

When Is Progressive Taxation Expansionary? Inequality, Public Debt, and Demand-Led Growth*

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Abstract

This article develops a Kaleckian–Goodwinian model that integrates earnings inequality and an explicit fiscal sector. The distribution of labor income between managers and production workers affects capacity utilization through differences in saving behavior, even when the aggregate wage share remains unchanged. The model replaces a reduced-form fiscal injection with a progressive income-tax schedule differentiated across classes. Greater progressivity has ambiguous growth effects: it may reduce after-tax profitability and private investment, but it also redistributes disposable income toward lower-saving groups and finances productive public investment. The medium-run analysis shows that inequality-responsive progressivity can dampen cumulative distributive instability. Numerical simulations indicate that state-contingent fiscal redistribution may convert a locally unstable economy into a stable adjustment path.

Keywords: earnings inequality; distributive dynamics; progressive taxation; public debt; Kaleckian growth

JEL: E12, E22, E62

1 Introduction

Over the last decades, the rise in income inequality has become a central concern in macroeconomics and political economy. A large empirical literature documents the increasing concentration of income and wealth among high-income groups and relates inequality to weaker growth, lower macroeconomic stability, and greater social vulnerability (Ostry et al., 2014). These debates raise a fiscal question that is central to this paper: whether the tax structure can attenuate the demand and stability effects of rising inequality, rather than merely finance a given level of public expenditure.

Within heterodox macroeconomics, and particularly in the Kaleckian tradition, the relationship between income distribution and growth has long occupied a central role. The seminal contribution of Dutt (1984) established demand-led growth models in which changes in functional distribution affect capacity utilization, accumulation, and growth. Bhaduri and Marglin (1990) extended this framework by showing that different demand regimes may emerge depending on whether the wage-share or profit-share channel dominates. Since then, the literature has examined how wage and profit shares shape macroeconomic performance and stability.

More recently, Kaleckian models have increasingly recognized that workers are not homogeneous. The expansion of managerial labor, professional occupations, and high-income wage earners has motivated models that incorporate personal or intra-wage inequality into demand-led growth frameworks (Tavani and Vasudevan, 2014; Palley, 2016; Carvalho and Rezai, 2016; Sanches, 2025; Silveira and Lima, 2021; Sonoda and Sasaki,

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2019; Dutt, 2016; Palley, 2014b,a). These contributions show that rising wage inequality may weaken aggregate demand when higher-income wage earners have larger propensities to save. Empirical evidence also suggests that wage inequality can depress growth and that earnings inequality interacts with the business cycle through employment and labor-market conditions (Hasparyk et al., 2023; Heathcote et al., 2020). This shifts the analytical focus from the aggregate wage share alone to the internal composition of the wage bill, since redistribution within labor may affect demand even when functional distribution is unchanged.

At the same time, fiscal policy composition matters for both activity and inequality. Narrative and empirical studies on tax changes and fiscal consolidations suggest that the macroeconomic effects of fiscal policy depend on whether adjustment is based on spending cuts, regressive taxation, or more progressive direct taxation (Cardoso, 2023; Ciminelli et al., 2019). Existing Kaleckian fiscal models have made important advances in the analysis of public expenditure, deficits, debt sustainability, taxation, and functional distribution (Ko, 2019; Tavani and Zamparelli, 2017; Ribeiro and Lima, 2019; Parui, 2024; Ventura et al., 2026; Dutt, 2013). However, comparatively less attention has been given to the way progressive taxation interacts with intra-labor inequality, aggregate demand, and public debt.

The paper contributes in two main ways. First, it integrates progressive taxation into a Kaleckian growth and distribution model (Ventura et al., 2026) with heterogeneous workers (Sanches, 2025), allowing for the simultaneous analysis of fiscal policy, functional distribution, and earnings inequality. Second, it formally connects tax progressivity, distributive conflict, and demand regimes, showing that progressivity may be expansionary when redistributive-demand and public-investment channels dominate the negative effect of taxation on after-tax profitability. The analysis shows that inequality-responsive tax progressivity can stabilize distributional dynamics by reducing distributive leakages and cumulative instability. This result highlights a novel role for fiscal policy as a medium-run stabilizing mechanism in demand-led economies.

The remainder of the paper is organized as follows. Sections 2 and 3 develop the model. Section 4 closes the medium-run dynamics. Section 5 provides the numerical illustration. Section 6 concludes.

2 Model

2.1 Classes and Income Distribution

The economy is closed, has Leontief technology, and contains three social groups: production workers (w), managers/professionals (m), and capitalists (c). Output is demand-led in the short run but constrained by capacity, and production requires fixed proportions of capital and effective labor of each group. In particular, potential output is given by

$$\bar{Y} = \min \{ \kappa K, a_w L_w, a_m L_m \}, \quad (1)$$

where K is the capital stock, κ is the full-capacity output–capital ratio, and a_w and a_m are labor productivities for production workers and managers, respectively. In the short-run closure adopted below, K is predetermined, labor inputs are assumed not to bind around the relevant equilibrium, and output adjusts to effective demand subject to the capacity ceiling. Managers are wage earners with higher income and saving propensities than production workers.

Prices are set by a constant mark-up on unit labor costs of production workers, reflecting the standard Kaleckian pricing rule:

$$p = z \frac{W_w}{\Lambda}, \quad z > 1, \quad (2)$$

where W_w is the nominal wage of production workers and Λ is their labor productivity (so that W_w/Λ is unit labor cost). In what follows, Λ denotes the productivity of production workers, corresponding to a_w in the short-run technology; we keep the notation Λ because it becomes endogenous in the medium-run dynamics.

The mark-up z pins down the functional distribution between wages and profits given unit costs.

Total wage income is the sum of wage bills paid to production workers and managers. Let ψ denote the aggregate wage share, and decompose it into the wage shares of each group:

$$\psi \equiv \psi_w + \psi_m = \frac{W_w L_w}{pY} + \frac{W_m L_m}{pY}, \quad (3)$$

so that the profit share is $\pi \equiv 1 - \psi$.

Earnings inequality is captured by two primitives. First, managers earn a higher nominal wage than production workers:

$$W_m = \eta W_w, \quad \eta > 1. \quad (4)$$

Second, managerial employment is proportional to production-worker employment but smaller in level:

$$L_m = \xi L_w, \quad 0 < \xi < 1. \quad (5)$$

Combining (4)–(5) yields a convenient reduced-form representation of the managers' wage share as a multiple of the production-workers' wage share:

$$\psi_m = \theta \psi_w, \quad \theta \equiv \xi \eta. \quad (6)$$

Hence, aggregate wage and profit shares can be written as

$$\psi = (1 + \theta)\psi_w = 1 - \bar{\pi}, \quad \psi_w(\theta) = \frac{1 - \bar{\pi}}{1 + \theta}, \quad \psi_m(\theta) = \frac{\theta(1 - \bar{\pi})}{1 + \theta}, \quad \pi = \bar{\pi}. \quad (7)$$

The parameter θ is therefore a parsimonious index of *earnings inequality within labor*: it rises with the managerial wage premium (η) and with the relative managerial employment intensity (ξ). Under constant mark-up pricing, the profit share $\bar{\pi}$ is pinned down in the short run, so changes in θ reallocate a fixed aggregate wage share across workers and managers via $\psi_w(\theta)$ and $\psi_m(\theta)$.

2.2 Aggregate Demand and Goods-Market Equilibrium

Short-run activity is summarized by the degree of capacity utilization,

$$u \equiv \frac{Y}{\bar{Y}}, \quad (8)$$

where $\bar{Y} \equiv \kappa K$ denotes full-capacity output and K is predetermined in the short run. Hence, variations in effective demand translate into variations in u .¹

A parsimonious progressive tax schedule. To capture tax progressivity in a minimal way, we assume a symmetric three-rate schedule around a baseline average tax rate t :

$$t_c = t + \varepsilon, \quad t_m = t, \quad t_w = t - \varepsilon, \quad \varepsilon > 0, \quad (9)$$

¹Throughout the analytical exposition, we normalize the full-capacity output–capital ratio to unity, $\kappa = 1$. Hence, $Y/K = u$. This normalization is adopted only to simplify notation and does not affect the qualitative comparative statics or the local stability conditions. With an arbitrary $\kappa > 0$, all saving, tax-revenue, and demand terms normalized by the capital stock would be multiplied by κ . It also justifies writing the employment-rate proxy in the medium run as $e = L/N = uk$ when $k = K/(N\Lambda)$.

with the admissible range $0 < \varepsilon < \min\{t, 1 - t\}$ ensuring $t_i \in (0, 1)$ for all groups. Progressivity is therefore summarized by the single parameter ε (the “distance” between adjacent brackets), while t shifts the overall level of taxation.

Disposable-income saving by class. Private saving is undertaken by each class out of *disposable* income. Let $s_i \in (0, 1)$ be the propensity to save of group $i \in \{w, m, c\}$. Using the income shares defined in Section 2.1, class saving normalized by the capital stock is

$$\frac{S_w}{K} = (1 - t + \varepsilon) s_w \psi_w(\theta) u, \quad (10)$$

$$\frac{S_m}{K} = (1 - t) s_m \psi_m(\theta) u, \quad (11)$$

$$\frac{S_c}{K} = (1 - t - \varepsilon) s_c \bar{\pi} u. \quad (12)$$

Hence total *post-tax* private saving per unit of capital is

$$\frac{S_p}{K} \equiv \frac{S_w + S_m + S_c}{K} = \left[s_w(1 - t + \varepsilon)\psi_w(\theta) + s_m(1 - t)\psi_m(\theta) + s_c(1 - t - \varepsilon)\bar{\pi} \right] u. \quad (13)$$

For later use, define the post-tax average saving rate out of output:

$$\bar{s}(\theta; t, \varepsilon) \equiv s_w(1 - t + \varepsilon)\psi_w(\theta) + s_m(1 - t)\psi_m(\theta) + s_c(1 - t - \varepsilon)\bar{\pi}, \quad \text{so that} \quad \frac{S_p}{K} = \bar{s}(\theta; t, \varepsilon) u. \quad (14)$$

In line with the three-class structure, we typically assume $0 < s_w < s_m < s_c < 1$, while progressivity is captured by $\varepsilon > 0$.

Tax revenues and the average tax rate. Given (9), the average tax rate on output is the income-share-weighted mean of class-specific rates:

$$\begin{aligned} \bar{i}(\theta; t, \varepsilon) &\equiv (t - \varepsilon)\psi_w(\theta) + t\psi_m(\theta) + (t + \varepsilon)\bar{\pi} \\ &= t[\psi_w(\theta) + \psi_m(\theta) + \bar{\pi}] + \varepsilon[\bar{\pi} - \psi_w(\theta)] \\ &= t + \varepsilon[\bar{\pi} - \psi_w(\theta)], \end{aligned} \quad (15)$$

where the last equality uses $\psi_w + \psi_m + \bar{\pi} = 1$. Under constant mark-up pricing, $\bar{\pi}$ is fixed, and therefore earnings inequality affects the tax take only through *composition effects* within the wage bill: a higher θ shifts a larger share of a fixed labor-income mass from workers to managers, altering $\psi_w(\theta)$ and thus $\bar{i}(\theta; t, \varepsilon)$.

Government budget constraint and the fiscal stance Let current government purchases per unit of private capital be policy-determined and exogenous in the short run,

$$g^g \equiv \frac{G^C}{K} = \bar{g}, \quad \bar{g} > 0, \quad (16)$$

while productive public investment per unit of private capital is given by (22), $i^G = i_0^G + \rho_\varepsilon \varepsilon$. Thus, under deficit finance, public expenditure relevant for the primary balance is $\bar{g} + i^G$, while tax revenues per unit of

capital satisfy

$$t^k \equiv \frac{T}{K} = \bar{t}(\theta; t, \varepsilon) u, \quad (17)$$

where $\bar{t}(\theta; t, \varepsilon)$ is the average tax rate implied by the progressive schedule $t_c = t + \varepsilon$, $t_m = t$, $t_w = t - \varepsilon$ (with $\varepsilon > 0$), defined in (15). The primary deficit (normalized by the capital stock) is therefore

$$d^k \equiv \frac{G^C + I^G - T}{K} = \bar{g} + i^G - \bar{t}(\theta; t, \varepsilon) u. \quad (18)$$

Let B denote the real stock of public debt and r_b the real interest rate on government bonds. Allowing for an effective tax rate t_b on interest income, net interest payments that add to debt are $(1 - t_b)r_b B$. The government flow budget constraint is

$$\dot{B} = (G^C + I^G - T) + (1 - t_b)r_b B. \quad (19)$$

Defining the debt-to-private-capital ratio $b \equiv B/K$ and using $\dot{b} = \dot{B}/K - b \dot{K}/K$ with $\dot{K}/K = g^p$, we obtain

$$\dot{b} = \left(\bar{g} + i^G - \bar{t}(\theta; t, \varepsilon) u \right) + \left[(1 - t_b)r_b - g^p \right] b. \quad (20)$$

Bhaduri–Marglin investment function. Investment follows a Bhaduri and Marglin (1990)-type (“Bhaduri–Marglin”) formulation for *private* accumulation. Under constant mark-up pricing, the profit share is pinned down at $\bar{\pi}$, so distribution does not enter investment through a profit-squeeze channel in this closure. Taxation is introduced by assuming that firms respond to *after-tax* profitability, so the profit-share component is scaled by $(1 - t_c) = (1 - t - \varepsilon)$. Private investment is distinguished from productive public investment. Private investment is

$$g^p \equiv \frac{I_p}{K} = \alpha_p + \alpha_G i^G + \beta u + \gamma(1 - t - \varepsilon) \bar{\pi}, \quad (21)$$

where $\alpha_p > 0$ captures baseline autonomous private investment, $\beta > 0$ measures the accelerator effect of utilization, $\gamma > 0$ governs the responsiveness to after-tax profitability, and $\alpha_G \geq 0$ captures the crowding-in effect of productive public investment on private accumulation (Tavani and Zamparelli, 2017).

Productive public investment per unit of private capital is denoted by i^G . A more progressive tax structure is assumed to increase the public sector’s capacity to finance productive investment:

$$i^G = i_0^G + \rho_\varepsilon \varepsilon, \quad \rho_\varepsilon > 0. \quad (22)$$

This formulation does not require private firms to invest more simply because the tax schedule becomes more progressive. Instead, progressivity affects private accumulation indirectly by financing productive public investment, which may crowd in private investment by improving infrastructure, logistics, education, health, training, innovation capacity, or other public inputs that raise expected profitability and reduce production and coordination costs. At the same time, the term $\gamma(1 - t - \varepsilon)\bar{\pi}$ preserves the contractionary after-tax-profitability channel. Hence, progressivity has two opposing effects on private investment: a positive indirect effect through public-investment-induced crowding-in, $\alpha_G \rho_\varepsilon$, and a negative after-tax-profitability effect, $\gamma \bar{\pi}$.

3 Short run equilibrium

3.1 Goods-market equilibrium

Total saving per unit of capital is the sum of post-tax private saving and the government balance, $S_g \equiv T - G^C - I^G - (1 - t_b)r_b B$. Thus,

$$\frac{S_g}{K} = t^k - g^s - i^G - (1 - t_b)r_b b = \bar{i}(\theta; t, \varepsilon) u - \bar{g} - i^G - (1 - t_b)r_b b. \quad (23)$$

Post-tax private saving out of wages and profits is $\bar{s}(\theta; t, \varepsilon)u$. In order to keep the short-run algebra transparent, we adopt the simplifying assumption that *net interest income is entirely saved*. Hence, total private saving also includes net interest income, so that ²

$$\frac{S_p}{K} = \bar{s}(\theta; t, \varepsilon)u + (1 - t_b)r_b b. \quad (24)$$

Accordingly, the interest term cancels out between S_p/K and S_g/K , so that aggregate saving per unit of capital becomes

$$g^s \equiv \frac{S_p + S_g}{K} = \bar{s}(\theta; t, \varepsilon)u + \bar{i}(\theta; t, \varepsilon)u - \bar{g} - i^G = [\bar{s}(\theta; t, \varepsilon) + \bar{i}(\theta; t, \varepsilon)]u - \bar{g} - i^G. \quad (25)$$

Hence the short-run goods market does not feature a direct interest-transfer channel.

Private investment follows the tax-adjusted Bhaduri–Marglin specification under constant mark-up pricing, with public investment affecting private accumulation through the crowding-in term.

Short-run goods-market equilibrium requires $g^p = g^s$. Combining (25)–(21) yields

$$u^*(\theta; t, \varepsilon) = \frac{\alpha_p + \alpha_G i^G + \gamma(1 - t - \varepsilon)\bar{\pi} + \bar{g} + i^G}{\bar{s}(\theta; t, \varepsilon) + \bar{i}(\theta; t, \varepsilon) - \beta}, \quad \bar{s}(\theta; t, \varepsilon) + \bar{i}(\theta; t, \varepsilon) > \beta. \quad (26)$$

Deficit finance thus raises short-run utilization through the autonomous demand components $\bar{g}$ and i^G , while the stability condition becomes the natural extension of the Keynesian requirement: marginal leakages through saving *and* taxation must dominate the marginal induced investment response.

3.2 Comparative statics

Reduced-form representation. For later use, rewrite (26) as

$$u^*(\theta; \bar{\pi}, t, \varepsilon) = \frac{N(\bar{\pi}; t, \varepsilon)}{D(\theta; \bar{\pi}, t, \varepsilon)}, \quad N(\bar{\pi}; t, \varepsilon) \equiv \alpha_p + \alpha_G i^G + \gamma(1 - t - \varepsilon)\bar{\pi} + \bar{g} + i^G, \quad (27)$$

where the denominator collects marginal leakages net of the accelerator,

$$D(\theta; \bar{\pi}, t, \varepsilon) \equiv \bar{s}(\theta; t, \varepsilon) + \bar{i}(\theta; t, \varepsilon) - \beta, \quad D(\theta; \bar{\pi}, t, \varepsilon) > 0. \quad (28)$$

²This assumption suppresses the direct demand effect of interest transfers. It can be rationalized either by assuming that government bonds are held by agents with a unit propensity to save, or by adopting a “saving-out-of-property-income” convention in which interest income is treated as a form of property income that is fully saved. This modelling choice echoes the controversy associated with [Kaldor \(1955\)](#) and [Pasinetti \(1962\)](#), where the aggregate saving rate depends on the type of income rather than on social class membership.

Mark-up (profit-share) shifts. Treat $\bar{\pi}$ as a mark-up parameter. Since $N_{\bar{\pi}} = \gamma(1 - t - \varepsilon)$ and $D_{\bar{\pi}} = \bar{s}_{\bar{\pi}} + \bar{t}_{\bar{\pi}}$, differentiating the reduced form $u^* = N/D$ implies

$$\frac{\partial u^*}{\partial \bar{\pi}} = \frac{\gamma(1 - t - \varepsilon)D - N(\bar{\pi}; t, \varepsilon)(\bar{s}_{\bar{\pi}} + \bar{t}_{\bar{\pi}})}{D^2}. \quad (29)$$

Under constant mark-up pricing, $\psi_w = (1 - \bar{\pi})/(1 + \theta)$, so the marginal effects on leakages are

$$\bar{t}_{\bar{\pi}} = \varepsilon \frac{2 + \theta}{1 + \theta}, \quad \bar{s}_{\bar{\pi}} = s_c(1 - t - \varepsilon) - \frac{1}{1 + \theta} \left[s_w(1 - t + \varepsilon) + \theta s_m(1 - t) \right]. \quad (30)$$

The sign of $\partial u^*/\partial \bar{\pi}$ is therefore regime-dependent: higher profitability raises planned investment through $N_{\bar{\pi}} > 0$, while simultaneously reshaping leakages through $\bar{s}_{\bar{\pi}}$ and $\bar{t}_{\bar{\pi}}$. Note that the likelihood of a profit-led regime increases with higher propensities to save out of wage income and with greater sensitivity of investment to profitability.

Within-labor inequality. Because N does not depend on θ , differentiating $u^* = N/D$ with respect to θ gives

$$\frac{du^*}{d\theta} = -\frac{N}{D^2} D_\theta, \quad D_\theta = \frac{d\bar{s}}{d\theta} + \frac{d\bar{t}}{d\theta}. \quad (31)$$

We can write

$$D_\theta = \frac{\bar{\psi}}{(1 + \theta)^2} \left[s_m(1 - t) - s_w(1 - t + \varepsilon) + \varepsilon \right], \quad \bar{\psi} = 1 - \bar{\pi}. \quad (32)$$

When the bracketed term is positive—e.g. when managers save sufficiently more than workers in post-tax terms and/or the schedule is sufficiently progressive—we have $D_\theta > 0$, that is, $s_m(1 - t) + \varepsilon > s_w(1 - t + \varepsilon)$, and thus $du^*/d\theta < 0$: higher within-labor inequality reduces utilization by increasing marginal leakages out of a fixed wage bill (Inequality-burdened regime). The economy is inequality-led otherwise.

Tax progressivity. Progressivity affects short-run utilization through three channels. First, it reduces after-tax profitability in private investment. Second, it changes private saving and tax leakages. Third, by raising i^G , it expands public-investment demand and induces crowding-in of private investment. Since $i^G_\varepsilon = \rho_\varepsilon$, the numerator effect is

$$N_\varepsilon = (1 + \alpha_G)\rho_\varepsilon - \gamma\bar{\pi} \equiv \mathcal{N}_\varepsilon, \quad (33)$$

and $D_\varepsilon = \bar{s}_\varepsilon + \bar{t}_\varepsilon$. Hence,

$$\frac{\partial u^*}{\partial \varepsilon} = \frac{\mathcal{N}_\varepsilon D - N D_\varepsilon}{D^2}. \quad (34)$$

Equation (34) makes the channels explicit. A higher ε raises the demand numerator whenever the direct public-investment effect and the crowding-in channel, $(1 + \alpha_G)\rho_\varepsilon$, dominate the negative after-tax-profitability effect, $\gamma\bar{\pi}$. At the same time, progressivity modifies the denominator through private-saving and tax leakages. Hence, progressivity can be expansionary only when the public-investment, redistributive-demand, and leakage-reducing effects dominate the profitability and fiscal-leakage channels.

Private accumulation. Given $g^{p*} = \alpha_p + \alpha_G i^G + \beta u^* + \gamma(1 - t - \varepsilon)\bar{\pi}$, the growth effect of a mark-up shift is

$$\frac{\partial g^{p*}}{\partial \bar{\pi}} = \beta \frac{\partial u^*}{\partial \bar{\pi}} + \gamma(1 - t - \varepsilon), \quad (35)$$

which combines the direct profitability effect with the indirect utilization response in (29). The effect of progressivity on private accumulation is

$$\frac{\partial g^{p\star}}{\partial \varepsilon} = \beta \frac{\partial u^\star}{\partial \varepsilon} + \alpha_G \rho_\varepsilon - \gamma \bar{\pi}. \quad (36)$$

where $\mathcal{A}_\varepsilon \equiv \alpha_G \rho_\varepsilon - \gamma \bar{\pi}$ denotes the direct net private-investment effect of progressivity.

Proposition 1 (Short-run progressivity under deficit finance). *Under $D > 0$, a marginal increase in progressivity raises utilization under deficit finance if and only if*

$$N_\varepsilon D > N D_\varepsilon. \quad (37)$$

It raises accumulation if and only if

$$\beta \frac{\partial u^\star}{\partial \varepsilon} + \alpha_G \rho_\varepsilon - \gamma \bar{\pi} > 0. \quad (38)$$

Progressivity is short-run expansionary when the public-investment, crowding-in, and consumption-leakage effects dominate the negative after-tax-profitability and tax-leakage effects.

4 Medium-Run Dynamics

This section closes the model in the medium run by specifying the joint dynamics of (i) capital intensity, k , (ii) within-labor earnings inequality, θ , and (iii) the public-debt-to-capital ratio, b . Short-run output remains demand-determined through the goods-market equilibrium, so that the capacity utilization is a reduced-form function of distribution and policy parameters.

Short-run closure embedded in the medium run The previous sections treated tax progressivity as a policy parameter. In the medium run, we allow the fiscal authority to adjust progressivity in response to within-labor earnings inequality. Specifically, progressivity follows the locally linear rule

$$\varepsilon(\theta) = \varepsilon_{\text{ref}} + \mu_\theta(\theta - \theta_{\text{ref}}), \quad \mu_\theta \geq 0, \quad (39)$$

where ε_{ref} is the reference degree of progressivity at the distributive benchmark θ_{ref} , and μ_θ measures the strength of the fiscal response to deviations of within-labor inequality from that benchmark. The admissible range is assumed to satisfy

$$0 < \varepsilon(\theta) < \min\{t, 1 - t\}, \quad (40)$$

in the relevant neighborhood of the steady state. Hence, locally, $\varepsilon_\theta \equiv d\varepsilon/d\theta = \mu_\theta$. This rule captures a fiscal regime in which increases in within-labor inequality induce a more progressive income-tax schedule, for example through stronger taxation of high earnings, expanded lower brackets, or reduced tax pressure on production workers.

Productive public investment is therefore also state-dependent:

$$i^G(\theta) = i_0^G + \rho_\varepsilon \varepsilon(\theta), \quad \rho_\varepsilon > 0. \quad (41)$$

Under deficit finance with full saving out of net interest income, the short-run equilibrium degree of capacity utilization becomes

$$u^\star(\theta, \bar{\pi}; t) = \frac{\alpha_p + \alpha_G i^G(\theta) + \gamma[1 - t - \varepsilon(\theta)]\bar{\pi} + \bar{g} + i^G(\theta)}{\bar{s}(\theta, \bar{\pi}; t, \varepsilon(\theta)) + \bar{t}(\theta, \bar{\pi}; t, \varepsilon(\theta)) - \beta}, \quad (42)$$

with the Keynesian stability condition

$$D(\theta) \equiv \bar{s}(\theta, \bar{\pi}; t, \varepsilon(\theta)) + \bar{i}(\theta, \bar{\pi}; t, \varepsilon(\theta)) - \beta > 0. \quad (43)$$

Given u^* , the private accumulation rate is

$$g^{p*}(\theta, \bar{\pi}; t) = \alpha_p + \alpha_G i^G(\theta) + \beta u^*(\theta, \bar{\pi}; t) + \gamma[1 - t - \varepsilon(\theta)]\bar{\pi}. \quad (44)$$

In the medium run, we treat $u = u^*(\theta, \bar{\pi}; t)$ and $g^p = g^{p*}(\theta, \bar{\pi}; t)$ as reduced forms. For later use, let $\tilde{u}_\theta$ denote the total derivative of u^* with respect to θ , taking into account both the direct distributional effect of θ and the endogenous response of progressivity $\varepsilon(\theta)$.

Dynamics of earnings inequality The medium-run law of motion for within-labor earnings inequality follows the mechanism proposed by [Sanches \(2025\)](#), adapted here to incorporate the fiscal-progressivity channel. The starting point is the definition introduced in Section 2.1:

$$\theta \equiv \xi\eta, \quad \eta \equiv \frac{W_m}{W_w}, \quad \xi \equiv \frac{L_m}{L_w}, \quad (45)$$

where η is the managerial wage premium and ξ is the relative employment intensity of managers/professionals vis-à-vis production workers. Taking logarithmic derivatives yields

$$\frac{\dot{\theta}}{\theta} = \frac{\dot{\xi}}{\xi} + \frac{\dot{\eta}}{\eta} = \left(\widehat{L}_m - \widehat{L}_w \right) + \left(\widehat{W}_m - \widehat{W}_w \right). \quad (46)$$

Thus, θ changes because of two distinct mechanisms: changes in the relative wage premium of managers and changes in the relative employment intensity of managers.

Employment is demand-driven and summarized by

$$e \equiv \frac{L}{N} = u k, \quad (47)$$

where $k \equiv K/(N\Lambda)$ is capital intensity. Following the Goodwinian logic, e is interpreted as an index of labor-market tightness. A higher employment rate strengthens workers' bargaining power, but the response is heterogeneous across groups. Production workers and managers/professionals do not have the same cyclical wage sensitivity. Let

$$\widehat{W}_w = \lambda_1 e, \quad (48)$$

$$\widehat{W}_m = \Omega_\eta - \phi \varepsilon(\theta) + \lambda_2 e, \quad (49)$$

where $\lambda_1 > 0$ is the sensitivity of production-worker wage growth to labor-market tightness and $\lambda_2 > 0$ is the corresponding sensitivity of managerial/professional wage growth. In line with [Sanches \(2025\)](#), we assume

$$\lambda_2 > \lambda_1, \quad (50)$$

so that managerial/professional workers enjoy a stronger relative bargaining position in booms. This may reflect promotion ladders, bonuses, retention premia, scarcity rents, or the greater capacity of higher-skilled workers to appropriate part of the gains associated with higher activity. The term Ω_η captures autonomous institutional or organizational forces that raise the managerial wage premium. The term $\phi \varepsilon(\theta)$, with $\phi > 0$, captures the direct

disciplining effect of inequality-responsive progressivity: when within-labor inequality rises, the fiscal rule increases progressivity and thereby compresses the after-tax attractiveness and bargaining strength associated with high earnings.

Equations (48)–(49) imply

$$\widehat{W}_m - \widehat{W}_w = \Omega_\eta - \phi \varepsilon(\theta) + (\lambda_2 - \lambda_1)e. \quad (51)$$

The term $(\lambda_2 - \lambda_1)e$ is the *relative bargaining-power effect*. It raises earnings inequality when the labor market tightens, because managerial/professional wages react more strongly to the employment rate than production-worker wages.

The second component is the employment-composition channel. Following the overhead-labor mechanism emphasized by Sanches (2025), production employment is assumed to be more cyclically sensitive than professional/managerial employment. Managers and professional workers are treated as a partial overhead-labor component: firms tend to retain them in downturns and do not need to expand them one-for-one with production employment during upturns. We write this assumption as

$$\widehat{L}_m - \widehat{L}_w = \Omega_\xi - \beta_M u^\star(\theta, \bar{\pi}; t), \quad \beta_M > 0. \quad (52)$$

The parameter β_M therefore measures the strength of the overhead-labor effect. Since it enters with a negative sign, an increase in utilization reduces the growth of managerial employment relative to production employment. Equivalently, production workers are more exposed to the cycle: their employment expands more strongly in booms and contracts more strongly in recessions. This is the mechanism through which recoveries may reduce earnings inequality even if managerial wages remain more responsive to labor-market tightness. The term Ω_ξ allows for autonomous organizational forces that may raise managerial intensity, such as greater firm complexity, bureaucratization, or the expansion of supervisory functions.

Combining (46), (51), and (52), and defining

$$\lambda_\Delta \equiv \lambda_2 - \lambda_1 > 0, \quad \Omega_0 \equiv \Omega_\eta + \Omega_\xi, \quad (53)$$

we obtain

$$\dot{\theta} = \theta \left[\lambda_\Delta u^\star(\theta, \bar{\pi}; t) k + \Omega_0 - \phi \varepsilon(\theta) - \beta_M u^\star(\theta, \bar{\pi}; t) \right]. \quad (54)$$

First, the bargaining-power effect, $\lambda_\Delta u^\star k$, is inequality-increasing whenever managerial/professional wage growth is more sensitive to labor-market tightness than production-worker wage growth (Rolim, 2019). Second, the overhead-labor effect, $-\beta_M u^\star$, is inequality-reducing when utilization rises, because production employment responds more strongly to activity than managerial/professional employment (Lavoie, 2017; Sanches, 2025). This specification is also consistent with empirical evidence showing that recessions disproportionately affect lower-skilled and production workers through employment and hours adjustments (Forsythe, 2022; Heathcote et al., 2020).

The net cyclical effect of demand on θ therefore depends on the comparison between these two forces:

$$\lambda_\Delta k \gtrless \beta_M. \quad (55)$$

If $\lambda_\Delta k > \beta_M$, the relative bargaining-power effect dominates and higher utilization tends to increase within-labor earnings inequality. If $\lambda_\Delta k < \beta_M$, the overhead-labor effect dominates and higher utilization tends to reduce within-labor earnings inequality. Finally, the term $\Omega_0 - \phi \varepsilon(\theta)$ summarizes the non-cyclical drift of earnings inequality after accounting for the direct disciplining effect of inequality-responsive tax progressivity. This interpretation is consistent with the empirical findings of Rolim (2019), who shows that professional workers' wage shares respond positively to aggregate-demand shocks while production workers experience stronger employment fluctuations over the business cycle.

Dynamics of capital intensity Define private capital intensity as

$$k \equiv \frac{K}{N\Lambda}, \quad (56)$$

where K is the private capital stock, N is the labor force (or working-age population), and Λ is labor productivity. Private capital accumulation satisfies $\dot{K}/K = g^{p\star}$. Labor-force growth is demand-led, $\dot{N}/N = \alpha_N u^\star$. Productivity growth has a Verdoorn component and a productive-public-investment component:

$$\frac{\dot{\Lambda}}{\Lambda} = \beta_T u^\star + \chi_G i^G(\theta), \quad \chi_G > 0. \quad (57)$$

The parameter χ_G captures the effect of productive public investment on labor productivity through infrastructure, human capital, health, training, science and technology, and other public inputs that raise the efficiency of private production (Tavani and Zamparelli (2017)). The law of motion for private capital intensity is therefore

$$\dot{k} = k \left[g^{p\star}(\theta, \bar{\pi}; t) - (\alpha_N + \beta_T) u^\star(\theta, \bar{\pi}; t) - \chi_G i^G(\theta) \right]. \quad (58)$$

Equation (58) highlights that private capital deepening depends on whether private accumulation outpaces the demand-led expansion of the effective labor input embodied in $N\Lambda$. Productive public investment has two opposing medium-run roles: it can crowd in private accumulation through $\alpha_G i^G(\theta)$, but it also raises effective labor productivity through $\chi_G i^G(\theta)$, increasing the growth rate of the denominator of k .

Debt dynamics Let B be the real stock of public debt, r_b the real interest rate on government bonds, and t_b the effective tax rate on interest income. The government flow budget constraint is

$$\dot{B} = (G^C + I^G - T) + (1 - t_b)r_b B, \quad (59)$$

with the primary deficit per unit of capital given by

$$d^k \equiv \frac{G^C + I^G - T}{K} = \bar{g} + i^G(\theta) - \bar{i}(\theta, \bar{\pi}; t, \varepsilon(\theta)) u^\star(\theta, \bar{\pi}; t). \quad (60)$$

Defining the debt-to-private-capital ratio $b \equiv B/K$ and using $\dot{K}/K = g^{p\star}$, we obtain the reduced-form debt dynamics

$$\dot{b} = \bar{g} + i^G(\theta) - \bar{i}(\theta, \bar{\pi}; t, \varepsilon(\theta)) u^\star(\theta, \bar{\pi}; t) + \left[(1 - t_b)r_b - g^{p\star}(\theta, \bar{\pi}; t) \right] b. \quad (61)$$

Under the full-saving-out-of-interest closure, $u^\star$ does not depend on b ; debt accumulation is driven by the primary deficit evaluated at the demand-determined activity level, plus the standard “snowball” term comparing the (net) interest rate to the private accumulation rate.

The medium-run system Collecting (54), (58), and (61), the medium-run evolution of the economy under deficit finance is described by the three-dimensional system

$$\begin{cases} \dot{k} = k \left[g^{p\star}(\theta, \bar{\pi}; t) - (\alpha_N + \beta_T) u^\star(\theta, \bar{\pi}; t) - \chi_G i^G(\theta) \right], \\ \dot{\theta} = \theta \left[\lambda_\Delta u^\star(\theta, \bar{\pi}; t) k + \Omega_0 - \phi \varepsilon(\theta) - \beta_M u^\star(\theta, \bar{\pi}; t) \right], \\ \dot{b} = \bar{g} + i^G(\theta) - \bar{i}(\theta, \bar{\pi}; t, \varepsilon(\theta)) u^\star(\theta, \bar{\pi}; t) + \left[(1 - t_b)r_b - g^{p\star}(\theta, \bar{\pi}; t) \right] b. \end{cases} \quad (62)$$

The short-run closure enters the medium run through the reduced-form functions $u^*(\cdot)$ and $g^{P*}(\cdot)$, while productive public investment affects the system through three channels: short-run demand, private-investment crowding-in, and productivity growth. The fiscal rule (39) adds a fourth channel by making progressivity respond endogenously to within-labor earnings inequality.

Steady states and local stability in the medium run The relevant law of motion for k is based on private capital accumulation, while productive public investment affects private accumulation through $\alpha_G i^G(\theta)$ and labor productivity through $\chi_G i^G(\theta)$. The distinctive feature of the medium-run closure is that progressivity follows the fiscal rule (39).

For compactness, define

$$\nu_0 \equiv \alpha_N + \beta_T, \quad \Omega(\theta) \equiv \Omega_0 - \phi \varepsilon(\theta), \quad \mathcal{M}(\theta) \equiv \alpha_p + \gamma[1 - t - \varepsilon(\theta)]\bar{\pi} + (\alpha_G - \chi_G)i^G(\theta). \quad (63)$$

The derivative of the policy rule is $\varepsilon_\theta = \mu_\theta$, and therefore

$$i_\theta^G = \rho_\varepsilon \mu_\theta, \quad \mathcal{M}_\theta = [(\alpha_G - \chi_G)\rho_\varepsilon - \gamma\bar{\pi}] \mu_\theta. \quad (64)$$

Under deficit finance, current government expenditure and productive public investment enter the short-run goods market as net autonomous demand components. The utilization rate is

$$u_D^*(\theta) = \frac{\alpha_p + \alpha_G i^G(\theta) + \gamma[1 - t - \varepsilon(\theta)]\bar{\pi} + \bar{g} + i^G(\theta)}{\bar{s}(\theta, \bar{\pi}; t, \varepsilon(\theta)) + \bar{i}(\theta, \bar{\pi}; t, \varepsilon(\theta)) - \beta}. \quad (65)$$

The stationarity condition for k is

$$g^{P*} = \nu_0 u^* + \chi_G i^G(\theta^*), \quad (66)$$

because k is defined using private capital and therefore depends on private accumulation, demand-led effective labor-input growth, and productivity growth. Using $g^{P*} = \alpha_p + \alpha_G i^G(\theta) + \beta u^* + \gamma[1 - t - \varepsilon(\theta)]\bar{\pi}$, the deficit-finance steady-state value θ_D^* is determined by

$$F_D(\theta) \equiv (\nu_0 - \beta)u_D^*(\theta) - \mathcal{M}(\theta) = 0. \quad (67)$$

The remaining steady-state levels are

$$u_D^* = u_D^*(\theta_D^*), \quad k_D^* = \frac{\beta_M u_D^* - \Omega(\theta_D^*)}{\lambda_\Delta u_D^*}, \quad g_D^{P*} = \nu_0 u_D^* + \chi_G i^G(\theta_D^*), \quad (68)$$

and

$$b^* = \frac{\bar{i}^* u_D^* - \bar{g} - i^G(\theta_D^*)}{(1 - t_b)r_b - g_D^{P*}}. \quad (69)$$

The endogenous rule also affects the deficit-finance steady state through the induced changes in utilization and productive public investment; the corresponding implicit-derivative expressions are reported in the appendix.

The Jacobian under deficit finance remains block triangular under the full-saving-out-of-interest closure, because u^* does not depend on b :

$$J_D^* = \begin{pmatrix} 0 & k^* H_\theta^* & 0 \\ \theta^* \lambda_\Delta u^* & \theta^* [(\lambda_\Delta k^* - \beta_M) \bar{u}_\theta^* - \phi \mu_\theta] & 0 \\ 0 & i_\theta^G - (\bar{i}_\theta^* u^* + \bar{i}^* \bar{u}_\theta^*) - b^* g_\theta^{P*} & (1 - t_b)r_b - g^{P*} \end{pmatrix}, \quad (70)$$

where all derivatives with respect to θ are total derivatives evaluated at the deficit-finance steady state. Therefore, local stability requires stability of the (k, θ) block,

$$\text{tr}(J_{D,k\theta}^*) < 0, \quad \det(J_{D,k\theta}^*) > 0, \quad (71)$$

Proposition 2 (Medium-run stability with inequality-responsive progressivity). *Suppose an interior steady state exists, with $u^* > 0$, $k^* > 0$, $\theta^* > 0$, and an admissible fiscal rule satisfying $0 < \varepsilon(\theta^*) < \min\{t, 1 - t\}$. The real-distributional block is locally stable if*

$$\theta^* [(\lambda_\Delta k^* - \beta_M) \tilde{u}_\theta^* - \phi \mu_\theta] < 0 \quad (72)$$

and

$$(\beta - \nu_0) \tilde{u}_\theta^* + [(\alpha_G - \chi_G) \rho_\varepsilon - \gamma \bar{\pi}] \mu_\theta < 0. \quad (73)$$

Local stability also requires debt stability:

$$g^{P^*} > (1 - t_b) r_b \quad (74)$$

under the full-saving-out-of-interest closure, this debt condition does not feed back into the stability of the (k, θ) subsystem.

The first two stability inequalities have a direct economic interpretation. The trace condition, equation (72), depends on the interaction between the distributive regime and the two mechanisms governing earnings inequality. If the economy is inequality-led, $\tilde{u}_\theta^* > 0$, a stronger overhead-labor effect β_M relative to the bargaining-power effect $\lambda_\Delta k^*$ contributes to stability by preventing demand expansion from translating into cumulative increases in within-labor inequality. In an inequality-burdened regime, $\tilde{u}_\theta^* < 0$, the opposite configuration can be stabilizing because induced accumulation helps offset the contractionary effect of inequality on demand. In both cases, the fiscal response contributes directly through $-\phi \mu_\theta$: a tax system that becomes more progressive as earnings inequality rises operates as a stabilizer of distributive conflict.

The determinant condition, equation (73), clarifies the role of accumulation and productivity channels. Holding the steady state and the total demand response $\tilde{u}_\theta^*$ fixed, a stronger crowding-in effect of public investment on private accumulation, α_G , makes the determinant condition harder to satisfy by amplifying cumulative demand–investment feedbacks. By contrast, a stronger productivity effect, χ_G , and a stronger negative effect of progressivity on after-tax profitability, γ , reduce the net induced accumulation pressure. The term $\nu_0 = \alpha_N + \beta_T$ captures labor-force growth and demand-induced productivity growth; in an inequality-led regime, stability requires these forces to dominate the accelerator effect β , preventing capital deepening from becoming self-reinforcing.

The condition (74) corresponds to the debt-stability condition according to which the growth rate of accumulation must exceed the effective real interest rate on public debt. When this condition holds and the admissible steady state features a positive debt ratio, the debt-to-capital ratio can converge even in the presence of a steady-state primary deficit, because the productive base of the economy expands faster than the snowball effect generated by interest payments. Importantly, under the full-saving-out-of-interest closure, debt dynamics do not feed back into aggregate demand, implying that debt stability remains analytically separated from the stability of the distributive subsystem.

5 Numerical illustration

This section provides a numerical illustration of the medium-run system. The exercise is not intended as a structural calibration of a particular economy. Its purpose is narrower: to show how the local dynamic properties of the model depend on the policy design governing tax progressivity. We compare two economies that are identical in all structural parameters and differ only in the responsiveness of tax progressivity to within-labor earnings inequality. The first economy sets $\mu_\theta = 0$, so that progressivity is fixed at its reference level. The second sets $\mu_\theta = 0.25$, so that progressivity reacts to deviations of θ from θ_{ref} according to the anchored rule in (39). Productive public investment continues to follow (41); short-run utilization and private accumulation are given by (65) and (44); and the simulated state vector (k, θ, b) follows (62). Thus, the figures below do not introduce an additional model block; they solve the same analytical system numerically under two alternative policy regimes.

The calibration is reported in Table 1. The values are deliberately simple and are chosen to generate economically admissible steady states with positive k^* , θ^* , b^* , u^* , and g^{P*} . The saving hierarchy satisfies $s_w < s_m < s_c$, so an increase in within-labor inequality tends to raise aggregate saving leakages by shifting a fixed wage bill toward higher-saving groups. This makes the numerical exercise demanding from a stabilization perspective: the fiscal rule must offset an inequality-burdened demand configuration rather than merely reinforce an already expansionary distributive mechanism. In this environment, rising within-labor inequality depresses aggregate demand by reallocating income toward groups with higher saving propensities. Consequently, the economy possesses an intrinsic leakage mechanism that weakens utilization and accumulation. The fiscal rule therefore operates against an endogenous destabilizing force rather than amplifying an already demand-expansionary distributive structure.

Figure 1 reports the projected dynamics in the (k, θ) plane. The dashed blue locus is the $\dot{k} = 0$ nullcline and the dashed orange locus is the $\dot{\theta} = 0$ nullcline. The streamlines represent normalized projections of the vector field, while the plotted trajectories are generated by the full system in (62). Since b does not feed back into u^* under the full-saving-out-of-interest closure, the (k, θ) projection captures the real-distributional block that determines the qualitative stability of the system; debt stability is then governed by the additional condition in (74).

Panel 1a shows that, when $\mu_\theta = 0$, the economy admits an interior stationary point that is locally a saddle. Progressivity then operates only as a fixed level parameter: it redistributes disposable income and finances public investment at the reference tax schedule, but it does not react when θ deviates from its benchmark. The stabilizing terms associated with the slope of the policy rule therefore vanish, including the direct compression term in the trace condition and the induced response of public investment.

Panel 1b shows that introducing the anchored fiscal response with $\mu_\theta = 0.25$ changes the qualitative dynamics. The same nullclines define the stationary point, but the slopes of the adjustment equations are modified by the endogenous response of $\varepsilon(\theta)$. In this calibration, the feedbacks operating through disposable-income redistribution, productive public investment, and the direct compression of the inequality drift are strong enough to make the real-distributional block locally stable. Thus, redistribution in levels is not equivalent to macroeconomic stabilization; what matters is the state-contingent response of progressivity to distributive imbalances.

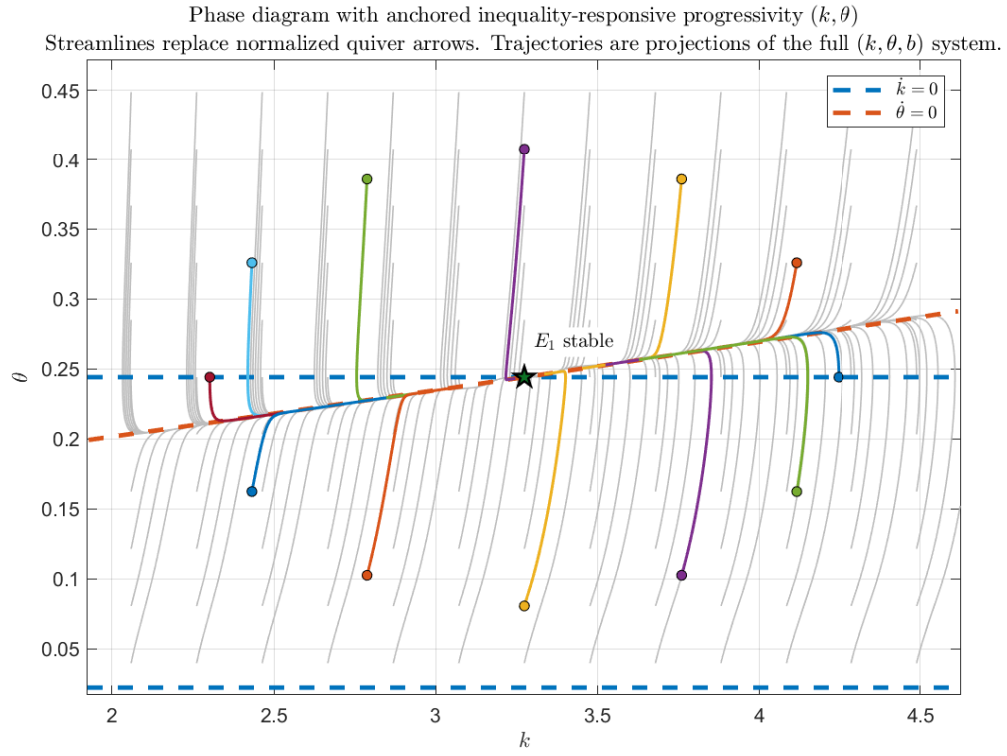
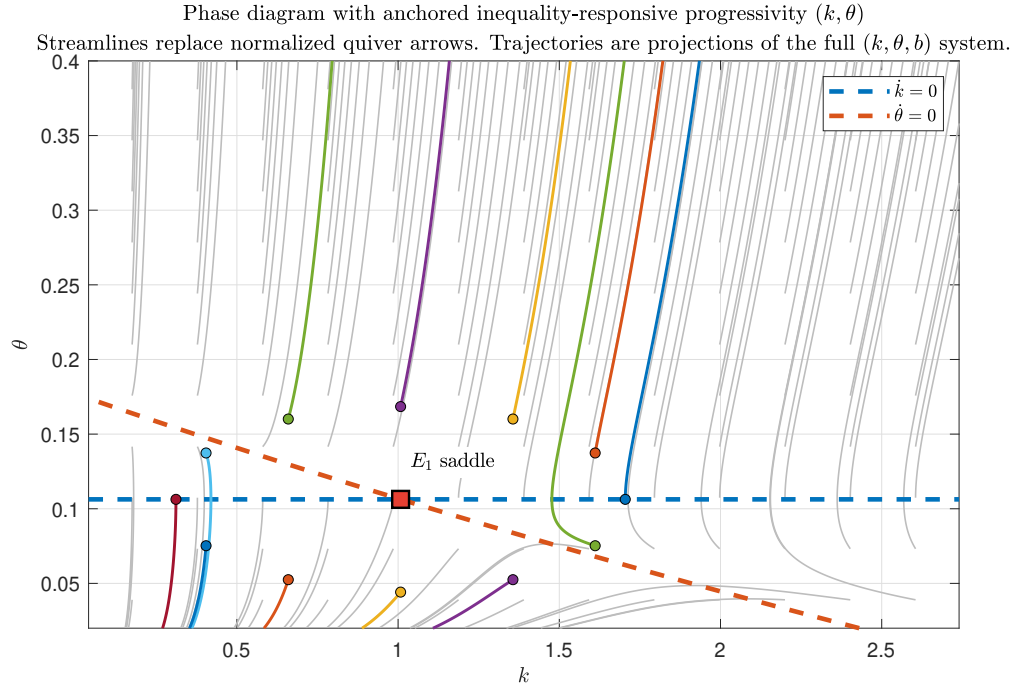
To assess whether this result is specific to the baseline calibration or reflects a broader region of the parameter space, Figure 2 reports a bifurcation-style sensitivity exercise. For each parameter pair, the numerical routine searches for admissible steady states, computes the Jacobian of the medium-run system, and classifies the locally most stable admissible equilibrium according to the sign of the dominant real part of its eigenvalues. Orange areas denote locally stable equilibria, yellow areas denote saddle or locally unstable equilibria, and gray areas indicate parameter combinations for which no admissible equilibrium is found. The dashed line marks the local-stability boundary, $\max \Re(\lambda) = 0$, while the white pentagram identifies the baseline calibration used in

Table 1: Calibration used in the numerical illustration

Parameter	Value	Description	Parameter	Value	Description
<i>Distribution and taxation</i>					
$\bar{\pi}$	0.30	Profit share	t	0.25	Baseline tax rate
ε_{ref}	0.02	Reference progressivity	θ_{ref}	0.15	Reference inequality
μ_{θ}	0 or 0.25	Fiscal response to inequality	t_b	0.20	Tax on bond income
<i>Saving behavior</i>					
s_w	0.05	Workers' saving propensity	s_m	0.40	Managers' saving propensity
s_c	0.80	Capitalists' saving propensity			
<i>Private and public accumulation</i>					
α_p	0.04	Autonomous private accumulation	α_G	0.40	Crowding-in effect
i_0^G	0.02	Autonomous public investment	ρ_{ε}	0.50	Public-investment response
β	0.05	Accelerator effect	γ	0.15	After-tax-profitability effect
χ_G	0.05	Productivity effect of public investment			
<i>Fiscal and debt block</i>					
$\bar{g}$	0.15	Current public expenditure	r_b	0.02	Real interest rate on bonds
<i>Medium-run dynamics</i>					
α_N	0.10	Labor-force growth component	β_T	0.08	Verdoorn component
λ_{Δ}	0.02	Relative bargaining effect	Ω_0	0.51	Autonomous inequality drift
ϕ	0.50	Progressivity compression effect	β_M	0.80	Overhead-labor effect

Notes: The two scenarios differ only in the fiscal-response parameter μ_{θ} . The first case sets $\mu_{\theta} = 0$, so progressivity is not state-contingent. The second sets $\mu_{\theta} = 0.25$, allowing tax progressivity to react to deviations of within-labor inequality from θ_{ref} .

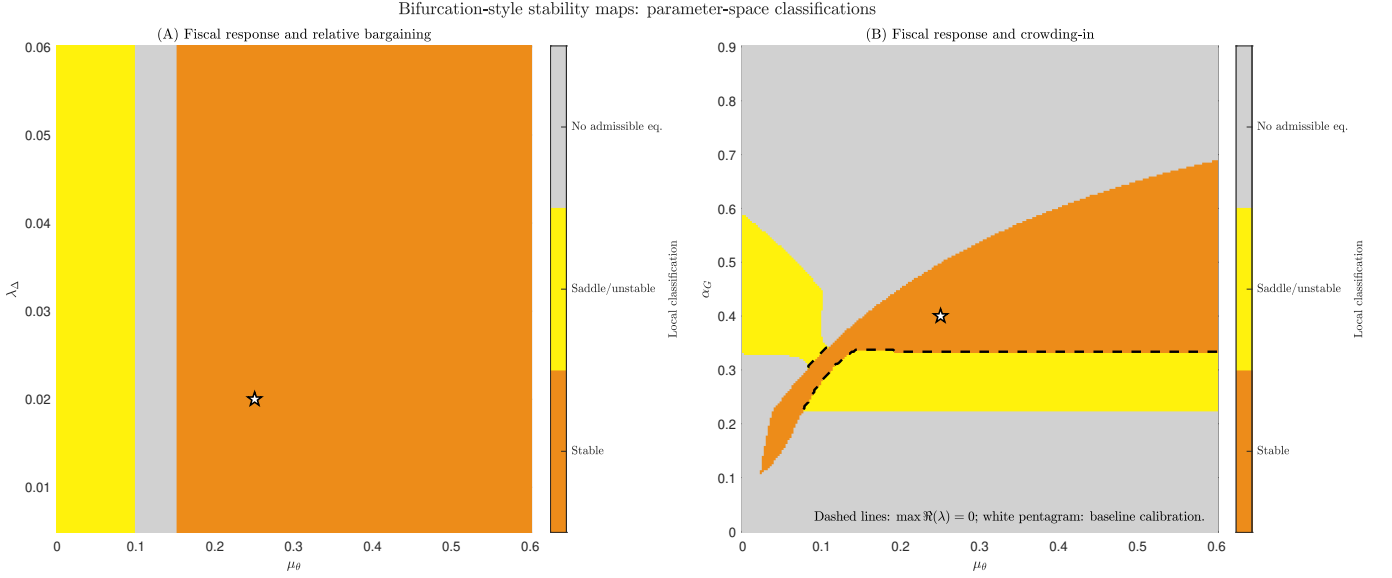
Figure 1: Projected phase diagrams under fixed and inequality-responsive progressivity



Notes: Streamlines represent the projected vector field. Trajectories are projections of the full (k, θ, b) system onto the (k, θ) plane. The two panels hold all parameters fixed except for μ_θ .

the phase diagrams. This boundary should be read as a local-stability frontier rather than, by itself, as evidence of a Hopf bifurcation.

Figure 2: Parameter-space stability maps



Notes: Orange areas denote locally stable admissible equilibria; yellow areas denote saddle or locally unstable equilibria; gray areas denote parameter combinations with no admissible equilibrium. Dashed lines indicate the local-stability frontier, $\max \Re(\lambda) = 0$. The white pentagram reports the baseline calibration used in the numerical simulations.

Panel A of Figure 2 varies the fiscal-response parameter, μ_θ , and the relative bargaining-power parameter, λ_Δ . Instability predominates when the fiscal response to inequality is weak, because the bargaining mechanism in (54) remains insufficiently disciplined. As μ_θ rises, the system enters a stable region for a broad range of λ_Δ , reflecting the stabilizing contribution of the term $-\phi\mu_\theta$ in the trace condition and the induced response of public investment. The gray band indicates combinations for which the algorithm does not find a positive admissible steady state.

Panel B varies μ_θ and the crowding-in parameter, α_G . Stability appears around intermediate combinations of fiscal responsiveness and public-investment-induced private accumulation. A higher α_G strengthens the expansionary channel of progressivity, but, if excessive, it may amplify cumulative demand–investment feedbacks. This is consistent with (73), where $(\alpha_G - \chi_G)\rho_\varepsilon$ can become destabilizing unless counterbalanced by productivity effects, the after-tax-profitability channel, or sufficient fiscal feedback.

Inequality-responsive progressivity can stabilize the economy, but only within a broader configuration of distributive bargaining, public-investment effects, admissible accumulation, productivity growth, and debt dynamics. A fixed progressive schedule may improve disposable-income distribution without necessarily stabilizing the macroeconomic consequences of inequality. By contrast, an anchored fiscal rule operates as an automatic stabilizer targeted at the distributive state variable itself.

6 Concluding remarks

This paper developed a Kaleckian model of growth, distribution, and fiscal policy with heterogeneous workers, progressive taxation, productive public investment, and public debt, building on Sanches (2025) and Ventura et al. (2026). By distinguishing production workers from managerial/professional workers within the wage share, the model showed that changes in earnings inequality can affect aggregate demand even

when the aggregate functional distribution of income remains unchanged. The key mechanism is that within-labor redistribution changes post-tax saving leakages and therefore modifies capacity utilization and private accumulation.

The analysis showed that the macroeconomic effects of earnings inequality and tax progressivity are regime-dependent. Higher within-labor inequality may depress activity when income is reallocated toward groups with relatively high propensities to save. Progressive taxation can offset this mechanism by shifting the post-tax distribution away from higher-saving groups and by financing productive public investment capable of crowding in private accumulation. At the same time, progressivity may reduce after-tax profitability and increase fiscal leakages. Its net effect on utilization and growth therefore depends on the interaction between saving behavior, and investment responses.

The medium-run extension showed that earnings inequality, capital intensity, and public debt evolve jointly. Earnings inequality is driven by two opposing mechanisms: a relative bargaining-power effect that benefits managerial/professional workers in expansions, and an overhead-labor mechanism through which production employment responds more strongly to the cycle. Productive public investment also has a dual role: it may crowd in private accumulation, but it also raises productivity and the growth of the effective labor input. Local stability therefore depends on the interaction between distributive dynamics, induced accumulation, productivity growth, and debt dynamics.

A central implication is that progressive taxation should be understood not only as a redistributive level parameter, but also as a potential feedback rule. When tax progressivity responds to within-labor earnings inequality, fiscal policy becomes part of the adjustment mechanism linking distribution, demand, accumulation, and debt. The analytical and numerical results show that state-contingent progressivity can stabilize an otherwise unstable inequality-burdened economy, provided that the fiscal response is strong enough to discipline distributive feedbacks but sufficiently anchored to preserve investment incentives and admissibility. Future research could extend the framework to incorporate endogenous monetary policy, financial fragility, household indebtedness, or open-economy constraints.

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Appendix

Implicit effects of the fiscal-response parameter

We have

$$F_D(\theta) \equiv (\nu_0 - \beta)u_D^*(\theta) - \mathcal{M}(\theta) = 0,$$

so that

$$\frac{d\theta_D^*}{d\mu_\theta} = -\frac{F_{D,\mu_\theta}}{F_{D,\theta}}, \quad \frac{du_D^*}{d\mu_\theta} = u_{D,\theta}^* \frac{d\theta_D^*}{d\mu_\theta} + u_{D,\mu_\theta}^*. \quad (75)$$

Derivative of the capital-intensity adjustment term

The policy rule implies $\varepsilon_\theta = \mu_\theta$ and $i_\theta^G = \rho_\varepsilon \mu_\theta$. Since

$$g^{p*} = \alpha_p + \alpha_G i_\theta^G(\theta) + \beta u^*(\theta) + \gamma[1 - t - \varepsilon(\theta)]\bar{\pi},$$

the total derivative of private accumulation with respect to θ is

$$g_\theta^{p*} = \beta \tilde{u}_\theta^* + (\alpha_G \rho_\varepsilon - \gamma \bar{\pi}) \mu_\theta. \quad (76)$$

The capital-intensity adjustment term is

$$H(\theta) = g^{p*}(\theta) - \nu_0 u^*(\theta) - \chi_G i_\theta^G(\theta),$$

and therefore

$$H_\theta^* = (\beta - \nu_0) \tilde{u}_\theta^* + [(\alpha_G - \chi_G) \rho_\varepsilon - \gamma \bar{\pi}] \mu_\theta. \quad (77)$$

This is the term that enters the determinant condition of the real-distributional block.