Legislature Composition and Representative Democracy*

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Abstract

This paper concerns the role of low-income citizens' policy preferences in the policy-making process in representative democracies. Provided redistribution is the salient policy issue, ignoring policy outcomes altogether, the often-observed predominance of high-income citizens in the national legislature may imply that not only high-income citizens but also low-income citizens who hold office would vote against low-income citizens' preferred redistribution policy if their vote was pivotal. Formalizing the underlying logic using well-documented office-holding premia shows that a sense of group identity or reelection concerns cannot override it. Low-income citizens' redistribution preferences might thus play a limited role in the policy-making process.

Keywords: Legislature Composition, Representation, Redistribution, Pivotal Vote.

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1 Introduction

High-income citizens predominate in the national legislature in many representative democracies (e.g., Carnes 2012, 2018; Thompson et al. 2019; Gagliarducci et al. 2010; Peichl et al. 2013; Dal Bó et al. 2017). A natural question thus is how salient the policy preferences of low-income citizens are in their policy-making process. This question is not settled. Some argue that low-income citizens' policy preferences are underrepresented (e.g., Gilens 2005, 2009; Carnes 2012; Gilens and Page 2014; Peters and Ensink 2015). Others disagree (e.g., Soroka and Wlezien 2008; Ura and Ellis 2008; Kelly and Enns 2010; Brunner et al. 2013; Branham et al. 2017). This question is important. Many major policy issues have an inherent redistributional component—from tax progressivity and welfare spending to public education and health care (e.g., Besley and Coate 1991; Boadway and Marchand 1995)—and studies of the determinants of preferences for redistribution—such as efficiency concerns, inequality aversion, and many others—consistently find that low-income citizens prefer more redistribution than high-income citizens (e.g., Corneo and Grüner 2002; Klor and Shayo 2010; Esarey et al. 2012; Durante et al. 2014; Lefgren et al. 2016; Gee et al. 2017; Tepe et al. 2021).

This paper highlights a possible implication of the observed predominance of high-income citizens in the national legislature. When redistribution is the salient policy issue, the predominance of high-income citizens among legislators may require that all legislators, including low-income citizens who hold office, vote against low-income citizens' preferred redistribution policy if their vote is pivotal—and so would every citizen if they held office. Low-income citizens' redistribution preferences might thus play only a limited role in the policy-making process. Of course, one might object that many legislators express support for redistributive policies in public statements or publicly recorded votes. However, arguably, public statements and votes might involve strategic interactions and messaging to voters, particularly when they do not affect the payoff-relevant policy outcome.

I illustrate the basic logic in a deliberately stylized environment that respects several empirical observations. First, low-income citizens—those with less-than-average income—constitute the majority in most electoral districts.[1] Second, low-income citizens prefer more redistribution than high-income citizens (see above). Third, voters do not expect low-income candidates to be less effective in office than high-income candidates (Carnes and Lupu 2016; Campbell and Cowley 2014).[2] Fourth, legislators vote according to their personal policy preferences (e.g., Levitt 1996; Lee et al. 2004; Matsusaka 2017). Finally, while there are many suitable channels to determine what redistribution policy legislators vote for if their vote is pivotal (see Section 4), I allow for income premia to be associated with holding office. Such office-holding premia are well documented across many democratic societies (e.g., Gagliarducci et al. 2010; Eggers and Hainmueller 2009; Peichl et al. 2013; Kotakorpi et al. 2017; Berg 2020). These premia may arise from, for example, relatively high

[1] For example, in 100% and in over 89% of all congressional districts for the 115th United States Congress, respectively, the median household income is less than the mean household income in the district and in the United States overall. Data: United States Census Bureau, 2012–2016 American Community Survey 5-year estimates, in 2016 inflation-adjusted US dollars, accessed on 4/20/2018.

[2] While voters do, of course, value competence as in previous experience or past performance in office (e.g, Lublin 1994; Squire 1995; Hobolt and Høyland 2011; Kendall et al. 2015), they do not seem to consider income to be informative as to whether a candidate has the required competence or characteristics for being a good representative.

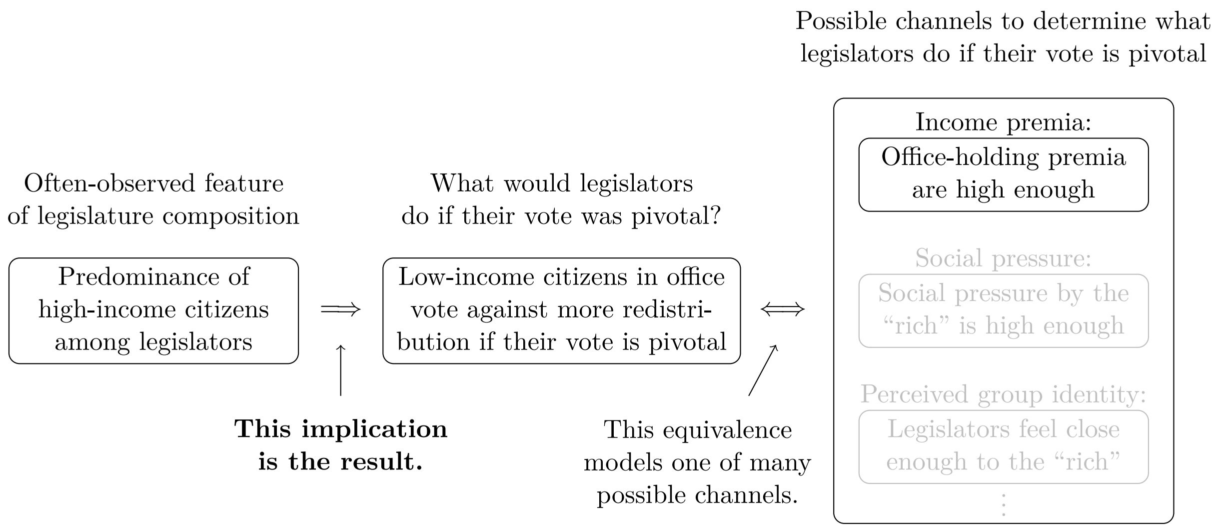

Figure 1: The result versus modeling possible channels.

legislator salaries, outside income while in office, and increased income potential in a future post-legislature career.[3] For example, in 2016, the base salary of a member of the United States Congress was \$174,000—more than four times the median earnings of under \$40,000 in the US population aged 25 and over.[4] That year's highest estimated outside income reported for a member of Congress was over \$1.7 million,[5] and the interpretation is that the visibility and public image legislators gain from the office might, for example, make book deals more lucrative. Finally, Diermeier et al. (2005) estimate that a first-time reelection to Congress increases post-congressional wages by at least about 4% or 17% depending on the chamber. While the environment allows for such office-holding premia, they are of unspecified size and could be very low or zero. Modifying this basic environment slightly, I also address the natural question of why a sense of group identity or reelection concerns would not override the underlying logic. Whether to enact more redistribution, which is the redistribution policy low-income citizens prefer, is the salient policy issue throughout. Modeling multiple electoral districts rather than one political office and abstracting from legislative voting allows me to focus on what legislators would do if their vote was pivotal independently of interpretations in terms of possibly observable policy outcomes, which I ignore altogether.

I find that the predominance of high-income citizens among legislators in equilibrium requires that low-income citizens in office also vote against more redistribution if their vote is pivotal, irrespective of how many low-income citizens actually hold office. In fact, while many low-income

[3]On high legislator salaries, see, e.g., Berg (2020). On outside income while in office, see, e.g., Gagliarducci et al. (2010); Eggers and Hainmueller (2009); Peichl et al. (2013); Geys and Mause (2013); Kotakorpi et al. (2017); Cirone et al. (2021); Weschle (2021); Dahlgaard et al. (2022). On post-legislature careers, see, e.g., Diermeier et al. (2005); Mattozzi and Merlo (2008); Eggers and Hainmueller (2009); Parker and Parker (2009); Palmer and Schneer (2016).

[4]Brudnick (2016) and United States Census Bureau, 2012–2016 American Community Survey 5-year estimates, accessed on 9/25/2018.

[5]Center for Responsive Politics, accessed at https://www.opensecrets.org/personal-finances/top-outside-income?filter=C&year=2016 on 12/03/2019.

citizens may hold office, even the extreme case of all legislators being high-income citizens can arise only if low-income citizens would also vote against more redistribution if they held office and their vote was pivotal. A sense of group identity or reelection concerns cannot override the underlying logic. If low-income citizens who hold office for whatever reason still vote for more redistribution if their vote is pivotal, then they get most votes in most districts and thus win most seats in the legislature, and high-income citizens cannot predominate in it.

Figure 1 clarifies the relationship between this result and the possibility of office-holding premia in the model. The result is that high-income citizens can predominate in the legislature only if low-income citizens vote against more redistribution if they hold office and their vote is pivotal. Given the channel modeled—which is one of many possible channels (also see Section 4)—for low-income citizens to vote against more redistribution if they hold office and their vote is pivotal, office-holding premia must be high enough. I show in the online appendix that the underlying logic carries over to extensions of the basic environment that allow for, respectively, a second policy dimension that is independent of income and a role for campaign finance and special interests. Whether the logic applies in practice is ultimately an empirical question, which, due to implications the pivotality condition has for empirical tests (see Section 4), is beyond the scope of this paper.

Further Related Literature. While the salient policy issue is redistribution (e.g., Meltzer and Richard 1981), given the focus on legislature composition, this paper is most closely related to the literature on political selection. I study a citizen-candidate environment (Osborne and Slivinski 1996; Besley and Coate 1997) with opportunistic parties and an income premium associated with holding office. Focusing on politician quality, ability, or valence, Carrillo and Mariotti (2001), Galasso and Nannicini (2011), Mattozzi and Merlo (2015), and others study the selection of political candidates by parties. Similarly, for example, Caselli and Morelli (2004), Messner and Polborn (2004), and Poutvaara and Takalo (2007) study the role of politician pay in determining the selection of political candidates. None of these papers can speak to the redistribution policies legislators would cast a pivotal vote for when high-income citizens predominate in the legislature. The same is true for Chari et al. (1997), Harstad (2010), and Christiansen (2013), who study the role of strategic delegation in determining district representatives in the context of public spending. Mattozzi and Snowberg (2018) study the distribution of tax revenues as local government spending across electoral districts. They assume that the more successful citizens are in the private sector, the better they are at securing resources for their district in the legislature. If these negotiation skills are important, then all districts elect high-income citizens as their legislators, whose preferences for low taxes lead to low overall government spending. Huber and Ting (2013) use control over the allocation of resources across districts by the majority party to explain poor voters voting for the party that favors less redistribution and rich voters voting for the party that favors higher taxes. By contrast, ignoring policy outcomes altogether, I highlight that the observed predominance of high-income citizens in the national legislature may imply that, once in office, legislators from all income backgrounds vote for the same redistribution policy if their vote is pivotal.

2 The Basic Environment

There are a unit-measure continuum of risk neutral citizens and two political parties, A and B. A fraction $\mu_l > 0$ of citizens belong to the low-income group l. They have market income $w_l > 0$. The remaining fraction $\mu_h = 1 - \mu_l > 0$ of citizens belong to the high-income group h. They have finite market income $w_h > w_l$. Median income is less than mean income $\bar{w} = \mu_l w_l + \mu_h w_h$: $\mu_l > \mu_h$.[6] Here, high and low income should be thought of as not too far above and below the mean.

Each citizen resides in exactly one of an odd finite number $d > 1$ of pairwise disjoint electoral districts. Districts are indexed by $j \in D = \{1, \dots, d\}$ and have an equal fraction $1/d$ of citizens residing in them each. The fraction of citizens belonging to income group i in district j is $\mu_i^j > 0$, where $\mu_l^j + \mu_h^j = 1/d$ for all $j \in D$ and $\sum_j \mu_i^j = \mu_i$ for all $i \in \{l, h\}$. There are districts with a majority of citizens from the low-income group l, which are collected in $D_l = \{j \in D : \mu_l^j > \mu_h^j\}$. There may be districts with a majority of citizens from the high-income group h, which are collected in $D_h = \{j \in D : \mu_l^j < \mu_h^j\}$. In every district, one group is a majority: $D = D_l \cup D_h$. As in, e.g., the United States, most districts have a majority of citizens from the low-income group l: $|D_l| > |D_h|$.[7]

Society must choose the d members of its national legislature. Each legislator represents one electoral district. Each electoral district is represented by one legislator. Each district's representative is determined in a plurality vote election in that district. Every citizen is eligible both to vote and to run for office in a district election if and only if they are a resident of that district. Running for office is costless but requires being a candidate for one of the two parties, who may be thought of as bearing all campaign costs. For each district, each party selects one candidate from the district's residents. Candidate selections are simultaneous and independent across districts. Parties maximize their expected number of seats in the legislature.[8] Consistent with empirical evidence (Carnes and Lupu 2016; Campbell and Cowley 2014), candidates from all income backgrounds are expected to be equally competent and effective once in office. The preferred interpretation of this assumption is that being a good representative requires certain skills and characteristics, but voters do not consider income to be informative as to whether a candidate possesses these. One may interpret parties' candidate selections in each district as being restricted to the positive numbers of high- and low-income citizens who are suitable for the role of a representative.

Legislators from group i have income γw_i. Holding office pays citizens a nonnegative premium over their market income: $\gamma \geq 1$. With an outside-income interpretation, for example, γ might be determined by restrictions on outside activities and income imposed by the political institutions, which at least in the short run are exogenous from the point of view of the individual legislator, without modeling the underlying agency problem (e.g., Gagliarducci et al. 2010). It might depend on explicit restrictions, implicit rules and custom, as well as simply how time-consuming the role of a legislator is. For simplicity, I assume that the premium as captured by γ is the same for both groups. The implication that $\gamma w_h > \gamma w_l$ captures the idea that, on average, the skills and

[6] The simplification to two income levels is not important (see Section 4).

[7] See Footnote 1. If $|D_l| < |D_h|$ instead, then high-income citizens can always predominate in the legislature.

[8] I discuss alternative party objectives in Section 4 and campaign costs and finance in the online appendix.

abilities associated with high-income occupations in the private sector are likely more transferable to politicians' opportunities to, e.g., generate outside income than those associated with less well-paying occupations. However, this assumption is not essential. Letting γ vary by group makes no difference.[9] I abstract from nonmonetary benefits from holding office that cannot be taxed, such as, e.g., ego rents from status or perks, because they would not add anything.[10]

The salient policy issue for voters when choosing their representatives is redistribution.[11] All income is taxed proportionally at rate $t \in \{0, 1\}$, including legislators'. Every citizen receives a lump sum transfer $\tau \geq 0$, including legislators. The budget must balance, which with only d legislators can be written as $\tau(\mu_l + \mu_h) = t(\mu_l w_l + \mu_h w_h)$ or $\tau = t\bar{w}$. Thus, a tax rate t implies a transfer $\tau = t\bar{w}$. A pair (t, τ) can be written as $(t, \tau) = (t, t\bar{w}) = t(1, \bar{w})$. The available policies can be summarized by $t = 1$ and $t = 0$ representing redistribution and no redistribution, respectively. This restriction to either full redistribution or no redistribution at all is stark but without loss in the context of the analysis here. First, this stylized environment captures the observation that citizens with high and low pre-tax incomes prefer different levels of redistribution. Second, the extent of redistribution the available policies enact is irrelevant for the analysis here as long as it differs across them. Third, allowing for a trade-off between the size of the pie and its distribution (Meltzer and Richard 1981) would not add anything material.[12]

Candidates in district elections cannot commit to a policy platform. To avoid distractions from what legislators would do if their vote was pivotal, however, I abstract from the specifics of legislative voting and the policy outcome throughout the paper. In principle, therefore, one can imagine that, when their vote is not pivotal in the legislature, legislators may strategically vote for any policy, and any policy outcome may arise. Publicly recorded votes in favor of some redistribution policy thus need not be consistent with what legislators would do if their vote was pivotal. In any case, when selecting their representatives, voters vote for candidates who, given a pivotal vote, are expected to cast it in favor of the individual voter's preferred redistribution policy, if there are any. That is, given the salience of redistribution, voters understand that the only expression of support for their preferred policy that matters is casting a pivotal vote in its favor, and they prefer a representative who would do so if the opportunity arose. While it is an assumption here for simplicity, the same voting strategy arises in a more fully specified environment with familiar refinements.[13] Ties in elections and individual voting decisions are broken by a fair coin. Given these assumptions, all voting is entirely mechanical. Parties' candidate selections are thus the only strategic decisions.

[9]As will become clear below, what matters is how high the office-holding premium is for low-income citizens, which is captured by a condition involving γw_l. Allowing the office-holding premium to vary by group so that there are $\gamma_l \geq 1$ and $\gamma_h \geq 1$, the condition involves $\gamma_l w_l$ instead of γw_l. All results and the underlying logic are unaffected.

[10]Such nonmonetary benefits from holding office and, similarly, nonmonetary costs from, e.g., the loss of privacy due to public scrutiny do not affect legislators' payoff comparisons and thus the results.

[11]Implicitly, there may be policy issues that are independent of income, which I make explicit in the online appendix.

[12]If there was a trade-off between the size of the pie and its distribution, then the policy choice 'redistribution' would enact less-than-full redistribution with a tax rate less than one. The results would not change materially. See Section 4 for a discussion of otherwise more complicated redistribution preferences.

[13]One example that builds on the current environment is to assume that the policy outcome is determined in a plurality vote among legislators, legislators eliminate weakly dominated strategies, and voters vote as if their vote decided the district election and as if the resulting legislator's vote decided the policy outcome.

3 Analysis

3.1 Strategies, Payoffs, and Equilibrium Definition

Private citizens from group i have after-tax income $(1-t)w_i + \tau = (1-t)w_i + t\bar{w}$. Their payoff is

$$(1) \qquad \phi_i(t) = \begin{cases} \bar{w} & \text{if } t = 1, \\ w_i & \text{if } t = 0. \end{cases}$$

Legislators from group i have after-tax income $(1-t)\gamma w_i + \tau = (1-t)\gamma w_i + t\bar{w}$. Their payoff is

$$(2) \qquad \psi_i(t) = \begin{cases} \bar{w} & \text{if } t = 1, \\ \gamma w_i & \text{if } t = 0. \end{cases}$$

As $\gamma \geq 1$, for each policy t, legislators have at least as high an after-tax income as they would have as a private citizen. Thus, fixing t, citizens weakly prefer being a legislator to not being one. What legislators do if their vote is pivotal follows from a comparison of the first and second entries in (2).

Observation 1. *If $\gamma w_i < \bar{w}$ ($\gamma w_i \geq \bar{w}$), then legislators from group i vote for (against) redistribution if their vote is pivotal.*

Legislators from the high-income group always vote against redistribution if their vote is pivotal because $\gamma \geq 1$ and $w_h > \bar{w}$ so that $\gamma w_h > \bar{w}$. Whether legislators from the low-income group vote for or against redistribution if their vote is pivotal depends on the office-holding premium γ because $\bar{w} > w_l$. Candidates' expected voting behavior in case of a pivotal vote interacts with voters' policy preferences to determine voters' mechanical voting behavior. What policy voters from group i prefer follows from a comparison of the first and second entries in (1) and $w_h > \bar{w} > w_l$.

Observation 2. *Low-(High-)income voters prefer redistribution (no redistribution).*

Given voters' mechanical voting, the only relevant decisions here are the candidate selections. The parties can select candidates in each district from any income group. Let $s_{P,j} \in \{l, h\}$ indicate the income group from which party $P \in \{A, B\}$ selects its candidate in district $j \in D$. A strategy s_P for party $P \in \{A, B\}$ then is a collection of candidate selections for all districts,

$$s_P = (s_{P,1}, \ldots, s_{P,d}) \in \mathcal{S} \equiv \{l, h\}^d.$$

Letting $-P \in \{A, B\} \backslash \{P\}$, given a profile $(s_{P,j}, s_{-P,j})$ of district-j candidate selections for both parties, $\pi_j(s_{P,j}, s_{-P,j})$ denotes the probability of party $P \in \{A, B\}$ winning the seat in district $j \in D$. Naturally, $\pi_j(s_{-P,j}, s_{P,j}) = 1 - \pi_j(s_{P,j}, s_{-P,j})$. These probabilities are specified below. They are determined by voters' voting behavior, which depends on what policies candidates vote for once in office if their vote is pivotal, which in turn depends on the office-holding premium. Party

P's objective is to maximize its expected number of seats in the legislature,

$$V(s_P, s_{-P}) = \sum_{j \in D} \pi_j(s_{P,j}, s_{-P,j}).$$

Definition 1. *An equilibrium is a strategy profile* $(s_A^*, s_B^*) \in \mathcal{S}^2$ *such that, for all* $P \in \{A, B\}$*,*

$$V(s_P^*, s_{-P}^*) \geq V(s_P, s_{-P}^*) \quad \forall s_P \in \mathcal{S}.$$

That is, given the other party's candidate selections in all districts, neither party can benefit from changing their candidate selection in some district. Finally, I say that:

Definition 2. *An income group predominates in the legislature iff most legislators belong to it.*

3.2 High-Income Citizens Cannot Predominate If Premia Are Low

Suppose that office-holding premia are low enough for $\gamma w_l < \bar{w}$. By Observation 1, the income that legislators from the low-income group collect while in office is low enough for them to vote for redistribution if their vote is pivotal. Consider district $j \in D$. If both candidates are from the same income group, then all voters in the district are indifferent among them and thus randomize. Each candidate is expected to receive the same share of votes, in which case a fair coin decides the election. That is, $\pi_j(y, y) = 1/2$ for all $y \in \{l, h\}$. Suppose that the two candidates in district j are from different income groups. Once in office, the candidate from the low-income group votes for redistribution if their vote is pivotal, while the candidate from the high-income group votes against redistribution if their vote is pivotal. As voters vote for candidates who they expect to vote for their preferred redistribution policy once in office and given a pivotal vote, it follows from Observation 2 that voters from each group vote for the candidate from their group. Let $i_j^* \in \{l, h\}$ indicate the majority group in district j; let $-i_j^* \in \{l, h\} \backslash \{i_j^*\}$ indicate the minority group in district j. Then, the probability of party P winning the seat in district j is

$$\pi_j(s_{P,j}, s_{-P,j}) = \begin{cases} 0 & \text{if } (s_{P,j}, s_{-P,j}) = (-i_j^*, i_j^*), \\ 1/2 & \text{if } (s_{P,j}, s_{-P,j}) \in \{(i_j^*, i_j^*), (-i_j^*, -i_j^*)\}, \\ 1 & \text{if } (s_{P,j}, s_{-P,j}) = (i_j^*, -i_j^*). \end{cases} \tag{3}$$

The probability that party P wins the seat in district j is one if party P's candidate is from the majority group in district j, while party $-P$'s candidate is not; zero if party $-P$'s candidate is from the majority group in district j, while party P's candidate is not; and one-half if both parties' candidates are from the same group.

Proposition 1. *If* $\gamma w_l < \bar{w}$*, then there is a unique equilibrium, and all candidates are from their district's majority group.*

All proofs are in the online appendix. As all candidates are from the majority group in their district, all legislators are from the majority group in the district they represent. As most districts have a low-income majority, most legislators have a low-income background. Therefore, high-income citizens do not predominate in the legislature if office-holding premia are low enough for low-income citizens who hold office to still vote for redistribution if their vote is pivotal.

Corollary 1. *High-income citizens do not predominate in the legislature in equilibrium if* $\gamma w_l < \bar{w}$.

3.3 High-Income Citizens Can Predominate If Premia Are High

Suppose that office-holding premia are high enough for $\gamma w_l \geq \bar{w}$. By Observation 1, the income that legislators from the low-income group collect while in office is high enough for them to vote against redistribution if their vote is pivotal. Consider district $j \in D$. Since candidates from all income backgrounds, once in office, vote against redistribution if their vote is pivotal, voters are indifferent and thus randomize their vote, irrespective of what group the candidates in their district are from. Each candidate is expected to receive the same share of votes, in which case a fair coin decides the election. Thus, the probability of party P winning the seat in district j is

$$\pi_j(s_{P,j}, s_{-P,j}) = 1/2 \quad \forall (s_{P,j}, s_{-P,j}) \in \{l, h\}^2. \tag{4}$$

Proposition 2. *If* $\gamma w_l \geq \bar{w}$*, then every profile of candidate selections is an equilibrium.*

For example, every profile of candidate selections with two candidates from the high-income group in most districts is an equilibrium. In such an equilibrium, while many legislators may be low-income citizens, most legislators are high-income citizens, who thus predominate in the legislature. Therefore, high-income citizens can predominate in the legislature if office-holding premia are high enough for low-income citizens who hold office to vote against redistribution if their vote is pivotal.

Corollary 2. *High-income citizens predominate in the legislature in some equilibrium if* $\gamma w_l \geq \bar{w}$.

3.4 No One Casts a Pivotal Vote For The Policy Low-Income Citizens Prefer

Combining the results from Sections 3.2 and 3.3, the observed predominance of high-income citizens among legislators can be linked to the redistribution policy legislators vote for if their vote is pivotal.

Proposition 3. *In equilibrium, if high-income citizens predominate in the legislature, then no legislator votes for redistribution if their vote is pivotal, regardless of whether they have a high- or low-income background.*

Suppose that high-income citizens predominate in the legislature in equilibrium. It must be the case that $\gamma w_l \geq \bar{w}$ because, by Corollary 1, high-income citizens do not predominate in the legislature if $\gamma w_l < \bar{w}$. By Corollary 2, high-income citizens predominate in the legislature in some equilibrium if $\gamma w_l \geq \bar{w}$. For the logic highlighted here, it is irrelevant why such an equilibrium arises and not a different one. By Observation 1, possibly many low-income citizens in office vote against redistribution if their vote is pivotal, as do high-income citizens. Thus, regardless of their income background, no legislator casts a pivotal vote for the redistribution policy low-income citizens prefer.

The underlying reason is straightforward. If low-income candidates, once in office, still vote for more redistribution if their vote is pivotal, then they get the votes of low-income citizens. Because low-income citizens constitute a majority in most electoral districts, low-income candidates win most seats. That is, high-income citizens do not predominate in the legislature. Thus, for high-income citizens to predominate among legislators, legislators from a low-income background must vote against more redistribution if their vote is pivotal. That is, while office-holding premia could in principle be very low or even zero, they must be high enough to induce legislators from a low-income background to vote against redistribution if their vote is pivotal. Therefore, if high-income citizens predominate in the legislature, then all legislators vote against the redistribution policy that low-income citizens prefer if their vote is pivotal, irrespective of whether they have a high- or low-income background, and so would any citizen if they held office. In fact, the extreme case in which all legislators are high-income citizens can arise only if low-income citizens would also vote against low-income citizens' preferred redistribution policy if they held office and had a pivotal vote.

3.5 A Sense of Group Identity Cannot Override The Underlying Logic

In this section, I extend the basic environment to allow for a sense of (income) group identity and show that it cannot override the above logic.[14] Suppose that legislators incur a utility cost $\kappa > 0$ if and only if they have a higher after-tax income than the other members of their original income group while that group's preferred policy is not enacted. The higher after-tax income suggests that the legislator left their original income group. The group's preferred policy not being enacted at the same time might make the legislator feel that they have abandoned its interests. The focus on the policy outcome rather than the individual legislator's vote again allows for the possibility that voting behavior in the legislature might involve strategic interactions. The utility cost is uniform because it is not related to income potential per se. However, allowing these costs to vary by income group makes no difference. As will become clear below, any such utility cost will affect only low-income citizens in office. To maintain internal consistency by ensuring that being selected by a party cannot make low-income citizens worse off than not being selected, I assume that $\gamma > 1$ and $\hat{\gamma} \equiv \gamma - \hat{\kappa} \geq 1$, where $\hat{\kappa} \equiv \kappa / w_l$. The assumption that $\gamma > 1$ implies that there is a positive income premium associated with holding office. However, it does not imply that this premium is high, i.e., $\gamma w_l < \bar{w}$ is not ruled out. Moreover, a high office-holding premium γ can be outweighed by a strong sense of group identity, i.e., a high cost κ.

The payoffs of private citizens are unaffected and still given by (1). Observation 2 still applies so that low-income voters prefer redistribution, while high-income voters prefer no redistribution. Determining which policy legislators vote for if their vote is pivotal requires comparing their payoffs associated with redistribution and no redistribution while accounting for them feeling a sense of group identity. Given redistribution, legislators from group l do not incur the utility cost because redistribution is group l's preferred policy. Legislators from group h do not incur the utility cost either because they have the same after-tax income $\bar{w}$ as all other members of group h. Given

[14] See, e.g., Lind (2007), Shayo (2009), and Klor and Shayo (2010) on group identity and redistribution preferences.

no redistribution, by contrast, legislators from group l incur the utility cost. Group l's preferred policy is not enacted while the legislator has a higher after-tax income than all other members of group l because $\gamma > 1$ so that $\gamma w_l > w_l$. Legislators from group h, on the other hand, do not incur the utility cost because no redistribution is group h's preferred policy. Therefore, letting $\gamma w_l - \kappa = \gamma w_l - \hat{\kappa} w_l = \hat{\gamma} w_l$, the payoffs of legislators from groups l and h are

$$\hat{\psi}_l(t) = \begin{cases} \bar{w} & \text{if } t = 1, \\ \hat{\gamma} w_l & \text{if } t = 0, \end{cases} \tag{5}$$

and

$$\hat{\psi}_h(t) = \begin{cases} \bar{w} & \text{if } t = 1, \\ \gamma w_h & \text{if } t = 0, \end{cases} \tag{6}$$

respectively. Comparing the first and second entries of (6), legislators from the high-income group vote against redistribution if their vote is pivotal because $\gamma > 1$ and $w_h > \bar{w}$ so that $\gamma w_h > \bar{w}$. Comparing the first and second entries of (5), whether legislators from the low-income group vote for or against redistribution if their vote is pivotal now depends on whether the office-holding premium is high enough to not only induce them to individually prefer no redistribution but to also overcome their sense of group identity by compensating them for the associated cost κ. Given a pivotal vote, they vote for (against) redistribution if $\hat{\gamma} w_l < \bar{w}$ ($\hat{\gamma} w_l \geq \bar{w}$). Finally, parties' strategies and payoffs and the definition of equilibrium are unaffected.

There are two cases. First, suppose that $\hat{\gamma} w_l < \bar{w}$. Then, legislators from the low-income group vote for redistribution if their vote is pivotal, while legislators from the high-income group vote against redistribution if their vote is pivotal. By the same logic as in Section 3.2, the probability of party P winning the seat in district j is given by (3). Second, suppose that $\hat{\gamma} w_l \geq \bar{w}$. Then, not only legislators from the high-income group but also legislators from the low-income group vote against redistribution if their vote is pivotal. By the same logic as in Section 3.3, the probability of party P winning the seat in district j is given by (4).

Proposition 4. *With a sense of group identity, in equilibrium, if high-income citizens predominate in the legislature, then no legislator votes for redistribution if their vote is pivotal, regardless of whether they have a high- or low-income background.*

The main result stated in Proposition 3 still holds in this extended environment. As before, if low-income citizens who hold office still vote for redistribution if their vote is pivotal, then they win the seat in most districts, and high-income citizens cannot predominate in the legislature. Thus, for high-income citizens to predominate in the legislature, low-income citizens who hold office must vote against redistribution if their vote is pivotal. The office-holding premium must be high enough to not only induce them to individually prefer no redistribution but to also overcome any sense of group identity they might have.

3.6 Reelection Concerns Cannot Override The Underlying Logic

In this section, I extend the basic environment to allow for reelection concerns and show that they cannot override the above logic.[15] Suppose that legislators from group i incur a cost $\kappa_i = \tilde{\kappa} w_i > 0$ for some constant $\tilde{\kappa} > 0$ if and only if they have a higher after-tax income than the majority income group in the district they represent while that majority's preferred policy is not enacted. One can think of this cost as capturing a desire to be reelected by their district. The implicit assumption that $\kappa_h > \kappa_l$ captures the idea that legislators from a high-income background lose a higher payoff associated with holding office if they are not reelected. It is consistent with the implicit assumption that $\gamma w_h > \gamma w_l$ (see Section 2). Voters might not reelect the legislator because the legislator collecting a higher after-tax income and the district majority's preferred policy not being enacted at the same time might suggest to voters that the legislator benefited from the office while failing to deliver for them.[16] The focus on the policy outcome rather than the individual legislator's vote again allows for the possibility that voting behavior in the legislature might involve strategic interactions. To ensure that being selected by a party in a district with a low-income majority cannot make citizens worse off than not being selected, I assume that $\gamma > 1$ and $\tilde{\gamma} \equiv \gamma - \tilde{\kappa} \geq 1$. Besides maintaining internal consistency, this assumption has two additional implications. First, reelection concerns cannot induce legislators from a high-income background to vote for more redistribution if their vote is pivotal. Arguably, this implication is not unreasonable. Second, the assumption that $\gamma > 1$ implies that holding office is associated with a positive income premium. However, again, it does not imply that this premium is high, i.e., $\gamma w_l < \bar{w}$ is not ruled out. Moreover, a high office-holding premium γ can be outweighed by a high cost κ_l of not being reelected.

The payoffs of private citizens are unaffected and still given by (1). Observation 2 still applies so that low-income voters prefer redistribution, while high-income voters prefer no redistribution. Determining which policy legislators vote for if their vote is pivotal requires comparing their payoffs associated with redistribution and no redistribution while accounting for reelection concerns. Given redistribution, legislators representing a district with a majority of low-income citizens do not incur the cost because redistribution is the preferred policy of the majority of their constituents, i.e., they have delivered. Legislators representing a district with a majority of high-income citizens do not incur the cost either because they have the same after-tax income $\bar{w}$ as the majority of the district's residents. Given no redistribution, by contrast, legislators representing a district with a majority of low-income citizens incur the cost. They failed to deliver the preferred policy of the majority of their constituents while having a higher after-tax income than that same majority because $\gamma w_h > \gamma w_l > w_l$ due to $\gamma > 1$. Legislators representing a district with a majority of high-income citizens, on the other hand, do not incur the cost because no redistribution is the preferred policy of the majority of their constituents, i.e., they have delivered. Letting $\gamma w_i - \kappa_i = \gamma w_i - \tilde{\kappa} w_i = \tilde{\gamma} w_i$, the

[15] For analyses of the role of reelection in its own right, see, e.g., Duggan (2000); Van Weelden (2013).

[16] The requirement that legislators must have a higher after-tax income than the majority in the district they represent for reelection concerns to arise also helps maintain internal consistency. It ensures that being selected by a party in a district with a high-income majority cannot make citizens worse off than not being selected.

payoff of a legislator from group i representing district j is

(7) $$\tilde{\psi}_i(t,j) = \begin{cases} \bar{w} & \text{if } t=1, j \in D_l, \\ \bar{w} & \text{if } t=1, j \in D_h, \\ \tilde{\gamma} w_i & \text{if } t=0, j \in D_l, \\ \gamma w_i & \text{if } t=0, j \in D_h. \end{cases}$$

Comparing the third and fourth entries with the first and second entries of (7), respectively, legislators from the high-income group vote against redistribution if their vote is pivotal because $\gamma > \tilde{\gamma} \geq 1$ and $w_h > \bar{w}$ so that $\gamma w_h > \tilde{\gamma} w_h > \bar{w}$. By the same comparison, whether legislators from the low-income group vote for or against redistribution if their vote is pivotal depends on the effective office-holding premium and the district they represent. If they represent a district with a majority of high-income citizens, then, given a pivotal vote, they vote for (against) redistribution if $\gamma w_l < \bar{w}$ ($\gamma w_l \geq \bar{w}$). If they represent a district with a majority of low-income citizens, then, given a pivotal vote, they vote for (against) redistribution if $\tilde{\gamma} w_l < \bar{w}$ ($\tilde{\gamma} w_l \geq \bar{w}$). In this case, if $\tilde{\gamma} w_l < \bar{w}$, then the office-holding premium is not high enough to overcome the reelection concerns of legislators from a low-income background who represent a district with a low-income majority. Finally, parties' strategies and payoffs and the definition of equilibrium are unaffected.

There are three cases. First, suppose that $\tilde{\gamma} w_l < \gamma w_l < \bar{w}$. Then, irrespective of which district they represent, legislators from the low-income group vote for redistribution if their vote is pivotal, while legislators from the high-income group vote against redistribution if their vote is pivotal. By the same logic as in Section 3.2, the probability of party P winning the seat in district j is given by (3). Second, suppose that $\gamma w_l > \tilde{\gamma} w_l \geq \bar{w}$. Then, irrespective of which district they represent, not only legislators from the high-income group but also legislators from the low-income group vote against redistribution if their vote is pivotal. By the same logic as in Section 3.3, the probability of party P winning the seat in district j is given by (4). Finally, suppose that $\tilde{\gamma} w_l < \bar{w} \leq \gamma w_l$. In this case, while legislators from the high-income group vote against redistribution if their vote is pivotal, whether legislators from a low-income background vote for or against redistribution if their vote is pivotal depends on which income group has a majority in the district they represent, which affects their reelection concerns. If they represent a district with a low-income majority, i.e., $j \in D_l$, then reelection concerns are effective: even though $\gamma w_l \geq \bar{w}$, they vote for redistribution if their vote is pivotal because $\tilde{\gamma} w_l < \bar{w}$. Similar to the logic in Section 3.2, in this district, voters from each group vote for a candidate from their group, if there is one, and randomize if both candidates are from the same group. Thus, the probability of party P winning the seat in district $j \in D_l$ is given by (3). However, if legislators from a low-income background represent a district with a high-income majority, i.e., $j \in D_h$, then they also vote against redistribution if their vote is pivotal because $\gamma w_l \geq \bar{w}$. Similar to the logic in Section 3.3, in this district, voters randomize irrespective of what group the candidates are from, and the election is expected to be decided by a fair coin. Thus, the probability of party P winning the seat in district $j \in D_h$ is given by (4).

Proposition 5. *With reelection concerns, in equilibrium, if high-income citizens predominate in the legislature, then no legislator votes for redistribution if their vote is pivotal, regardless of whether they have a high- or low-income background.*

The main result stated in Proposition 3 still holds in this extended environment. As before, if low-income citizens who hold office still vote for redistribution if their vote is pivotal, then they win the seat in most districts, and high-income citizens cannot predominate in the legislature. Thus, for high-income citizens to predominate in the legislature, low-income citizens who hold office must vote against redistribution if their vote is pivotal. The office-holding premium must be high enough to not only induce them to individually prefer no redistribution but to also overcome any reelection concerns they might have.

4 Discussion and Conclusion

This paper highlights a possible implication of the often-observed predominance of high-income citizens in the national legislature in representative democracies. Provided redistribution is the salient policy issue, most legislators being high-income citizens may require that, regardless of their income background, once in office, all citizens vote against the redistribution policy preferred by low-income citizens if their vote is pivotal. The redistribution preferences of low-income citizens might thus play a limited role in the policy-making process. The underlying logic is unaffected by a sense of group identity or reelection concerns. As shown in the online appendix, it is also unaffected by a second policy dimension that is independent of income and a role for campaign finance and special interests.

The underlying logic does not rest on the channel I chose to formalize it. Arguably, a suitable alternative channel for this logic could involve elements of social pressure as touched on by Krugman (2010). For example, candidates and office holders often interact with celebrities and rich donors. One might imagine that this experience may instill a sense of closeness with and social pressure by them in low-income citizens, in which case, once in office, they vote against more redistribution if their vote is pivotal. If low-income citizens do not develop this sense of closeness, then they still vote for more redistribution if their vote is pivotal and thus win most seats in the legislature. For high-income citizens to predominate among legislators, low-income citizens who hold office thus must develop this sense of closeness and vote against more redistribution if their vote is pivotal.

Throughout, I maintained two important assumptions. First, all citizens can run for office. This assumption simplifies the requirement that, in every district, some low-income citizen can run—that is, it is not impossible altogether for low-income citizens to run. One might interpret this assumption as there not being any income, wealth, property, or education qualifications to be eligible for office. This condition is generally met in most modern democracies. One might also interpret it as some low-income citizens possessing the charisma and political skills to win a party nomination. However, see, for example, Carnes (2018) for a discussion of possible reasons why it is not very common for low-income citizens to run for office in the US. Second, redistribution is the salient policy issue.

This assumption justifies asking what role the policy preferences of low-income citizens play in the policy-making process to begin with. Insofar as policy preferences over issues that have no inherent redistributional component are independent of income, if redistribution is not a salient policy issue, then the role of low-income citizens' policy preferences in the policy-making process should not be a major concern. Therefore, arguably, these two assumptions offer a reasonable point of departure.

Other assumptions are less important. For example, the logic is unaffected if there are more than two income levels, with every district having residents from every income group. In this case, high-income citizens predominating in the legislature requires that even the lowest-income citizens who may hold office, once in office, vote against more redistribution if their vote is pivotal. Similarly, while two parties selecting citizen-candidates ensures that an equilibrium exists without further restrictions on the income distribution, the logic is unaffected if the two parties have opposing policy preferences and select candidates who, once in office, vote for the party's preferred redistribution policy if their vote is pivotal. Again, for high-income citizens to predominate in the legislature, once in office, low-income citizens must also vote against redistribution if their vote is pivotal. Given parties' policy preferences, if enough party discipline can be induced to overcome the effect of office-holding premia and ensure that legislators from a low-income background vote for redistribution if their vote is pivotal, then high-income citizens cannot predominate in the legislature.[17] Finally, focusing on the channel I model here, in a more complicated environment, the level of redistribution legislators prefer might be a decreasing function of their income while in office, which differs across income backgrounds due to the uniform office-holding premium. However, the logic is unaffected if one allows for the office-holding premium to vary by income background, which can be easily justified. For high-income citizens to win the seat in most districts, once in office, low-income citizens must vote for at most as much redistribution as high-income citizens if their vote is pivotal. The office-holding premium thus must be sufficiently higher for low- than for high-income citizens.

While it is often unobservable what a legislator would do if their vote decided the policy outcome, the theory remains testable. However, an appropriate empirical test requires among other things that the national legislature decides whether to enact more redistribution by a margin of one vote and that the vote of some legislator from a low-income background counts towards the majority and is thus pivotal. Depending on the precise setting, for example, a second chamber might need to reasonably be expected to pass the bill with certainty so that a vote that is expected to decide whether the bill passes in the first chamber is also expected to decide whether the bill passes overall.

Future work could further explore the robustness of and alternative channels for the underlying logic and what assumptions might be violated empirically. For example, one might ask under what conditions this implication still arises with proportional representation or when party politics or gatekeepers play a more prominent role at the candidate selection stage. One could similarly ask what role status and group identity derived from holding a prestigious office might play. Finally, one might ask how salient redistribution is as a policy issue in congressional elections.

[17] Here, the assumption is that party discipline cannot induce legislators from a high-income background to vote for redistribution if their vote is pivotal. Arguably, this assumption is not unreasonable.

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Online Appendix for

Legislature Composition and Representative Democracy

This online appendix collects additional results and omitted proofs. Section A shows that the logic and intuition of the main result in Proposition 3 carry over to extensions of the basic environment that allow for a second policy dimension that is independent of income (Section A.1) and a role for campaign costs, campaign finance, and special interests (Section A.2). Section B collects all proofs.

A Additional Results

A.1 A Second Policy Dimension May Not Affect The Logic

In this section, I extend the basic environment by adding a second policy dimension, the preferences over which are a source of heterogeneity among citizens that is independent of income, to assess whether it affects the underlying logic. Suppose that the legislature decides over redistribution and an additional policy dimension that I refer to as regulation in separate plurality votes. A fraction $\lambda_1 > 0$ of the citizens in each income group in each district prefer regulation to be enacted. If regulation is enacted, then citizens in this group experience an additional utility benefit $\theta > 0$. The remaining fraction $\lambda_0 = 1 - \lambda_1 > 0$, $\lambda_0 < \lambda_1$, of the citizens in each income group in each district prefer regulation not be enacted. Citizens in this group experience an additional utility benefit $\theta > 0$ if regulation is not enacted. Thus, in every district j, there are four types of citizens: $\lambda_1\mu_l^j > 0$ citizens of type $(l, 1)$ who have low income and prefer regulation; $\lambda_0\mu_l^j > 0$ citizens of type $(l, 0)$ who have low income and prefer no regulation; $\lambda_1\mu_h^j > 0$ citizens of type $(h, 1)$ who have high income and prefer regulation; and $\lambda_0\mu_h^j > 0$ citizens of type $(h, 0)$ who have high income and prefer no regulation, where $\lambda_1\mu_l^j + \lambda_0\mu_l^j + \lambda_1\mu_h^j + \lambda_0\mu_h^j = 1/d$. However, redistribution is the salient policy issue: any benefits related to regulation cannot fully compensate low-income citizens for too little redistribution, i.e., $\theta < \bar{w} - w_l$.[1]

Given the second policy dimension, legislator voting behavior requires a bit more care. As before, the goal is to assess what redistribution policy legislators vote for if their vote is pivotal. This goal

[1] Roemer (1998) studies political competition between two parties that represent constituents with preferences over taxation and a second policy dimension, where wealth or income and the stance on the second policy dimension are not independently distributed. Under some conditions, the party representing (a subset of) the majority in society (the poor) does not propose their ideal tax rate. One of the conditions is that the second policy dimension is sufficiently salient. I assume the opposite of this condition. Also see, e.g., Besley and Coate (2003, 2008) on issue (un)bundling.

can be achieved by assuming that legislators vote as if their vote was decisive in the legislature. This restriction amounts to requiring legislators to play only strategies that are not weakly dominated. At the district level, assume that voters vote as if their vote was decisive in determining the district's representative and as if that representative's vote was decisive in determining the policy outcome in the legislature. Given the same stance on regulation, voters thus still vote for a candidate who, once in office and given a pivotal vote, is expected to vote for the voter's preferred redistribution policy. As before, in all elections and individual voting decisions, ties are broken by a fair coin.

Let $\delta \in \{0, 1\}$ indicate whether or not regulation is enacted, where $\delta = 1$ means that it is enacted, while $\delta = 0$ means that it is not enacted. The payoffs of voters of type $(i, 1)$ are

$$\breve{\phi}_{i,1}(t, \delta) = \begin{cases} \bar{w} + \delta\theta & \text{if } t = 1, \\ w_i + \delta\theta & \text{if } t = 0, \end{cases} \tag{8}$$

while those of voters of type $(i, 0)$ are

$$\breve{\phi}_{i,0}(t, \delta) = \begin{cases} \bar{w} + (1 - \delta)\theta & \text{if } t = 1, \\ w_i + (1 - \delta)\theta & \text{if } t = 0. \end{cases} \tag{9}$$

The payoffs of legislators of type $(i, 1)$ are

$$\breve{\psi}_{i,1}(t, \delta) = \begin{cases} \bar{w} + \delta\theta & \text{if } t = 1, \\ \gamma w_i + \delta\theta & \text{if } t = 0, \end{cases} \tag{10}$$

while those of legislators of type $(i, 0)$ are

$$\breve{\psi}_{i,0}(t, \delta) = \begin{cases} \bar{w} + (1 - \delta)\theta & \text{if } t = 1, \\ \gamma w_i + (1 - \delta)\theta & \text{if } t = 0. \end{cases} \tag{11}$$

As legislators vote as if their vote was decisive, legislators of types $(i, 1)$ and $(i, 0)$ always vote for and against regulation, respectively. Comparing the first and second entries in Equations (10) and (11), given a pivotal vote, legislators vote for (against) redistribution if $\gamma w_i < \bar{w}$ ($\gamma w_i \geq \bar{w}$). That is, irrespective of their preferences over regulation, legislators from the high-income group vote against redistribution if their vote is pivotal because $\gamma \geq 1$ and $w_h > \bar{w}$ so that $\gamma w_h > \bar{w}$. As before, whether legislators from the low-income group vote for or against redistribution if their vote is pivotal depends on the office-holding premium, irrespective of their preferences over regulation. As voters vote as if their vote was decisive in determining the district's representative and as if that representative's votes were decisive in determining the outcome in the legislature, for example, because a candidate of type $(h, 0)$ votes against both redistribution and regulation if their vote is pivotal, a voter of type $(h, 1)$ associates payoff w_h with voting for them, while a voter of type $(l, 0)$ associates payoff $w_l + \theta$ with voting for them.

Parties can select their candidates from any of the four types of citizens in each district. That is, $s_{P,j} \in \{(l,1),(l,0),(h,1),(h,0)\}$ indicates the type of citizen from which party $P \in \{A,B\}$ selects its candidate in district $j \in D$. A strategy s_P for party $P \in \{A,B\}$ then is a collection of candidate selections for all districts,

$$s_P = (s_{P,1}, \dots, s_{P,d}) \in \mathcal{S} \equiv \{(l,1),(l,0),(h,1),(h,0)\}^d.$$

Apart from the definition of $\mathcal{S}$, parties' payoffs and the definition of equilibrium are unchanged.

If both candidates in a district are of the same type, then all voters are indifferent among them and thus randomize. Each candidate is expected to receive the same share of votes, in which case a fair coin decides the election. That is, in every district $j \in D$,

$$\pi_j(y,y) = 1/2 \quad \forall y \in \{(l,1),(l,0),(h,1),(h,0)\}. \tag{12}$$

As to office-holding premia, first, suppose that $\gamma w_l < \bar{w}$. Then, legislators from the low-income group vote for redistribution if their vote is pivotal, while legislators from the high-income group vote against redistribution if their vote is pivotal. Let $i_j^* \in \{l,h\}$ again indicate the majority income group in district j. Lemma 1 provides all the details needed about the probability of party P winning the seat in district j in this case.

Lemma 1. *If $\gamma w_l < \bar{w}$, then $\pi_j((i_j^*,1),y) = 1$ for all $y \neq (i_j^*,1)$ and $j \in D$.*

As the benefits related to regulation cannot fully compensate them for too little redistribution, low-income citizens always vote for a low-income candidate, if there is one, irrespective of their stance on regulation. Similarly, high-income citizens always vote for a high-income candidate, if there is one, irrespective of their stance on regulation. If there are two candidates from the same income group but with different stances on regulation, then voters vote for the candidate who shares their preferences on regulation. Thus, a candidate from the district's majority income group who favors regulation, as do the majority of voters in every district, wins the election with certainty unless their opponent is of the same type.

Second, suppose that $\gamma w_l \geq \bar{w}$. Then, not only legislators from the high-income group but also legislators from the low-income group vote against redistribution if their vote is pivotal. Therefore, candidates' stances on regulation are all that matters to voters. Lemma 2 provides all the details needed about the probability of party P winning the seat in district j in this case.

Lemma 2. *If $\gamma w_l \geq \bar{w}$, then $\pi_j((i_{P,j},1),(i_{-P,j},1)) = 1/2$ for all $(i_{P,j}, i_{-P,j}) \in \{l,h\}^2$ and $j \in D$ and $\pi_j((i_{P,j},1),(i_{-P,j},0)) = 1$ for all $(i_{P,j}, i_{-P,j}) \in \{l,h\}^2$ and $j \in D$.*

If only one candidate favors regulation, then that candidate wins the election with certainty. For all other constellations, all voters in the district are indifferent among both candidates and thus randomize so that a fair coin flip is expected to decide the election. The main result in Proposition 3 holds in this extended environment.

Proposition 6. *With a second policy dimension that is independent of income, in equilibrium, if high-income citizens predominate in the legislature, then no legislator votes for redistribution if their vote is pivotal, regardless of whether they have a high- or low-income background.*

As long as redistribution is the salient policy issue and the benefits from issues unrelated to redistribution cannot fully compensate low-income citizens for too little redistribution, with low office-holding premia, high-income citizens cannot predominate in the legislature. As before, low-income candidates win the seat in most districts if they still vote for redistribution once in office and given a pivotal vote. Therefore, if high-income citizens predominate in the legislature, then the office-holding premium must be high enough to induce legislators from a low-income background to vote against redistribution if their vote is pivotal. To be sure, in many equilibria in which most legislators are high-income citizens, there are also many legislators from a low-income background. As before, therefore, if high-income citizens predominate in the legislature, then no legislator votes for the redistribution policy low-income citizens prefer if their vote is pivotal, irrespective of whether they have a high- or low-income background, and neither would any other citizen if they held office. The logic captured in Proposition 3 is thus robust to explicitly adding a second policy dimension. Finally, all candidates and thus all legislators vote for regulation if their vote is pivotal.

A.2 Campaign Finance And Special Interests May Not Affect The Logic

Candidates for office might face campaign costs. Such costs could be a concern if the only way candidates can pay for them is out of their own pocket. In this case, only wealthy or high-income citizens can run for office. However, such costs might be less of a concern if candidates can fundraise to cover them. For the 115th United States Congress, for example, about 43% of all candidates for the US House of Representatives in the 2016 election contributed or loaned nothing at all to their campaigns; about 52% of all candidates contributed or loaned no more than $1,000 to their campaigns; and about 69% of all candidates contributed or loaned no more than $10,000 to their campaigns. Moreover, of all winners, about 83%, 86%, and 89% contributed or loaned nothing at all, no more than $1,000, and no more than $10,000 to their campaigns, respectively; of all nonincumbent winners, about 27%, 38%, and 45% contributed or loaned nothing at all, no more than $1,000, and no more than $10,000 to their campaigns, respectively.[2] That is, being wealthy or having high income is not necessary to win the office, let alone to run for it. Specifically, candidates might raise money from interest groups that care about 'winning a district's seat' by supporting a candidate who is aligned with them on their issue and votes in their favor on related policies once in office. Here, I allow in an admittedly starkly simplified fashion for such a role for a special interest group, the preferences over whose policy issue among citizens are independent of income, to assess whether it affects the underlying logic.[3]

[2] Data from the Federal Election Commission, accessed on 7/2/2019 at `https://www.fec.gov/data/browse-data/?tab=historical` and `https://www.congress.gov/members` accessed on 7/4/2019.

[3] I focus on campaign finance (also see, e.g., Besley and Coate 2003, 2008). On lobbying, see, e.g., Besley and Coate (2001); Felli and Merlo (2006); Gehlbach et al. (2010).

Starting from the environment in Section A.1, suppose that running for office is prohibitively costly for individual citizens. There is a special interest group with abundant resources that opposes regulation. It is ready to finance the campaign costs of all candidates in all districts who will vote in line with their agenda on related policies in the legislature once in office.

As in Section A.1, the payoffs of voters of type $(i, 1)$ are given by (8), while those of voters of type $(i, 0)$ are given by (9). Similarly, the payoffs of legislators of type $(i, 1)$ are given by (10), while those of legislators of type $(i, 0)$ are given by (11). Comparing the first and second entries in (10) and (11), given a pivotal vote, legislators vote for (against) redistribution if $\gamma w_i < \bar{w}$ ($\gamma w_i \geq \bar{w}$). Thus, legislators from the high-income group vote against redistribution if their vote is pivotal, while whether legislators from the low-income group vote for or against redistribution if their vote is pivotal depends on the office-holding premium.

As legislators vote as if their vote was decisive, legislators of types $(i, 1)$ and $(i, 0)$ vote for and against regulation, respectively. The special interest group thus finances a candidate's campaign if and only if the candidate is of types $(l, 0)$ or $(h, 0)$. Citizens of types $(l, 1)$ and $(h, 1)$ cannot run for office. Parties can select their candidates in each district only from those citizens who oppose regulation. That is, $s_{P,j} \in \{(l, 0), (h, 0)\}$ indicates the type of citizen from which party $P \in \{A, B\}$ selects its candidate in district $j \in D$. Suppressing the regulation preference 0 from the types of citizens that can run for office so that $s_{P,j} \in \{l, h\}$, parties' strategies and payoffs as well as the definition of equilibrium are as specified in Section 3.1.

There are two cases. First, suppose that $\gamma w_l < \bar{w}$. Then, legislators from the low-income group vote for redistribution if their vote is pivotal, while legislators from the high-income group vote against redistribution if their vote is pivotal. Ignoring regulation because all candidates vote against it once in office, by the same logic as in Section 3.2, the probability of party P winning the seat in district j is given by (3). Second, suppose that $\gamma w_l \geq \bar{w}$. Then, not only legislators from the high-income group but also legislators from the low-income group vote against redistribution if their vote is pivotal. Again, ignoring regulation because all candidates vote against it once in office, by the same logic as in Section 3.3, the probability of party P winning the seat in district j is given by (4). The main result stated in Proposition 3 still holds in this extended environment.

Proposition 7. *With campaign finance and special interests, in equilibrium, if high-income citizens predominate in the legislature, then no legislator votes for redistribution if their vote is pivotal, regardless of whether they have a high- or low-income background.*

As before, low-income candidates win the seat in most districts if they still vote for redistribution once in office and given a pivotal vote. The predominance of high-income citizens in the legislature requires that legislators from a low-income background also vote against redistribution if their vote is pivotal. That is, if high-income citizens predominate in the legislature, then no legislator votes for the redistribution policy that low-income citizens prefer if their vote is pivotal, irrespective of whether they have a high- or low-income background, and neither would any other citizen if they held office. The logic captured in Proposition 3 is thus robust to this addition of a role for campaign finance and special interests. Finally, all candidates and thus all legislators oppose regulation.

B Proofs

Observations 1 and 2 derive directly from comparing the respective entries in Equations (1) and (2); Corollaries 1 and 2 follow immediately from Propositions 1 and 2. Their proofs are thus omitted.

Proposition 1

Proof. The probability of party $P \in \{A, B\}$ winning the seat in district j is given by (3). Consider the strategy profile (s^*_A, s^*_B) such that $(s^*_{A,j}, s^*_{B,j}) = (i^*_j, i^*_j)$ for all $j \in D$. Then, by (3), $\pi_j(s^*_{P,j}, s^*_{-P,j}) = \pi_j(i^*_j, i^*_j) = 1/2$ for all $P \in \{A, B\}$ and $j \in D$. Party P's payoff is

$$V(s^*_P, s^*_{-P}) = \sum_{j \in D} \pi_j(s^*_{P,j}, s^*_{-P,j}) = \frac{1}{2}d.$$

Consider any party $P \in \{A, B\}$ and suppose that they were to deviate to a different strategy $s'_P \neq s^*_P$. Then, there must be a nonempty subset $D' \subseteq D$, such that $k \in D'$ if and only if $s'_{P,k} \neq s^*_{P,k}$. Moreover, for all $k \in D'$, $s'_{P,k} = -i^*_k$ and thus, by (3), $\pi_k(s'_{P,k}, s^*_{-P,k}) = \pi_k(-i^*_k, i^*_k) = 0$, while for all $j \in D - D'$, $\pi_j(s'_{P,j}, s^*_{-P,j}) = \pi_j(s^*_{P,j}, s^*_{-P,j}) = 1/2$. Thus, letting $d' = |D'| > 0$, party P's payoff from this deviation is

$$V(s'_P, s^*_{-P}) = \sum_{j \in D} \pi_j(s'_{P,j}, s^*_{-P,j}) = \frac{1}{2}(d - d') < \frac{1}{2}d = V(s^*_P, s^*_{-P}).$$

That is, deviating to any different strategy $s'_P \neq s^*_P$ is not profitable. Thus, the strategy profile (s^*_A, s^*_B) such that $(s^*_{A,j}, s^*_{B,j}) = (i^*_j, i^*_j)$ for all $j \in D$ is an equilibrium.

Consider any strategy profile $(s_A, s_B) \neq (s^*_A, s^*_B)$. That is, in some district $k \in D$, $(s_{A,k}, s_{B,k}) \neq (i^*_k, i^*_k)$. Party P's payoff is

$$V(s_P, s_{-P}) = \pi_k(s_{P,k}, s_{-P,k}) + \sum_{j \in D, j \neq k} \pi_j(s_{P,j}, s_{-P,j}).$$

There are two cases: either *(a)* both parties select candidates from the minority group $-i^*_k$, i.e., $(s_{P,k}, s_{-P,k}) = (-i^*_k, -i^*_k)$; or *(b)* only one of the two parties selects a candidate from the minority group $-i^*_k$, while the other party selects a candidate from the majority group i^*_k, i.e., for some $P \in \{A, B\}$, $(s_{P,k}, s_{-P,k}) = (-i^*_k, i^*_k)$. Consider each case in turn.

Case (a). If $(s_{P,k}, s_{-P,k}) = (-i^*_k, -i^*_k)$, then by (3), $\pi_k(s_{P,k}, s_{-P,k}) = \pi_k(-i^*_k, -i^*_k) = 1/2$ and

$$V(s_P, s_{-P}) = \pi_k(s_{P,k}, s_{-P,k}) + \sum_{j \in D, j \neq k} \pi_j(s_{P,j}, s_{-P,j}) = \frac{1}{2} + \sum_{j \in D, j \neq k} \pi_j(s_{P,j}, s_{-P,j}).$$

Party P can deviate to strategy s'_P such that $s'_{P,j} = s_{P,j}$ for all $j \in D, j \neq k$ and $s'_{P,k} = i^*_k$. From

(3) follows that $\pi_k(s'_{P,k}, s_{-P,k}) = \pi_k(i^*_k, -i^*_k) = 1$ so that

$$V(s'_P, s_{-P}) = 1 + \sum_{j \in D, j \neq k} \pi_j(s_{P,j}, s_{-P,j}) > \frac{1}{2} + \sum_{j \in D, j \neq k} \pi_j(s_{P,j}, s_{-P,j}) = V(s_P, s_{-P}).$$

That is, (s_A, s_B) is not an equilibrium.

Case (b). If $(s_{P,k}, s_{-P,k}) = (-i^*_k, i^*_k)$, then by (3), $\pi_k(s_{P,k}, s_{-P,k}) = \pi_k(-i^*_k, i^*_k) = 0$ and

$$V(s_P, s_{-P}) = \pi_k(s_{P,k}, s_{-P,k}) + \sum_{j \in D, j \neq k} \pi_j(s_{P,j}, s_{-P,j}) = \sum_{j \in D, j \neq k} \pi_j(s_{P,j}, s_{-P,j}).$$

Party P can deviate to strategy s'_P such that $s'_{P,j} = s_{P,j}$ for all $j \in D, j \neq k$ and $s'_{P,k} = i^*_k$. From (3) follows that $\pi_k(s'_{P,k}, s_{-P,k}) = \pi_k(i^*_k, i^*_k) = 1/2$ so that

$$V(s'_P, s_{-P}) = \frac{1}{2} + \sum_{j \in D, j \neq k} \pi_j(s_{P,j}, s_{-P,j}) > \sum_{j \in D, j \neq k} \pi_j(s_{P,j}, s_{-P,j}) = V(s_P, s_{-P}).$$

That is, (s_A, s_B) is not an equilibrium.

Therefore, the strategy profile (s^*_A, s^*_B) such that $(s^*_{A,j}, s^*_{B,j}) = (i^*_j, i^*_j)$ for all $j \in D$ is the unique equilibrium. ∎

Proposition 2

Proof. The probability of party P winning the seat in district j is given by (4). Consider any strategy profile (s_A, s_B). By (4), $\pi_j(s_{P,j}, s_{-P,j}) = 1/2$ for all $P \in \{A, B\}$ and $j \in D$. Therefore, party P's payoff is

$$V(s_P, s_{-P}) = \sum_{j \in D} \pi_j(s_{P,j}, s_{-P,j}) = \frac{1}{2}d.$$

Consider any deviation by any party $P \in \{A, B\}$ to a strategy $s'_P \neq s_P$. By (4), $\pi_j(s'_{P,j}, s_{-P,j}) = 1/2$ for all $j \in D$. Therefore, party P's payoff from this deviation is

$$V(s'_P, s_{-P}) = \sum_{j \in D} \pi_j(s'_{P,j}, s_{-P,j}) = \frac{1}{2}d = V(s_P, s_{-P}).$$

That is, deviating to any different strategy $s'_P \neq s_P$ is not profitable. Hence, the strategy profile (s_A, s_B) is an equilibrium. Thus, every strategy profile (s_A, s_B) is an equilibrium. ∎

Proposition 3

Proof. By Propositions 1 and 2, an equilibrium always exists for all $\gamma \geq 1$. Suppose that high-income citizens predominate in the legislature in equilibrium. By contraposition, it follows from Corollary 1 that $\gamma w_l \geq \bar{w}$ must hold, and Corollary 2 verifies that if $\gamma w_l \geq \bar{w}$, then there is an equilibrium such that high-income citizens predominate in the legislature. From $\gamma w_l \geq \bar{w}$ follows that all legislators vote against redistribution if their vote is pivotal, irrespective of their income background. ■

Proposition 4

Proof. Replacing γ by $\hat{\gamma}$, Propositions 1–2, Corollaries 1–2, and Proposition 3 hold. The proofs of Propositions 1–2 are unaffected; Corollaries 1–2 follow directly; the proof of Proposition 3 only requires that γ be replaced by $\hat{\gamma}$. ■

Proposition 5

Proof. To establish the result, I first consider the three possible cases and show that:

1. If $\tilde{\gamma} w_l < \gamma w_l < \bar{w}$, then there is a unique equilibrium, and all candidates are from their district's majority group.

2. If $\gamma w_l > \tilde{\gamma} w_l \geq \bar{w}$, then every profile of candidate selections is an equilibrium.

3. If $\tilde{\gamma} w_l < \bar{w} \leq \gamma w_l$, then an equilibrium exists, and in every equilibrium, in every district with a low-income majority, both candidates are from the low-income group.

Consider each case in turn.

1. Suppose that $\tilde{\gamma} w_l < \gamma w_l < \bar{w}$. Then, the probability of party P winning the seat in district j is given by (3). The proof is then exactly the same as that of Proposition 1.

2. Suppose that $\gamma w_l > \tilde{\gamma} w_l \geq \bar{w}$. Then, the probability of party P winning the seat in district j is given by (4). The proof is then exactly the same as that of Proposition 2.

3. Suppose that $\tilde{\gamma} w_l < \bar{w} \leq \gamma w_l$. Then, the probability of party P winning the seat in district $j \in D_l$ is given by (3), while the probability of party P winning the seat in district $j \in D_h$ is given by (4).

   Consider the strategy profile (s^*_A, s^*_B) such that $(s^*_{A,j}, s^*_{B,j}) = (l, l)$ for all $j \in D_l$ and $(s^*_{A,j}, s^*_{B,j}) = (h, h)$ for all $j \in D_h$. By (3), party $P \in \{A, B\}$ wins the seat in all districts $j \in D_l$ with probability $\pi_j(s^*_{P,j}, s^*_{-P,j}) = \pi_j(i^*_j, i^*_j) = 1/2$; by (4), party $P \in \{A, B\}$ wins the seat in all districts $j \in D_h$ with probability $\pi_j(s^*_{P,j}, s^*_{-P,j}) = \pi_j(h, h) = 1/2$. Thus, party P has payoff

   $$V(s^*_P, s^*_{-P}) = \sum_{j \in D} \pi_j(s^*_{P,j}, s^*_{-P,j}) = \frac{1}{2} d.$$

   Consider any party $P \in \{A, B\}$ and suppose that they were to deviate to a different strategy $s'_P \neq s^*_P$. Then, there must be a nonempty subset $D' \subseteq D$, such that $k \in D'$ if and only if $s'_{P,k} \neq s^*_{P,k}$. Moreover, for all $k \in D'$, $s'_{P,k} = h = -i^*_k$ if $k \in D_l$, while $s'_{P,k} = l$ if $k \in D_h$. Thus, if $k \in D_l$, then by (3), $\pi_k(s'_{P,k}, s^*_{-P,k}) = \pi_k(-i^*_k, i^*_k) = 0$, while if $k \in D_h$, then by (4),

$\pi_k(s'_{P,k}, s^*_{-P,k}) = \pi_k(l,h) = 1/2$. That is, for all $k \in D'$, $\pi_k(s'_{P,k}, s^*_{-P,k}) \leq \pi_k(s^*_{P,k}, s^*_{-P,k})$, while for all $j \in D - D'$, $\pi_j(s'_{P,j}, s^*_{-P,j}) = \pi_j(s^*_{P,j}, s^*_{-P,j})$. Therefore, party P's payoff from this deviation is

$$V(s'_P, s^*_{-P}) = \sum_{j\in D} \pi_j(s'_{P,j}, s^*_{-P,j}) \leq \sum_{j \in D} \pi_j(s^*_{P,j}, s^*_{-P,j}) = V(s^*_P, s^*_{-P}).$$

That is, deviating to any different strategy $s'_P \neq s^*_P$ is not profitable. Thus, the strategy profile (s^*_A, s^*_B) such that $(s^*_{A,j}, s^*_{B,j}) = (l,l)$ for all $j \in D_l$ and $(s^*_{A,j}, s^*_{B,j}) = (h,h)$ for all $j \in D_h$ is an equilibrium.

Consider any strategy profile (s_A, s_B) such that in some district $k \in D_l$, $(s_{A,k}, s_{B,k}) \neq (i^*_k, i^*_k) = (l,l)$. The probability of party P winning the seat in district $k \in D_l$ is given by (3). Party P's payoff is

$$V(s_P, s_{-P}) = \pi_k(s_{P,k}, s_{-P,k}) + \sum_{j \in D, j\neq k} \pi_j(s_{P,j}, s_{-P,j}).$$

There are two cases: either *(a)* both parties select candidates from group h, i.e., $(s_{P,k}, s_{-P,k}) = (h,h) = (-i^*_k, -i^*_k)$; or *(b)* only one of the two parties selects a candidate from group h, while the other party selects a candidate from group l, i.e., for some $P \in \{A,B\}$, $(s_{P,k}, s_{-P,k}) = (h,l) = (-i^*_k, i^*_k)$. Consider each case in turn.

Case (a). If $(s_{P,k}, s_{-P,k}) = (-i^*_k, -i^*_k)$, then by (3), $\pi_k(s_{P,k}, s_{-P,k}) = \pi_k(-i^*_k, -i^*_k) = 1/2$ and

$$V(s_P, s_{-P}) = \pi_k(s_{P,k}, s_{-P,k}) + \sum_{j \in D, j\neq k} \pi_j(s_{P,j}, s_{-P,j}) = \frac{1}{2} + \sum_{j \in D, j\neq k} \pi_j(s_{P,j}, s_{-P,j}).$$

Party P can deviate to strategy s'_P such that $s'_{P,j} = s_{P,j}$ for all $j \in D, j \neq k$ and $s'_{P,k} = l = i^*_k$. From (3) follows that $\pi_k(s'_{P,k}, s_{-P,k}) = \pi_k(i^*_k, -i^*_k) = 1$ so that

$$V(s'_P, s_{-P}) = 1 + \sum_{j \in D, j\neq k} \pi_j(s_{P,j}, s_{-P,j}) > \frac{1}{2} + \sum_{j \in D, j\neq k} \pi_j(s_{P,j}, s_{-P,j}) = V(s_P, s_{-P}).$$

That is, (s_A, s_B) is not an equilibrium.

Case (b). If $(s_{P,k}, s_{-P,k}) = (-i^*_k, i^*_k)$, then by (3), $\pi_k(s_{P,k}, s_{-P,k}) = \pi_k(-i^*_k, i^*_k) = 0$ and

$$V(s_P, s_{-P}) = \pi_k(s_{P,k}, s_{-P,k}) + \sum_{j \in D, j\neq k} \pi_j(s_{P,j}, s_{-P,j}) = \sum_{j \in D, j\neq k} \pi_j(s_{P,j}, s_{-P,j}).$$

Party P can deviate to strategy s'_P such that $s'_{P,j} = s_{P,j}$ for all $j \in D, j \neq k$ and $s'_{P,k} = l = i^*_k$.

From (3) follows that $\pi_k(s'_{P,k}, s_{-P,k}) = \pi_k(i^*_k, i^*_k) = 1/2$ so that

$$V(s'_P, s_{-P}) = \frac{1}{2} + \sum_{j \in D, j \neq k} \pi_j(s_{P,j}, s_{-P,j}) > \sum_{j \in D, j \neq k} \pi_j(s_{P,j}, s_{-P,j}) = V(s_P, s_{-P}).$$

That is, (s_A, s_B) is not an equilibrium.

Therefore, in every equilibrium, the strategy profile (s^*_A, s^*_B) satisfies $(s^*_{A,j}, s^*_{B,j}) = (l, l)$ for all $j \in D_l$.

As there is an equilibrium in all cases, an equilibrium exists for all $\tilde{\gamma} \geq 1$. Finally, if $\tilde{\gamma} w_l < \bar{w}$, then as shown in 1. and 3., $(s^*_{A,j}, s^*_{B,j}) = (l, l)$ for all $j \in D_l$ in every equilibrium. Thus, district j's legislator is from group l for all $j \in D_l$. Therefore, the legislature has at least $|D_l|$ legislators from group l and at most $|D_h|$ legislators from group h. Since $|D_l| > |D_h|$, the majority of legislators are from group l. By contraposition, if high-income citizens predominate in the legislature, then $\tilde{\gamma} w_l \geq \bar{w}$ must hold. As shown in 2., there is an equilibrium such that $(s^*_{A,j}, s^*_{B,j}) = (h, h)$ for all $j \in D''$, where $D'' \subseteq D$ is some subset of D such that $|D''| > |D|/2$, so that $|D''| > |D|/2$ legislators, i.e., the majority of legislators, are from group h. Thus, if high-income citizens predominate in the legislature in equilibrium, then $\tilde{\gamma} w_l \geq \bar{w}$. It then follows from $\gamma w_l > \tilde{\gamma} w_l \geq \bar{w}$ and $\gamma w_h > \tilde{\gamma} w_h > \bar{w}$ that all legislators vote against redistribution if their vote is pivotal, irrespective of their income background and which district they represent. That is, no legislator votes for redistribution if their vote is pivotal. ∎

Lemma 1

Proof. Suppose that $\gamma w_l < \bar{w}$. Every district j has $1/d$ voters. From $\lambda_1 + \lambda_0 = 1$ and $\lambda_1 > \lambda_0$ follows that $\lambda_1 > 1/2$.

Consider any $P \in \{A, B\}$ and $j \in D_l$. From $\mu^j_l + \mu^j_h = 1/d$ and $\mu^j_l > \mu^j_h$ follows that $\mu^j_l > 1/2d$. Fix $s_{P,j} = (l, 1)$. If $s_{-P,j} = (l, 0)$, then $\lambda_1 \mu^j_l$ voters of type $(l, 1)$ and $\lambda_1 \mu^j_h$ voters of type $(h, 1)$ vote for $(l, 1)$ because $\bar{w} + \theta > \bar{w}$. That is, $\lambda_1 \mu^j_l + \lambda_1 \mu^j_h = \lambda_1/d > 1/2d$ voters vote for $(l, 1)$ so that $\pi_j((l, 1), (l, 0)) = 1$. If $s_{-P,j} = (h, 1)$, then $\lambda_1 \mu^j_l$ voters of type $(l, 1)$ vote for $(l, 1)$ because $\bar{w} + \theta > w_l + \theta$ since $\bar{w} > w_l$; similarly, $\lambda_0 \mu^j_l$ voters of type $(l, 0)$ vote for $(l, 1)$ because $\bar{w} > w_l$. That is, $\lambda_1 \mu^j_l + \lambda_0 \mu^j_l = \mu^j_l > 1/2d$ voters vote for $(l, 1)$ so that $\pi_j((l, 1), (h, 1)) = 1$. If $s_{-P,j} = (h, 0)$, then $\lambda_1 \mu^j_l$ voters of type $(l, 1)$ vote for $(l, 1)$ because $\bar{w} + \theta > w_l$ since $\bar{w} > w_l$; similarly, $\lambda_0 \mu^j_l$ voters of type $(l, 0)$ vote for $(l, 1)$ because $\bar{w} > w_l + \theta$. That is, $\lambda_1 \mu^j_l + \lambda_0 \mu^j_l = \mu^j_l > 1/2d$ voters vote for $(l, 1)$ so that $\pi_j((l, 1), (h, 0)) = 1$. Thus, $\pi_j((l, 1), y) = 1$ for all $y \neq (l, 1)$ and $j \in D_l$.

Consider any $P \in \{A, B\}$ and $j \in D_h$. From $\mu^j_l + \mu^j_h = 1/d$ and $\mu^j_h > \mu^j_l$ follows that $\mu^j_h > 1/2d$. Fix $s_{P,j} = (h, 1)$. If $s_{-P,j} = (h, 0)$, then $\lambda_1 \mu^j_h$ voters of type $(h, 1)$ and $\lambda_1 \mu^j_l$ voters of type $(l, 1)$ vote for $(h, 1)$ because $w_i + \theta > w_i$. That is, $\lambda_1 \mu^j_l + \lambda_1 \mu^j_h = \lambda_1/d > 1/2d$ voters vote for $(h, 1)$ so that $\pi_j((h, 1), (h, 0)) = 1$. If $s_{-P,j} = (l, 1)$, then $\lambda_1 \mu^j_h$ voters of type $(h, 1)$ vote for $(h, 1)$ because $w_h + \theta > \bar{w} + \theta$ since $w_h > \bar{w}$; similarly, $\lambda_0 \mu^j_h$ voters of type $(h, 0)$ vote for $(h, 1)$ because $w_h > \bar{w}$. That is, $\lambda_1 \mu^j_h + \lambda_0 \mu^j_h = \mu^j_h > 1/2d$ voters vote for $(h, 1)$ so that $\pi_j((h, 1), (l, 1)) = 1$. If

$s_{-P,j} = (l,0)$, then $\lambda_1\mu_h^j$ voters of type $(h,1)$ vote for $(h,1)$ because $w_h + \theta > \bar{w}$; similarly, $\lambda_0\mu_h^j$ voters of type $(h,0)$ vote for $(h,1)$ because $w_h > \bar{w} + \theta$ since $w_h - \bar{w} > \bar{w} - w_l > \theta$, where the first inequality follows from $\mu_l > \mu_h$: $w_h - \bar{w} = w_h - \mu_l w_l - \mu_h w_h = \mu_l(w_h - w_l) > \mu_h(w_h - w_l) = \mu_h w_h - (1-\mu_l)w_l = \bar{w} - w_l$. That is, $\lambda_1\mu_h^j + \lambda_0\mu_h^j = \mu_h^j > 1/2d$ voters vote for $(h,1)$ so that $\pi_j((h,1),(l,0)) = 1$. Thus, $\pi_j((h,1),y) = 1$ for all $y \neq (h,1)$ and $j \in D_h$. ■

Lemma 2

Proof. Suppose that $\gamma w_l \geq \bar{w}$. Every district j has $1/d$ voters. From $\lambda_1 + \lambda_0 = 1$ and $\lambda_1 > \lambda_0$ follows that $\lambda_1 > 1/2$.

Consider any $P \in \{A,B\}$ and $j \in D$. Fix $s_{P,j} = (i_{P,j},1)$ for some $i_{P,j} \in \{l,h\}$. If $s_{-P,j} = s_{P,j}$, then $\pi_j((i_{P,j},1),(i_{P,j},1)) = 1/2$ by (12). Suppose that $s_{-P,j} = (-i_{P,j},1)$, where $-i_{P,j} \in \{l,h\}\backslash\{i_{P,j}\}$. Then, the candidates are of types $(l,1)$ and $(h,1)$, and all voters are indifferent among them: as both candidates favor regulation and vote against redistribution if their vote is pivotal once in office, the payoff associated with voting for either candidate is $w_i + \theta$ for voters of types $(l,1)$ and $(h,1)$ and w_i for voters of types $(l,0)$ and $(h,0)$. Thus, all voters randomize so that a fair coin flip is expected to decide the election and thus $\pi_j((i_{P,j},1),(-i_{P,j},1)) = 1/2$. That is, $\pi_j((i_{P,j},1),(i_{-P,j},1)) = 1/2$ for all $(i_{P,j},i_{-P,j}) \in \{l,h\}^2$. Finally, suppose that $s_{-P,j} = (i_{-P,j},0)$ for some $i_{-P,j} \in \{l,h\}$. As both candidates vote against redistribution if their vote is pivotal once in office irrespective of their income background, for voters of types $(l,1)$ and $(h,1)$, the payoff associated with voting for the candidate of type $(i_{P,j},1)$ is $w_i + \theta$, while that associated with voting for the candidate of type $(i_{-P,j},0)$ is w_i. Therefore, as $w_i + \theta > w_i$, all $\lambda_1\mu_l^j + \lambda_1\mu_h^j = \lambda_1/d > 1/2d$ voters of types $(l,1)$ and $(h,1)$ vote for the candidate of type $(i_{P,j},1)$, who thus wins the election with certainty. That is, $\pi_j((i_{P,j},1),(i_{-P,j},0)) = 1$ for all $(i_{P,j},i_{-P,j}) \in \{l,h\}^2$. ■

Proposition 6

Proof. To establish the result, I first consider the two possible cases and show that:

1. If $\gamma w_l < \bar{w}$, then there is a unique equilibrium, and all candidates are from their district's majority income group and favor regulation.

2. If $\gamma w_l \geq \bar{w}$, then every profile of candidate selections from the citizens who favor regulation is an equilibrium.

Consider each case in turn.

1. Suppose that $\gamma w_l < \bar{w}$. Consider the strategy profile (s_A^*, s_B^*) such that $(s_{A,j}^*, s_{B,j}^*) = ((i_j^*,1),(i_j^*,1))$ for all $j \in D$. Then, by (12), $\pi_j(s_{P,j}^*, s_{-P,j}^*) = \pi_j((i_j^*,1),(i_j^*,1)) = 1/2$ for all $P \in \{A,B\}$ and $j \in D$. Party P's payoff is

$$V(s_P^*, s_{-P}^*) = \sum_{j\in D} \pi_j(s_{P,j}^*, s_{-P,j}^*) = \frac{1}{2}d.$$

Consider any party $P \in \{A, B\}$ and suppose that they were to deviate to a different strategy $s'_P \neq s^*_P$. Then, there must be a nonempty subset $D' \subseteq D$ such that $k \in D'$ if and only if $s'_{P,k} \neq s^*_{P,k}$. Moreover, for all $k \in D'$, $s'_{P,k} \neq (i^*_k, 1)$, while $s^*_{-P,k} = (i^*_k, 1)$ and thus, by Lemma 1, $\pi_k(s'_{P,k}, s^*_{-P,k}) = 1 - \pi_k(s^*_{-P,k}, s'_{P,k}) = 1 - \pi_k((i^*_k, 1), s'_{P,k}) = 1 - 1 = 0$, while for all $j \in D - D'$, $\pi_j(s'_{P,j}, s^*_{-P,j}) = \pi_j(s^*_{P,j}, s^*_{-P,j}) = 1/2$. Thus, letting $d' = |D'| > 0$, party P's payoff from this deviation is

$$V(s'_P, s^*_{-P}) = \sum_{j \in D} \pi_j(s'_{P,j}, s^*_{-P,j}) = \frac{1}{2}(d - d') < \frac{1}{2}d = V(s^*_P, s^*_{-P}).$$

That is, deviating to any different strategy $s'_P \neq s^*_P$ is not profitable. Thus, the strategy profile (s^*_A, s^*_B) such that $(s^*_{A,j}, s^*_{B,j}) = ((i^*_j, 1), (i^*_j, 1))$ for all $j \in D$ is an equilibrium.

Consider any strategy profile $(s_A, s_B) \neq (s^*_A, s^*_B)$. That is, in some district $k \in D$, $(s_{A,k}, s_{B,k}) \neq ((i^*_k, 1), (i^*_k, 1))$. Party P's payoff is

$$V(s_P, s_{-P}) = \pi_k(s_{P,k}, s_{-P,k}) + \sum_{j \in D, j \neq k} \pi_j(s_{P,j}, s_{-P,j}).$$

There are two cases: either *(a)* neither party selects a candidate of type $(i^*_k, 1)$, and at least one party wins the seat in district k with probability less than one, i.e., for some $P \in \{A, B\}$, $s_{P,k} \neq (i^*_k, 1)$, $s_{-P,k} \neq (i^*_k, 1)$, and $\pi_k(s_{P,k}, s_{-P,k}) < 1$; or *(b)* only one of the two parties selects a candidate of type $(i^*_k, 1)$, while the other party selects a candidate of some other type, i.e., for some $P \in \{A, B\}$, $s_{P,k} \neq (i^*_k, 1)$, while $s_{-P,k} = (i^*_k, 1)$. Consider each case in turn.

Case (a). If $s_{P,k} \neq (i^*_k, 1)$, $s_{-P,k} \neq (i^*_k, 1)$, and $\pi_k(s_{P,k}, s_{-P,k}) < 1$, then

$$V(s_P, s_{-P}) = \pi_k(s_{P,k}, s_{-P,k}) + \sum_{j \in D, j \neq k} \pi_j(s_{P,j}, s_{-P,j}) < 1 + \sum_{j \in D, j \neq k} \pi_j(s_{P,j}, s_{-P,j}).$$

Party P can deviate to strategy s'_P such that $s'_{P,j} = s_{P,j}$ for all $j \in D, j \neq k$ and $s'_{P,k} = (i^*_k, 1)$. As $s_{-P,k} \neq (i^*_k, 1)$, by Lemma 1, $\pi_k(s'_{P,k}, s_{-P,k}) = \pi_k((i^*_k, 1), s_{-P,k}) = 1$ so that

$$V(s'_P, s_{-P}) = 1 + \sum_{j \in D, j \neq k} \pi_j(s_{P,j}, s_{-P,j}) > V(s_P, s_{-P}).$$

That is, (s_A, s_B) is not an equilibrium.

Case (b). If $s_{P,k} \neq (i^*_k, 1)$ and $s_{-P,k} = (i^*_k, 1)$, then by Lemma 1, $\pi_k(s_{P,k}, s_{-P,k}) = 1 - \pi_k(s_{-P,k}, s_{P,k}) = 1 - \pi_k((i^*_k, 1), s_{P,k}) = 1 - 1 = 0$ and

$$V(s_P, s_{-P}) = \pi_k(s_{P,k}, s_{-P,k}) + \sum_{j \in D, j \neq k} \pi_j(s_{P,j}, s_{-P,j}) = \sum_{j \in D, j \neq k} \pi_j(s_{P,j}, s_{-P,j}).$$

Party P can deviate to strategy s'_P such that $s'_{P,j} = s_{P,j}$ for all $j \in D, j \neq k$ and $s'_{P,k} = (i^*_k, 1)$.

As $s_{-P,k} = (i_k^*, 1)$, $\pi_k(s'_{P,k}, s_{-P,k}) = \pi_k((i_k^*, 1), (i_k^*, 1)) = 1/2$ by (12) so that

$$V(s'_P, s_{-P}) = \frac{1}{2} + \sum_{j \in D, j \neq k} \pi_j(s_{P,j}, s_{-P,j}) > \sum_{j \in D, j \neq k} \pi_j(s_{P,j}, s_{-P,j}) = V(s_P, s_{-P}).$$

That is, (s_A, s_B) is not an equilibrium.

Therefore, the strategy profile (s_A^*, s_B^*) such that $(s_{A,j}^*, s_{B,j}^*) = ((i_j^*, 1), (i_j^*, 1))$ for all $j \in D$ is the unique equilibrium.

2. Suppose that $\gamma w_l \geq \bar{w}$. Consider any strategy profile (s_A^*, s_B^*) such that for all $j \in D$, $(s_{A,j}^*, s_{B,j}^*) = ((i_{A,j}, 1), (i_{B,j}, 1))$ for some $(i_{A,j}, i_{B,j}) \in \{l, h\}^2$. By Lemma 2, $\pi_j((i_{A,j}, 1), (i_{B,j}, 1)) = 1/2$ for all $j \in D$. Party P's payoff is

$$V(s_P^*, s_{-P}^*) = \sum_{j \in D} \pi_j(s_{P,j}^*, s_{-P,j}^*) = \frac{1}{2}d.$$

Consider any party $P \in \{A, B\}$ and suppose that they were to deviate to a different strategy $s'_P \neq s_P^*$. Then, there must be a nonempty subset $D' \subseteq D$ such that $k \in D'$ if and only if $s'_{P,k} \neq s_{P,k}^* = (i_{P,k}, 1)$. Moreover, for all $k \in D'$, $s'_{P,k} \in \{(-i_{P,k}, 1), (i_{P,k}, 0), (-i_{P,k}, 0)\}$, where $-i_{P,k} \in \{l, h\} \backslash \{i_{P,k}\}$, while $s_{-P,k}^* = (i_{-P,k}, 1)$ and, by Lemma 2 and $\pi_k(s'_{P,k}, s_{-P,k}^*) = 1 - \pi_k(s_{-P,k}^*, s'_{P,k})$, $\pi_k(s'_{P,k}, s_{-P,k}^*) \leq 1/2$. That is, for all $k \in D'$, $\pi_k(s'_{P,k}, s_{-P,k}^*) \leq \pi_k(s_{P,k}^*, s_{-P,k}^*)$, while for all $j \in D - D'$, $\pi_j(s'_{P,j}, s_{-P,j}^*) = \pi_j(s_{P,j}^*, s_{-P,j}^*)$. Therefore, party P's payoff from this deviation is

$$V(s'_P, s_{-P}^*) = \sum_{j \in D} \pi_j(s'_{P,j}, s_{-P,j}^*) \leq \sum_{j \in D} \pi_j(s_{P,j}^*, s_{-P,j}^*) = V(s_P^*, s_{-P}^*).$$

That is, deviating to any different strategy $s'_P \neq s_P^*$ is not profitable. Thus, every strategy profile (s_A^*, s_B^*) such that for all $j \in D$, $(s_{A,j}^*, s_{B,j}^*) = ((i_{A,j}, 1), (i_{B,j}, 1))$ for some $(i_{A,j}, i_{B,j}) \in \{l, h\}^2$ is an equilibrium.

As there is an equilibrium in each case, an equilibrium exists for all $\gamma \geq 1$. Finally, if $\gamma w_l < \bar{w}$, then as shown in 1., in equilibrium, $(s_{A,j}^*, s_{B,j}^*) = ((l, 1), (l, 1))$ for all $j \in D_l$, while $(s_{A,j}^*, s_{B,j}^*) = ((h, 1), (h, 1))$ for all $j \in D_h$. Thus, district j's legislator is from group l for all $j \in D_l$ and from group h for all $j \in D_h$. Therefore, the legislature has $|D_l|$ legislators from group l and $|D_h|$ legislators from group h. Since $|D_l| > |D_h|$, the majority of legislators are from group l. By contraposition, if high-income citizens predominate in the legislature, then $\gamma w_l \geq \bar{w}$ must hold. As shown in 2., there is an equilibrium such that $(s_{A,j}^*, s_{B,j}^*) = ((h, 1), (h, 1))$ for all $j \in D''$, where $D'' \subseteq D$ is some subset of D such that $|D''| > |D|/2$, so that $|D''| > |D|/2$ legislators, i.e., the majority of legislators, are from group h. Thus, if high-income citizens predominate in the legislature in equilibrium, then $\gamma w_l \geq \bar{w}$. It then follows from $\gamma w_h > \gamma w_l \geq \bar{w}$ that all legislators vote against redistribution if their vote is pivotal, irrespective of their income background. That is, no legislator votes for redistribution if their vote is pivotal. ■

Proposition 7

Proof. Propositions 1–2, Corollaries 1–2, and Proposition 3 hold. The proofs of Propositions 1–2 are unaffected; Corollaries 1–2 follow directly; the proof of Proposition 3 is unaffected. ■

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