

The Political Implications of Reference-Dependent Preferences*

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Abstract

This paper studies electoral competition over redistributive taxes between a safe incumbent and a risky opponent. With reference-dependent preferences, economically disappointed voters become risk lovers, and hence are attracted by the more risky candidate. We show that the equilibrium can display policy divergence: the intrinsically more risky candidate proposes lower taxes and is supported by a coalition of very rich and very disappointed voters, while the safe candidate proposes higher taxes. This can explain why new populist parties are often supported by economically dissatisfied voters and yet they run on economic policy platforms of low redistribution.

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1 Introduction

Over the past decade, the landscape of Western democracies has been marked by the surge of populism, a phenomenon often linked to economic shocks and insecurity. Research has established strong connections between economic vulnerability and support for populist movements, with evidence showing that individuals experiencing economic insecurity or fearing loss of social status are more likely to embrace populist parties and display anti-establishment attitudes (Algan et al. 2017, Dal Bo et al. 2023, Guiso et al. 2024). Surprisingly, despite advocating policies favoring the affluent, these populist movements often gain traction across very diverse socio-economic segments, creating a complex puzzle. In countries like the US, the UK, or Italy, populist politicians and their policy agendas are supported by a coalition of affluent segments alongside frustrated and disenchanted low to middle-class voters. This intriguing alliance begs the question: why does this occur, and what implications does it hold?

This paper addresses this question and examines how reference-dependent preferences can explain parts of this puzzle. Our argument builds on Panunzi et al. (2024), who show that economic disappointment - specifically when individuals' income falls significantly below their reference point - fundamentally alters risk preferences and voting behavior. We start from the premise, that we support empirically, that populist leaders inherently embody risk, because they have a penchant for unconventional policies. We study an economy where two candidates, a moderate candidate and a riskier - yet less efficient - populist candidate, engage in electoral competition over redistributive taxation. Suppose that a substantial negative shock hits the economy, causing several voters to fall beneath their expected consumption level. As in Panunzi et al. (2024), the riskiness of the populist candidate appeals to disillusioned voters who seek a chance to reclaim the lost ground. Conversely, voters whose consumption remains close to their reference point exhibit strong loss aversion, making them particularly averse to the uncertainty associated with the populist candidate. In this context, how do these competing politicians react to the aggregate negative shock, and what policy platforms do they propose?

The answer is not obvious, because the interplay between heterogeneous candidates and voters' reference-dependent preferences adds a layer of conflict beyond conventional redistribution. In particular, individual voting behavior is no longer a monotonic function of relative income, which in turn affects equilibrium policy platforms. In this setting,

we examine how political candidates strategically position themselves with regard to redistributive taxation. Our analysis reveals two distinct types of equilibria. In the first type of equilibrium there is policy convergence: both candidates seek the support of the same marginal voter and propose identical tax rates targeted on that voter's preferences. However, when a significant negative shock hits, policy divergence can emerge in equilibrium: the populist candidate runs on a policy platform of lower taxation and lower redistribution, compared to the moderate candidate, and he/she is supported by a coalition of rich voters and poorer and very disappointed voters.

This divergence stems from the populist candidate's ability to retain the support of poorer but disappointed voters even when proposing a lower tax rate than his moderate opponent. The reason is that disappointed voters are attracted by the larger intrinsic riskiness of the populist leader. To grasp the intuition, consider a scenario where a candidate unilaterally deviates from a conjectured equilibrium tax rate. A lower tax rate, while hurting poorer voters, also amplifies their disappointment. This increased disappointment benefits the intrinsically more risky candidate, namely the populist. Consequently, when the populist implements a lower tax rate, impoverished voters do not penalize him/her as severely as they would penalize the safer candidate for the same policy deviation.

Voters who are above their reference point, instead, lean towards the moderate candidate, because he is more efficient and (for loss-averse voters just above their reference point) less risky. But voters with above average income also benefit from lower tax rates, the more so the richer they are. Hence, if the populist tax rate is lower than that of the moderate, the populist candidate also wins the support of some very rich voters, i.e. those with income above a threshold. Hence, if the equilibrium displays policy convergence, the equilibrium populist tax rate is always below that of the moderate, and the populist candidate is supported by an "unwieldy" coalition of very rich voters and of poorer and disappointed voters.

Finally, the equilibrium with policy divergence is more likely if a substantial fraction of the electorate falls below its reference point, due to a significant negative shock. In such instances, moderate voters become modestly disappointed, necessitating substantial redistributive policies for the moderate candidate to retain their support. This dynamic pushes the populist to propose lower taxes, allying wealthier voters and those deeply disillusioned.

Since our key mechanism is based on the idea that populist candidates are risky, we

start our paper by providing evidence supporting this key assumption about the nature of populist leadership. We use a synthetic control method (SCM) to analyze the effects of populist governance on economic outcomes, as in Funke et al. (2023) - see also Abadie and Gardeazabel (2003) and Abadie et al. (2010). This methodology is particularly well-suited for our analysis, as it allows us to construct plausible counterfactuals in a panel of countries. First, for each populist episode in our sample, we select comparison units using a data-driven procedure that finds optimal weights over control countries. The procedure minimizes the disparity between observed trends in the treated country and the synthetic counterfactual, during the pre-treatment period. Second, having generated a synthetic counterfactual for each populist episode, we consider an interval of ± 15 years around the start year of the populist leadership. The key identifying assumption is that the synthetic control follows a similar trajectory to what the populist economy would have experienced if a populist government had not been elected. Drawing on the database of Funke et al. (2023), we analyze 27 instances of populist governance in 18 countries. Our baseline sample covers all major advanced and emerging market economies, including the nine largest South American states and ten main emerging markets from Asia and Africa. The results show that populist governance reduces real GDP per capita by approximately 9.2% on average (similar to Funke et al. 2023) and increases growth volatility (measured by yearly standard deviation) by about 20% relative to average pre-treatment volatility. These findings provide support to our modeling assumption that populist leadership introduces both inefficiency (lower expected output) and increased risk (higher volatility).

Literature Our paper is related to three lines of research. First, it contributes to explain the sources of success of populist parties during the recent decades - see the literature surveyed by Guriev and Papaioannou (2020). An important question in that literature is why economically disadvantaged voters support right wing populist parties who oppose welfare state expansion. Some contributions answer this question with reference to a second dimension of political conflict, on non-economic issues (immigration, or civil rights), that allows right wing populist parties to attract conservative lower class voters (Norris and Inglehart 2019). In an earlier paper (Panunzi et al. 2024) we have shown that populist parties can attract economically disappointed voters because of their intrinsic riskiness, providing some supportive evidence of this mechanism. That paper did not study equilibrium policies, however. Here we extend the insights of Panunzi et al. (2024)

by examining electoral competition over a redistributive policy, and show that in equilibrium the more risky candidate can indeed find it optimal to campaign on a policy of lower taxes, finding the support of both rich and poor but disappointed voters. We also extend the analysis of Funke et al. (2023), by showing that, when populist leaders are in government, per capita income is not only lower on average, but its growth is also more volatile, compared to a non-populist counterfactual.

Second, we contribute to explain why electoral competition can yield equilibrium policy divergence if candidates have different features. The concept of voters weighing their policy preferences against the inherent qualities of rival candidates has been explored in several papers. Groseclose (2001) and Aragonés and Palfrey (2002) investigated electoral dynamics involving candidates with divergent valences, revealing that voters, while having conventional policy inclinations, tend to favor candidates with higher valence. Consequently, in equilibrium, the advantaged candidate gravitates towards the center, while the disadvantaged counterpart adopts more extreme policy positions. More recent work by Krása and Polborn (2010, 2012, 2014) demonstrates equilibrium policy divergence in scenarios where candidates possess differing abilities and select one-dimensional policies to optimize electoral prospects. Their crucial assumption posits that candidates' abilities complement the policies they advocate. In contrast, our study focuses on candidates' intrinsic risk disparities, with voters exhibiting non-monotonic risk preferences relative to income levels.

Third, we contribute to a rapidly growing line of research that incorporates insights from behavioral economics in political economic analysis (eg. Quattrone and Tversky 1988, Alesina and Passarelli 2019, Lockwood and Rockey 2015, Passarelli and Tabellini 2017, Grillo and Prato 2023). In particular, we take to political economics some specific the insights of prospect theory, building on the seminal work of Koszegi and Rabin (2006; 2007). Relative to existing research in behavioral political economics, we highlight how reference dependent preferences, by affecting voters' attitudes towards risk, can have a profound impact on equilibrium redistributive policies and voters' coalitions.

The outline of the paper is as follows. In the next section, we provide some evidence regarding our key assumption on the characteristics of populist politicians. In Section 3 we present the baseline model of political competition; section 4 provides a first characterization of the political equilibrium, which is further analyzed in Sections 5, where we discuss the properties of the double-crossing equilibrium, and 6, where we analyze the

conditions under which divergence or convergence of tax rates occur. Section 7 discusses how our main results extend to a more general setting. Section 8 concludes.

2 Empirical Motivation

Our theoretical framework rests on a two-part hypothesis linking economic disappointment to populist voting behavior. First, populist candidates systematically differ from moderate candidates in their characteristics, exhibiting both higher inefficiency and greater outcome variance. Second, individuals who experience substantial unexpected income losses are forced to consume below their reference point, triggering a shift in risk preferences. This economic disappointment induces greater risk tolerance, leading such voters to favor populist candidates despite “or because of” their higher risk profile. This theoretical mechanism aligns with evidence from Panunzi et al. (2024), who document that economically disappointed voters exhibit increased risk tolerance and a higher propensity to support populist politicians.

In this section, we provide empirical evidence that populist leaders generate a reduction in real GDP per capita and an increase in GDP per capita growth volatility (standard deviation) compared to a plausible non-populist counterfactual.

2.1 Data

Our analysis builds on the comprehensive leadership database constructed by Funke et al. (2023), which draws from the Archigos database to identify and classify political leaders across major economies. The dataset spans from 1900 (or independence) to 2020, encompassing 1,482 leaders with 1,853 leader spells. Among these, Funke et al. identify 53 populist leaders (3.4 percent) who served 72 leader spells (3.9 percent). The geographic coverage includes major advanced and emerging market economies, the nine largest South American states, and ten key emerging markets from Asia and Africa. It combines two sources for GDP data: historical records from the Macrohistory Database (Jorda et al., 2017) and recent World Bank statistics. Following Funke et al.’s baseline specification, our estimation sample focuses on 18 countries that experienced 27 distinct episodes of populist governance. Several countries in our sample, including Argentina, Brazil, Ecuador, Italy, and Peru, underwent multiple populist periods. Table 2 in Appendix C provides

detailed country-level information.¹

2.2 Empirical Strategy: Synthetic Control Method

Given the challenges in establishing causal relationships between populist governance and economic outcomes, we employ the Synthetic Control Method (SCM) as our primary empirical strategy. This approach, pioneered by Abadie and Gardeazabel (2003) and Abadie et al. (2010), and further developed in political economy applications by Abadie, Diamond, and Hainmueller (2015), enables systematic comparison between populist-led economies and synthetic counterfactuals. For a comprehensive review of the method, see Abadie (2021).

The SCM implementation consists of two key stages:

1. Construction of Comparison Units: We employ a data-driven procedure to assign non-negative weights to control countries, minimizing the disparity between observed trends in treatment and control units during the pre-treatment period. This approach ensures that our synthetic control closely mirrors the pre-populist economic trajectory of the treated country.

2. Generation of Counterfactuals: For each populist episode, we construct a synthetic counterfactual using data from a ± 15 -year window around the leadership transition. The method rests on the assumption that this synthetic control approximates the economic trajectory the treated country would have followed absent populist leadership.

The weight determination process varies by outcome variable:

- For GDP level effects, following Funke et al., we use real GDP per capita as the primary matching variable
- For GDP growth volatility effects, we match on pre-treatment trends of our key variable: the 10-year rolling standard deviation of per capita real GDP growth

Detailed specifications of the matching procedure and additional robustness checks are provided in Appendix C.

¹Compared to the sample of countries in Funke et al. (2023), we exclude Slovakia from our analysis due to insufficient data for calculating the 10-year rolling standard deviation.

2.3 Results

Figure 1 presents our central findings on the economic effects of populist leadership. The figure comprises four panels comparing treated economies with their synthetic counterfactuals. The left panels replicate Funke et al. (2023), while the right panels display our new estimates. Each analysis is presented in two formats: Panel A shows the average paths of populist-led economies (solid line) and their synthetic counterparts (dashed line, "doppelgaenger"), with all variables normalized to zero at the start of populist governance. Panel B plots the difference between these paths, highlighting the treatment effect. *The results reveal two key patterns: populist leadership systematically reduces real GDP per capita and increases its volatility.* For the volatility analysis, we mark two critical time points with vertical lines: the start of populist governance ($t = 0$) and the tenth period post-treatment.

The uncertainty in the control group comes from randomness in the construction of the synthetic control weights in the pretreatment period (in-sample uncertainty) and from the out-of-sample prediction due to the stochastic error after the treatment (out-of-sample uncertainty). We implement both methods to obtain the confidence intervals using a simulation-based approach for in-sample (quantified through 200 simulations), and a sub-Gaussian bounds approach for the out-of-sample uncertainty. Following Funke et al., our displayed confidence intervals reflect only out-of-sample uncertainty, as these provide more conservative bounds. Detailed derivations of these intervals are available in Appendix C, where we also offer a placebo exercise.

A populist taking power is not a random event. Consistently with other findings, Funke et al. document that: 'Populist often enter the government in the wake of economic financial crises, when growth performance is weak.' (Funke et al., 2023, page 3273). In the SCM, such pre-existing weak economic performance is captured in the construction of the control group.

Average effects. Our analysis reveals that populist leadership reduces real GDP per capita by approximately 9.2%.² This is in line with Funke et al. (2023) who found a cumulated effect of more than 10% after 15 periods. The estimated effects on growth volatility are displayed in columns 1 and 2 of Table 1. These estimates derive from comparing the trajectories of treated units against their synthetic controls, following the Synthetic Con-

²See, Table 3 in Appendix C.

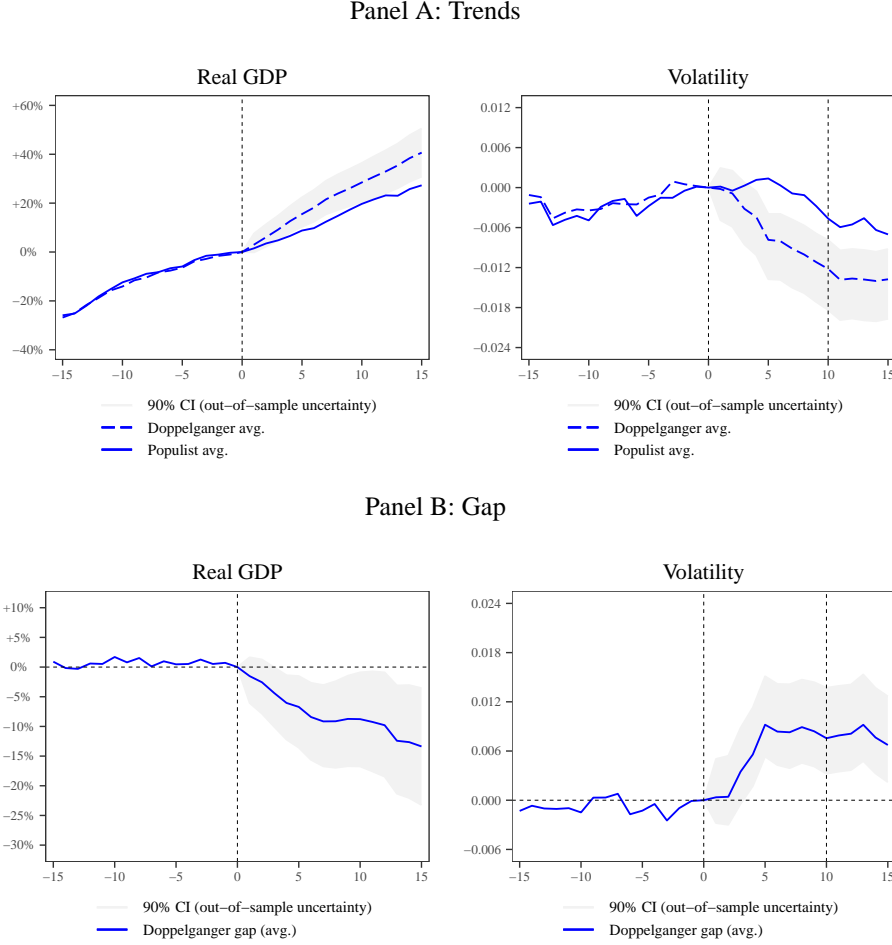


Figure 1: Baseline results on GDP level and volatility. This figure shows the effect of populism on the real GDP per capita and the standard deviation of real GDP per capita growth. The standard deviation (volatility) is calculated as a 10-years rolling. From period 1 until 9, the volatility considers information of the GDP growth from the pre-treatment period. The results on the GDP drop replicate that in Funke et al. (2023). The 90 percent confidence intervals are based on Cattaneo et al. (2021) and (2022).

trol Method (SCM). The precise calculation approach is detailed in Appendix C.3. The estimated effect of increasing the standard deviation of growth by 0.72 percentage points corresponds to an increase of about 20% relative to the average standard deviation of growth in the 15 pre-treatment periods.

Synthetic Difference in Differences. We complement our analysis by estimating populism’s effect on GDP volatility using the Synthetic Difference-in-Differences (SDiD) methodology (Arkhangelsky et al., 2021; and Clarke et al., 2023). The SDiD approach shares

Table 1: Effect of a Populist Leader on real GDP growth volatility

	SCM		SDiD
	(1)	(2)	(3)
Populist	0.0072*** (0.0012)	0.0072** (0.0033)	0.0075*** (0.0030)
Clustered S.E. at episode/‘country’ level	No	Yes	Yes
Number of observations	1,602	1,602	44,113

Table 1: This table reports the effect of populism on GDP volatility. Standard errors are shown in parentheses. ***, **, * represents significance at 1%, 5% and 10%, respectively.

key features with the Synthetic Control Method (SCM) while offering distinct advantages. Like SCM, the SDiD framework considers a binary treatment variable, assumes treated units receive exposure only after a specified date and requires control units to remain untreated throughout the study period. The SDiD methodology enhances the standard Difference-in-Differences approach by computing optimal weights that align pre-treatment trends between exposed and unexposed units. Additionally, it determines time weights to balance pre- and post-exposure periods. This data-driven approach to control group selection enables us to estimate the Average Treatment Effect on the Treated (ATT) without relying on the parallel trends assumption between treatment and control units. Appendix C provides a comprehensive explanation of this methodology.

The estimated effect of populist government on volatility, according to the SDiD procedure, is displayed in Column 3 of Table 1. The SDiD estimate closely aligns with our findings from the Synthetic Control Method, reinforcing the robustness of our results.

3 The Model

We study voters choosing between two candidates - a moderate and a populist - under reference-dependent preferences. The moderate is safe (i.e. it entails no uncertainty), while the populist is risky and less efficient than the moderate. We model this with the assumption that when the populist is in office, each voter has a stochastic income with a lower expected value compared to his certain income when the moderate is in office. This formulation is the same as in Panunzi et al. (2024), but here we add endogenous policy

choice by the two candidates.

Consider a continuum of voters with income $\theta \geq 0$, distributed according to cumulative distribution G with density g . Under the moderate (M), a voter's gross income equals their base income θ . Under the populist, their income becomes $\theta - z + \eta$, where $z > 0$ captures the populist's inefficiency, and η is a random shock distributed over $[-\varepsilon, \varepsilon]$ with density h and $\mathbb{E}(\eta) = \int_{-\varepsilon}^{+\varepsilon} \eta h(\eta) d\eta = 0$. The populist is therefore riskier than the moderate (because of the presence of the random shock η). z measures the inefficiency of the populist compared to the moderate. We assume $\varepsilon > z$, ensuring the populist can sometimes deliver higher income than the moderate for all voters. Note that the difference between the populist and moderate candidates only concerns aggregate outcomes and it is the same for all voters - although, as shown below, different voters have different evaluations of these intrinsic features of candidates.

While with standard preferences, all voters would be in favor of the moderate candidate, this is no longer true with reference-dependent preferences. The risk associated with the populist candidate may be appealing to voters whose income is much below their reference point, who may vote for him, provided that the difference in efficiency is not too large.

In particular, we assume that for any given distribution of consumption F_c , voters have utility:³

$$U(F_c, x) = \mathbb{E}[c + \mu(c - x)],$$

where c is consumption, $\mu(\cdot)$ is a negative valued, increasing, and convex function that penalizes the voter whenever $c < x$. $x > 0$ is the (exogenous) reference point' and we assume that it is the same for everyone, irrespective of his actual income.⁴

Let $d = c - x$. We summarize our assumptions on μ below:

ASSUMPTION 1. *The function μ is continuous over the whole domain, with $\mu(d) = 0$ for all $d \geq 0$. Moreover, for $d < 0$, μ is at least twice continuously differentiable and the following properties hold:*

(i) $\mu(d) < 0$; (ii) $\mu'(d) > 0$; (iii) $\mu''(d) > 0$; (iv) $\mu'''(d) \leq 0$; (v) for $d = 0$, μ admits left derivatives at least till the third degree $\mu_-^n(0)$, $n = 1, 2, 3$, which are compatible with the natural extensions of (ii)-(iv).

³With an abuse of notation, we denote by c both the random variable and a particular realization of it.

⁴This assumption together with the linearity in consumption in absence of loss aversion will be relaxed in Section 7.

While the first three conditions are standard in models of reference-dependent preferences⁵, point (iv) of Assumption 1 is less standard and plays an important role in our results. In essence, it is equivalent to having preferences for moving risk from high to low-income levels. Hence the assumption implies that more disappointed agents are more likely to favor the populist candidate because of its intrinsic riskiness.⁶

The moderate and the populist candidates compete over income tax rates $0 \leq \tau_M, \tau_P \leq 1$, (subscripts refer to candidates). The tax proceeds are distributed as a lump sum to every agent. Under the moderate candidate, the consumption of agent θ equals:

$$c_M(\theta, \tau) = (1 - \tau_M)\theta + f(\tau_M),$$

while, under the populist, consumption is random and equals:

$$c_P(\theta, \tau) = (1 - \tau_P)\theta - z + f(\tau_P) + \eta,$$

where, recall, the random variable η is distributed between $-\varepsilon$ and $+\varepsilon$ and both η and z affect all agents equally. Note that since $-z + \eta$ only affects aggregate income and redistribution is lump sum, effectively only the fixed and idiosyncratic income component θ is taxed.

The function $f(\tau)$ solves the government budget constraint and embeds inefficiencies due to distortionary taxation. Specifically, we assume:

$$f(\tau) = \tau \mathbf{E}\theta - i(\tau), \tag{1}$$

with $i(\cdot) \geq 0$ an increasing and convex function representing tax distortions, and $\mathbf{E}\theta$ representing the cross-sectional average of θ .⁷

The timing is the following. Agents start with a given reference point x . Before elections, their gross income level θ is realized. Candidates then propose their tax rates in sequential order: first the moderate and then the populist. Finally, elections are held and the winner is elected. If the populist candidate wins, income shocks are realized and agents consume.

⁵See, e.g., Koszegi and Rabin (2009)

⁶See Panunzi, Pavoni and Tabellini (2024) for a more thorough discussion.

⁷To avoid confusion, we use the 'bold' notation \mathbf{E} for cross-sectional averages and the 'math' notation \mathbb{E} when the integration is taken over the shock $\eta \in [-\varepsilon, \varepsilon]$.

Throughout we assume that the properties of $i(\cdot)$ satisfy the following:

ASSUMPTION 2. *The function f as defined in (1) takes a maximal value at tax rate $0 \leq \tau_0 < 1$ and the function $i(\cdot)$ is such that $i(0) = 0 = i'(0)$.*

Thus, if f is differentiable, at τ_0 we have $f'(\tau_0) = E\theta - i'(\tau_0) \leq 0$, with equality if $\tau_0 > 0$. It is easy to verify that the optimal tax rate for an agent with income θ , denoted by τ^θ , satisfies the optimality condition: $f'(\tau^\theta) \leq \theta$, with equality if $\theta \leq E\theta$ and strict inequality otherwise, irrespective of which type of agent is in office (this follows from the assumption that the shock associated with the populist is aggregate). Hence, τ^θ is a decreasing function of θ if $\theta < E\theta$ and $\tau^\theta = 0$ if $\theta \geq E\theta$. Moreover, by definition of τ_0 , $\tau^\theta \leq \tau_0$. No voter with $\theta \geq 0$, no matter how poor, would ever want to have a tax rate on the wrong side of the Laffer curve.

Despite these well-behaved policy preferences, however, voters' preferences for the package of a politician's type (moderate or populist) and his associated tax rate do not satisfy the single crossing property. Let $w_P(\theta, \tau_P)$ and $w_M(\theta, \tau_M)$ denote the expected utility functions of type θ under the populist and the moderate, respectively. Then, the two curves, for some tax rates τ_P and τ_M , may intersect at more than one value of θ . This can be seen from Figure 2. If $\tau_P = \tau_M$, then the indirect utility functions $w_P(\theta, \tau_P)$ (dotted curve) and $w_M(\theta, \tau_M)$ of voter θ under each candidate intersect at most once to the left of x , at income level $\hat{\theta}$. But suppose that τ_P is lowered below τ_M . This steepens the slope of $w_P(\theta, \tau_P)$ (solid curve) relative to that of $w_M(\theta, \tau_M)$. Hence the linear component of $w_P(\cdot)$ (where $c^P > x$) intersects the linear component of $w_M(\cdot)$ for $\theta < \infty$. At the same time, the convex component of $w_P(\cdot)$ could remain flatter than that of $w_M(\cdot)$ for $c^P < x$ and for small realizations of θ . Hence the two curves can intersect in at least two points, one to the left (denoted as $\underline{\theta}$) and one to the right (denoted as $\bar{\theta}$) of x , as shown in Figure 2.

The absence of single-crossing implies that a Condorcet winner may not exist. In such a case, a simple model of Downsian electoral competition, where the two candidates compete in the election by simultaneously committing to a tax rate, does not have a pure-strategy Nash equilibrium, because of the nonconvexity of the objective functions.

To get around this problem, we assume instead that the two candidates move sequentially and that they maximize their vote share.⁸ Specifically, we assume the following

⁸The assumption that candidates maximize the vote share can be interpreted as saying that (exogenous) political rents are an increasing function of the vote share. Alternatively, the outcome of the election could

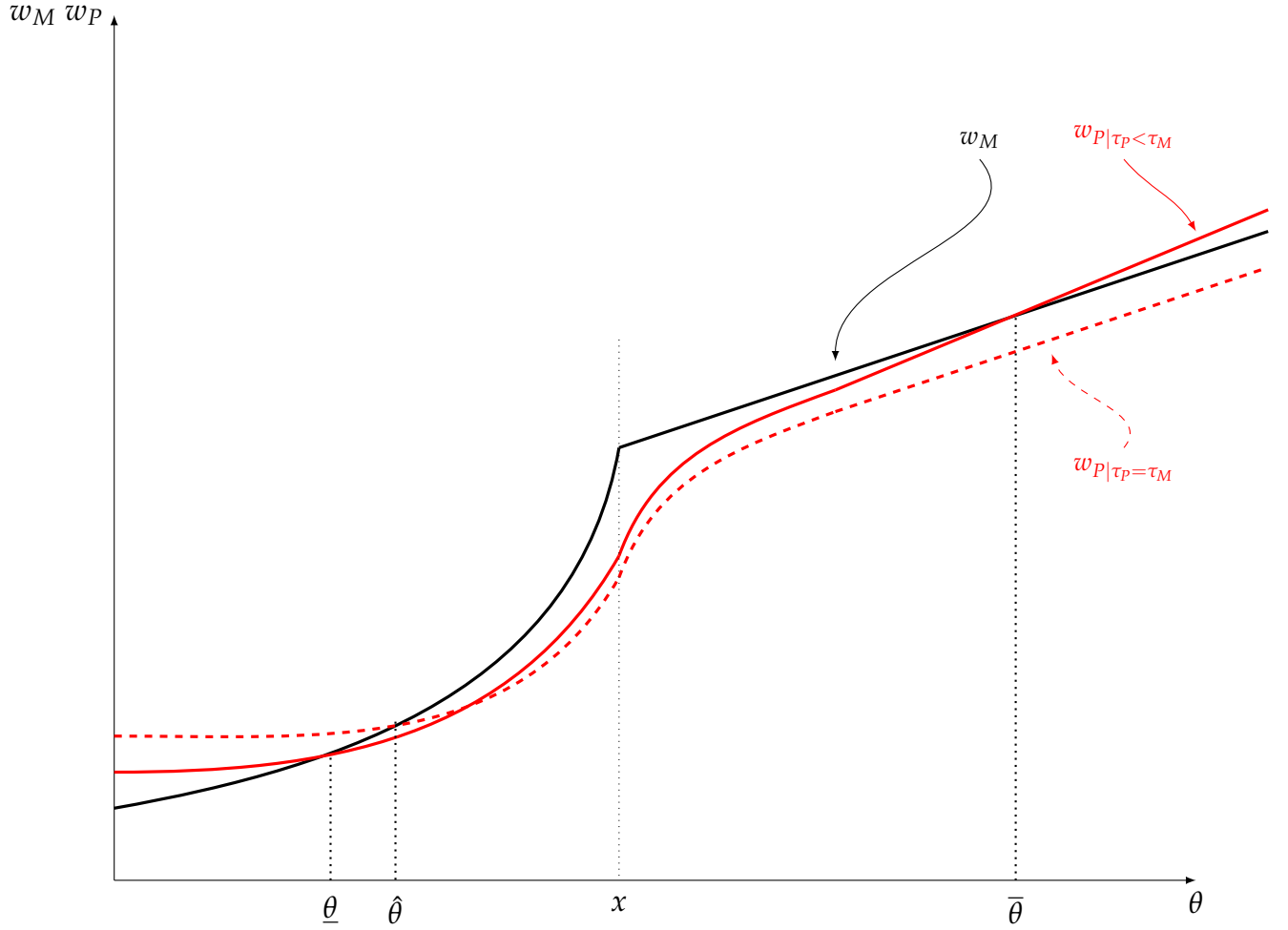


Figure 2: The black solid and the red dashed curves, representing $w_M(\cdot)$ and $w_P(\cdot)$ respectively, are drawn under the assumption that $\tau_M = \tau_P$. In this case, the curves intersect only once at income level $\hat{\theta}$. If τ_P is reduced, while τ_M remains constant, the (red dashed) curve $w_P(\cdot)$ rotates to the red solid curve, and it can intersect $w_M(\cdot)$ at two income levels, $\underline{\theta}$ and at $\bar{\theta} > x$. Voters with income with $\theta < \underline{\theta}$ and with $\theta > \bar{\theta}$ prefer candidate P to M . Those in between prefer M . In the absence of distortions (i.e., $i \equiv 0$), the rotation would have centered the mean income $E\theta$. With distortion, a reduction in τ_P also shift the curve w_P upwards.

timing. First, the moderate candidate commits to a tax rate τ_M . Then the populist candidate commits to a tax rate τ_P . Finally, voters observe both tax rates and, knowing the risk properties of each candidate, they vote. This timing assumption can be interpreted as saying that the moderate candidate is the incumbent and this makes him less flexible in his policy announcements. Although we will maintain such timing in our narrative, this can be considered non-consequential, for at least two reasons. First, since the game played is zero-sum, whenever the game admits a Nash equilibrium in pure strategies (i.e., a saddle of the payoff function), Stackelberg and Nash equilibria generate the same payoffs and the same tax rates. Second, in Proposition 3 (iii) below, we show that the key qualitative properties of the equilibrium set are independent of the identity of the first mover.⁹

Socially optimal policy. What is the optimal tax policy in this economy? The answer is not straightforward, because the marginal utility of income varies depending on whether voters are above or below their reference point. Moreover, very disappointed voters are risk-loving, and so they may prefer not to be insured against income risk. The appendix characterizes the tax rate that solves the utilitarian optimum assuming that income is not stochastic (or, equivalently, that the moderate is elected), and shows that it is strictly positive if $E\theta > x$ and there is a positive measure of agents with $\theta < x$. In this case, all disappointed agents are poorer than the average, and hence they benefit from redistribution. Since disappointed voters have higher marginal utility of income due to their loss aversion, a positive tax rate is optimal despite the tax distortions. In particular, at the social optimum the marginal tax distortions are equated to the marginal social benefit of redistributing in favor of the disappointed agents.

If $E\theta < x$, however, this is no longer true, since some individuals with particularly high marginal utility are also hurt by redistribution. In this case, a positive tax rate is socially optimal only under an additional condition stated in the appendix. This condition is more likely to be satisfied if: (i) there are not too many individuals with income between x and $E\theta$; (ii) the function $\mu(\cdot)$ is not too convex.

be random and determined by the realization of an aggregate and exogenous popularity shock, making the probability of victory an increasing function of the vote share.

⁹Since the choice variables lie in the compact set $[0, 1]$ the existence of a (Stackelberg, sequential) equilibrium (in pure strategies) of the dynamic game is guaranteed whenever the payoff functions of both players are continuous. In our context, it is easy to show that continuity of the payoff functions is guaranteed whenever the net distortion and the loss functions - f and μ - and are continuous and the distribution of over θ admits a density (in particular, it has no mass points, perhaps with the exclusion of the extremes).

We now turn to the analysis of the political equilibrium.

4 Political Competition over Redistributive Taxation

4.1 Single crossing

We first consider the case $\tau_P \geq \tau_M$. The next Lemma states a sufficient condition under which the single crossing property holds over this range of tax rates.

LEMMA 1. *Suppose that Assumptions 1 and 2 hold, and also assume that $\mathbf{E}\theta \leq x - \varepsilon + z$. Then, for $\tau_P \geq \tau_M$ we have: (i) the expected utilities $w_M(\theta, \tau_M)$ and $w_P(\theta, \tau_P)$ cross at most once, and (ii) this may only happen for $\theta = \hat{\theta}$ such that $\mathbb{E}c_P(\hat{\theta}, \tau_P) < c_M(\hat{\theta}, \tau_M) < x$. (iii) Moreover, $w_M(\theta, \tau_M) \geq w_P(\theta, \tau_P)$ (resp. $w_M(\theta, \tau_M) \leq w_P(\theta, \tau_P)$) if $\theta \geq \hat{\theta}$ (resp. $\theta \leq \hat{\theta}$).*

Note that $z - \varepsilon < 0$. The (sufficient) condition $\mathbf{E}\theta \leq x - \varepsilon + z$ can hence be interpreted as saying that the economy has been hit by such a large negative shock that even the average voter (whose income is $\mathbf{E}\theta$) always remains below his reference point when the populist is elected. This assumption also implies that any voter that is in favor of redistribution, that is, with income $\theta < \mathbf{E}\theta$ will also be disappointed.¹⁰

The threshold level $\hat{\theta}(\tau_M, \tau_P)$ for which $w_P(\hat{\theta}, \tau_P) = w_M(\hat{\theta}, \tau_M)$, if it exists, is defined implicitly by the following equation

$$c_M(\hat{\theta}(\tau_M, \tau_P), \tau_M) + \mu(c_M(\hat{\theta}(\tau_M, \tau_P), \tau_M) - x) = \mathbb{E}c_P(\hat{\theta}(\tau_M, \tau_P), \tau_P) + \mathbb{E}\mu(c_P(\hat{\theta}(\tau_M, \tau_P), \tau_P) - x) \quad (2)$$

Single crossing implies that the political competition when $\tau_P \geq \tau_M$ is very simple. By Lemma 1, all voters with $\theta > \hat{\theta}(\tau_M, \tau_P)$ vote for M , while all voters with $\theta < \hat{\theta}(\tau_M, \tau_P)$ vote for P . Then, to maximize his vote share, the populist candidate sets τ_P to maximize $\hat{\theta}(\tau_M, \tau_P)$, taking τ_M as given. We denote with $\tau_P^*(\tau_M)$ the solution to the populist optimization problem for each τ_M , that is the populist's Best Response. Each point of the correspondence $\tau_P^*(\tau_M)$ must satisfy $\frac{\partial \hat{\theta}}{\partial \tau_P} = 0$. By symmetry of the (zero sum game) problem, the moderate aims at minimizing $\hat{\theta}(\tau_M, \tau_P^*(\tau_M))$. By the envelope property, the effect of τ_M on $\hat{\theta}$ has opposite sign with respect to that of τ_P and it is larger in absolute value. In particular, taking into account the reaction function of the populist candidate, the thresh-

¹⁰Note indeed that for any tax rate τ , if $\theta \leq \mathbf{E}\theta$ then $c_i(\theta, \tau_i) \leq \mathbf{E}\theta < x$, $i = M, P$.

old $\hat{\theta}$ is strictly increasing in τ_M in the range where $\tau_P^*(\tau_M) > \tau_M$. As a consequence, we cannot have an equilibrium with $\tau_P^* > \tau_M^*$. More formally:

LEMMA 2. *Under the assumptions of Lemma 1, in equilibrium we cannot have $\tau_P^* > \tau_M^*$.*

The result is obtained, in particular, because if the populist finds it optimal to choose $\tau_P^* > \tau_M$, then the moderate would be able to decrease $\hat{\theta}$ further (and hence increase his vote share) by raising τ_M . This is in turn the consequence of a key property of our framework. By comparing the slope of $\hat{\theta}$ with respect to τ_P (see equation (10) in the Appendix) and the slope of $\hat{\theta}$ with respect to τ_M (see equation (11) in the Appendix), whenever these slopes are different from zero, for this range of taxes we have:¹¹

$$\left| \frac{\partial \hat{\theta}}{\partial \tau_M} \right| > \left| \frac{\partial \hat{\theta}}{\partial \tau_P} \right|.$$

In other words, M gains more votes amongst the poor when it raises its tax rate, compared to what happens when P does the same. The reason is that more redistribution makes poor agents better off, and hence less disappointed, so that their consumption gets closer to x . Since $\mu'''(\cdot) < 0$, they thus become less risk-loving, and this increases further the number of voters who lean towards M . The opposite occurs when the populist raises taxes. An increase in τ_P gains the support of disappointed voters because they favor redistribution; this effect is however mitigated since by making them richer they become less risk-loving.

4.2 Political Equilibrium

We are now ready to study the full equilibrium. To simplify the exposition, throughout we assume that the distribution G has (full) support over \mathbb{R}_+ .

¹¹Specifically, the two conditions are:

$$\frac{\partial \hat{\theta}}{\partial \tau_P} = \frac{f_\tau(\tau_P) - \hat{\theta}(\tau_M, \tau_P)}{(1 - \tau_M)R(c_M, c_P) - (1 - \tau_P)},$$

and

$$\frac{\partial \hat{\theta}}{\partial \tau_M} = \frac{R(c_M, c_P)[\hat{\theta}(\tau_M, \tau_P) - f_\tau(\tau_M)]}{(1 - \tau_M)R(c_M, c_P) - (1 - \tau_P)},$$

where $R(c_M, c_P) := (1 + \mu'(c_M - x))/(1 + \mathbb{E}\mu'(c_P - x))$, and abusing notation $\mathbb{E}\mu'(c_P - x) := \int_{-\varepsilon}^{x - \mathbb{E}c_P} \mu'(\mathbb{E}c_P + \eta - x)h(\eta)d\eta$. Since at the crossing point we have $\mathbb{E}c_P < c_M$ and $\mu'(\cdot)$ is positive and concave, we have $R(c^M, c^P) > 1$.

We summarize this discussion in the following:

PROPOSITION 3. *Under the assumptions of Lemma 1, a political equilibrium outcome can be of two sorts:*

i) *Policy convergence: The equilibrium displays single crossing and we have policy convergence at the bliss point of the voter who is just indifferent between M and P at the equilibrium tax rate. That is: $\tau_P^* = \tau_M^* = \tau^{\hat{\theta}}$.*

ii) *Populist tax cuts: the populist candidate strictly prefers $\tau_P(\tau_M^*) < \tau_M^*$, and the schedules $w_P(\theta, \tau_P^*)$ and $w_M(\theta, \tau_M^*)$ cross at more than one income level θ .*

Moreover, the equilibrium configurations (i) and (ii) and their qualitative features about taxes and crossing remain the same if P is the first mover.

The intuition for outcome (i) is as follows. In the range $\tau_P \geq \tau_M$, both candidates would like to flatten the curves of voters' welfare w_M and w_P , so as to shift the threshold $\hat{\theta}$ in their desired direction. This tendency is mitigated by the fact that higher taxes also entail higher tax distortions, however. Higher tax distortions shift the expected utility downwards and hence move the threshold $\hat{\theta}$ in the opposite direction. In this case, these two forces are balanced. Not surprisingly, single crossing implies policy convergence at the bliss point of the voter who is just indifferent between the two candidates (not necessarily the median voter).

The equilibrium of case (ii) in Proposition 3 is more interesting. Here we do not have single-crossing (i.e., the voters' utility functions intersect more than once), and in equilibrium there is no policy convergence: the populist candidate announces a lower tax rate than the moderate. Proposition 3 (ii) also indicates that in this case there must be at least another intersection point, possibly more than one. As in the previous discussion of Figure 2, let $\bar{\theta}$ denote the highest level of income for which $w_P(\theta, \tau_P(\tau_M^*))$ and $w_M(\theta, \tau_M^*)$ intersect. Since $\tau_P(\tau_M^*) < \tau_M^*$, it must be the that $w_P(\bar{\theta}, \tau_P(\tau_M^*))$ intersects $w_M(\bar{\theta}, \tau_M^*)$ from below.¹² Hence, all voters with income $\theta > \bar{\theta}$ prefer candidate P to candidate M. Let $\underline{\theta}$ denote the first intersection point to the left of $\bar{\theta}$, so that at $\underline{\theta}$ the function $w_M(\underline{\theta}, \tau_M^*)$ intersects $w_P(\underline{\theta}, \tau_P(\tau_M^*))$ from below (i.e. w_M is steeper than w_P). Hence, all voters with income $\theta < \underline{\theta}$ in a neighbourhood of $\underline{\theta}$ prefer candidate P to candidate M. Since $\tau_P(\tau_M^*) < \tau_M^*$ and

¹²The fact that w_P intersects w_M from below can be proved by contradiction. Suppose that at $\bar{\theta}$ w_P intersects w_M from above. Then $\bar{\theta}$ cannot be the right-most intersection point, because: (i) $\tau_P(\tau_M^*) < \tau_M^*$ implies $\frac{\partial w_P}{\partial \theta} > \frac{\partial w_M}{\partial \theta}$ in the linear part of the utility functions: (ii) G has (full) support over \mathbb{R}_+ .

$\mu'(\cdot) > 0$, this second intersection point can only occur in the region where w_M is non-linear - i.e., where $c_M(\underline{\theta}, \tau_M^*) < x$. We thus have:

COROLLARY 4. *In case (ii) of Proposition 3 the populist candidate is supported by a coalition that includes the richest voters (i.e. all voters with $\theta > \bar{\theta}$) and disappointed voters (i.e. voters with $c_M < x$ in equilibrium).*

To illustrate this corollary in a case with double crossing of the functions $w_M(\theta, \tau_M^*)$ and $w_P(\theta, \tau_P(\tau_M^*))$, we can refer to Figure 2. This is the case illustrated by the solid curve. All voters with income $\theta > \bar{\theta}$ and with income $\theta < \underline{\theta}$ prefer candidate P to candidate M . The populist candidate is supported by a coalition of the extremes, the rich voters and the poor and disappointed voters. With more than double crossing, the poorest voters could support the moderate incumbent (who promises higher taxes), but it would remain true that the populist candidate draws the support of the richest voters and of some disappointed voters. With double (or more) crossing, it is also true that the moderate candidate always receives the support of some voters with intermediate levels of income, i.e. with $\underline{\theta} < \theta < \bar{\theta}$. These are the voters who fear the risky populist politician the most because, being close to their reference point, they could suffer a lot if the populist politician has a bad draw, because of loss aversion.

In other words, the populist candidate knows that he appeals the most to the risk loving and disappointed voters. He can thus afford to choose a tax rate that is too low for these voters, knowing that they would be reluctant to vote for the moderate politician that they dislike. Setting a lower tax rate, enables the populist candidate to also gain the vote of the richest and non-disappointed individuals, who only care about the policy platforms and not about the intrinsic features of the two politicians. Thus, in equilibrium the populist politician sets a lower tax rate and is supported by a coalition of rich and disappointed voters.

Finally, who wins the election? If in equilibrium $\tau_P(\tau_M^*) \geq \tau_M^*$, then by Lemma 1 we have single crossing at the level of income $\hat{\theta}(\tau_P(\tau_M^*), \tau_M^*)$. Voters to the right of $\hat{\theta}$ prefer the moderate candidate, and those to the left prefer the populist candidate. Hence candidate M wins if the median level of income exceeds $\hat{\theta}$, while candidate P wins in the opposite case. Note that, if in equilibrium $w_M(\theta, \tau_M^*)$ and $w_P(\theta, \tau_P(\tau_M^*))$ cross only once at the point $\hat{\theta}$, although there is policy convergence, the equilibrium tax rates of either candidate are not attracted by the median voter bliss point. If in equilibrium $\tau_P(\tau_M^*) < \tau_M^*$, then we

may have double crossing or more, we have no policy convergence, and to determine who wins we have to sum the coalitions of voters in favor of one or the other candidate. For instance, in the case of double crossing, the size of the voting coalition in favor of the moderate candidate is $G(\bar{\theta}(\tau_P(\tau_M^*) \tau_M^*)) - G(\underline{\theta}(\tau_P(\tau_M^*) \tau_M^*))$. If this expression exceeds $1/2$ then M wins, otherwise P does. Here too, the median voter bliss point does not pin down equilibrium tax rates.¹³

5 Double crossing

We now consider more in detail the case in which the value functions $w_M(\theta, \tau_M)$ and $w_P(\theta, \tau_P)$ cross at most twice for $\tau_P < \tau_M$. In the online Appendix D, we provides a set of sufficient conditions for this to happen. These conditions amount to assuming - roughly - that: (i) for any $\tau_P < \tau_M$, the right-most crossing point occurs sufficiently far from the reference point x , and that (ii) the function $\mu(\cdot)$ is sufficiently well behaved that $w_M(\theta, \tau_M)$ remains below $w_P(\theta, \tau_P)$ for all levels of income below the first crossing point to the left of x . The latter is obviously the crucial assumption, while property (i) only serves to formally state property (ii). Under these conditions, if $\tau_P < \tau_M$ then we have at most double crossing. As a result, by Proposition 3, in equilibrium candidate P is supported either by a group of poor and disappointed voters (single crossing equilibrium), or by a coalition of poor and disappointed voters and of rich voters, while voters with consumption close to the reference point vote for M (double crossing equilibrium).

Consider how the candidates behave in this type of equilibrium. Since there is double crossing, the optimal tax rate for P maximizes the area to the right of $\bar{\theta}$ plus the area to the left of $\underline{\theta}$. His optimality condition (assuming interiority), taking τ_M as given, is:

$$g(\underline{\theta}) \frac{\partial \underline{\theta}}{\partial \tau^P} = g(\bar{\theta}) \frac{\partial \bar{\theta}}{\partial \tau^P},$$

where $g(\cdot)$ is the density of the income distribution $G(\cdot)$. This condition says that, at an interior optimum, the marginal votes gained by P amongst the poor when raising τ_P are equal to the votes lost amongst the rich.¹⁴ By the envelope theorem, the optimality

¹³If the election outcome was determined by the realization of an aggregate and exogenous popularity shock, as discussed in footnote 11, then the statements in the text would have to be interpreted as affecting the probability of winning, but not who is ultimately appointed.

¹⁴Note indeed, that in order to have an equilibrium of this type, it must be that $\underline{\theta} < E\theta$.

condition for M , taking into account how τ_P responds to τ_M , is:

$$g(\underline{\theta}) \frac{\partial \underline{\theta}}{\partial \tau_M} = g(\bar{\theta}) \frac{\partial \bar{\theta}}{\partial \tau_M},$$

which has the same interpretation, namely M also equates the marginal votes gained and lost on the opposite sides of the income distribution, evaluated at exactly the same thresholds, $\underline{\theta}$ and $\bar{\theta}$.

For simplicity, suppose that the right-most intersection point $\bar{\theta}$ occurs in the region where both $w_M(\theta, \tau_M)$ and $w_P(\theta, \tau_P)$ are linear, as in Figure 2. These optimality conditions imply that - for this case to happen - in equilibrium we must have $\tau_P(\tau_M^*) < \tau_M^*$. This is because, as discussed above and formally shown in the proof of Lemma 2 in appendix A, at $\tau_M = \tau_P$ we have:

$$\left| \frac{\partial \underline{\theta}}{\partial \tau_M} \right| > \frac{\partial \underline{\theta}}{\partial \tau_P} \quad \text{and} \quad \frac{\partial \bar{\theta}}{\partial \tau_M} = \left| \frac{\partial \bar{\theta}}{\partial \tau_P} \right|.$$

Namely, the lower income threshold $\underline{\theta}$ is more sensitive to changes in τ_M than in τ_P , while the upper threshold is equally sensitive at $\tau_M = \tau_P$. As we saw, the assumption $\mu'''(.) < 0$, implies that M gains more votes amongst the poor when it raises its tax rate, compared to what happens when P does the same. This effect is absent at the upper threshold $\bar{\theta}$, where swing voters are risk-neutral. Hence, the equilibrium must be found at a point where $\tau_P(\tau_M^*) < \tau_M^*$. At this point, tax distortions are higher under M , and the concavity of f implies that $\frac{\partial \bar{\theta}}{\partial \tau_M} > \left| \frac{\partial \bar{\theta}}{\partial \tau_P} \right|$.¹⁵ Namely, the upper threshold is also more sensitive to changes in τ_M than in τ_P when $\tau_P(\tau_M^*) < \tau_M^*$, because of the larger tax distortions associated with τ_M .

In other words, under the stated assumptions the equilibrium is such that, at both margins, the elasticity of votes gained or lost is higher for M than for P . This in turn follows from the intrinsic difference between the two candidates. Because P is risky, it

¹⁵More formally, if $\bar{\theta}$ is in the linear part of w_M and w , we have

$$\begin{aligned} \frac{\partial \bar{\theta}}{\partial \tau_P} &= \frac{\underline{\theta}(\tau_M, \tau_P) - f_\tau(\tau_P)}{\tau_M - \tau_P}, \\ \text{while} \\ -\frac{\partial \bar{\theta}}{\partial \tau_M} &= \frac{\underline{\theta}(\tau_M, \tau_P) - f_\tau(\tau_M)}{\tau_M - \tau_P}. \end{aligned}$$

Whenever f is strictly concave, $\tau_P < \tau_M$ implies $f_\tau(\tau_M) < f_\tau(\tau_P)$. If $\bar{\theta}$ was in the non-linear part of w_M or of w_P , then these expressions would contain additional terms, which we do not report here for ease of exposition.

has less to gain from offering redistribution to the poor. The reason is that, by making the poor voters better off, P also reduces its intrinsic attractiveness amongst disappointed voters. Not surprisingly, therefore, in equilibrium P sets lower taxes than M .

6 Convergence or Divergence of Tax Rates

As we have shown, in our model two types of equilibria may exist: one with convergence of tax rates ($\tau_M = \tau_P$) and one with divergence ($\tau_M > \tau_P$). In this subsection, we discuss when these two types of equilibria prevail.

The first relevant property of the economic environment is whether, when both candidates offer the same tax rates, the average voter $\mathbf{E}\theta$ prefers the populist or the moderate. Define $\hat{\theta}(\tau^{\hat{\theta}}, \tau^{\hat{\theta}})$ as the level of income of an individual who is indifferent between the two candidates when they both set tax rates at his bliss point, $\tau^{\hat{\theta}}$, namely such that:

$$w_M(\hat{\theta}, \tau^{\hat{\theta}}) = w_P(\hat{\theta}, \tau^{\hat{\theta}}). \quad (3)$$

As depicted in Figure 2, individuals with $\theta > \hat{\theta}$ (resp. $\theta < \hat{\theta}$) prefer the moderate (resp. populist) candidate when they set the same tax rate. Note that $\hat{\theta}$ and $\tau^{\hat{\theta}}$ do not depend on the distribution of θ among voters.¹⁶

Suppose that, when $\tau_M = \tau_P = 0$, the average voter prefers the populist candidate: $\mu(\mathbf{E}\theta - x) < -z + \mathbb{E}\mu(\mathbf{E}\theta - z - x)$. In this case, the only equilibrium is described in the following Proposition:

PROPOSITION 5. *If $\mu(\mathbf{E}\theta - x) < -z + \mathbb{E}\mu(\mathbf{E}\theta - z + \eta - x)$, then $\tau_M^* = \tau_P^* = 0$ and $\hat{\theta}(0, 0) > \mathbf{E}\theta$.*

That is, if the marginal voter $\hat{\theta}$ is opposed to redistribution, then neither candidate can gain votes by proposing a positive tax rate, and policy divergence is ruled out in equilibrium. Thus, a necessary (but not sufficient) condition for the equilibrium to have

¹⁶Using the condition for a voter optimal tax rate, $\hat{\theta}$ and $\tau^{\hat{\theta}}$ are implicitly defined by:

$$\begin{aligned} \mu(\theta - i(\tau) - x) &= -z + \mathbb{E}\mu(\theta - i(\tau) - z + \eta - x) \\ i'(\tau) &= \text{Max}[0, \mathbf{E}\theta - \theta] \end{aligned}$$

The first equation is the indifference condition, the second equation defines the optimal tax rate for an individual with income θ .

policy divergence is that, when candidates propose the same tax rate, the average voter prefers the moderate candidate. Note this in turn requires that $z > 0$ and sufficiently large, since $\mathbb{E}\mu(\mathbf{E}\theta + \eta - x) > \mu(\mathbf{E}\theta - x)$ by convexity of $\mu(\cdot)$. In other words, unless the populist's inefficiency, z , is sufficiently high, we are always in the case where there is convergence of tax rates to $\tau_M = \tau_P = 0$.

Next consider the polar case, where the average voter prefers the moderate candidate if both tax rates are at the maximal level τ_0 , namely $\mu(\mathbf{E}\theta - i(\tau_0) - x) > -z + \mathbb{E}\mu(\mathbf{E}\theta - i(\tau_0) - z + \eta - x)$. In this case, it must be that $\hat{\theta} < \mathbf{E}\theta$. This is so since whenever the average voter prefers the moderate candidate at $\tau_M = \tau_P = \tau_0$, it also does so for any $\tau_M = \tau_P < \tau_0$. In this case, in equilibrium we can either have single crossing convergence of tax rates at $\tau^{\hat{\theta}} > 0$,¹⁷ or double crossing (or more) and divergence with $\tau_P^*(\tau_M^*) > \tau_M^*$. The outcome, in particular, depends on the distribution of voters.

By Proposition 3, in an equilibrium where $\tau_P^* \geq \tau_M^*$, we can only have equality between the two tax rates at $\tau^{\hat{\theta}}$. Hence if, when $\tau_M = \tau^{\hat{\theta}}$, the populist prefers to set $\tau_P < \tau^{\hat{\theta}}$, an equilibrium with convergence of tax rates fails to exist. In other words, we only need to consider the incentives of the populist candidate to deviate from the putative single crossing equilibrium with policy convergence. In the single crossing equilibrium, the populist candidate obtains a fraction of votes $G(\hat{\theta}(\tau^{\hat{\theta}}, \tau^{\hat{\theta}}))$. Let $\underline{\theta}(\tau^{\hat{\theta}}, \tau_P)$ and $\bar{\theta}(\tau^{\hat{\theta}}, \tau_P)$ be the two crossing points depicted in Figure 2 if the populist chooses $\tau_P < \tau^{\hat{\theta}} = \tau_M$, with $\underline{\theta}(\tau^{\hat{\theta}}, \tau_P) < \bar{\theta}(\tau^{\hat{\theta}}, \tau_P)$.¹⁸ Note that $\underline{\theta}(\tau^{\hat{\theta}}, \tau_P) < \hat{\theta}(\tau^{\hat{\theta}}, \tau^{\hat{\theta}})$: by reducing the tax rate, the populist loses votes among voters who favor redistribution.¹⁹ Then the populist prefers to deviate and set $\tau_P < \tau^{\hat{\theta}}$ if the votes gained among the rich exceed those lost among the poor, namely if there is a tax rate $\tau_P < \tau^{\hat{\theta}}$ such that:

$$1 - G(\bar{\theta}(\tau^{\hat{\theta}}, \tau_P)) > G(\hat{\theta}(\tau^{\hat{\theta}}, \tau^{\hat{\theta}})) - G(\underline{\theta}(\tau^{\hat{\theta}}, \tau_P))$$

If this condition holds, then an equilibrium with policy divergence and $\tau_M^* > \tau_P^*$ exists. Intuitively, this condition is more likely to be satisfied if the income distribution is such that there are many rich above $\bar{\theta}$, or if there are few poor in the region between $\hat{\theta}$ and $\underline{\theta}$.

¹⁷Note in particular, that - since $i'(0) = 0$ - the preferred tax rate for $\hat{\theta} < \mathbf{E}\theta$ must be positive.

¹⁸For simplicity, we only consider the possibility of an equilibrium with double crossing, ruling out equilibria with more than two crossing points (again, for a set of sufficient conditions for this to happen, see Appendix D).

¹⁹Since $\tau^{\hat{\theta}}$ is the ideal tax rate for $\hat{\theta}$, when the populist reduces the proposed tax rate, $\hat{\theta}$ is no longer indifferent between the two candidates, but prefers to vote for the moderate.

This condition is also more likely to be satisfied if the points $\hat{\theta}$ and $\underline{\theta}$ are close together (i.e. these two thresholds are not very sensitive to τ_P).

6.1 A Numerical Example

We now illustrate these intuitions with a numerical example. The example is documented in Figure 3 below and Figures 5, 6, 7, 8, 9 and 10 in Appendix E. Figure 10 (in the online Appendix) illustrates the populist reaction function and displays the discontinuity in P 's reaction function: if τ_M is sufficiently low, $\tau_P^*(\tau_M) > \tau_M$ and it is increasing in τ_M . But once τ_M exceeds a critical value (0.12 in this numerical example), P finds it optimal to jump to a lower tax rate $\tau_P^*(\tau_M) < \tau_M$. Candidate M in turn finds it optimal to accept this situation, and the Stackelberg equilibrium is found at $\tau_M^* = .22$ and $\tau_P(\tau_M^*) = .18$, where we have double crossing and both candidates are at an interior optimum.

The equilibrium with double crossing emerges because M does not want to lose the support of moderately disappointed voters. To get their vote, M must offer sufficiently high redistribution, otherwise P could attract them with a tax rate close to their bliss point. By setting a large τ_M , however, the moderate creates an opportunity for the populist to reduce the tax rate and attract the richest voters. This is indeed what P does in the political equilibrium with double crossing.

This numerical example has the same qualitative properties, including $\tau_P^* < \tau_M^*$, if roles are reversed and P is the Stackelberg leader. Figure 10 (in the Appendix) illustrates the reaction functions $\tau_P(\tau_M)$ (blue solid line) and $\tau_M(\tau_P)$ (red dashed line). Both reaction functions are discontinuous and they never cross, indicating that a Nash equilibrium in pure strategies does not exist. Figure 10 also reports the Stackelberg equilibria when P is moving first (the two red squares). These are both at a point where $\tau_P^* < \tau_M(\tau_P^*)$. Proposition 3 (iii) clarifies that this is not a coincidence: the key qualitative features of the equilibrium are preserved even if the timing assumptions are reversed and P moves first. This is not surprising, since with $\tau_P \geq \tau_M$ we have single crossing by Lemma 1. Hence, if the equilibrium was in the region $\tau_P \geq \tau_M$, either the follower (here M) would have to be indifferent between two points, one above and another below the 45-degree line, or there would be policy convergence in equilibrium. Even if P moves first, there cannot be an equilibrium where the follower (M) strictly prefers $\tau_M > \tau_P$.

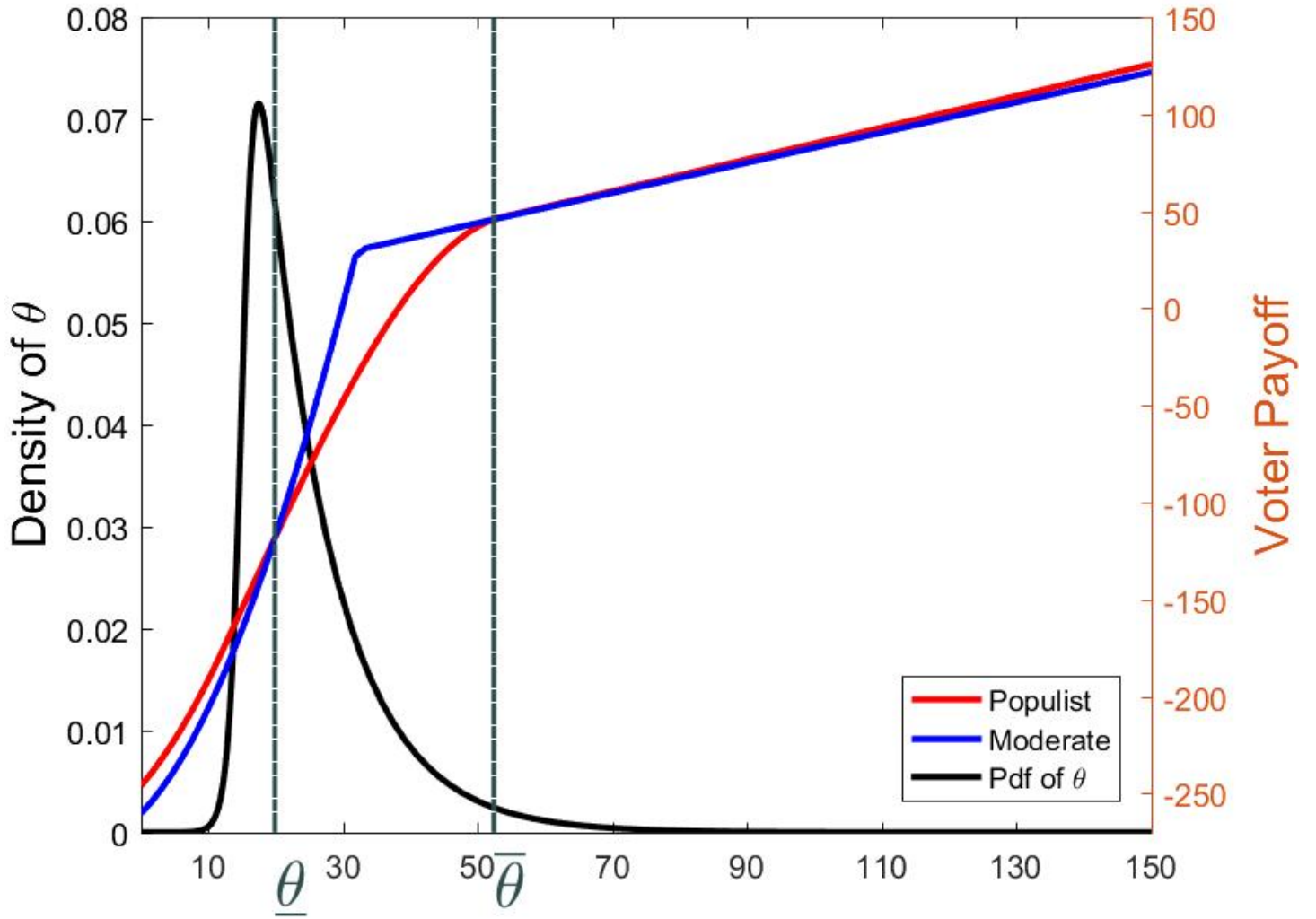


Figure 3: **A numerical example of double crossing.** The figure combines figures 6 and 7 in Appendix E. It reports both the distribution of θ (the left scale) and voters' welfare (reported in the right scale) under the two parties - w_P (in red) and w_M (in blue) - as a function of θ for the equilibrium level of taxes. The vertical dashed lines represent the equilibrium crossing points. Voters prefer M between the two points and P for θ outside the two vertical lines.

7 Extensions

In our model, there are two dimensions of political conflict. One is the traditional redistributive conflict over tax policy. The other is disagreement over the desired risk properties of candidates. Both dimensions are related to individual income, relative to average income for redistribution, and relative to a common reference point for risk. Preferences for high taxes are decreasing in individual income, θ . Similarly, for any tax rate $\tau \in [0, 1)$, the difference between net income (consumption) and the common reference point x increases with θ . The shape of μ implies that the risk attitude of voters as a function of income is non-monotone, with voters who consume close to the reference point being most averse to risk. Our results generalize to extensions of the model that preserve these qualitative features. In this section, we briefly discuss two such extensions.

Risk aversion We assumed that the direct utility of voters is linear in consumption. All our results would still hold if we assumed risk averse voters, namely if $w^M(c, x) = u(c) + \mu(c - x)$ with u strictly increasing and concave. In this case, however, we need two additional ‘regularity’ assumptions. First, in order to keep individuals with high income not very averse to risk (and hence potentially willing to vote for the populist), u should display Decreasing Absolute Risk Aversion (DARA). Risk aversion penalizes the populist, and DARA implies that such penalty decreases with income. Second, more disappointed individuals (i.e. those with lower $c - x$) should be more likely to prefer the populist candidate in the absence of taxation (as in Lemma 1). For this to be the case, we need to assume that for $c < x$ the function w^M satisfies Assumption 1. In particular, the convexity of μ must dominate the concavity of u - i.e., $u''(c) + \mu''(c - x) > 0$ and $u'''(c) + \mu'''(c - x) \leq 0$ for all $c < x$.

Heterogeneous Reference Points We can also relax the assumption that all voters have the same reference point, as long as we preserve the feature that individuals with lower income are more disappointed (i.e., they are further below their idiosyncratic reference point) and that rich voters are not disappointed. For example, all our results still hold if the reference point of individuals with income θ is given by: $x(\theta) = (1 - \rho)\theta + \rho x_0$ for $1 \geq \rho > \tau_0$ (where τ_0 is the tax rate that maximizes tax revenue). In this case, all our results remain true as long as we strengthen the assumption made in Lemma 1 to

$E\theta \leq x_0 - \varepsilon + z$. Recall that the assumption guarantees that all non-disappointed voters have above average income, and hence cannot be attracted by the populist if he proposes a higher tax rate. Given this, it is not difficult to show that we are also able to retain all other results in the paper.

8 Concluding Remarks

As Western democracies continue to grapple with economic uncertainty and social discontent, it is important to reach a more profound understanding of the mechanisms driving populist success and its implications for democratic governance. This paper tries to shed light on these issues, with a particular emphasis on the context of economic shocks and social insecurity. Paradoxically, despite an agenda that often favors the rich, the populist appeal transcends diverse socio-economic strata and fosters unexpected supporting coalitions. We posit that reference-dependent preferences play a pivotal role in elucidating this phenomenon.

Our analysis, which centers on a scenario of electoral competition between a moderate and a riskier populist candidate, unveils the nuanced interplay between candidate characteristics and voter preferences. In the aftermath of a significant negative shock to the economy, the inherent riskiness embodied by populist leaders becomes paradoxically appealing to disillusioned voters seeking to mitigate their losses. Conversely, voters close to their expected income levels exhibit heightened aversion to risk, leading to opposition against risk-laden policies. This dynamic engenders two potential equilibria: one with policy convergence, wherein both candidates compete for the same marginal voter and advocate analogous tax policies, and another with policy divergence, characterized by the populist proposing lower taxes and reduced redistribution, garnering the support of wealthier voters and deeply disillusioned individuals. The divergence arises from the differential impact of policy proposals on voters' reference-dependent preferences, particularly evident when a substantial fraction of the electorate falls below their reference points due to economic shocks.

The implications of our analysis extend beyond the immediate electoral outcomes and suggest several important directions for future research. First, the model hints at potential dynamic effects that could make populism self-reinforcing. When risky populist policies fail to deliver their promised outcomes, voters already below their reference point fall

even further behind their expectations. Our framework suggests that such deeper disappointment could paradoxically strengthen rather than weaken the appeal of populist candidates, as increasingly disappointed voters become even more risk-seeking in their political choices. This dynamic could help explain the persistence of populist movements even after initial policy failures, and why some countries appear trapped in cycles of populist governance.

A second crucial avenue for research concerns the evolution of voters' reference points. While our model takes reference points as given, understanding their formation and adjustment is essential for a complete theory of populist success. Do reference points adjust downward after major economic shocks, and if so, how quickly? The answer has important implications for the persistence of populist appeal. Economic disappointment may have long-lasting political effects if reference points are sticky, even as objective conditions improve. Alternatively, if reference points adjust rapidly, the political impact of economic shocks might be more temporary. This question connects to broader issues in behavioral economics about expectation formation and adaptation to new circumstances. Moreover, it raises important policy questions about managing public expectations during economic transitions or reform programs.

A third important direction concerns the strategic responses available to moderate parties facing populist challengers. Our model suggests that traditional redistributive policies alone may be insufficient to win back disappointed voters, as these voters' political choices are driven more by risk-seeking behavior than by conventional economic incentives. This creates a difficult strategic dilemma for moderate parties: should they maintain their commitment to careful, well-tested policies at the risk of losing elections, or should they incorporate elements of populist platforms despite recognizing their risks? Understanding how moderate parties can effectively compete with populists while maintaining their fundamental character is crucial for democratic stability.

Finally, our analysis raises broader questions about institutional design in democracies subject to populist pressures. If reference-dependent preferences create systematic biases toward risky policies during periods of economic disappointment, should democratic systems incorporate institutional constraints specifically designed to manage such biases? Examples might include mandatory delay periods before major policy changes, requirements for supermajority support for certain types of reforms, or independent agencies with a mandate to evaluate certain policies. Such institutional changes would need to

balance the legitimate desire to constrain potentially harmful policy choices against the need to maintain democratic responsiveness. These questions connect our analysis to the broader literature on constitutional political economy and optimal institutional design under behavioral biases. These research directions take on particular urgency in light of contemporary political developments. The persistence and proliferation of populist movements across established democracies suggest that they represent not a transitory phenomenon but a lasting feature of modern political systems. Their demonstrated capacity to reshape democratic institutions and governance makes understanding their causes and consequences a central challenge for political economy research.

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A Proofs

A.1 Socially optimal tax rate

Suppose first that the moderate candidate is in office. The social planner maximizes the utilitarian optimum, namely:

$$\int_0^{\infty} c(\theta, \tau) dG(\theta) + \int_0^{\theta_x(\tau)} \mu[c(\theta, \tau) - x] dG(\theta), \quad (4)$$

where, recall, $G(\cdot)$ is the distribution of θ , and $\theta_x(\tau)$ is such that $c(\theta_x(\tau), \tau) = x$, namely

$$\theta_x(\tau) = \frac{x + i(\tau) - \tau \mathbf{E}\theta}{1 - \tau}$$

Taking the derivative with respect to τ , and recalling that $\mu[c(\theta_x(\tau), \tau) - x] = 0$, we obtain:

$$-i'(\tau) + \int_0^{\theta_x(\tau)} \mu'[c(\theta, \tau) - x] [\mathbf{E}\theta - \theta - i'(\tau)] dG(\theta) \equiv M(\tau) \quad (5)$$

Now evaluate this expression at the point $\tau = 0$. Since $i'(0) = 0$, we can write it as:

$$\int_0^x (\mathbf{E}\theta - \theta) \mu'(\theta - x) dG(\theta). \quad (6)$$

If $\mathbf{E}\theta > x$ and there is a positive measure of agents with $\theta < x$ this expression is clearly strictly positive. Hence $\tau = 0$ cannot be a solution. Intuitively, disappointed agents are loss averse, and hence they have a higher marginal utility of income. Since $\mathbf{E}\theta > x$, all disappointed agents are poorer than the average. Hence, a positive tax redistributes from non-disappointed to disappointed agents, and this increases social welfare. Note that convexity plays no role here, just loss aversion is sufficient for this result.

If $\mathbf{E}\theta < x$ then (6) can be written as:

$$\int_0^{\mathbf{E}\theta} (\mathbf{E}\theta - \theta) \mu'(\theta - x) dG(\theta) + \int_{\mathbf{E}\theta}^x (\mathbf{E}\theta - \theta) \mu'(\theta - x) dG(\theta). \quad (7)$$

The first term is positive, the second term is negative, hence this expression has an ambiguous sign. Intuitively, some disappointed agents have above average income, so we can no longer tell whether a positive tax rate is optimal.

Rewriting (7), the condition for $\tau > 0$ to be an optimal solution is:

$$\int_0^{\mathbf{E}\theta} (\mathbf{E}\theta - \theta) \mu'(\theta - x) dG(\theta) > \int_{\mathbf{E}\theta}^x (\theta - \mathbf{E}\theta) \mu'(\theta - x) dG(\theta) \quad (8)$$

This condition is more likely to be met if:

- (i) there are not too many people between $\mathbf{E}\theta$ and x .
- (ii) the function $\mu(\cdot)$ is not too convex.

To see why convexity works against (8), note that $\mu'(\cdot)$ is an increasing function. Hence, the marginal utility of income is higher for the disappointed losers from redistribution than from the disappointed beneficiaries (i.e., μ' is uniformly higher on the RHS of (8)). Moreover, the LHS of (8) sees higher values of μ' weighted by smaller values of $\mathbf{E}\theta - \theta$, while the opposite happens on the RHS. In other words, the covariance between $(\mathbf{E}\theta - \theta)$ and $\mu'(\theta - x)$ is negative, and this also works against (8) being satisfied.

We summarize these results in the following:

PROPOSITION 6. *The socially optimal tax rate when the moderate candidate is in office is positive if $\mathbf{E}\theta > x$ and there is a positive measure of agents with $\theta < x$, or if $\mathbf{E}\theta < x$ and (8) holds.*

Suppose that one of these conditions is met, so that the optimal tax rate is positive, ruling out a corner solution. Then, the socially optimal tax rate is implicitly defined by setting (5) equal to 0. Intuitively, at a social optimum the marginal tax distortions, $i'(\tau) > 0$, are equated to the marginal social benefit of redistributing in favor of the disappointed agents (the second term in (5)).

Proof of Lemma 1.

Proof. (i) First of all, note that $c_M(\cdot, \tau_M)$ is strictly monotone in θ for all $\tau_M < 1$. We will hence be able to span all θ by looking at the whole range for c_M .

A. Consider all θ such that $c_M(\theta, \tau_M) \geq x$. Given our assumptions, it must be that $c_M(\theta, \tau_M) \geq \mathbb{E}\theta$. We now show that in this case the two functions w_M and w_P cannot cross because the populist has higher distortions than the moderate and the loss function μ is not acting for the latter. Formally: $c_M(\theta, \tau_M) \geq \mathbb{E}\theta$ and the monotonicity of consumption in θ implies $\theta \geq \mathbb{E}\theta$. As a consequence, $\tau_P \geq \tau_M$ implies that $c_M(\theta, \tau_P) \leq c_M(\theta, \tau_M)$ and $\mathbb{E}c_P(\theta, \tau_P) = c_M(\theta, \tau_P) - z$. Since under M consumption is above the reference point, while under P consumption might end up being below x in the bad state (and $\mu \leq 0$), the difference $w_P(\theta, \tau_P) - w_M(\theta, \tau_M)$ must be larger than z for all such θ .

B. Consider the complement set: θ such that $c_M(\theta, \tau_M) < x$. We here have two cases to consider.

B1. First, assume in addition that $c_M(\theta, \tau_M) \geq \mathbb{E}c_P(\theta, \tau_P)$. That is, we consider all θ such that we have $x > c_M(\theta, \tau_M) \geq \mathbb{E}c_P(\theta, \tau_P)$. The difference between the two functions w_M and w_P is strictly increasing in θ . They might hence cross at most once in this range. Formally, we have:²⁰

$$\frac{\partial}{\partial \theta} [w_M(\theta, \tau_M) - w_P(\theta, \tau_P)] = (\tau_P - \tau_M) + (1 - \tau_M)\mu'(c_M - x) - (1 - \tau_P)\mathbb{E}\mu'(c_P - x) > 0,$$

where the last strict inequality is guaranteed even for $\tau_P = \tau_M$ because of Assumption 1 (iv). In particular, note that for any convex extension of μ we have $\mu'(c_M - x) \geq \int_{-\varepsilon}^{+\varepsilon} \mu'(c_P - x)h(\eta)d\eta$ and in any such extension, for $c_P - x > 0$ we must have $\mu'(c_P - x) \geq \mu'_-(0) > 0$. The inequality is hence satisfied a fortiori when for such values $\mu'(c_P - x) = 0$.

B2. Consider now the alternative case where $c_M(\theta, \tau_M) < x$ and $c_M(\theta, \tau_M) < \mathbb{E}c_P(\theta, \tau_P)$. Note that, since $\tau_P \geq \tau_M$, it must be that $\theta \leq \mathbb{E}\theta$. And hence, under our Assumption of f , we have $(1 - \tau_P)\theta + f(\tau_P) \leq \mathbb{E}\theta$ and hence $\mathbb{E}c_P(\theta, \tau_P) = (1 - \tau_P)\theta + f(\tau_P) - z \leq \mathbb{E}\theta - z \leq x - \varepsilon$, where the last inequality is implied by our assumption. This in turn implies that $c_M(\theta, \tau_M) \leq \mathbb{E}c_P(\theta, \tau_P) < x - \varepsilon$.

We now show that the two conditions $x - \varepsilon \geq c_M(\theta, \tau_M)$ and $\mathbb{E}c_P(\theta, \tau_P) \geq c_M(\theta, \tau_M)$ together imply that $w_P(\theta, \tau_P) > w_M(\theta, \tau_M)$. This will show that the functions w_P and w_M cannot cross in the relevant range of θ in this case. In words, we have $w_P(\theta, \tau_P) > w_M(\theta, \tau_M)$ since for this range of θ the populist enjoys higher average consumption and the riskiness of the convex punishment. More in detail, since $\mathbb{E}c_P(\theta, \tau_P) \geq c_M(\theta, \tau_M)$, it suffices to show that:

$$\mu(c_M(\theta, \tau_M) - x) \leq \mathbb{E}\mu(c_P(\theta, \tau_P) - x). \quad (9)$$

To see why (12) holds, note that $c_M(\theta, \tau_M) < x - \varepsilon$, so: (i) $\mu(c_M(\theta, \tau_M) - x) < 0$ and (ii) if we define $\tilde{c}_M(\theta, \tau_M) := c_M(\theta, \tau_M) + \eta$ where η takes the values between $-\varepsilon$ and $+\varepsilon$ with density h , from Jensen's inequality, we have $\mathbb{E}\mu(\tilde{c}_M(\theta, \tau_M) - x) \geq \mu(c_M(\theta, \tau_M) - x)$. Now, since $\mathbb{E}c_P(\theta, \tau_P) \geq \mathbb{E}\tilde{c}_M(\theta, \tau_M) = c_M(\theta, \tau_M)$ we obtain the result from the monotonicity of μ .

²⁰Obviously, for $c_P = x$, μ' should be replaced by its left derivative, however this is of measure zero in the integral and we ignore it to simplify notation.

(ii) Since the only case where we can have a crossing point is **B1**, we have also shown the second part of the proposition. Namely, that at the crossing point $\hat{\theta}$, if any, we have $\mathbb{E}c_P(\hat{\theta}, \tau_P) < c_M(\hat{\theta}, \tau_M) < x$.

(iii) It is sufficient to observe that in region **B1** $\frac{\partial(w_M - w_P)}{\partial\theta} > 0$. \square

Proof of Lemma 2. As a preliminary result we would like to state some regularity conditions on the objects of analysis.

LEMMA 7. Assume $f(\cdot)$ is twice continuously differentiable, and $\mu(\cdot)$ are twice continuously differentiable everywhere except at zero. (i) For $\bar{\tau} := (\bar{\tau}_M, \bar{\tau}_P)$, let $\hat{\theta}$ be a threshold for which $w_P(\hat{\theta}, \bar{\tau}_P) = w_M(\hat{\theta}, \bar{\tau}_M)$. Then $\hat{\theta}(\cdot)$ is twice continuously differentiable as a function of (τ_M, τ_P) in an open neighbour of $\bar{\tau}$ as long as $w_{P,\theta}(\hat{\theta}, \bar{\tau}_P) \neq w_{M,\theta}(\hat{\theta}, \bar{\tau}_M)$. (ii) The condition $w_{P,\theta}(\hat{\theta}, \bar{\tau}_P) \neq w_{M,\theta}(\hat{\theta}, \bar{\tau}_M)$ is satisfied for all $\hat{\theta}$ associated to $\bar{\tau}_P \geq \bar{\tau}_M$.

Proof. (Sketch) (i) The result uses a basic version of the implicit function theorem (e.g., Apostol 1957, page 146) which can be generalized to higher order derivatives (Dieudonné, 1969, pages 265-273). The assumptions imply the function $H : \theta \times [0, 1] \times [0, 1]$ defining the zero point:

$$H(\theta, \tau_M, \tau_P) := w_M(\theta, \tau_M) - w_P(\theta, \tau_P),$$

is twice continuously differentiable with respect to (θ, τ_M, τ_P) at any triplet $(\hat{\theta}, \bar{\tau}_M, \bar{\tau}_P)$ compatible with a zero of the function. And since $H = w_P - w_M$, the last assumption guarantees that $H_1(\hat{\theta}, \bar{\tau}_M, \bar{\tau}_P) \neq 0$ as required by the theorem. To show that H is twice continuously differentiable we just need to check the $c = x$ cases. First of all, $\hat{\theta}$ cannot be such that $c_M(\hat{\theta}, \bar{\tau}_M) = x$ as this would be incompatible with a crossing point (i.e., a zero of H). In addition the continuity of μ at zero and the integral definition of w_P guarantee twice continuous differentiability of w_P .

(ii) Finally, we show that whenever $\bar{\tau}_P \geq \bar{\tau}_M$, $H_1(\hat{\theta}, \bar{\tau}_M, \bar{\tau}_P) \neq 0$. This is the single crossing case. The result follows since w_P crosses w_M from below and the derivative is changing continuously. \square

We are now ready to show Lemma 2.

Proof. The proof will be by contraposition. If such equilibrium exists, it will deliver single crossing. Given the monotonicity and continuity of the cumulate G , any point in the Best Response of the populist compatible with the stated equilibrium maximizes the threshold $\hat{\theta}$ defined in (2), and in particular it must solve the first order necessary condition (recall indeed that $\tau_0 < 1$ so the solution must be interior):

$$\hat{\theta}_2(\tau_M^*, \tau_P^*) = 0.$$

As well, note that, by single crossing, and the strict monotonicity of G all threshold points that maximize populist objective for the same fixed τ_M must deliver the same threshold. From (2), The derivative of the threshold level with respect to τ_P equals

$$\frac{\partial \hat{\theta}}{\partial \tau_P} = \frac{f_\tau(\tau_P) - \hat{\theta}(\tau_M, \tau_P)}{(1 - \tau_M)R(c_M, c_P) - (1 - \tau_P)}, \quad (10)$$

where $R(c_M, c_P) := (1 + \mu'(c_M - x)) / \left(1 + \int_{-\varepsilon}^{x - \mathbb{E}c_P} \mu'(\mathbb{E}c_P + \eta - x)h(\eta)d\eta\right)$. Notice this is well defined by Lemma 7. Moreover, since we have shown in Lemma 1 that at the crossing point we have $\mathbb{E}c_P < c_M$ and $\mu'(\cdot)$ is positive, increasing, and concave, we have $R(c_M, c_P) > 1$. Note indeed that - by the Jensen's inequality - for any concave extension of μ' we would have $\mathbb{E}\mu'(c_P - x) \leq \mu'(c_M - x)$. Moreover, $\mathbb{E}\mu'(c_P - x) \geq \int_{-\varepsilon}^{x - \mathbb{E}c_P} \mu'(\mathbb{E}c_P + \eta - x)h(\eta)d\eta$, because $\mu' \geq 0$. As a consequence, the denominator is positive for $\tau_P \geq \tau_M$.

Since the solution is interior, we must have

$$f_\tau(\tau^*) = \hat{\theta}(\tau_M^*, \tau_P^*).$$

Consider now the problem of the moderate, who is minimizing $\hat{\theta}$. Since the game is zero sum, we can apply the envelope theorem even though the populist best response is not singled valued. In particular, under our assumptions, the moderate objective is differentiable (Milgrom and Segal, 2002). By the envelope theorem, a necessary condition for the moderate optimality (minimization) is

$$\frac{\partial \hat{\theta}(\tau_M^*, \tau_P^*)}{\partial \tau_M} \geq 0, \quad \text{with equality for } \tau_M > 0.$$

From (2), the derivative of $\hat{\theta}$ with respect to τ_M takes the following expression:

$$\frac{\partial \hat{\theta}}{\partial \tau_M} = \frac{R(c_M, c_P)[\hat{\theta}(\tau_M, \tau_P) - f_\tau(\tau_M)]}{(1 - \tau_M)R(c_M, c_P) - (1 - \tau_P)}. \quad (11)$$

We now show that expression (11) must be negative for each $\tau_P > \tau_M$ compatible with populist's optimum, hence incompatible with moderate optimality. First of all, note again, in the range $\tau_P > \tau_M$ and since $R(c_M, c_P) > 1$, the denominator of (11) is positive. Since $f_\tau(\tau)$ is *decreasing* in τ , and recalling that at the interior populist optimum we have $\hat{\theta} = f_\tau(\tau_P)$, for $\tau_P > \tau_M$ we have $\frac{\partial \hat{\theta}(\tau_M, \tau_P)}{\partial \tau_M} < 0$ as claimed. \square

Proof of Proposition 3

Proof. We consider two possibilities for an equilibrium. (i) First, the case where $\tau_P^* \geq \tau_M^*$. From Lemma 2, the only situation compatible with equilibrium is $\tau_P^* = \tau_M^*$, that is Policy Convergence. It is immediate to see that under Policy Convergence no optimality condition is violated so this is a genuine possibility.

(ii) The other possibly is hence $\tau_P^* < \tau_M^*$ which can be optimal because the function $w_P(\cdot, \tau_P(\tau_M^*))$ and $w_M(\cdot, \tau_M^*)$ cross more than once (i.e. for at least two different values of θ). Again, as we discuss below, the concavity of f and of μ' makes such equilibrium a genuine possibility.

(iii) This is an immediate consequence of Lemma 2. We can indeed follow line by line the proof of Lemma 2 to show that we cannot have $\tau_P^* > \tau_M^*$ in equilibrium. In particular, we can compare the first order conditions for P and M under $\tau_M^* < \tau_P$ (and recalling that in this case we have single crossing), in order to show the same contradiction derived there. \square

Proof of Lemma 5

Proof. First note that if the average voter prefers the populist candidate at $\tau_P = \tau_M = 0$, it also does so for any $\tau_P = \tau_M > 0$. The difference of the utility of the average voter with the populist and his utility with the moderate when they both set a tax rate equal to τ is indeed

$$\mathbb{E}\mu(\mathbb{E}(\theta - i(\tau) - z - x) - z - \mu(\mathbb{E}\theta - i(\tau) - x)).$$

The derivate with respect to τ is $-i'(\tau)[\mathbb{E}\mu'(\mathbb{E}\theta - i(\tau) - z - x) - \mu'(\mathbb{E}\theta - i(\tau) - x)]$. The term inside square brackets is negative given our assumption on the third derivative of $\mu(\cdot)$. Since $i'(\tau) > 0$, the derivative is positive.

Suppose now that $\tau_M = 0$. In that case, since $\tau_P \geq \tau_M$, we have a single crossing equilibrium. Let $\hat{\theta}(\tau_M, \tau_P)$ be the marginal voter when the tax rates are respectively τ_M and τ_P . Then $\hat{\theta}(0, \tau_P)$ is decreasing in τ_P and so the optimal response of the populist is $\tau_P^*(0) = 0$. Now consider the choice of M . Let $V_M(\tau_M, \tau_P)$ denote the share of votes for M (obviously $V_M(\tau_M, \tau_P) + V_P(\tau_M, \tau_P) = 1$). Suppose that $\tau_M > 0$ and consider $\tau_P^*(\tau_M)$. We must consider two subcases. i) If $\tau_P^*(\tau_M) \geq \tau_M$, we have single crossing. The optimal response of P in this range is $\tau_P^*(\tau_M) = \tau_M$. But $V_M(\tau_M, \tau_M) \leq V_M(0, 0)$. In fact, $\hat{\theta}(\tau, \tau)$ is implicitly defined by

$$\mu((1 - \tau)\hat{\theta}(\tau, \tau) + f(\tau) - x) + z - \mathbb{E}\mu((1 - \tau)\hat{\theta}(\tau, \tau) + f(\tau) - z - x) = 0.$$

Then, using the implicit function theorem, we obtain $\frac{d\hat{\theta}}{d\tau} = \frac{\hat{\theta}(\tau, \tau) - f'(\tau)}{1 - \tau}$ which is positive as by assumption we are in the region where $\theta > \mathbb{E}\theta$. When the threshold increases, the votes for the moderate decrease. So this cannot be part of an equilibrium. ii) Alternatively, assume that $\tau_P^*(\tau_M) < \tau_M$. This means that $V_P(\tau_M, \tau_P^*(\tau_M)) \geq V_P(\tau_M, \tau_M)$, or, equivalently $V_M(\tau_M, \tau_P^*(\tau_M)) \leq V_M(\tau_M, \tau_M)$. As $V_M(\tau_M, \tau_M) \leq V_M(0, 0)$, this cannot be an equilibrium. Therefore, the only equilibrium is of single crossing, with $\tau_M = \tau_P = 0$. \square

B Proofs for the Extensions Section

B.1 Heterogeneous Reference Points

PROPOSITION 8. *Consider the case where the reference point solves: $x(\theta) = (1 - \rho)\theta + \rho x_0$ for $1 > \rho > \tau_0$. Suppose that Assumptions 1 and 2 hold, and also assume $\mathbb{E}\theta \leq x_0 - \varepsilon + z$. Then for $\tau_0 \geq \tau_P \geq \tau_M$, we have at most one crossing at $\hat{\theta}(\tau)$ such that*

$$\mathbb{E}c_P(\hat{\theta}(\tau), \tau_P) \leq c_M(\hat{\theta}(\tau), \tau_M) < x(\theta).$$

Proof. This proof closely follows that of Lemma 1 (for $\tau_0 \geq \tau_P \geq \tau_M$). First of all, note that our assumptions imply that $c_M(\cdot, \tau_M) - x(\cdot)$ is strictly monotone in θ for all $\tau_M \leq \tau_0$. We will hence be able to span all ranges of values of θ by looking at the range for $c_M(\cdot, \tau_M) - x(\cdot)$. Fix $\tau_0 \geq \tau_P \geq \tau_M$. **A.** Consider all θ such that $c_M(\theta, \tau_M) - x(\theta) \geq 0$. Given our assumptions, it must be that $c_M(\theta, \tau_M) \geq \mathbb{E}\theta$. To see why this is the case suppose instead that $c_M(\theta, \tau_M) < \mathbb{E}\theta$. If $\theta > \mathbb{E}\theta$ then $\tau_M > 0$ implies $c_M(\theta, \tau_M) < \theta$ but then from the definition of $x(\theta)$ we have $x(\theta) > (1 - \rho)\theta + \rho\mathbb{E}\theta \geq \mathbb{E}\theta$, which contradicts the fact that $c_M(\theta, \tau_M) \geq x(\theta)$. If $\theta \leq \mathbb{E}\theta$, then by the fact that these agent

would desire redistribution if it were not distortionary, that $\tau_M \leq \tau_0 < \rho$, and the fact that taxes are in fact distortionary it must be that $c_M(\theta, \tau_M) \leq (1 - \tau_0)\theta + \tau_0 \mathbf{E}\theta < x(\theta)$, again contradicting $c_M(\theta, \tau_M) - x(\theta) \geq 0$.

We now show that in this case the two functions w_M and w_P cannot cross because the populist has higher distortions than the moderate and the loss function μ is not acting for the latter. Formally: the monotonicity of consumption in θ and $c_M(\theta, \tau_M) \geq \mathbf{E}\theta$ implies $\theta \geq \mathbf{E}\theta$. As a consequence, $\tau_P \geq \tau_M$ implies that $c_M(\theta, \tau_P) \leq c_M(\theta, \tau_M)$ and $\mathbb{E}c_P(\theta, \tau_P) = c_M(\theta, \tau_P) - z$. Since under M consumption is above the reference point, while under P consumption might end up being below x in the bad state (and $\mu \leq 0$), the difference $w_P(\theta, \tau_P) - w_M(\theta, \tau_M)$ must be larger than z for all such θ .

B. Consider the complement set: θ such that $c_M(\theta, \tau_M) < x(\theta)$. We here have two cases to consider.

B1. First, assume in addition that $c_M(\theta, \tau_M) \geq \mathbb{E}c_P(\theta, \tau_P)$. That is, we consider all θ such that we have $x(\theta) > c_M(\theta, \tau_M) \geq \mathbb{E}c_P(\theta, \tau_P)$. The difference between the two functions w_M and w_P is strictly increasing in θ . They might hence cross at most once in this range. Formally, we have:²¹

$$\begin{aligned} \frac{\partial}{\partial \theta} [w_M(\theta, \tau_M) - w_P(\theta, \tau_P)] = \\ (\tau_P - \tau_M) + [(1 - \tau_M) - (1 - \rho)]\mu'(c_M - x(\theta)) - [(1 - \tau_P) - (1 - \rho)]\mathbb{E}\mu'(c_P - x(\theta)) > 0, \end{aligned}$$

where the last strict inequality is guaranteed even for $\tau_P = \tau_M$ because of Assumption 1 (iv). In particular, note that for any convex extension of μ we have $\mu'(c_M - x) \geq \int_{-\varepsilon}^{+\varepsilon} \mu'(c_P - x)h(\eta)d\eta$ and in any such extension, for $c_P - x > 0$ we must have $\mu'(c_P - x) \geq \mu'_-(0) > 0$. The inequality is hence satisfied a fortiori when for such values $\mu'(c_P - x) = 0$.

B2. Consider now the alternative case where $c_M(\theta, \tau_M) < x(\theta)$ and $c_M(\theta, \tau_M) < \mathbb{E}c_P(\theta, \tau_P)$. Note that, since $\tau_P \geq \tau_M$, it must be that $\theta \leq \mathbf{E}\theta$. And hence, under our Assumption of f , and the desire of redistribution of this agent in case of no distortion, we have $(1 - \tau_P)\theta + f(\tau_P) < (1 - \rho)\theta + \rho \mathbf{E}\theta$ and hence $\mathbb{E}c_P(\theta, \tau_P) = (1 - \tau_P)\theta + f(\tau_P) - z < (1 - \rho)\theta + \rho \mathbf{E}\theta - z \leq x(\theta) - \varepsilon$, where the last inequality is implied by the assumption $\mathbf{E}\theta \leq x_0 - \varepsilon + z$. This in turn implies that $c_M(\theta, \tau_M) \leq \mathbb{E}c_P(\theta, \tau_P) < x(\theta) - \varepsilon$.

We now show that the two conditions $x(\theta) - \varepsilon \geq c_M(\theta, \tau_M)$ and $\mathbb{E}c_P(\theta, \tau_P) \geq c_M(\theta, \tau_M)$ together imply that $w_P(\theta, \tau_P) > w_M(\theta, \tau_M)$. This will show that the functions w_P and w_M cannot cross in the relevant range of θ in this case. In words, we have $w_P(\theta, \tau_P) > w_M(\theta, \tau_M)$ since for this range of θ the populist enjoys higher average consumption and the riskiness of the convex punishment. More in detail, since $\mathbb{E}c_P(\theta, \tau_P) \geq c_M(\theta, \tau_M)$, it suffices to show that:

$$\mu(c_M(\theta, \tau_M) - x(\theta)) \leq \mathbb{E}\mu(c_P(\theta, \tau_P) - x(\theta)). \quad (12)$$

To see why (12) holds, note that $c_M(\theta, \tau_M) < x(\theta) - \varepsilon$, so: (I) $\mu(c_M(\theta, \tau_M) - x(\theta)) < 0$ and (II) if we define $\tilde{c}_M(\theta, \tau_M) := c_M(\theta, \tau_M) + \eta$ where η takes the values between $-\varepsilon$ and $+\varepsilon$ with density h , from Jensen's inequality, we have $\mathbb{E}\mu(\tilde{c}_M(\theta, \tau_M) - x(\theta)) \geq \mu(c_M(\theta, \tau_M) - x(\theta))$. Now, since $\mathbb{E}c_P(\theta, \tau_P) \geq \mathbb{E}\tilde{c}_M(\theta, \tau_M) = c_M(\theta, \tau_M)$ we obtain the result from the monotonicity of μ .

Finally, since the only case where we can have a crossing point is **B1**, we have also shown that

²¹Obviously, for $c_P(\theta, \tau_P) = x(\theta)$, μ' should be replaced by its left derivative, however this is of measure zero in the integral and we ignore it to simplify notation.

at the crossing point $\hat{\theta}$, if any, we have $\mathbb{E}c_P(\hat{\theta}, \tau_P) < c_M(\hat{\theta}, \tau_M) < x(\theta)$. \square

C More on the Empirical Exercise

To estimate the effect of populism government on the GDP volatility we compute the standard deviation of the real annual GDP per capita growth of country i in year t , calculated with a rolling of 10 years. That is,

$$\sigma_{i,t} = \left(\sum_{k=0}^9 \frac{(g_{i,t-k} - \bar{g}_t)^2}{9} \right)^{\frac{1}{2}} \quad (13)$$

where $\sigma_{i,t}$ represents the standard deviation, $g_{i,t-k}$ is the real GDP growth in period $t - k$, and \bar{g}_t is the average value calculated as

$$\bar{g}_t = \sum_{k=0}^9 \frac{g_{i,t-k}}{10}. \quad (14)$$

It is important to highlight that, since the dependent variable is a rolling calculation of 10 years, the 1st until the 9th post-treatment observation include GDP growth information from the pre-treatment period. For example, the 6th post-treatment standard deviation includes: 4 observations of GDP growth from the pre-treatment period and 6 observations of GDP growth from the post-treatment period.

C.1 Synthetic Control Method (SCM)

The idea behind the synthetic control method (SCM) is that, ‘[...] when the units of observation are a small number of aggregate entries, a combination of unaffected units often provides a more appropriate comparison than any single unaffected alone.’ (Abadie, 2021). The SCM also formalizes the selection of the comparison units using a data driven procedure. In particular, to apply the SCM methodology, we generate a synthetic counterfactual for each populist leadership episodes, considering data within a range of $+/-15$ years around the start year of the populist leadership. We use real GDP growth volatility to match on the pre-treatment trends.²² That is, for each populist episode e , we let X_0^e denote the vector of covariates in the treatment country and X^e the matrix of covariates for all preselected²³ counterfactual countries i . W^e denotes the vector of individual weights w_i^e , $i = 1, \dots, I$. The optimal weighting vector \hat{W}^e is chosen to minimize the following mean-squared

²²As we mentioned before, since the standard deviation is a rolling calculation of 10 years, the 1st until the 9th post-treatment observation include GDP growth information from the pre-treatment period.

²³Of course, we drop those countries that experienced a populist leadership during the episode.

error:

$$\begin{aligned} \min_{\{W_e\}} & (X_0^e - X^e W^e)' V^e (X_0^e - X^e W^e), \quad e = 1, \dots, E, \\ \text{s.t.} & \sum_{i=1}^I w_i^e = 1 \quad \forall e \\ & w_i^e \geq 0 \quad \forall e, i. \end{aligned}$$

here V^e is a positive semidefinite and symmetric matrix. In our case, its elements are chosen so that to minimize the mean squared prediction error of the outcome variable for the pre-intervention periods (see Abadie et al., 2010).

We consider as baseline sample the same as that used by Funke et al. for their main estimation. The sample estimation thus comprises 18 countries, covering a total of 27 instances of populist governance. Certain countries such as Argentina, Brazil, Ecuador, Italy, and Peru have experienced multiple populist periods. Given data limitations we are not able to calculate the 10-years rolling standard deviation for Slovakia, hence, it is excluded from the analysis. For additional information, refer to Table 2. Finally, for episodes that occurred during wartime, we assigned missing values corresponding to the war years. In total, six episodes were adjusted due to proximity to war periods.

Table 2: Populist episodes sample for SCM estimation: volatility

	Year 1	Year 2	Year 3	Year 4	Total Episodes
Argentina	1947	1974	1990	2004	4
Bolivia	1953				1
Brazil	1952	1991			2
Chile	1953				1
Ecuador	1953	1961	1969	1997	4
India	1967				1
Israel	1997				1
Italy	1995	2002			2
Japan	2002				1
Mexico	1971				1
New Zealand	1976				1
Peru	1986	1991			2
Philippines	1999				1
South Korea	2004				1
Taiwan	2001				1
Thailand	2002				1
Turkey	2004				1
Venezuela	2000				1

The results are displayed in Figure 1 in the main text, where we also display the uncertainty bands. We also conducted a robustness exercise where we enlarge the set of episodes beyond those used in the primary findings of Funke et al. (2023). These episodes are indicated to form the ‘extended sample’ by Funke et al. The results (available upon request) are qualitatively the same

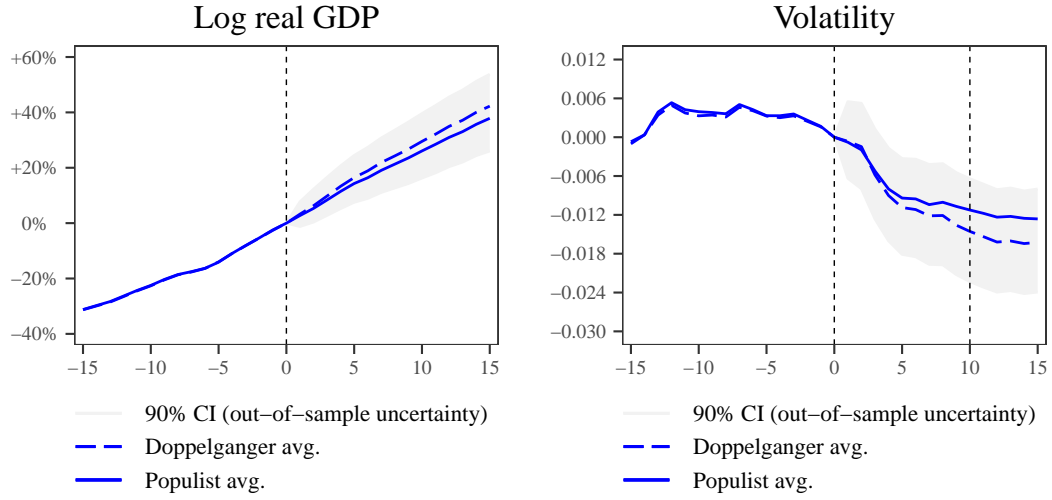


Figure 4: **Country placebo tests: Log real GDP level and Volatility.** This figure shows the country-level placebo experiment where we simulate the entry of a populist government into office for other country within the donor pool. Then, we re-estimate the average treatment and doppelgänger (synthetic control) GDP level and volatility paths.

although somewhat smaller in magnitude (the point estimate of the average effect of populist on GDP growth volatility is reduced by 27% to 0.0052).

C.2 Placebo exercise

Following Funke et al. (2023) we implement a placebo analysis for each populist episode by applying the SCM to every country in the donor pool. In each iteration, the populist treatment is reassigned to one of the control countries within the episode, while the originally treated country is placed into the donor pool. This process simulates the scenario where a control country experiences a populist government instead of the actual treated country. For each placebo run, we obtain the volatility and level paths of the placebo unit and its corresponding synthetic control. The intuition behind this is that the SCM estimator can reliably identify a causal treatment effect only if comparable treatment magnitudes are not observed in scenarios where the intervention was absent. The results are shown in Figure 4.

C.3 Computing the Average Effect.

From the synthetic control estimation, we can obtain the standard deviation path for each treated populist episode and its respective synthetic control, from period -15 to +15. We use this information to obtain an ‘average’ effect of the populist leader on GDP per capita volatility. For each

Table 3: Effect of populism on real log GDP

This table reports the effect of populism on on real log GDP. Standard errors are shown in parentheses. ***, **, * represents significance at 1%, 5% and 10%, respectively.

	(1)	(2)
Populist	-0.0919*** (0.0155)	-0.0919* (0.0531)
Clustered S.E. at observation-episode level	No	Yes
R squared	0.49	0.49
Number of observations	1,644	1,644

episode e , we define the two following dummies:

$$P_i^e = \begin{cases} 1 & \text{if the observation corresponds to the country experiencing the populist leader} \\ 0 & \text{if the observation corresponds to the synthetic control associated to episode } e \end{cases}$$

and

$$T_t^e = \begin{cases} 1 & \text{if the year corresponds to a post-treatment period, i.e, } t \in [1, 15] \\ 0 & \text{if the year corresponds to a pre-treatment period, i.e, } t \in [-15, 0] \end{cases}$$

We can now run the following regression:

$$\tilde{\sigma}_{i,t}^e = \gamma_0^e + \gamma_1 P_i^e \times T_t^e + \gamma_2 T_t^e + \gamma_3 P_i^e + \varepsilon_{i,t}^e \quad (15)$$

where $\tilde{\sigma}_{i,t}^e$ is the 10-years rolling standard deviation of either the treated country (if $P_i^e = 1$) or the synthetic control obtained from the SCM estimation (if $P_i^e = 0$), γ_0^e is the episode-specific constant, $\varepsilon_{i,t}^e$ represents the error term, and $t \in [-15, 15]$. The estimation hence quantifies an ‘average’ effect of a populist leader in GDP per capital growth volatility.

For completeness, in Table 3 we report the estimation results where in the above, we replace $\tilde{\sigma}_{i,t}^e$ for the log or real GDP.

C.4 Synthetic Diff-in-Diff (SDiD)

In order to estimate the effect of populism on GDP volatility using the Synthetic Difference-in-Difference (SDiD) methodology, we follow Arkhangelsky et al. (2021). Fix an episode e . We then have a balanced panel with N units and T time periods, where the outcome for unit i in period t is given by Y_{it}^e . The binary treatment (populist leader) is denoted by $W_{it}^e \in \{0, 1\}$. It is assumed that the first N_{co} (control) units are never exposed to the treatment, whereas the last $N_{tr} = N - N_{co}$ (treated) units are exposed after time T_{pre} . Similar to SCM, SDiD finds weights $\hat{\omega}_i^e$ that align pre-

treatment trends in the outcome of unexposed units with those for the exposed units. In addition, SDiD also looks for time weights $\hat{\lambda}_t^e$ that balance pre-exposure time periods with post-exposure ones.²⁴

The objective of SDiD is to estimate the causal effect of receiving the treatment W_{it}^e (an average treatment effect on the treated, ATT), even in the absence of belief in the parallel trends assumption between all treatment and control units on average. It is important to recall that, in our database, each populism episode (i.e, treated unit) has its respective number of control units. Hence, the objective function we use is as follows:

$$\left(\hat{\tau}^{\text{sdid}}, \hat{\alpha}, \hat{\beta} \right) = \arg \min_{\tau, \alpha, \beta} \left\{ \sum_{e=1}^{27} \sum_{i=1}^N \sum_{t=-15}^{15} (Y_{it}^e - \alpha_i^e - \beta_t - W_{it}^e \tau)^2 \hat{\omega}_i^e \hat{\lambda}_t \right\}, \quad (16)$$

where α_i^e and β_t represents country-episode fixed effect and time fixed effects (relative to the start of the episode), respectively. In our setting, Y_{it}^e represents the GDP volatility (10-years rolling standard deviation of the GDP growth), and W_{it}^e represents the populist treatment and e represent the episode that goes from 1 to 27.

Regarding the confidence interval for the SDiD method, Arkhangelsky et al. (2021) shows that the estimator is asymptotically normal, and show that confidence intervals on τ can be estimated as:

$$CI^{\text{sdid}} = \hat{\tau}^{\text{sdid}} \pm z_{\alpha/2} \sqrt{\hat{V}_{\tau}}$$

where $z_{\alpha/2}$ refers to the inverse normal density function at percentile $\alpha/2$ should one wish to compute $1 - \alpha$ confidence intervals. To construct the confidence intervals we need an estimate of the variance of τ , \hat{V}_{τ} . Arkhangelsky et al. (2021) suggest three possible procedures to estimate this variance: a block bootstrap, a jackknife, or a permutation-based approach. In our setting, we implement the jackknife approach, which involves systematically recalculating the treatment effect by iteratively removing one unit from the sample at a time. For each iteration, the SDiD estimator, denoted $\hat{\tau}_{(-i)}^{\text{sdid}}$, is recomputed while keeping the optimal weights for units and time fixed from the full-sample estimation (see Arkhangelsky et al. (2021) for details). Remember that in our case, unit i corresponds to the episode-country observation. The jackknife variance, $\hat{V}_{\tau}^{\text{jack}}$, is then calculated as the variance of these recalculated estimates across all iterations.

²⁴Like in the SCM, the weights $\hat{\omega}_i^e$ and $\hat{\lambda}_t$ are estimated in a first stage to ensure that the weighted average of the control units (synthetic control) approximates the treated unit's outcome in the pre-treatment periods (we also set $\hat{\omega}_i^e = 1$ whenever country i is treated in episode e . And $\hat{\lambda}_t = \frac{1}{15}$ for $t > 0$). Once these weights are determined, they are simply used in the SDiD estimation stage as described in (16). In order to maintain the asymptotic properties described in Arkhangelsky et al., while allowing for correlated observations within time periods for the same unit, we use regularization in estimating the ω_i^e weights.

Online Appendix:

The Political Implications of Reference-Dependent Preferences

by Fausto Panunzi, Nicola Pavoni and Guido Tabellini

D Sufficient conditions for having at most double crossing

Here we provide sufficient conditions guaranteeing that the value functions $w_M(\theta, \tau_M)$ and $w_P(\theta, \tau_P)$ cross at most twice for $\tau_P < \tau_M$, and we rule out the possibility of more than two crossing points. For this result, we need the following assumptions.

ASSUMPTION 3. *The function $f(\cdot)$ satisfies the following condition*

$$\frac{f(\tau_0) + z}{\tau_0} - z - \varepsilon > x,$$

with $f(\tau) = \tau \mathbf{E}\theta - i(\tau)$, and $\frac{(1-\tau)z - i(\tau)}{\tau}$ decreasing in τ .

It can be checked directly, that the expression $\frac{(1-\tau)z - i(\tau)}{\tau}$ is decreasing in τ , for example, in the standard quadratic case: $i(\tau) = \frac{1}{2}\tau^2$. Recall that τ_0 denotes the revenue maximizing tax rate. This assumption - together with Assumption 2 - guarantees that, for any $\tau_P < \tau_M$, the right-most crossing point occurs in a region where average consumption under P is weakly lower than consumption under M (in the most typical case, this is because voters have linear utility under both the populist and the moderate candidate and hence the two consumption levels coincide). This in turn implies that at any θ to the left of this point - and in particular at a $\underline{\theta}$ for which we could have a second crossing point between w_M and w_P - average consumption under P is lower than that under M . The latter statement is true since $\tau_P < \tau_M$ implies that net income schedule under the populist $\mathbb{E}c_P$ is steeper than c_M as a function of θ .

ASSUMPTION 4. *The function μ is such that for all admissible $c < x$ we have*

$$\int_{-\varepsilon}^{x-c} \mu''(c + \eta - x) h(\eta) d\eta \geq \mu''(c - x) + h(x - c) \mu'_-(0),$$

where, clearly, for all $x - c > \varepsilon$ we have $h(x - c) = 0$. Moreover, the density h is weakly decreasing for positive entries, i.e., for $\eta > 0$.

In the above, $\mu'_-(0)$ indicates the left side derivative of $\mu(c - x)$ evaluated at 0 (assumed to always exist). This assumption can be seen as about the concavity of $\mu'(\cdot)$ as it is more likely to be

satisfied if μ'' is large for low values. It would be satisfied if μ' is concave enough. A low $\mu'_-(0)$ and a low density for large η would also help.

Assumption 4 is unfortunately never satisfied for h uniform. Here we provide a second assumption, which might hold for h uniform but involves a joint condition on the maximal tax rate.

ASSUMPTION 5. *The function μ is such that for all admissible $c < x$ we have*

$$\tau_0 + \int_{-\varepsilon}^{x-c} \mu'(c + \eta - x)h(\eta)d\eta \leq (1 - \tau_0)\mu'(c - x),$$

where, clearly, for all $x - c > \varepsilon$ we have $h(x - c) = 0$.

If c is low enough, the condition becomes:

$$\tau_0 + \int_{-\varepsilon}^{\varepsilon} \mu'(c + \eta - x)h(\eta)d\eta \leq (1 - \tau_0)\mu'(c - x).$$

Note that the (sufficient) condition is easier to satisfy the more concave is μ' . As well, as c approaches x the condition is less difficult to satisfy, especially if the concavity of μ' increases with c , namely if $\mu^{iv} \leq 0$. By contrast, for example, if μ is quadratic the condition becomes $\tau_0 \leq -\tau_0\mu'(c - x)$, which can never be satisfied.

Recalling the mean value theorem, the condition, becomes

$$\tau_0 + \mu'(c + \xi - x) \leq (1 - \tau_0)\mu'(c - x),$$

for ξ a negative constant as long as μ' is concave.

PROPOSITION 9 (Double Crossing). *Under Assumptions 1, 2, 3, and either 4 or 5 (or both) we have the following. If $\tau_P < \tau_M$ then the functions $w_M(\cdot, \tau_M)$ and $w_P(\cdot, \tau_P)$ cross at most twice as a function of θ .*

The idea of the proof in case we use Assumption 4 is that - since at the first crossing point to the left of x the slope of w_P must be lower than that of w_M - it suffices to guarantee that to the left of such crossing point the difference of slopes can only increase: the assumption guarantees that w_P is flatter than w_M for all such points.

The idea of the proof in case we use Assumption 5 is that - since at the first crossing point to the left of x , w_P and w_M take the same value (by definition) - it suffices to guarantee that to the left of such crossing point the difference in the levels of such values can only increase: the assumption guarantees that w_P is higher than w_M for all such points.

Proof of Proposition 9

Proof. We start with a preliminary lemma.

LEMMA 10. Let $\bar{\theta}$ be the largest crossing point for $\tau_P < \tau_M$. Under Assumption 2 and 3, $\mathbb{E}c_P(\bar{\theta}, \tau_P) \leq c_M(\bar{\theta}, \tau_M)$.

Proof. We can have two cases.

Case 1: At $\bar{\theta}$ we have $\mathbb{E}c_P(\bar{\theta}, \tau_P) < c_M(\bar{\theta}, \tau_M)$. There is nothing to show in this case obviously.

Case 2: At $\bar{\theta}$, we have $\mathbb{E}c_P(\bar{\theta}, \tau_P) \geq c_M(\bar{\theta}, \tau_M)$. In this case we will show that the only possibility is $\mathbb{E}c_P(\bar{\theta}, \tau_P) = c_M(\bar{\theta}, \tau_M)$. By direct computation, whenever $\mathbb{E}c_P(\bar{\theta}, \tau_P) \geq c_M(\bar{\theta}, \tau_M)$, the threshold $\bar{\theta}(\tau_P, \tau_M) > 0$ solves:

$$\bar{\theta}(\tau_P, \tau_M) \geq \mathbf{E}\theta + \frac{i(\tau_P) - i(\tau_M) + z}{\tau_M - \tau_P}. \quad (17)$$

Consider now the following sequence of inequalities.

$$\begin{aligned} \mathbb{E}c_P(\bar{\theta}(\tau_P, \tau_M), \tau_P) \geq c_M(\bar{\theta}(\tau_P, \tau_M), \tau_M) &= (1 - \tau_M)\bar{\theta}(\tau_P, \tau_M) + f(\tau_M) \\ &\geq (1 - \tau_M) \left[\mathbf{E}\theta + \frac{i(\tau_P) - i(\tau_M) + z}{\tau_M - \tau_P} \right] + \tau_M \mathbf{E}\theta - i(\tau_M) \\ &\geq \mathbf{E}\theta + \frac{1 - \tau_M}{\tau_M} z - \frac{i(\tau_M)}{\tau_M} \geq \mathbf{E}\theta + \frac{1 - \tau_0}{\tau_0} z - \frac{i(\tau_0)}{\tau_0}. \end{aligned} \quad (18)$$

The first inequality in the first row is by assumption, the second equality is by definition. The inequality in the second row uses (17), while the inequality in the third row is due to the fact that the expression in the first row increases with τ_P for $\tau_P < \tau_M$. We hence set $\tau_P = 0$ and use Assumption 2. The first inequality in the last row is due to the fact that the expression in the previous row is decreasing in τ_M from Assumption 3. Now, Assumption 3 implies that the very last expression in the chain of inequalities solves:

$$\mathbf{E}\theta + \frac{1 - \tau_0}{\tau_0} z - \frac{i(\tau_0)}{\tau_0} = \frac{f(\tau_0) + z}{\tau_0} - z > x + \varepsilon.$$

Recalling the very first term in the chain of inequalities (18), we have $\mathbb{E}c_P(\bar{\theta}(\tau_P, \tau_M), \tau_P) > x + \varepsilon$. This implies that μ cannot be active for the populist at $\bar{\theta}$. Since μ is active for the moderate would imply $c_M > \mathbb{E}c_P$ the only possibility is that μ is not active for the moderate either and $\mathbb{E}c_P(\bar{\theta}(\tau_P, \tau_M), \tau_P) = c_M(\bar{\theta}(\tau_P, \tau_M), \tau_M)$ as claimed. \square

We can now start the core of the proof of the proposition. From Lemma 10, we have $c_M(\bar{\theta}, \tau_M) \geq \mathbb{E}c_P(\bar{\theta}, \tau_P) := (1 - \tau_P)\bar{\theta} + f(\tau_P) - z = \int_{-\varepsilon}^{\varepsilon} [(1 - \tau_P)\bar{\theta} + f(\tau_P) + \eta] h(\eta) d\eta - z$. Now, consider the largest crossing point below $\bar{\theta}$, if it exists (if not then we have single crossing and we are done), and denote it by $\underline{\theta}$. Since $\tau_P < \tau_M$, $c_M(\bar{\theta}, \tau_M) \geq \mathbb{E}c_P(\bar{\theta}, \tau_P)$ implies that at any crossing point $\underline{\theta} < \bar{\theta}$ we must have $c_M(\underline{\theta}, \tau_M) > \mathbb{E}c_P(\underline{\theta}, \tau_P)$. Clearly, at $\underline{\theta}$ the slope of w_P must be lower than that of w_M , that is, w_P must cross w_M from below. In addition, $c_M(\underline{\theta}, \tau_M) < x$ otherwise we will not have any second crossing at $\underline{\theta}$. We now show that Assumption 4 guarantees that the slope of w_P to the left of $\underline{\theta}$ will always be lower than that of w_M . This implies that we cannot have another crossing point in this region.

Consider a crossing point to the left of x , with $\tau_P < \tau_M$. We saw that at such $\underline{\theta}$ we have:

- (a) (same level): $w_M(\underline{\theta}, \tau_M) = w_P(\underline{\theta}, \tau_P)$;
- (b) (flatter w_P): $w'_M(\underline{\theta}, \tau_M) \geq w'_P(\underline{\theta}, \tau_P)$;
- (c) (lower consumption): $c_M(\theta, \tau_M) \geq \mathbb{E}c_P(\theta, \tau_P)$ for all $\theta \leq \underline{\theta}$.

We want to show that for all $\theta \leq \underline{\theta}$ we have $w_P(\theta, \tau_P) - w_M(\theta, \tau_M) \geq 0$. Note that for $s = M, P$ we have

$$w_s(\theta, \tau_s) = w_s(\underline{\theta}, \tau_s) - \int_{\underline{\theta}}^{\theta} w'_s(t, \tau_s) dt.$$

and hence using, property (a) above, we have:

$$w_P(\theta, \tau_P) - w_M(\theta, \tau_M) = \int_{\underline{\theta}}^{\theta} w'_M(t, \tau_M) dt - \int_{\underline{\theta}}^{\theta} w'_P(t, \tau_P) dt = \int_{\underline{\theta}}^{\theta} [w'_M(t, \tau_M) - w'_P(t, \tau_P)] dt.$$

Part 1. Using Assumption 4. Obviously, if $w'_M(\theta, \tau_M) \geq w'_P(\theta, \tau_P)$ for all $\theta \leq \underline{\theta}$ we would be done. The change in slope of the functions w_P and w_M are given by their second derivatives:

$$w''_M(\theta, \tau_M) = (1 - \tau_M)^2 \mu''(c_M(\theta, \tau_M) - x)$$

and

$$w''_P(\theta, \tau_P) = (1 - \tau_P)^2 \int_{-\varepsilon}^{\{\varepsilon, \mathbb{E}c_P(\theta, \tau_P) - x\}^-} \mu''(\mathbb{E}c_P(\theta, \tau_P) + \eta - x) h(\eta) d\eta - h(x - \mathbb{E}c_P(\theta, \tau_P)) (1 - \tau_P)^2 \mu'_-(0).$$

where, to emphasize the properties of μ we used $\{\varepsilon, \mathbb{E}c_P(\theta, \tau_P) - x\}^- := \min\{\varepsilon, \mathbb{E}c_P(\theta, \tau_P) - x\}$. Recall that at all such $\theta < \underline{\theta}$ we have $\mathbb{E}c_P(\theta, \tau_P) < c_M(\theta, \tau_M) < x$. Now, let $c = c_M(\theta, \tau_M)$. We have both:

$$(1 - \tau_M)^2 \mu''(c - x) \leq (1 - \tau_P)^2 \mu''(c - x) \quad \text{and} \\ (1 - \tau_P)^2 \int_{-\varepsilon}^{\mathbb{E}c_P(\theta, \tau_P) - x} \mu''(\mathbb{E}c_P(\theta, \tau_P) + \eta - x) h(\eta) d\eta \geq (1 - \tau_P)^2 \int_{-\varepsilon}^{x - c} \mu''(c + \eta - x) h(\eta) d\eta.$$

In the first inequality we simply used $0 \leq \tau_P < \tau_M < 1$; to show the second inequality, we used $\mu''' < 0$ and the fact that $\mathbb{E}c_P(\theta, \tau_P) < c < x$ and $\mu'' \geq 0$. Finally, note that the second statement of Assumption 4 implies $h(x - c) \geq h(x - \mathbb{E}c_P(\theta, \tau_P))$. Now, bringing these results together, and noticing that $(1 - \tau_P)^2 > 0$, the first statement of Assumption 4 implies $w''_P(\theta, \tau_P) \geq w''_M(\theta, \tau_M)$. This is the desired result. It states that for each θ to the left of $\underline{\theta}$ the slope of w_P is *lower* than that of w_M .

Part 2. Using Assumption 5. Recall again we want to show that for all $\theta \leq \underline{\theta}$:

$$w_P(\theta, \tau_P) - w_M(\theta, \tau_M) = \int_{\underline{\theta}}^{\theta} [w'_M(t, \tau_M) - w'_P(t, \tau_P)] dt \geq 0.$$

Again, if we show that $w'_M(t, \tau_M) - w'_P(t, \tau_P) \geq 0$ for all $t < \underline{\theta}$ and conceivable τ_P, τ_M , we are done.

If we now write the first derivative of the functions we have

$$w'_M(t, \tau_M) = (1 - \tau_M)[1 + \mu'(c_M(t, \tau_M) - x)];$$

and

$$w'_P(t, \tau_P) = (1 - \tau_P) \left[1 + \int_{-\varepsilon}^{\{\varepsilon, \mathbb{E}c_P(t, \tau_P) - x\}^-} \mu'(\mathbb{E}c_P(t, \tau_P) + \eta - x)h(\eta)d\eta \right],$$

where, to emphasize the properties of μ , we wrote: $\{\varepsilon, \mathbb{E}c_P(t, \tau_P) - x\}^- := \min\{\varepsilon, \mathbb{E}c_P(t, \tau_P) - x\}$ and then we used $\mu(0) = 0$. We hence have:

$$\begin{aligned} & w'_M(t, \tau_M) - w'_P(t, \tau_P) \\ &= (\tau_P - \tau_M) + (1 - \tau_M)\mu'(c_M(t, \tau_M) - x) - (1 - \tau_P) \int_{-\varepsilon}^{\{\varepsilon, \mathbb{E}c_P(t, \tau_P) - x\}^-} \mu'(\mathbb{E}c_P(t, \tau_P) + \eta - x)h(\eta)d\eta \\ &\geq -\tau_0 + (1 - \tau_0)\mu'(c_M(t, \tau_M) - x) - \int_{-\varepsilon}^{\{\varepsilon, \mathbb{E}c_P(t, \tau_P) - x\}^-} \mu'(\mathbb{E}c_P(t, \tau_P) + \eta - x)h(\eta)d\eta \\ &\geq -\tau_0 + (1 - \tau_0)\mu'(\mathbb{E}c_P(t, \tau_P) - x) - \int_{-\varepsilon}^{\{\varepsilon, \mathbb{E}c_P(t, \tau_P) - x\}^-} \mu'(\mathbb{E}c_P(t, \tau_P) + \eta - x)h(\eta)d\eta \geq 0. \end{aligned}$$

The first equality is by definition. The inequality in the second row is due to the fact we have replaced the multiplicative terms of taxes with their worst cases possibilities. The inequality in the last row is due to the fact that we replaced c_M for $\mathbb{E}c_P$ and we know that $\mathbb{E}c_P < c_M < x$ and μ is convex. The very last inequality is guaranteed by Assumption 5 using $c = \mathbb{E}c_P$. \square

E Parameter Values and Figures in the Simulated Example

In Figures 5 and 6 we report a graphical representation of our loss function μ and distribution of θ with support \mathbb{R}_+ and $\mathbf{E}(\theta) = 25$. The inefficiency parameter for the populist equals $z = 1$, while the reference point equals $x = 30$. Finally, we set:

$$f(\tau) = \begin{cases} \tau \mathbf{E}(\theta) - \alpha \frac{\tau^2}{2} & \text{if } \tau \leq \tau_0, \\ -\infty & \text{if } \tau > \tau_0, \end{cases} \quad \text{with } \tau_0 = 0.5, \text{ and } \alpha = 20.$$

$$\eta \sim \mathcal{U}[-\varepsilon, \varepsilon] \quad \text{uniform, with } \varepsilon = 17.$$

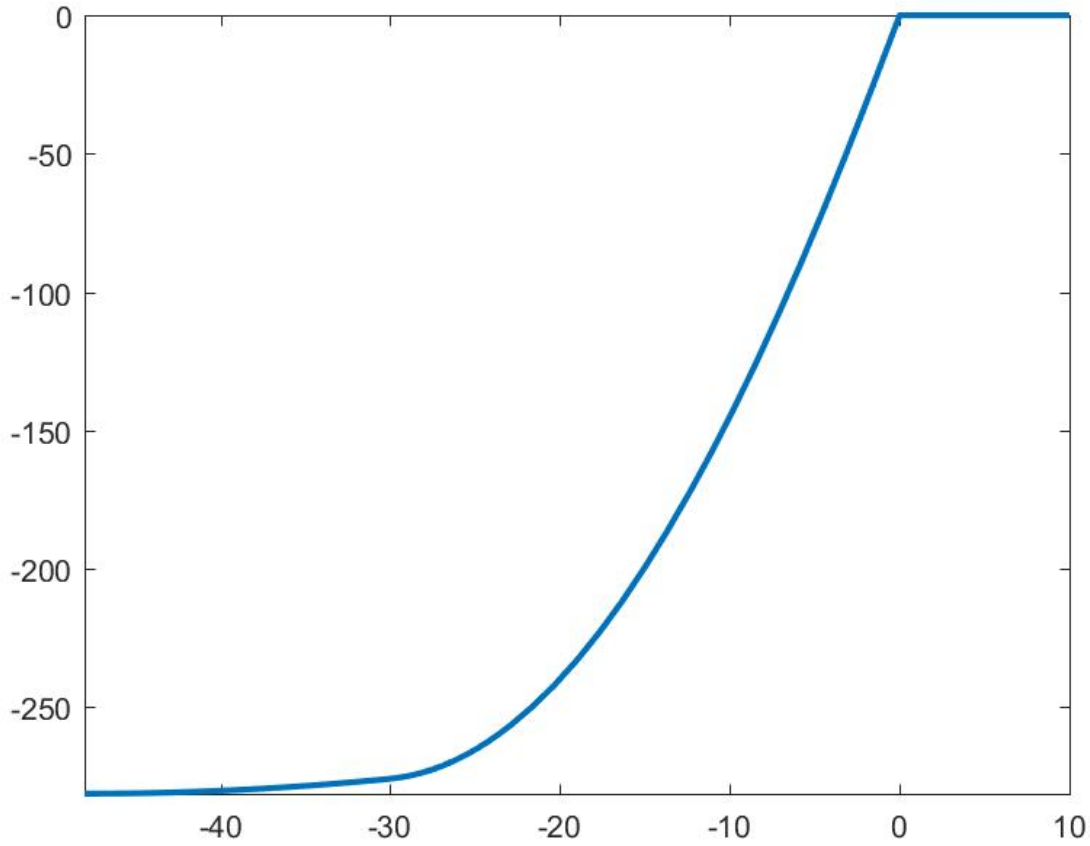


Figure 5: **Voters' preferences.** The figure represents the loss function μ as a function of $c - x$.

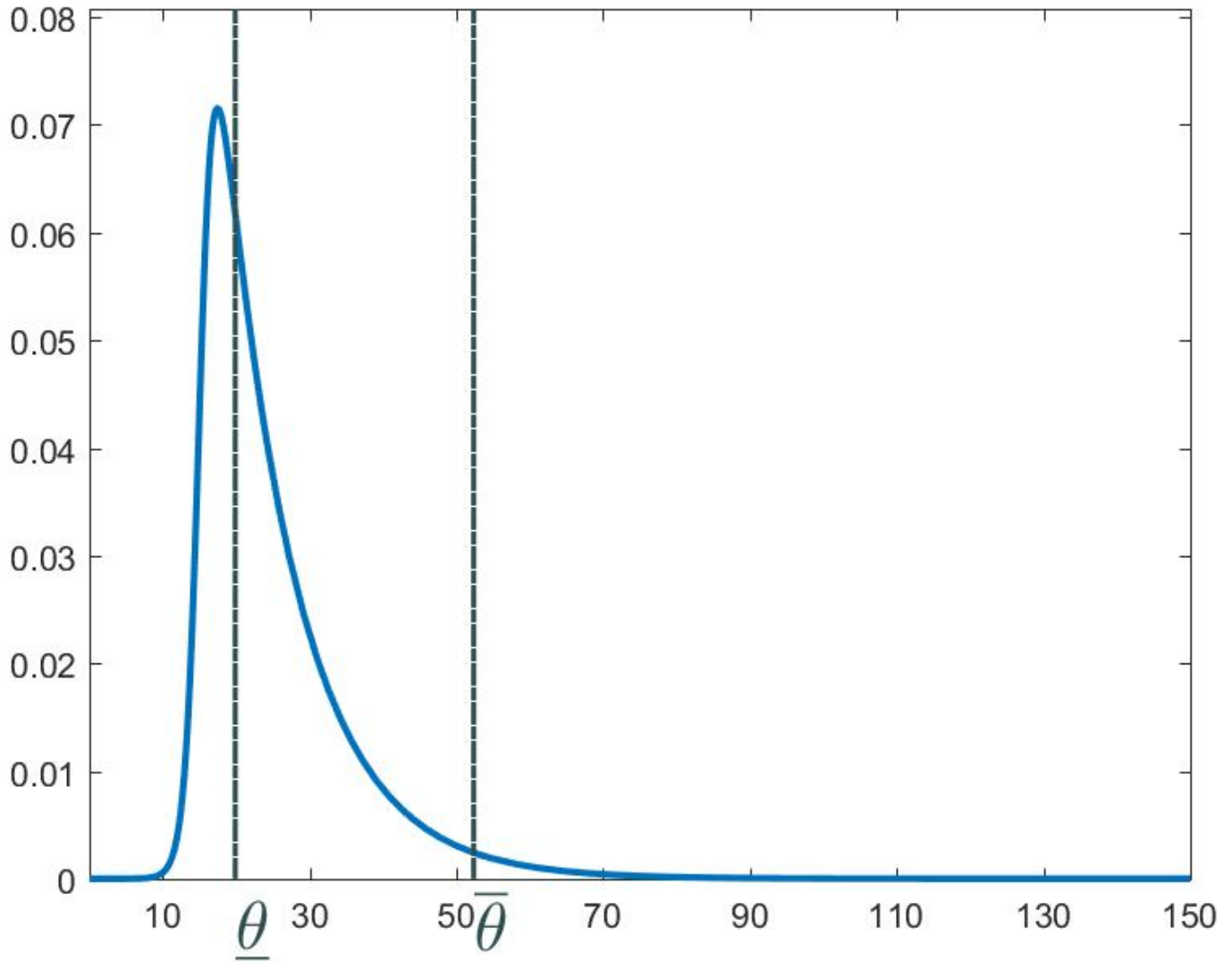


Figure 6: **The distribution of income and the double crossing.** The figure reports the (density) distribution of θ . The vertical dashed lines represent the equilibrium crossing points. Voters prefer M between the two points and P for θ outside the two vertical lines.

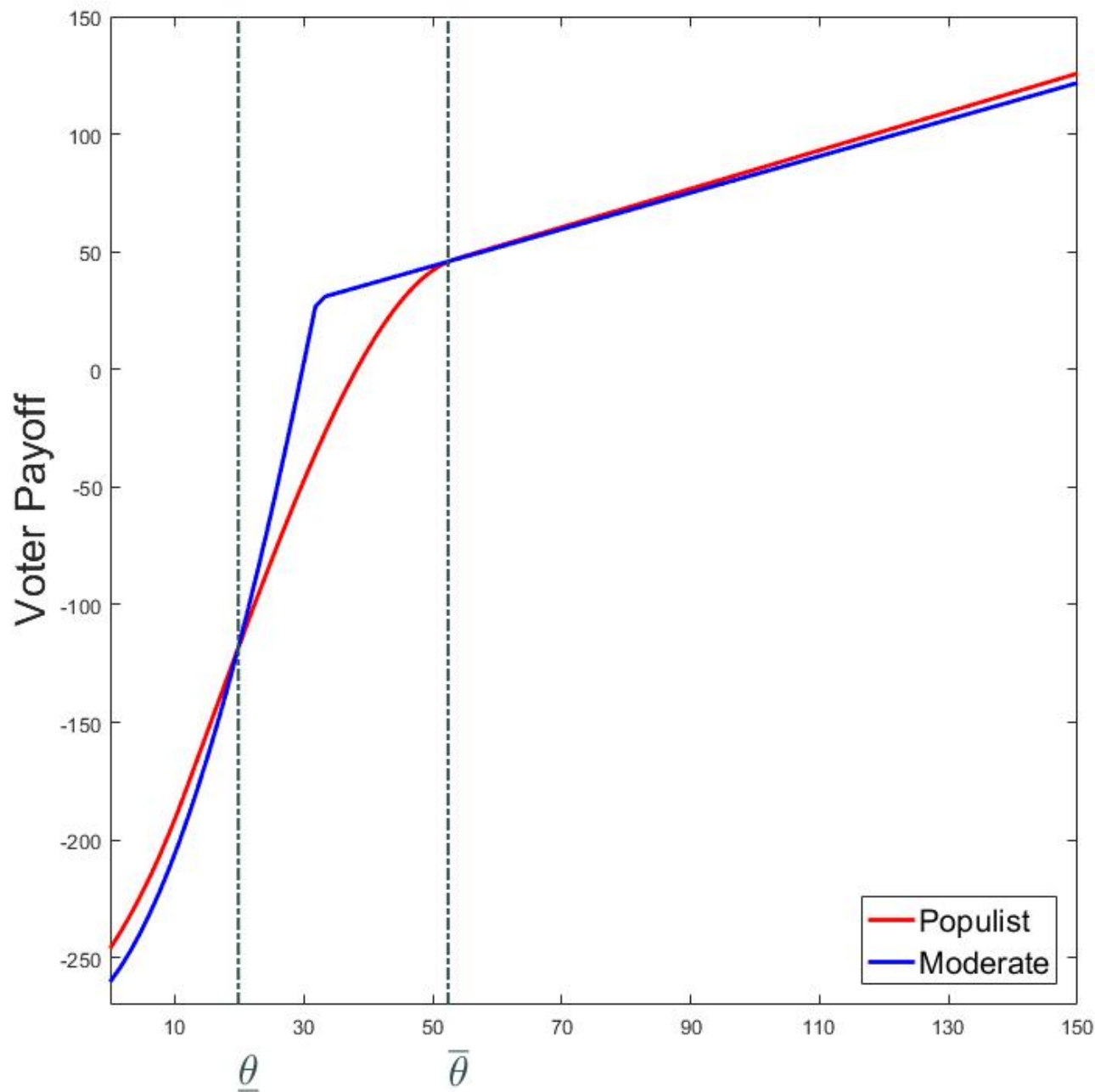


Figure 7: **The crossing in the space of utilities.** The figure reports both w_P (in red) and w_M (in blue) as a function of θ for the equilibrium level of taxes. The vertical dashed lines represent the equilibrium crossing points. As it can be seen from the figure, voters prefer M between the two points and P for θ outside the two vertical lines.

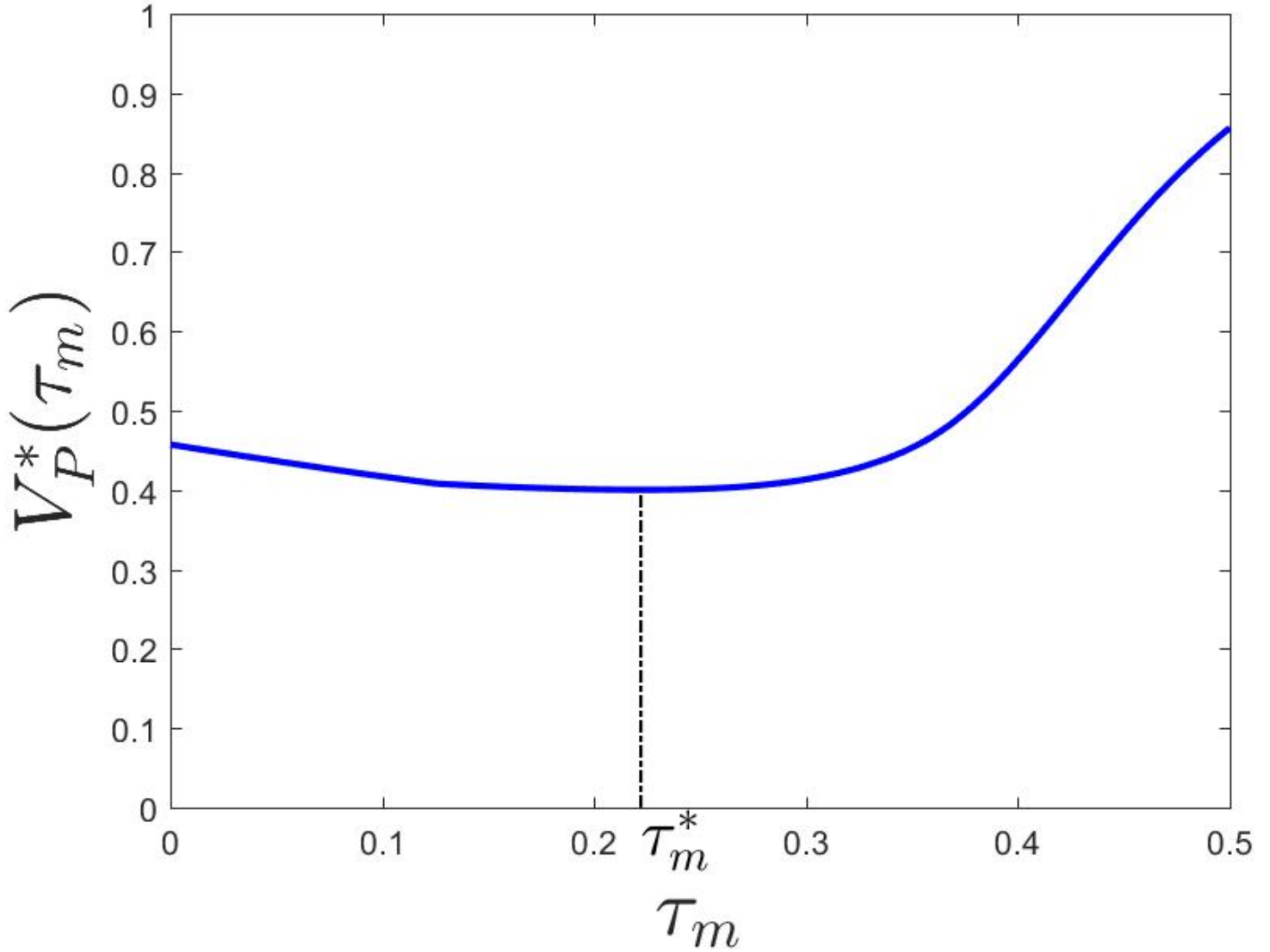


Figure 8: **The share of votes for P .** The figure reports the share of voters that prefer P , that is the populist's payoff, once P reacts optimally to M , as a function of τ_M . Since population is constant, M 's payoff equals $1 - V_P^*(\tau_M)$. The vertical dashed line represent the equilibrium value for τ_M (i.e., $\tau_M^* = 0.22$). As it can be seen from the figure, for $\tau_M^* = 0.22$, V_P^* is minimal.

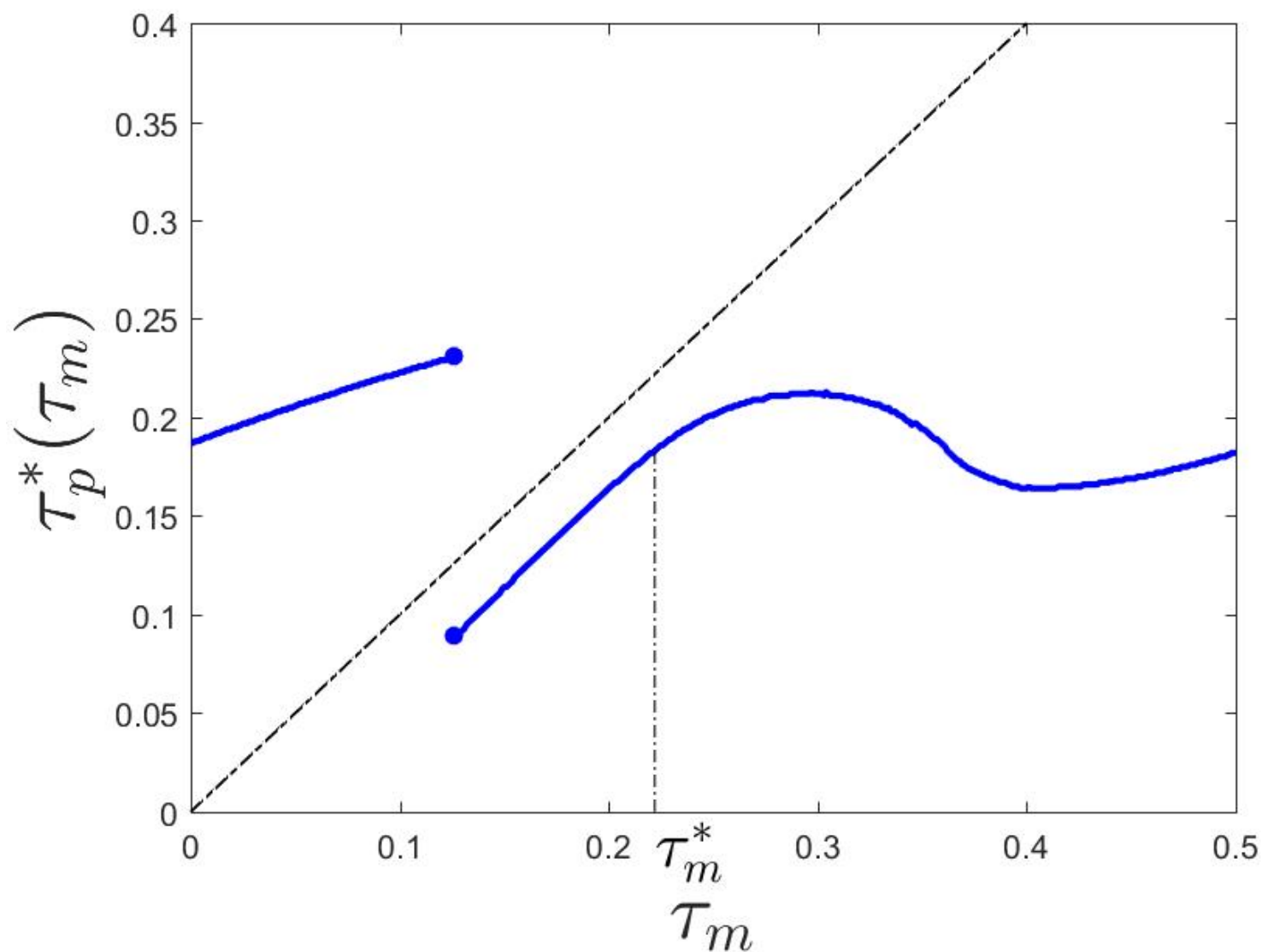


Figure 9: **The populist's Best Response Function.** The figure reports P 's optimal choice as a function of τ_m (the best response). The vertical dashed line represent the equilibrium value for τ_m (i.e., $\tau_m^* = 0.22$). As it can be seen from the figure, for $\tau_m > .12$ the populist finds it optimal to set $\tau_p < \tau_m$.

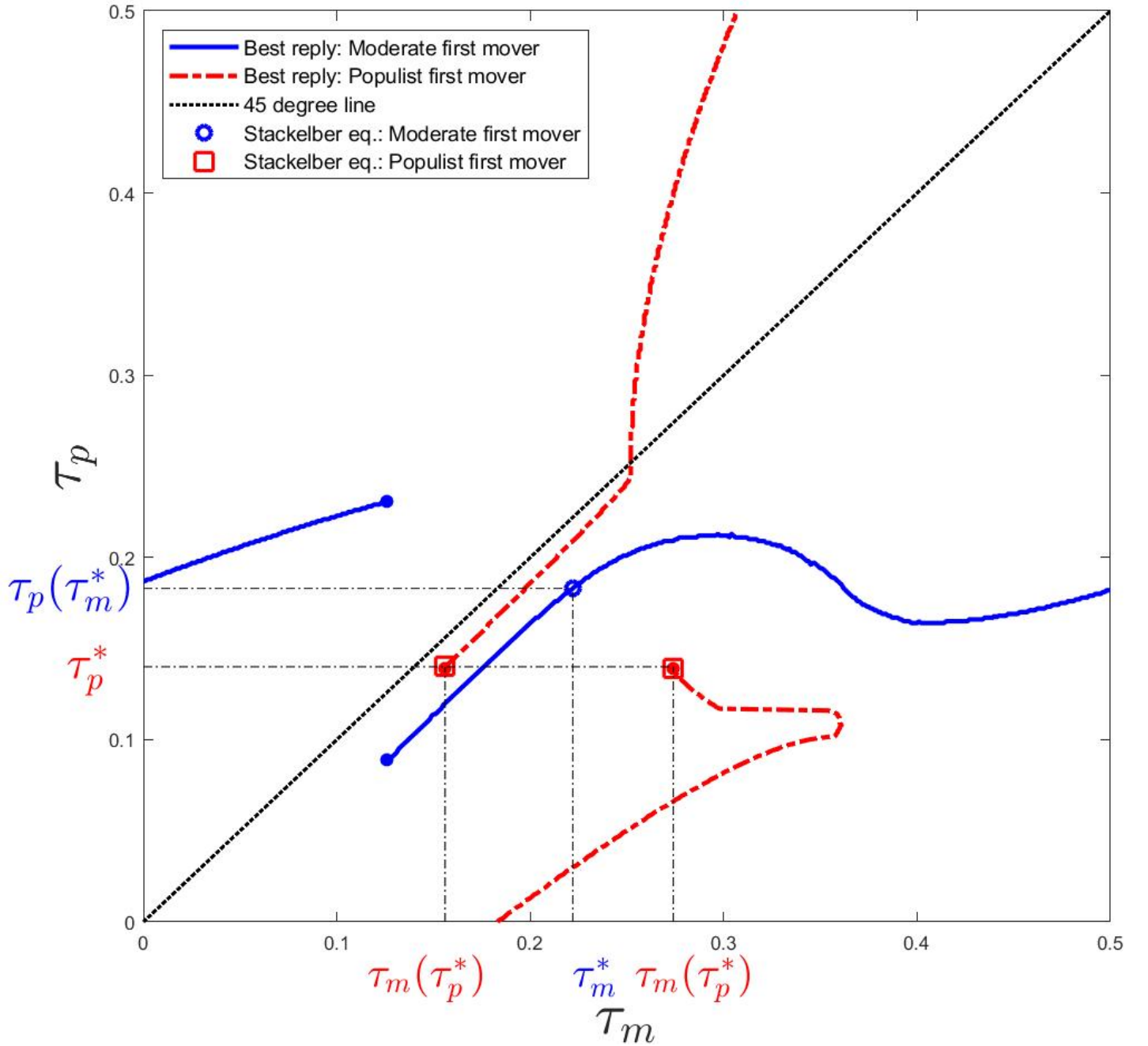


Figure 10: **The moderate and populist's Best Response Functions.** The figure reports both P and M best responses (in solid blue and dashed red, respectively) and indicates the Stackelberg equilibria. The equilibrium for the benchmark timing is indicated on the P best response with a blue circle. The equilibria emerging in the game when P moves first are indicated on the M best response with the two red squares. Note that since the game is of zero sum, indifference for M also implies constant payoff for P . In accordance to our theoretical results, in both cases, the populist tax is lower than that of the moderate (both equilibrium points lie below the 45 degree line). In addition, note that for the parameters used, there is no Nash in pure strategies due to the lack of convexity of the sets in the best response correspondences.