Fear of communism: a political theory of land reform in democracies*

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July 18, 2023

Abstract

I provide an alternative explanation for why democracies fail to deliver large-scale land reforms. I build the argument through a signaling game with two types of politicians – benevolent and communist – and three groups of voters – landlords, rural citizens, and urban citizens. The combination of electoral incentives and high uncertainty about politician's types make the incumbent distance herself from the image of the one who carries too extensive land reforms (communist). I show that in equilibrium, both types of politicians redistribute less land than they would if there were no electoral incentives. Interestingly, the magnitude of the land reforms is inferior to the one preferred by the median voter, regardless of the incumbent's type, if the reelection motive is sufficiently strong. This result corroborates the empirical evidence on the weak correlation between politicians' ideology and the magnitude of implemented reforms. Comparative statics reinforce that electoral incentives are the main force driving the results.

Keywords: land reform; political economy; voting.

JEL classification: C71; Q1; D72.

*Part of this work was developed while I was visiting the Department of Government at Harvard University. I am very grateful for the support and kind hospitality provided during my visit. I would also like to thank João Plínio Juchem Neto and seminar participants at UNIFESP, PPGE/UFRGS, FEA-RP, SING17 - 17th European Meeting on Game Theory (2022), International Conference on Social Choice and Voting Theory (2021), and The 15th International Conference on Game Theory and Management (GTM2021) for their valuable comments and suggestions. Additionally, I express my appreciation to Eduarda Sayago for her excellent research assistance during this project.

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1 Introduction

Although the literature has suggested that democracies are generally better at providing redistributive policies than autocracies (Brown and Hunter, 1999; Lake and Baum, 2001; Rudra and Haggard, 2005; Stasavage, 2005), the relationship between democracy and redistribution is complex and depends on a range of contextual factors (Beloshitzkaya et al., 2020). In fact, democracies tend to be more responsive to the demands of their citizens, particularly those with less political power, such as low-income and marginalized groups. However, factors such as the level of economic development, the quality of institutions, the political power of different interest groups (e.g rich elites), and the quality of governance may make it difficult to implement such policies. On the other hand, autocrats might also have incentives to provide some redistribution as they need to maintain popular legitimacy (Beloshitzkaya et al., 2020).

The lack of consensus about the association between democracy and redistribution is particularly well-known in the literature on land reform[1]. Some influential studies have argued that successful reforms are more likely when there is concentration of political power (Huntington, 1968; Tai, 2022). Some authors go further by claiming that an authoritarian approach to land reform has yielded the most consequential results (El-Ghonemy, 2006). Empirical evidence has partially supported this view as most of majors reforms throughout history have happened in countries where democracy is absent or weakened (Albertus, 2015). These arguments contradict the classic view of the social conflict theory, in which a democratic opening that expands the franchise (Acemoglu and Robinson, 2000, 2006) and allows institutionalized political parties to compete for rural voters (Lapp, 2004) would result in more redistribution.

There are several potential explanations for the difficulties democracies face in delivering large-scale land reforms. Elites can capture or disproportionately influence the policymaking process to undermine redistribution (Acemoglu and Robinson, 2008; Huntington, 1968), as the complexity of the legislative process provides many opportunities for them to block these policies (Tai, 2022; Thiesenhusen, 1989). Institutions that protect property rights, generally absent in autocracies, may also hamper redistributive policies such as land reforms (North and Weingast, 1989; Olson, 1993). None of these arguments, however, explore the importance of electoral incentives, a key ingredient of the political economy in democracies.

In this paper, I present a theory that offers an alternative explanation for the "land reform puzzle." My argument focuses on the very nature of democracy: incumbent politicians choose land reforms whose magnitude is low – lower than their respective bliss points and, under general conditions, lower than the median voter's bliss point – because this

[1]Land reform encompasses policies such as land expropriation and redistribution, negotiated transfers from the private market, colonization programs, land titling, tenure reforms, and the generation of private land markets. As As detailed below, I focus on land expropriation and redistribution.

maximizes their electoral prospects. Three elements are necessary to explain this result. The first is the potential presence in the electoral race of a candidate who is undesirable to the median voter. In the baseline model, I assume that such a candidate wishes to carry out reforms whose magnitude is higher than the median voter's bliss point. I refer to this type of politician as "communist" as there is a well-known association between massive land reforms and communism (see section 2.2). Second, incomplete information is also necessary, such that voters do not observe the politicians' types. Third, there must be sufficient uncertainty in society. I represent this uncertainty through the noise in policy observation (e.g., due to media coverage, political bias, etc.).

My model is a signaling game with two types of politicians (benevolent and communist) and three groups of voters (landlords, rural and urban citizens). The politician in office chooses the magnitude of the implemented land reform. Such a policy works as a (noisy) signal, as voters use it to update their beliefs about the incumbent's type. Because politicians want to be reelected (they are both office and policy seekers), they try to please the median voter. As a consequence, both types distance themselves from the image of a communist by choosing less redistributive reforms. Benevolent and communist politicians alike implement land reforms whose magnitude is *lower than what they themselves think is socially best*.

More importantly, when the reelection motive is sufficiently strong, even communist politicians choose reforms whose magnitude is lower than the median voter's preferred one. In other words, in trying to continue in office, both types of politicians deliver a policy that is different from the median voter's bliss point, precisely the citizen they want to please. The conclusion that similar land reforms are implemented by politicians with different preferences over redistribution provides theoretical support for some of the empirical findings in the literature, namely that ideology matters little for the magnitude of the implemented reforms (Albertus, 2015; Huber et al., 2008).

Comparative static exercises reinforce the conclusion that electoral incentives are the main force driving the results. For example, under quite general conditions, I show that the magnitude of the land reform chosen by politicians decreases both in the direct benefits from holding office and in the probability of losing for a candidate of the other type. The effect of an increase in the "communist threat," on the other hand, is non-monotonic as it affects the two types of politician in different ways. Yet, I show that such a threat also decreases the magnitude of the reform implemented by benevolent types when the election is (ex-ante) very close. Those results are robust to the relaxation of most of the assumptions made in the baseline model. Similarly, there is no qualitative change in the results when I replace the communist type with one whose bliss point is lower than the socially optimal.

The main contribution of this paper is to present a theory explaining why democracies struggle to implement large-scale land reforms, which is both alternative and complementary to the existing literature. Furthermore, by providing micro-foundations for the behavior of landlords, and rural and urban citizens, my model is tractable and flexible enough to allow the analysis of different cases. It also produces a range of comparative static results, which are easy to interpret and can help compare democracies with different parameter values. The theoretical contribution of this paper goes beyond the development of a novel framework to study land reform in democracies. It adds to a very scarce literature on formal models studying land redistribution. To the extent of my knowledge, the only other paper in the field is Albertus (2015).

1.1 Related literature

This paper is related to several strands of the literature. First, it is related to the Land Reform Puzzle. The observation that the most redistributive variety of land reform occurs under autocratic rule, not under democracy has been studied since the 60s (Albertus, 2015; El-Ghonemy, 2006; Huntington, 1968; Tai, 2022). A well-known argument is made by the social conflict theory, which predicts that democracies should be more likely to adopt policies that will benefit the majority of citizens as they allow the poor to exert greater influence over politicians than the oligarchy (Acemoglu and Robinson, 2000, 2006; Boix et al., 2003). However, empirical evidence has shown that redistribution from the rich to the poor is not higher in democracies than it is in autocracies (Ross, 2006; Scheve and Stasavage, 2012; Slater et al., 2014). Similarly, even at the highest levels of inequality, there is no association between democracy and redistribution (Mulligan et al., 2004).

Several explanations for the phenomenon are suggested by the literature. For example, the new generation of social conflict theory argues that even after a transition to democracy, elites may circumvent democratic institutions to capture policymaking and block redistribution (e.g., by engaging in vote buying or clientelism) (Acemoglu and Robinson, 2008). The neoclassical theory of the state also provides an alternative explanation by focusing on the lack of formal institutions and commitment mechanisms – those designed to protect property rights, in particular – in autocracies vis-à-vis democracies (North and Weingast, 1989; Olson, 1993). Finally, there is an argument that explores the interplay between landed elites and ruling political elites (Albertus, 2015). The idea is that for land redistribution to occur, a coalitional split between the two elites and low institutional constraints are necessary. The explanation I provide in this paper is different and complementary to all the aforementioned, as it focuses on the electoral incentives and uncertainty in society.

Second, this paper is related to the sizable and well-established literature on signaling in elections (Banks, 1990; Callander and Wilkie, 2007; Harrington, 1993). In general, authors in this field develop formal models that incorporate the cost of betrayal and signaling concerns into the platform choice, features similar to those of my model. However, contrary to the theory built in this paper, these works consider politicians who seek their first election and thus cannot use current policies to affect voters' beliefs. Two signaling models particularly close to the one I develop are Acemoglu et al. (2013) and Matsen et al. (2016). In their papers, an incumbent chooses populist policies in response to the potential presence of an undesirable politician in the race and the high uncertainty in society. My theory can be seen as an application of the framework of Acemoglu et al. (2013) to a particular redistributive policy, namely land reform.

Third, the vast literature that uses models in which politicians or decision-makers have private information and are judged based on their performance or the messages they send is also related to this paper (e.g., Canes-Wrone et al., 2001; Hodler et al., 2010; Maskin and Tirole, 2004 for Political Economy models and Morris, 2001; Prendergast, 1993 for other settings). Along the same lines, the literature on political agency presents several approaches to political agency and the selection of politicians of different competencies (Austen-Smith and Banks, 1989; Besley, 2005; Besley and Coate, 1997; Griebeler and Silva, 2020; Grossman and Helpman, 1994, 2001; Persson and Tabellini, 2002), which are also features of my model. Nevertheless, these papers do not discuss or derive biases in policies that could explain why small-scale land reforms are implemented in democracies.

1.2 Outline

The rest of the paper is organized as follows. In the following section, I present the signaling game that is the basis of the political theory of land reforms in democracies. The baseline case, which includes the presence of the communist type, is analyzed in detail. This section also presents comparative statics and the analysis of alternative scenarios. Section 3 explores the role of several assumptions of the model. Section 4 concludes. The omitted proofs of the propositions are presented in Appendix A.

2 Model

Consider a society composed of three groups of (private) citizens: landlords, (landless) rural citizens, and urban citizens. The politician in power must choose the magnitude of a redistributive land reform to implement. Initially, each landlord has the same amount of land $l_i = \frac{T}{n}$, where $T > 0$ is the total amount of land available, and $n > 0$ is the mass of landlords in society. Let $m > 0$ and $k > 0$ be the mass of rural and urban citizens, respectively, such that the total mass of citizens in the society is $k + m + n$. While both rural and urban citizens have no land, only the former can be directly benefited from the reform by receiving some portion of T.

Land reform has also an effect on society as a whole, affecting all three groups. I assume that fair land distribution is valued by all citizens, although in different magnitudes.

There are several channels by which land reform may affect the welfare of landlords, and rural and urban citizens apart from the redistribution itself. A more equitable land distribution is associated, for example, with more-developed financial markets (Vollrath and Erickson, 2007) as land can be required as collateral in credit transactions[2]. There is also a well-documented link between skewed landholding patterns and land conflict (Albertus and Kaplan, 2013; Boone, 2014; Paige, 1978; Russett, 1964; Wood, 2000). Literature has also shown that, by creating equality of holdings, land reform can positively impact economic growth (Alesina and Rodrik, 1994; Lipton, 2009). The contribution to economic growth goes further, given that land redistribution is considered one of the few developmental policies in which the trade-off between equity and efficiency may be absent (Bardhan and Mookherjee, 2010). Moreover, it can increase the supply of agricultural goods as small farms can be more productive than large farms (Berry et al., 1979; Deininger et al., 2003).

A final reason why citizens might prefer a more equitable land distribution is related to their preference for fairness (see, for instance, the comprehensive survey on both the experimental and the theoretical literature by Fehr and Schmidt, 2001). Because land reform can transform the material and social well-being of the poor (Albertus, 2015; Lipton, 2009) (e.g., by increasing income from the land for the land-poor, raising demand for labor, and creating farm enterprise opportunities), it is reasonable to assume that even people who are not affected directly by such policies (e.g., urban citizens) might support it to some extent. Finally, the impact of land redistribution on the rural poor is not only material as land ownership is a manifestation of social class, reflecting privilege and power (Thiesenhusen, 1989).

The *social value of land* (SVL) function captures the effect of land reform that is common to all citizens. Let $x \in \left[0, \frac{m}{m+n}\right]$ be the total amount of land expropriated from landlords to be redistributed to rural citizens (the magnitude of the reform)[3]. The SVL function is given by

$$v(x) = -x\left(x - \frac{m}{m+n}\right). \tag{2.1}$$

For future reference, observe that $v(x)$ achieves its maximum at $x^{FB} = \frac{m}{2(m+n)}$, and $v(x^{FB}) = \left[\frac{m}{2(m+n)}\right]^2$. The strict concavity of this function implies that there is a (unique) socially optimal level of land reform. Such a level is increasing in the number of landlords and decreasing in the number of rural citizens. An important remark is that x^{FB} implies that some land concentration ownership is socially optimal. Observe that the amount

[2] This argument is related to the contribution by De Soto (2000) to the literature on Development Economics. Although De Soto's chief concern is the effect of property rights on development – rather than on inequality –, one can argue that a fairer land distribution would increase the number of people able to use the land as collateral, which would allow them to access credit markets.

[3] By setting the upper limit of the domain as $\frac{m}{m+n}$, I rule out the unlikely case in which the expropriation is large enough to make an individual rural citizen end up with more land than a landlord. Yet, the model can easily be adapted for higher land redistribution.

of land in the hands of each landlord and each rural citizen is $\frac{T(m+2n)}{2m(m+n)}$ and $\frac{Tm}{2n(m+n)}$, respectively. The former is higher than the latter whenever $n > \frac{m}{2}$. In most contexts, it is reasonable to assume that the rural landless population is substantially higher than the landlord's population. While this result depends on the choice of the functional form of $v(\cdot)$, it is not crucial for the model's main results.

A possible micro foundation for the SVL function would include the reasons citizens care about fairness in land distribution. For the sake of simplicity, suppose that only the probability of conflict and the agricultural productivity (food supply, ultimately) matter for landlords, rural and urban citizens. When most of the land is on landlords' hands, there is a high chance of conflict initiated by rural citizens (e.g., due land invasions). In addition, as the literature suggests (Berry et al., 1979; Deininger et al., 2003), there is room for productivity gains by reallocating land. Thus, for small x (lower than x^{FB}), the marginal impact of land reform is positive. Instead, if land is well-divided among all citizens, landlords may to start conflicts or marshal influence with local judges, the police, and even militias (Albertus et al., 2018; LeGrand, 1986). The potential benefits from the economies of scale would also be absent when there is little land concentration. As a result, the marginal impact of land reform for large x (higher than x^{FB}) would be negative.

2.1 Voters

Each citizen is a voter, so I use these two terms interchangeably throughout the text. For the sake of notation, let $j = \{L, R, U\}$ index the group of citizens. The utility of landlord i (group $j = L$) is given by

$$u_i^L(x) = \frac{T}{n}(1 - x) + \phi_i v(x), \tag{2.2}$$

where $\phi_i \in \mathbb{R}_+$ measures the weight given to the SVL. The higher ϕ_i, the more citizen i cares about the social impacts of land reform vis-à-vis the private effects of the redistribution. I assume that ϕ is distributed according to a CDF $G : \mathbb{R}_+ \to [0, 1]$, with PDF $g(\cdot)$. Moreover, the distribution of ϕ_i across different groups is identical and independent. This assumption allows different citizens, both within and between groups, may assign different weights to the social benefit of the land reform.

One can calculate the bliss point of the landlord i through the first-order condition (FOC) of (2.2):

$$\phi_i v'(x) - \frac{T}{n} = 0. \tag{2.3}$$

Given the functional form of $v(\cdot)$, the above equation has the following unique solution $x^L(\phi_i) = \frac{1}{2}\left(\frac{m}{m+n} - \frac{T}{n\phi_i}\right) < x^{FB}$ for all i. The above condition shows the trade-off caused by a (marginal) land reform: while it takes away $\frac{T}{n}$ of the landlord's land, it also affects her utility through the marginal effect of the SVL, namely $\phi_i v'(x)$. Whenever $x < x^{FB}$, such an impact is positive, which yields the trade-off. For $x > x^{FB}$, on the other hand, there is no trade-off as both effects are negative – which helps to explain why $x^L(\phi_i) < x^{FB}$. As a consequence, $\frac{dx^L}{d\theta_i} > 0$: the higher the weight assigned to the SVL, the higher the landlord's bliss point – and the closer to x^{FB}.

The utility of a rural citizen i (group $j = R$), in turn, is given by

$$u_i^R(x) = \frac{xT}{m} + \phi_i v(x). \tag{2.4}$$

Observe that the total of expropriated land is $x \sum_i^m l_i = xT$, such that it is assumed that each landless citizen receives the same amount of it in case of reform, namely $\frac{xT}{m}$. Similar to landlords, rural citizens care about both the amount of land they get and the SVL. The FOC of the rural citizen's problem shows the trade-off she faces:

$$\frac{T}{m} + \phi v'(x) = 0. \tag{2.5}$$

On the one hand, a reform of magnitude $x > 0$ has a positive marginal impact on her utility due to the land redistribution. On the other hand, it may decrease the SVL function by moving away from x^{FB}. That is the case whenever $x > x^{FB}$. If $x < x^{FB}$, there is no trade-off given that both terms in the above expression are positive.

The above reasoning suggests that, regardless of ϕ_i, the bliss point of rural citizen i is higher than x^{FB}. It is straightforward to see that it is $x^R(\phi_i) = \frac{1}{2}\left(\frac{m}{m+n} + \frac{T}{m\phi_i}\right) > x^{FB}$. One can also notice that x^R is decreasing in ϕ_i: contrary to the landlords, rural citizens who assign a higher weight to the SVL prefer land reforms of lower magnitude. In other words, the higher the relative importance of the SVL via-a-vis to the private benefit from the redistribution, the closer her bliss point to x^{FB}.

Contrary to the other two groups, urban citizens (group $j = U$) neither own any land before the reform nor receive a piece after it is implemented. In fact, they only care about the SVL, such that their utility is $u_i^U(x) = \phi_i v(x)$. This implies that the bliss point of urban citizen i is $x^U(\phi_i) = x^{FB}$. For future reference, recall that $x^R(\phi_i) > x^U(\phi_i) > x^L(\phi_i)$ for all ϕ_i. In other words, taking three citizens who assign the same weight to the SVL, one from each group, the landlord is the one who prefers the smallest land redistribution. Furthermore, the rural citizen prefers the largest redistribution, and the urban citizen prefers a reform of intermediate magnitude.

2.2 Politicians

There are two types of politicians in the society, benevolent (B) and communist (C). As usual, politicians' types are private information, such that voters do not observe whether a particular politician is B or C. Yet, voters do know the distribution of types: a share

$\mu \in [0,1]$ of the pool of politicians in the society is benevolent – and therefore $1-\mu$ is the share of communists. This implies that voters assign an (unconditional) probability of μ to the incumbent being benevolent. The same applies to the challenger. The former, however, can use the land reform to send a signal to voters and thus affect their beliefs, whereas the latter is a passive player.

The model is a standard two-period signaling game ($t = 1, 2$). The timing of the events is as follows:

1. At the beginning of $t = 1$, the incumbent chooses the magnitude of the land reform x_1^p, where $p \in \{B, C\}$.

2. Voters observe the land reform with noise. Formally, they receive a signal $s = x_1^p + \varepsilon$ and then update their beliefs about the incumbent's type through the Bayes rule. The noise ε is a random variable to be defined below.

3. In the end of the period $t = 1$, voters vote for either the incumbent or the challenger, who is randomly drawn from the pool of politicians.

4. At $t = 2$, the politician in office (the former incumbent or the new elected politician) chooses x_2^p.

5. All agents learns the realizations of x_1^p and x_2^p and payoffs are realized.

Politicians' utilities at period t are the following:

$$U_t^B(x_t^B) = V(x_t^B) + W\mathbb{I}_{\{\text{in office at } t\}} \tag{2.6}$$

$$U_t^C(x_t^C) = \hat{v}(x_t^C) + W\mathbb{I}_{\{\text{in office at } t\}}, \tag{2.7}$$

where $W > 0$ captures the direct utility from being in office in period t and $\mathbb{I}_A$ is an indicator variable, such that $\mathbb{I}_A = 1$ if A is true and $\mathbb{I}_A = 0$ otherwise. Parameter W may, for example, take into account the financial (e.g., wage, bonus, pension) and psychological (e.g., power, reputation) benefits the politician receives whenever she is in power. Observe that W is an important component of the electoral incentives of the candidates as they only get such benefits if they win the election. As I assume that both citizens and politicians do not discount the future, the total utility of politician $p = B, C$ is $U^p(x_1^p, x_2^p) = \sum_{t=1}^2 U_t^p(x_t^p)$[4].

The benevolent politician's payoff includes function $V(\cdot)$, which is the total welfare

[4]The inclusion of a discount factor does not change qualitatively the results. Comparative statics with respect to such a parameter is straightforward and intuitive. As Acemoglu et al. (2013) shows, if politicians discount the future, the higher the discount, the lesser the incentives for reelection.

of the society:

$$\begin{aligned} V(x_t^B) &= k\int_0^{+\infty} u^U(x_t^B)g(\phi)d\phi + m\int_0^{+\infty} u^R(x_t^B)g(\phi)d\phi + n\int_0^{+\infty} u^L(x_t^B)g(\phi)d\phi \\ &= T + (k+m+n)\mathbb{E}[\phi]v(x_t^B). \end{aligned} \tag{2.8}$$

It is straightforward to see that $V(x^{FB})' = v(x^{FB})' = 0$, such that the total welfare is maximized when the SVL is maximized. A relevant remark is that this result depends on the implicit assumption that there is no inefficiency: all the land taken from group L goes to group R – there is no deadweight loss in the process. Moreover, observe that this result does not depend on the size of the groups. Finally, in order to make the preferences of the two types more similar, I assume that $\mathbb{E}[\theta] = 1/(k+m+n)$.

The payoff of the communist, in turn, includes the following function:

$$\hat{v}(x) = -x\left[x - \left(\frac{m}{m+n} + \beta\right)\right], \tag{2.9}$$

where $\beta \in \left(0, \frac{m}{m+n}\right)$ is the *communist bias*. The function $\hat{v}(\cdot)$ has the same shape as $v(\cdot)$ (strictly concave and symmetric around the maximum) but it is shifted to the right. This implies that it achieves its maximum at $x^C = \frac{1}{2}\left(\frac{m}{m+n} + \beta\right) > x^{FB}$. The idea is that the communist politician believes (e.g., for ideological reasons) that, for a given magnitude of the land reform, the benefit from the redistribution is higher than what the rest of the society believes. Henceforth, I will refer to x^{FB} and x^C as the benevolent and communist bliss points, respectively, as they maximize their instant utilities.

The choice of the label communist is due to the widespread association between massive land reforms and communism. Historically, many communist regimes have implemented land reforms as part of their efforts to transform their societies. The well-known cases of China in the 1950s, Cuba in the 1960s, and the Soviet Union in its early years are textbook examples of major land expropriation and posterior redistribution. Other examples of this association can be found in the comprehensive analysis by Albertus (2015). In fact, land reform is often viewed as a chief component of Marxist ideology and a strategy for achieving a classless society. Some authors even highlight the revolutionary (socialist) road to reform (Paige, 1978; Skocpol and Theda, 1979; Tuma, 1965)[5].

A crucial assumption in the model is the uncertainty surrounding the type of land reform implemented by the incumbent government. Following the literature (e.g., Ace-

[5]The association between communism and land reform is well-established even in democracies. In Brazil, for example, the expression "land reform" (reforma agrária, in Portuguese) was mentioned 84 times in the official government plans of the candidates for president in the four more recent elections (data from the Brazilian Superior Electoral Court, TSE). More than 83% of these references were made by left-wing parties. Some of these parties even have the word "socialist" or "communist" in their label, such as The Brazilian Communist Party (Partido Comunista Brasileiro, PCB), Socialism and Liberty Party (Partido Socialismo e Liberdade, PSOL), and Brazilian Socialist Party (Partido Soocialista Brasileiro, PSB).

moglu et al., 2013)[6], I assume that citizens observe it with noise:

$$s_t = x_t^p + \varepsilon_t, \tag{2.10}$$

where ε is distributed according to a CDF $F : \mathbb{R} \to [0, 1]$, with PDF $f(\cdot)$[7]. This implies that by observing signal s rather than the actual magnitude x, citizens cannot be sure about the incumbent's type. Instead, they must use the information contained in s to update their beliefs. Notice also that the shock is not idiosyncratic as ε is the same for all citizens – and thus all receive the same signal.

There are several factors that can contribute to the noise in policy observation, such as media coverage, political bias,and personal experiences. While political bias, and personal experiences are idiosyncratic, media coverage affects all voters indiscriminately. Depending on the sources of information they rely on, voters may receive different narratives and interpretations of policy outcomes. For example, a policy reported positively by one news outlet may be portrayed negatively by another (Chan and Suen, 2009). Voters can also observe the effects of policies with delay, which is equivalent to observe it partially or with noise. Effects of policies can take time to manifest and become apparent, and therefore it may take some time for voters to fully understand their impact. One can argue that although the redistributive effects of a land reform are likely to be observed instantly and without distortion, the same may not happen for the impact of the SVL.

The following assumption is held throughout the baseline model.

Assumption 2.1 *The variable ε has a Normal distribution $\mathcal{N}(0, \sigma^2)$, where the variance σ^2 is sufficiently large.*

The choice for the Normal distribution is standard in the literature (Acemoglu et al., 2013; Matsen et al., 2016). It has several features that fit an unbiased shock, such as its symmetry, which implies that the mean and median are equal to zero. It also assigns higher probability to values close to the mean and it is smooth and concave for values close to it. The assumption of a high variance is also standard in the literature and imposes that there is sufficient noise in the observation of policies to ensure the convexity of the politicians' maximization problems. The importance of the assumption 2.1 is discussed in section 3, where I analyze other possible distributions for ε

[6] Another paper that adopts a very similar framework to ours is Matsen et al. (2016). In their model, however, the noise affects voters' utilities directly. This difference is due to the incumbent having two decision variables in their model.

[7] Given that the support of F is the whole real line, it is possible that the realization of ε yields either $s < 0$ or $s > 1$. One can interpret these cases as extreme policies. In the former case, for instance, the policy not only does not take away any land from the landlords but also benefit them to the expense of the rural citizens.

2.3 Analysis

The equilibrium concept is pure-strategy perfect Bayesian equilibrium (in undominated strategies). This simply implies that citizens vote for the politician that will give them the highest expected utility should their vote turn out to be decisive. For the sake of simplicity, assume that when indifferent, voters reelect the incumbent. As the game is dynamic, one must use backward induction to solve it. The next proposition presents the results of the second period, when politicians face no electoral incentive as there is no reelection concerns.

Proposition 2.2 *In the second period, benevolent and communist politicians choose their respective bliss points, that is,* $x_2^B = x^{FB}$ *and* $x_2^C = x^C$*.*

The solutions to the politicians' problems in $t = 2$ are those that maximize (2.6) and (2.7), respectively. Because politicians are both policy and office motivated, they might face two sorts of incentives when they choose the magnitude of the land redistribution. On the one hand, they want to implement the policy they believe is the best for society. On the other hand, they want to win to get the benefits of being in office and implement their agenda. In $t = 2$, however, only the former incentive is present as there are no reelection concerns – there is no period $t = 3$ in the model. One can use this result as a benchmark for those of the period $t = 1$ when electoral incentives matter.

Voters anticipate the land reform chosen in $t = 2$ for both types of politicians. Thus, they can calculate the utility derived from the victory of each type and then decide whether they prefer the benevolent or the communist politician. As preferences are concave and single-peaked, citizens choose the candidate whose platform is closest to their bliss point. It is straightforward to conclude that landlords and urban citizens prefer B over C. Yet, among the rural citizens, there are individuals whose weight assigned to the SVL is sufficiently large for them to prefer B.

A rural citizen i prefers B over C if and only if $u_i^R(x^{FB}) \geq u_i^R(x^C)$:

$$\phi_i \geq \frac{T}{m} \frac{(x^C - x^{FB})}{(v(x^{FB}) - v(x^C))} = \frac{2T}{\beta m}. \tag{2.11}$$

The share of rural citizens who prefer the benevolent type is therefore $1 - G\left(\frac{2T}{\beta m}\right)$. One can observe that such a share is increasing in the communist bias and in the size of the rural citizens population, and decreasing in the total amount of land T. Thus, the total share of voters (among the three groups) who prefer B is given by

$$\Omega = \frac{k+n}{k+m+n} + \frac{m}{k+m+n}\left[1 - G\left(\frac{2T}{\beta m}\right)\right]. \tag{2.12}$$

In the baseline model, I focus on the case in which the benevolent type is the most popular. This is equivalent to $\Omega \geq \frac{1}{2}$: at least half of the population prefer B over C. A sufficient condition for this assumption to hold is that the rural citizens are the minority in the population ($k + n \geq m$). While I believe that this is the most prevalent case worldwide, the model can also be used to study land reform choices when communist politicians are the most popular ones. I analyze this possibility in section 2.5. Finally, observe that, given the assumptions of the model, $\Omega \geq \frac{1}{2}$ is also equivalent to stating that the median voter prefers the benevolent type.

Assumption 2.3 *The median voter prefers B over C.*

Because the challenger is benevolent with probability μ, a citizen who prefer B vote for the incumbent only if her posterior that this politician is benevolent is no less than μ. Denote the equilibrium land reform that a benevolent and a communist politician carries in period 1 by $b = x_1^B$ and $c = x_1^C$, respectively. The Bayesian updating gives the posterior that the incumbent is benevolent:

$$\hat{\mu}(s) = \frac{\mu f(s-b)}{\mu f(s-b) + (1-\mu) f(s-c)}. \tag{2.13}$$

For now, assume that $b < c$: voters believe that the magnitude of the land reform chosen by benevolent politicians is lower than the communist politicians' choice. (In Proposition 2.4 below, I show that this belief is the only correct one in equilibrium.) By using the properties of the Normal distributions (symmetry around zero), one can show that $\hat{\mu}(s) \geq \mu$ if and only if

$$s \leq \frac{b+c}{2}. \tag{2.14}$$

Intuitively, the signal received by the citizen must be sufficiently low for voters to believe that the incumbent is benevolent.

Because $b < c$, condition (2.14) is the necessary and sufficient condition for the incumbent to receive the votes of the citizens who prefer the benevolent politician. Thus, the probability that a voter i who prefers B over C vote for the incumbent after she implementing land reform x is

$$\begin{aligned} \pi(x) &= \Pr\left(x + \varepsilon \leq \frac{b+c}{2}\right) && (2.15) \\ &= F\left(\frac{b+c}{2} - x\right) && (2.16) \end{aligned}$$

where the last equality follows from the fact that ε is symmetric around zero. One can see that this probability does not depend on the type of the incumbent, only on her choice of policy, as her type is private information and does not directly affect the realization of the signal – affects only through the policy choice.

I also assume that the election outcome is not deterministic. Instead, the incumbent's probability of victory is an increasing function of the total number of votes she expects to receive[8]. This is a significant difference compared to the literature. While in the models by Acemoglu et al. (2013) and Matsen et al. (2016), for example, there is a representative voter, here there is heterogeneity both within and between the different groups. Such a heterogeneity creates the need for an additional source of uncertainty. Let $\chi(x)$ be the expected number of votes received by the incumbent, then she wins with probability $\Pr(\chi(x) \geq 1/2) = \chi(x)$. Linearity is assumed for simplicity, but the qualitative results would not change if $\Pr(\chi(x) \geq 1/2)$ was increasing and concave in $\chi(x)$.

Finally, observe that the expected number of votes received by the incumbent is

$$\chi(x) = F\left(\frac{b+c}{2} - x\right)\Omega + \left[1 - F\left(\frac{b+c}{2} - x\right)\right](1-\Omega). \tag{2.17}$$

Function $\chi(x)$ is not only composed of all the citizens who prefer B over C and have received the signal s satisfying (2.14) (term $F\left(\frac{b+c}{2} - x\right)\Omega$). It also includes all the citizens who prefer C over B but have received a signal $s \geq (b+c)/2$. After observing a sufficiently large signal, this latter group believes that the incumbent is communist and thus votes for her.

One can now turn to the politicians' first-period problem, given the reelection strategy of voters. The benevolent one chooses the magnitude of the land reform by solving

$$\begin{aligned} \max_{x_1^b \in [0, \frac{m}{m+n}]} & V\left(x_1^b\right) + W + Pr\left(\chi(x_1^b) \geq \tfrac{1}{2}\right)\left(V\left(x^{FB}\right) + W\right) \\ &+ \left(1 - Pr\left(\chi(x_1^b) \geq \tfrac{1}{2}\right)\right)\left[\mu V\left(x^{FB}\right) + (1-\mu) V\left(x^C\right)\right]. \end{aligned}$$

Its FOC is

$$v'(x_1^b) - f\left(x_1^b\right)(2\Omega - 1)\mathcal{B} = 0, \tag{2.18}$$

where I have substituted $\frac{dPr\left(\chi(x_1^b) \geq 1/2\right)}{dx} = -f(x)(2\Omega - 1)$ and $\mathbb{E}[\phi] = 1/(k+m+n)$. I also have defined the constant $\mathcal{B} \coloneqq \left[\left(V\left(x^{FB}\right) - V\left(x^C\right)\right)(1-\mu) + W\right]$, the benevolent incumbent's reelection motive – rents from office and disutility from policy choice if a communist politician is elected instead.

The problem of a communist politician is similar:

$$\begin{aligned} \max_{x_1^c \in [0, \frac{m}{m+n}]} & \hat{v}\left(x_1^c\right) + W + Pr\left(\chi(x_1^c) \geq \tfrac{1}{2}\right)\left(\hat{v}\left(x^C\right) + W\right) \\ &+ \left(1 - Pr\left(\chi(x_1^c) \geq \tfrac{1}{2}\right)\right)\left[\mu \hat{v}\left(x^{FB}\right) + (1-\mu)\hat{v}\left(x^C\right)\right] \end{aligned}$$

The FOC is

$$\hat{v}'(x_1^c) - f\left(x_1^c\right)(2\Omega - 1)\mathcal{C} = 0, \tag{2.19}$$

where $\mathcal{C} \coloneqq \left[\left(\hat{v}\left(x^C\right) - \hat{v}\left(x^{FB}\right)\right)\mu + W\right]$ is the communist incumbent's reelection motive.

[8] There are several potential sources for this uncertainty. Uncertain turnout or incumbency advantage, for example, are among the most plausible.

One can show that $\mathcal{B} - \mathcal{C} = (\beta/2)^2 (1 - 2\mu)$. This means that, when compared to the communist politician, the benevolent one has stronger incentives to be reelected if and only if $\mu < \frac{1}{2}$. In this case, being defeated is costly as there is a high probability of being replaced by a communist politician. Moreover, such a difference is increasing in the communist bias. When $\mu = \frac{1}{2}$, $\mathcal{B} = \mathcal{C}$, such that both types face the same incentives to win.

Because (2.18) and (2.19) must be satisfied in equilibrium for $x_1^b = b$ and $x_1^c = c$, respectively, the equilibrium is now characterized by the following two equations:

$$-2b + \frac{m}{m+n} - f\left(\frac{c-b}{2}\right)(2\Omega - 1)\mathcal{B} = 0 \tag{2.20}$$

$$-2c + \frac{m}{m+n} + \beta - f\left(\frac{b-c}{2}\right)(2\Omega - 1)\mathcal{C} = 0. \tag{2.21}$$

The first of the above equations gives the equilibrium value of the land reform of benevolent politicians, b, when communist politicians are choosing reform c. Conversely, the second equation corresponds to the equilibrium value of the reform of communist politicians when benevolent politicians are choosing b. In other words, (2.20) and (2.21) form a system of best-response functions, which jointly determine the second-period outcome.

Before discussing the existence and uniqueness of the equilibrium, one can see that, if there exists solution (b, c) for (2.20) and (2.21), it must satisfy $b < x^{FB}$ and $c < x^C$. Mathematically, this result is a consequence of the presence of terms $-f\left(\frac{c-b}{2}\right)(2\Omega - 1)\mathcal{B} < 0$ and $-f\left(\frac{b-c}{2}\right)(2\Omega - 1)\mathcal{C} < 0$. If $b = x^{FB}$ and $c = x^C$, the left-hand side (LHS) of both equations would be negative. Intuitively, this means that both benevolent and communist politicians choose land reforms whose magnitude is lower than their respective bliss points. They do so because a decrease in x starting from their bliss points creates a second-order loss in the first period but delivers a first-order increase in the probability of reelection and thus a first-order expected gain. More importantly, when the benevolent politician is in office, her choice does not please the median voter. As I show below, as long as the reelection motive is sufficiently large, this is the case even for the communist.

The electoral incentives are indeed the forces driving the result. If the incumbent's reelection motives, $\mathcal{B}$ and $\mathcal{C}$, were equal to zero, the solution of the system (2.20) and (2.21) would be the same as in the second-period. Moreover, $-f'(\cdot)(2\Omega - 1)$ measures the marginal probability of being reelected in response to a (marginally) larger land reform. Although the benefits from holding office ($W > 0$) contribute to lower values of b and c (see the comparative statics in section 2.4), the result holds even for $W = 0$. This is because politicians still want to be reelected: they want to implement the land redistribution they believe is the best and avoid the victory of someone who (potentially) thinks differently.

The politicians' best responses help to understand the mechanisms of the result. The best-response function of the benevolent type is upward-sloping, whereas the best response function of the communist is downward-sloping. One can calculate their slopes by differentiating the LHS of (2.20) and (2.21) with respect to b and c – applying the Implicit Function Theorem. If, for example, voters expects that communist politicians implement land reforms in a magnitude lower than c, it is optimal for benevolent politicians to decrease her own land reform in response. When c is lower, it becomes harder for voters to distinguish one type of politician from another. This gives incentives for benevolent politicians to distinguish themselves by choosing a lower distribution, despite the loss due to the higher distance from her bliss point.

If, instead, voters expect that benevolent politicians implement land reforms in a magnitude lower than b, it is optimal for communist politicians to reply by increasing their reform. Observe that, contrary to the previous case, when b is lower, it becomes easier for voters to distinguish one type of politician from another. Although communist politicians decrease their probability of winning by choosing a higher redistribution, the instantaneous (first-period) benefit from getting closer to their bliss point is higher than the expected (second-period) loss. The difference in the slope of the best-response functions is due to the benevolent type's initial advantage: the bliss point of the benevolent politicians is closer to the median voter's than the bliss point of communist politicians. This implies that the former group may distinguish themselves – and get a higher probability of winning – without needing to go too far from their preferred policy.

The main results of this section are summarized below.

Proposition 2.4 *Suppose that assumptions 2.1 and 2.3 hold. Then:*

(i) There exists a unique equilibrium (perfect Bayesian equilibrium in pure strategies). In the first period, benevolent and communist politicians choose policies $x_1^b = b$ *and* $x_1^c = c$ *such that* $b < c$.

(ii) Both types of politician choose land reform whose magnitude is lower than their respective bliss points, that is, $0 < b < x^{FB}$ *and* $c < x^C < \frac{m}{m+n}$.

2.4 Comparative statics

Comparative statics reinforce the conclusion that electoral incentives are the main force driving the results. Higher benefits from holding office, for instance, have a monotone impact on the choices of both benevolent and communist politicians. The next proposition details such effects.

Proposition 2.5 *Suppose that assumptions 2.1 and 2.3 hold. Then:*

(i) The higher the benefits from holding office, the lower is the magnitude of the land reform implemented by both types of politician.

(ii) In the absence of direct benefits from holding office (i.e., if $W = 0$), communist politicians never choose land reform whose magnitude is lower than the socially optimal, i.e., $c > x^{FB}$.

(iii) For $W > 0$ high enough, the equilibrium involves $c < x^{FB}$.

By increasing the incumbent's reelection motives for both types, a higher W makes politicians decrease the magnitude of their chosen land reforms. In fact, if the cost of losing the election due to the foregone benefits from holding office is sufficiently high, then even communist politicians choose policies to the left of the median voter (land reforms whose magnitude is lower than the socially optimal) in the first period. This implies that high electoral incentives may make communist politicians "betray their ideology". More importantly, this result supports the empirical evidence that there is no relationship between redistribution and left-wing government in some contexts, such as Latin America (Albertus, 2015; Huber et al., 2008).

Proposition 2.6 *Suppose that assumptions 2.1 and 2.3 hold. Then the higher the total share of voters who prefer benevolent politicians over communists politicians, the lower the magnitude of the land reform implemented by both types of politicians.*

The intuition behind Proposition 2.6 is similar to the previous one: a higher Ω increases the expected benefit from being reelected for both types of politician. As a consequence, both benevolent and communist politicians decrease the magnitude of the equilibrium land reforms. Graphically, there is a downward shift in the benevolent politicians' best-response function and a shift to the left in the communist politicians' best-response function – like in the previous proposition. Compared to Proposition 2.5, however, the increase in the expected benefit is not due to a higher reelection motive. Instead, it is a consequence of the likelihood of coming to power. Finally, observe that a higher Ω can be explained by higher k or n, for example.

Proposition 2.7 *Suppose that assumptions 2.1 and 2.3 hold. Then a higher share of the benevolent type in the pool of politicians (i.e., a higher μ) affects the outcome of the first period as follows:*

(i) A communist incumbent decreases the magnitude of the land reform.

(ii) A benevolent incumbent increases the magnitude of the land reform if σ^2 is sufficiently high.

When there is a higher probability that the challenger is benevolent, incumbent communists face stronger incentives to win. Their efforts to increase the reelection probability makes them choose a lower c. On the other hand, a higher μ decreases the benevolent incumbent's reelection motive by reducing the opportunity cost of losing the race. Moreover, all else equal, by decreasing the magnitude of the equilibrium land reform by the communist candidate, a higher μ makes the two types of politicians harder to distinguish in equilibrium. While the former (direct) effect increases b, the latter (indirect one) decreases it as the benevolent politicians' best-response function is upward-sloping. If the magnitude of the reform is subjected to a highly distorted signal (high variance), the marginal probability of winning is low – as voters are relatively insensitive to small changes in the policy – and the direct effect dominates the indirect[9].

Proposition 2.8 *Suppose that assumptions 2.1 and 2.3 hold and that benevolent politicians are marginally favorite (i.e., $\Omega = 1/2 + \varepsilon$, where $\varepsilon > 0$ is arbitrarily low). Then a higher communist bias (i.e., a higher β) affects the outcome of the first period as follows:*

(i) A benevolent incumbent decreases the magnitude of the land reform.

(ii) A communist incumbent increases the magnitude of the land reform if σ^2 is sufficiently high.

The effects of an increase in the communist bias on equilibrium land reforms are more complex than the previous ones. First, observe that a higher β increases both $\mathcal{B}$ and $\mathcal{C}$, such that there is a negative partial effect on the magnitude of the reform for both types. Second, the communist bliss point is an increasing function of the communist bias, which implies that becomes more costly for communist politicians to choose $c < x^C$ as β increases. Finally, the two best-response functions have opposite slopes. As Appendix A.5 shows, which effect dominates depends on the parameters' values. Yet, when benevolent politicians are marginally favorite, such that the total share of voters who prefer them are marginally higher than a half, one can find monotone effects.

For the benevolent incumbent, the partial effect dominates, which implies that a higher communist bias increases her "fear of communism": losing the election is more costly as the challenger may implement a land reform whose magnitude is further from her bliss point. This makes benevolent politicians choose lower b in response to higher β. For the communist incumbent, on the other hand, the direct impact on her bliss point dominates: the utility loss from choosing lower c is higher than the expected benefit from the higher probability of winning. As in the previous proposition, this is true when there is sufficient noise in society. A high variance decreases the marginal probability of winning, which in turn decreases the expected benefit from winning.

[9]Whether the threshold above which the variance satisfies the statement (ii) of Proposition 2.7 is higher or lower than the threshold implied by assumption 2.1 depends on the parameters' values (see $\bar{\sigma}$ and σ_5 in Appendix A.1 and A.4, respectively). Observe that, if $\bar{\sigma} \geq \sigma_5$, then the assumption made in statement (ii) is innocuous. If $\bar{\sigma} < \sigma_5$ instead, then an even higher distorted signal is required to guarantee $\frac{db}{d\mu} > 0$. The same reasoning applies to the statement (ii) of Proposition 2.8.

2.5 The case of a popular communist[10]

This section analyzes the case in which most citizens prefer communists over benevolent politicians. Formally, this is the case when $\Omega < \frac{1}{2}$. Throughout this section, therefore, I make the following assumption:

Assumption 2.9 *The median voter prefers C over B.*

Given the definition of Ω (equation (2.12)), the above assumption holds if and only if $mG\left(\frac{2T}{\beta m}\right) > \frac{1}{2}$. Because the total number of citizens who prefer B over C is composed of all landlords and urban citizens, and a share of rural citizens (those whose ϕ is sufficiently large), a necessary condition for the assumption to hold is the total number of rural citizens (m) be higher than a half. In addition, the share of rural citizens who prefer the communist type (those with small ϕ) cannot be too low ($G\left(\frac{2T}{\beta m}\right)$). Observe that such a share depends on both parameters' values and the probability distribution $G(\cdot)$. If, for example, $G(\cdot)$ is a skewed right distribution and β is small, then a large share of rural voters prefer communists over benevolent politicians.

All the analysis performed in section 2.3 continues to hold, except for the fact that now $(2\Omega - 1) < 0$. This implies that the marginal probability of winning is now positive, such that there is an incentive for both types of politicians to increase the magnitude of the land reform implemented. Once again, this result can be seen in the system (2.20)-(2.21). Suppose that a unique equilibrium (b, c) exists – which Proposition 2.10 guarantees under the same conditions as Proposition 2.4 –, then it must satisfy $b > x^{FB}$ and $c > x^{C}$. Contrary to the case in which $\Omega > \frac{1}{2}$, now if $b = x^{FB}$ and $c = x^{C}$ the LHS of both equations would be positive. Because the median voter prefers more redistribution than x^{FB}, both types of politicians try to look like communists by choosing large-scale reforms.

Proposition 2.10 *Suppose that assumptions 2.1 and 2.9 hold. Then:*

(i) There exists a unique equilibrium (perfect Bayesian equilibrium in pure strategies). In the first period, benevolent and communist politicians choose policies $x_1^b = b$ and $x_1^c = c$ such that $b < c$.

(ii) Both types of politician choose land reform whose magnitude is higher than their respective bliss points, that is, $0 < x^{FB} < b$ and $x^C < c < \frac{m}{m+n}$.

Another consequence of the popularity of communist politicians is the change in the slopes of the best response functions. The communist type now wants to distinguish

[10] When the communist is as popular as the benevolent type ($\Omega = \frac{1}{2}$), the incumbent is reelected with probability one (seen equation (2.17)). Recall that the median voter vote for the incumbent in case of indifference.

herself from the benevolent one. Thus, if voters expect that benevolent politicians implement land reforms in a magnitude higher than b, it is optimal for communist politicians to reply by increasing the magnitude of their own reform. In other words, the communist politicians' best-response function is upward-sloping. The benevolent type, on the other hand, has a downward-sloping best-response function. Although there is a decrease in their probability of winning when they choose a smaller-scale land redistribution in response to a higher c, the instantaneous (first-period) benefit from getting closer to their bliss point is higher than the expected (second-period) loss.

As electoral incentives continue to be the main forces driving the results, it is straightforward to see that the comparative statics is similar to the analysis carried out when $\Omega < \frac{1}{2}$. Larger benefits from holding office, for example, make both benevolent and communist politicians choose larger land reforms. Moreover, the result of Proposition 2.6 continues to hold as a higher Ω decreases the marginal probability of winning. Instead, the effect of a higher share of the benevolent type in the pool of politicians is now the opposite: a benevolent incumbent decreases the magnitude of the land reform while the communist incumbent increases it if σ^2 is sufficiently high. Finally, when communist politicians are marginally favorite ($\Omega = \frac{1}{2} - \delta$, where $\delta > 0$ is arbitrarily small), the results of Proposition 2.8 continue to hold. This happens because β affects not only the reelection motive, but also the communist politicians' bliss point.

2.6 The communist and the landlord

Suppose now that there are two biased types of politician, namely the communist and the landlord. The utility of the landlord politician at period t is given by

$$U_t^{LL}(x_t^{LL}) = \tilde{v}(x_t^{LL}) + W\mathbb{I}_{\{\text{in office at } t\}}. \tag{2.22}$$

Function $\tilde{v}(\cdot)$ is defined similarly to the case of the communist:

$$\tilde{v}(x) = -x\left[x - \left(\frac{m}{m+n} - \alpha\right)\right], \tag{2.23}$$

where $\alpha \in \left(0, \frac{m}{m+n}\right)$ is the *landlord bias*. It is straightforward to see that the landlord's bliss point is $x^{LL} = \frac{1}{2}\left(\frac{m}{m+n} - \alpha\right) < x^{FB}$. The presence of politicians who represent the interests of large landlords is not unrealistic. On the contrary, the empirical literature has documented that this group can marshal influence with local judges, the police, and even militias to prevent successful land reforms (Albertus et al., 2018; LeGrand, 1986). Moreover, landed interests can capture and influence legislators to reverse terms of land reform (Albertus, 2015).

The total share of voters who prefer each type now depends also on the magnitude of the two biases. When $\beta > \alpha$, it is the case that

$$\begin{aligned} \Omega^{LL} &= \frac{n+k}{k+m+n} + \frac{m}{k+m+n}\left[1 - G\left(\frac{2T}{m(\beta-\alpha)}\right)\right] \\ \Omega^{C} &= \frac{m}{k+m+n} G\left(\frac{2T}{m(\beta-\alpha)}\right) \end{aligned}$$

Observe that the baseline model is a particular case of the above setting, with $\alpha = 0$. Because the communist bias is higher than the landlord's, x^{LL} is closer to x^{FB} than x^{C}, such that all the landlords and urban citizens prefers landlord politicians over communists. In addition, a share of the rural citizens (those whose ϕ is sufficiently high) also prefers the landlord type.

When $\beta < \alpha$, the share of voters who prefers each type is

$$\begin{aligned} \Omega^{LL} &= \frac{n}{k+m+n} G\left(\frac{2T}{n(\alpha-\beta)}\right) \\ \Omega^{C} &= \frac{k+m}{k+m+n} + \frac{n}{k+m+n}\left[1 - G\left(\frac{2T}{n(\alpha-\beta)}\right)\right]. \end{aligned}$$

Now x^{C} is closer to x^{FB} than x^{LL}, such that all the rural and urban citizens prefer communists. Furthermore, a share of the landlords (those whose ϕ is sufficiently high) also prefer communists. Finally, if $\alpha = \beta$, all landlords prefer landlord politicians while all rural citizens prefer communists. Urban citizens are indifferent, so I assume that they split evenly between the two types. Formally,

$$\begin{aligned} \Omega^{LL} &= \frac{n}{k+m+n} + \frac{1}{2}\frac{k}{k+m+n} \\ \Omega^{C} &= \frac{m}{k+m+n} + \frac{1}{2}\frac{k}{k+m+n}. \end{aligned}$$

Although the magnitude of the biases affects the total share of voters who prefer each type of politician, results continue to be driven by the median voter. In other words, the support of the majority determines whether there is under or over provision of land reform. If, for example, the communist bias is higher ($\beta > \alpha$), but communist politicians are more popular ($\Omega^{LL} < \frac{1}{2}$ or, equivalently, $\Omega^{C} > \frac{1}{2}$), there is an incentive to implement larger land reforms. If, instead, $\beta < \alpha$, but most of the voters still prefer the communist type, land reforms implemented by landlords and communists are higher than their respective bliss points. As it was seen in section 2.5, several parameters determine which type is the most popular, such as the size of each group and the functional form of $G(\cdot)$.

The next proposition summarizes the results of this section[11].

[11] The proof of Proposition 2.11 is omitted as each statement is a particular case of the previous results.

Proposition 2.11 *Suppose that assumptions 2.1 holds. Then:*

(i) There exists a unique equilibrium (perfect Bayesian equilibrium in pure strategies). In the first period, landlord and communist politicians choose policies $x_1^{LL} = l$ and $x_1^C = c$ such that $l < c$.

(ii) If the median voter prefers the landlord type ($\Omega^{LL} > \frac{1}{2}$), then both types of politician chooses land reform whose magnitude is lower than their respective bliss points, that is, $0 < l < x^{LL}$ and $c < x^C < \frac{m}{m+n}$.

(iii) If the median voter prefers the communist type ($\Omega^{LL} < \frac{1}{2}$), then both types of politician chooses land reform whose magnitude is higher than their respective bliss points, that is, $0 < x^{LL} < l$ and $x^C < c < \frac{m}{m+n}$.

3 Robustness of the model

This section discusses how the results change when assumptions made throughout the text are relaxed. First, suppose that $\mathbb{E}[\phi] \neq \frac{1}{k+m+n}$. As $(k+m+n)\mathbb{E}[\phi]$ can be interpreted as the relative weight benevolent politicians give to the SVL (see equation (2.8)), the higher the expected value of ϕ the more they worry about achieving the first-best policy – and the less they worry about getting reelected. Formally, now the system of best-response functions is

$$(k+m+n)\mathbb{E}[\phi]\left(-2b + \frac{m}{m+n}\right) - f\left(\frac{c-b}{2}\right)(2\Omega - 1)\mathcal{B} = 0 \tag{3.1}$$

$$-2c + \frac{m}{m+n} + \beta - f\left(\frac{b-c}{2}\right)(2\Omega - 1)\mathcal{C} = 0. \tag{3.2}$$

It is straightforward to see that, as long as assumption 2.1 and 2.3 hold, there is no qualitative change in the results, such that $b < x^{FB}$ and $c < c^C$.

Yet there is a quantitative change in the results of the baseline model when $\mathbb{E}[\phi] \neq \frac{1}{k+m+n}$. By applying the Implicit Function Theorem (see appendix B), one can conclude that $\frac{\partial b}{\partial \mathbb{E}[\phi]} > 0$ and $\frac{\partial c}{\partial \mathbb{E}[\phi]} < 0$. This implies that a higher expected value of ϕ makes both b closer to x^{FB} and c farther from x^C – and closer to x^{FB}. The optimal policy of the benevolent type approaches the first-best because now she values more the SVL vis-a-vis being in office. In fact, as $\mathbb{E}[\phi] \to \infty$, the relative value of reelection goes to zero, which implies that $b \to x^{FB}$. For the communist one, there is no direct effect on her first-order condition, such that the only impact is through her best-response function, which is decreasing in b. Thus, as b goes to infinity, the land reforms chosen by both types of politicians become more similar.

Changes in the functional form of the SVL do not change the baseline model results as long as they preserve some standard properties. Any $v(\cdot)$ that guarantees single-peaked preferences and concavity of the politicians' optimization problem is sufficient for the results. In particular, it suffices to assume that exists $x^* \in [0, \frac{m}{m+n})$ such that $v'(x) > 0$ if $x < x^*$, $v'(x) < 0$ if $x > x^*$, and $v''(x) < 0$ for all $x \in [0, \frac{m}{m+n})$. As the utilities of citizens from the three different groups and of both type of politicians depend on $v(\cdot)$, the same reasoning applies to changes in their functional forms. While one can argue that it is too restrictive to assume specific functional forms for the preferences, such an assumption yields closed-solutions, yielding a gain in terms of intuition.

Finally, assumption 2.1 can also be replaced by a less restrictive option. Matsen et al. (2016), for example, assumes that the probability density function $f(\varepsilon)$ is symmetric around zero, everywhere differentiable, satisfies $f'(\cdot) < 0$ for all $\varepsilon > 0$, and $f'(\cdot) > 0$ for all $\varepsilon < 0$. Moreover, the same authors require that the derivative of $f(\varepsilon)$ is not too high (which reduces to an assumption that the variance is not too small if ε has a normal distribution). As aforementioned, the crux of the assumptions is that sufficient noise in the observed policy ensures the concavity of the politicians' maximization problems. Because ε is a shock, it is natural to assume that its distribution is symmetric around zero and bell-shaped.

A bell-shaped distribution ensures that the probability of reelection is sensitive to changes in the magnitude of the land reform. The former is affected by the latter through the updating of voters' beliefs. To see the importance of this requirement, suppose that $\varepsilon \sim \mathcal{U}[-\delta, \delta]$ with $\delta > 0$. This implies $f(\varepsilon) = \frac{1}{2\delta}$, which in turns implies that $f(s-b) = f(s-c) = \frac{1}{2\delta}$. In this case, the signal sent by politicians is not informative. Thus, voters' updated beliefs are equal to their priors ($\mu(s) = \mu$), such that the incumbent is reelected with certainty. As a result, the best choice for benevolent and communist politicians in the first period is $b = x^{FB}$ and $c = x^C$, respectively. Finally, even the Normal distribution may make the probability of reelection little sensitive to policies if the variance is too high. If $\varepsilon \sim \mathcal{N}(0, \sigma^2)$, then $f(\varepsilon) \to 0$ as $\sigma^2 \to \infty$, such that the marginal probability of reelection approaches zero. Such an uninformative signal is also the case when $\Omega = \frac{1}{2}$. Because politicians cannot affect voters' beliefs, their best choices are their respective bliss points.

4 Concluding remarks

Land is the chief productive asset for the world's rural poor and serves as social insurance in the developing world (e.g., by providing not only employment and income but also sustenance, a place to live, insurance for infirmity and age, and security for future generations) (Albertus, 2015). Moreover, because land reform, in general, and land redistribution, in particular, are ongoing in many developing countries, many of which are democracies, there is plenty of room for studies that explore why such policies have been delivered so poorly. The theoretical literature, especially, is sparse and presents many opportunities for advancement.

The theory I present in this paper is both alternative and complementary to the existing literature. The argument is based on the very nature of democracy, namely the electoral incentives incumbents face. When there is sufficient uncertainty in society, candidates try to distance themselves from the image of the type that is undesired by most voters. As a consequence, they choose policies that go too far in the other direction. If people dislike communists, for example, all politicians implement land reforms whose magnitude is lower than what they think is the optimal for society. My model also has the advantage of being tractable and flexible, such that other cases can be analyzed in the same framework.

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A Omitted proofs

A.1 Proposition 2.4

To prove (i), consider the three possibles cases, namely $\mu = \frac{1}{2}$, $\mu > \frac{1}{2}$ and $\mu < \frac{1}{2}$. When $\mu = \frac{1}{2}$, $\mathcal{B} = \mathcal{C} = W + \frac{1}{2}\left(\frac{\beta}{2}\right)^2$. Thus, by subtracting (2.20) from (2.21), one concludes that $c = b + \frac{\beta}{2}$. This implies that $f\left(\frac{c-b}{2}\right) = f\left(\frac{b-c}{2}\right) = f\left(\frac{\beta}{4}\right)$, which yields the following equilibrium:

$$\begin{aligned} b &= x^{FB} - \frac{(2\Omega - 1)\left[W + \frac{1}{2}\left(\frac{\beta}{2}\right)^2\right]}{2} f\left(\frac{\beta}{4}\right) \\ c &= x^{C} - \frac{(2\Omega - 1)\left[W + \frac{1}{2}\left(\frac{\beta}{2}\right)^2\right]}{2} f\left(\frac{\beta}{4}\right), \end{aligned}$$

where $f\left(\frac{\beta}{4}\right) = \frac{e^{\frac{-\beta^2}{32\sigma^2}}}{\sigma\sqrt{2\pi}}$.

The proof for the cases $\mu > \frac{1}{2}$ and $\mu < \frac{1}{2}$ starts by subtracting (2.20) from (2.21) and defining $z = \frac{c-b}{2}$. This yields

$$H(z) \coloneqq 4z - f(z)\,(2\Omega - 1)\,(1 - 2\mu)\left(\frac{\beta}{2}\right)^2 - \beta = 0, \tag{A.1}$$

where I have substituted $\mathcal{B} - \mathcal{C} = (1 - 2\mu)(\beta/2)^2$. Observe that (A.1) is equivalent to

$$\frac{4\,(4z - \beta)}{(2\Omega - 1)\,(1 - 2\mu)\beta^2} = f(z). \tag{A.2}$$

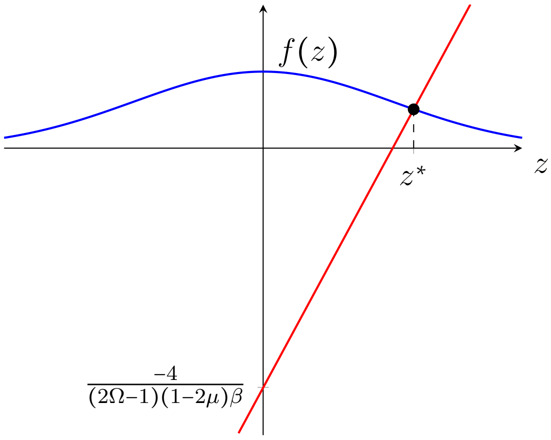
First, suppose that $\mu < \frac{1}{2}$. In this case, while the LHS of (A.2) is a line with a positive slope and a negative intercept, the RHS is the PDF of the Normal distribution $\mathcal{N}(0, \sigma^2)$. As Figure 1 suggests, existence and uniqueness of the solution are guaranteed by the shape of the two functions.

To prove the above statements formally, let me invoke the Intermediate Value Theorem. For, first notice that, when $\mu < \frac{1}{2}$, $H(z) < 0$ for all $z \leq 0$ as the fist term in (A.1) is non-positive and the other two are negative. In addition, because $\lim_{z\to+\infty} f(z) = 0$, it is the case that $\lim_{z\to+\infty} H(z) = +\infty$. Given that $H(z)$ is continuous, there exists at least one $z^* > 0$ such that $H(z^*) = 0$. To ensure uniqueness, it suffices to show that

$$H'(z) = 4 - f'(z)\,(2\Omega - 1)\,(1 - 2\mu)\left(\frac{\beta}{2}\right)^2 > 0$$

for all $z > 0$. This result follows from the fact that $f'(z) < 0$ for all $z > 0$. This argument does not only prove that there exists a unique pair (b, c) that solves system (2.20)-(2.21), but also demonstrates that $b < c$ as $z = (c - b)/2$.

Figure 1: Existence and uniqueness of the equilibrium when $\mu < \frac{1}{2}$

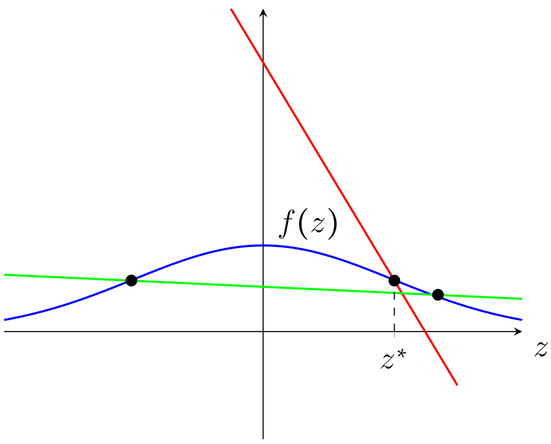


Suppose now that $\mu > \frac{1}{2}$. In this case, the LHS of (A.2) is a a line with a negative slope and a positive intercept. Figure 2 shows that, although existence is not an issue, there is the possibility of multiple equilibria. Yet a sufficient condition for uniqueness can be imposed by requiring that the intercept of LHS of (A.2) be higher than $f(0)$. Thus, it suffices to require

$$\sigma > \frac{(2\Omega - 1)(2\mu - 1)\beta}{4\sqrt{2\pi}} \coloneqq \sigma_1. \tag{A.3}$$

One can see in figure 2 that this case is represented by the red curve. The green curve represents the case with small variance and multiple equilibria.

Figure 2: Existence and uniqueness of the equilibrium when $\mu > \frac{1}{2}$



Formally, when $\mu > \frac{1}{2}$, it is the case that $\lim_{z\to-\infty} H(z) = -\infty$ and $\lim_{z\to+\infty} H(z) = +\infty$. In addition,

$$H'(z) = 4 + f'(z)(2\Omega - 1)(2\mu - 1)\left(\frac{\beta}{2}\right)^2 > 0$$

for all $z \leq 0$. For $z > 0$, the above inequality holds if $|f'(z)|$ is bound from above. Given that $-f'(z)$ achieves its maximum at $z = \sigma$, it suffices to impose $\frac{16}{(2\Omega-1)(2\mu-1)\beta^2} > -f'(\sigma)$.

This is equivalent to

$$\sigma > \frac{\sqrt{(2\Omega-1)\,(2\mu-1)}\beta}{4\,(2\pi e)^{\frac{1}{4}}} \coloneqq \sigma_2. \tag{A.4}$$

If (A.4) holds, then the Intermediate Value Theorem can be applied, such that there exists a unique z^* satisfying (A.1). Because $H'(0) > 0$, it is the case that $z^* > 0$. Once again, the uniqueness of the solution ensures that $b < c$.

Claim (ii) is partially proven in the text. Observe that $c < x^C < \frac{m}{m+n}$ as $\beta < \frac{m}{m+n}$. To prove that $b > 0$, it is sufficient to guarantee that the marginal utility of the benevolent type is positive when $b = 0$, that is,

$$\frac{m}{m+n} - f\left(\frac{c}{2}\right)(2\Omega-1)\,\mathcal{B} > 0. \tag{A.5}$$

Because $f(0)$ is the maximum value of $f(\cdot)$, the above inequality holds if $f(0) < \left(\frac{m}{m+n}\right)\frac{1}{(2\Omega-1)\mathcal{B}}$. This is equivalent to

$$\sigma > \frac{(2\Omega-1)\left[W+\left(\frac{\beta}{2}\right)^2(1-\mu)\right]}{\left(\frac{m}{m+n}\right)\sqrt{2\pi}} \coloneqq \sigma_3,$$

where I have substituted $\mathcal{B} = W + \left(\frac{\beta}{2}\right)^2(1-\mu)$.

It only remains to show that the equilibrium (b, c) satisfies the second-order condition for both types of politician. In other words, one needs to show that:

$$-2 + \frac{1}{2}f'\left(\frac{c-b}{2}\right)(2\Omega-1)\,\mathcal{B} \;<\; 0 \tag{A.6}$$

$$-2 + \frac{1}{2}f'\left(\frac{b-c}{2}\right)(2\Omega-1)\,\mathcal{C} \;<\; 0. \tag{A.7}$$

While $f'\left(\frac{c-b}{2}\right) < 0$ for $c > b$ guarantees that (A.6) holds, $f'\left(\frac{b-c}{2}\right) > 0$ for $c > b$ creates the need for an additional assumption to guarantee that (A.7) also holds. Given that (A.7) is equivalent to

$$f'\left(\frac{b-c}{2}\right) < \frac{4}{(2\Omega-1)\,\mathcal{C}},$$

it suffices to find an upper bound for $f'(\cdot)$ to obtain the result. As the maximum value that $f'(\cdot)$ achieves is $f'(-\sigma) = \left(\sigma^2\sqrt{2\pi e}\right)$, one must requires

$$\sigma > \frac{\sqrt{(2\Omega-1)\left[W+\mu\left(\frac{\beta}{2}\right)^2\right]}}{2\,(2\pi e)^{\frac{1}{4}}} ::= \sigma_4, \tag{A.8}$$

where I have substituted $\mathcal{C} = W + \mu\left(\frac{\beta}{2}\right)^2$.

Finally, let me define $\bar{\sigma} \coloneqq \max\{\sigma_1, \sigma_2, \sigma_3, \sigma_4\}$. By assuming that $\sigma > \bar{\sigma}$, the proof is complete. ∎

A.2 Proposition 2.5

To show (i), one must first find the determinant of the Hessian matrix of the politicians' problem:

$$\begin{aligned} |\mathcal{H}(b,c)| &= \begin{vmatrix} -2+\frac{1}{2}f'\left(\frac{c-b}{2}\right)(2\Omega-1)\mathcal{B} & -\frac{1}{2}f'\left(\frac{c-b}{2}\right)(2\Omega-1)\mathcal{B} \\ -\frac{1}{2}f'\left(\frac{b-c}{2}\right)(2\Omega-1)\mathcal{C} & -2+\frac{1}{2}f'\left(\frac{b-c}{2}\right)(2\Omega-1)\mathcal{C} \end{vmatrix} \\ &= -\left[-2+\frac{1}{2}f'\left(\frac{c-b}{2}\right)(2\Omega-1)\mathcal{B}\right]-\left[-2+\frac{1}{2}f'\left(\frac{b-c}{2}\right)(2\Omega-1)\mathcal{C}\right]>0 \end{aligned}$$

because of the second-order conditions are satisfied (see the proof of Proposition 2.4).

Now, let me denote the LHS of (2.20) and (2.21) by h^B and h^C, respectively. Then, consider the following derivatives:

$$\begin{aligned} \frac{\partial h^B}{\partial W} &= -f\left(\frac{c-b}{2}\right)(2\Omega-1)<0 \\ \frac{\partial h^C}{\partial W} &= -f\left(\frac{b-c}{2}\right)(2\Omega-1)<0. \end{aligned}$$

By applying the Implicit Function Theorem, one has

$$\frac{db}{dW} = -\frac{\begin{vmatrix} -f\left(\frac{c-b}{2}\right)(2\Omega-1) & -\frac{1}{2}f'\left(\frac{c-b}{2}\right)(2\Omega-1)\mathcal{B} \\ -f\left(\frac{b-c}{2}\right)(2\Omega-1) & -2+\frac{1}{2}f'\left(\frac{b-c}{2}\right)(2\Omega-1)\mathcal{C} \end{vmatrix}}{|\mathcal{H}(b,c)|} \tag{A.9}$$

$$\frac{dc}{dW} = -\frac{\begin{vmatrix} -2+\frac{1}{2}f'\left(\frac{c-b}{2}\right)(2\Omega-1)\mathcal{B} & -f\left(\frac{c-b}{2}\right)(2\Omega-1) \\ -\frac{1}{2}f'\left(\frac{b-c}{2}\right)(2\Omega-1)\mathcal{C} & -f\left(\frac{b-c}{2}\right)(2\Omega-1) \end{vmatrix}}{|\mathcal{H}(b,c)|}. \tag{A.10}$$

Because $-|\mathcal{H}(b,c)|<0$, the signal of $-\frac{db}{dW}$ ($-\frac{dc}{dW}$, respectively) is the same of the determinant in the numerator in (A.9) ((A.10)). For (A.9),

$$\begin{aligned} &\begin{vmatrix} -f\left(\frac{c-b}{2}\right)(2\Omega-1) & -\frac{1}{2}f'\left(\frac{c-b}{2}\right)(2\Omega-1)\mathcal{B} \\ -f\left(\frac{b-c}{2}\right)(2\Omega-1) & -2+\frac{1}{2}f'\left(\frac{b-c}{2}\right)(2\Omega-1)\mathcal{C} \end{vmatrix} = -f\left(\frac{c-b}{2}\right)(2\Omega-1) \\ &\cdot\left[-2+\frac{1}{2}f'\left(\frac{b-c}{2}\right)(2\Omega-1)\mathcal{C}+\frac{1}{2}f'\left(\frac{c-b}{2}\right)(2\Omega-1)\mathcal{B}\right]>0 \end{aligned}$$

as $f'\left(\frac{c-b}{2}\right)<0$ for $b<c$ and the second-order condition is satisfied. This implies that $\frac{db}{dW}<0$.

Finally, for (A.10),

$$\begin{aligned} &\begin{vmatrix} -2+\frac{1}{2}f'\left(\frac{c-b}{2}\right)(2\Omega-1)\mathcal{B} & -f\left(\frac{c-b}{2}\right)(2\Omega-1) \\ -\frac{1}{2}f'\left(\frac{b-c}{2}\right)(2\Omega-1)\mathcal{C} & -f\left(\frac{b-c}{2}\right)(2\Omega-1) \end{vmatrix} = -f\left(\frac{c-b}{2}\right)(2\Omega-1) \\ &\cdot\left[-2+\frac{1}{2}f'\left(\frac{c-b}{2}\right)(2\Omega-1)\mathcal{B}+\frac{1}{2}f'\left(\frac{b-c}{2}\right)(2\Omega-1)\mathcal{C}\right]>0. \end{aligned}$$

This implies that $\frac{dc}{dW} < 0$. I have therefore proven that the higher the benefits from holding office, the lower is the magnitude of the land reform implemented by both types of politician.

For item (ii), suppose that $W = 0$ and observe that the highest utility a communist politician who chooses $x_1 < x^{FB}$ can obtain is $\hat{v}(x_1) + \hat{v}(x^C)$. This occurs when she is re-elected with probability one. Yet, she can always obtain $\hat{v}(x^C) + \hat{v}(x^{FB})$ by choosing $x_1 = x^C$. This occurs when she loses the election for a benevolent politician with probability one. Given the strict concavity of $\hat{v}(\cdot)$, it is the case that $\hat{v}(x^{FB}) > \hat{v}(x_1)$ for all $x_1 < x^{FB}$. As a consequence, $x_1 = x^C$ would be a profitable deviation, and thus $x_1 < x^{FB}$ may not hold in an equilibrium if $W = 0$.

Finally, item (iii) may be proven by contradiction. The first step is to combine (2.20) and (2.21) to obtain:

$$b = x^{FB} + \frac{\mathcal{B}}{2\mathcal{C}}\left(2c - \frac{m}{m+n} - \beta\right), \tag{A.11}$$

where I have substituted the value of x^{FB}. One can substitute (A.11) into (2.21) to obtain:

$$-2c + \frac{m}{m+n} + \beta = (2\Omega - 1)\,\mathcal{C} f\left(\frac{1}{2}\left[x^{FB} - \frac{\mathcal{B}}{\mathcal{C}}x^C + \frac{c}{\mathcal{C}}(\mathcal{B} - \mathcal{C})\right]\right), \tag{A.12}$$

where I have substituted the value of x^C.

Suppose now that the magnitude of the land reform implemented by communist politicians is bound from below, such that $c > K$, where K is a constant. This implies that the argument of f is also bounded from below:

$$\frac{1}{2}\left[x^{FB} - \frac{\mathcal{B}}{\mathcal{C}}x^C + \frac{c}{\mathcal{C}}(\mathcal{B} - \mathcal{C})\right] > \hat{K} \coloneqq \frac{1}{2}\left[x^{FB} - \frac{\mathcal{B}}{\mathcal{C}}x^C + \frac{K}{\mathcal{C}}(\mathcal{B} - \mathcal{C})\right]. \tag{A.13}$$

Because $\lim_{W \to +\infty} \mathcal{C} = +\infty$, (A.6) implies that the RHS of (A.12) goes to infinity as well. Thus, the LHS must also go to infinity to hold the equality in (A.12), which requires that $c \to -\infty$. But this contradicts the initial statement that the magnitude of the land reform implemented by communist politicians is bound from below. As a consequence, there exists a $\bar{W} > 0$ such that, for $W > \bar{W}$, $c < x^{FB}$. ■

A.3 Proposition 2.6

Consider the following derivatives:

$$\begin{aligned}
\frac{\partial h^B}{\partial \Omega} &= -2f\left(\frac{c-b}{2}\right)\mathcal{B} < 0 \\
\frac{\partial h^C}{\partial \Omega} &= -2f\left(\frac{c-b}{2}\right)\mathcal{C} < 0,
\end{aligned}$$

where I have used the symmetry of $f(\cdot)$. By applying the Implicit Function Theorem, one has

$$\frac{db}{d\Omega} = -\frac{\begin{vmatrix} -2f\left(\frac{c-b}{2}\right)\mathcal{B} & -\frac{1}{2}f'\left(\frac{c-b}{2}\right)(2\Omega-1)\mathcal{B} \\ -2f\left(\frac{c-b}{2}\right)\mathcal{C} & -2+\frac{1}{2}f'\left(\frac{b-c}{2}\right)(2\Omega-1)\mathcal{C} \end{vmatrix}}{|\mathcal{H}(b,c)|} = -\frac{4f\left(\frac{c-b}{2}\right)\mathcal{B}}{|\mathcal{H}(b,c)|} < 0 \tag{A.14}$$

$$\frac{dc}{d\Omega} = -\frac{\begin{vmatrix} -2+\frac{1}{2}f'\left(\frac{c-b}{2}\right)(2\Omega-1)\mathcal{B} & -2f\left(\frac{c-b}{2}\right)\mathcal{B} \\ -\frac{1}{2}f'\left(\frac{b-c}{2}\right)(2\Omega-1)\mathcal{C} & -2f\left(\frac{c-b}{2}\right)\mathcal{C} \end{vmatrix}}{|\mathcal{H}(b,c)|} = -\frac{4f\left(\frac{c-b}{2}\right)\mathcal{C}}{|\mathcal{H}(b,c)|} < 0, \tag{A.15}$$

because $|\mathcal{H}(b,c)| > 0$, $\mathcal{B} > 0$ and $\mathcal{C} > 0$. ■

A.4 Proposition 2.7

Consider the following derivatives:

$$\begin{aligned} \frac{\partial h^B}{\partial \mu} &= f\left(\frac{c-b}{2}\right)(2\Omega-1)\left(\frac{\beta}{2}\right)^2 > 0 \\ \frac{\partial h^C}{\partial \mu} &= -f\left(\frac{c-b}{2}\right)(2\Omega-1)\left(\frac{\beta}{2}\right)^2 < 0, \end{aligned}$$

where I have used the symmetry of $f(\cdot)$ and substituted $V\left(x^{FB}\right) - V\left(x^{C}\right) = \hat{v}\left(x^{C}\right) - v\left(x^{FB}\right) = (\beta/2)^2$. By applying the Implicit Function Theorem, one has

$$\frac{db}{d\mu} = -\frac{\begin{vmatrix} f\left(\frac{c-b}{2}\right)(2\Omega-1)\left(\frac{\beta}{2}\right)^2 & -\frac{1}{2}f'\left(\frac{c-b}{2}\right)(2\Omega-1)\mathcal{B} \\ -f\left(\frac{c-b}{2}\right)(2\Omega-1)\left(\frac{\beta}{2}\right)^2 & -2+\frac{1}{2}f'\left(\frac{b-c}{2}\right)(2\Omega-1)\mathcal{C} \end{vmatrix}}{|\mathcal{H}(b,c)|} \tag{A.16}$$

$$\frac{dc}{d\mu} = -\frac{\begin{vmatrix} -2+\frac{1}{2}f'\left(\frac{c-b}{2}\right)(2\Omega-1)\mathcal{B} & f\left(\frac{c-b}{2}\right)(2\Omega-1)\left(\frac{\beta}{2}\right)^2 \\ -\frac{1}{2}f'\left(\frac{b-c}{2}\right)(2\Omega-1)\mathcal{C} & -f\left(\frac{c-b}{2}\right)(2\Omega-1)\left(\frac{\beta}{2}\right)^2 \end{vmatrix}}{|\mathcal{H}(b,c)|}. \tag{A.17}$$

Because $-|\mathcal{H}(b,c)| < 0$, the signal of $-\frac{db}{d\mu}$ ($-\frac{dc}{d\mu}$, respectively) is the same of the determinant in the numerator in (A.16) ((A.17)). For (A.16),

$$\begin{vmatrix} f\left(\frac{c-b}{2}\right)(2\Omega-1)\left(\frac{\beta}{2}\right)^2 & -\frac{1}{2}f'\left(\frac{c-b}{2}\right)(2\Omega-1)\mathcal{B} \\ -f\left(\frac{c-b}{2}\right)(2\Omega-1)\left(\frac{\beta}{2}\right)^2 & -2+\frac{1}{2}f'\left(\frac{b-c}{2}\right)(2\Omega-1)\mathcal{C} \end{vmatrix} = f\left(\frac{c-b}{2}\right)(2\Omega-1)\left(\frac{\beta}{2}\right)^2 \cdot\left[-2+\frac{1}{2}f'\left(\frac{b-c}{2}\right)(2\Omega-1)\mathcal{C} - \frac{1}{2}f'\left(\frac{c-b}{2}\right)(2\Omega-1)\mathcal{B}\right].$$

Because $\frac{1}{2}f'\left(\frac{c-b}{2}\right)(2\Omega-1)\mathcal{B}<0$ for $b<c$ and $-2+\frac{1}{2}f'\left(\frac{b-c}{2}\right)(2\Omega-1)\mathcal{C}<0$ by assumption 2.1, the signal of the determinant is ambiguous. To obtain $\frac{db}{d\mu}>0$, it is sufficient that

$$f'\left(\frac{b-c}{2}\right)<\frac{4}{(2\Omega-1)(\mathcal{B}+\mathcal{C})}<\frac{4}{(2\Omega-1)\mathcal{C}}.$$

One can now use the same reasoning applied to the proof of Proposition 2.4 to show that the above condition is satisfied if $\sigma>\sigma_5:=\frac{\sqrt{(2\Omega-1)\left[2W+\left(\frac{\beta}{2}\right)^2\right]}}{2(2\pi e)^{\frac{1}{4}}}>\sigma_4$ (see equation (A.8)). This proves item (ii).

For item (i), notice that

$$\begin{vmatrix}-2+\frac{1}{2}f'\left(\frac{c-b}{2}\right)(2\Omega-1)\mathcal{B} & f\left(\frac{c-b}{2}\right)(2\Omega-1)\left(\frac{\beta}{2}\right)^2\\ -\frac{1}{2}f'\left(\frac{b-c}{2}\right)(2\Omega-1)\mathcal{C} & -f\left(\frac{c-b}{2}\right)(2\Omega-1)\left(\frac{\beta}{2}\right)^2\end{vmatrix}=-f\left(\frac{c-b}{2}\right)(2\Omega-1)\left(\frac{\beta}{2}\right)^2$$
$$\cdot\left[-2+\frac{1}{2}f'\left(\frac{c-b}{2}\right)(2\Omega-1)\mathcal{B}-\frac{1}{2}f'\left(\frac{b-c}{2}\right)(2\Omega-1)\mathcal{C}\right]>0$$

as $-2+\frac{1}{2}f'\left(\frac{c-b}{2}\right)(2\Omega-1)\mathcal{B}<0$ by assumption 2.1 and $f'\left(\frac{b-c}{2}\right)>0$ for $b<c$. This implies that $\frac{dc}{d\mu}<0$, which concludes the proof. ■

A.5 Proposition 2.8

Consider the following derivatives:

$$\begin{aligned}\frac{\partial h^B}{\partial\beta} &= -f\left(\frac{c-b}{2}\right)\left[\frac{4T}{\beta^2(k+m+n)}g\left(\frac{2T}{\beta m}\right)\mathcal{B}+(2\Omega-1)(1-\mu)\frac{\beta}{2}\right]\\ \frac{\partial h^C}{\partial\beta} &= 1-f\left(\frac{c-b}{2}\right)\left[\frac{4T}{\beta^2(k+m+n)}g\left(\frac{2T}{\beta m}\right)\mathcal{C}+(2\Omega-1)\mu\frac{\beta}{2}\right],\end{aligned}$$

where where I have used the symmetry of $f(\cdot)$, and substituted $\frac{\partial\Omega}{\partial\beta}=\frac{2T}{\beta^2(k+m+n)}g\left(\frac{2T}{\beta m}\right)$, $\frac{\partial\mathcal{B}}{\partial\beta}=(1-\mu)\frac{\beta}{2}$ and $\frac{\partial\mathcal{C}}{\partial\beta}=\mu\frac{\beta}{2}$. By applying the Implicit Function Theorem, one has

$$\begin{aligned}\frac{db}{d\beta} &= -\frac{\begin{vmatrix}-f\left(\frac{c-b}{2}\right)\left[\frac{4T}{\beta^2(k+m+n)}g\left(\frac{2T}{\beta m}\right)\mathcal{B}+(2\Omega-1)(1-\mu)\frac{\beta}{2}\right] & -\frac{1}{2}f'\left(\frac{c-b}{2}\right)(2\Omega-1)\mathcal{B}\\ 1-f\left(\frac{c-b}{2}\right)\left[\frac{4T}{\beta^2(k+m+n)}g\left(\frac{2T}{\beta m}\right)\mathcal{C}+(2\Omega-1)\mu\frac{\beta}{2}\right] & -2+\frac{1}{2}f'\left(\frac{b-c}{2}\right)(2\Omega-1)\mathcal{C}\end{vmatrix}}{|\mathcal{H}(b,c)|}\\ \frac{dc}{d\beta} &= -\frac{\begin{vmatrix}-2+\frac{1}{2}f'\left(\frac{c-b}{2}\right)(2\Omega-1)\mathcal{B} & -f\left(\frac{c-b}{2}\right)\left[\frac{4T}{\beta^2(k+m+n)}g\left(\frac{2T}{\beta m}\right)\mathcal{B}+(2\Omega-1)(1-\mu)\frac{\beta}{2}\right]\\ -\frac{1}{2}f'\left(\frac{b-c}{2}\right)(2\Omega-1)\mathcal{C} & 1-f\left(\frac{c-b}{2}\right)\left[\frac{4T}{\beta^2(k+m+n)}g\left(\frac{2T}{\beta m}\right)\mathcal{C}+(2\Omega-1)\mu\frac{\beta}{2}\right]\end{vmatrix}}{|\mathcal{H}(b,c)|}.\end{aligned}$$

Observe that

$$\begin{vmatrix} -f\left(\frac{c-b}{2}\right)\left[\frac{4T}{\beta^2(k+m+n)}g\left(\frac{2T}{\beta m}\right)\mathcal{B}+(2\Omega-1)(1-\mu)\frac{\beta}{2}\right] & -\frac{1}{2}f'\left(\frac{c-b}{2}\right)(2\Omega-1)\mathcal{B} \\ 1-f\left(\frac{c-b}{2}\right)\left[\frac{4T}{\beta^2(k+m+n)}g\left(\frac{2T}{\beta m}\right)\mathcal{C}+(2\Omega-1)\mu\frac{\beta}{2}\right] & -2+\frac{1}{2}f'\left(\frac{b-c}{2}\right)(2\Omega-1)\mathcal{C} \end{vmatrix}$$

$$\begin{aligned} &= -\frac{1}{2}f'\left(\frac{c-b}{2}\right)(2\Omega-1)\Bigg(f\left(\frac{c-b}{2}\right)\Bigg\{\left[\frac{4T}{\beta^2(k+m+n)}g\left(\frac{2T}{\beta m}\right)\mathcal{B}+(2\Omega-1)(1-\mu)\frac{\beta}{2}\right]\mathcal{C} \\ &\qquad -\left[\frac{4T}{\beta^2(k+m+n)}g\left(\frac{2T}{\beta m}\right)\mathcal{C}+(2\Omega-1)\mu\frac{\beta}{2}\right]\mathcal{B}\Bigg\}+\mathcal{B}\Bigg) \\ &\qquad +2f\left(\frac{c-b}{2}\right)\left[\frac{4T}{\beta^2(k+m+n)}g\left(\frac{2T}{\beta m}\right)\mathcal{B}+(2\Omega-1)(1-\mu)\frac{\beta}{2}\right], \end{aligned}$$

where I have used the symmetry of $f(\cdot)$. If $\Omega=\frac{1}{2}$, then the RHS of the above expression becomes $2f\left(\frac{c-b}{2}\right)\frac{4T}{\beta^2(k+m+n)}g\left(\frac{2T}{\beta m}\right)\mathcal{B}>0$. Therefore, by continuity, there exists an open ball $B\left(\frac{1}{2},\varepsilon_1\right)=(-\varepsilon_1,\varepsilon_1)$ such that if $\Omega\in B\left(\frac{1}{2},\varepsilon_1\right)$, then the RHS continues to be positive. This implies that $\frac{db}{d\beta}<0$, which proves claim (i).

To prove claim (ii), notice that

$$\begin{vmatrix} -2+\frac{1}{2}f'\left(\frac{c-b}{2}\right)(2\Omega-1)\mathcal{B} & -f\left(\frac{c-b}{2}\right)\left[\frac{4T}{\beta^2(k+m+n)}g\left(\frac{2T}{\beta m}\right)\mathcal{B}+(2\Omega-1)(1-\mu)\frac{\beta}{2}\right] \\ -\frac{1}{2}f'\left(\frac{b-c}{2}\right)(2\Omega-1)\mathcal{C} & 1-f\left(\frac{c-b}{2}\right)\left[\frac{4T}{\beta^2(k+m+n)}g\left(\frac{2T}{\beta m}\right)\mathcal{C}+(2\Omega-1)\mu\frac{\beta}{2}\right] \end{vmatrix}$$

$$\begin{aligned} &= -\frac{1}{2}f'\left(\frac{b-c}{2}\right)(2\Omega-1)\Bigg(\left\{1-f\left(\frac{c-b}{2}\right)\left[\frac{4T}{\beta^2(k+m+n)}g\left(\frac{2T}{\beta m}\right)\mathcal{C}+(2\Omega-1)\mu\frac{\beta}{2}\right]\right\}\mathcal{B} \\ &\qquad +f\left(\frac{c-b}{2}\right)\left[\frac{4T}{\beta^2(k+m+n)}g\left(\frac{2T}{\beta m}\right)\mathcal{B}+(2\Omega-1)(1-\mu)\frac{\beta}{2}\right]\mathcal{C}\Bigg) \\ &\qquad -2\left\{1-f\left(\frac{c-b}{2}\right)\left[\frac{4T}{\beta^2(k+m+n)}g\left(\frac{2T}{\beta m}\right)\mathcal{C}+(2\Omega-1)\mu\frac{\beta}{2}\right]\right\}. \end{aligned}$$

If $\Omega=\frac{1}{2}$, then the RHS of the above expression becomes $-2\left[1-f\left(\frac{c-b}{2}\right)\frac{4T}{\beta^2(k+m+n)}g\left(\frac{2T}{\beta m}\right)\mathcal{C}\right]$. There exists, therefore, an open ball $B\left(\frac{1}{2},\varepsilon_2\right)$ such that if $\Omega\in B\left(\frac{1}{2},\varepsilon_2\right)$, the above determinant's sign is the same as in $-2\left[1-f\left(\frac{c-b}{2}\right)\frac{4T}{\beta^2(k+m+n)}g\left(\frac{2T}{\beta m}\right)\mathcal{C}\right]$. Thus, a sufficient condition for $\frac{dc}{d\beta}>0$ is

$$f\left(\frac{c-b}{2}\right)<\left[\frac{4T}{\beta^2(k+m+n)}g\left(\frac{2T}{\beta m}\right)\mathcal{C}\right]^{-1}. \tag{A.18}$$

Once again, it suffices to impose that $f(0)$ is sufficiently low. In fact, condition (A.18) is satisfied if

$$\sigma>\frac{4Tg\left(\frac{2T}{\beta m}\right)\mathcal{C}}{\sqrt{2\pi}\beta^2(k+m+n)}\coloneqq\sigma_6, \tag{A.19}$$

where I have substituted $\mathcal{C}=W+\mu\left(\frac{\beta}{2}\right)^2$. Finally, the proof is complete by setting $\varepsilon=\min\{\varepsilon_1,\varepsilon_2\}$. ■

A.6 Proposition 2.10

Existence and uniqueness can be proven following the same steps as in Appendix A.1. The fact that $b < c$ is also proven following such steps. An important remark is that, because $2\Omega - 1 < 0$, the sign of both intercept and slope of the line defined in the LHS of (A.2) have changed, such that cases $\mu < \frac{1}{2}$ and $\mu > \frac{1}{2}$ are now represented by figure 2 and 1, respectively. It only remains to guarantee that $c < \frac{m}{m+n}$ and that the equilibrium (b, c) satisfies the second-order condition.

For $c < \frac{m}{m+n}$, it suffices to require that

$$-2\left(\frac{m}{m+n}\right) + \frac{m}{m+n} + \beta + f\left(\frac{b - \frac{m}{m+n}}{2}\right)(1 - 2\Omega)\,\mathcal{C} < 0,$$

which is equivalent to

$$f\left(\frac{b - \frac{m}{m+n}}{2}\right) < \frac{\frac{m}{m+n} - \beta}{(1 - 2\Omega)\,\mathcal{C}}.$$

By employing the same reasoning used in the previous proof, one can find a sufficient condition for the above inequality to hold:

$$\sigma > \frac{(1 - 2\Omega)\,\mathcal{C}}{\left(\frac{m}{m+n} - \beta\right)\sqrt{2\pi}} \coloneqq \sigma_7. \tag{A.20}$$

Observe that, when $\Omega < \frac{1}{2}$, (A.7) holds as $b < c$. However, (A.6) is no longer true. Thus, the second-order condition is satisfied if

$$f'\left(\frac{b - c}{2}\right) < \frac{4}{(1 - 2\Omega)\,\mathcal{B}},$$

where I have used the symmetry of $f(\cdot)$. A sufficient condition for the above inequality to hold is

$$\sigma > \frac{\sqrt{(1 - 2\Omega)\left[W + (1 - \mu)\left(\frac{\beta}{2}\right)^2\right]}}{2\,(2\pi e)^{\frac{1}{4}}} ::= \sigma_8, \tag{A.21}$$

where I have substituted $\mathcal{B} = W + (1 - \mu)\left(\frac{\beta}{2}\right)$. Finally, let me define $\hat{\sigma} \coloneqq \max\{\sigma_1, \sigma_2, \sigma_7, \sigma_8\}$. By assuming that $\sigma > \bar{\sigma}$, the proof is complete. ∎

B Changes in $\mathbb{E}[\phi]$

Let

$$|\bar{\mathcal{H}}| = \begin{vmatrix} -2(k + m + n)\mathbb{E}[\phi] + \frac{1}{2}f'\left(\frac{c-b}{2}\right)(2\Omega - 1)\mathcal{B} & -\frac{1}{2}f'\left(\frac{c-b}{2}\right)(2\Omega - 1)\mathcal{B} \\ -\frac{1}{2}f'\left(\frac{b-c}{2}\right)(2\Omega - 1)\mathcal{C} & -2 + \frac{1}{2}f'\left(\frac{b-c}{2}\right)(2\Omega - 1)\mathcal{C} \end{vmatrix}$$

be the determinant of the Hessian matrix associated with the politicians' optimization problems. Assumption 2.1 implies that $|\bar{\mathcal{H}}| > 0$ (see appendix A.1). By applying the Implicit Function Theorem, one has the following derivatives

$$\begin{aligned}
\frac{db}{d\mathbb{E}\left[\phi\right]} &= -\frac{\begin{vmatrix} (k+m+n)\left(-2b+\frac{m}{m+n}\right) & -\frac{1}{2}f'\left(\frac{c-b}{2}\right)(2\Omega-1)\mathcal{B} \\ 0 & -2+\frac{1}{2}f'\left(\frac{b-c}{2}\right)(2\Omega-1)\mathcal{C} \end{vmatrix}}{|\bar{\mathcal{H}}|} \\
&= -\frac{1}{|\bar{\mathcal{H}}|}\left\{\left[(k+m+n)\left(-2b+\frac{m}{m+n}\right)\right]\left(-2+\frac{1}{2}f'\left(\frac{b-c}{2}\right)(2\Omega-1)\mathcal{C}\right)\right\} > 0,
\end{aligned}$$

and

$$\begin{aligned}
\frac{dc}{d\mathbb{E}\left[\phi\right]} &= -\frac{\begin{vmatrix} -2(k+m+n)\mathbb{E}\left[\phi\right]+\frac{1}{2}f'\left(\frac{c-b}{2}\right)(2\Omega-1)\mathcal{B} & (k+m+n)\left(-2b+\frac{m}{m+n}\right) \\ -\frac{1}{2}f'\left(\frac{b-c}{2}\right)(2\Omega-1)\mathcal{C} & 0 \end{vmatrix}}{|\bar{\mathcal{H}}|} \\
&= -\frac{1}{|\bar{\mathcal{H}}|}\left[(-1)\left(-2b+\frac{m}{m+n}\right)\left(-\frac{1}{2}f'\left(\frac{b-c}{2}\right)(2\Omega-1)\mathcal{C}\right)\right] < 0,
\end{aligned}$$

where I have used assumption 2.1 and the fact that $b < x^{FB}$.