When Populism Meets Globalization: Analysis of Tax Competition*

Satoshi Kasamatsu† and Daiki Kishishita‡

First version: April 6, 2018 Current version: May 16, 2018

Abstract

An important feature of populism is the preference for extreme economic policy. We study the causes and consequences of the extreme reduction of tax rates—a feature of right-wing populism—in the age of globalization. To this end, we construct a two-country tax competition model in which the residents in one of the two countries do not know their policy-maker's type (benevolent or leviathan). We show that a politician who implements extremely low taxation acquires a good reputation and thus a populist taxation policy arises when s/he has reputation (i.e., reelection) concerns. Furthermore, we show that globalization (an increase in the mobility of tax bases across countries) alters the properties of this populism. In particular, reputation concerns inducing populism can improve the country's welfare under tax competition, whereas that is not the case in a closed economy. This welfare-enhancing effect of populism under tax competition is obtained when the productivity of this country is sufficiently lower than that of the other country.

Keywords: Tax competition; Populism; Reputation; Signaling; Leviathan

JEL classification: D72; F21; H20; H73; H87

*We would like to thank Hikaru Ogawa for his discussions and advice. We are also grateful to Martin Besfamille, Susumu Sato, Tsuyoshi Shinozaki, and Atsushi Yamagishi as well as the seminar participants at Keio University, University of Tsukuba, and Doshisha University for their helpful comments. Kasamatsu was financially supported by JSPS Grant-in-Aid for JSPS Research Fellows (16J02563). Kishishita was financially supported by JSPS Grant-in-Aid for JSPS Research Fellows (17J02113). All remaining errors are our own.

†Graduate School of Economics, The University of Tokyo. JSPS Research Fellow (DC1). 7-3-1, Hongo, Bunkyo-ku, Tokyo, Japan. 113-0033. E-mail: kasamatsu00@gmail.com

‡Graduate School of Economics, The University of Tokyo. JSPS Research Fellow (DC1). 7-3-1, Hongo, Bunkyo-ku, Tokyo, Japan. 113-0033. E-mail: daiki.kishishita@gmail.com

1 Introduction

An important feature of populism, which is on the rise in many countries, is the preference for extreme economic policies. The aim of this study is to examine extremely low taxation as a populist economic policy. In particular, using the framework of capital tax competition, we investigate the consequences of populism by focusing on its connection with globalization.

Populists often favor extreme policies even though such actions seem to be harmful to the majority of voters. Nonetheless, populists are supported by a large number of voters. This paradoxical phenomenon—extremism with strong support by citizens—is an important feature of populism. Populists' fiscal policies are often particularly extreme. For example, while left-wing populists seek extreme income redistribution, right-wing populists often argue for anti-taxation. The 45th U.S. President Donald Trump, who is regarded as a right-wing populist (Steger 2017), promised to reduce corporate tax rates in the 2016 presidential election. This taxation policy is sometimes criticized as a populist one.[1] Such right-wing populism partly characterized by anti-taxation is longstanding. For instance, in the 1990s, right-wing populism strongly connected with neoliberal economic policies emerged in Latin America (Roberts 1995) and Western Europe (Betz 1993).[2] Other cases include the Tea Party in the United States (Formisano 2012), market populism in Canada such as argued by the Harper government (Sawer and Laycock 2009), and neoliberal populism in Japan that emerged in the 2000s and 2010s (Weathers 2014; Lindgren 2015). In the present study, we focus on the taxation policy of right-wing populism characterized by extremely low taxation and investigate its consequences.

In exploring this objective, we pay special attention to the effect of globalization since it changes the nature of taxation policies drastically. Recent globalization has enabled production factors to move across countries at low cost, implying that tax bases such as capital are now mobile. This increased mobility results in severe international tax competition, which is characterized as a race to the bottom (e.g., Devereux, Lockwood, and Redoano 2008).[3] Indeed, corporate tax rates have tended to decline (Keen and Konrad 2013: Figure 1) and policymakers (as well as academic researchers) have thus paid much attention to tax competition concerns in the determination of taxation policies.[4] As such, globalization affects taxation policies. Hence,

[1] We do not intend to argue that his taxation policy is not socially optimal.

[2] Current right-wing populists often mix left- and right-wing economic policies (Rovny 2013). However, the analysis of anti-taxation populism is still important to understand current right-wing populism in Europe for the following reasons. First, the origins of right-wing populist parties in Europe are based on neoliberalism and many right-wing populist parties such as the Progress Party in Norway still favor anti-taxation. Furthermore, one of the largest features of populism is anti-elitism (Mudde 2004). Although the economic policies of right-wing populist parties are not based on neoliberalism, they argue that the current welfare state is a self-serving tool in the hands of bureaucrats (De Koster, Achterberg, and Van der Waal 2013).

[3] See Devereux and Loretz (2013) for a review of empirical studies of tax competition.

[4] According to Donald Trump, one of the objectives of cutting corporate tax is to gain competitive advantage over other countries (Financial Times, September 28, 2017. `https://www.ft.com/content/`

we focus on the effect of globalization in the analysis of populism. In particular, we investigate taxation on capital since capital is a typical mobile tax base and the tax competition literature has been developing in the context of capital taxation.

To this end, we construct a two-country capital tax competition model in which capital, but not labor, can move freely across countries. Further, there are two types of politicians: the benevolent type whose objective is to maximize residents' utility and the leviathan type whose objective is to maximize tax revenue.[5] In addition, politicians have reputation (i.e. reelection) concerns, namely they want to maintain their reputation as the benevolent type (i.e., a good politician). In the presented model, the residents of country 1 do not know the policymaker's type, while country 2's policymaker is known to be benevolent. We also consider a closed economy model in which capital is immobile. By comparing country 1 in the tax competition model with that in the closed economy model, we can therefore investigate the effect of globalization.

We start by showing that extremely low taxation arises when high reputation concerns are present. As the residents in country 1 do not know their policymaker's type, they update their beliefs based on the tax rate s/he chooses. Here, the tax rate that maximizes the budget is higher than the tax rate that maximizes welfare, meaning that a low tax rate can be a signal that the policymaker is the benevolent type.[6] To acquire such a good reputation, the benevolent type has an incentive to choose an extremely low tax rate that the leviathan type never chooses. Hence, extremely low taxation on capital arises. Furthermore, a politician who implements such an extreme policy is supported by voters in the sense that s/he acquires a good reputation. In this regard, extremely low taxation with strong support by citizens (a feature of right-wing populism) arises.

Globalization alters the properties of this populism. The most drastic change concerns the welfare implications. Reputation concerns induce extremely low taxation on capital, implying that the existence of reputation concerns inducing populism seems to be harmful to the country's welfare. Indeed, this is the case in a closed economy. By contrast, we show that it can improve the country's expected welfare in the tax competition model. This result indicates that globalization changes the welfare implications of populism drastically. The driving force behind this result is the strategic interactions between countries. No country behaves as a price taker in the determination of tax rates. In particular, a change in a country's tax rate affects the price of capital, generating the terms-of-trade effect (DePeter and Myers 1994). This terms-of-trade effect, which

79538ba6-a35b-11e7-b797-b61809486fe2).

[5]The leviathan-type government was first proposed by Brennan and Buchanan (1977, 1980) in the literature on public choice and this has been followed by many studies in the tax competition literature.

[6]Mudde (2004: 543) defines populism as "an ideology that considers society to be ultimately separated into two homogeneous and antagonistic groups, 'the pure people' versus 'the corrupt elite', and which argues that politics should be an expression of the volonté générale (general will) of the people." Thus, populists need to persuade voters that they are not the corrupt elite. Our result therefore shows that cutting taxes is one way of signaling that politicians are not corrupt.

has been widely recognized in the tax competition literature, plays a role in the above welfare implications.

To shed further light on this mechanism, suppose that each country's technology and capital endowment are the same. First, consider the effect on country 1's welfare when its policymaker is the benevolent type. Since country 2 does not know the type of country 1's policymaker, it chooses a tax rate taking into account the possibility that country 1's policymaker is the leviathan type (i.e., the possibility that country 1's tax rate is high). Hence, country 2's tax rate is higher than country 1's tax rate implemented by the benevolent type. This means that country 1 attracts a larger amount of capital than country 2 does, and as a result, country 1 is a capital-importer. Remember that reputation concerns make the benevolent type choose an extremely low tax rate, which increases the interest rate. Since country 1 is a capital-importer, this is harmful to country 1 (its terms of trade are worse off). As a result, reputation concerns have a negative effect on country 1's welfare when its policymaker is the benevolent type.

However, we see the opposite effect on country 1's welfare when its policymaker is the leviathan type. In this case, country 1's tax rate is considerably higher than country 2's tax rate. Hence, country 1 attracts a smaller amount of capital than country 2 does, and as a result, country 1 is a capital-exporter. This implies that an increase in the interest rate is beneficial for country 1 because it improves its terms-of-trade. Therefore, if the interest rate when country 1's policymaker is the leviathan type increases due to populism, reputation concerns inducing populism are beneficial. Indeed, the interest rate increases. Remember that country 2 chooses its tax rate taking into account the possibility that country 1's policymaker is the benevolent type. Thus, the possibility of populism in country 1 decreases country 2's tax rate. Furthermore, this decreases country 1's tax rate implemented by the leviathan type. Hence, the interest rate when country 1's policymaker is the leviathan type increases due to populism. Therefore, reputation concerns have a positive effect on country 1's welfare when its policymaker is the leviathan type.

In summary, two opposite effects of populism on the country's welfare exist. Thus, in contrast to the closed economy, whether populism is harmful is unclear. Furthermore, the positive effect dominates the negative effect in some cases (i.e., reputation concerns inducing populism improve country 1's expected welfare). In particular, the country enjoys the benefits of populism when its productivity is sufficiently lower than that of the other country. The lower country 1's productivity is, the lower the amount of capital it imports, implying that the negative effect falls, while the positive effect rises. Hence, reputation concerns improve country 1's welfare when its productivity is sufficiently low.

The remainder of the paper proceeds as follows. Section 2 reviews the related literature. Section 3 describes the model. Section 4 derives the equilibrium in a closed economy. Section 5 derives the equilibrium under tax competition. Section 6 discusses some extensions. Section 7 concludes.

2 Related Literature

Our study is related to two strands of the literature: populism and tax competition.

Populism. A growing number of studies provide formal models of populism.[7] Since populism has a multifaceted nature, each study focuses on a specific aspect such as extremism (e.g., Acemoglu, Egorov, and Sonin 2013), herding (e.g., Frisell 2009), and anti-elitism (e.g., Kishishita 2017). In this study, we consider populism such that a politician chooses an extreme policy to signal that s/he is a good politician. Acemoglu, Egorov, and Sonin (2013) explore this type of explanation as signaling. By adopting a similar mechanism,[8] we analyze how globalization changes the properties of populism as extremism.

One contribution to the literature on populism as extremism is that we show that populism can enhance a country's welfare. By definition, extremism implies that politicians choose policies that are extreme compared with the socially optimal policy. Nonetheless, we show that extremism can have a positive effect when the country faces tax competition.[9]

In addition, our study contributes to the literature by investigating the connection between populism and globalization. Theoretical and empirical studies show that globalization can be a cause of populism in various ways (e.g., Dippel, Gold, and Heblich 2015; Autor et al. 2017; Karakas and Mitra 2017; Colantone and Stanig 2018; forthcoming). Although this is an important research agenda, globalization could influence populism in other ways. Ours is the first study to show that globalization alters the welfare implications of populism, shedding new light on the connection between populism and globalization.

Tax competition. Drawing on the seminal works of Zodrow and Mieszkowski (1986) and Wilson (1986), numerous studies have analyzed capital tax competition to clarify the effects of interregional competition for mobile tax bases (see Keen and Konrad (2013) for a literature review). Although some studies (including ours) analyze the political process in an indirect democracy, they fail to explain the paradoxical phenomenon that some politicians promise extremely low taxation and yet are still supported by a large number of voters. The indirect democracy with heterogeneous politicians has been modeled in two directions. In one strand, politicians are either the benevolent or the leviathan type. This strand considers a model in which the politician

[7] Studies of populist fiscal policies include Acemoglu, Robinson, and Torvik (2013), Matsen, Natvik, and Torvik (2016), Aggeborn and Persson (2017), and Karakas and Mitra (2017). None of these works concerns tax competition.

[8] In contrast to our model, they adopt an abstract model describing policy preferences as the quadratic loss function and focus on left-wing populism. See Matsen, Natvik, and Torvik (2016) for the application to petro populism.

[9] Eguia and Giovannoni (2017) study a kind of extremism such that the opposition party commits to an unorthodox policy (i.e., it invests in the ability to implement such a policy). They show that this can be welfare-improving because the opposition party's high ability to implement the unorthodox policy is beneficial for voters when the mainstream policy becomes invalid in the future. The key factor is that the extreme policy can be a desirable policy in the future. By contrast, we show that even extremism inducing an extreme policy, which is never good for voters, may still benefit them.

who wins the election chooses the tax rate. A country's welfare is likely to be improved by voting in the leviathan type, and thus this type tends to be elected by voters (Pal and Sharma 2013; Kawachi, Ogawa, and Susa 2017).[10] Hence, tax rates tend not to be extremely low. The other strand focuses on the difference in a candidate's capital share. Voters choose among candidates with different capital shares, and the elected one chooses the tax rate. In this model, voters tend to delegate to the politician whose capital share is lower than the median voter's share (Persson and Tabellini 1992; Ihori and Yang 2009; Ogawa and Susa 2017; Nishimura and Terai 2017). The lower the capital share a politician has, the higher the tax rate s/he implements, and therefore tax rates tend not to be extremely low. Hence, neither strand can explain the reality on which we focus in this study.[11] By contrast, we show that the paradoxical phenomena can be explained under information asymmetries between politicians and voters.

Furthermore, these information asymmetries provide a new way to analyze tax competition. Despite its importance, few studies have analyzed information asymmetries between voters and politicians under tax competition. The exception is the study of Besley and Smart (2002). However, their environments differ from ours in the following two aspects. First, taxation in their model is not on capital. Second, the benevolent type in their setting has no reputation concerns and thus does not behave strategically. As a result, populism never arises in contrast to in our model. This distinction is another novelty of our study.

3 The Model

3.1 Basic Settings

There are two countries $i \in \{1,2\}$, and in each of these is a continuum of homogeneous residents with measure one. Each resident owns one unit of labor and provides it inelastically. Labor is immobile across countries. The production of private goods requires labor and capital under a constant-returns-to-scale technology. Our focus throughout the analysis is on country 1.

Capital endowment. The initial endowment of capital per capita in country i is $\bar{k}$, meaning that each country has the same amount of capital endowment $\bar{k}$. There are no absentee capital owners (i.e., total capital in this economy is $2\bar{k}$).

Firms. In each country, there is a continuum of firms with measure one whose production technology is the same. Since we assume constant-returns-to-scale technology, this yields perfect

[10]This result is the case as long as the asymmetry between countries is not large.

[11]Under special interests politics in which interest groups formed by capitalists try to affect policymaking, tax rates tend to be low (e.g., Sato 2003; Lai 2014). However, in this case, a politician who chooses low taxation would not be supported by the majority of rational/informed voters.

competition in each country. In particular, the production function per capita in country i is given by $f_i(k_i) = (A_i - k_i)k_i$, where k_i represents the amount of capital per capita in country i and $A_i > 0$ represents the productivity of country i.[12] Let $\Delta \equiv A_1 - A_2$. Assume that $|\Delta| \leq 16\bar{k}$. Then, the profit of a firm in country i is given by $\pi_i = (A - k_i)k_i - w_i - r_i k_i - t_i k_i$, where w_i is the wage rate, r_i is the interest rate, and t_i is the capital tax rate in country i.

In the closed economy model analyzed in Section 4, capital is immobile across countries, and thus $k_i = \bar{k}$. Hence, the interest rate in country 1 is given by

$$r_1 = A - 2\bar{k} - t_1. \tag{1}$$

In the open economy model analyzed in Section 5, capital is mobile across countries, and hence $r_1 = r_2 = r$. Thus, $r = A - 2k_i - t_i$ and $2\bar{k} = k_1 + k_2$. Combining these two yields the amount of capital and the interest rate in an open economy:

$$k_1 = \bar{k} + \frac{\Delta - (t_1 - t_2)}{4}; \;\; k_2 = \bar{k} - \frac{\Delta - (t_1 - t_2)}{4}. \tag{2}$$

$$r = \frac{A_1 + A_2}{2} - \frac{t_1 + t_2}{2} - 2\bar{k}. \tag{3}$$

We assume that r must be non-negative.

Residents. The preference of residents in country i is defined by $U(c_i, g_i) = c_i + (1+\alpha)g_i$, where c_i is the consumption of a private numeraire good and g_i is the public good. Here, $\alpha \in [0,1)$ represents the strength of preferences for public goods.

The total income of a resident in country i consists of labor income and rent from capital. Labor income is $f_i(k_i) - f_i'(k_i)k_i$. Thus, $c_i = f_i(k_i) - f_i'(k_i)k_i + r_i\bar{k}$.

Governments. In each country, a policymaker chooses a unit tax rate on the capital used within the country, t_i, and produces the public good. t_i is allowed to be negative (negative t_i represents a subsidy). The production technology of the public good is linear. In particular, one unit of the public good is produced by one unit of the private good. We assume that the budget of country i is given by $T + t_i k_i$, where T is sufficiently large so that the budget is positive. T represents the other sources of tax revenue such as the revenue of capital tax in past periods and the lump-sum tax.[13] Thus, $g_i = T + k_i t_i$.

[12] This production technology and the preferences defined later are standard settings in the literature on strategic tax competition. Studies using similar settings include Itaya et al. (2008), Kempf and Rota-Graziosi (2010), Ogawa (2013), Eichner (2014), Hindriks and Nishimura (2015), Kawachi, Ogawa, and Susa (2017), and Nishimura and Terai (2017). This production function is homogeneous of degree one.

[13] The equilibrium tax (subsidy) rate t_i can be negative under populism. In such a case, it is difficult to interpret g_i without T. Thus, we introduce this. The alternative way is to introduce the non-negativity of t_i instead of T. In this

3.2 Politicians

We consider the following two types of politicians: the *benevolent* type and the *leviathan* type. The objective function of the benevolent politician in country i is the weighted sum of country i's welfare and her/his own reputation:

$$\max_{t_i} U(c_i, g_i) + \lambda \pi_i(t_i),$$

where $\lambda \geq 0$ and $\pi_i(t_i)$ is residents' beliefs that the policymaker in country i is the benevolent type given t_i. Residents would vote for the politician likely to be the benevolent type.[14] Thus, $\pi_i(t_i)$ can be regarded as the reelection probability of the policymaker in country i after introducing t_i and λ is the benefit of reelection.[15] A model that explicitly introduces election and reelection motives is provided in Section 6.2. The beliefs the residents hold are updated based on t_i endogenously as in classical incomplete information games. We assume that λ is not too large (i.e., $\rho\sqrt{\lambda} \leq 16\bar{k} + \Delta$), where $\rho \in (0,1)$ is defined later.

On the contrary, the objective function of the leviathan type in country i is the weighted sum of country i's (net) tax revenue[16] and her/his own reputation:

$$\max_{t_i} T + t_i k_i + \lambda \pi_i(t_i).$$

To focus on the effect of such politicians on one country, we suppose that country 2's policymaker is the benevolent type[17] and that country 1's policymaker as well as the residents in this economy know this. Since country 2's policymaker is known to benevolent, $\pi_2(t_2) = 1$ for all t_2. Thus, country 2's policymaker only maximizes residents' welfare. On the contrary, the type of country 1's policymaker is unobservable to country 2's policymaker as well as to the residents in this economy. The probability that country 1's policymaker is the benevolent type is denoted by $\rho \in (0,1)$.

Notice that country 2's policymaker has no private information. Hence, country 2's tax rate

setting, a similar result holds.

[14]It can be optimal to vote for the leviathan type rather than the benevolent type (Pal and Sharma 2013; Kawachi, Ogawa, and Susa 2017). However, even in such a case, it is still natural that residents vote for the benevolent type for the following two reasons. First, the leviathan type would extract some tax revenue. Second, the leviathan type is self-interested in contrast to the benevolent type and may not follow voters' policy preferences. On the second interpretation, see Section 6.2.

[15]Many studies in various fields introduce career or reputation concerns as the reduced form. Examples in political economics include Fox and Van Weelden (2010) and Fu and Li (2014).

[16]A similar setting for the leviathan type has been widely adopted (e.g., Pal and Sharma 2013; Kawachi, Ogawa, and Susa 2017), although previous studies have not incorporated the reputation term.

[17]The situation in which country 2's policymaker is known to be benevolent could be verified by the following reasons. For instance, country 2's policymaker serves a second term (i.e., her/his type is already well known). Alternatively, the selection of politicians works well in country 2 because of monitoring by mass media and thus only the benevolent type is elected.

never signals the type of country 1's policymaker. This fact allows us to exclude the possibility of yardstick competition, which arises because of information externalities (Besley and Case 1995).[18]

3.3 Timing of the Game and Equilibrium Concept

The timing of the game is as follows:

1. Nature draws the type of the policymaker in country 1. Only country 1's policymaker observes it.

2. Each country simultaneously determines the tax rate.

3. Given the tax rate, residents in country 1 update the belief about their policymaker's type $\pi_1(t_1)$.

4. Capital moves, and both production and consumption are done.

5. The payoff is realized.

Since t_1 can signal the type of country 1's policymaker, there could be a lot of equilibria depending on the belief formation as in standard signaling games. To deal with this issue, we employ the intuitive criterion proposed by Cho and Kreps (1987) and eliminate equilibria which are sustained by implausible belief formations. In short, the equilibrium concept is perfect Bayesian equilibrium satisfying the intuitive criterion. In particular, we focus on pure strategies. Hence, an equilibrium consists of $(t_1^{G*}, t_1^{B*}, t_2^*, \pi_1^*)$ in which $t_1^{G*}(t_1^{B*})$ represents the equilibrium tax rate chosen by the benevolent (leviathan) policymaker in country 1 since the benevolent (leviathan) type is "good" ("bad"). See Appendix A for the definition of the intuitive criterion.

4 Benchmark: Closed Economy

We start by investigating the benchmark case where capital is totally immobile. In this situation, $k_i = \bar{k}$. We examine country 1's equilibrium tax rates in this closed economy. Here, the utility of the residents in country 1 can be rewritten as

$$U(c_1, g_1) = (A_1 - \bar{k})\bar{k} - t_1\bar{k} + (1+\alpha)(T + t_1\bar{k}).$$

[18]While yardstick competition has been widely observed in local government, Devereux, Lockwood, and Redoano (2008) empirically show that competition over corporate tax across countries is tax competition rather than yardstick competition.

Let the equilibrium tax rate implemented by country 1's benevolent (leviathan) policymaker given λ be $t_{1C}^{G*}(\lambda)$ ($t_{1C}^{B*}(\lambda)$). We sometimes omit λ in the expression of the equilibrium tax rates to simplify the notations. Throughout this section, we assume that $\alpha \in (0,1)$.[19]

4.1 Equilibrium without Reputation Concerns

Consider the case where $\lambda = 0$ (i.e., there are no reputation concerns). $\lambda = 0$ represents the situation that the incumbent policymaker is removed from office with certainty because of term limits. Alternatively, perfect information (i.e., the incumbent's type is directly revealed to residents before the election) is equivalent to $\lambda = 0$ since the reelection probability is independent of the tax rate in this setting.

The equilibrium tax rates are the solutions to the following maximization problems:

$$t_{1C}^{G*}(0) = \text{argmax}_{t_1}(A_1 - \bar{k})\bar{k} - t_1\bar{k} + (1+\alpha)(T + t_1\bar{k}).$$

$$t_{1C}^{B*}(0) = \text{argmax}_{t_1} t_1\bar{k}.$$

Since $\alpha > 0$, both the benevolent and the leviathan types prefer as high a capital tax rate as possible (i.e., their objective functions are increasing in t_1).[20] Here, we have the non-negativity constraint of the interest rate, meaning that $r_1 = A_1 - 2\bar{k} - t_1 \geq 0$. Thus, $(t_{1C}^{G*}(0), t_{1C}^{B*}(0)) = (A_1 - 2\bar{k}, A_1 - 2\bar{k})$.

4.2 Definition of Populism

Before analyzing the equilibrium with reputation concerns, we define populism formally. Populism herein is characterized by extremism supported by a large number of voters. In other words, under populism, a politician who chooses an extreme policy acquires a good reputation. The following definition reflects this verbal definition.

Definition 1. *An equilibrium $(t_{1C}^{G*}, t_{1C}^{B*}, \pi_1^*)$ is a populism equilibrium if (i) there exists $t_1 \in \{t_{1C}^{G*}, t_{1C}^{B*}\}$ such that $t_1 \notin \text{argmax}U_1(c_1, g_1)$, and (ii) for $t_1 \in \{t_{1C}^{G*}, t_{1C}^{B*}\}$ such that $t_1 \notin \text{argmax}U_1(c_1, g_1)$, $\pi_1^*(t_1) > \rho$ holds.*

(i) requires that at least one politician implements an extreme policy and (ii) requires that such a politician obtains a reputation higher than that held previously. Here, if $t_{1C}^* \in \text{argmax}U_1(c_1, g_1)$, (ii) does not hold. Therefore, the above definition is equivalent to the following definition.

[19]Since the provision of capital is totally inelastic in this simple closed economy model, when $\alpha = 0$, any tax rate is optimal for residents in the constant marginal utility setting. To exclude such an implausible case, we assume that $\alpha > 0$.

[20]Since the preferences are linear, the higher tax rate is better for residents. See also Section 6.5.

Definition 2. *An equilibrium* $(t_{1C}^{G*}, t_{1C}^{B*}, \pi_1^*)$ *is a populism equilibrium if (i)* $t_{1C}^{G*} \notin \mathrm{argmax} U_1(c_1, g_1)$*, and (ii)* $\pi_1^*(t_{1C}^{G*}) = 1$.

We note two remarks. First, from (ii), pooling equilibria are not populism equilibria. Thus, it suffices to focus on separating equilibria. Second, we can define right-wing (left-wing) populism by using the above definition. If $t_{1C}^{G*} < (>)\ \mathrm{argmax} U_1(c_1, g_1)$, the equilibrium is a right-wing (left-wing) populism equilibrium.

4.3 Equilibrium with Reputation Concerns

Consider the case where $\lambda > 0$. In this case, the benevolent type has an incentive to choose a tax rate below $A_1 - 2\bar{k}$ to signal that s/he is the benevolent type to residents. To examine how such an incentive affects equilibrium tax rates, we focus on separating equilibria such that $t_{1C}^{G*} \neq t_{1C}^{B*}$.[21]

First, $t_{1C}^{B*} = A_1 - 2\bar{k}$. Suppose that this does not hold. Since $\pi_1(t_{1C}^{B*}) = 0$ from the Bayes rule, the leviathan type's payoff from reputation is the lowest when choosing t_{1C}^{B*}. Thus, if t_{1C}^{B*} does not maximize $T + t_1\bar{k}$, s/he can obtain a higher payoff by deviating from the equilibrium tax rate. Hence, $t_{1C}^{B*} = A_1 - 2\bar{k}$ must hold.

Next, pin down the value of t_{1C}^{G*}. Here, as in the usual signaling game, the leviathan type must be indifferent between t_{1C}^{G*} and t_{1C}^{B*} in separating equilibria satisfying the intuitive criterion (see the proof of Theorem 1). Since $\pi_1(t_{1C}^{G*}) = 1$ and $\pi_1(t_{1C}^{B*}) = 0$, this condition is given by

$$t_{1C}^{B*}\bar{k} = t_{1C}^{G*}\bar{k} + \lambda. \tag{4}$$

Here, the left-hand side is the payoff of the leviathan type when choosing its equilibrium tax rate, while the right-hand side is her/his payoff when implementing the tax rate chosen by the benevolent type and pretending to be the benevolent type. By using (4), we can pin down the value of t_{1C}^{G*}:

$$t_{1C}^{G*} = A_1 - 2\bar{k} - \frac{\lambda}{\bar{k}}.$$

The remaining task is to show that only the derived tax rates constitute separating equilibria. We obtain the following result (Appendix B presents the omitted proofs).

Theorem 1. *When* $\lambda > 0$ *and* $\alpha > 0$*, there exist unique separating equilibrium tax rates such that*

$$t_{1C}^{G*}(\lambda) = A_1 - 2\bar{k} - \frac{\lambda}{\bar{k}};\ \ t_{1C}^{B*}(\lambda) = A_1 - 2\bar{k}.$$

Here, the benevolent type chooses extremely low taxation, which is not optimal for residents' welfare. Furthermore, such an extreme policy signals to residents that the politician is good. In

[21] Although pooling equilibria could exist, we do not discuss them because they are never populism equilibria as seen in the previous subsection.

other words, this equilibrium is a populism equilibrium according to Definition 2. In this regard, the extreme reduction of tax rates supported by residents (a feature of right-wing populism) arises when reputation concerns exist.

4.4 Comparison

Compare the equilibrium with and without reputation concerns. First, observe that the equilibrium tax rate chosen by the leviathan type is the same independently of the value of λ. This fact implies that the populist taxation policy by the benevolent type does not affect the policy chosen by the leviathan type in a closed economy—at least in this simple setting.

Next, examine welfare. Without reputation concerns, the benevolent type chooses the socially optimal tax rate. However, with reputation concerns, s/he chooses a tax rate below the socially optimal tax rate. As a result, the welfare of country 1 with reputation concerns is lower than that without reputation concerns (i.e., populism is harmful).[22]

5 Equilibrium: Open Economy

In this section, for simplicity, we assume that $\alpha = 0$, namely tax revenues are returned to residents as a lump-sum transfer. This assumption is standard in the literature. Furthermore, this is a useful approach to examine the terms-of-trade effect. Since there is no discontinuity between $\alpha = 0$ and $\alpha > 0$ in the tax competition model,[23] the equilibrium under tax competition with $\alpha = 0$ can be regarded as the approximation of the equilibrium under tax competition with sufficiently small $\alpha > 0$. The case where $\alpha > 0$ is examined in Section 6.4. When $\alpha = 0$,

$$U(c_i, g_i) = (A_i - k_i)k_i + r(\bar{k} - k_i).$$

Let the equilibrium tax rate implemented by country 1's benevolent (leviathan) policymaker be $t_{1O}^{G*}(\lambda)$ ($t_{1O}^{B*}(\lambda)$) and the equilibrium tax rate implemented by country 2's policymaker be $t_{2O}^{*}(\lambda)$. Although we allow the countries to be asymmetric (i.e., $\Delta \neq 0$), our results qualitatively do not depend on the asymmetry except for the welfare implications.

[22]This welfare implication does not depend on our specific settings about the utility function. Since the definition of populism is that the tax rate chosen by the benevolent type and the policy chosen by the benevolent type are independent of whether populism arises, reputation concerns inducing populism are always harmful. See Section 6.5.

[23]In the closed economy model, $\alpha = 0$ is problematic because the provision of capital is totally inelastic. This is not the case in the tax competition model. Under tax competition, the optimal tax rate for residents is uniquely determined even if $\alpha = 0$.

5.1 Equilibrium without Reputation Concerns

We first derive the equilibrium without reputation concerns (i.e., $\lambda = 0$). In this model, country 1's policymaker is unconcerned about her/his reputation when choosing t_1. Hence, when country 1's policymaker is the benevolent type, s/he maximizes welfare, while when country 1's policymaker is the leviathan type, s/he maximizes the budget.

The equilibrium tax rates are the solutions to the following maximization problems:

$$t_{1O}^{G*}(0) = \text{argmax}_{t_1}(A_1 - k_1)k_1 + r(\bar{k} - k_1) \;\text{ s.t.}(2),(3),\text{and } t_2 = t_{2O}^{*}(0).$$

$$t_{1O}^{B*}(0) = \text{argmax}_{t_1} t_1 k_1 \;\text{ s.t.}(2),(3),\text{and } t_2 = t_{2O}^{*}(0).$$

$$t_{2O}^{*}(0) = \text{argmax}_{t_2} E[(A_2 - k_2)k_2 + r(\bar{k} - k_2)] \;\text{ s.t.}(2),(3),\text{and } t_1 = t_{1O}^{G*}(0)(t_{1O}^{B*}(0)) \text{ with prob.} \rho \; (1-\rho).$$

By solving each maximization problem, we have the following best-response functions:

$$t_{1O}^{G*}(0) = \frac{\Delta + t_{2O}^{*}(0)}{3}. \tag{5}$$

$$t_{1O}^{B*}(0) = \frac{\Delta + t_{2O}^{*}(0)}{2} + 2\bar{k}. \tag{6}$$

$$t_{2O}^{*}(0) = \frac{-\Delta + \rho t_{1O}^{G*}(0) + (1-\rho) t_{1O}^{B*}(0)}{3}. \tag{7}$$

These equations yield the equilibrium capital tax rates.

Theorem 2. *When $\lambda = 0$, there exist unique equilibrium tax rates such that*

$$t_{1O}^{G*}(0) = \frac{4}{15+\rho}\left[\Delta + (1-\rho)\bar{k}\right]; \;\; t_{1O}^{B*}(0) = \frac{6}{15+\rho}\left[\Delta + (1-\rho)\bar{k}\right] + 2\bar{k};$$

$$t_{2O}^{*}(0) = \frac{1}{15+\rho}\left[-(3+\rho)\Delta + 12(1-\rho)\bar{k}\right].$$ [24]

5.2 Equilibrium with Reputation Concerns

We next derive the equilibrium with reputation concerns (i.e., $\lambda > 0$). Again, we focus on separating equilibria since populism equilibria must be separating equilibria. Then, the equilibrium belief must satisfy $\pi_1(t_{1O}^{G*}) = 1$ and $\pi_1(t_{1O}^{B*}) = 0$ from the Bayes rule. For now, we examine the separating equilibria other than those in the previous subsection (i.e., $t_{1O}^{G*} \neq t_{1O}^{G*}(0)$).

First, in any separating equilibria, country 1's leviathan policymaker maximizes $T + k_1 t_1$ at the equilibrium tax rate as in the closed economy model. Thus, we have the following fact from

[24] We implicitly assume that A_1 and A_2 are so large that r under these tax rates is non-negative. The same is also assumed in Theorem 3.

(6) and (7).

Fact 1. *The following must hold:*

$$t_{1O}^{B*} = \frac{\Delta + t_{2O}^{*}}{2} + 2\bar{k}. \tag{8}$$

$$t_{2O}^{*} = \frac{-\Delta + \rho t_{1O}^{G*} + (1-\rho) t_{1O}^{B*}}{3}. \tag{9}$$

By substituting (9) into (8), we can rewrite t_{1O}^{B*} as the function of t_{1O}^{G*}:

$$t_{1O}^{B*} = \frac{1}{5+\rho}\left(\Omega + \rho t_{1O}^{G*}\right), \tag{10}$$

where $\Omega \equiv 12\bar{k} + 2\Delta$. Substituting this into (8) yields

$$t_{2O}^{*} = \frac{1}{3}\left[\frac{(1-\rho)\Omega + 6\rho t_{1O}^{G*}}{5+\rho} - \Delta\right]. \tag{11}$$

We have succeeded in rewriting the equilibrium tax rates of country 1's leviathan policymaker and country 2's policymaker as the function of country 1's benevolent policymaker's equilibrium tax rate.

The remaining task is to pin down the value of t_{1O}^{G*}. If $t_{1O}^{G*} \neq t_{1O}^{G*}(0)$, the leviathan type must be indifferent between t_{1O}^{G*} and t_{1O}^{B*} in separating equilibria satisfying the intuitive criterion. By using this property, we can pin down the value of t_{1O}^{G*}.

Lemma 1. *At separating equilibria where $t_{1O}^{G*} \neq t_{1O}^{G*}(0)$, the following must hold:*

$$t_{1O}^{G*} = \frac{\Omega \pm (5+\rho)2\sqrt{\lambda}}{5}. \tag{12}$$

First, country 1's leviathan policymaker prefers t_{1O}^{B*} to a highly low tax rate even if s/he can acquire a good reputation (i.e., $\pi_1 = 1$) under such a low tax rate. Thus, there exists a low tax rate such that country 1's leviathan policymaker is indifferent between t_{1O}^{B*} and that tax rate with $\pi_1 = 1$. That is $\frac{\Omega-(5+\rho)2\sqrt{\lambda}}{5}$. In addition, an extremely high tax rate is also not beneficial for the leviathan type because the country can attract only a small amount of capital and thus tax revenue remains small. Hence, there also exists an excessively high tax rate such that country 1's leviathan policymaker is indifferent between t_{1O}^{B*} and that tax rate with $\pi = 1$. That is $\frac{\Omega+(5+\rho)2\sqrt{\lambda}}{5}$.

So far, we have shown that if separating equilibria other than those in the previous subsection exist, (12) holds. However, this does not mean that (12), (10), and (11) always constitute an equilibrium. To prove that this is an equilibrium, we must examine the incentive compatibility condition of country 1's policymaker. We find the following result.

Lemma 2. 1. *When* $\sqrt{\lambda} < \frac{16\bar{k}+\Delta}{15+\rho}$, *country 1's benevolent policymaker has a strict incentive to deviate from* $\frac{\Omega \pm (5+\rho)2\sqrt{\lambda}}{5}$ *for any belief* π *satisfying the intuitive criterion.*

2. *When* $\frac{16\bar{k}+\Delta}{15+\rho} \geq \sqrt{\lambda} < \frac{\sqrt{3}(16\bar{k}+\Delta)}{30-\sqrt{3}(15+\rho)}$,

   (i) Country 1's benevolent policymaker has no incentive to deviate from $\frac{\Omega \pm (5+\rho)2\sqrt{\lambda}}{5}$ *for some belief* π *satisfying the intuitive criterion, and*

   (ii) Country 1's leviathan policymaker has no incentive to deviate from t_{1O}^{B*} *under* $t_{1O}^{G}* = \frac{\Omega-(5+\rho)2\sqrt{\lambda}}{5}$ *for some belief* π *satisfying the intuitive criterion, but*

   (iii) Country 1's leviathan policymaker has a strict incentive to deviate from t_{1O}^{B*} *under* $t_{1O}^{G}* = \frac{\Omega+(5+\rho)2\sqrt{\lambda}}{5}$ *for any belief* π *satisfying the intuitive criterion.*

3. *When* $\sqrt{\lambda} \geq \frac{\sqrt{3}(16\bar{k}+\Delta)}{30-\sqrt{3}(15+\rho)}$,

   (i) Country 1's benevolent policymaker has no incentive to deviate from $\frac{\Omega \pm (5+\rho)2\sqrt{\lambda}}{5}$ *for some belief* π *satisfying the intuitive criterion, and*

   (ii) Country 1's leviathan policymaker has no incentive to deviate from t_{1O}^{B*} *under* $t_{1O}^{G}* = \frac{\Omega \pm (5+\rho)2\sqrt{\lambda}}{5}$ *for some belief* π *satisfying the intuitive criterion.*

The remaining task is to examine the condition for the existence of an equilibrium discussed in the previous section. We obtain the following result.

Lemma 3. *The tax rates* $(t_{1O}^{G*}(0), t_{1O}^{B*}(0), t_{2O}^{*}(0))$ *constitute an equilibrium if and only if* $\sqrt{\lambda} \leq \frac{16\bar{k}+\Delta}{15+\rho}$.

By combining Lemmas 2 and 3, we finally obtain the characterization of separating equilibria.

Theorem 3. *Suppose that* $\lambda > 0$.

1. *When* $\sqrt{\lambda} \leq \frac{16\bar{k}+\Delta}{15+\rho}$, *there exist unique separating equilibrium tax rates:* $(t_{1O}^{G*}(\lambda), t_{1O}^{B*}(\lambda), t_{2O}^{*}(\lambda)) = (t_{1O}^{G*}(0), t_{1O}^{B*}(0), t_{2O}^{*}(0))$.

2. *When* $\frac{16\bar{k}+\Delta}{15+\rho} \leq \sqrt{\lambda} < \frac{\sqrt{3}(16\bar{k}+\Delta)}{30-\sqrt{3}(15+\rho)}$, *there exist unique separating equilibrium tax rates:* $t_{1O}^{G*}(\lambda) = \frac{\Omega-(5+\rho)2\sqrt{\lambda}}{5}$, $t_{1O}^{B*}(\lambda)$ *is characterized by (10), and* $t_{2O}^{*}(\lambda)$ *is characterized by (11).*[25]

3. *When* $\sqrt{\lambda} \geq \frac{\sqrt{3}(16\bar{k}+\Delta)}{30-\sqrt{3}(15+\rho)}$, *there are two separating equilibria tax rates:* $t_{1O}^{G*}(\lambda) = \frac{\Omega \pm (5+\rho)2\sqrt{\lambda}}{5}$, $t_{1O}^{B*}(\lambda)$ *is characterized by (10) and* $t_{2O}^{*}(\lambda)$ *is characterized by (11).*

[25] When $\sqrt{\lambda} = \frac{16\bar{k}+\Delta}{15+\rho}$, $\frac{\Omega-(5+\rho)2\sqrt{\lambda}}{5} = t_{1O}^{G*}(0)$.

5.3 Emergence of Populism

Examine whether and under which conditions the extremely low tax rate arises. In the tax competition model, country 1's optimal tax rate for its residents depends on country 2's tax rate. Thus, we define populism as the equilibrium in which (i) the equilibrium tax rate chosen by country 1's benevolent policymaker is different from the best response to country 2's equilibrium tax rate when country 1's objective function is its residents' welfare, and (ii) such an extreme policy signals that the policymaker is the benevolent type (i.e., $\pi_1(t^*_{1G}) = 1$). This is an extension of Definition 2. In particular, when country 1's tax rate implemented by the benevolent type is lower (higher) than the best response to maximize residents' welfare, we call the equilibrium right-wing (left-wing) populism.

Proposition 1. *1. When* $\sqrt{\lambda} \leq \frac{16\bar{k}+\Delta}{15+\rho}$,

$$t^{G*}_{1O}(\lambda) = t^{G*}_{1O}(0) = \text{argmax}_{t_1}(A_1 - k_1)k_1 + r(\bar{k} - k_1) \text{ s.t.}(2), (3), \text{and } t_2 = t^*_{2O}(\lambda).$$

2. When $\frac{16\bar{k}+\Delta}{15+\rho} < \sqrt{\lambda} < \frac{\sqrt{3}(16\bar{k}+\Delta)}{30-\sqrt{3}(15+\rho)}$,

$$t^{G*}_{1O}(\lambda) = \frac{\Omega - (5+\rho)2\sqrt{\lambda}}{5} < \text{argmax}_{t_1}(A_1 - k_1)k_1 + r(\bar{k} - k_1) \text{ s.t.}(2), (3), \text{and } t_2 = t^*_{2O}(\lambda).$$

3. When $\sqrt{\lambda} \geq \frac{\sqrt{3}(16\bar{k}+\Delta)}{30-\sqrt{3}(15+\rho)}$,

$$t^{G*}_{1O}(\lambda) = \frac{\Omega - (5+\rho)2\sqrt{\lambda}}{5} < \text{argmax}_{t_1}(A_1 - k_1)k_1 + r(\bar{k} - k_1) \text{ s.t.}(2), (3), \text{and } t_2 = t^*_{2O}(\lambda);$$

$$t^{G*}_{1O}(\lambda) = \frac{\Omega + (5+\rho)2\sqrt{\lambda}}{5} > \text{argmax}_{t_1}(A_1 - k_1)k_1 + r(\bar{k} - k_1) \text{ s.t.}(2), (3), \text{and } t_2 = t^*_{2O}(\lambda).$$

As in the closed economy model, reputation concerns induce right-wing populism. This is seen in the tax rate $t^{G*}_{1O} = \frac{\Omega-(5+\rho)2\sqrt{\lambda}}{5}$. This tax rate is lower than the optimal tax rate that maximizes country 1's welfare given country 2's equilibrium tax rate.

One interesting result is that under sufficiently high reputation concerns, left-wing and right-wing populism can arise. When λ is sufficiently high, there is a left-wing populism equilibrium such that the benevolent type chooses an extremely high tax rate ($\frac{\Omega+(5+\rho)2\sqrt{\lambda}}{5}$) in addition to the right-wing populism equilibrium. This multiplicity of populism equilibria implies that whether voters support a left-wing populist or a right-wing populist is independent of primitives such as voters' ideology under certain circumstances. This could be consistent with the reality. In the U.S. presidential election of 2016, Bernie Sanders as well as Donald Trump attracted a large number of voters and both were regarded as populist (Steger 2017). Hence, left-wing and right-wing populism simultaneously emerged. Moreover, the significant factions of Sanders' supporters expressed opinions that they would vote for Trump if Sanders was defeated in the preliminary election. [26] Our result provides one possible explanation for such reality.

Although this result is remarkable, we focus on right-wing populism for the following two reasons. First, our main interest in this study is how to explain right-wing populism. Second and more importantly, left-wing populism only arises when the degree of reputation concerns λ is considerably high,[27] and thus right-wing populism is more likely to arise.

5.4 Comparison

We first examine how populism induced by reputation concerns changes the outcome variables such as the tax rates, interest rate, and capital each country attracts. Then, we move onto how populism changes the welfare of country 1. Let $r_O^{G*}(\lambda)$ ($r_O^{B*}(\lambda)$) be the interest rate given $(t_{1O}^{G*}(\lambda), t_{2O}^{*}(\lambda))$ $((t_{1O}^{G*}(\lambda), t_{2O}^{*}(\lambda)))$, and $k_{1O}^{G*}(\lambda)$ ($k_{1O}^{B*}(\lambda)$) be k_1 given $(t_{1O}^{G*}(\lambda), t_{2O}^{*}(\lambda))$ $((t_{1O}^{G*}(\lambda), t_{2O}^{*}(\lambda)))$.

To this end, in this section, we focus on the case where $\sqrt{\lambda} > \frac{16\bar{k}+\Delta}{15+\rho}$ since otherwise, the equilibrium with reputation concerns is reduced to the equilibrium without reputation concerns. In particular, we focus on the equilibrium where $t_{1O}^{G}* = \frac{\Omega-(5+\rho)2\sqrt{\lambda}}{5}$ and compare it with the equilibrium without reputation concerns.

Proposition 2. *Suppose that* $\sqrt{\lambda} > \frac{16\bar{k}+\Delta}{15+\rho}$.

(a) $t_{1O}^{G*}(\lambda) < t_{1O}^{G*}(0), t_{1O}^{B*}(\lambda) < t_{1O}^{B*}(0)$, *and* $t_{2O}^{*}(\lambda) < t_{2O}^{*}(0)$.

(b) $r_O^{G*}(\lambda) - r_O^{G*}(0) = \frac{5+3\rho}{5}\left(\sqrt{\lambda} - \frac{16\bar{k}+\Delta}{15+\rho}\right) > 0$ *and* $r_O^{B*}(\lambda) - r_O^{B*}(0) = \frac{3\rho}{5}\left(\sqrt{\lambda} - \frac{16\bar{k}+\Delta}{15+\rho}\right) > 0$.

(c) $k_{1O}^{G*}(\lambda) - k_{1O}^{G*}(0) = \frac{5-\rho}{10}\left(\sqrt{\lambda} - \frac{16\bar{k}+\Delta}{15+\rho}\right) > 0$ *and* $k_{1O}^{B*}(\lambda) - k_{1O}^{B*}(0) = -\frac{\rho}{10}\left(\sqrt{\lambda} - \frac{16\bar{k}+\Delta}{15+\rho}\right) < 0$.

First, examine the equilibrium tax rates. The most interesting property is the effect of populism on the leviathan type's equilibrium tax rate. In a closed economy, the populist taxation policy of the benevolent type does not affect the taxation policy of the leviathan type because the latter has no incentive to choose the extremely low taxation chosen by the former and simply chooses the tax rate that maximizes the budget, which is independent of the benevolent type's taxation policy. However, this is not the case under tax competition because of strategic interactions. As a result of populism, the benevolent type in country 1 implements a lower tax rate than

[26] CBS News "Over Four in 10 Sanders Voters in West Virginia Would Vote for Trump." (`https://www.cbsnews.com/news/over-four-in-10-sanders-voters-in-west-virginia-would-vote-for-trump/`)

[27] Suppose that $\Delta = 0$. Then,

$$\sqrt{\lambda} \geq \frac{\sqrt{3}(16\bar{k}+\Delta)}{30-\sqrt{3}(15+\rho)} > 4\bar{k}.$$

This implies that λ must be at least higher than $16\bar{k}^2$ (i.e., the benefit of reelection for a politician is 16 times the amount of capital per capita.

s/he implements without reputation concerns. Country 2's policymaker chooses the tax rate by taking this fact into account. Since there is strategic complementarity, country 2's policymaker also chooses a lower tax rate than s/he does without reputation concerns. Hence, the tax rate that maximizes country 1's budget becomes lower as a result of populism. Therefore, even the leviathan type chooses a lower tax rate than s/he does without reputation concerns. As such, the low taxation induced by reputation concerns spreads from country 1's benevolent policymaker to country 2's policymaker and country 1's leviathan policymaker through the strategic interactions between the countries.

Since all the tax rates decrease as a result of reputation concerns, both the interest rate when country 1's policymaker is the benevolent type and that when country 1's policymaker is the leviathan type increase. This effect of populism on the interest rates plays a key role in the welfare implications of populism.

Lastly, examine the effect on the amount of capital country 1 attracts. Consider the case where country 1's policymaker is the benevolent type. In this case, country 1's policymaker chooses an extremely low tax rate when s/he faces reputation concerns. On the contrary, country 2's policymaker behaves less aggressively because s/he takes into account the possibility that country 1's policymaker is the leviathan type. Thus, country 1 can attract a larger amount of capital as a result of populism. However, the opposite is true when country 1's policymaker is the leviathan type. The tax rate implemented by country 1's leviathan policymaker also decreases due to populism. However, country 2's tax rate decreases more aggressively because country 2's policymaker takes into account the possibility that country 1's policymaker is the benevolent type and thus country 1's tax rate decreases due to populism. Hence, the amount of capital country 1 attracts decreases as a result of populism.

Based on these comparisons, we analyze the welfare implications of populism. Let $W_{1O}^{G*}(\lambda)$ ($W_{1O}^{B*}(\lambda)$) be $U(c_1, g_1)$ given $(t_{1O}^{G*}(\lambda), t_{2O}^{*}(\lambda))$ $((t_{1O}^{G*}(\lambda), t_{2O}^{*}(\lambda)))$. Again, we focus on the equilibrium where $t_{1O}^{G}* = \frac{\Omega-(5+\rho)2\sqrt{\lambda}}{5}$ and compare this equilibrium with the equilibrium without reputation concerns.

Proposition 3. *Suppose that* $\sqrt{\lambda} > \frac{16\bar{k}}{15+\rho}$.

(a) Suppose that $\Delta = 0$. $W_{1O}^{G*}(\lambda) < W_{1O}^{G*}(0)$ *while* $W_{1O}^{B*}(\lambda) > W_{1O}^{B*}(0)$.

(b) (i) When $\rho > 4\sqrt{15} - 15$,[28] *there exists* $\underline{\Delta} < 0$ *such that if and only if* $\Delta > \underline{\Delta}$, $W_{1O}^{G*}(\lambda) < W_{1O}^{G*}(0)$. *(ii) When* $\rho \leq 4\sqrt{15} - 15$, $W_{1O}^{G*}(\lambda) < W_{1O}^{G*}(0)$ *for any* Δ.

(c) There exists $\bar{\Delta} > 0$ *such that if and only if* $\Delta < \bar{\Delta}$, $W_{1O}^{B*}(\lambda) > W_{1O}^{B*}(0)$.

(d) When $\rho > \frac{\sqrt{601}}{4} - \frac{23}{4}$, *there exists* $\bar{\Delta}' < 0$ *such that if and only if* $\Delta < \bar{\Delta}'$, $\rho W_{1O}^{G*}(\lambda) + (1-\rho)W_{1O}^{B*}(\lambda) > \rho W_{1O}^{G*}(0) + (1-\rho)W_{1O}^{B*}(0)$.

[28] $4\sqrt{15} - 15$ is around 0.49.

As in the benchmark case, suppose that $\Delta = 0$ (i.e., the technology of each country is the same). Then, $W_{1O}^{G*} < W_{1O}^{G*}(0)$, while $W_{1O}^{B*} > W_{1O}^{B*}(0)$. This fact indicates that the welfare of country 1 when the policymaker is the benevolent type is worse off due to populism, while that when the policymaker is the leviathan type is better off. The driving force behind this result is the terms-of-trade effect. To see this, first observe that $t_{1O}^{G*}(0) < t_{2O}^{*}(0) < t_{1O}^{B*}(0)$ when $\Delta = 0$. Country 2's tax rate is between $t_{1O}^{G*}(0)$ and $t_{1O}^{B*}(0)$ because its policymaker chooses the tax rate by taking into account the possibility that country 1's policymaker is the benevolent type as well as that country 1's policymaker is the leviathan type. Hence, country 1 is a capital-importer (capital-exporter) when the policymaker is the benevolent (leviathan) type. Thus, an increase in the interest rate improves (hurts) country 1's terms of trade when its policymaker is the leviathan (benevolent) type. Here, as seen in Proposition 2, populism increases the interest rate. Therefore, it is harmful (beneficial) when country 1's policymaker is the benevolent (leviathan) type. This result can be extended to the asymmetric technology case as long as the difference in production technology is not large (see (b) and (c) in the above proposition).

In a closed economy, reputation concerns inducing extremely low taxation are always harmful. However, such a clear negative effect is no longer obtained in an open economy. The negative effect on welfare when the policymaker is benevolent is offset to some extent by the positive effect on welfare when the policymaker is leviathan. In particular, for some parameter values, the positive effect dominates the negative effect. As an illustration, consider the case where $A_1 = 12$, $A_2 = 17$, $\bar{k} = 3$, $\rho = 0.4$, and $\lambda = 10$. Table 1 shows welfare in this case, highlighting that $\rho W_{1O}^{G*} + (1-\rho)W_{1O}^{B*} > \rho W_{1O}^{G*}(0) + (1-\rho)W_{1O}^{B*}(0)$ holds. In other words, country 1's expected welfare is improved by reputation concerns inducing populism.

This can be seen in (d) of the above proposition. When $\rho > \frac{\sqrt{601}}{4} - \frac{23}{4} \approx 0.38$, there is an upper bound of Δ, which is negative, such that if and only if Δ is below this threshold, reputation concerns improve welfare. The lower country 1's productivity is, the larger the amount of capital the country exports under a leviathan policymaker. Thus, the positive effect on welfare under the leviathan type is strengthened when Δ is small. In addition, the lower country 1's productivity is, the smaller the amount of capital the country imports under a benevolent policymaker. Thus, the negative effect on welfare under the benevolent type falls as country 1's productivity is lower. Hence, only when country 1's productivity is lower than that of country 2 populism benefit country 1. This result indicates that a country that has poor production technology enjoys the benefit of populism.

This finding is clear when country 1's productivity is excessively smaller than that of country 2. In such a case, when ρ is more than a half, there is no negative effect of populism and thus populism always improves welfare. Under low productivity, country 1 becomes a capital-importer even if the policymaker is the benevolent type. Thus, an increase in the interest rate as a result of populism is beneficial even when the policymaker is the benevolent type. Hence, welfare

Table 1: Numerical Example (1)

W_{1O}^{G*}	27.46025	W_{1O}^{B*}	21.76246	$\rho W_{1O}^{G*} + (1-\rho) W_{1O}^{B*}$	24.04157
$W_{1O}^{G*}(0)$	27.51813	$W_{1O}^{B*}(0)$	21.67081	$\rho W_{1O}^{G*}(0) + (1-\rho) W_{1O}^{B*}(0)$	24.00974

Table 2: Numerical Example (2)

W_{1O}^{G*}	30.73568	W_{1O}^{B*}	31.88010	$\rho W_{1O}^{G*} + (1-\rho) W_{1O}^{B*}$	31.079008
$W_{1O}^{G*}(0)$	30.32253	$W_{1O}^{B*}(0)$	29.88438	$\rho W_{1O}^{G*}(0) + (1-\rho) W_{1O}^{B*}(0)$	30.19108

under the benevolent policymaker can be improved by populism. This is (i) in (b). In such a case, welfare under both the benevolent and the leviathan policymakers improves. As a result, expected welfare rises. Table 2 illustrates the case where $A_1 = 8$, $A_2 = 28$, $\bar{k} = 2$, $\rho = 0.7$, and $\lambda = 4.5$. In summary, reputation concerns inducing populism can benefit country 1.

6 Discussions

In this section, we discuss some issues which are left in the former sections.

6.1 Country 2's Welfare

Populism in country1 has the externality to country 2's welfare. This can be seen in the following result.[29]

Proposition 4. *Suppose that $\sqrt{\lambda} > \frac{16\bar{k}}{15+\rho}$. Then, there exists $\underline{\Delta}''$ such that if and only if $\Delta > \underline{\Delta}''$, $\rho W_{2O}^{G*}(\lambda) + (1-\rho) W_{2O}^{G*}(\lambda) > \rho W_{2O}^{G*}(0) + (1-\rho) W_{2O}^{G*}(0)$.*

Hence, whether high reputation concerns in country 1 are harmful for country 2 depends on country 2's relative productivity. In particular, when country 2's productivity is sufficiently high, country 2 suffers the negative effect of country 1's populism. Such negative externality could arise, while the opposite is true when country 2's productivity is sufficiently low.

The mechanism behind this result is the same as that for country 1's welfare. Reputation concerns inducing populism increases the interest rate. Country 2 can enjoy this high interest rate only when country 2 is likely to be the capital exporter.

6.2 World Welfare

We have investigated the effect on each country's welfare. In addition to them, we can also explore the effect on the world welfare. Let the sum of country 1's welfare and country 2's welfare when country 1's policymaker is the benevolent type (the leviathan type) denoted by

[29] The more detail results corresponding to each result in Proposition 3 are available upon the request.

$W_O^{G*}(\lambda)$ ($W_O^{B*}(\lambda)$). For simplicity, focus on the case where $t_{1O}^{G*}(0) < t_{2O}^{*}(0) < t_{1O}^{B*}(0)$. Note that this is just a sufficient condition for the following result.

Proposition 5. *Suppose that* $\sqrt{\lambda} > \frac{16\bar{k}+\Delta}{15+\rho}$ *and* $t_{1O}^{G*}(0) < t_{2O}^{*}(0) < t_{1O}^{B*}(0)$*. Then,* $\rho W_O^{G*}(\lambda) + (1-\rho) W_O^{B*}(\lambda) < \rho W_O^{G*}(0) + (1-\rho) W_O^{B*}(0)$.

Hence, the world welfare is undermined. The mechanism behind this result is the negative effect on the efficiency of the resource allocation. When $\alpha = 0$, the world welfare is given by $f_1(k_1) + f_2(k_2)$. Thus, the world welfare is undermined when the allocation of capital across countries is inefficient. In particular, as the difference between tax rates implemented by country 1 and 2, the inefficiency of capital allocation becomes severer and thus the world welfare decreases. Here, populism expands the difference between tax rates implemented by country 1 and 2. Hence, it is harmful in terms of the world welfare.

6.3 Dynamic Model

In this subsection, we construct a two-periods model in which the incumbent's reputation affects the reelection probability. This extension provides one micro-foundation for reputation concerns.

There are two periods ($t = 1,2$). In period 1, there is an incumbent in each country. In each period, there is one policy issue. In period 1, the policymaker chooses the tax rate on capital that will be applied in both periods 1 and 2. In period 2, there is another policy issue x. The policy about this issue is chosen from a unidimensional policy space $[0,1]$. Let the policy chosen by country i's policymaker in period 2 be x_i.

The total utility of residents in country i is given by $(1+\delta)U(c_i, g_i) - \delta(x_i - x_i^*)^2$, where $\delta \in (0,1]$ is the discount factor and $x_i^* \in [0,1]$ is the residents' ideal policy about issue x. The policy preference about issue x is represented by a quadratic loss function.[30]

The benevolent type's total utility is given by $(1+\delta)U(c_i, g_i) - \delta(x_i - x_i^*)^2 + \delta \mathbf{1}_i b$, where $\mathbf{1}_i$ is the indicator function which takes one if this politician is the policymaker in period 2, and $b > 0$ represents the office-seeking motivation. On the other hand, the leviathan type's total utility is given by $(1+\delta)(T + T_i k_i) - \delta(x_i - x_{iL}^*)^2 + \delta \mathbf{1}_i b$, where $x_{iL}^* \in [0,1]$ is the leviathan type's ideal policy and $x_{iL} \neq x_i^*$. Since the leviathan type is self-interested, her/his objective is different from residents in terms of not only the taxation policy but also other policy dimensions.

At the beginning of period 2, there are two candidates: the incumbent and a challenger who is benevolent with probability a half.[31] Based on the observed tax rate, each resident votes for one

[30]We assume that this issue is not an economic policy issue so that the policy preference about this issue is separable from the economic utility.

[31]When the probability that a new candidate in period 2 is the benevolent type is not a half, λ takes different values between the benevolent type and the leviathan type. Since the mechanism generating the results presented in the former section does not depend on the fact that λ is the same across two types, we still obtain the qualitatively same result even if λ can take different values between two types, although calculations become messy.

of the two politicians sincerely.[32] Note that the utilities of residents and politicians are realized at the end of the game.

Since the measure of each voter is zero, the set of perfect Bayesian equilibria involves equilibria in which voters do not vote sincerely. To rule out such implausible equilibria, we focus on perfect Bayesian equilibria with weakly undominated strategies in which sincere voting is guaranteed.

In period 2, the benevolent type chooses the residents' ideal policy x_i^*, while the leviathan type chooses the policy undesirable for the residents x_{iL}^*. Thus, residents in country 1 vote for the incumbent (the new candidate) if $\pi_1(t_1)$ is higher (smaller) than 0.5. In this regard, the reputation is connected to the reelection probability. On the other hand, residents in country 2 vote for the incumbent who is known to be benevolent. Therefore, we obtain the results that correspond to Theorems 1 and 3. Define

$$\lambda \equiv \frac{\delta}{1+\delta}\left[b+\frac{1}{2}(x_i^*-x_{iL}^*)^2\right]. \tag{13}$$

Theorem 4. *Separating equilibria in the closed economy model and the open economy model are characterized by Theorems 1 and 3.*

We give one remark to the interpretation of the benevolent type. In the basic model, the benevolent type has reputation concerns in addition to the concerns about the residents' utility. In this regard, the benevolent type seems not to be purely benevolent. This is true in one sense while not true in the other sense. To see this, observe the decomposition of reputation concerns in (13). On the one hand, when the benevolent type has office-seeking motivation b, λ is high. Since the office-seeking motivation is the self-interesting one, the benevolent type with reputation concerns is not necessarily purely benevolent. On the other hand, λ also depends on the difference between the residents' ideal policy and the leviathan type's ideal policy for the second issue $(x_i^*-x_{iL}^*)^2$. When the leviathan type wins the election, the policy different from the residents' ideal policy is implemented for the second issue. To avoid such loss, the benevolent type has an incentive to be reelected. Hence, even if the benevolent type is purely benevolent, s/he has reelection concerns that induce populism.

6.4 Objective Function of the Leviathan Type

In the basic model, the objective function of the leviathan type is the weighted sum of the net tax revenue and reputation concern. Though maximizing the budget/ tax revenue has been used as the reduced form (e.g., Pal and Sharma 2013; Kawachi, Ogawa, and Susa 2017), one may wonder why the leviathan type has this type of objective function. In this subsection, we provide micro-foundation.

[32] All the residents are assumed to have the same belief about the incumbent's type.

Without changing any result, suppose that there exist a finite number of residents in each country and denote its number by N. We define the benevolent type's objective function by exactly the same way. Let $T' \equiv NT$ and $K_i \equiv Nk_i$. We define the leviathan type's objective function as follows:

$$\max_{t_1} \theta(T' + t_1 K_1) + \lambda \pi_1(t_1).$$

The total (net) revenue of country 1 for the provision of public goods is $T' + t_1 K_1$. Suppose that the leviathan type can extract θ faction of the revue, and thus the leviathan type maximizes $\theta(T' + t_1 K_1) + \lambda \pi_1(t_1)$. The above objective function represents such situation. The objective function we adopted in the basic model is a special case of this objective function i.e., that is equivalent to the case where $\theta = 1/N$.[33]

6.5 Public Goods

So far, we have assumed $\alpha = 0$ in the tax competition model. In this subsection, we investigate the case where $\alpha > 0$, which describes the situation where public goods are provided.

6.5.1 Equilibrium without Reputation Concerns

As in Section 5.1, we have the following best response functions:

$$t_{1O}^{G*}(0) = \frac{8\alpha\bar{k} + (1+2\alpha)\Delta + (1+2\alpha)t_{2O}^{*}(0)}{3+4\alpha}. \tag{14}$$

$$t_{1O}^{B*}(0) = \frac{\Delta + t_{2O}^{*}(0)}{2} + 2\bar{k}. \tag{15}$$

$$t_{2O}^{*}(0) = \frac{8\alpha\bar{k} - (1+2\alpha)\Delta + (1+2\alpha)\left[\rho t_{1O}^{G*}(0) + (1-\rho)t_{1O}^{B*}(0)\right]}{3+4\alpha}. \tag{16}$$

These equations yield the equilibrium capital tax rates.

Theorem 5. *When $\lambda = 0$, there exist unique equilibrium tax rates such that*

$$t_{1O}^{G*}(0) = \frac{4}{(5+6\alpha)(3+4\alpha) + (1+2\alpha)\rho}\left\{(1+2\alpha)(1+\alpha)\Delta + [24\alpha^2 + 18\alpha + 1 - (1+2\alpha)\rho]\bar{k}\right\};$$

$$t_{1O}^{B*}(0) = \frac{2}{(5+6\alpha)(3+4\alpha) + (1+2\alpha)\rho}\left\{(3+4\alpha)\Delta + [(3+4\alpha)(1+6\alpha) - 3(1+2\alpha)\rho]\bar{k}\right\} + 2\bar{k};$$

$$t_{2O}^{*}(0) = \frac{1}{(5+6\alpha)(3+4\alpha) + (1+2\alpha)\rho}\left\{-(3+4\alpha+\rho)(1+2\alpha)\Delta + 4[(3+4\alpha)(1+6\alpha) - 3(1+2\alpha)\rho]\bar{k}\right\}.$$

[33]Note that $\theta \neq 1/N$ is equivalent that the value of λ is different between the two types. Since the mechanism generating the results presented in the basic model does not depend on the fact that λ is the same across two types, we still obtain the qualitatively same result even if λ can take different values between the two types.

6.5.2 Equilibrium with Reputation Concerns

As in Section 5.2, we focus on separating equilibria. First, we have the following fact that corresponds to Fact 1.

Fact 2. *The following must hold:*

$$t_{1O}^{B*} = \frac{\Delta + t_{2O}^{*}}{2} + 2\bar{k}. \tag{17}$$

$$t_{2O}^{*} = \frac{8\alpha\bar{k} - (1+2\alpha)\Delta + (1+2\alpha)\left[\rho t_{1O}^{G*} + (1-\rho)t_{1O}^{B*}\right]}{3+4\alpha}. \tag{18}$$

By substituting (18) into (17), we can rewrite t_{1O}^{B*} as the function of t_{1O}^{G*}:

$$t_{1O}^{B*} = \frac{1}{5+\rho+2\alpha(3+\rho)}\left[\Omega_1 + (1+2\alpha)\rho t_{1O}^{G*}\right], \tag{19}$$

where $\Omega_1 \equiv 12(1+2\alpha)\bar{k} + 2(1+\alpha)\Delta$. Substituting this into (17) yields

$$t_{2O}^{*} = \frac{1}{3+4\alpha}\left[\frac{(1+2\alpha)(1-\rho)\Omega_1 + 2(1+2\alpha)(3+4\alpha)\rho t_{1O}^{G*}}{5+\rho+2\alpha(3+\rho)} + 8\alpha\bar{k} - (1+2\alpha)\Delta\right]. \tag{20}$$

The remaining task is to pin down the value of t_{1O}^{G*}. If $t_{1O}^{G*} \neq t_{1O}^{G*}(0)$, the leviathan type must be indifferent between t_{1O}^{G*} and t_{1O}^{B*} in separating equilibria satisfying the intuitive criterion. Using this property, we obtain the following lemma.

Lemma 4. *At separating equilibria where $t_{1O}^{G*} \neq t_{1O}^{G*}(0)$, the following must hold:*

$$t_{1O}^{G*} = \frac{\Omega_1 \pm [5+\rho+2\alpha(3+\rho)]\,2\sqrt{\lambda}}{5+6\alpha}. \tag{21}$$

For simplicity, from now on, we focus on $\frac{\Omega_1 - [5+\rho+2\alpha(3+\rho)]2\sqrt{\lambda}}{5+6\alpha}$, which corresponds to our main focus in the case where $\alpha = 0$: $\frac{\Omega - (5+\rho)2\sqrt{\lambda}}{5}$ as the tax rate chosen by the benevolent type other than $t_{1O}^{G*}(0)$. Finally, we obtain the characterization of separating equilibria.

Theorem 6. *Suppose that $\lambda > 0$ and $(A+B\rho)\bar{k} + (C+D\rho)\Delta \geq 0$.*

(a) Consider the case where $\sqrt{3+4\alpha}(5+6\alpha)(2-\sqrt{3+4\alpha}) - \rho(1+2\alpha) \geq 0$.

1. *When $\sqrt{\lambda} \leq \frac{2(A+B\rho)\bar{k}+(1+\alpha)(C+D\rho)\Delta}{E[(5+6\alpha)(3+4\alpha)+(1+2\alpha)\rho]}$, there exist unique separating equilibrium tax rates: $(t_{1O}^{G*}(\lambda), t_{1O}^{B*}(\lambda), t_{2O}^{*}(\lambda)) = (t_{1O}^{G*}(0), t_{1O}^{B*}(0), t_{2O}^{*}(0))$.*
2. *When $\frac{2(A+B\rho)\bar{k}+(1+\alpha)(C+D\rho)\Delta}{E[(5+6\alpha)(3+4\alpha)+(1+2\alpha)\rho]} \leq \sqrt{\lambda} \leq \frac{2(A+B\rho)\bar{k}+(1+\alpha)(C+D\rho)\Delta}{E(1+2\alpha)\rho}$, $(t_{1O}^{G*}(0), t_{1O}^{B*}(0), t_{2O}^{*}(0))$ does not constitute any equilibrium. In addition, there exist separating equilibrium tax rates such that $t_{1O}^{G*}(\lambda) = \frac{\Omega_1 - [5+\rho+2\alpha(3+\rho)]2\sqrt{\lambda}}{5+6\alpha}$, $t_{1O}^{B*}(\lambda)$ is characterized by (19), and $t_{2O}^{*}(\lambda)$ is characterized by (20).*

(b) Consider the case where $\sqrt{3+4\alpha}(5+6\alpha)(2-\sqrt{3+4\alpha})-\rho(1+2\alpha)<0$.

1. *When $\sqrt{\lambda} \leq \frac{2(A+B\rho)\bar{k}+(1+\alpha)(C+D\rho)\Delta}{E[(5+6\alpha)(3+4\alpha)+(1+2\alpha)\rho]}$, there exist unique separating equilibrium tax rates: $(t_{1O}^{G*}(\lambda), t_{1O}^{B*}(\lambda), t_{2O}^{*}(\lambda)) = (t_{1O}^{G*}(0), t_{1O}^{B*}(0), t_{2O}^{*}(0))$.*
2. *When $\frac{2(A+B\rho)\bar{k}+(1+\alpha)(C+D\rho)\Delta}{E[(5+6\alpha)(3+4\alpha)+(1+2\alpha)\rho]} \leq \sqrt{\lambda} \leq \bar{\mathscr{L}}$, $(t_{1O}^{G*}(0), t_{1O}^{B*}(0), t_{2O}^{*}(0))$ does not constitute any equilibrium. In addition, there exist separating equilibrium tax rates such that $t_{1O}^{G*}(\lambda) = \frac{\Omega_1-[5+\rho+2\alpha(3+\rho)]2\sqrt{\lambda}}{5+6\alpha}$, $t_{1O}^{B*}(\lambda)$ is characterized by (19), and $t_{2O}^{*}(\lambda)$ is characterized by (20).*

Here,

$$A = 2(5+6\alpha)(12\alpha^3+36\alpha^2+37\alpha+12);\ \ B = 2(1+2\alpha)(-36\alpha^3-24\alpha^2+19\alpha+12);$$

$$C=(5+6\alpha)(4\alpha^2+6\alpha+3);\ D=(1+2\alpha)(-12\alpha^2-6\alpha+3);\ E=(3+4\alpha)\left[5+6\alpha+\rho(1+2\alpha)\right];$$

$$\bar{\mathscr{L}} = \min\left\{\frac{2(A+B\rho)\bar{k}+(1+\alpha)(C+D\rho)\Delta}{E\left[(1+2\alpha)\rho+(3+4\alpha)(5+6\alpha)-2\sqrt{3+4\alpha}(5+6\alpha)\right]}, \frac{2(A+B\rho)\bar{k}+(1+\alpha)(C+D\rho)\Delta}{E(1+2\alpha)\rho}\right\}.$$

In Theorem 6, we assume one additional condition: $(A+B\rho)\bar{k}+(C+D\rho)\Delta \geq 0$. This holds when $\bar{k}$ is sufficiently larger than $|\Delta|$.[34] In particular, when $\alpha = 0$, this is reduced to $|\Delta| \leq 16\bar{k}$ which has been assumed in the model. Under this assumption, right-wing populism arises when reputations concerns are sufficiently large (and not too large).[35] Thus, the emergence of right-wing populism due to reputation concerns can be the case even if $\alpha > 0$.

Lastly, examine the relationship with the case where $\alpha = 0$. Though the notations are quite complicated, we can see that when $\alpha \to 0$, equilibria in Theorem 6 converge to those in Theorem 3. In other words, there is a continuity between the case where $\alpha = 0$ and the case where $\alpha > 0$. In this regard, the result for the case where $\alpha = 0$ is a limit result that approximates the case where α is positive but small.

6.5.3 Welfare

Since the result under $\alpha = 0$ is a limit result, for sufficiently small α, the same welfare implications as in Proposition 3 hold. Indeed, the numerical example in Table 3 illustrates the situation that reputation concerns inducing populism improve the expected welfare of country 1. Here, the values of parameters except for α are the same as those in Table 2 and the value of α is 0.35.

[34] For all $\rho \in (0,1)$, $A+B\rho > 0$ and $C+D\rho > 0$ hold. Therefore, if $\bar{k}$ is sufficiently large, this assumption holds.

[35] In Theorem 3, it seems that there is no upper bound of λ for the existence of right-wing populism. However, this is not the case. As in the proof of Step 2-3 in Lemma 2, $\sqrt{\lambda} \leq \frac{16\bar{k}+\Delta}{\rho}$ must hold. However, since we assume this in the setting (Section 3), we can ignore this upper bound in Theorem 3. Indeed, we can easily verify that the upper bound given in Theorem 6 converges to $\frac{16\bar{k}+\Delta}{\rho}$ as α goes to zero.

Table 3: Numerical Example: Public Goods

W_{1O}^{G*}	24.28276	W_{1O}^{B*}	26.35320	$\rho W_{1O}^{G*}+(1-\rho)W_{1O}^{B*}$	24.90389
$W_{1O}^{G*}(0)$	24.48857	$W_{1O}^{B*}(0)$	25.68625	$\rho W_{1O}^{G*}(0)+(1-\rho)W_{1O}^{B*}(0)$	24.84787

However, this does not mean that all the effects of reputation concerns on the welfare are exactly the same. Indeed, when $\alpha > 0$, we have the effect on public goods provision other than the terms-of-trade effect. To see this, observe that $U(c_i, g_i)$ can be rewritten as $(A_i - k_i)k_i + r(\bar{k} - k_i) + \alpha t_i k_i$. For simplicity, consider the case where α is sufficiently close to zero. Examine country 1's welfare under the leviathan type policymaker. For λ under which right-wing populism arises, $W_{1O}^{B*}(\lambda) - W_{1O}^{B*}$ can be decomposed as follows:

$$W_{1O}^{B*}(\lambda) - W_{1O}^{B*} = (A_1 - k_{1O}^{B*}(\lambda))k_{1O}^{B*}(\lambda) + r_O^{B*}(\lambda)(\bar{k} - k_{1O}^{B*}(\lambda)) - \left[(A_1 - k_{1O}^{B*}(0))k_{1O}^{B*}(0) + r_O^{B*}(0)(\bar{k} - k_{1O}^{B*}(0))\right] \tag{22}$$

$$+ \alpha\left[t_{1O}^{B*}(\lambda)k_{1O}^{B*}(\lambda) - t_{1O}^{B*}(0)k_{1O}^{B*}(0)\right]. \tag{23}$$

Here, the first-term (22) is positive so long as Δ is not too large from Proposition 3 (c). This is due to the terms-of-trade effect. In addition, we have the opposite effect that is the second-term (23). Since $t_{1O}^{B*}(\lambda)k_{1O}^{B*}(\lambda) < t_{1O}^{B*}(0)k_{1O}^{B*}(0)$ from Proposition 2, this second-term is negative. This negative effect is the effect due to a decrease in the amount of public goods provision. As the result of populism, the tax rate decreases and thus the tax revenue shrinks, implying a decrease in the amount of public goods. When α is positive, this additional negative effect exists.

6.6 Another Model for Closed Economy

In the basic model, we adopted the linear preferences to make our analysis for tax competition tractable. However, this makes our result for the closed economy extreme. Since the provision of capital is inelastic in the closed economy model, linear preferences imply that country 1's welfare is maximized when the tax rate reaches the upper bound determined by the non-negativity constraint of the interest rate. In other words, the optimal tax rate is the corner solution. One may doubt that our result for the closed economy model crucially depends on this extreme property. This is not the case. To demonstrate it, consider the different utility function of residents: $U(c_i, g_i) = c_i + \log(g_i)$.

We start with the case without reputation concerns i.e., $\lambda = 0$. By solving the maximization problems, we have

$$t_{1C}^{G*}(0) = 1 - \frac{T}{\bar{k}};\ \ t_{1C}^{B*}(0) = A_1 - 2\bar{k}.$$

Here, the equilibrium tax rate chosen by the benevolent type is not the corner solution.

Next, we turn to the case with reputation concerns. Similarly with Section 4.3, we have the following result. Again, we focus on separating equilibria. Since the proof is exactly the same as that of the basic model, we omit the proof.

Theorem 7. *Suppose that* $\lambda > 0$.

(i) When $\lambda \leq (A_1 - 1)\bar{k} - 2\bar{k}^2 + T$, $(t_{1C}^{G*}(\lambda), t_{1C}^{B*}(\lambda)) = (t_{1C}^{G*}(0), t_{1C}^{B*}(0))$.

(ii) There exists $\bar{\lambda} > 0$ *such that when* $(A_1 - 1)\bar{k} - 2\bar{k}^2 + T < \lambda < \bar{\lambda}$,

$$t_{1C}^{G*}(\lambda) = A_1 - 2\bar{k} - \frac{\lambda}{\bar{k}}; \;\; t_{1C}^{B*}(\lambda) = A_1 - 2\bar{k}.$$

Here, we can easily verify that $t_{1C}^{G*}(\lambda) < t_{1C}^{G*}(0)$ in (ii). In other words, right-wing populism arises in (ii). Moreover, that is obviously harmful to residents in country 1 since the tax rate chosen by the benevolent type becomes smaller than the socially optimal level while the tax rate chosen by the leviathan type remains the same. As seen in this alternative model, our result for closed economy does not depend on our specific preferences.

7 Concluding Remarks

One feature of right-wing populism is anti-taxation (i.e., the extreme reduction of tax rates). We studied the consequences of such a taxation policy by focusing on how globalization (particularly an increase in the mobility of tax bases across countries) changes its properties. To this end, we constructed a two-country capital tax competition model in which the residents in one of the two countries face information asymmetry about their policymaker's type (benevolent or leviathan). We then compared the equilibrium in this model with that in a closed economy where capital is totally immobile.

Extremely low taxation on capital arises when the policymaker has reputation concerns. Globalization changes the properties of this populism such as the welfare implications. Since extremely low taxation is not optimal by definition, it seems to be obvious that reputation concerns inducing populism are harmful to the country's welfare. Indeed, this is the case in a closed economy. However, perhaps surprisingly, this is not necessarily the case under tax competition. Indeed, we showed that reputation concerns inducing populism can improve the country's welfare under tax competition when its productivity is sufficiently low.

Before closing this paper, let us see the remaining challenges for future researchers. First, in the model, only residents in country 1 face information asymmetry about their policy-maker's type. In reality, however, populism may arise in both countries. Examining such a situation may be worthwhile. Second, although we focused on the leviathan type as a bad politician, other types of bad politicians could exist. Studying such a possibility could also be promising. These issues are left to future work.

Appendices

A Intuitive Criterion

For the convenience of readers, we define the intuitive criterion (Cho and Kreps 1987) in the framework of our specific model.

We start by introducing some notations. Define the type space for country 1's policymaker's type by $\Theta \equiv \{G, B\}$ with its generic element θ, where G represents that country 1's policymaker is benevolent. Let $v_1(t_1, t_2, \pi_1, \theta)$ be the payoff of country 1's policymaker given t_1, t_2, and π_1 when her/his type is θ. In particular, we denote her/his equilibrium payoff by $v_1^*(\theta)$.

Given these notations, we introduce the following set. For each t_1, define

$$\Theta(t_1) = \left\{ \theta \in \Theta \,\middle|\, v_1^*(\theta) \leq \max_{\pi_1 \in [0,1]} v_1(t_1, t_2^*, \pi_1, \theta) \right\}.$$

This is the set of types for which country 1's policymaker can be better-off by deviating from the equilibrium strategy to t_1 depending on π_1. Thus, if $\Theta(t_1) = \{G\}$, it implies that the leviathan type never has an incentive to deviate to t_1. In such a case, residents in country 1 should not think that the policymaker who chose t_1 is the leviathan type. The intuitive criterion imposes such restriction on off-path belief formations.

Definition 3. *A perfect Bayesian equilibrium* $(t_1^{G*}, t_1^{B*}, t_2^*, \pi_1^*)$ *satisfies the intuitive criterion if for each* t_1*, (i)* $\pi_1^*(t_1) = 1$ *when* $\Theta(t_1) = \{G\}$ *and (ii)* $\pi_1^*(t_1) = 0$ *when* $\Theta(t_1) = \{B\}$.

B Omitted Proofs

B.1 Proof of Theorem 1

Step. 1: Prove that (4) must hold in separating equilibria satisfying the intuitive criterion (if exist).

$t_{1C}^{B*}\bar{k} \geq t_{1C}^{G*}\bar{k} + \lambda$ must hold from the incentive compatibility condition of the leviathan type. Thus, it suffices to show that if this inequality holds with strict inequality, the intuitive criterion is not satisfied. Prove by contradiction.

Suppose that the inequality holds with strict inequality. Then, $t_{1C}^{G*} \neq t_{1C}^{G*}(0)$. Thus, for any $\varepsilon > 0$, there exists $t \in [t_{1C}^{G*} - \varepsilon, t_{1C}^{G*} + \varepsilon]$ such that $U(c_1, g_1)$ given t is higher than that given t_{1C}^{G*}. This implies that if $\pi_1(t) = 1$ for such t (say t_d), the benevolent type has a strict incentive to deviate from t_{1C}^{G*}. Thus, for such t, $\pi_1(t_d) \neq 1$ must hold at the equilibrium.

However, this belief restriction does not satisfy the intuitive criterion. To see this, examine the leviathan type's incentive. Since $t_{1C}^{B*}\bar{k} > t_{1C}^{G*}\bar{k} + \lambda$ holds, there exists some $\bar{\varepsilon} > 0$ such that for any $t \in [t_{1C}^{G*} - \bar{\varepsilon}, t_{1C}^{G*} + \bar{\varepsilon}]$, $t_{1C}^{B*}\bar{k} > t\bar{k} + \lambda$ also holds. This means that the leviathan type never has an incentive to choose $t \in [t_{1C}^{G*} - \bar{\varepsilon}, t_{1C}^{G*} + \bar{\varepsilon}]$. Thus, for $t \in [t_{1C}^{G*} - \bar{\varepsilon}, t_{1C}^{G*} + \bar{\varepsilon}]$, $\pi_1(t) = 1$ from the intuitive criterion. This contradicts with $\pi_1(t_d) \neq 1$.

Step. 2: It is straightforward that the derived tax rates constitute a perfect Bayesian equilibrium satisfying the intuitive criterion. ■

B.2 Proof of Lemma 1

As in Step 1 in the proof of Theorem 1, we can easily verify that

$$t_{1O}^{B*}\bar{k} = t_{1O}^{G*}\bar{k} + \lambda \tag{24}$$

must hold if $t_{1O}^{G*} \neq t_{1O}^{G*}(0)$. Substituting (2), (3), (10), and (11) into (24) yields

$$\frac{5 - t_{1O}^{G*} - \Omega}{5 + \rho} = \pm 2\sqrt{\lambda},$$

which can be rewritten as

$$t_{1O}^{G*} = \frac{\Omega \pm (5+\rho)2\sqrt{\lambda}}{5}. \ ■$$

B.3 Proof of Lemma 2

Step. 1: Since the deviation incentive of each player depends on the belief formation and the belief formation is restricted by the intuitive criterion, we first examine how the belief formation is restricted by the intuitive criterion.

Suppose that the benevolent type has a strict incentive to deviate from t_{1O}^{G*} to t if $\pi_1(t) = 1$. Given t_{1O}^{G*}, the belief such that $\pi_1(t) = 0$ satisfies the intuitive criterion if the leviathan type has an incentive to deviate to t depending on the belief formation. In other words, $\pi_1(t) = 0$ satisfies the intuitive criterion if and only if

$$t_{1O}^{B*}\bar{k} \leq t\bar{k} + \lambda.$$

By substituting (2), (3), (10), and (11) into this, we have

$$\left(t_1 - \frac{\Omega + \rho t_{1O}^{G*}}{5 + \rho}\right)^2 \leq \lambda,$$

which can be rewritten as

$$\frac{\Omega+\rho t_{1O}^{G*}}{5+\rho}-2\sqrt{\lambda}\leq t_1\leq\frac{\Omega+\rho t_{1O}^{G*}}{5+\rho}+2\sqrt{\lambda}. \tag{25}$$

Step. 2: Consider the deviation incentive of country 1's benevolent policymaker from t_{1O}^{G*}. Since the residents' utility function has a quadratic form, there exists a unique maximizer of the residents' utility; that is

$$t_1^{*d}=\frac{\Delta+t_2}{3}$$

as seen in equation (5). By substituting (11) into this, we have the maximizer of the residents' utility given t_{2O}^{*}:

$$t_1^{*d}=\frac{2}{9}\Delta+\frac{1-\rho}{5+\rho}\frac{\Omega}{9}+\frac{2\rho}{5+\rho}\frac{t_{1O}^{G*}}{3}. \tag{26}$$

Step. 2-1: If and only if t_1^{*d} satisfies (25), $\pi(t_1^{*d})=0$ satisfies the intuitive criterion. Derive this condition. First, consider the case where $t_{1O}^{G*}=\frac{\Omega-(5+\rho)2\sqrt{\lambda}}{5}$. In this case, t_1^{*d} satisfies (25) if and only if

$$\sqrt{\lambda}\geq\frac{16\bar{k}+\Delta}{15+\rho}\ \ \sqrt{\lambda}\geq-\frac{16\bar{k}-\Delta}{15-\rho}.$$

Here, the second inequality always holds because the right-hand side of the inequality is always non-positive. Hence, these conditions are summarized by

$$\sqrt{\lambda}\geq\frac{16\bar{k}+\Delta}{15+\rho}. \tag{27}$$

Second, consider the case where $t_{1O}^{G*}=\frac{\Omega+(5+\rho)2\sqrt{\lambda}}{5}$. In this case, t_1^{*d} satisfies (25) if and only if

$$\sqrt{\lambda}\geq-\frac{16\bar{k}+\Delta}{15-\rho}. \tag{28}$$

Step. 2-2: Even if $\pi_1(t_1^{*d})=0$, the benevolent type may still have an incentive to deviate to t_1^{*d}. The incentive compatibility condition for this deviation. This condition is given by

$$U(c_1,g_1|t_1^{*d},t_{2O}^{*})\leq U(c_1,g_1|t_{1O}^{*d},t_{2O}^{*})+\lambda.$$

Substituting (2) and (3) into this yields

$$\frac{3}{16}(t_1^{*d}-t_{1O}^{G*})^2\leq\lambda. \tag{29}$$

Consider, first, the case where $t_{1O}^{G*} = \frac{\Omega-(5+\rho)2\sqrt{\lambda}}{5}$. In this case, (29) can be rewritten as

$$\left[30-\sqrt{3}(15+\rho)\right]\sqrt{\lambda} \geq -\frac{\sqrt{3}}{30}(16\bar{k}+\Delta).$$

Since the left-hand side is positive and the right-hand side is negative, this always holds i.e., the benevolent type has no incentive to deviate from $t_{1O}^{G*} = \frac{\Omega-(5+\rho)2\sqrt{\lambda}}{5}$.

Next, consider the case where $t_{1O}^{G*} = \frac{\Omega+(5+\rho)2\sqrt{\lambda}}{5}$. In this case, (29) can be rewritten as

$$\sqrt{\lambda} \geq \frac{\sqrt{3}(16\bar{k}+\Delta)}{30-\sqrt{3}(15+\rho)}. \tag{30}$$

Step. 2-3: Lastly, the benevolent type may deviate to the tax rate in which $\pi_1(t)=0$ cannot be satisfied i.e., t for which (25) does not hold.

First, consider the case where $t_{1O}^{G*} = \frac{\Omega-(5+\rho)2\sqrt{\lambda}}{5}$. Observe that $\frac{\Omega+\rho t_{1O}^{G*}}{5+\rho} - 2\sqrt{\lambda}$, which is the lower bound of t_1 for (25), is equal to $t_{1O}^{G*} = \frac{\Omega-(5+\rho)2\sqrt{\lambda}}{5}$. Furthermore, the residents' utility has a quadratic form and the unique maximizer. Thus, if the unique maximizer t_1^{*d} is weakly closer to the lower bound of t_1 for (25) than to the upper bound, the benevolent type has no deviation incentive. This condition can be written as

$$\frac{\Omega+\rho t_{1O}^{G*}}{5+\rho} \geq t_1^{*d},$$

which can be rewritten as

$$\sqrt{\lambda} \leq \frac{16\bar{k}+\Delta}{\rho}.$$

This is satisfied by the assumption about λ so that the benevolent type has no deviation incentive.

Next, consider the case where $t_{1O}^{G*} = \frac{\Omega+(5+\rho)2\sqrt{\lambda}}{5}$. Observe that $\frac{\Omega+\rho t_{1O}^{G*}}{5+\rho} + 2\sqrt{\lambda}$, which is the upper bound of t_1 for (25), is equal to $t_{1O}^{G*} = \frac{\Omega+(5+\rho)2\sqrt{\lambda}}{5}$. Similarly in the above, the benevolent type has no deviation incentive if

$$\frac{\Omega+\rho t_{1O}^{G*}}{5+\rho} \leq t_1^{*d},$$

which can be rewritten as

$$\sqrt{\lambda} \geq -\frac{(16\bar{k}+\Delta)}{\rho}.$$

This always holds because the right-hand side is negative.

By combining these steps, we have Lemma 2. ■

B.4 Proof of Lemma 3

Only if part: Suppose that there exists a separating equilibrium in which $(t_{1O}^{G*}, t_{1O}^{B*}, t_{2O}^{*}) = (t_{1O}^{G*}(0), t_{1O}^{B*}(0), t_{2O}^{*}(0))$. Consider the leviathan type's deviation incentive. The leviathan type has no incentive to deviate from $t_{1O}^{B*}(0)$ to $t_{1O}^{G*}(0)$ if and only if

$$t_{1O}^{B*}(0)k_1 \geq t_{1O}^{G*}(0)k_1 + \lambda.$$

Substituting (5), (6), (7), and (2) into this yields

$$\left(\frac{16\bar{k}+\Delta}{15+\rho}\right)^2 \geq \lambda.$$

Thus, only if $\sqrt{\lambda} \leq \frac{16\bar{k}+\Delta}{15+\rho}$, $(t_{1O}^{G*}(0), t_{1O}^{B*}(0), t_{2O}^{*}(0))$ can constitute an equilibrium.

If part: It is straightforward that $(t_{1O}^{G*}(0), t_{1O}^{B*}(0), t_{2O}^{*}(0))$ constitutes an equilibrium satisfying the intuitive criterion. ■

B.5 Proof of Theorem 1

Combining Lemma 2 and Lemma 3, we directly obtain the theorem. Notice that when $\sqrt{\lambda} = \frac{16\bar{k}+\Delta}{15+\rho}$, $t_{1O}^{G*}(0) = \frac{\Omega-(5+\rho)\sqrt{\lambda}}{5}$. ■

B.6 Proof of Proposition 1

(i) When $\sqrt{\lambda} \leq \frac{16\bar{k}+\Delta}{15-\rho}$, the equilibrium is $(t_{1O}^{G*}, t_{1O}^{B*}, t_{2O}^{*}) = (t_{1O}^{G*}(0), t_{1O}^{B*}(0), t_{2O}^{*}(0))$. Thus, obviously, t_{1O}^{G*} maximizes the residents' utility given t_{2O}^{*}.

(ii) When $\sqrt{\lambda} > \frac{16\bar{k}+\Delta}{15-\rho}$, the equilibrium such that $t_{1O}^{G*} = \frac{\Omega-(5+\rho)2\sqrt{\lambda}}{5}$ exists. Remember that

$$t_1^{*d} = \mathrm{argmax}_{t_1} (A_1 - k_1)k_1 + r(\bar{k} - k_1) \ \text{ s.t.}(2), (3), \text{and } t_2 = t_{2O}^{*}.$$

Here, as discussed in Step 2-1 in the proof of Lemma 2, $\frac{\Omega-(5+\rho)2\sqrt{\lambda}}{5} < t_1^{*d}$ if and only if $\sqrt{\lambda} > \frac{16\bar{k}+\Delta}{15+\rho}$.

(iii) When $\sqrt{\lambda} \geq \frac{\sqrt{3}(16\bar{k}+\Delta)}{30-\sqrt{3}(15+\rho)}$, the equilibrium such that $t_{1O}^{G*} = \frac{\Omega+(5+\rho)2\sqrt{\lambda}}{5}$ exists. Similarly, $\frac{\Omega+(5+\rho)2\sqrt{\lambda}}{5} > t_1^{*d}$ if and only if $\sqrt{\lambda} > \frac{16\bar{k}+\Delta}{15-\rho}$. This holds when $\sqrt{\lambda} \geq \frac{\sqrt{3}(16\bar{k}+\Delta)}{30-\sqrt{3}(15+\rho)}$.

By combining (i) -(iii), we have the proposition. ■

B.7 Proof of Proposition 2

(a)

$$t_{1O}^{G*} - t_{1O}^{G*}(0) = -\frac{2}{5}(5+\rho)\left(\sqrt{\lambda} - \frac{16\bar{k}+\Delta}{15+\rho}\right) < 0.$$

Using this, we obtain $t_{1O}^{B*} < t_{1O}^{B*}$ and $t_{2O}^{*} < t_{2O}^{*}(0)$. ■

(b)

$$\begin{aligned} r_O^{G*} - r_O^{G*}(0) =& \frac{t_{1O}^{G*}(0) + t_{2O}^{*}(0) - (t_{1O}^{G*} + t_{2O}^{*})}{2} \\ =& \frac{5+3\rho}{2(5+\rho)}(t_{1O}^{G*}(0) - t_{1O}^{G*}) \\ =& \frac{5+3\rho}{5}\left(\sqrt{\lambda} - \frac{16\bar{k}+\Delta}{15+\rho}\right). \end{aligned}$$

The first equality comes from equation (3), the second equality comes from (11), and the third equality comes from (a). Similarly, we obtain the value of $r_O^{B*} - r_O^{B*}(0)$. ■

(c)

$$\begin{aligned} k_{1O}^{G*} - k_{1O}^{G*}(0) =& \frac{t_{1O}^{G*}(0) - t_{1O}^{G*} + t_{2O}^{*} - t_{2O}^{*}(0)}{4} \\ =& \frac{5-\rho}{4(5+\rho)}(t_{1O}^{G*}(0) - t_{1O}^{G*}) \\ =& \frac{5-\rho}{10}\left(\sqrt{\lambda} - \frac{16\bar{k}+\Delta}{15+\rho}\right). \end{aligned}$$

The first equality comes from equation (2), the second equality comes from (11), and the third equality comes from (a). Similarly, we obtain the value of $k_{1O}^{B*} - k_{1O}^{B*}(0)$. ■

B.8 Proof of Proposition 3

(b) and (c) imply (a).

(b) Observe that $W_{1O}^{G*} - W_{1O}^{G*}(0)$ can be rewritten as

$$\begin{aligned} W_{1O}^{G*} - W_{1O}^{G*}(0) =& f(k_{1O}^{G*}) - f(k_{1O}^{G*}(0)) - r_O^{G*}(k_{1O}^{G*} - k_{1O}^{G*}(0)) + (r_O^{G*} - r_O^{G*}(0))(\bar{k} - k_{1O}^{G*}(0)) \\ =& (k_{1O}^{G*} - k_{1O}^{G*}(0))\left[A_1 - r_O^{G*} - (k_{1O}^{G*} + k_{1O}^{G*}(0))\right] + (r_O^{G*} - r_O^{G*}(0))(\bar{k} - k_{1O}^{G*}(0)) \\ =& \left(\sqrt{\lambda} - \frac{16\bar{k}+\Delta}{15+\rho}\right)\left\{\frac{5-\rho}{10}\left[A_1 - r_O^{G*} - (k_{1O}^{G*} + k_{1O}^{G*}(0))\right] + \frac{5+3\rho}{5}(\bar{k} - k_{1O}^{G*}(0))\right\}. \end{aligned} \tag{31}$$

The second equality comes from the definition of $f(k)$, and the third equality comes from the values of $k_{1O}^{G*}-k_{1O}^{G*}(0)$ and $r_{1O}^{G*}-r_{1O}^{G*}(0)$ derived in Proposition 2.

Here, $A_1 - r_O^{G*} - (k_{1O}^{G*}+k_{1O}^{G*}(0))$ in (31) can be rewritten as

$$\begin{aligned} A_1 - r_O^{G*} - (k_{1O}^{G*}+k_{1O}^{G*}(0)) &= \frac{1}{4}\left(3t_{1O}^{G*}+t_{2O}^{*}+t_{1O}^{G*}(0)-t_{2O}^{*}(0)\right) \\ &= \frac{11+\rho}{15+\rho}\frac{\Delta}{2}+\frac{7+\rho}{15+\rho}4\bar{k}-\frac{3+\rho}{2}\sqrt{\lambda}. \end{aligned} \tag{32}$$

In addition, $\bar{k}-k_{1O}^{G*}(0)$ in (31) can be rewritten as

$$\bar{k}-k_{1O}^{G*}(0) = -\frac{2}{15+\rho}\left[\Delta+(1-\rho)\bar{k}\right]. \tag{33}$$

Substituting (32) and (33) into (31) yields

$$\left(\sqrt{\lambda}-\frac{16\bar{k}+\Delta}{15+\rho}\right)\times K, \tag{34}$$

where

$$K = \frac{-\rho^2-30\rho+15}{20(15+\rho)}\Delta+\frac{4\rho^2+60}{5(15+\rho)}\bar{k}-\frac{(5-\rho)(3+\rho)}{20}\sqrt{\lambda}.$$

Since $\sqrt{\lambda}-\frac{16\bar{k}+\Delta}{15+\rho}>0$, the sign of (31) is equal to the sign of K. Thus, it suffices to focus on the sign of K.

First, when $\Delta=0$, $K<\frac{-8\rho}{5(15+\rho)}\bar{k}<0$. Here, the first inequality comes from $\sqrt{\lambda}>\frac{16\bar{k}+\Delta}{15+\rho}$. Hence, when $\Delta=0$, $W_{1O}^{G*}<W_{1O}^{G*}(0)$.

Second, observe that whether K is increasing or decreasing in Δ depends on the sign of $-\rho^2-30\rho+15$.

(i) When $\rho>4\sqrt{15}-15$, $-\rho^2-30\rho+15<0$ i.e., K (i.e., (31)) is decreasing in Δ.

(ii) When $\rho=4\sqrt{15}-15$, $-\rho^2-30\rho+15=0$ i.e., K is independent of Δ. Thus, $K<0$ for any Δ.

(iii) When $\rho<4\sqrt{15}-15$, $-\rho^2-30\rho+15>0$ i.e., K is increasing in Δ. Then, for any $\Delta<0$, $K<0$ holds. Focus on $\Delta>0$. Here, the upper bound of Δ is $(15+\rho)\sqrt{\lambda}-16\bar{k}$ because $\sqrt{\lambda}>\frac{16\bar{k}+\Delta}{15+\rho}$ must hold. Hence, if $K>0$ holds when $\Delta=(15+\rho)\sqrt{\lambda}-16\bar{k}$, $W_{1O}^{G*}<W_{1O}^{G*}(0)$ holds for any $\Delta>0$. Suppose that $\Delta=(15+\rho)\sqrt{\lambda}-16\bar{k}$. Then,

$$K=\frac{-\rho^2-30\rho+15}{20}\sqrt{\lambda}-\frac{-\rho^2-30\rho+15}{5(15+\rho)}4\bar{k}+\frac{4\rho^2+60}{5(15+\rho)}\bar{k}-\frac{(5-\rho)(3+\rho)}{20}\sqrt{\lambda}=\frac{8\rho}{5}(\bar{k}-\sqrt{\lambda}).$$

Since $\sqrt{\lambda} > \frac{16\bar{k}+\Delta}{15+\rho}$ holds for non-negative Δ, this is negative. Hence, $K < 0$ for any Δ.

Combining these arguments, we have (b) and the first part of (a). ■

(c) Observe that $W_{1O}^{B*} - W_{1O}^{B*}(0)$ can be rewritten as

$$W_{1O}^{B*} - W_{1O}^{B*}(0) = \left(\sqrt{\lambda} - \frac{16\bar{k}+\Delta}{15+\rho}\right)\left\{-\frac{\rho}{10}\left[A_1 - r_O^{B*} - (k_{1O}^{B*} + k_{1O}^{B*}(0))\right] + \frac{6\rho}{5}(\bar{k} - k_{1O}^{B*}(0))\right\}. \tag{35}$$

Here, $A_1 - r_O^{B*} - (k_{1O}^{B*} + k_{1O}^{B*}(0))$ in (35) can be rewritten as

$$A_1 - r_O^{B*} - (k_{1O}^{B*} + k_{1O}^{B*}(0)) = \frac{12+\rho}{15+\rho}\frac{\Delta}{2} + \frac{9+\rho}{15+\rho}4\bar{k} - \frac{\rho}{2}\sqrt{\lambda}. \tag{36}$$

In addition, $\bar{k} - k_{1O}^{B*}(0)$ in (35) can be rewritten as

$$\bar{k} - k_{1O}^{B*}(0) = \frac{1}{15+\rho}\left[-\frac{3}{2}\Delta + (3+\rho)2\bar{k}\right]. \tag{37}$$

Substituting (36) and (37) into (35) yields

$$\left(\sqrt{\lambda} - \frac{16\bar{k}+\Delta}{15+\rho}\right) \times K', \tag{38}$$

where

$$K' = \frac{\rho}{5}\left(-\frac{6-\rho}{15+\rho}\frac{\Delta}{4} + \frac{4\rho}{15+\rho}\bar{k} + \frac{\rho}{4}\sqrt{\lambda}\right).$$

Since $\sqrt{\lambda} - \frac{16\bar{k}+\Delta}{15+\rho} > 0$, the sign of (35) is equal to the sign of K'. Thus, it suffices to focus on the sign of K'. When $\Delta = 0$, it is straightforward that $K' > 0$. In addition, K' is obviously decreasing in Δ. Hence, we have (c) and the second part of (a). ■

(d) Substituting (34) and (38), $\rho(W_{1O}^{G*} - W_{1O}^{G*}(0)) + (1-\rho)(W_{1O}^{B*} - W_{1O}^{B*}(0))$ can be rewritten as

$$\rho(W_{1O}^{G*} - W_{1O}^{G*}(0)) + (1-\rho)(W_{1O}^{B*} - W_{1O}^{B*}(0)) = \frac{\rho}{20}\left(\sqrt{\lambda} - \frac{16\bar{k}+\Delta}{15+\rho}\right)K'', \tag{39}$$

where

$$K'' = \frac{-20\rho^2 - 23\rho + 9}{(15+\rho)}\Delta + \frac{16}{5}\bar{k} - (15+\rho)\sqrt{\lambda}.$$

Since $\sqrt{\lambda} - \frac{16\bar{k}+\Delta}{15+\rho} > 0$, the sign of (39) is equal to the sign of K''.

First, observe that when $\Delta = 0$, $K'' < 0$ because $\sqrt{\lambda} - \frac{16\bar{k}}{15+\rho} > 0$. Second, when $\rho > \frac{\sqrt{601}}{4} - \frac{23}{4}$, $-20\rho^2 - 23\rho + 9 < 0$, and thus, K'' is decreasing in Δ. Hence, it is straightforward that when $\rho > \frac{\sqrt{601}}{4} - \frac{23}{4}$, there exists $\bar{\Delta}' < 0$ such that if and only if $\Delta < \bar{\Delta}'$, K'' is positive. ■

B.9 Proof of Proposition 4

$\rho(W_{2O}^{G*} - W_{2O}^{G*}(0)) + (1-\rho)(W_{2O}^{B*} - W_{2O}^{B*}(0))$ can be rewritten as

$$\rho(W_{2O}^{G*} - W_{2O}^{G*}(0)) + (1-\rho)(W_{2O}^{B*} - W_{2O}^{B*}(0)) = \frac{\rho}{20}\left(\sqrt{\lambda} - \frac{16\bar{k}+\Delta}{15+\rho}\right)N'', \tag{40}$$

where

$$N'' = \frac{47\rho+375}{5(15+\rho)}\Delta + \frac{-32\rho^2+66\rho-130}{5(15+\rho)}8\bar{k} + \frac{25+23\rho}{5}\sqrt{\lambda}.$$

Since $\sqrt{\lambda} - \frac{16\bar{k}+\Delta}{15+\rho} > 0$, the sign of (40) is equal to the sign of N''. Since N'' is increasing in Δ, if Δ is sufficiently large, $N'' > 0$. Thus, there exists $\underline{\Delta''}$ such that if and only if $\Delta > \underline{\Delta''}$, $\rho(W_{2O}^{G*} - W_{2O}^{G*}(0)) + (1-\rho)(W_{2O}^{B*} - W_{2O}^{B*}(0)) > 0$. ■

B.10 Proof of Proposition 5

It suffices to prove that $W_O^{G*} < W_O^{G*}(0)$ and $W_O^{B*} < W_O^{B*}(0)$.

Step 1. To begin with, observe that the world welfare given k_1 and k_2 can be rewritten as $f_1(k_1) + f_2(k_2)$. Here,

$$f_1(k_1) + f_2(k_2) = -2\left[k_1 - \left(\bar{k} + \frac{\Delta}{4}\right)\right]^2 + \text{const.}$$

Thus, the world welfare is maximized at

$$k_1^* = \bar{k} + \frac{\Delta}{4}.$$

Hence, the world welfare is decreasing in $|k_1 - k_1^*|$.

Step 2. Prove that $W_O^{G*} < W_O^{G*}(0)$. From step 1, it suffices to prove that $|k_{1O}^{G*} - k_1^*| > |k_{1O}^{G*}(0) - k_1^*|$. In addition, from (2), this is equivalent to prove that $|t_{1O}^{G*} - t_{2O}^{G*}| > |t_{1O}^{G*}(0) - t_{2O}^{G*}(0)|$.

Here, since $t_{1O}^{G*}(0) - t_{2O}^{G*}(0) < 0$ is assumed, $t_{1O}^{G*} - t_{2O}^{G*} < 0$. Therefore, what to prove is that $t_{1O}^{G*}(0) - t_{2O}^{G*}(0) > t_{1O}^{G*} - t_{2O}^{G*}$.

$$\begin{aligned} t_{1O}^{G*}(0) - t_{2O}^{G*}(0) - (t_{1O}^{G*} - t_{2O}^{G*}) =& \frac{5-\rho}{5+\rho}(t_{1O}^{G*}(0) - t_{1O}^{G*}) \\ =& \frac{2}{5}(5-\rho)\left(\sqrt{\lambda} - \frac{16\bar{k}+\Delta}{15+\rho}\right) > 0. \end{aligned}$$

The first equality comes from (11), and the second equality comes from Proposition 2(a). Hence, $W_O^{G*} < W_O^{G*}(0)$.

Step 3. By using the similar procedure, we have $W_O^{B*} < W_O^{B*}(0)$. ■

B.11 Proof of Theorem 4

Divide politicians' utilities in the extension by $(1+\delta)$. Such normalization does not change any result.

Observe that Theorems 1 and 4 hold under the alternative setting that $\lambda \pi_i(t_i)$ in politicians' utilities is replaced by $f(\pi_i(t_i))$ where $f(1) - f(0) = \lambda$ and f is a weakly increasing function.[36] Given residents' voting strategy, politicians' utilities in the extension can be rewritten as the sum of economic utilities ($U(c_i, g_i)$ or $T + t_i k_i$) and f. Thus, it suffices to prove that f in this extension satisfies two properties that $f(1) - f(0) = \lambda$ and f is a weakly increasing function.

To begin with, it is easily verified that the residents in country 1 vote for the incumbent (the new candidate) if $\pi_1(t_1) > \rho$ ($\pi_1(t_1) < \rho$). Thus,

$$f(1) = \frac{\delta}{1+\delta} b; \;\; f(0) = -\frac{\delta}{1+\delta} \frac{(x_i^* - x_{iL}^*)^2}{2},$$

which implies that

$$f(1) - f(0) = \frac{\delta}{1+\delta} \left[b + \frac{1}{2}(x_i^* - x_{iL}^*)^2 \right] = \lambda.$$

Furthermore, it is straightforward that f is a weakly increasing function.

Therefore, we obtain the theorem. ■

B.12 Proof of Theorem 6

The proof is almost the same as those of Lemmas 1, 2, 3 and Theorem 3. The only difference is the condition under which the country 1's benevolent type does not deviate from t_{1O}^{G*} to the tax rate that maximizes the residents' utility. This was examined in Step. 2-2 of Lemma 2 for the case where $\alpha = 0$. As in Lemma 2, let the tax rate that maximizes the residents' utility given t_{2O}^* be t_1^{*d}.

Even if $\pi_1(t_1^{*d}) = 0$, the benevolent type may still have an incentive to deviate to t_1^{*d}. The incentive compatibility condition for this deviation is given by

$$U(c_1, g_1 | t_1^{*d}, t_{2O}^*) \leq U(c_1, g_1 | t_{1O}^{*d}, t_{2O}^*) + \lambda.$$

Substituting (2) and (3) into this yields

$$\frac{3+4\alpha}{16}(t_1^{*d} - t_{1O}^{G*})^2 \leq \lambda. \tag{41}$$

[36]This may not be sufficient for the analysis of pooling equilibria. However, this is enough for the analysis of separating equilibria.

Substituting $t_{1O}^{G*} = \frac{\Omega_1 - [5+\rho+2\alpha(3+\rho)]2\sqrt{\lambda}}{5+6\alpha}$ into (41) yields

$$-2\sqrt{\lambda}(\sqrt{3+4\alpha}(5+6\alpha)(2-\sqrt{3+4\alpha})-\rho(1+2\alpha)) \leq \frac{4\bar{k}(A+B\rho)+2(1+\alpha)\Delta(C+D\rho)}{E}.$$

If $\sqrt{3+4\alpha}(5+6\alpha)(2-\sqrt{3+4\alpha})-\rho(1+2\alpha) \geq 0$ holds, the above inequality always holds[37] i.e., the benevolent type has no incentive to deviate from $t_{1O}^{G*} = \frac{\Omega_1 - [5+\rho+2\alpha(3+\rho)]2\sqrt{\lambda}}{5+6\alpha}$.

Next, consider the case where $\sqrt{3+4\alpha}(5+6\alpha)(2-\sqrt{3+4\alpha})-\rho(1+2\alpha) < 0$. Then, if and only if the following inequality holds, the benevolent type has no incentive to deviate from $t_{1O}^{G*} = \frac{\Omega_1 - [5+\rho+2\alpha(3+\rho)]2\sqrt{\lambda}}{5+6\alpha}$:

$$\sqrt{\lambda} \leq \frac{2(A+B\rho)\bar{k}+(1+\alpha)(C+D\rho)\Delta}{E\left[(1+2\alpha)\rho+(3+4\alpha)(5+6\alpha)-2\sqrt{3+4\alpha}(5+6\alpha)\right]}. \blacksquare$$

References

[1] Acemoglu, D., Egorov, G., & Sonin, K. (2013). A Political Theory of Populism. *The Quarterly Journal of Economics, 128*(2), 771- 805.

[2] Acemoglu, D., Robinson, J. A., & Torvik, R. (2013). Why Do Voters Dismantle Checks and Balances?. *Review of Economic Studies, 80*(3), 845-875.

[3] Aggeborn, L., & Persson, L. (2017). Public Finance and Right-Wing Populism. Unpublished.

[4] Autor, D., Dorn, D., Hanson, G., & Majlesi, K. (2017). Importing Political Polarization? The Electoral Consequences of Rising Trade Exposure. Unpublished.

[5] Besley, T., & Case, A. (1995). Incumbent Behavior: Vote Seeking, Tax Setting and Yardstick Competition. *American Economic Review, 85*(1), 25-45.

[6] Besley, T. J., & Smart, M. (2002). Does Tax Competition Raise Voter Welfare? Unpublished.

[7] Betz, H. G. (1993). The New Politics of Resentment: Radical Right-Wing Populist Parties in Western Europe. *Comparative Politics, 25*(4), 413-427.

[8] Brennan, G., & Buchanan, J. (1977). Towards a Tax Constitution for Leviathan. *Journal of Public Economics, 8*(3), 255-273.

[37] This is because the left-hand side is negative whereas the right-hand side is positive.

[9] Brennan, G., & Buchanan, J. (1980). *The Power to Tax: Analytical Foundations of a Fiscal Constitution.* Cambridge University Press.

[10] Cho, I. K., & Kreps, D. M. (1987). Signaling Games and Stable Equilibria. *The Quarterly Journal of Economics, 102*(2), 179-221.

[11] Colantone, I., & Stanig, P. (2018). Global Competition and Brexit. *American Political Science Review, 112*(2), 201-218.

[12] Colantone, I., & Stanig, P. (forthcoming). The Trade Origins of Economic Nationalism: Import Competition and Voting Behavior in Western Europe. *American Journal of Political Science.*

[13] De Koster, W., Achterberg, P., & Van der Waal, J. (2013). The New Right and the Welfare State: The Electoral Relevance of Welfare Chauvinism and Welfare Populism in the Netherlands. *International Political Science Review, 34*(1), 3-20.

[14] DePeter J.A., & Myers, G.M. (1994). Strategic Capital Tax Competition: A Pecuniary Externality and a Corrective Device. *Journal of Urban Economics, 36*(1), 66—78.

[15] Devereux, M. P., Lockwood, B., & Redoano, M. (2008). Do Countries Compete over Corporate Tax Rates? *Journal of Public Economics, 92*(5-6), 1210-1235.

[16] Devereux, M. P., & Loretz, S. (2013). What Do We Know about Corporate Tax Competition?. *National Tax Journal, 66*(3), 745-774.

[17] Dippel, C., Gold, R., & Heblich, S. (2015). Globalization and Its (Dis-) Content: Trade Shocks and Voting Behavior. *NBER Working Paper* No. 21812.

[18] Eguia, J. X., & Giovannoni, F. (2017). Tactical Extremism. Unpublished.

[19] Eichner, T. (2014). Endogenizing Leadership and Tax Competition: Externalities and Public Good Provision. *Regional Science and Urban Economics, 46*(C), 18-26.

[20] Formisano, R. P. (2012). *The Tea Party: A Brief History.* Johns Hopkins University Press.

[21] Fox, J., & Van Weelden, R. (2010). Partisanship and the Effectiveness of Oversight. *Journal of Public Economics, 94*(9), 674-687.

[22] Frisell, L. (2009). A Theory of Self-Fulfilling Political Expectations. *Journal of Public Economics, 93*(5), 715-720.

[23] Fu, Q., & Li, M. (2014). Reputation-Concerned Policy Makers and Institutional Status Quo Bias. *Journal of Public Economics, 110*(C), 15-25.

[24] Hindriks, J., & Nishimura, Y. (2015). A Note on Equilibrium Leadership in Tax Competition Models. *Journal of Public Economics, 121*(C), 66-68.

[25] Ihori, T., & Yang, C. C. (2009). Interregional Tax Competition and Intraregional Political Competition: The Optimal Provision of Public Goods under Representative Democracy. *Journal of Urban Economics, 66*(3), 210-217.

[26] Itaya, J. I., Okamura, M., & Yamaguchi, C. (2008). Are Regional Asymmetries Detrimental to Tax Coordination in a Repeated Game Setting?. *Journal of Public Economics, 92*(12), 2403-2411.

[27] Karakas, L. D., & Mitra, D. (2017). Inequality, Redistribution and the Rise of Outsider Candidates. Unpublished.

[28] Kawachi, K., Ogawa, H., & Susa, T. (2017). Endogenizing Government's Objectives in Tax Competition with Capital Ownership. Unpublished.

[29] Keen, M., & Konrad, K. A. (2013). The Theory of International Tax Competition and Coordination. Auerbach, A. J., Chetty, R., Feldstein, M., & Saez, E. (eds.) *Handbook of Public Economics, 5*, 257-328. Amsterdam: North-Holland.

[30] Kempf, H., & Rota-Graziosi, G. (2010). Endogenizing Leadership in Tax Competition. *Journal of Public Economics, 94*(9), 768-776.

[31] Kishishita, D. (2017). Emergence of Populism under Risk and Ambiguity. Unpublished.

[32] Lai, Y. B. (2014). Asymmetric Tax Competition in the Presence of Lobbying. *International Tax and Public Finance, 21*(1), 66-86.

[33] Lindgren, P. Y. (2015). Developing Japanese Populism Research through Readings of European Populist Radical Right Studies: Populism as an Ideological Concept, Classifications of Politicians and Explanations for Political Success. *Japanese Journal of Political Science, 16*(4), 574-592.

[34] Matsen, E., Natvik, G. J., & Torvik, R. (2016). Petro Populism. *Journal of Development Economics, 118,* 1-12.

[35] Mudde, C. (2004). The Populist Zeitgeist. *Government and Opposition, 39*(4), 542-563.

[36] Nishimura, Y., & Terai, K. (2017). The Direction of Strategic Delegation and Voter Welfare in Asymmetric Tax Competition Models. Unpublished.

[37] Ogawa, H. (2013). Further Analysis on Leadership in Tax Competition: The Role of Capital Ownership. *International Tax and Public Finance, 20*(3), 474-484.

[38] Ogawa, H., & Susa, T. (2017). Strategic Delegation in Asymmetric Tax Competition. *Economics & Politics, 29*(3), 237-251.

[39] Pal, R., & Sharma, A. (2013). Endogenizing Governments' Objectives in Tax Competition. *Regional Science and Urban Economics, 43*(4), 570-578.

[40] Persson, T., & Tabellini, G. (1992). The Politics of 1992: Fiscal Policy and European Integration. *The Review of Economic Studies, 59*(4), 689-701.

[41] Roberts, K. M. (1995). Neoliberalism and the Transformation of Populism in Latin America: The Peruvian Case. *World Politics, 48*(1), 82-116.

[42] Rovny, J. (2013). Where Do Radical Right Parties Stand? Position Blurring in Multidimensional Competition. *European Political Science Review, 5*(1), 1-26.

[43] Sato, M. (2003). Tax Competition, Rent-Seeking and Fiscal Decentralization. *European Economic Review, 47*(1), 19-40.

[44] Sawer, M., & Laycock, D. (2009). Down with Elites and Up with Inequality: Market Populism in Australia and Canada. *Commonwealth & Comparative Politics, 47*(2), 133-150.

[45] Steger, W. (2017). Populist Challenges in the 2016 Presidential Nominations. Cavari, A., Mayer, K., & Powell, R., J. (eds.) *The 2016 Presidential Elections: The Causes and Consequences of a Political Earthquake,* 23-42. Lexington Books.

[46] Weathers, C. (2014). Reformer or Destroyer? Hashimoto Tōru and Populist Neoliberal Politics in Japan. *Social Science Japan Journal, 17*(1), 77-96.

[47] Wilson, J. D. (1986). A Theory of Interregional Tax Competition. *Journal of Urban Economics, 19*(3), 296-315.

[48] Zodrow, G. R., & Mieszkowski, P. (1986). Pigou, Tiebout, Property Taxation, and the Underprovision of Local Public Goods. *Journal of Urban Economics, 19*(3), 356-370.