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**Article — Published Version**

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Journal of Economic Interaction and Coordination

**Provided in Cooperation with:**

Springer Nature

*Suggested Citation:* Proaño, Christian R.; Galanis, Giorgos; Peña, Juan Carlos (2024) : On the macro-political dynamics of conflict inflation, Journal of Economic Interaction and Coordination, ISSN 1860-7128, Springer, Berlin, Heidelberg, Vol. 20, Iss. 3, pp. 725-745, <https://doi.org/10.1007/s11403-024-00432-0>

This Version is available at:

<https://hdl.handle.net/10419/323454>

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# On the macro-political dynamics of conflict inflation

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Received: 2 February 2024 / Accepted: 24 October 2024 / Published online: 14 November 2024  
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## Abstract

In recent times, the notion that inflation may be the result of conflicting claims by workers and capitalists over the distribution of income has experienced a revival in the academic and policy debate. Against this background, we investigate in this paper the macrodynamics of conflict inflation without and with the additional influence of the political sphere in an extended version of the baseline model of behavioral political cycles proposed by Galí (J Econ Behav Organ 212:50–67, 2023). By means of numerical simulations, we illustrate the reaction of main macroeconomic variables to the emergence of conflicting claims over the distribution of income between workers and capitalists, as well as their possible effects at the political sphere.

**Keywords** Behavioral macroeconomics · Disequilibrium · Discrete choices · Macroeconomic fluctuations · Political cycles · Polarization

**JEL Classifications** D5 · E3 · H2

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We would like to thank Giorgio Ricchiuti, Leonardo Bargigli, Thomas Lux, Gilberto Tadeu Lima, Marwil Davila-Fernandez, Sebastian Dullien, Alexander Herzog-Stein, Sven Schreiber, Thomas Theobald as well as participants of the 2023 DISEI Workshop at the University of Florence and the 2024 Annual Conference of the Eastern Economic Association for helpful comments and suggestions. All remaining errors are ours.

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## 1 Introduction

After nearly a decade where inflation rates around the world were rather low and often quite close to the 2% reference level in line with the central banks' targets, the global supply chain disruptions due to the COVID-19 pandemic first and the Russian War on Ukraine then led to an unprecedented surge in inflation in the Western economies in particular. The highly unequal impact of such high inflation rates on different parts of the population has led to a reevaluation of the causes for inflationary developments, focusing in particular on the role of the distributional conflict, after decades where inflation dynamics were predominantly understood through the lens of the New Keynesian approach (see e.g. Galí 2015).

Arguably, the most recent influential contribution in both policy and academic discourse comes from Weber and Wasner (2023), who posit that inflation is primarily propelled by profits, framing it as “sellers” inflation. Emphasizing the significance of profits in elucidating the observed escalation in prices, Weber and Wasner (2023) underscores that inflation originates from the struggle for income distribution between wage and profit earners, challenging the notion popularized by Friedman (1970) that inflation is primarily a monetary phenomenon. According to Weber and Wasner (2023), the conflict over the distribution of income proceeds in three stages: during the first stage, bottlenecks in upstream sectors result in windfall profits and trigger new price increases. During the second stage, downstream sectors also increase prices to protect their profit margins from increases in costs. Finally, labor responds to the fall of real wages due to increases in prices demanding higher wages.

This perspective, characterizing inflation as a “conflict phenomenon,” is deeply rooted in the traditions of Keynesian and post-Keynesian economics, dating back to the seminal works of Kalecki (1954); Kaldor (1955, 1957), and Robinson (1952), and subsequently advanced by scholars such as Kalecki (1971); Rowthorn (1977); Marglin (1984), and Dutt (1987) among others.<sup>1</sup> Recent contributions to the literature on conflict inflation include work by Hein (2006); Lavoie (2006); Stockhammer (2008); Hein and Stockhammer (2009); Setterfield (2009, 2023) who share the broader post-Keynesian perspective and also Lorenzoni and Werning (2023) who use a New Keynesian framework.

Recent empirical literature has extensively examined how the economic well-being of workers, particularly in terms of reduced disposable income, influences voters' preferences. This research has gained prominence due to the significant increase in income and wealth inequality observed in Western societies in recent decades, a phenomenon documented extensively by Atkinson et al. (2011); Stiglitz (2012) and Piketty (2014). The increasing inequality has not only brought income disparity into the center of political debate, but it has also been linked to the rising electoral success of far-right and far-left parties in many Western European democracies from 1970 to 2016 (Proaño et al. 2024). The extent to which domestic authorities wish

<sup>1</sup> For an in-depth exploration of the various approaches within this broader framework, refer to and Hein (2023) and Hein and Häusler (2023).

to address income inequality and engage in income redistribution may depend on their government ideology (Kauder et al. 2021). Partisan theories (Alesina 1987; Hibbs 1977) highlight that left-wing governments tend to focus on helping lower-income people through policies such as higher taxes on the wealthy and more social programs. In contrast, right-wing governments often focus on policies that benefit wealthier individuals, such as tax cuts and deregulation. For instance, Angelopoulos et al. (2012) indicate that left-wing government's tax capital income is more heavily relative to labor income in 16 OECD countries between 1970 and 2000. Moreover, Dorn and Schinke (2018) show that the income share of the top 1% increased more under right-wing governments than under left-wing governments using a sample of 17 OECD countries between 1970 and 2014.

Against this background, we investigate in this paper the macrodynamics of conflict inflation without and with the additional influence of the political sphere in a slightly extended version of the baseline model of behavioral political cycles proposed by Di Guilmi et al. (2023). By means of numerical simulations, we illustrate the reaction of main macroeconomic variables to the emergence of conflicting claims over the distribution of income between workers and capitalists, as well as their possible effects at the political sphere. Our findings can be summarized as follows: first and foremost, conflicting claims between workers and capitalists have permanent negative level effects on key macroeconomic variables such as the wage share, private consumption and output, what can be related to negative welfare effects. Second, at the political sphere, the discrepancy between the workers' wage share target and the wage share that is consistent with macroeconomic equilibrium (the former being assumed to be larger than the latter) has also a permanent impact on the political climate, leading also to an increase in the capitalists tax rate, what depresses the after-tax profit rate and, by extension, aggregate investment and capitalists' consumption. And last but not least, the macroeconomic effects seem to dominate the pure political effects, at least under the chosen parameter constellation.

Our work contributes to the broader literature on heuristic switching models initiated by the behavioral finance papers by Lux (1995) and Brock and Hommes (1997, 1998). Models with heterogeneous interacting agents within the "heuristic switching" tradition have been traditionally used to study questions first regarding financial markets (Chiarella and He 2002, 2003; Westerhoff and Dieci 2006) and then macroeconomic (De Grauwe 2012, 2011; Flaschel et al. 2018; Hommes and Lustenhouwer 2019; Hommes et al. 2019; Assenza et al. 2021; Proaño and Lojak 2020, 2021), and exchange rate dynamics (De Grauwe and Grimaldi 2005; Proaño 2011, 2013). Recently, this literature has evolved in very different directions, focusing on questions related to voting (Di Guilmi and Galanis 2021; Di Guilmi et al. 2023), decisions related to climate action (Galanis et al. 2022; Cahen-Fourot et al. 2023; Campiglio et al. 2024; Dávila-Fernández et al. 2024) and decisions related to health outcomes (Di Guilmi et al. 2022; Galanis et al. 2021; Proaño et al. 2024).

The remainder of this paper is organized as follows. First, in Sect. 2, we describe the macro-political model based on Di Guilmi et al. (2023). We illustrate through numerical simulations the transmission mechanisms at work in the model in Sect. 3, in particular regarding to exogenous supply shocks. Finally, we draw some concluding remarks from this study in Sect. 4.

## 2 The model

### 2.1 The macroeconomic sphere

As in Di Guilmi et al. (2023), we model the macroeconomic sphere along the lines of the Keynesian disequilibrium approach put forward by Chiarella and Flaschel (2000); Chiarella et al. (2005) and more recently Chiarella et al. (2021).

We denote by  $\rho$  the profit rate, which is given by

$$\rho = (1 - v)y - \delta \quad (1)$$

where  $y = Y/K$  is the output-capital ratio,  $\delta$  is the depreciation rate of capital and  $v$  is the wage share of aggregate income. The wage share is given by

$$v = \omega L^d / Y,$$

where  $\omega$  is the real wage such that  $\omega = w/p$  with  $w$  capturing nominal wages and  $p$  current prices; and  $L^d$  is the employment level which along Keynesian lines is assumed to be demand driven.

Further, as standard in the heterodox literature, we assume different saving rates between capitalists ( $s_c$ ) and workers ( $s_w$ ). More specifically, while capitalists are assumed to save a share  $0 < s_c < 1$  of their after-tax disposable income, workers are assumed not to save ( $s_w = 0$ ). Accordingly, aggregate private consumption  $c$ , expressed as a fraction of the capital stock ( $c = \frac{C}{K}$ ) is the sum of workers' and capitalists' consumption, i.e.

$$c = \overbrace{(1 - \tau_w)vy}^{C_w/K} + \overbrace{(1 - s_c)(1 - \tau_c)\rho}^{C_c/K} \quad (2)$$

where  $C_w$  is workers' consumption,  $C_c$  is capitalists' consumption (with  $C_w + C_c = C$ ) and  $\tau_w$  and  $\tau_c$  are the workers' and the capitalists' tax rates, respectively.

As in Di Guilmi et al. (2023), we assume a balanced government budget, and also assume that government spending  $g$ , expressed here in relation to the capital stock ( $g = \frac{G}{K}$ ) is fully funded by taxes, i.e.

$$g = \tau_w vy + \tau_c \rho. \quad (3)$$

Further, the gross investment to capital stock ratio  $\iota = I/K$  is assumed to depend on the profitability gap (Fisher 1933; Kalecki 1993 and Keynes 1936), i.e. on the difference between the after-tax profit rate  $(1 - \tau_c)\rho$  and the real rate of interest  $r$ , i.e.

$$\iota = \iota_\rho \{ (1 - \tau_c)\rho - r \} + \delta,$$

with  $\iota_\rho$  representing the sensitivity of investment to the profitability gap,  $\delta$  being the rate of capital depreciation and  $r$  is the real interest rate defined as

$$r = i - \hat{p} \quad (4)$$

with  $i$  being the nominal interest rate and  $\hat{p}$  is the price inflation rate.<sup>2</sup>

As it is standard in modern monetary macroeconomics, the nominal interest rate is assumed to be determined in a Taylor rule manner (Taylor 1993), i.e.

$$i = r_o + \phi_\pi(\hat{p} - \pi^*) \quad (5)$$

where  $r_o$  is the steady-state real interest rate,  $\pi^*$  is the target inflation rate and  $\phi_\pi$  is the interest rate sensitivity with respect to the inflation gap  $\hat{p} - \pi^*$ .<sup>3</sup>

After insertion of (1) and (4), the gross investment to capital ratio can be expressed as

$$\iota = \iota_o \{ (1 - \tau_c)((1 - v)y - \delta) - r_o - \phi_\pi(\hat{p} - \pi^*) + \hat{p} \} + \delta. \quad (6)$$

In a standard manner, aggregate demand  $y^d$  is given in a closed economy by

$$y^d = c + \iota + g, \quad (7)$$

and the output is assumed to adjust in reaction to the goods market disequilibrium given by the difference between aggregate demand and current aggregate output, i.e.<sup>4</sup>

$$\dot{y} = \beta_y(y^d - y). \quad (8)$$

Finally, and in contrast to Di Guilmi et al. (2023), who used a reduced-form specification for the dynamics of the wage share, we follow here the standard approach of the “Bielefeld School” of specifying two separate wage and price Phillips curves to model the dynamics of the real wage (and for a constant labor productivity, of the wage share), as in Chiarella et al. (2005) as well as, for example, Franke et al. (2006), namely

$$\hat{w} = \beta_{we}(y - y_o) - \beta_{wv} \ln(v/v_o^w) + \kappa_{wp}\hat{p} + (1 - \kappa_{wp})\pi^c + \kappa_{wz}g_z, \quad (9)$$

$$\hat{p} = \beta_{py}(y - y_o) + \beta_{pv} \ln(v/v_o^f) + \kappa_{pw}(\hat{w} - g_z) + (1 - \kappa_{pw})\pi^c, \quad (10)$$

where  $g_z$  is the trend labor productivity growth,  $y_o$  is the equilibrium output-capital ratio,  $\pi^c$  the inflationary climate in the economy assumed usually to be determined in an adaptive manner in relation to target values  $v_o^w$  and  $v_o^f$  (as it will be discussed

<sup>2</sup> While in Di Guilmi et al. (2023), the real interest rate was simply assumed to be a positive function of the output gap; here, we model separately the evolution of the nominal interest rate and of price inflation.

<sup>3</sup> Operationally, the central bank is implicitly assumed to adjust the interest rate on bank reserves accordingly, even if a banking sector is not explicitly modeled here.

<sup>4</sup> In a proper KMG framework, intended and unintended inventories, together with the firms' output expectations, would determine aggregate output. As this channel is not central for the current analysis, we opted for this simplified specification instead. It should be pointed out, however, that this short-cut implies that the well-known Kalecki-Levy identity does not hold in the current model version. We believe, however, that this shortcoming does not have important consequences for the model's analysis, while allowing us to keep our model as parsimonious as possible. We thank a referee for pointing this out to us.

below) and  $\beta_{we}, \beta_{wv}, \beta_{py}, \beta_{pv}, \kappa_{wp}, \kappa_{wz}, \kappa_{pw} > 0$ , capture the relative importance of the different factors on  $\hat{w}$  and  $\hat{p}$ , respectively.

While in Chiarella et al. (2005) as well as, for example, in Franke et al. (2006) and many other works of the Bielefeld School, it was assumed that the target wage share used in the wage and price determination were consistent with each other, i.e.  $v_o^w = v_o^f$ , we assume now that  $v_o^w > v_o^f$ . Accordingly, for  $v < v_o^w$ , workers will seek to catch up to what they considered as a “fair” wage share level  $v_o^w$  and demand higher nominal wages, impacting positively wage inflation. By the same token, workers will be more restrained in their wage claims if  $v > v_o^w$ .

The positive influence of  $\ln(v/v_o^f)$  on the price inflation dynamics described by (10) can be explained by a target markup rate  $\gamma$  that firms may wish to realize. Accordingly, firms raise prices if labor costs are currently so high that  $(1 + \gamma)wN > pY$ , which is equivalent to  $(1 + \gamma)wN/pY - 1 = (1 + \gamma)v_o^f - 1 > 0$ . As

$$v_o^f = \frac{1}{1 + \gamma}$$

is the wage share that would be consistent with the firms’ markup rate  $\gamma$ , it follows that prices will increase if

$$\frac{v}{v_o^f} > 1.$$

Solving both equations jointly for  $\hat{w}$  and  $\hat{p}$  yields the reduced-form Phillips curves (with  $f_w(y, v) = \beta_{we}(y - y_o) - \beta_{wv} \ln(v/v_o^w)$ ,  $f_p(y, v) = \beta_{py}(y - y_o) + \beta_{pv} \ln(v/v_o^f)$  and  $\kappa = 1/(1 - \kappa_{wp}\kappa_{pw})$ ):

$$\begin{aligned}\hat{w} &= \kappa [f_w(y, v_o^w) + \kappa_{wp}f_p(y, v_o^f) + (\kappa_{wz} - \kappa_{wp}\kappa_{pw})g_z] + \pi^c, \\ \hat{p} &= \kappa [f_p(y, v_o^f) + \kappa_{pw}f_w(y, v_o^w) + \kappa_{pw}(\kappa_{wz} - 1)g_z] + \pi^c,\end{aligned}$$

and thus a law of motion for the evolution of the labor share  $v = w/(pz)$ :

$$\begin{aligned}\hat{v} &= \hat{w} - \hat{p} - g_z \\ &= \kappa [(1 - \kappa_{pw})f_w(y, v) - (1 - \kappa_{wp})f_p(y, v) + (\kappa_{wz} - 1)(1 - \kappa_{pw})g_z].\end{aligned}\quad (11)$$

As it can be clearly observed, (11) can be understood as a reduced-form representation of this equation that also fulfills the properties of the original law of motion of the wage share of the Bielefeld School.

Last but not least, the trend inflation or inflationary climate is assumed to be updated in an adaptive manner through

$$\dot{\pi}^c = \beta_{\pi^c}(\hat{p} - \pi^c). \quad (12)$$

as, for example, in Franke et al. (2006) and Proaño et al. (2006).

## 2.2 The political sphere

Following Di Guilmi and Galanis (2021) and Di Guilmi et al. (2023), we consider two political parties (left  $L$  and right  $R$ ) and  $2N$  boundedly rational voters with evolving preferences,  $N$  being very large. While the  $R$  party favors a flat tax across capitalists and workers, the  $L$  party aims for a higher tax on capitalist income.

Let the  $x$  be the relative support of the left, such that

$$x = \frac{n^L - n^R}{2N}, \quad (13)$$

where  $n^L$  is the number of the left voters and  $n^R$  the number of voters who support the right, such that  $n^L + n^R = 2N$ . As in Di Guilmi et al. (2023) we assume that the relative tax contributions from the two classes are given by

$$\tau_c = \tau_w(2 + x) \quad (14)$$

such that when all voters support  $L$  ( $x = 1$ ), capitalists are taxed three times as much as workers, and when all voters choose  $R$  ( $x = -1$ ) the tax rate is the same across social groups.<sup>5</sup>

As in Di Guilmi et al. (2023), we assume that political preferences are exhaustive such that if an agent does not choose one party then they necessarily choose the other. More specifically, agent  $i$  chooses to vote  $L$  if  $U_i > 0$  and prefers  $R$ , otherwise, with  $U_i$  given by

$$U_i = \gamma_x x + \gamma_y x(y - y^o) + \gamma_v(v_o^w - v) + \epsilon_i, \quad (15)$$

where the first term represents the *bandwagon effect*, captured by  $x$ , the second term represents the *responsibility hypothesis* captured by the output gap ( $y - y^o$ ), the third term represents the public's *distributional preferences*, quantified by  $v_o^w - v$  and  $\epsilon_i$  represents the unobservable characteristics for agent  $i$ .

While the first term related to the *bandwagon effect* is self-explanatory, according to the second term, an economic boom ( $y > y^o$ ) will benefit the party with the political majority at that moment (recalling that  $x > 0$  and  $x < 0$  imply a left-wing and right-wing majority, respectively), whereas none of the two parties will benefit from such a situation when  $x = 0$ .

Further, regarding the third term, we assume that if the wage share is lower than  $v_o^w$  the electorate will turn to the left-party, which is traditionally associated to more equality-oriented policies. By contrast, if  $v > v_o^w$ , the public will turn to the right-wing party.<sup>6</sup>

<sup>5</sup> The assumption of having a maximum tax rate for capitalist income of three times the one for workers is a simplifying assumption which allows for a tractable functional form as per equation (14).

<sup>6</sup> This third term replaces the inequality factor in Di Guilmi and Galanis (2021) because, in line with the KMG tradition, here we consider the functional rather the personal distribution of income.

Postulating that  $\epsilon_i$  in (15) follows a logistic distribution,<sup>7</sup> it can be shown (see Di Guilmi and Galanis 2021) that the change in the relative proportion of voters is<sup>8</sup>

$$\dot{x} = (1-x) \frac{e^{\gamma V}}{1+e^{\gamma V}} - (1+x) \frac{1}{1+e^{\gamma V}} = \frac{e^{\gamma V} - 1}{1+e^{\gamma V}} - x. \quad (17)$$

### 2.3 Local stability analysis

Di Guilmi et al. (2023) show that a quite similar macro-political model (without conflicting claims and thus with  $v_o^f = v_o^w = v_o$ , and with a more simplified reduced-form labor share equation with similar properties to the one in with  $r = r_o + r_y(y - y_o)$  instead of (5)) has three steady states regarding  $v$ :  $v_o = 0$ ,  $v_o = 1$  and  $0 < v_o < 1$ , the latter being the only economically relevant one. Further, their proposition 1 describes that a sufficiently larger reaction of the real interest rate to economic activity, and a sufficiently low bandwagon effect ( $\gamma_x < 2$ ) are sufficient conditions for local stability of the economically meaningful steady state.

While in the present paper, the dynamics of the labor share are specified somewhat differently, the stability properties of the modified model are consistent with the Di Guilmi et al. (2023) baseline macro-political model.

Assuming  $x = 0$  to isolate the political sphere for the moment, and plugging (2), (3) and (6) into (8), we get

$$\dot{y} = \beta_y \{ (\iota_p - s_c)(1 - 2\tau_w)[(1 - v)y - \delta] - \iota_p[\bar{r} + \phi_\pi(\hat{p} - \pi^*)] \}, \quad (18)$$

while the evolution of  $v$  and  $\pi^c$  is given by (11) and (12), i.e.

$$\begin{aligned} \dot{v} &= v \cdot \kappa \left[ (1 - \kappa_{pw})f_w(y, v) - (1 - \kappa_{wp})f_p(y, v) + (\kappa_{wz} - 1)(1 - \kappa_{pw})g_z \right]. \\ \dot{\pi}^c &= \beta_{\pi^c}(\hat{p} - \pi^c). \end{aligned}$$

Ruling out the economically nonmeaningful case where  $v^o = 0$ , and assuming that it is the wage share  $v$  which adjusts to bring about equilibrium in the goods market, the macroeconomic steady state is given by  $y = y^o$ ,  $\pi^c = \pi^*$  and

<sup>7</sup> The assumption of a logistic distribution implies a logit model for the discrete choice process, as it is common in empirical research (Train 2009). The logistic distribution is also the standard implicit assumption in the theoretical models drawing on discrete choice theory. We refer the interested reader to the survey by Hommes (2006), for example, and to the discussion in Galanis et al. (2022).

<sup>8</sup> Equation (17) is equivalent to equation (4) in Franke and Westerhoff (2017) when all agents are able to update their preferences in each time unit, which is reasonable to assume in political polling. Accordingly, equation (17) can be expressed as

$$\dot{x} = \mu [\tanh(\gamma V) - x] \quad (16)$$

with  $\mu = 1$  as the fraction of agents who are able to update their preference. The case of  $\mu < 1$  is defined as *asynchronous updating* (see Franke 2014; Hommes et al. 2005).

$$v = v^o = 1 - \frac{\iota_\rho \bar{r}}{y^o(\iota_\rho - s_c)(1 - 2\tau_w)} - \frac{\delta}{y^o}$$

As discussed in Di Guilmi et al. (2023), under the realistic assumption that the workers' tax rate  $\tau_w$  is lower than  $1/2$ , the wage share is always defined in the interval between 0 and 1, i.e.  $v \in (0, 1)$ , for  $\iota_\rho > s_c$ , a condition that is the reverse of the standard post-Keynesian stability condition (see e.g. Kaldor 1940 and Franke 2017). By contrast, for the case where  $s_c > \iota_\rho$ , this holds only as long as

$$\frac{\iota_\rho \bar{r}}{y^o(\iota_\rho - s_c)(1 - 2\tau_w)} < \frac{\delta}{y^o}.$$

As we will discuss below, since for  $\iota_\rho > s_c$ ,

$$\frac{\partial \dot{y}}{\partial v} = -\beta_y \{(\iota_\rho - s_c)(1 - 2\tau_w)[(1 - v^o)y^o - \delta] - \iota_\rho \bar{r}\} y^o < 0,$$

and for  $s_c > \iota_\rho$ ,

$$\frac{\partial \dot{y}}{\partial v} > 0,$$

the former case can be understood as representing a “profit-led” and the latter a “wage-led” economy (see e.g. ?). Among other things, we will investigate the differentiated dynamics in these two cases below by means of numerical simulations.

### 3 Numerical analysis

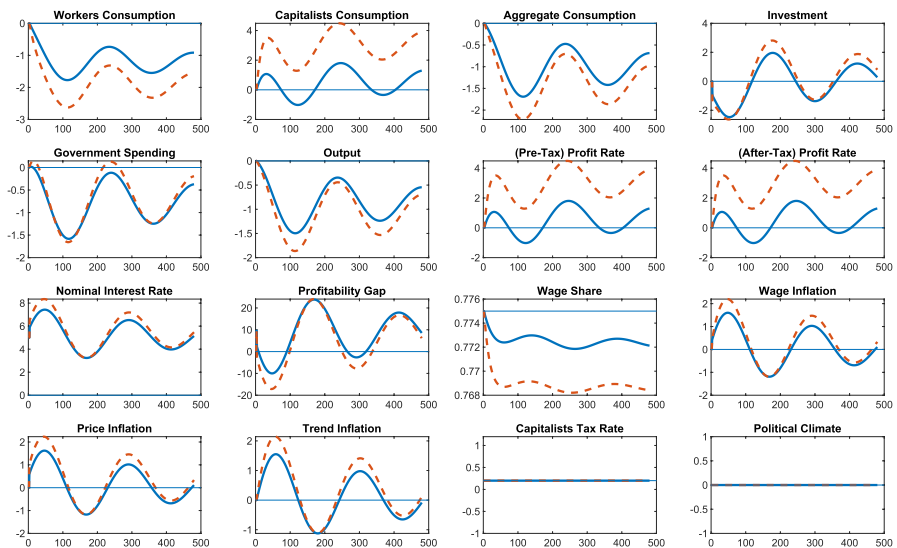
#### 3.1 Calibration

The baseline parameter values for the following numerical simulations are reported in Table 1. They are the same as those used in Di Guilmi et al. (2023) (see also Chiarella et al. 2021), with the exception of the coefficients concerning the wage-price dynamics and the inflationary climate, which are based on Chiarella et al. (2005) and the GMM estimation study for the U.S. by Proaño et al. (2006).

Following Chiarella et al. (2005) who argue that a time step equivalent to a monthly frequency is enough to generate dynamics similar enough to those of a model specified in continuous time, we use a discrete-time approximation of the above continuous-time system obtained through the Euler Method and set the time step  $h = 1/12$ , taking the

**Table 1** Baseline parameter values

Variable	Symbol	Value	
Depreciation rate	$\delta$	0.1	Di Guilmi et al. (2023)
Output adjustment parameter (annualized)	$\beta_y$	1	Di Guilmi et al. (2023)
Workers' tax rate (for $x = 0$ )	$\tau_w$	0.1	Di Guilmi et al. (2023)
Capitalists' tax rate (for $x = 0$ )	$\tau_c$	0.2	Di Guilmi et al. (2023)
Steady-state real interest rate	$\bar{r}$	0.05	Di Guilmi et al. (2023)
Steady-state output-capital ratio	$y^o$	1.0	Di Guilmi et al. (2023)
Capitalists' saving rate	$s_c$	0.2	Di Guilmi et al. (2023)
Profit rate coefficient in investment function	$i_\rho$	0.4	Di Guilmi et al. (2023)
Employment sensitivity of wage inflation	$\beta_{we}$	0.55	Proaño et al. (2006)
Wage share sensitivity of wage inflation	$\beta_{wv}$	0.5	Proaño et al. (2006)
Cross-over term of wage inflation	$\kappa_w$	0.42	Proaño et al. (2006)
Cross-over term of price inflation	$\kappa_p$	0.55	Proaño et al. (2006)
Capacity sensitivity of price inflation	$\beta_{py}$	0.15	Proaño et al. (2006)
Wage share sensitivity of price inflation	$\beta_{pv}$	0.25	Proaño et al. (2006)
Adjustment parameter in trend price inflation	$\beta_\pi$	1	Proaño et al. (2006)
Herding coefficient in sentiment expression	$\gamma_x$	2.0	Di Guilmi et al. (2023)
Business cycle coefficient in sentiment expression	$\gamma_y$	10	Di Guilmi et al. (2023)
Wage share coefficient in sentiment expression	$\gamma_v$	0.0/2.5	Di Guilmi et al. (2023)

**Fig. 1** Pure conflict inflation dynamics using the baseline parameter values of Table 1 (continuous line) and with  $\beta_{pv} = 0.5$  (dashed line)

annual frequency as reference. Accordingly, the evolution of any given model variable  $x_t$  is determined by  $x_t = x_{t-1} \cdot (1 + h \cdot \hat{x}_t)$ , with  $\hat{x}_t$  being the annual growth rate of  $x_t$ .

### 3.2 The macrodynamics of conflicting income claims

We begin our analysis by focusing on the macroeconomic sphere only, “shutting down,” so to say, the interaction between the macroeconomic and the political sphere.

Figure 1 illustrates the dynamics emerging from the introduction of conflict inflation into the Keynes-Goodwin macroeconomic model described in the previous section for  $\beta_{pv} \simeq \beta_{wv}$  (scenario 1, continuous line), and  $\beta_{pv} = 0.5 > \beta_{wv}$  (scenario 2, dashed line). While the first scenario uses the U.S. parameter estimates of Proaño et al. (2006), the second scenario illustrates the situation where the impact of  $v \neq v_o^f$ , and thus of the firms income claims, have a stronger impact on price inflation than those of workers on wage inflation.

In the initial period of the simulation, the wage share targets of workers and capitalists are assumed to be the same, i.e.  $v_o^w = v_o^f = v_o$ , where  $v_o$  is the wage share consistent with macroeconomic equilibrium. In the following period and for the rest of the simulation, we set

$$v_o^w = v_o + 0.0125 \quad \text{and} \quad v_o^f = v_o - 0.0125,$$

implying thus a claim wedge of 2.5%. As Fig. 1 clearly illustrates, the emergence of the wedge  $v_o^w - v_o^f > 0$ , that represents the conflicting claims of workers and capitalists over aggregate income, leads to cyclical movements in the macroeconomic variables considered. More specifically, as  $v_o^f < v_o < v_o^w$ , both wages and prices experience an upward pressure, with  $\hat{w} > \hat{p}$  and thus an increase in the wage share  $v$  in the first scenario (continuous line) and vice versa in the second (dashed line).

Focusing now on the first scenario, the increase in  $v$  leads to a sharp decrease in the profit rate that is translated into a significant reduction of aggregate investment and aggregate output that reverts the initial wage share rise. As the first two panels in Fig. 1 clearly show the reaction of the workers, and the capitalist’s consumption is quite different; while capitalists consumption follows basically the dynamics of the profit rate, workers consumption follow the dynamics of aggregate output. In the aggregate, the latter dominates the former, featuring cyclical dynamics highly correlated with the evolution of aggregate output.

The dynamics emerging in the second scenario, where  $\beta_{pv} > \beta_{wv}$ , are quite similar to those of the first scenario, being the single most important difference of the profit rate, and by extension of the capitalists consumption. As  $\beta_{pv} > \beta_{wv}$ , the impact of conflicting claims leads to a higher price- than wage inflation, what reduces unambiguously the wage share, increase the profit rate and thus, capitalists consumption.

The most interesting aspect of this first analysis is however the fact that in both cases key macroeconomic variables converge to a *lower* level than in the case where  $v_o^w = v_o^f = v_o$ , suggesting that the emergence of conflicting claims over the distribution of income has significant macroeconomic costs. Further, it seems that the

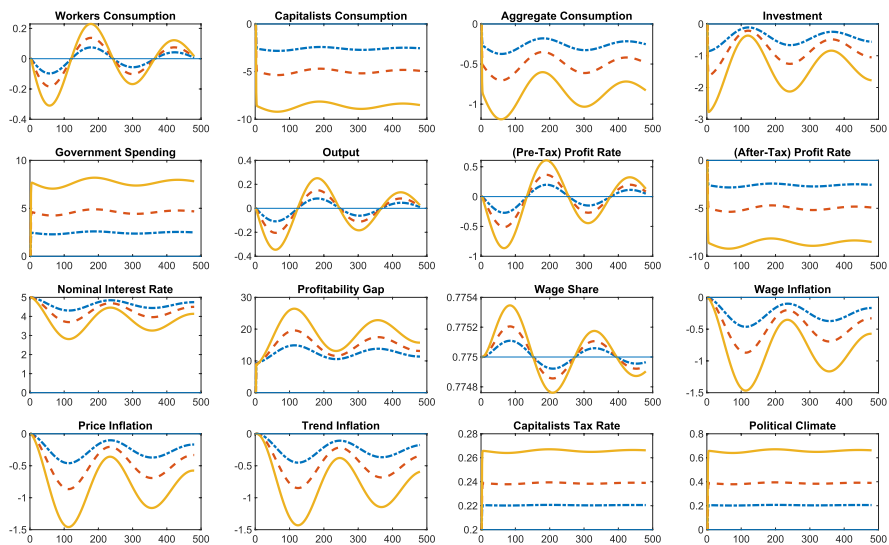
costs of this macroeconomic inefficiency is larger in the second scenario (where  $\beta_p v > \beta_{vv}$ ), i.e. where the impact of the wedge  $v_o^f \neq v$  on price inflation is larger than that of  $v_o^w \neq v$  on wage inflation. The mechanism behind this rather unexpected result is the following: Since  $v_o^w > v_o$  and  $v_o^f < v_o$ , there will always be a pressure on wage and price inflation that holds in the normal case. (Since no party will be able to fully meet its respective targets.) As a result, only a state of underutilization in the goods markets can counterbalance this continuous pressure in the wage and price inflation equations if the system is to asymptotically converge to the long-run steady state. As a result, the output gap becomes permanently negative.

### 3.3 The political dimension of conflicting income claims

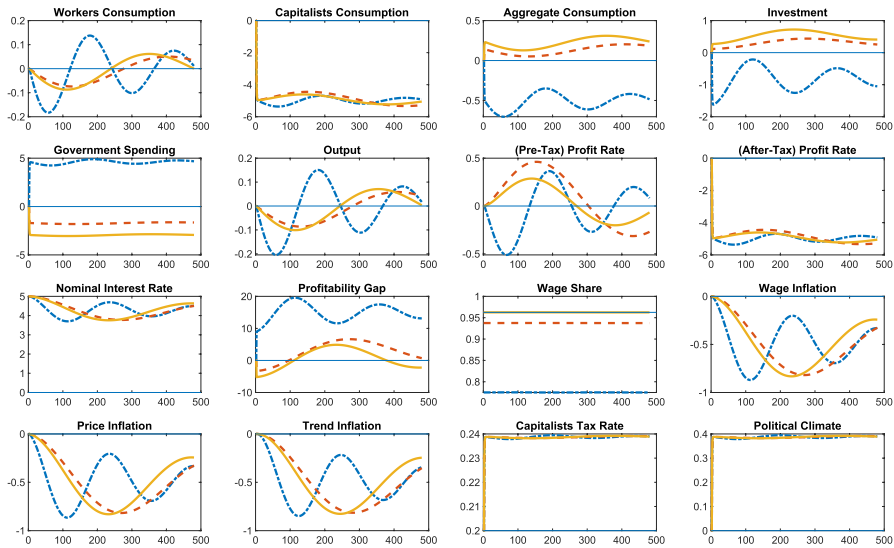
Let us now analyze how conflicting claims over the distribution of aggregate income may affect the political sphere in isolation.

In contrast to Di Guilmi and Galanis (2021) and Di Guilmi et al. (2023), where distributional preferences of the society were oriented toward to macroeconomic steady state  $v_o$  and there was thus no conflicting claims between firms and workers, according to (15), the workers' wage share target  $v_o^w$  is assumed to determine solely the distributional preferences at the political sphere, as workers represent a much larger share of the population as capitalists.

As it can be clearly observed in Fig. 2, a reference wage share of  $v_o^w$  instead of  $v_o$  leads to a left-shift in the political climate, as the higher income claims of workers remain unfulfilled. This lead, through (14), to an increase in the capitalists tax rate  $\tau_c$  relative to the (unvarying) workers' tax rate  $\tau_w$ . This leads to a drop in the (after-tax)



**Fig. 2** The political sphere of conflicting income claims using the baseline parameter values of Table 1 for different values of  $\gamma_v = 25$  (continuous line),  $\gamma_v = 50$  (dashed line) and  $\gamma_v = 100$  (dotted line)



**Fig. 3** The political sphere of conflicting income claims using the baseline parameter values of Table 1 and  $\gamma_v = 50$  and  $i_p = 0.4$  (dashed-dotted line, representing a *profit-led economy*),  $i_p = 0.075$  (dashed line, *wage-led economy*) and  $i_p = 0.1$  (continuous line, *wage-led economy*)

profit rate, which reduces both investment, as well as capitalist's consumption permanently. Further, as the government implements a balanced budget fiscal policy, the higher  $\tau_c$  lead also to an increase in government spending that counterbalances partially the level drop of aggregate investment. As a result, output fluctuates around its long-run value in a symmetric manner, in contrast to the previous scenario. Finally, it should be noted that the discrepancy between  $v_o^w$  and  $v_o$  on the political sphere does not lead to a permanently lower wage share, but only to fluctuations around  $v_o$  that increase in amplitude with larger values of  $s_v$ , in contrast to the pure macrodynamics scenario discussed previously.

As a robust check for the previous simulation, we rerun the previous simulation for the case where  $i_p = 0.075$  and  $i_p = 0.1$ , so that in both cases  $i_p < s_c = 0.2$ . Both parametrizations represent the case of a *wage-led economy*, as discussed in the local stability analysis section.<sup>9</sup>

As Fig. 3 illustrates, in the wage-led economy an exogenous left-shift in the political climate that leads to an increase in the capitalists tax rate that, in contrast to the previous case, does not depress aggregate investment despite of the drop in the after-tax profit rate due to the low values of  $i_p$ , in contrast to the *profit-led economy* assumed in the baseline calibration (where  $i_p = 0.4 > s_c$ ). As in the *profit-led* case, an increase in  $\tau_c$  depresses the capitalists' consumption but, since the steady-state wage share is higher in the *wage-led* case, workers' consumption, and thus aggregate

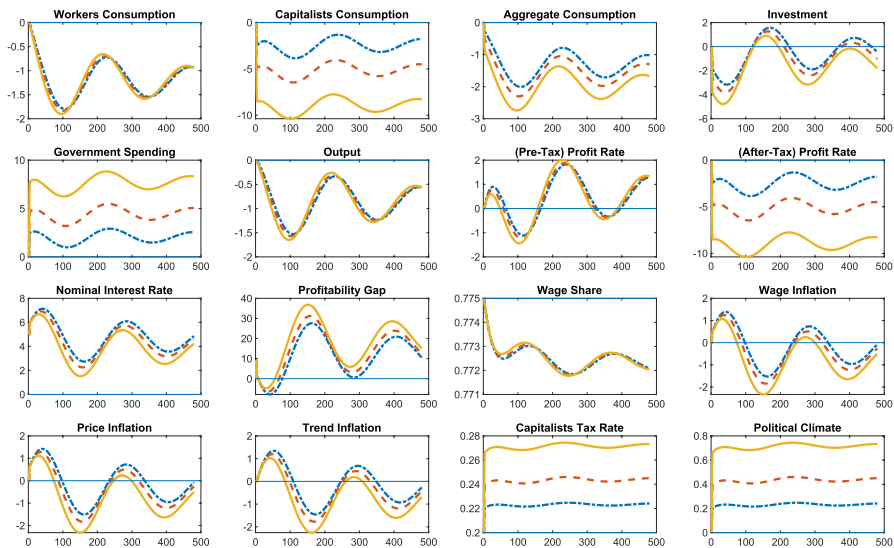
<sup>9</sup> It should be noted, however, that lower values of  $i_p$  translate into (possibly unrealistic) high values of the steady-state wage share  $v^o$  for the given parameter constellation.

consumption, is also higher. Note that this result cannot be observed directly in the first panel because workers' consumption is depicted all figures relative to the respective steady-state values, but is evident in the panel of aggregate consumption. Further, a higher steady-state wage share in the *wage-led* case implies a lower profit rate and, given the chosen parameter values, a lower government spending despite a higher capitalist tax rate, see (1) and (3). An increase in the capitalist tax rate  $\tau_c$  leads thus to a differentiated composition of aggregate demand in the *wage-* versus the *profit-led* case; while in the *profit-led* case, a higher  $\tau_c$  led to lower aggregate consumption and investment, and higher government spending, in the *wage-led* case, the opposite holds with aggregate consumption and investment and a lower government spending. These findings suggest that further research on the long-term differences between wage- and profit-led regimes from a political economy perspective may be quite promising.

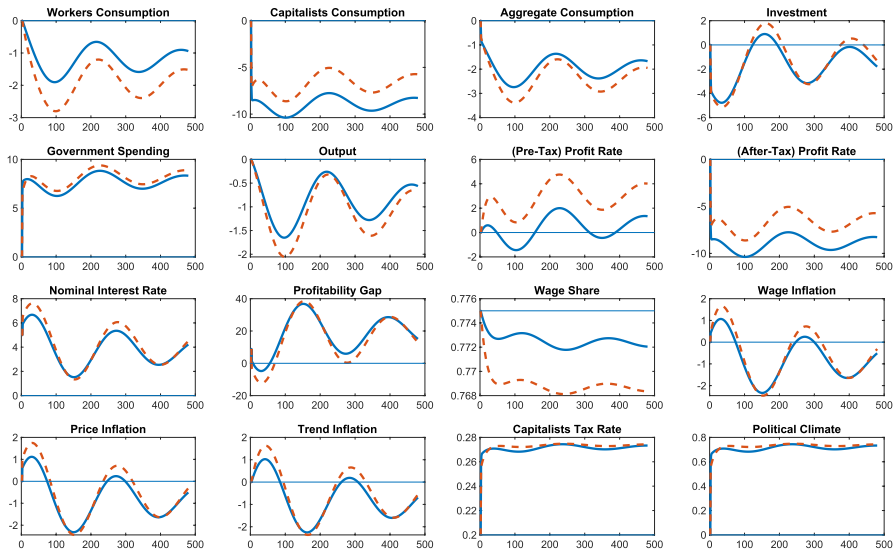
### 3.4 Macro-political dynamics

We link now the macroeconomic and the political sphere and analyze their interaction in the numerical simulation illustrated in Fig. 4.

Coupling these two spheres leads to interesting, though not entirely new dynamics relative to the previous scenarios. As shown in Fig. 4, the emergence of conflicting claims leads to permanent negative effects on the workers' consumption, but also on the capitalists' consumption due to the increase in the capitalists' tax rate driven by the left-swing in the political climate. As a result, the permanent fall in aggregate private consumption is larger than it was in the scenarios where the macroeconomic



**Fig. 4** Macro-political dynamics of conflicting income claims using the baseline parameter values of Table 1 for different values of  $\gamma_v = 25$  (continuous line)  $\gamma_v = 50$  (dashed line) and  $\gamma_v = 100$  (dotted line)



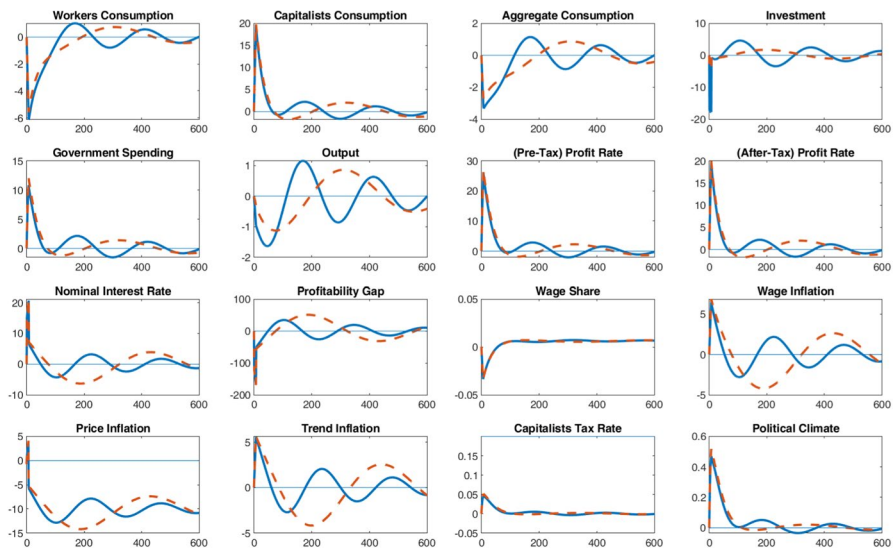
**Fig. 5** Macro-political dynamics of conflicting income claims using the baseline parameter values of Table 1 with  $\gamma_v = 50$  (continuous line), and  $\beta_{pv} = 0.5$  (dashed line)

and political spheres were considered in isolation. The coupling of the macroeconomic and political spheres leads also to more cyclical dynamics than in the previous two isolated scenarios, as the interaction between the changing political climate and macroeconomic variables lead to more pronounced dynamics.

Figure 5 illustrates the macro-political dynamics of conflicting claims for  $\beta_{pv} = 0.5$ , i.e. for the case where firms can “pass-over” their income claims through price inflation stronger than workers can do through wage inflation. As it can be observed, under this scenario firms, through their relatively stronger price-setting power, can enforce a thoroughly positive and higher pretax profit rate, as well as an after-tax profit rate for the case where  $\gamma_v$  is sufficiently low ( $\gamma_v = 25$ ). The firms’ relatively higher power is translated into a lower wage share and, more importantly, into a significantly lower workers’ consumption. Further, for  $\beta_{pv}$  price and wage inflation and output feature, a more pronounced cyclical behavior, driven mainly by the more volatile aggregate investment.

As a final exercise, we simulate the macro-political dynamics of a large cost-push shock (10%) lasting for 6 periods that would drive up in a first instance price inflation using the baseline parameter values of Table 1. In order to “distill” these dynamics from the cyclical dynamics that emerge from the conflicting claims both at the macroeconomic and the political spheres discussed in the previous sections, we “burn” the first 3000 periods and implement a cost-push shock of 10 percent points when the economy has converged already to the conflicting claims steady state. The result of this exercise, which aims at loosely representing the 2022 global supply chain shock, is depicted in Fig. 6.

As illustrated therein, the sudden rise in price inflation leads to a drop in the wage share that is translated into a fall in workers’ consumption, on the one hand, and an



**Fig. 6** The macro-political dynamics following a large cost-push shock using the baseline parameter values of Table 1 for  $\iota_p = 0.4$  (continuous line) and  $\iota_p = 0.1$  (dashed – line)

increase in the capitalists's consumption due to the rise in their pre- and after-tax profit share. However, the profitability gap drops due to the endogenous response of monetary policy and the resulting increase in the nominal (and real) interest rate. As a result, aggregate investment drops, contributing to a further decrease in aggregate output that cannot be fully counterbalanced by the increase in government spending. Interestingly, besides from some relatively minor cyclical differences, the dynamics in both considered scenarios are quite similar, and reflect the macroeconomic dynamics observed in many advanced economies.<sup>10</sup> A major exception is, however, the reaction of the political climate, which in the current frameworks experiences a left-shift, in contrast to the overall political right-shift observable in the US and many countries in Europe associated with an increasing inequality (see e.g. Proaño et al., 2024). We leave a model-based explanation of this phenomenon for further research.<sup>11</sup>

## 4 Concluding remarks

The recent debate surrounding the distributional consequences of high inflation has reignited focus on the political dimension of economic issues, particularly the conflicting income claims between workers and firm owners. This topic has become a

<sup>10</sup> Note, however, that our model assumes always a balanced fiscal budget and no countercyclical fiscal policy. We intend to explore this dimension in a follow-up paper.

<sup>11</sup> As discussed in Dávila-Fernández et al. (2024), the political sphere has become increasingly multi-dimensional in particular regarding purely economic versus cultural and social issues, for example, concerning climate change.

critical point of discussion among both researchers and policymakers, as it highlights the intricate relationship between economic and political forces that shape income distribution across different socioeconomic groups. This interplay is not just a contemporary concern but has been a fundamental element of classical political economy, with roots tracing back to Adam Smith, David Ricardo and Karl Marx and has also been a cornerstone of modern Post-Keynesian theories of inflation. In this context, we employ a variation of the baseline macroeconomic model of behavioral political cycles proposed by Di Guilmi et al. (2023) to explore the dynamic effects of these conflicting claims on the distribution of income between workers and capitalists.

By introducing this specific political dimension into our model, we aim to capture the complex feedback loops that arise when different classes pursue their respective income objectives within a politically sensitive environment. Our numerical simulations demonstrate that the conflicting income claims of workers and capitalists have significant and persistent effects on key macroeconomic variables. Specifically, we find that such distributional conflicts lead to permanent negative shifts in the levels of output, investment and capital accumulation. Moreover, these conflicts influence the wage share, thereby altering the distribution of income over time. This result is particularly important for understanding the long-term implications of political struggles over income distribution, as they do not merely result in temporary fluctuations but induce lasting changes in the structure of the economy.

Our findings highlight the importance of incorporating the political dimension of heterogeneous, interacting agents into dynamic macroeconomic models. Traditionally, these models tend to simplify or overlook the political processes that drive economic policy decisions, focusing predominantly on economic mechanisms. However, our research indicates that neglecting the political aspect can lead to an incomplete or even misleading understanding of economic dynamics, particularly in situations where income distribution is a contentious issue. In this context, our work not only builds upon but also expands the insights provided by Azzimonti and Talbert (2014), and more recently by Di Guilmi et al. (2023), both of whom highlight the importance of considering political cycles and their interaction with economic variables.

A key extension of our paper, compared to Di Guilmi et al. (2023), is the inclusion of *wage-led* regime dynamics alongside the *profit-led* regime. In the *profit-led* regime, an increase in the profit share stimulates economic activity. However, this assumption does not hold universally across all countries or historical periods (for a relevant discussion see Onaran and Galanis (2014) and Blecker (2016) among others). By examining both *wage-led* and *profit-led* regimes, we offer a more comprehensive understanding of economic dynamics. Our findings highlight the importance of comparing these two scenarios, paying particular attention to the interaction between macroeconomic factors and the political sphere. This dual perspective opens a promising path for future research regarding the nexus between income distribution, growth and political dynamics.

In our study, we have concentrated on examining the interaction between political forces and conflicting distributional claims within a dynamic macroeconomic environment. This focus has necessarily led us to abstract from several important

issues that present additional potential avenues for further research on this topic. In particular, our model incorporates the political dimension primarily through the lens of relative tax levels between different social classes, while also maintaining the assumption of a balanced budget. A potential extension of this work could involve relaxing the balanced budget constraint, allowing debt levels to be influenced by the degree of political support. This alternative specification could provide a richer understanding of the interplay between political forces and economic outcomes.

The probably most important shortcoming of the theoretical framework is that while it reflects the well-established notion that a higher inequality leads to more support for left-wing parties (as it was the case in the 1970 s and 1980 s), it cannot explain the aforementioned positive relationship between higher inequality and far-right support documented, for example, by Proaño et al. (2024). This, however, is one of the most relevant issues nowadays, and a thorough understanding of the underlying mechanisms behind this development from a model-based behavioral perspective appears as a task of utmost importance. Quite likely, this would imply some nontrivial modification of the present model that would go beyond the scope of this paper, like the explicit formulation of the (changing) objectives of political parties that could allow, for example, for protest voters that would vote against their own political beliefs if they are continuously disappointed by their “preferred” party. We intend to explore these and other venues in the further research.

**Funding** Open Access funding enabled and organized by Projekt DEAL.

## Declarations

**Conflict of interest** All authors certify that there is no actual or potential conflict of interest in relation to this article.

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