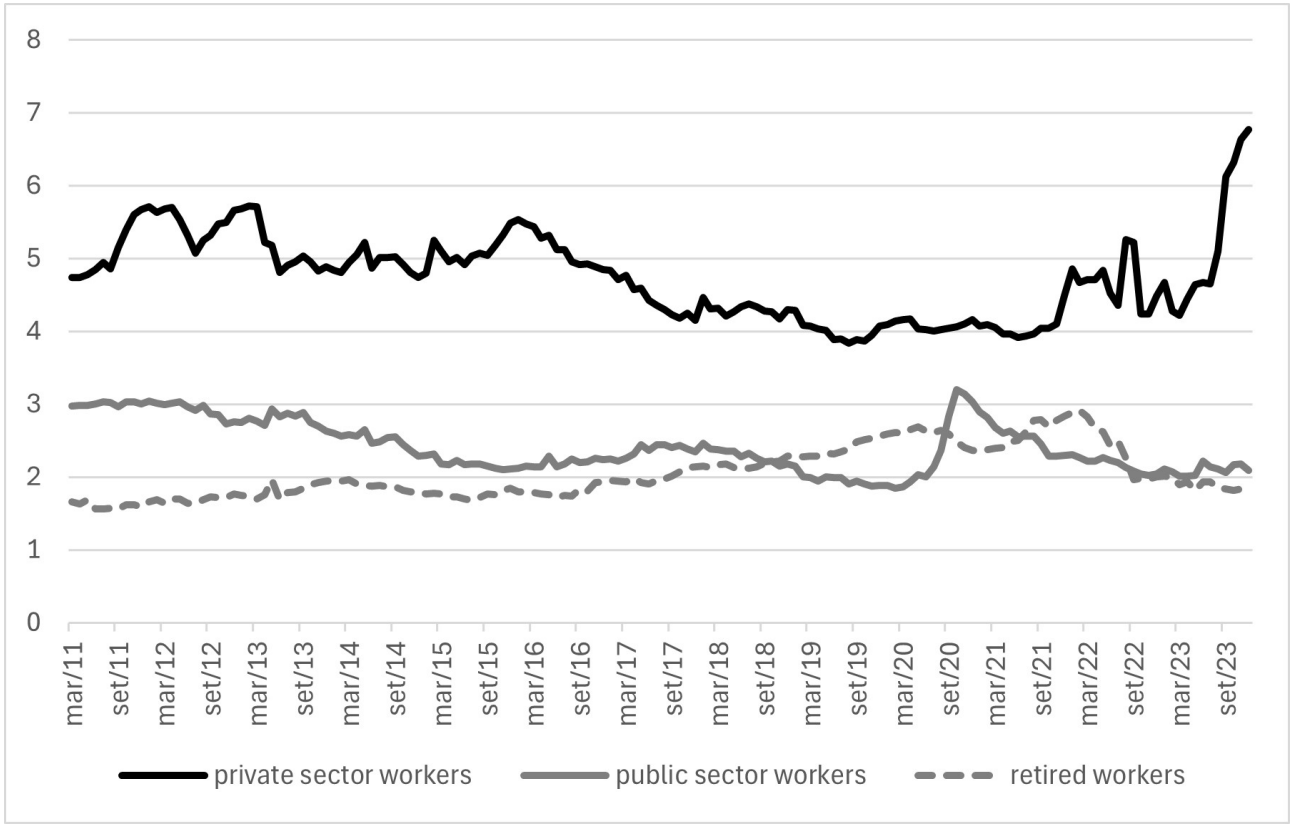

Figure 4: Default rates by category of worker - consigned credit

Source: Authors' elaboration using data from Central Bank of Brazil.

For example, from 2014 to 2015, the concession decreased for active and retired workers by 24.8% and 21%, respectively. From 2015 to 2016, the concession for retired workers showed stability (a small negative variation of 1.47%), while for active workers, it diminished by 23.8%. From 2019 to 2020, the year of the pandemic, the concession for retired workers increased by 29.3%, while for active workers, it showed stability (a small decrease of 1.18%) - although there was a decrease afterward for retired workers. However, as we are considering the empirical evidence brought by Sanches and Carvalho (2023), we focus on the period of the 2015-2016 crisis.

Figure 3 shows the share of each type of worker in the total balance of the personal consigned credit portfolio. It shows that the participation over time of retired workers in the total balance of consigned personal credit remained relatively constant in 2010-2014, and increased during the crisis, especially after 2015. As for active workers, we observe the opposite trend. It is noticeable that until mid-2014, the participation of active workers remained around 70% of the total consigned credit balance, while for inactive workers, this number was around 30%. From

2014 onwards, during the crisis period, the participation of active workers started to decline, reaching almost 60% by the end of 2018, while the share of inactive workers showed a growing trend, reaching almost 40%. A possible explanation is that the retired workers category has the lowest default rate, especially during the years 2015-2016, despite an increase in the last few years (see Figure 4).

Considering the collective evidence of a greater multiplier effect of social benefits, including pensions, during the 2015-2016 crisis (Sanches and Carvalho, 2023), along with the observation that consigned credit concessions for retired workers exhibited much smaller fluctuations compared to those for active workers, it becomes apparent that social benefits played a stabilizing role in income during the crisis period. Building upon this finding, we develop a neo-Kaleckian theoretical model to investigate the conditions under which the multiplier effect amplifies during recessions.

Our model incorporates two classes and household indebtedness. We find that the countercyclical nature of both credit supply and demand contributes to a more countercyclical multiplier effect - for both transfer and autonomous government multipliers. We also find both multipliers to be positive, consistent with the empirical literature. In addition, we note that while credit can positively impact the multiplier effect in downturns, there is a limit to its effectiveness since the debt stock contributes to reducing the transfer multiplier. However, it does not affect the autonomous government multiplier. Our model formalizes the evidence that social benefits, when combined with credit mechanisms, constitute a significant element in income stabilization during economic contractions. The remainder of this paper is organized as follows: Section 2 reviews the theoretical neo-Kaleckian literature, while Section 3 presents the model and its implications. Finally, Section 4 concludes the paper.

2 Related Literature

Neo-Kaleckian models have been extensively developed in the literature during the 1980s and 1990s, serving as the primary theoretical framework for demand-led models. Their structure allows for the assessment of the impacts of functional income distribution on effective demand

and, consequently, on economic growth, within a context of idle capacity and imperfect competition. Given our context, where the multiplier of social benefits is higher during crises, we will apply a model focusing on a situation of excess idle capacity where income distribution among classes plays a significant role in economic growth.

The models that incorporate firm debt are more numerous than those that explore household debt (Charpe et al., 2012). However, after the 2008 Crisis, several models emerged that focused on the role of household debt. One of the main models in this respect, predating the 2008 Crisis, is Dutt's (2006), which provides a Steindlian model in which the consumption function of the working class depends on disposable income net of debt service, plus a consumer credit element represented by the change in the debt stock each period. This variation, in turn, represents how much credit workers take and fundamentally depends on a parameter that can be interpreted as the willingness of banks to offer credit. This parameter can also be seen from the demand side as how much workers desire to consume beyond their labor income. The change in the debt stock also depends on the disposable income. The capitalist's disposable income thus incorporates the transfer of income from the working class to the capitalist class through the flow of interest payments. In this model, an increase in the credit supply/demand parameter has a positive impact on the degree of utilization of installed capacity in the short run by enhancing consumption. However, in the longer term, the overall impact of credit on aggregate demand is ambiguous, given the contractionary effect of income transfer to the class with a higher propensity to save, which provides credit to workers, depressing aggregate consumption (Dutt, 2006).

Similar conclusions have been found in the literature, which has extensively explored this ambiguous nature of household credit. Hein (2011), for example, emphasizes that capitalists constitute a financial class, lending to workers, and are productive because they are responsible for the production of firms. On the other hand, Duman (2013) starts from a similar idea and emphasizes that the credit supply/demand parameter is a function of the bank spread on the supply side and the home ownership rate on the demand side. In Marsellou (2011) and Isaac and Kim (2013), both households and firms incur debt. Palley (2010) proposes a model of household indebtedness that endogenizes income distribution, while Pariboni (2016) suggests that the consumption pattern financed by credit is autonomous and not income-induced. Serra

(2023) and Carvalho et al. (2024) discuss the long-term implications for economic growth of households borrowing to finance human capital accumulation. Also, some authors discuss the issue of borrowing through the lens of conspicuous consumption, where workers incur debt due to the desire to emulate the consumption patterns of capitalists (Kapeller and Schütz, 2015; Setterfield and Kim, 2016; Kim et al., 2014). In general, all these authors highlight that an increase in household borrowing, on the one hand, stimulates aggregate demand and raises consumption; on the other hand, the allocation of interest to capitalists, who have a lower propensity to consume, reduces aggregate demand, leading to possible long-term instability.

The household indebtedness models mentioned in this section consider that debt-financed consumption depends on disposable income, as in Dutt (2006), and consequently on output. However, this dependence is governed by an exogenous parameter, which has a dual interpretation: it can be seen from the perspective of banks' willingness to offer credit and from the perspective of workers' willingness to take credit to consume beyond their labor income. What we propose here is to distinguish between the supply and demand functions. Specifically, our model will incorporate the idea that both credit demand and credit supply are influenced by the economic cycle, as outlined in the empirical motivation (Section 1). This adjustment will, in turn, yield significant implications for the multiplier effect, as we explain in the next section.

3 Model

The starting point is a class structure comprising worker households and capitalist households. In the literature, the division between capitalists and workers is justified by the difference between such classes in the propensities to consume. Additionally, while one class borrows, the other lends and receives interest payments on the debt (Charpe et al, 2012; Palley, 1994; Setterfield and Kim, 2016). This dynamic creates purchasing power to worker households, while there must be income distribution in the opposite direction as workers accumulate debts and need to pay interest to the creditors, the capitalists (Dutt, 2006).

It is important to note that the literature has extensively explored the issue of the dual nature of credit in the long run, as discussed above. Our intention here is not to construct a

model that highlights this - although the consequences of household indebtedness are highly relevant for long-term economic growth. This is because our specific focus is on the change in the multiplier effect during the recent recession. Since our temporal scope is restricted to the crisis period, we will build a model that only considers the short term, focusing on the multiplier effect issue.

Furthermore, the model presented in this paper does not endogenize the business cycle; instead, we focus solely on the impact of economic conditions on the spending multiplier, rather than explaining the cycle itself. For this reason, we assume that economic fluctuation are caused by changes in the autonomous component of the investment function. This assumption simplifies the analysis of the short-term implication of the business cycle on the multiplier. In the following subsections, we explain the structure of the model.

3.1 Firms

The representative firm of this economy combines capital (K) and labor (L) through a fixed-coefficient technology to produce a homogeneous good (Y) used for consumption, investment, and tax payment.

$$Y = \min\{\nu K, aL\} \tag{1}$$

Moreover, there is no population growth, and the output-to-physical capital (ν) and the output- to-labor (a) coefficients are constant and normalized to one.

The pricing mechanism in this economy is traditionally Kaleckian, where prices are determined by a mark-up over the unit labor cost, which remains constant as long as there is idle capacity (Asimakopoulos, 1975):

$$P = (1 + m)\frac{WL}{Y} \tag{2}$$

Where m is the mark-up, W is the nominal money wage, and P is the price level. Since

the wage share of aggregate income before taxes, transfers, and debt servicing is $\psi = \frac{WL}{PY}$, the *ex-ante* profit share of income (π) can be represented in terms of the mark-up:

$$\pi = \frac{m}{1+m} \tag{3}$$

Therefore, for a constant mark-up, income distribution is exogenously given. The profit rate (r) is:

$$r = \frac{rK}{Y}\frac{Y}{K} = \pi u \tag{4}$$

Where $u = Y/K$ is the capacity utilization of the physical capital stock for $\nu = 1$. The total income of this economy, therefore, is given by the sum of the wage bill and profits:

$$WL + \Pi = Y \tag{5}$$

The investment function, I/K, is the traditional one in the canonical Kaleckian model, which depends on the degree of utilization (with $\gamma_1 > 0$) and an autonomous component that reflects animal spirits (γ_0). This autonomous part of investment can be interpreted as a degree of optimism among entrepreneurs, linked to expectations about the future trend of the growth rate of sales, for example (Lavoie, 2014). In this sense, this parameter is closely related to the phases of the business cycle.

$$g_K = \frac{I_K}{K} = \gamma_0 + \gamma_1 u \tag{6}$$

3.2 Government

In this economy, the government holds a balanced budget, taxing wage and profit income at a constant rate τ and spending all tax revenues as income transfers to worker households. Thus, although taxation is not progressive, as worker and capitalist households pay taxes in

the same proportion of their income, the counterpart of the tax burden compensates it, as worker households receive from the government a net transfer higher than their tax payment. Moreover, even though unbalances in government budget play a significant role in economic dynamics (Kalecki, 2009), for simplicity, we do not consider the possibility of government expenditures surpassing tax revenues, as we focus on short-term economic issues.

Therefore, tax revenue (or, its counterpart, income transfer to worker households) is equal to a constant fraction of aggregate income:

$$T = \tau WL + \tau rK = \tau Y \tag{7}$$

3.3 Worker households

Worker households receive wages and pay taxes on their wage income. However, they receive all tax revenue as income transfer from the government, so that their income after transfers is higher than their labor income. Moreover, they are able to increase their consumption level through borrowing (B) at a constant interest rate i, resulting in debt servicing as counterpart. As is common in Kaleckian models, workers spend all they earn. Thus, worker households' consumption (C_w) equals their net income after taxes, transfers, borrowing, and debt servicing:

$$C_w = [1 - \pi(1 - \tau)]Y - iD + B \tag{8}$$

Where D represents worker households' outstanding debt balance. Moreover, we only consider the case in which worker households' disposable income after taxes and transfers (given by $[1-\pi(1-\tau)]Y$) is greater than the debt service (iD). Notice that this condition is necessary for a positive value for Equation (9), as we describe in the following subsection.

3.4 Borrowing

The credit supply function represents an extension of Dutt (2006), including the endogenization of the parameter reflecting credit supply/demand conditions, which became dependent on the business cycle. First, we consider worker households' desired borrowing level (B^d) as an inverse function of the economic conditions, as given by

$$B^d = b(\gamma_0)\{[1 - \pi(1 - \tau)]Y - iD\} \tag{9}$$

with $b(\gamma_0)' < 0$ representing a countercyclical worker households' propensity to borrow out of their net income after taxes, transfers, and debt servicing. This component is justified by the empirical evidence that the propensity to consume is higher during crises for the class of workers who receive some social benefit, so the multiplier is greater in times of crisis. As argued by Sanches and Carvalho (2023), the effect of social benefits in the sample that includes the crisis is greater, whether in terms of the response of output or, especially, in terms of the response solely of household consumption. An explanation for that variable is that workers aim to smooth their consumption over time, increasing their desired borrowing in the downside of the business cycle.

As in Charpe et al. (2012), banks need to assume a central role in credit rationing, which also depends on the available income of workers (Dutt, 2006). Thus, to also consider credit supply conditions, we assume that commercial banks lend to worker households only a fraction ϕ of their desired borrowing level:

$$\phi = \phi_0\gamma_0 + \phi_1 i + \phi_2(\gamma_0)\frac{T}{[1 - \pi(1 - \tau)]Y} = \phi_0\gamma_0 + \phi_1 i + \phi_2(\gamma_0)\frac{\tau}{[1 - \pi(1 - \tau)]} \tag{10}$$

Thus, the amount of money that worker households are able to borrow in Equation (8), given (9)-(10), is $B = \phi B^d$. Credit is dependent on the economic cycle, just like the available income of active workers. During expansionary periods, banks tend to have higher profits and take more risks, offering more credit (Van den Heuvel, 2002). In this sense, $\phi_0 > 0$ is a procyclical

component of credit supply conditions. Besides, banks increase their willingness to lend when the interest rate (i) rises, as it represents the price of credit, which implies $\phi_1 > 0$. However, since B^d in Equation (9) represents credit demand conditions, notice that a higher interest rate reduces worker households' desire to borrow.

The third term of Equation (10) shows that commercial banks are more willing to lend money the higher the certainty on worker households' net income, with $\phi_2 > 0$. Since worker households receive labor income and government transfers, with the latter being less dependent on the business cycle,[3] we assume that the government transfer-to-total worker households' income is a measure of that certainty level on their revenues. Moreover, following a Minskyan argument that the credit risk perception is reduced in a moment of economic tranquility (Minsky, 1978), that term becomes more (less) relevant to credit supply when economic conditions are less (more) favorable, so that $\partial\phi_2/\partial\gamma_0 < 0$.

This observation is further supported by the data presented in Section 1, which highlights the dynamics of consigned credit concession to retired workers, who receive government transfers, as being comparatively stable throughout economic downturns. In contrast, the provision of such credits to actively employed individuals is significantly impacted by economic contractions. This disparity can be attributed to the more stable nature of retirees' incomes, which are secured through government transfers. Notably, during the 2015-2016 crisis, the default rate among retired workers was the lowest one, underscoring their financial stability. Consequently, it can be inferred that banks exhibit a higher propensity to extend credit to retired workers during economic downturns. Therefore, the parameter ϕ_2 is indicative of the portion of the credit supply that is countercyclical, while ϕ_0 represents the procyclical component. For the class of actively employed workers, banks reduce the credit supply the closer the economy gets to a downturn in activity level, unlike what happens with social transfer beneficiaries.

[3]Although both government tax revenue and aggregate household income are influenced by the economic cycle, we assume that, at the individual level, labor income is perceived as more uncertain than government transfers when commercial banks are making lending decisions.

3.5 Capitalist Households

Capitalist households own both firms and banks, thus receiving two types of income. First, they receive income from distributed profits, which are not reinvested in the firms. The firm's profits are subject to taxation at a rate τ. In addition to income from firm's profits, capitalist households owns banks, earning interest on loans granted to workers. They consume a fraction $(1-s)$ of their net income, while the remaining portion represents their savings. Thus, their consumption behavior is given by:

$$C_p = (1-s)[\pi(1-\tau)Y + iD] \tag{11}$$

Where C_p stands for capitalist households' consumption level.

3.6 Short-term quantity adjustment

The model developed here aims to explain the larger multiplier effect of government transfers with social benefits during the recent recession. Thus, our focus is on the short run, as mentioned earlier. In the long run, credit can become an income transfer mechanism for the capitalist class, such that debt servicing generates stagnationist effects - as Post-Keynesian models typically show. However, this model solely focuses on the larger multiplier effect of fiscal policy that occurs from transfers with social benefits in the context of a decrease in economic activity, and one possible channel through which this occurs is through consumer credit.

In the short run, for a constant capital stock (K), the equilibrium in the goods market is:

$$Y = C_w + C_p + I \tag{12}$$

With aggregate demand determining aggregate output and the level of physical capital capacity utilization as the adjusting variable. Using Equations (6), (8), and (11) into Equation (12) and normalizing it by the physical capital stock result in the short-run equilibrium of

capacity utilization:

$$u^* = \frac{\gamma_0 - [s + \phi(\gamma_0, \tau, i, \pi)b(\gamma_0)]i\delta}{s\pi(1-\tau) - \gamma_1 - \phi(\gamma_0, \tau, i, \pi)b(\gamma_0)[1 - \pi(1-\tau)]} = \frac{\gamma_0 - [s + \phi(\gamma_0, \tau, i, \pi)b(\gamma_0)]i\delta}{\Omega} \quad (13)$$

The Keynesian stability condition requires that the sensitivity of savings to changes in the degree of capacity utilization exceeds the sum of the sensitivities of investment to the same variable (γ_1) and of worker households' borrowing also in relation to u - i.e., that $\Omega = s\pi(1-\tau) - \gamma_1 - \phi(\gamma_0, \tau, i, \pi)b(\gamma_0)[1 - \pi(1-\tau)] > 0$. Thus, it is noteworthy that, although credit has a significant importance in sustaining aggregate demand, providing a higher propensity to consume and stimulating the multiplier effect (as we will see shortly), there is a threshold beyond which increases in credit supply/demand parameters may cause the Keynesian stability condition to become unsustainable.

We present the derivatives of Equation (13) with respect to the parameters in the Appendix. Consistently with the literature, we observe a negative impact of the propensity to save on the capacity utilization rate. Moreover, the debt stock diminishes aggregate demand by reducing the desired borrowing level and channeling income towards the segment with the highest propensity to save (capitalists) through debt servicing. The interest rate affects the aggregate demand ambiguously: similarly to the debt ratio, a higher interest rate reduces the demand for credit and increases the debt service. Nonetheless, a higher interest rate stimulates the credit supply, affecting the aggregate demand positively. Note that the positive (negative) impact depends on the aggregate demand (debt ratio), as it tends to be positive (negative) if u (δ) is high.

Additionally, the derivative of u with respect to the profit share suggests a wage-led economy, given our assumption of a canonical investment function. But besides this reason, note the impact of π on the credit supply is positive ($\phi_\pi > 0$). If the interest rate and/or the stock of debt is high, for example, the impact of π on aggregate demand tends to be more negative, given the mechanism that transfers income to the class that saves. It is noteworthy that the sensitivity of investment to the capacity utilization rate, γ_1, yields a positive impact, implying a favorable effect of the accelerator on demand. Regarding the supply credit and demand credit

(ϕ and b, respectively), their impacts on the capacity utilization rate are positive, since they stimulate consumption and aggregate demand.

In the Appendix, we also derive the capacity utilization rate in relation to the economic cycle parameter γ_0. The condition for the capacity utilization rate to be pro-cyclical is that the economic cycle parameter (or the autonomous investment), combined with the pro-cyclical part of credit supply, is higher than the countercyclical part of the credit supply/demand. Note the elasticity effects are weighted by the household borrowing-to-GDP ratio.

With the exception for the profit share, all the other exercises imply the same signs for the profit rate, since $r^* = \pi u^*$. In the Appendix, we derive the impact of π on r, which is negative. Note also, the rate of economic growth is given by $g^* = \gamma_0 + \gamma_1 u^*$. All the derivatives, therefore, have the same sign as for u, since $\gamma_1 > 0$.

Next, we analyze the government spending multipliers and their procyclicality. We start with the autonomous expenditure multiplier, which is given by:

$$\frac{1}{s\pi(1-\tau) - \gamma_1 - \phi(\gamma_0, \tau, i, \pi)b(\gamma_0)[1-\pi(1-\tau)]} = \frac{1}{\Omega} > 0 \tag{14}$$

The multiplier of autonomous consumption is countercyclical (procyclical) if it decreases (increases) in response to a rise in γ_0. This condition is represented by $\partial\Omega/\partial\gamma_0 > 0$ ($\partial\Omega_/\partial\gamma_0 < 0$).

$$\frac{\partial\Omega}{\partial\gamma_0} = \Omega_{\gamma_0} = -[1-\pi(1-\tau)]\Big[\frac{\partial\phi(\gamma_0, \tau, i, \pi)}{\partial\gamma_0}b(\gamma_0) + \phi(\gamma_0, \tau, i, \pi)\frac{\partial b(\gamma_0)}{\partial\gamma_0}\Big] \tag{15}$$

Which can be represented in terms of elasticities:

$$\Omega_{\gamma_0} = -[1-\pi(1-\tau)]\frac{b(\gamma_0)\phi(\gamma_0, \tau, i, \pi)}{\gamma_0}(\varepsilon_{\phi,\gamma_0} + \varepsilon_{b,\gamma_0}) \tag{16}$$

With $\varepsilon_{\phi,\gamma_0} = (\partial\phi/\partial\gamma_0)(\gamma_0/\phi)$ denoting the elasticity of ϕ with respect to γ_0, and $\varepsilon_{b,\gamma_0} = (\partial b/\partial\gamma_0)(\gamma_0/b)$ denoting the elasticity of b with respect to γ_0. Note the elasticity $\varepsilon_{\phi,\gamma_0}$ has a

pro-cyclical component ($\phi_0 > 0$) and a countercyclical component ($\frac{\partial \phi_2}{\partial \gamma_0} < 0$), as discussed in Section 3.4:

$$\frac{\partial \phi}{\partial \gamma_0} = \phi_0 + \frac{\partial \phi_2}{\partial \gamma_0} \frac{\tau}{[1 - \pi(1 - \tau)]} \tag{17}$$

Also, as explained in Section 3.4, ε_{b,γ_0} is countercyclical, since $\frac{\partial b}{\partial \gamma_0} < 0$.

The condition for the multiplier to be countercyclical is that the countercyclical components of credit supply/demand - that is, the components given by $\frac{\partial \phi_2}{\partial \gamma_0} < 0$ and $\frac{\partial b}{\partial \gamma_0} < 0$, respectively - are higher than the procyclical component (given by ϕ_0). In other words, the condition implies that the effect of higher credit supply for worker households who receive social transfers (e.g., retirees) during downturns, combined with the higher demand for credit by workers in the same period, more than compensates for the reduction in credit supply reflected by ϕ_0.

Therefore, if the multiplier is countercyclical, as empirically verified by Sanches and Carvalho (2022, 2023) and Orair et al. (2016), the countercyclical portion of credit more than offsets the contraction of credit caused by the pro-cyclical component in the downturn, so this countercyclical part stabilizes income when economic activity experiences a decline. A greater access to credit, made possible especially after the regulation of consigned loans (Section 1), for example, may have contributed to increasing the sensitivity of credit supply to transfers (increasing the derivative $\frac{\phi_2}{\gamma_0} < 0$) - which contributes to the countercyclical multiplier result. This higher access to credit may also have contributed to making the countercyclical part of credit demand more relevant (increasing the derivative $\frac{\partial b}{\partial \gamma_0} < 0$), as workers could access credit more easily. In other words, greater access to credit was a significant element for stabilizing income during downturns.

Motivated by the empirical literature on the multiplier effects for social benefits, we derived the multiplier for transfers in the following steps. First, we derived Equation (13) in relation to transfers τ, which is the multiplier associated with transfers. Then, we compare the transfer multiplier to the autonomous expenditure multiplier (given by Equation 14). We show the conditions under which the transfer multiplier is higher than the autonomous expenditure multiplier (as shown empirically by Cardoso et al. (2023); Sanches and Carvalho, 2022; Orair et

al., 2016; Reeves et al., 2013; Furceri and Zdzienicka, 2012). Finally, we derived this result in relation to the economic cycle parameter γ_0 to study the conditions under which this multiplier is countercyclical.

For a balanced government budget, the transfer multiplier can be calculated through an increase in τ:

$$\frac{\partial u^*}{\partial \tau} = \frac{(s+\phi b)\pi}{\Omega} u^* + \phi_\tau b \frac{[1-\pi(1-\tau)]u^* - i\delta}{\Omega} > 0 \tag{18}$$

With $\phi_\tau = \phi_2(1-\pi)/[1-\pi(1-\tau)]^2 > 0$.

Note, in Equation (18), the impact of transfers on the aggregate demand is positive. This result is supported by empirical evidence, that finds a positive multiplier effect for social benefits (see, for example, for Brazil: Sanches and Carvalho, 2023; Orair et al., 2016; Mostafa et al., 2010; Sanches and Carvalho, 2022. For other countries: Cardoso et al., 2023; Reeves et al., 2013; Furceri and Zdzienicka, 2012). Also, note that the debt stock (δ) lower the multiplier effect of transfers by their negative impact in Equation (18). It does not affect, however, the autonomous expenditure multiplier (see Equation 14).

The empirical evidence generally supports the finding that the social benefits multiplier effect is higher than the total government expenditure multiplier (Cardoso et al., 2023; Sanches and Carvalho, 2022; Orair et al., 2016; Reeves et al., 2013; Furceri and Zdzienicka, 2012).

In order to have:

$$\frac{\partial u^*}{\partial \tau} > \frac{1}{\Omega} \tag{19}$$

The condition is:

$$(s+\phi b)\pi u^* + \phi_\tau b\{[1-\pi(1-\tau)]u^* - i\delta\} > 1 \tag{20}$$

Note the debt stock (δ) makes this condition more difficult to happen: it lowers the multiplier effect of transfers (see Equation 18), while it does not affect the autonomous expenditure multiplier (see Equation 14).

In order to evaluate the condition in which the transfer multiplier is countercyclical - as suggested by the empirical literature that motivates this study (Sanches and Carvalho, 2022, 2023; Orair et al., 2016), we calculated the derivative of Equation (18) with respect the economic cycle parameter γ_0:

$$\frac{\partial(\partial u^*/\partial\tau)}{\partial\gamma_0} = E + F \tag{21}$$

We call the derivative of the first term in Equation (18) "E":

$$E = (\varepsilon_{\phi,\gamma_0} + \varepsilon_{b,\gamma_0})\frac{\pi u}{\Omega}\frac{b\phi}{\gamma_0}\Big\{1 + \frac{(s+\phi b)}{\Omega}[1-\pi(1-\tau)]\Big\} + \frac{(s+\phi b)\pi}{\Omega}u_{\gamma_0} \tag{22}$$

The derivative of the second term in Equation (18) is (we call "F"):

$$F = \frac{[1-\pi(1-\tau)]u - i\delta}{\Omega}\Big\{\Big(b\frac{\partial\phi_\tau}{\partial\gamma_0} + \phi_\tau b_{\gamma_0}\Big) + \frac{\phi_\tau b[1-\pi(1-\tau)]}{\Omega}\frac{b\phi}{\gamma_0}(\varepsilon_{\phi,\gamma_0}+\varepsilon_{b,\gamma_0})\Big\} + \frac{\phi_\tau b}{\Omega}[1-\pi(1-\tau)]u_{\gamma_0} \tag{23}$$

With

$$\frac{\partial\phi_\tau}{\partial\gamma_0} = \frac{\partial\phi_2}{\partial\gamma_0}\frac{(1-\pi)}{[1-\pi(1-\tau)]^2} < 0 \tag{24}$$

As the empirical evidence brought by Sanches and Carvalho (2023) and Orair et al. (2016) support that the transfer multiplier is countercyclical ($\frac{\partial(\partial u^*/\partial\tau)}{\partial\gamma_0} < 0$), the conditions for this effect are related to negative impacts in the derivative in Equations (22) and (23). For example: i) if the countercyclical part of credit supply is higher than its procyclical part ($\frac{\partial\phi}{\partial\gamma_0} < 0$), it contributes to a negative elasticity $\varepsilon_{\phi,\gamma_0}$ and to a negative derivative; ii) Note that $\frac{\partial\phi_\tau}{\partial\gamma_0} < 0$ and

$\frac{\partial b}{\partial \gamma_0} < 0$ collaborate to a negative derivative - that is, the countercyclical part of supply/demand of credit; iii) If the capacity utilization is pro-cyclical (see the Appendix), then it contributes to a positive derivative (pro-cyclical transfer multiplier), since $u_{\gamma_0} > 0$.

4 Concluding Remarks

Taking into account the empirical evidence that highlights a more pronounced multiplier effect of social benefits - including pensions - amidst the 2015-2016 crisis in Brazil, alongside the notable stability observed in consigned credit concessions for retired workers in contrast to active workers, we argued in Section 1 that these results, taken together, suggest social benefits played a stabilizing income role during the crisis.

Our hypothesis regarding the emergence of a fiscal multiplier for social benefits expenditure that increases during periods of economic downturn revolves around the indebtedness of individuals receiving the social benefit - e.g. retired workers - whose consumption rises in a scenario of reduced economic activity due to credit availability. This increase in consumption is facilitated by borrowing, which occurs through two channels: an increase in banks' credit supply to workers during recessions due to the stability of their income from social benefits, and an increase in demand for credit.

As for the empirical evidence, we presented data on consigned credit in Brazil in Section 1, indicating that during the crisis period credit granted to retired workers experienced a much smaller decline than credit granted to active workers. Thus, credit is seen as a possible indirect channel through which the stabilizing effect on income from social benefits expenditure occurs.

We present a neo-Kaleckian model with two classes, capitalists and workers, alongside household debt. Our motivation is to understand the multiplier effect associated with transfers, thus we focus on the short-run. While Charles et al. (2015) explain the empirical evidence of a higher government expenditure multiplier during downturns by increasing capitalists' propensity to save during expansions, we include the role of household credit to stabilize income during downturns.

From the supply side, the credit supply function is built with two aspects: a pro-cyclical component and a component that responds positively during economic recessions. This last part can be interpreted as a component that depends on the share of government's transfer in household income. This part of the credit supply is countercyclical as transfers (such as pensions) are more stable and less dependent on the economic cycle. From the demand side, credit demand is also countercyclical, as workers rely on consumption credit to offset income reductions.

The short-run adjustment of the model suggests that the interest rate has an ambiguous effect on the capacity utilization rate: on the one hand, a higher interest rate stimulates credit supply, thereby boosting aggregate demand. On the other hand, it transfers income to the class with a higher propensity to save, the capitalists. The literature usually discusses only this second effect.

Regarding the multiplier, we find that the autonomous government expenditure multiplier is countercyclical if the countercyclical components of credit supply and demand mentioned above outweigh the pro-cyclical element of the credit supply. In other words: the increase in credit supply for workers receiving social transfers (e.g., retirees) during the period of lower economic activity, combined with a rise in the demand for credit among workers during economic downturns, more than offsets the reduction in credit supply.

We also derived the multiplier for transfers. As empirical literature suggests, the transfer multiplier effect is higher than the multiplier associated with autonomous government expenditure. We found both multipliers to be positive, consistent with the empirical literature. However, the debt stock contributes to a lower transfer multiplier, while it does not affect the autonomous government spending multiplier.

Finally, we verified the conditions for the transfer multiplier to be countercyclical, consistent with empirical evidence. Similar to the autonomous government multiplier, we found that the countercyclical part of credit supply/demand contributes to a more countercyclical transfer multiplier. Conversely, a more pro-cyclical capacity utilization contributes to a more pro-cyclical multiplier.

One limitation of our model is that we solely analyze the short term, given our specific focus on the crisis period and tools to combat a recession. The Kaleckian literature on household indebtedness typically highlights the dual nature of credit: while the short-term effect of credit is positive, leading to higher consumption propensity, its long-term effect can be destabilizing as it reinforces an income distribution from workers, who consume more, to capitalists, thus accentuating the stagnationary effect of household indebtedness.

While our model addresses some of these issues already in the short run, such as the negative impact of higher household indebtedness on borrowing decisions and the multiplier effect, we leave its long-term implications for future research. We showed, however, that an increase in the debt stock diminishes the transfer multiplier effect. Consequently, we have identified a constraint on the effectiveness of credit in bolstering the multiplier during periods of recession.

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Appendix

In this Appendix, we present the short-term comparative statics of the macroeconomic variables described in Section 3.6, using Equations (13) and (4):

$$\frac{\partial u^*}{\partial \pi} = -\frac{\phi_\pi b i \delta + u^*(1-\tau)s}{\Omega} - u^* b \frac{(1-\tau)\phi_0\gamma_0 + (1-\tau)\phi_1 i}{\Omega} < 0 \tag{25}$$

$$\frac{\partial u^*}{\partial i} = \phi_1 b \frac{[1-\pi(1-\tau)]u^* - i\delta}{\Omega} - \frac{(s+\phi b)\delta}{\Omega} \tag{26}$$

$$\frac{\partial u^*}{\partial \delta} = -\frac{i(s+\phi b)}{\Omega} < 0 \tag{27}$$

$$\frac{\partial u^*}{\partial \gamma_1} = \frac{u^*}{\Omega} > 0 \tag{28}$$

$$\frac{\partial u^*}{\partial s} = -\frac{i\delta + \pi(1-\tau)u^*}{\Omega} < 0 \tag{29}$$

$$\frac{\partial u^*}{\partial \phi} = b\frac{[1-\pi(1-\tau)]u^* - i\delta}{\Omega} > 0 \tag{30}$$

$$\frac{\partial u^*}{\partial b} = \phi\frac{[1-\pi(1-\tau)]u^* - i\delta}{\Omega} > 0 \tag{31}$$

$$\frac{\partial u^*}{\partial \gamma_0} = \frac{1 + (\phi b)_{\gamma_0}\{[1-\pi(1-\tau)]u^* - i\delta\}}{\Omega} = \frac{\gamma_0 + \left(\frac{B}{Y}\right)^*(\varepsilon_{\phi,\gamma_0} + \varepsilon_{b,\gamma_0})}{\gamma_0\Omega} \tag{32}$$

$$\frac{\partial r^*}{\partial \pi} = -u^*\frac{\gamma_1 + \phi b[1-\pi(1-\tau)]}{\Omega} - \frac{\phi_\pi b i\delta\pi}{\Omega} - \pi u^* b\frac{(1-\tau)\phi_0\gamma_0 + (1-\tau)\phi_1 i}{\Omega} < 0 \tag{33}$$