Financial Rewards, Crowding, and Political Elitism*

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Abstract

Many democracies experience political elitism in the sense that virtually all members of the national legislature are higher-income citizens. At the same time, first, evidence suggests that voters do not prefer higher-income candidates over lower-income candidates and, second, lower-income citizens would be vastly better off financially if they held office. I study an environment that is consistent with the last two observations and ask why political elitism might arise—or why lower-income citizens might not run for office. Two conditions on the reward structure together are necessary and sufficient for elitism. They ensure that lower-income candidates cannot occur in equilibrium because their presence implies that profitable deviations exist. Under these conditions, in equilibrium, lower-income citizens do not run for office even though they would be vastly better off financially holding it. Higher-income citizens crowd the race and lower the probability of winning enough to reduce lower-income citizens' expected gains from also entering the race below the cost. Several implications can guide policy and the interpretation of empirical evidence. First, outside-income limits can prevent elitism, but salary reform alone often cannot. Second, a nonmonotonic relationship between politician salary and elitism can help to reconcile mixed evidence other likely complementary channels cannot address.

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1 Introduction

Descriptive representation has been argued to matter not only for giving groups a voice but also for legitimizing policy-making processes and outcomes, affecting implementation and compliance (e.g., Mansbridge 1999; Hayes and Hibbing 2017; Arnesen and Peters 2018; Clayton et al. 2019). However, many representative democracies experience political elitism in the sense that at all times, virtually all members of the national legislature are citizens with high income potential (Carnes 2012, 2018; Thompson et al. 2019; Gagliarducci et al. 2010; Dal Bó et al. 2017).[1] In the United States, for example, not only members of Congress but congressional candidates more generally tend to be higher-income citizens (Thompson et al. 2019; Treul and Hansen 2023).

This pattern is particularly interesting given two further observations. First, evidence suggests that electoral prospects are independent of income in the sense that voters do not prefer higher-income candidates—or their traits and skills—over lower-income candidates (Carnes and Lupu 2016a; Griffin et al. 2020; Campbell and Cowley 2014; Hainmueller et al. 2014).[2] In addition, suitable lower-income citizens appear to be no less interested in holding office in principle than suitable higher-income citizens (Carnes and Lupu 2025). Second, being a member of the national legislature pays a relatively high salary (e.g., Berg 2020) and may facilitate outside income from consultancy, speeches, book deals, and so on (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 2024; Dahlgaard et al. 2025). For example, in 2016, members of the US Congress received a base salary of $174,000, while the US population aged at least 25 had median earnings under $40,000.[3] In the same year, despite an outside earned-income limit under $28,000, one member's estimated outside income surpassed $1.7 million.[4] Arguably, book royalties might be less considerable without legislators' visibility and public image. Most other democracies have less restrictive rules (Weschle 2021), and outside income is common among their legislators (Geys and Mause 2013). In addition, holding office may increase post-legislature income (e.g., Parker and Parker 2009; Eggers and Hainmueller 2009; Palmer and Schneer 2016). For example, Diermeier et al. (2005) find first-time reelection to the US House or Senate to raise post-congressional wages by over 4% and 16%, respectively.

Given these observations, treating elitism as an outcome rather than a principle of political selection, why does it arise? More specifically, given the same electoral prospects as higher-income citizens, why might lower-income citizens not run for office despite being vastly better off financially

[1] For example, Thompson et al. (2019) find that candidates for and members of the US Congress have substantially higher past incomes than nonpoliticians with the same occupation, education, city of residence, birth state, race, gender, and age. Similarly, Dal Bó et al. (2017) find that Swedish members of parliament have higher income potential than otherwise similar nonpoliticians. Also see Carnes and Lupu (2023). I discuss wealth in Section 4.

[2] The evidence in these studies suggests that, if anything, voters favor lower-income candidates. Hoyt and DeShields (2021) find in survey experiments that candidates from lower-class family backgrounds, if anything, have an electoral advantage over otherwise similar candidates from higher-class family backgrounds in fictional gubernatorial elections. Controlling for contest, candidate, and district characteristics, Treul and Hansen (2023) find that lower-income citizens receive a smaller vote share in primaries for the US House of Representatives than higher-income citizens but do not win at significantly different rates. Matching primary candidates on observables, there are no significant differences.

[3] Brudnick (2016) and US Census Bureau, 2012–2016 ACS 5-year estimates, accessed 9/25/2018.

[4] Brudnick (2016) and www.opensecrets.org accessed 12/03/2019.

holding office than being a private citizen?[5]

I address this question in a model in which, consistent with the motivating evidence, holding office is associated with financial rewards and electoral prospects are independent of income. For electoral prospects to be independent of income, the policy issue does not represent a conflict between higher- and lower-income citizens. Otherwise, lower-income candidates would have an electoral advantage because most voters are lower-income citizens.[6] Similarly, candidates' expected performance as a representative does not depend on income. Otherwise, candidates from some income group would have an electoral advantage. (I further discuss and justify both assumptions and their formalization in Sections 4 and 2.1, respectively.) In addition, holding office pays a salary, brings prestige or perks, and translates income potential as a private citizen into outside income.[7] Potential candidates decide whether to run for office by comparing the cost of running with the expected gains, which depend on the probability of winning the election. The probability of winning the election in turn depends on how competitive the race is—i.e., how many candidates there are—which gives rise to a strategic interaction in the running decision. The arguably natural and uniquely suitable definition of political elitism in this model is that only higher-income citizens ever run for office (see Section 4 for a detailed discussion).

Two conditions that together ensure that lower-income candidates cannot occur in equilibrium because their presence implies that some citizen can profitably deviate are necessary and sufficient for elitism. First, the office must be attractive. For some citizens, the gains from holding office instead of being a private citizen must be large enough for them to be willing to face competition in the election. If the office is unattractive, then no one wants to compete for it, and a lower-income citizen can run and win unopposed. If the office is attractive, then some noncandidate citizen can profitably deviate to running if there is a single lower-income candidate. Second, the difference in income between holding office and being a private citizen must be sufficiently larger for higher- than for lower-income citizens. If there is a lower-income candidate, then their expected gains from running outweigh the cost. For a higher-income noncandidate, deviating to running is then profitable because, despite the resulting distinctly lower probability of winning, their expected gains are high enough due to their sufficiently larger difference in income. Under these two conditions, in equilibrium, lower-income citizens choose not to run for office even though they would be vastly better off financially holding office than being a private citizen. The reason is that higher-income citizens crowd the race. As a result, the probability of winning lower-income citizens would face upon also entering the race is too low for their expected gains to justify incurring the cost of running.

[5]There usually are no wealth, income, or education qualifications for office holders. As to campaign finance, for example, about 43%, 83%, and 27%, respectively, of all candidates, winners, and nonincumbent winners in the 2016 election for the US House of Representatives contributed or loaned \$0 to their campaigns (Federal Election Commission accessed 7/2/2019 and the Directory of Members of the US Congress accessed 7/4/2019). I discuss other likely complementary channels promoting political elitism in detail in Section 3.4.

[6]For example, in 2016, median household income was less than mean household income in all US congressional districts (US Census Bureau, 2012–2016 ACS 5-year estimates, accessed on 4/20/2018). The environment thus is not suitable to study redistribution. However, since electoral prospects seem independent of income, redistribution might not be salient. Section 4 discusses redistribution and conflict in an unmodeled second policy dimension.

[7]Outside income could be interpreted as income from post-legislature employment or corruption (see Section 4).

The two conditions can inform policy aimed at preventing elitism. Imposing restrictive enough outside-income limits prevents elitism because it limits how much larger the difference in income between holding office and being a private citizen can be for higher- than for lower-income citizens. What is restrictive enough can be linked to income data that is observable in principle. If necessary, such limits on outside income could be accompanied by increases in legislator salaries to keep average legislator income unchanged. However, a reform of legislator salaries alone often cannot prevent elitism. All legislators regardless of income potential receive the same salary. Since a salary reform thus equally affects their income in office, it does not affect how much larger the difference in income between holding office and being a private citizen is for higher- than for lower-income citizens.

Finally, for prestigious offices, the relationship between legislator salary and elitism can be nonmonotonic. This nonmonotonicity can help to reconcile mixed evidence on the association between politician pay and politician background (see Section 3.4 for details). Depending on fundamentals, an increase in the legislator salary may induce a shift to elitism, a shift to no elitism, or no shift at all. As in the mixed evidence, higher politician pay thus can be associated with more, fewer, or unchanged numbers of politicians being more highly educated or from higher-paying occupations. By contrast, as I discuss in detail in Section 3.4, other likely complementary channels promoting political elitism cannot address this mixed evidence, let alone reconcile it.

Related literature. The details of the reward structure have long been argued to affect who chooses to run for office (e.g., Groseclose and Krehbiel 1994; Fiorina 1994; Hall and van Houweling 1995; Keane and Merlo 2010). I consider an environment in which finite numbers of higher- and lower-income citizens can run for office at a cost (Osborne and Slivinski 1996; Besley and Coate 1997) and office holders may collect outside income. The framework is most closely related to that of Gagliarducci et al. (2010). They study the trade-off between legislator quality and effort when outside income is possible in an environment with a continuum of potential candidates who can run for office at no cost.[8] My focus is on political elitism. The differences between the two environments are essential to study elitism, which cannot arise in the framework of Gagliarducci et al. (2010) for realistic parameters.[9] Since running is costless in their framework, lower-income citizens always run for the national legislature. Regardless of outside income, legislator salaries are much higher than lower-income citizens' market income, and nonpecuniary rewards (e.g., ego rents) are positive.[10] Thus, the share of lower-income citizens among candidates and legislators (since winning is random) is not smaller than in the population. By contrast, considering only a finite number of citizens who face a cost of running induces a strategic interaction that is not present in Gagliarducci et al. (2010). Elitism can arise from this strategic interaction by lower-income citizens

[8] Also see Grossman and Hanlon (2014) and Fedele and Naticchioni (2016).

[9] Other frameworks of political selection similarly are not suitable to study political elitism. For example, in Dal Bó and Finan (2018), to interpret valence as market-income potential, at least the cost of running must be increasing in valence to capture differences in the opportunity costs of holding office. In this case, however, some lower-income citizens (with valence close enough to zero) always run for office, while higher-income citizens may or may not run.

[10] For the US Congress, Diermeier et al. (2005) estimate a yearly monetary value of general nonpecuniary rewards of about 17% to over 166% of the sample period's mean annual salary, depending on the chamber and committee roles.

choosing not to run. Because the environment is strategic, the nature of the analysis and results are completely different. Appendix A highlights how and why Gagliarducci et al. (2010)'s predictions for observing higher-income politicians change in this different environment.

For consistency with the motivating evidence, I assume that all candidates are expected to be equally competent representatives regardless of income. In this dimension, my analysis complements many studies that assume a link between private-sector success and competence in office (e.g., Caselli and Morelli 2004; Messner and Polborn 2004; Poutvaara and Takalo 2007; Mattozzi and Snowberg 2018). The case I study accords with evidence that voters do not perceive higher-income candidates as more qualified or effective than lower-income candidates (Carnes and Lupu 2016a; Campbell and Cowley 2014).[11] Being a good representative requires certain skills and abilities, but high income does not seem to indicate to voters that candidates have them. Section 4 offers a detailed discussion.

I defer the discussion of literature on other likely complementary channels promoting political elitism to Section 3.4. I describe the model in Section 2 and analyze it in Section 3. I offer additional discussion of the environment, analysis, and results in Section 4 and conclude in Section 5.

2 The Model

Consider a set of $I \in \mathbb{N}$ risk-neutral citizens indexed by $i \in \mathcal{I} = \{1, \ldots, I\}$. There are $I_l > 1$ lower-income citizens with indices in $\mathcal{L} \subset \mathcal{I}$ and market-income potential $w_l > 0$. There are also $I_h > 1$ higher-income citizens with indices in $\mathcal{H} \subset \mathcal{I}$ and finite market-income potential $w_h > w_l$, where $\mathcal{L} \cup \mathcal{H} = \mathcal{I}$, $\mathcal{L} \cap \mathcal{H} = \emptyset$. Citizen i's market income thus is[12]

$$w(i) = \begin{cases} w_l & \text{if } i \in \mathcal{L}, \\ w_h & \text{if } i \in \mathcal{H}. \end{cases}$$

All citizens are potential candidates and can choose whether to run for office or not: they are eligible and suitable to hold office. This assumption simplifies the exposition. Potential candidates could be a subset of the citizens. What matters is that the subset of citizens who are suitable to hold office contains enough lower-income citizens to ensure that elitism is not explained simply by missing suitable lower-income citizens. For each $i \in \mathcal{I}$, let $\chi(i) \in \{0, 1\}$ indicate whether or not citizen i chooses to run for office, where $\chi(i) = 1$ indicates running, while $\chi(i) = 0$ indicates not running. The profile of running decisions can be represented by the set of candidates, $\mathcal{C} = \{i \in \mathcal{I} : \chi(i) = 1\}$. The number of candidates is $n = |\mathcal{C}| \geq 0$. The set of noncandidate citizens is $\mathcal{I} \setminus \mathcal{C}$. The set of candidates other than citizen i is $\mathcal{C}_{-i} = \mathcal{C} \setminus \{i\}$. The number of candidates other than citizen i is

[11] Using nationally representative data, Carnes and Lupu (2016a) and Campbell and Cowley (2014) find evidence for several countries, including the United States, that candidates' perceived competence is independent of income. Hoyt and DeShields (2021) find that otherwise similar gubernatorial candidates with a lower-class compared to a higher-class family background are not perceived less competent. However, focusing on the skill of directing resources to the district, Mattozzi and Snowberg (2018) report evidence from convenience samples via Amazon's Mechanical Turk that US voters may perceive higher-income candidates as more competent. Section 4 has more discussion.

[12] Higher and lower incomes should not be thought of as referring to extremes but rather to large income groups above and below but possibly near the mean income. The restriction to two income levels is for simplicity.

$n_{-i} = |\mathcal{C}_{-i}| \geq 0$. If there is no candidate, then the office remains vacant. If there is at least one candidate, then citizens voting sincerely in the election gives each candidate equal probability of winning in equilibrium (see Section 4 for details). Therefore, I simplify the exposition by assuming that the office holder is determined by simple random sampling from the candidates, giving each of the $n > 0$ candidates probability $1/n$ of winning the office.

A finite utility benefit $\theta(i) > 0$ accrues to citizen i, with arbitrary heterogeneity across citizens, if and only if some citizen holds office. This assumption formalizes electoral prospects independent of income (see Section 2.1 for a detailed discussion). Running for office incurs a finite utility cost $\delta > 0$ from, for example, a loss of privacy due to public scrutiny. The office holder receives finite office utility benefit $\beta \geq 0$ from, for example, prestige and perks associated with the office. To ensure that elitism is not explained by assuming differences by income in preferences over prestige or privacy, the utility benefit β and the utility cost δ are institutional in nature and equal for all citizens (see Section 2.1 for an example).

To hold office, citizen i must give up their market income $w(i)$.[13] However, legislators receive a finite legislator salary not less than the market income of lower-income citizens, $v \geq w_l$. As illustrated in the introduction, this assumption is reasonable in the context of national legislatures. While in office, citizen i generates finite outside income $\varphi(i) \geq 0$.[14] (See Section 4 for interpretations as income from post-legislature employment or corruption.) Some skills valued in the private sector may be transferable to available outside activities. Thus, outside income may depend on citizen i's market-income potential,

$$\varphi(i) = \begin{cases} \varphi_l \geq 0 & \text{if } i \in \mathcal{L}, \\ \varphi_h \geq 0 & \text{if } i \in \mathcal{H}. \end{cases}$$

From the point of view of an individual citizen, the laws and rules they face once a legislator are exogenous at least in the short run. They thus take the salary v and the constraints on outside activity and income as given. Citizen i's income while in office thus is $v + \varphi(i) = \gamma(i)w(i)$, where

$$\gamma(i) \equiv v/w(i) + \varphi(i)/w(i) = \begin{cases} \gamma_l \equiv v/w_l + \varphi_l/w_l & \text{if } i \in \mathcal{L}, \\ \gamma_h \equiv v/w_h + \varphi_h/w_h & \text{if } i \in \mathcal{H}. \end{cases} \tag{1}$$

The expressions $\gamma(i)$ are useful in the below discussion of differences in income between holding office and being a private citizen and office-holding premia.

The expected payoffs of citizen $i \in \mathcal{I}$ depend on their identity—their index i—and the number n_{-i} of candidates other than them. If there is no other candidate, then citizen i's payoff of not running is their market income $w(i)$ because the policy will not be enacted. If there is at least one other candidate, then citizen i's payoff of not running is their market income plus their policy benefit, $\theta(i) + w(i)$, because the policy will be enacted by some other citizen. Therefore, citizen i's

[13] That is, naturally, higher-income citizens face higher opportunity costs of holding office than lower-income citizens.

[14] In the data, not all legislators have outside income. It may thus represent the expected value at the time of running of a draw of outside-income opportunities once in office from a distribution that may vary by income background.

expected payoff of not running is

$$V_0(n_{-i}, i) = \begin{cases} w(i) & \text{if } n_{-i} = 0, \\ \theta(i) + w(i) & \text{if } n_{-i} > 0. \end{cases} \tag{2}$$

When running for office, citizen i incurs the cost of running δ, but the policy benefit $\theta(i)$ accrues to them because the policy will be enacted either by them or by another candidate. With probability $1/(n_{-i}+1)$, citizen i wins the office and collects the office benefits β and the in-office income $\gamma(i)w(i)$. With probability $n_{-i}/(n_{-i}+1)$, citizen i does not win the office and has market income $w(i)$ as a private citizen. Therefore, citizen i's expected payoff of running is

$$V_1(n_{-i}, i) = \frac{1}{n_{-i}+1}\left(\theta(i) + \beta + \gamma(i)w(i) - \delta\right) + \frac{n_{-i}}{n_{-i}+1}\left(\theta(i) + w(i) - \delta\right). \tag{3}$$

Finally, two assumptions prevent needless convolution by ruling out unrealistic, uninteresting cases. First, the utility benefits from holding office and enacting the policy outweigh the cost of running for at least some higher- and lower-income citizens: $\theta(k_h) + \beta > \delta$ for some $k_h \in \mathcal{H}$ and $\theta(k_l) + \beta > \delta$ for some $k_l \in \mathcal{L}$.[15] This assumption ensures that some citizens would be willing to run for office at least if they were unopposed. Second, both income groups are large enough:

$$\min\{I_l, I_h\} > \left(\beta + \max\{(\gamma_l - 1)w_l, (\gamma_h - 1)w_h\}\right)/\delta. \tag{4}$$

This assumption prevents cases in which all citizens in an income group run for office.[16]

2.1 Discussion of Some Assumptions

The policy benefit $\theta(i)$ and equal electoral prospects. The assumption that $\theta(i) > 0$ accrues to citizen i if and only if some citizen holds office formalizes electoral prospects independent of income. First, to prevent an electoral advantage due to policy preferences depending on income, the policy issue cannot represent a conflict between higher- and lower-income citizens. Otherwise, lower-income candidates would have an electoral advantage because most voters are lower-income citizens (see Footnote 6). Therefore, all citizens benefit from the policy, although the size of the benefit may vary arbitrarily. The policy might represent a local service or public good for which a representative must formally request the required resources. All income can then be interpreted as after taxes raised from all citizens in all districts to finance such local public goods in all districts.[17] The arbitrary heterogeneity of $\theta(i)$ across citizens allows for, among others things, differences in preferences over the local public good by income. For example, one could imagine a scenario in

[15] As $\theta(i) > 0\ \forall i$, these inequalities do not require that the office benefits alone outweigh the cost of running, $\beta > \delta$.

[16] First, for example, without Inequality (4), elitism might not arise simply because there are too few higher-income citizens. Second, the right-hand side of Inequality (4) depends on the maximum gains from holding office over being a private citizen (and the cost of running). Thus, for example, if the prestige and outside-income potential associated with an office are very low, then very small numbers of higher- and lower-income citizens satisfy Inequality (4).

[17] As the setup is, explicitly modeling taxation to pay for the legislator salary and the policy would not add anything.

which the provision of some local public transport could benefit both lower-income citizens (who gain a more affordable mode of transport than commuting by car) and higher-income citizens (who face less traffic on their commute by car), even if the benefit might be a lot larger for one group than for the other. I discuss redistribution and policy conflict more generally in Section 4.

Second, to prevent an electoral advantage due to expected competence in office depending on income, all potential candidates are (expected to be) equally competent to enact the policy regardless of income. Otherwise, candidates from some income group would have an electoral advantage. As discussed above, this assumption is consistent with evidence that voters do not perceive higher-income candidates as more qualified or effective than lower-income candidates (Carnes and Lupu 2016a; Campbell and Cowley 2014; see Section 4 for more discussion). This assumption also ensures that elitism is not explained by simply assuming that voters expect lower-income citizens to be less competent in office.

The utility benefit β and the utility cost δ are independent of income. This assumption ensures that elitism is not explained by assuming differences by income in preferences over prestige or privacy. For example, the utility cost of running might be related to the media landscape and the nature of public scrutiny candidates face. Some citizens might value privacy more and choose to share less information about themselves publicly, while others might value privacy less and choose to share more. One can imagine that members of the media exert on average the same effort on revealing information about each candidate beyond what is shared or easily accessible. Then all citizens might expect similar levels of discomfort from the loss of privacy as a candidate. More generally, an implicit assumption here is that campaigning does not require taking time off from market activity and is financed by fundraising done on one's own time.

Outside income may depend on market-income potential. Outside income might be facilitated, for example, by the networks or visibility legislators gain through their role. It might depend on, for example, how transferable legislators' skills are to lucrative outside activity that complies with formal and informal rules. Skills valued in the private sector may or may not be more transferable to lucrative outside activities. The assumption that outside income may depend on market-income potential allows for both cases. Alternatively, outside income could be interpreted as income from post-legislature employment or corruption (see the discussions in Section 4).

3 Analysis

I first introduce some definitions, additional notation, and terminology in Section 3.1. I study when elitism arises in Section 3.2 and what might prevent it in Section 3.3. Finally, I discuss how the results can help to reconcile mixed evidence on the association between politician pay and politician background in Section 3.4. All proofs are relegated to Appendix B.

3.1 Definitions of Equilibrium, Elitism, and Additional Terminology

Using (2) and (3), an equilibrium is defined as a profile of running decisions such that, given all other citizens' running decisions, no citizen can benefit from changing theirs.

Definition 1. *An equilibrium is a set $\mathcal{C}$ such that*

$$V_1(n_{-i}, i) \geq V_0(n_{-i}, i) \quad \forall i \in \mathcal{C}, \tag{5}$$

$$V_0(n_{-i}, i) \geq V_1(n_{-i}, i) \quad \forall i \in \mathcal{I} \setminus \mathcal{C}. \tag{6}$$

From the point of view of citizen i, the running decisions of all other citizens together determine the number n_{-i} of candidates other than themselves. Given a set $\mathcal{C}$ of $n \geq 0$ candidates, $n_{-i} = n$ for all $i \in \mathcal{I} \setminus \mathcal{C}$ and, if there are candidates so that $\mathcal{C} \neq \emptyset$ and $n \geq 1$, then $n_{-i} = n - 1$ for all $i \in \mathcal{C}$.

I show in Proposition 1 below that an equilibrium always exists and that there are candidates for office. The following definition of elitism is natural and uniquely suitable here (see Section 4).

Definition 2. *Elitism arises if and only if there is no equilibrium with a lower-income candidate.*

Below, I distinguish the *difference in income between holding office and being a private citizen*,

$$\gamma(i)w(i) - w(i) = (\gamma(i) - 1)w(i),$$

from the *office-holding premium*,

$$\frac{\gamma(i)w(i) - w(i)}{w(i)} = \gamma(i) - 1.$$

From (1), $v \geq w_l$, and $\varphi(i) \geq 0$ follows that $\gamma(i) \geq w_l/w(i)$, $\gamma(i)$ increases in both v and $\varphi(i)$, and lower-income citizens' difference in income between holding office and being a private citizen is nonnegative, $(\gamma_l - 1)w_l \geq 0$. I say that:

Definition 3. *There is a positive office-holding premium for citizen i if and only if $\gamma(i) > 1$. The office-holding premium is higher for citizen i than for citizen j if and only if $\gamma(i) > \gamma(j)$.*

To ease discussion and interpretation, given the fixed real numbers $\varphi(i) \geq 0$ and $w(i) > 0$, I calculate the number $\phi(i) \equiv \varphi(i)/w(i) \geq 0$ and refer to it as the office productivity for citizen i. Without loss of generality, I then can express any given outside income $\varphi(i) \geq 0$ for citizen i as the product of their market-income potential $w(i)$ and the resulting office productivity $\phi(i)$ for them, $\varphi(i) = \phi(i)w(i)$, where

$$\phi(i) = \begin{cases} \phi_l \equiv \varphi_l/w_l \geq 0 & \text{if } i \in \mathcal{L}, \\ \phi_h \equiv \varphi_h/w_h \geq 0 & \text{if } i \in \mathcal{H}. \end{cases}$$

Given a citizen's outside income and market-income potential, the office productivity captures the extent to which the office translates their market-income potential into outside income. I say that:

Definition 4. *The office is productive for citizen i if and only if $\phi(i) > 0$. The office is more productive for citizen i than for citizen j if and only if $\phi(i) > \phi(j)$.*

An unproductive office can pay positive office-holding premia due to a high enough salary. Similarly, a productive office does not pay higher-income citizens a positive office-holding premium if the salary does not more than compensate them for a lower productivity relative to the market.

3.2 When Does Elitism Arise?

Two initial insights about this environment are that an equilibrium exists and there are candidates.

Proposition 1. *An equilibrium exists. In every equilibrium, there is at least one candidate.*

If no citizen runs for office, then the policy is not enacted. A lower-income citizen who deviates to running wins with certainty. They incur the cost of running but also receive the benefits from holding office and the policy being enacted, which outweigh the cost of running for at least some lower-income citizens. Their income in office is not less than their income as a private citizen, and they may collect an office-holding premium. There thus is at least one candidate in equilibrium.

Citizens decide whether to run for office by comparing their expected payoff of running, $V_1(n_{-i}, i)$, to their expected payoff of not running, $V_0(n_{-i}, i)$. This comparison amounts to comparing the cost of running to the expected gains—the office benefits and the difference in income between holding office and being a private citizen, weighted by the probability of winning. Citizens' running decisions do not affect the office benefits or the difference in income. However, an additional citizen entering the race increases competition and thus decreases the probability of winning the benefits and the difference in income for all candidates. In equilibrium, noncandidate citizens do not benefit from also entering the race given that $n_{-i} = n > 0$ candidates are already running. Due to the distinctly lower probability of winning if they entered the race as well, $V_0(n, i) \geq V_1(n, i)$ because the expected gains from also running would not outweigh the associated cost:

$$\delta \geq \frac{1}{n+1} \left(\beta + (\gamma(i) - 1)w(i)\right).$$

For candidates, on the other hand, given that $n_{-i} = n - 1$ others are running, $V_1(n-1, i) \geq V_0(n-1, i)$ because the probability of winning and collecting the gains from holding office they are facing is high enough:

$$\frac{1}{n} \left(\beta + (\gamma(i) - 1)w(i)\right) \geq \delta.$$

Two conditions matter for political elitism. First, Condition 1 states that the office is attractive. The maximum gains from holding office instead of being a private citizen—the office benefits and the maximum difference in income—are sufficiently larger than the cost of running.

Condition 1. *The cost of running for office satisfies* $2\delta < \beta + \max\{(\gamma_l - 1)w_l, (\gamma_h - 1)w_h\}$.

The office could be attractive due to, for example, the benefits of lots of prestige and perks associated with it alone, $\beta > 2\delta$. A national legislative office might be attractive in this sense. It

could also be attractive because it facilitates enough lucrative outside activity for some citizens' difference in income alone to be large enough relative to the cost of running. An attractive office might offer some prestige and perks and facilitate some lucrative outside activity.

The left panel of Figure 1 illustrates Condition 1 for an example where $\delta > \beta > 0$. It depicts the space of pairs of differences in income, showing lower-income citizens' difference in income on the horizontal axis and higher-income citizens' difference in income on the vertical axis. While the difference in income is nonnegative for lower-income citizens due to $(\gamma_l - 1)w_l \geq 0$, it may be negative for higher-income citizens. The solid line separates the set of pairs of differences in income for which Condition 1 holds from the set of pairs for which Condition 1 does not hold, where the latter includes the pairs on the solid line itself.

Second, Condition 2 states that the difference in income is sufficiently larger for higher- than for lower-income citizens.

Condition 2. *The difference in differences in income between holding office and being a private citizen satisfies*

$$(\gamma_h - 1)w_h - (\gamma_l - 1)w_l > \delta \left(1 - \left(\frac{\beta + (\gamma_l - 1)w_l}{\delta} - \left\lfloor \frac{\beta + (\gamma_l - 1)w_l}{\delta} \right\rfloor\right)\right).$$

The expression $\lfloor \cdot \rfloor$ denotes the floor function. Importantly, Condition 2 does not restrict the difference in income that lower-income citizens can expect. That is, lower-income citizens can be vastly better off financially holding office than being a private citizen as is the case in the data. Condition 2 could be written differently. As will become clear below, stating it in terms of the difference in differences in income helps to make the role of the financial rewards structure in the results and discussion in Sections 3.3 and 3.4 transparent. Since all office holders collect the same salary, the left-hand side of Condition 2 amounts to the difference in differences in income between outside activity while in office and market activity as a private citizen. Thus, the difference in differences in income may be sufficiently large if, for example, the office facilitates sufficiently lucrative outside activity for higher- relative to lower-income citizens. One possibility might be that more lucrative outside activities require specific skills and abilities that tend to be associated with higher-income occupations (but are not valued by voters or important for overall performance as a representative).[18] For an office that is prestigious enough for the utility benefit from holding it to outweigh the cost of running, $\beta \geq \delta$, Condition 2 implies Condition 1.

Remark 1. *Condition 2 implies Condition 1 if and only if $\beta \geq \delta$.*

The middle panel of Figure 1 is analogous to the left panel and also assumes $\delta > \beta > 0$. The solid line separates the set of pairs of differences in income for which Condition 2 holds from the set of pairs for which Condition 2 does not hold, where the latter includes the pairs on the solid line itself. Together, Conditions 1 and 2 are necessary and sufficient for elitism to arise.

[18] This example does not depend on whether opportunities for lucrative outside activity are more likely to arise for office holders in certain political positions. In those positions, lower-income citizens would simply not be able to use the more lucrative opportunities that require skills and abilities they do not have, which may affect running decisions.

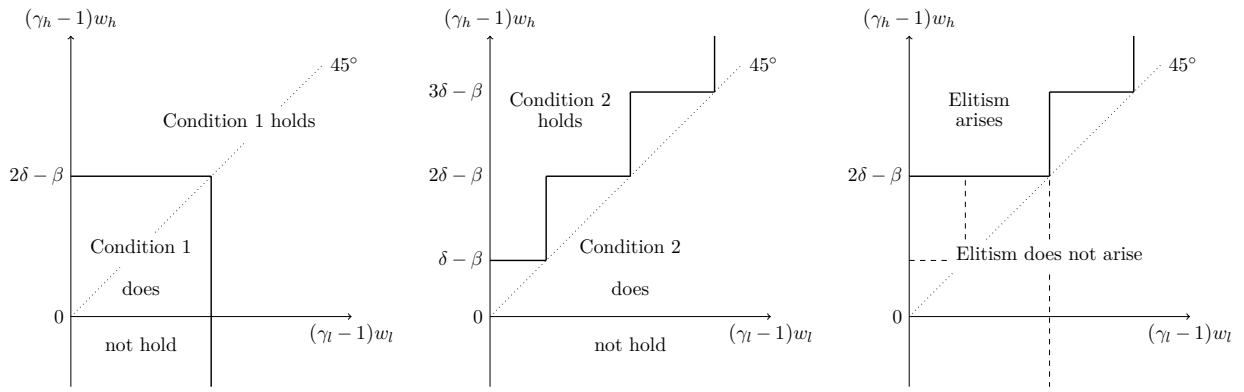

Figure 1: The left and middle panels depict pairs of differences in income for lower- and higher-income citizens that satisfy Conditions 1 and 2, respectively, where $\delta > \beta > 0$. The right panel depicts the pairs of differences in income that satisfy both Conditions 1 and 2, i.e., for which elitism arises.

Proposition 2. *Elitism arises if and only if Conditions 1 and 2 hold.*

Under Conditions 1 and 2, lower-income citizens choose not to run for office in equilibrium even though they may be vastly better off financially in office than as a private citizen. Only higher-income citizens ever run for office. They crowd the race and lower the probability of winning for each candidate enough to discourage lower-income citizens from running. Despite being vastly better off financially holding office, the probability of winning that lower-income citizens would face upon also entering the race is too low for their expected gains from running to outweigh the cost.

The right panel of Figure 1 combines the left and middle panels to separate the pairs of differences in income for which elitism arises from those for which elitism does not arise. Conditions 1 and 2 together ensure that lower-income candidates cannot occur in equilibrium because their presence implies that some noncandidate citizen can profitably deviate. Condition 1 ensures that given the cost of running, the office's prestige, perks, salary, and productivity attract at least two candidates in equilibrium. These candidates must be willing to pay the cost of running to enter a competitive election with an uncertain outcome. Citizens are willing to enter such an election for an attractive office because the gains from holding it instead of being a private citizen are sufficiently large. A single lower-income candidate thus cannot be an equilibrium because some noncandidate citizen would benefit from deviating to running. By contrast, for an unattractive office, the cost of running is too high compared to the maximum gains from it for anyone to want to compete for it. Many citizens may be better off holding office instead of being a private citizen but are willing to run only if there is no competition. A single lower-income candidate thus can be an equilibrium, and elitism does not arise.

Condition 2 ensures that noncandidate higher-income citizens want to deviate to running if there is a lower-income candidate. Given the probability of winning and the office's prestige and perks, a lower-income candidate's difference in income between holding office and being a private citizen must be large enough for their expected gains from running to outweigh the cost. A noncandidate

higher-income citizen's deviation to running decreases the probability of winning for all candidates. However, their sufficiently larger difference in income compared to the lower-income candidate ensures that their expected gains from running still outweigh the cost. The deviation thus is profitable, and there cannot be a lower-income candidate in equilibrium. By contrast, if higher-income citizens do not have a sufficiently larger difference in income, then the gains noncandidates among them can expect upon deviating to running do not outweigh the cost. An equilibrium with lower-income candidates thus exists, and elitism does not arise.

The solid line in the middle panel of Figure 1 captures this intuition. Consider a pair of differences in income located on a horizontal segment of the solid line. Given lower-income citizens' difference in income associated with the pair, Condition 2 requires higher-income citizens' difference in income to be larger than that associated with the pair. It must be sufficiently larger than that of lower-income citizens because the pair is located north of the 45° line. Now, given the office benefits and cost of running, an increase in lower-income citizens' difference in income makes the office more attractive to them. They now might be willing to run for it even when facing more competitors, which would imply a lower probability of winning. However, a small enough increase in the difference in income does not compensate them for the distinctly lower probability of winning implied by an additional competitor. The number of other candidates a lower-income candidate is willing to compete with in this case and the implied probability of winning are unchanged. Thus, given a lower-income candidate, noncandidate higher-income citizens' calculations regarding a deviation to running are unaffected by a small enough increase in lower-income citizens' difference in income. Upon deviating to running, their probability of winning is the same as before the increase in lower-income citizens' difference in income. Therefore, the same differences in income as before are still large enough for noncandidate higher-income citizens to benefit from deviating to running. This intuition explains why the segment of the solid line that the initial pair of differences in income is located on is horizontal to begin with.

Given a large enough increase in their difference in income, however, a lower-income candidate accepts a distinctly lower probability of winning due to an additional competitor to begin with. Therefore, upon deviating to running, a noncandidate higher-income citizen faces a distinctly lower probability of winning than before the increase in lower-income citizens' difference in income. They thus require a distinctly larger difference in income than before to benefit from this deviation. The vertical segment of the solid line captures this jump in the difference in income they require. Further increases in lower-income citizens' difference in income again do not affect higher-income citizens' calculations initially, which is why the next segment is horizontal again, until they do eventually, which is why the next horizontal segment is followed by another vertical segment, and so on.

I show in Appendix A that higher-income citizens may run for office despite having lower income as office holder than as a private citizen. For elitism to arise, however, by Condition 2 and $(\gamma_l - 1)w_l \geq 0$, higher-income citizens must collect positive office-holding premia, $\gamma_h > 1$. This prediction that elitism coincides with positive office-holding premia matches observations (e.g., Gagliarducci et al. 2010; Berg 2020). Yet, elitism does not require that holding office pays higher income premia

or facilitates more productive outside activity for higher- than for lower-income citizens.

Corollary 1. *Elitism can arise while (1) office-holding premia are higher for lower- than for higher-income citizens; (2) the office is more productive for lower- than for higher-income citizens.*

For example, the same high enough office-holding premium for higher- and lower-income citizens ensures that Conditions 1 and 2 hold. For a small enough further increase in the premium for lower-income citizens, Conditions 1 and 2 still hold. Conversely, higher income premia or more productive outside activity for higher- than for lower-income citizens are not enough for elitism to arise.

Corollary 2. *Elitism may not arise while (1) office-holding premia are higher for higher- than for lower-income citizens; (2) the office is more productive for higher- than for lower-income citizens.*

For example, suppose office benefits alone do not compensate for the cost of running, $\beta < \delta$. Then the same positive, low enough office-holding premia for higher- and lower-income citizens make the office unattractive. A small further decrease in lower-income citizens' office-holding premium makes no difference. By Corollaries 1 and 2, higher income premia or more productive outside activity for higher- than for lower-income citizens are not necessary or sufficient for elitism to arise.

3.3 What May Prevent Elitism?

Elitism implies a lack of descriptive representation. Descriptive representation plays an important role in giving groups a voice and legitimizing policy outcomes and the policy-making process itself. Elitism as an outcome of political selection also prevents lower-income citizens from becoming higher-income citizens by collecting the relatively high legislator salary and possibly outside income. I thus explore what may prevent elitism. Given Proposition 2, taking utility benefits and costs as given, I ask whether salary reform or outside-income limits can ensure that Conditions 1 and 2 do not both hold.

3.3.1 Using Legislator Salaries to Prevent Elitism is Often Impossible

One approach to preventing elitism might be a salary reform. For example, decreasing the salary might make the office unattractive. However, an office that facilitates lucrative enough outside activity might still be attractive despite a lower salary. A reform that has been suggested as a remedy for elitism in US state legislatures is to increase legislator salaries to essentially make the office more attractive to lower-income citizens (e.g., Carnes and Hansen 2016).[19] Unfortunately, there may not be a reform of legislator salaries that by itself prevents elitism.

Proposition 3. *If $\beta \geq \delta$, then elitism arises for every legislator salary if and only if $(\phi_h - 1)w_h - (\phi_l - 1)w_l > \delta$.*

[19] See Carnes (2018) for a discussion of several reform proposals aimed at alleviating the numerical underrepresentation of lower-income citizens in public offices.

Suppose the office is prestigious enough for $\beta \geq \delta$. It might be a national legislative office or a prestigious local office. By Remark 1, it suffices to consider Condition 2. Using (1), it can be rewritten in terms of the difference in differences in income between outside activity while in office and market activity as a private citizen,

$$(7) \qquad (\phi_h - 1)w_h - (\phi_l - 1)w_l > \delta\left(1 - \left(\frac{\beta + v + (\phi_l - 1)w_l}{\delta} - \left\lfloor \frac{\beta + v + (\phi_l - 1)w_l}{\delta} \right\rfloor\right)\right) \equiv g(v).$$

Inequality (7) captures the fact that all legislators regardless of income potential receive the same salary. The salary thus does not affect the difference in differences in income between holding office and being a private citizen. At the same time, the right-hand side of (7) is a function $g(v)$ of the salary that takes values of at most δ. Condition 2 thus holds for all legislator salaries if and only if the difference in differences in income between outside activity while in office and market activity as a private citizen is sufficiently large, i.e., greater than δ. Therefore, if a reasonably prestigious office facilitates sufficiently productive outside activity for higher- relative to lower-income citizens, then elitism arises regardless of the salary. No salary reform can prevent it. Otherwise, elitism does not arise for some salary, and thus some salary reform prevents elitism. This result highlights that to increase descriptive representation, a salary reform might not be optimal even in the best-case scenario in which it does not alter office holders' incentives.

3.3.2 Appropriate Outside-Income Limits Always Prevent Elitism

Another approach to preventing elitism might be outside-income limits, which have been widely discussed (e.g., Geys and Mause 2013) but adopted only to varying degree (e.g., Bovend'Eert 2018). Suppose legislators face a perfectly enforced outside-income limit $m \geq 0$, which could, for example, be proportional to the legislator salary. Then citizen i's outside income satisfies $0 \leq \varphi(i) \leq m$. Their overall income while in office satisfies $v \leq \gamma(i)w(i) \leq v + m$. As a result, the lower the outside-income limit m is, the smaller is the maximum difference in differences in income that is consistent with it, $(v + m - w_h) - (v - w_l) = m - (w_h - w_l)$. Therefore, a low enough outside-income limit prevents elitism.

Proposition 4. *Elitism does not arise if an outside-income limit $m \leq \bar{m} \equiv w_h - w_l$ is imposed.*

Proposition 4 characterizes outside-income limits that are sufficiently restrictive for elitism not to arise. They ensure that Condition 2 cannot hold because the difference in differences in income between holding office and being a private citizen is nonpositive. The highest such limit, $\bar{m}$, can be linked to income data that is observable in principle. It can also be linked to a metric of income inequality. Holding the shares of higher- and lower-income citizens and average income constant, a larger difference $w_h - w_l$ indicates higher income inequality as measured by the coefficient of variation of income.[20] In this sense, Proposition 4 suggests that societies with higher income inequality can prevent elitism with less restrictive outside-income limits.

[20] Denoting mean income by $\bar{w}$, here, the coefficient of variation of income is $(\sqrt{(I_l/I)(I_h/I)}/\bar{w})(w_h - w_l)$.

Outside-income limits reduce the income legislators can collect while in office. Concerns that such regulation may make attracting candidates harder can be addressed to some extent by simultaneously increasing legislator salaries. In the United States, for example, outside-income limit legislation has been accompanied by compensatory increases in legislator salaries on several occasions in the past (Rosenson 2007). In fact, Rosenson (2007) finds that outside-income limits might not get passed without such compensation because they clash with legislators' financial self-interest. By Proposition 4, given a restrictive enough outside-income limit, salary increases cannot lead to elitism. So, in principle, a combined reform can prevent elitism while the average legislator income remains unchanged. I discuss pensions and post-legislature careers in this context in Section 4.

Members' outside activity and income tend to be more restricted in the United States Congress than in many other countries' national legislatures (Weschle 2021). Yet, virtually all candidates for and members of the United States Congress are higher-income citizens (Carnes 2012; Thompson et al. 2019; Treul and Hansen 2023). Despite the restrictions, an arguably rather prestigious congressional office still must be productive enough for higher- relative to lower-income citizens for elitism to arise. Maybe the nature of outside activity is not restricted enough, allowing some members of Congress to benefit from, for example, their position's visibility and public image through book deals.

Finally, given Proposition 3, outside-income limits could be used to change office productivities enough to allow an appropriate salary reform to prevent elitism in prestigious offices.

3.4 The Channel Can Help to Reconcile Mixed Evidence

Insofar as higher income is associated with higher levels of education and higher-paying occupations, the results can help to reconcile mixed evidence on the association between politician pay and politician background. For example, on the one hand, Gagliarducci and Nannicini (2013) find that, in Italy, higher mayoral pay is associated with more educated mayors and mayoral candidates who are more educated and from higher-paying occupations. On the other hand, Pique (2019) finds that, in Peru, higher mayoral wages are associated with less educated mayors who are less experienced in private management and mayoral candidates with less political experience.

For US state legislatures, Hoffman and Lyons (2014) and Carnes and Hansen (2016) exploit variation in legislator pay across states and time to investigate its association with legislator background. Analyzing data for all US states for four years, Carnes and Hansen (2016) find that higher legislator pay is associated with a higher share of legislators from higher-paying occupations. However, analyzing data for only a subset of the states for three-and-a-half decades, Hoffman and Lyons (2014) find no association between legislator salaries and the share of highly educated legislators. Together, this evidence suggests that the association between politician pay and politician background in US state legislatures depends on the states and period considered.

As for higher-level legislatures, on the one hand, Atkinson et al. (2016) find that higher salaries are associated with more educated members of parliament in Canada.[21] On the other hand, Fisman

[21] Women members appear to drive this association. Kotakorpi and Poutvaara (2011) also find that higher salaries

et al. (2015) and Braendle (2015) study the European Parliament's harmonization of members' base pay that varied with member nationality. Fisman et al. (2015) find that higher salaries are associated with less qualified members by one metric of education quality. Braendle (2015) finds no association between salaries and the share of members from a higher-education background or higher-skill occupations. There thus may be a negative association or none at all between salaries and the share of members of the European Parliament from a higher-education or higher-skill background.

Across these varied political contexts, higher politician pay sometimes is associated with more politicians being more highly educated or from higher-paying occupations. Other times, it is associated with fewer politicians from these backgrounds. Still other times, there is no association at all. To look at this mixed evidence through the lens of this paper's stylized environment, one can think of elitism and no elitism as observing, respectively, relatively more and relatively fewer politicians being higher-income citizens. The mixed evidence then suggests that, across these varied contexts, higher salaries can move society in either direction between elitism and no elitism or not at all.

Other channels likely contributing to elitism cannot address associations with salary increases, let alone differences in them across contexts.[22] One such channel is that some higher-income citizens may have an early fundraising advantage when running for Congress (Bonica 2020). This channel's importance depends on campaign finance regulation that varies across countries (Falguera et al. 2014). However, all else equal, a salary increase does not affect it. Another channel is that party gatekeepers and internal promotion processes might make candidate selections unrepresentative (Fox and Lawless 2010; Tolley 2019; Dancygier et al. 2021; Folke and Rickne 2025). This channel's importance depends on formal and informal rules governing political recruitment. However, a salary increase does not affect the role of gatekeepers or internal promotion processes. Yet another channel is that high time and resource costs may deter campaigns by lower-income citizens and induce candidate recruitment using higher-income political leaders' networks (Carnes 2018). This channel's importance depends on formal and informal rules governing electoral campaigns and candidate recruitment. Again, however, a salary increase does not affect the relevant cost.

By contrast, salary increases affect the financial rewards for holding office and thus candidate self-selection. Proposition 2 thus can help to reconcile different associations between politician pay and politician background across these different contexts. Suppose the office is prestigious enough for $\beta \geq \delta$. It again might be a national legislative office or a prestigious local office. As in Section 3.3.1, it suffices to consider Inequality (7). An increase in the legislator salary increases higher- and lower-income citizens' difference in income between holding office and being a private citizen by the same amount. The difference in differences in income is unchanged. The salary v thus does not affect the left-hand side of (7). The right-hand side of (7) is a nonmonotonic function $g(v)$ that takes values in $(0, \delta]$ and has jumps. It is depicted in Figure 2 for parameters that are consistent

are associated with more educated women candidates for parliament in Finland but find no association for men.

[22] While Poutvaara and Takalo (2007), for example, can potentially capture some ambiguity about the sign of the association between politician pay and (average) candidate background, they assume an electoral advantage for higher-income citizens (moderated by a noisy signal), which is inconsistent with the evidence discussed in the introduction.

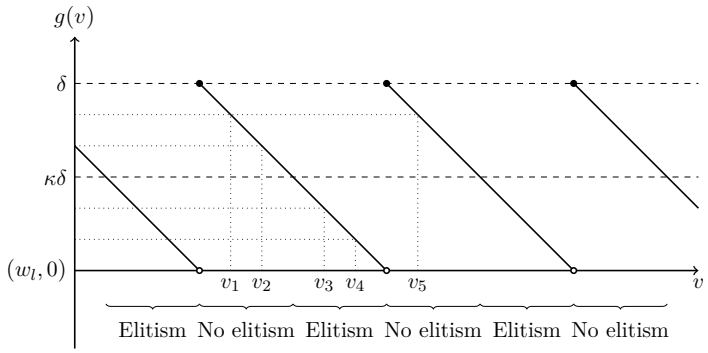

Figure 2: This figure depicts the right-hand side of (7), represented by a nonmonotonic function $g(v)$ with values in $(0, \delta]$ and jumps, and the left-hand side of (7) equal to $\kappa\delta$ for some $\kappa \in (0, 1)$. If the office is rather prestigious, $\beta \geq \delta$, then elitism arises if and only if (7) holds, or $g(v) < \kappa\delta$.

with $\beta \geq \delta$. An increase in the salary v along the horizontal axis decreases the function $g(v)$ towards zero, where it jumps up to δ and then decreases towards zero again, and so on.

Suppose the difference in differences in income between outside activity while in office and market activity as a private citizen is positive but smaller than the cost of running: $(\phi_h - 1)w_h - (\phi_l - 1)w_l = \kappa\delta$ for some $\kappa \in (0, 1)$. In Figure 2, $\kappa\delta$ is represented by the lower of the two dashed lines. Elitism arises if $\kappa\delta > g(v)$ and does not arise otherwise. At legislator salary v_1, elitism does not arise. Increasing v slightly to v_2, elitism still does not arise. Thus, a salary increase may not change who runs for office. Once the salary increases to v_3, elitism arises. Thus, a salary increase may lead to more politicians being higher-income citizens. Further increasing the legislator salary to v_4, elitism still arises. Thus, again, a salary increase may not change who runs for office. Once the salary increases to v_5, elitism does not arise anymore. Thus, a salary increase may lead to fewer politicians being higher-income citizens. The pattern repeats with further salary increases. Thus, for prestigious enough offices, in line with the mixed evidence, a salary increase may increase, decrease, or not affect the share of politicians from a higher-education or higher-income background. The different predictions stem from differences in the initial legislator salary, the distribution of market-income potential, the productivity of the office, and the cost of running.[23]

The nonmonotonicity in the relationship between legislator salary and elitism in prestigious offices arises for intermediate differences in differences in income. While the difference in differences in income is unaffected by changes in the salary, the threshold determining whether elitism arises, captured by the function $g(v)$, changes with the salary. The function $g(v)$ is nonmonotonic in the salary due to discontinuous jumps. Therefore, increases in the salary change the threshold and thus whether the fixed difference in differences in income is above it nonmonotonically. This property of the function $g(v)$ arises due to the strategic interaction of finitely many potential candidates and the resulting jumps in the probability of winning the office. Arguably, finitely many players interacting strategically is a suitable model of most contexts in the political sphere.

[23] A salary increase also has no effect if the difference in differences in income between outside activity while in office and market activity as a private citizen is greater than the cost of running (see Proposition 3) or nonpositive.

4 Further Discussion

In this section, I discuss some assumptions, interpretations, and limitations of the analysis.

Pensions and Post-Legislature Careers. All utility benefits can be interpreted as the associated lifetime utility. Similarly, $w(i)$, v, and $\varphi(i)$ can represent citizen i's expected present value of, respectively, all future market income as a private citizen, all future legislator salaries and pensions, and all future income from outside activity and post-legislature employment. With this interpretation of the model, the interpretation of Conditions 1 and 2 would be almost unchanged. The office must be attractive, for example, by facilitating lucrative future career opportunities, and it must facilitate sufficiently lucrative future career opportunities for higher- relative to lower-income citizens. For example, the more lucrative post-legislature career opportunities that can arise might require certain skills and abilities that tend to be associated with a higher-income background. The interpretation of some results changes slightly. On the one hand, the extent to which $\varphi(i)$ can be limited to prevent elitism as Proposition 4 suggests depends on why holding office increases post-legislature income potential. The increased income potential might derive mostly from human capital accumulation (e.g., Parker and Parker 2009), imposing restrictions on which might be difficult and undesirable. Holding office might also showcase skills that correlate with market ability (Mattozzi and Merlo 2008). However, arguably, much of the increased income potential likely stems from networks and political connections acquired (e.g., Blanes i Vidal et al. 2012; Bertrand et al. 2014). In this case, former legislators' private sector employment could be restricted. For example, they could be prevented from lobbying (e.g., Keane and Merlo 2010) for a "cooling off" period (Straus 2015). On the other hand, Proposition 3 suggests that there may not be a reform of legislator salaries and pensions (e.g., Keane and Merlo 2010) that by itself prevents elitism.

Corruption. In principle, outside income could be interpreted as unofficial income from engaging in rent seeking or corruption while in office (e.g., Fisman et al. 2014). The interpretation of Conditions 1 and 2 would be almost unchanged. The office must be attractive, for example, by enabling lucrative corruption, and it must enable sufficiently lucrative corruption for higher- relative to lower-income citizens. For example, it might take skills and abilities that tend to be associated with a higher-income background to identify and exploit the more lucrative opportunities for corruption within the legislative and regulatory framework in place. With this interpretation of the model, one approach to preventing elitism would be to sufficiently limit opportunities for corruption and rent seeking by, for example, improving monitoring (e.g., Bobonis et al. 2016; Avis et al. 2018).

The Definition of Elitism. Given the stylized environment, arguably, the definition of elitism I use is natural and uniquely suitable. First, elitism cannot be defined in terms of a nonzero maximum number of lower-income candidates an equilibrium can have. Consider an attractive office. Through the probability of winning, the expected payoff of running depends on the size but not the composition of the set of candidates. Fix some equilibrium with a lower-income candidate.

Given the office's prestige, the cost of running, the probability of winning, and their difference in income between holding office and being a private citizen, running must be optimal for this lower-income candidate. However, if there were any number of other lower-income citizens among the candidates, then each of them would face the same office prestige, cost of running, probability of winning, and difference in income. Running thus would be optimal for them as well, as required for an equilibrium. That is, if a lower-income citizen can be a candidate in equilibrium, then any number of the candidates, including all of them, can be lower-income citizens.[24] Second, if equilibria with lower-income candidates exist, then not observing one just means that none of them arose. Unless some biased equilibrium selection criterion rules them out, the label elitism does not seem fitting in this case. In addition, if all possible equilibria are equally likely to arise, then, given equal electoral prospects, one would expect to see lower-income citizens hold office more often.[25]

Wealth. I focus on income (potential), as does much of the discussion in the literature motivating this paper (see Section 1). However, members of Congress are not only citizens with high income potential but also considerably wealthier than the population they represent. By some estimates, in 2013, the median net worth among members of Congress was over one million US dollars, while that among US households was less than $60,000.[26] Wealth might grant some advantages to potential candidates and contribute to political elitism. For example, wealth might facilitate access to elite networks through which one might be recruited as a candidate or raise funds. I consider these channels complementary to the channel I study. Crowding induced by financial rewards remains important in its own right because, in contrast to other channels, it can address mixed evidence on the association between politician salary and politician background (see Section 3.4). The wealth-related channels cannot address this mixed evidence because the advantages wealth grants to potential candidates are not affected by a change in politician salary. Finally, income is correlated with wealth (e.g., Kuhn and Ríos-Rull 2025). Absent too many, too severe adverse income shocks and given some propensity to save and invest, many citizens with high income potential who eventually become members of Congress will have accumulated substantial wealth by that time.

Effort. I focus on legislators' income background rather than legislative effort. In addition, to ensure that electoral prospects are independent of income as the motivating evidence suggests, expected effort must either not affect candidate evaluations or be independent of income. I thus simplify the analysis and abstract from effort. The empirical evidence on the interaction of outside activity and income with legislator effort is somewhat mixed. It ranges from higher outside income being associated with lower effort (Gagliarducci et al. 2010) to outside income being or not being

[24] Therefore, also, if elitism as defined does not arise, then an equilibrium with only lower-income candidates exists.

[25] The observations discussed here also suggest that defining elitism as there being an equilibrium in which only higher-income citizens run for office is conceptually undesirable. First, in this case, often nothing prevents some or even all candidates from being lower-income citizens in equilibrium. Second, because each citizen's payoff comparison only depends on the number of other candidates regardless of income, if an equilibrium with a higher-income candidate exists, then an equilibrium with only higher-income candidates exists. Thus, in this case, preventing "elitism" implies elitism in the sense that all candidates are from the same group (lower income, in this case) in every equilibrium.

[26] See www.opensecrets.org, accessed 9/24/2018.

associated with lower effort depending on what metric of effort is used (Arnold et al. 2014; Staat and Kuehnhanss 2017) to outside income being associated with lower effort among only a specific subset of legislators (Fedele and Naticchioni 2016) to the sign of the association between effort and outside activity not only depending on how effort is measured but also on the number and type of outside positions legislators hold (Hurka et al. 2018) to legislators with outside income exerting more effort than others (Weschle 2024). Therefore, given the paper's focus, overall, arguably, abstracting from legislative effort seems to be a reasonable starting point.

Political Parties, Campaign Finance, and Special Interests. I focus on the decision to become a candidate. If running requires nomination by a political party based on, for example, charisma, then the suitability of the potential candidates includes that they are charismatic. Uncharismatic citizens cannot run for office. Charismatic citizens still must decide whether to apply for a party nomination. The important assumption is that enough higher- and lower-income citizens are charismatic. Similarly, if running requires campaign funding from a special interest group based on policy alignment, then the suitability of the potential candidates includes that they are aligned with some interest group. Citizens who are not aligned with any interest group cannot run for office. Citizens who are aligned with an interest group still must decide whether to run. The important assumption is that enough higher- and lower-income citizens are aligned with some interest group.

Voting. Suppose that if there are at least two candidates for office, then the office holder is determined by a plurality-vote election instead of random sampling. All noncandidate citizens can vote in the election, while candidates cannot (I relax this assumption below). Voters vote sincerely, abstain if they are indifferent among all candidates, and otherwise break ties by simple random sampling. Tied elections are also broken by simple random sampling. As all voting is sincere and mechanical, a pure-strategy Nash equilibrium only requires that given all other citizens' running decisions, no citizen can benefit from changing theirs. Since all candidates in the election are expected to be equally good at enacting the desired policy irrespective of their income background, all voters are indifferent among them and abstain. Thus, all candidates tie at zero votes. Simple random sampling determines the election winner. Each of the $n > 1$ candidates wins the election with probability $1/n$. If candidates were allowed to vote (sincerely) as well, noncandidate voters are again indifferent among all candidates and abstain, but candidates vote for themselves. If a candidate voted for another candidate rather than for themselves, then they must have at least as high a payoff when losing as when winning. They can increase their expected payoff further by deviating to not running and saving the associated cost. Thus, all candidates tie at one vote. The tie is broken by simple random sampling. Again, each of the $n > 1$ candidates wins the election with probability $1/n$.

Competence. Voters not expecting differences in the quality of representation by legislator income background is necessary for the equal electoral prospects the motivating evidence suggests. It is consistent with evidence that voters do not perceive higher-income candidates as more qualified

or effective in office than lower-income candidates (Carnes and Lupu 2016a; Campbell and Cowley 2014). Of course, voters do seem to value competence measured by, for example, previous experience or past performance in public office (e.g., Lublin 1994; Squire 1995; Hobolt and Høyland 2011; Kendall et al. 2015). Yet, insofar as higher income is associated with higher education, Carnes and Lupu (2016b) find that the perception that higher-income candidates are not more qualified or effective is warranted. Measuring wealth by reported assets, Stacy (2025) finds that wealthier members of the US House of Representatives are more effective at advancing their policy agendas than less wealthy members. However, the differences are not due to experience or innate ability but related to institutional factors such as majority party membership and committee roles. On the other hand, for example, Besley et al. (2011) argue that a country leader's educational attainment affects economic growth. Similarly, Gagliarducci and Nannicini (2013) find evidence suggesting that higher-paid mayors improve bureaucratic efficiency. More generally, however, being a good representative likely has many dimensions. Overall performance is difficult to evaluate by metrics capturing only one specific dimension. The lack of an electoral advantage for higher-income candidates suggests that voters do not perceive high income as informative of whether a candidate has the skills to be a good representative. This interpretation might be particularly important when evaluating the performance of representatives in the legislature rather than local executives, such as, for example, the mayors Gagliarducci and Nannicini (2013) focus on.

Focusing on higher- and lower-income citizens who are suitable and competent to hold office and enact the policy only amounts to assuming that such citizens exist. This assumption does not preclude the possibility that there is some underlying ability that imperfectly correlates with education, income, and competence in office. Similarly, positive selection on certain skills, possibly associated with certain higher-income occupations, in equilibrium is consistent with elitism here. For example, while voters do not expect differences in the quality of representation based on income, some skills might be more suitable for particularly lucrative outside activity, post-legislature careers, or corruption opportunities than others. The assumptions essentially ensure that elitism is not explained by lower-income citizens simply not being suitable to hold office because they somehow lack the required competence. However, being suitable and competent to hold office, all potential candidates, both with higher and lower income, still must decide whether to put themselves forward as a candidate. At the same time, focusing on citizens who can enact the policy is without loss of generality. Suppose there was a candidate who cannot enact the policy. If, on the one hand, there is another candidate who can enact the policy, then the candidate who cannot enact the policy does not receive any votes as all citizens desire the policy to be enacted. They can thus profitably deviate to not running and save the cost. If, on the other hand, there is no other candidate who can enact the policy, then the elected office holder cannot and will not enact the policy. In this case, some lower-income citizen who can enact the policy can profitably deviate to running. They would win the election with certainty as all citizens desire the policy to be enacted. They would collect the policy and office benefits, which outweigh the cost of running for at least some lower-income citizens, and a potential income premium. Thus, in equilibrium, all candidates can enact the policy.

Policy Conflict. The environment is not suitable to study redistribution. Given the evidence that electoral prospects are independent of income, redistribution might also not be a salient policy issue. If it was salient and income groups preferred conflicting policies, then electoral prospects would not be independent of income because most citizens are lower-income citizens. Instead, the policy benefit could represent a composite benefit of the district being represented in the legislature, including the value of having a voice in a future policy conflict. However, under certain conditions, the analysis can be interpreted as speaking to elitism in the presence of policy conflict in an unmodeled second policy dimension. For concreteness, consider regulation of a specific issue that is supported by most higher-income citizens and most lower-income citizens in the district. Let two ideological parties, one supporting regulation and one opposing it, be comprised of all higher- and lower-income citizens who share the respective position. Let each party nominate its candidate for the district election by a primary election in which citizens are eligible to vote and run if and only if they are a member of the party residing in the district. All primary voters thus are indifferent among all candidates because they desire the local public good and share the position on regulation. In the district election, all citizens in the district then vote for the candidate who shares their stance on regulation. Thus, the candidate fielded by the party supporting the regulation becomes the representative with certainty. Then little is lost by focusing on the majority party and altogether ignoring the district's losing party, its primary, and the candidate it ends up fielding. Elitism arising then can be interpreted as there being no equilibrium with a lower-income candidate for the majority party's nomination. The analysis and results then can be interpreted as relating to the majority party's primary and the income background of all candidates in it—the only candidates who can possibly win the office.

5 Concluding Remarks

Many representative democracies experience political elitism in the sense that at all times, virtually all members of the national legislature are higher-income citizens. At the same time, first, evidence suggests that electoral prospects are independent of income in the sense that voters do not prefer higher-income candidates or their traits or skills over lower-income candidates. Second, besides paying a relatively high salary, holding office may facilitate outside income or increase one's income potential in a post-legislature career. That is, holding office can be quite lucrative and would make lower-income citizens vastly better off financially than being a private citizen. Motivated by these observations, I explore how elitism can arise by self-selection when electoral prospects are independent of income and lower-income citizens would be vastly better off financially if they held office.

I identify two conditions regulating the financial reward structure that are necessary and sufficient for elitism. They together ensure that lower-income candidates cannot occur in equilibrium because their presence implies that some noncandidate citizen can profitably deviate. Under these conditions, in equilibrium, lower-income citizens choose not to run for office even though they would be vastly better off financially holding office than being a private citizen. The reason is that

higher-income citizens crowd the race and lower the probability of winning enough to discourage lower-income citizens from running. Despite the large financial gains from holding office, the probability of winning lower-income citizens would face upon also entering the race is too low for their expected gains to justify incurring the cost of running.

The results have important implications for both guiding policy aimed at preventing elitism, if desired, and interpreting empirical evidence. First, restrictive enough outside-income limits can always prevent elitism. Effective outside-income limits can be linked to income data and income inequality. They can be combined with increases in legislator salaries to ensure high enough legislator income, for example, to attract suitable citizens to the role. Salary reform alone, on the other hand, often cannot prevent elitism. In the context of post-legislature employment and revolving doors, preventing elitism might require restricting the private sector employment that former legislators can take up. For example, one might have to ban former legislators from lobbying for at least some time after they left office. On the other hand, there often is no reform of legislator pay or pensions that by itself can prevent elitism. Second, the analysis uncovers that the relationship between the legislator salary and elitism can be nonmonotonic for prestigious offices. This nonmonotonicity can help to reconcile mixed evidence on the association between politician pay and politician background that other likely complementary channels promoting political elitism cannot even address. Depending on fundamentals, an increase in politician pay can be associated with more, fewer, or unchanged numbers of politicians being more highly educated or from higher-paying occupations.

Future work could integrate crowding induced by the financial reward structure with other potentially important and complementary channels. Prominent such channels are the roles of parties, party gatekeepers, and political and civic leaders in candidate recruitment and advantages in campaign finance acquisition. Future work also could study empirically the association between elitism and restrictions on legislators' outside activity, outside income, and post-legislature employment.

Appendices

Appendix A discusses how and why the predictions in Gagliarducci et al. (2010) change in the environment here. Appendix B collects omitted proofs.

A Additional Predictions to Compare to Gagliarducci et al. (2010)

In this Section, I highlight some important implications of the environment in comparison with the insights from the analysis in Gagliarducci et al. (2010). Proposition 5 provides a sufficient condition for an equilibrium with higher-income candidates to exist. This condition is not relevant for the analysis of elitism, although some higher-income citizens must run in equilibrium when elitism arises. However, some results stated in Corollary 3 below that follow from Proposition 5 can be compared with Gagliarducci et al. (2010)'s necessary condition for higher-income citizens entering politics.

Proposition 5. *An equilibrium with at least one higher-income candidate exists if*

$$(\gamma_h - 1)w_h \geq \max\left\{\delta - \beta - \theta(k_h), \right. \\ \left. (\gamma_l - 1)w_l - \delta\left(1 - \left(\frac{\beta + (\gamma_h - 1)w_h}{\delta} - \left\lfloor \frac{\beta + (\gamma_h - 1)w_h}{\delta} \right\rfloor\right)\right)\right\}. \tag{8}$$

Higher-income citizens have more lucrative options in the private sector than lower-income citizens. Yet, an equilibrium with higher-income citizens running for office exists if their difference in income between holding office and being a private citizen is large enough. The first element of the set on the right-hand side of (8) ensures that the only candidate in a one-candidate equilibrium can be a higher-income citizen. The second element ensures that an equilibrium with many candidates can have higher-income candidates. The expression multiplying δ, where $\lfloor\cdot\rfloor$ again is the floor function, differs from the similar-looking expression in Condition 2 and has the opposite sign.

Inspecting (8) reveals several insights. As $\theta(k_h) + \beta > \delta > 0$ and $(\gamma_l - 1)w_l \geq 0$, the right-hand side of (8) can be negative. The inequality thus can hold while higher-income citizens have higher income as a private citizen than when holding office, $(\gamma_h - 1)w_h < 0$. Hence, an equilibrium with higher-income citizens running for office can exist even when they must accept a pay cut to hold office. There can also be higher-income candidates while holding office does not facilitate outside income at all, $\varphi_l = \varphi_h = 0$, while outside income is higher for lower- than for higher-income citizens, $\varphi_l > \varphi_h$, or while the office is more productive for lower- than for higher-income citizens, $\phi_l > \phi_h$.

Corollary 3. *Higher-income citizens may run for office while (1) they have higher income as a private citizen than when holding office; (2) the office does not facilitate outside income while in office at all; (3) outside income while in office is higher for lower- than for higher-income citizens; (4) the office is more productive for lower- than for higher-income citizens.*

Insofar as income potential captures ability, for higher-income candidates, it thus is not necessary that outside activity rewards higher ability, let alone rewards it more than market activity. This

implication provides a sharp contrast to Gagliarducci et al. (2010). They assume that outside activity rewards higher ability and find that it must do so more than market activity for there to be higher-income candidates in equilibrium. In their framework, running for office is costless. Thus, if everyone is better off holding office than being a private citizen, then everyone runs for office, including those with high market income. Gagliarducci et al. (2010) call these equilibria trivial and exclude them from consideration. However, among them are cases in which outside activity does not reward higher ability more than market activity. By contrast, given a large enough number of potential candidates, the cost of running in the framework here gives rise to a meaningful strategic interaction among them. Equilibria thus are never trivial in the sense that not everyone runs for office even if everyone is better off holding office than being a private citizen. Corollary 3 therefore characterizes some cases that Gagliarducci et al. (2010) ignore because they lead to trivial outcomes in their framework but not in the framework here. More generally, for political elitism to arise, it is not enough that higher-income citizens are willing to enter the political arena. Lower-income citizens also must not run. As discussed in the introduction, elitism cannot arise in Gagliarducci et al. (2010)'s framework for realistic parameters.

B Proofs

Proposition 1

Proof. There are two cases: *(1)* $2\delta \geq \beta + \max\{(\gamma_l - 1)w_l, (\gamma_h - 1)w_h\}$; *(2)* $2\delta < \beta + \max\{(\gamma_l - 1)w_l, (\gamma_h - 1)w_h\}$. From (1) follows with $v \geq w_l$ and $\phi_l \geq 0$ that $\gamma_l w_l \geq w_l$. Therefore, $(\gamma_l - 1)w_l \geq 0$ so that $\max\{(\gamma_l - 1)w_l, (\gamma_h - 1)w_h\} \geq 0$. I show that an equilibrium exists in general by separately describing and verifying an equilibrium for each case.

(1) Suppose that $2\delta \geq \beta + \max\{(\gamma_l - 1)w_l, (\gamma_h - 1)w_h\}$. Let $\mathcal{C} = \{k_l\}$ so that $n = 1$. Recall that $k_l \in \mathcal{L}$. Using (2) and (3) together with the fact that $n_{-i} = n - 1$ for all $i \in \mathcal{C}$ and $n_{-i} = n$ for all $i \in \mathcal{I} \setminus \mathcal{C}$ in (5) and (6), $\mathcal{C}$ is an equilibrium if and only if

$$\theta(k_l) + \beta + \gamma(k_l)w(k_l) - \delta \geq w(k_l), \tag{9}$$

$$\theta(i) + w(i) \geq \frac{1}{2}\left(\theta(i) + \beta + \gamma(i)w(i) - \delta\right) + \frac{1}{2}\left(\theta(i) + w(i) - \delta\right) \quad \forall i \in \mathcal{I} \setminus \{k_l\}. \tag{10}$$

Inequality (9) holds because $k_l \in \mathcal{L}$, $\gamma_l w_l \geq w_l$, and $\theta(k_l) + \beta > \delta$ so that

$$\theta(k_l) + \beta + \gamma(k_l)w(k_l) - \delta = \theta(k_l) + \beta + \gamma_l w_l - \delta \geq \theta(k_l) + \beta + w_l - \delta > w_l = w(k_l).$$

Inequality (10) can be rewritten as

$$2\delta \geq \beta + (\gamma(i) - 1)w(i) \quad \forall i \in \mathcal{I} \setminus \{k_l\},$$

which holds because $2\delta \geq \beta + \max\{(\gamma_l - 1)w_l, (\gamma_h - 1)w_h\} \geq \beta + (\gamma(i) - 1)w(i)$ for all $i \in \mathcal{I} \setminus \{k_l\}$. That is, $\mathcal{C}$ is an equilibrium. Thus, an equilibrium exists.

(2) Suppose that $2\delta < \beta + \max\{(\gamma_l - 1)w_l, (\gamma_h - 1)w_h\}$. Pick $n \in \mathbb{N}$ such that

$$n \leq \frac{\beta + \max\{(\gamma_l - 1)w_l, (\gamma_h - 1)w_h\}}{\delta} \leq n + 1. \tag{11}$$

It follows that $n \geq 2$. By (4), $n < I_l$ and $n < I_h$. Consider any $\mathcal{C}$ such that $|\mathcal{C}| = n$ and $\mathcal{C} \subset \mathcal{L}$ if $(\gamma_l - 1)w_l \geq (\gamma_h - 1)w_h$ and $\mathcal{C} \subset \mathcal{H}$ otherwise. That is, there are $n \geq 2$ candidates and $(\gamma(i) - 1)w(i) = \max\{(\gamma_l - 1)w_l, (\gamma_h - 1)w_h\}$ for all $i \in \mathcal{C}$. Using (2) and (3) together with the fact that $n_{-i} = n - 1$ for all $i \in \mathcal{C}$ and $n_{-i} = n$ for all $i \in \mathcal{I} \setminus \mathcal{C}$ in (5) and (6), $\mathcal{C}$ is an equilibrium if and only if

$$\frac{1}{n}\left(\theta(i) + \beta + \gamma(i)w(i) - \delta\right) + \frac{n-1}{n}\left(\theta(i) + w(i) - \delta\right) \geq \theta(i) + w(i) \quad \forall i \in \mathcal{C}, \tag{12}$$

$$\theta(i) + w(i) \geq \frac{1}{n+1}\left(\theta(i) + \beta + \gamma(i)w(i) - \delta\right) + \frac{n}{n+1}\left(\theta(i) + w(i) - \delta\right) \quad \forall i \in \mathcal{I} \setminus \mathcal{C}. \tag{13}$$

Inequality (12) can be rewritten as

$$\beta + (\gamma(i) - 1)w(i) \geq n\delta \quad \forall i \in \mathcal{C},$$

which holds by (11) because $\beta + (\gamma(i) - 1)w(i) = \beta + \max\{(\gamma_l - 1)w_l, (\gamma_h - 1)w_h\} \geq n\delta$ for all $i \in \mathcal{C}$. Inequality (13) can be rewritten as

$$(n+1)\delta \geq \beta + (\gamma(i) - 1)w(i) \quad \forall i \in \mathcal{I} \setminus \mathcal{C},$$

which holds by (11) because $\beta + (\gamma(i) - 1)w(i) \leq \beta + \max\{(\gamma_l - 1)w_l, (\gamma_h - 1)w_h\} \leq (n+1)\delta$ for all $i \in \mathcal{I} \setminus \mathcal{C}$. That is, $\mathcal{C}$ is an equilibrium. Thus, an equilibrium exists.

Therefore, combining *(1)* and *(2)*, an equilibrium exists in general.

Suppose for a contradiction that $\mathcal{C} = \emptyset$ is an equilibrium. Consider k_l. As $n = 0$, by (6), $V_0(0, k_l) \geq V_1(0, k_l)$ or, using (2) and (3), $w(k_l) \geq \theta(k_l) + \beta + \gamma(k_l)w(k_l) - \delta = \theta(k_l) + \beta + \gamma_l w_l - \delta \geq \theta(k_l) + \beta + w_l - \delta > w_l = w(k_l)$ since $k_l \in \mathcal{L}$, $\gamma_l w_l \geq w_l$, and $\theta(k_l) + \beta > \delta$, a contradiction. Thus, $\mathcal{C} = \emptyset$ is not an equilibrium, and in every equilibrium, there is at least one candidate. ■

Remark 1

Proof. Rewrite Condition 2 as

$$\beta + (\gamma_h - 1)w_h > \delta + \delta\left\lfloor \frac{\beta + (\gamma_l - 1)w_l}{\delta} \right\rfloor. \tag{14}$$

First, suppose that $\beta \geq \delta > 0$ and Condition 2 holds. Since $(\gamma_l - 1)w_l \geq 0$, it follows that $\beta + (\gamma_l - 1)w_l \geq \delta$ so that the right-hand side of (14) is at least 2δ. Thus, $\beta + (\gamma_h - 1)w_h > 2\delta$, and Condition 1 holds. Second, suppose that $0 \leq \beta < \delta$. Consider the case in which $0 \leq (\gamma_l - 1)w_l < \delta - \beta < (\gamma_h - 1)w_h < 2\delta - \beta$. Then $0 \leq \beta + (\gamma_l - 1)w_l < \delta < \beta + (\gamma_h - 1)w_h < 2\delta$. Thus, since $0 \leq \beta + (\gamma_l - 1)w_l < \delta$, (14) holds due to $\delta < \beta + (\gamma_h - 1)w_h$, but, since $\beta + (\gamma_l - 1)w_l <$

$\beta + (\gamma_h - 1)w_h < 2\delta$, Condition 1 does not hold. ■

Proposition 2

Proof. I proceed in two steps. **Step 1** establishes that if elitism arises, then Conditions 1 and 2 hold. **Step 2** establishes that if Conditions 1 and 2 hold, then elitism arises.

Step 1. I proceed by contraposition. Suppose that Conditions 1 and 2 do not both hold. I show that elitism does not arise, i.e., there is an equilibrium with a lower-income candidate. There are two cases: *(1)* Condition 1 does not hold, and Condition 2 holds or does not hold; *(2)* Condition 1 holds, and Condition 2 does not hold. Consider each case in turn.

(1) Suppose that Condition 1 does not hold, and Condition 2 holds or does not hold. Then $2\delta \geq \beta + \max\{(\gamma_l - 1)w_l, (\gamma_h - 1)w_h\}$. For this case, irrespective of whether or not Condition 2 holds, the first part of the proof of Proposition 1 shows that an equilibrium with a lower-income candidate exists. Therefore, elitism does not arise.

(2) Suppose that Condition 1 holds, and Condition 2 does not hold. Then,

$$(\gamma_h - 1)w_h - (\gamma_l - 1)w_l \leq \delta\left(1 - \left(\frac{\beta + (\gamma_l - 1)w_l}{\delta} - \left\lfloor \frac{\beta + (\gamma_l - 1)w_l}{\delta} \right\rfloor\right)\right). \tag{15}$$

I show that there is an equilibrium with a lower-income candidate. Pick $n \in \mathbb{N}$ such that

$$n < \frac{\beta + \max\{(\gamma_l - 1)w_l, (\gamma_h - 1)w_h\}}{\delta} \leq n + 1. \tag{16}$$

It follows from Condition 1 that $n \geq 2$. By (4), $n < I_l$ and $n < I_h$. Consider any $\mathcal{C} \subset \mathcal{L}$ such that $|\mathcal{C}| = n$. That is, there are $n \geq 2$ lower-income candidates. Using (2) and (3) together with the fact that $n_{-i} = n - 1$ for all $i \in \mathcal{C}$ and $n_{-i} = n$ for all $i \in \mathcal{I} \setminus \mathcal{C}$ in (5) and (6), $\mathcal{C}$ is an equilibrium if and only if

$$\frac{1}{n}\left(\theta(i) + \beta + \gamma(i)w(i) - \delta\right) + \frac{n-1}{n}\left(\theta(i) + w(i) - \delta\right) \geq \theta(i) + w(i) \quad \forall i \in \mathcal{C}, \tag{17}$$

$$\theta(i) + w(i) \geq \frac{1}{n+1}\left(\theta(i) + \beta + \gamma(i)w(i) - \delta\right) + \frac{n}{n+1}\left(\theta(i) + w(i) - \delta\right) \quad \forall i \in \mathcal{I} \setminus \mathcal{C}. \tag{18}$$

Inequality (18) can be rewritten as

$$(n+1)\delta \geq \beta + (\gamma(i) - 1)w(i) \quad \forall i \in \mathcal{I} \setminus \mathcal{C},$$

which holds by (16) because $\beta + (\gamma(i) - 1)w(i) \leq \beta + \max\{(\gamma_l - 1)w_l, (\gamma_h - 1)w_h\} \leq (n+1)\delta$ for all $i \in \mathcal{I} \setminus \mathcal{C}$. As $\mathcal{C} \subset \mathcal{L}$, Inequality (17) can be rewritten as

$$\beta + (\gamma_l - 1)w_l \geq n\delta. \tag{19}$$

There are two cases: *(a)* $(\gamma_l - 1)w_l \geq (\gamma_h - 1)w_h$; *(b)* $(\gamma_l - 1)w_l < (\gamma_h - 1)w_h$.

(a) If $(\gamma_l - 1)w_l \geq (\gamma_h - 1)w_h$, then $\max\{(\gamma_l - 1)w_l, (\gamma_h - 1)w_h\} = (\gamma_l - 1)w_l$, and it follows directly from (16) that (19) and thus (17) holds.

(b) If $(\gamma_l - 1)w_l < (\gamma_h - 1)w_h$, then $\max\{(\gamma_l - 1)w_l, (\gamma_h - 1)w_h\} = (\gamma_h - 1)w_h$, and $(\beta + (\gamma_h - 1)w_h)/\delta > n$ from (16) so that (19) and thus (17) holds because by (15),

$$\begin{aligned}
& \beta + (\gamma_l - 1)w_l \geq \beta + (\gamma_h - 1)w_h - \delta\left(1 - \left(\frac{\beta + (\gamma_l - 1)w_l}{\delta} - \left\lfloor \frac{\beta + (\gamma_l - 1)w_l}{\delta} \right\rfloor\right)\right) \\
\iff \quad & \frac{\beta + (\gamma_l - 1)w_l}{\delta} \geq \frac{\beta + (\gamma_h - 1)w_h}{\delta} - 1 + \frac{\beta + (\gamma_l - 1)w_l}{\delta} - \left\lfloor \frac{\beta + (\gamma_l - 1)w_l}{\delta} \right\rfloor \\
\implies \quad & \left\lfloor \frac{\beta + (\gamma_l - 1)w_l}{\delta} \right\rfloor \geq \frac{\beta + (\gamma_h - 1)w_h}{\delta} - 1 > n - 1 \\
\implies \quad & \frac{\beta + (\gamma_l - 1)w_l}{\delta} \geq \left\lfloor \frac{\beta + (\gamma_l - 1)w_l}{\delta} \right\rfloor \geq n \\
\implies \quad & \beta + (\gamma_l - 1)w_l \geq n\delta.
\end{aligned}$$

That is, $\mathcal{C}$ is an equilibrium with a lower-income candidate. Thus, elitism does not arise.

Therefore, combining *(1)* and *(2)*, if Conditions 1 and 2 do not both hold, then elitism does not arise. By contraposition, therefore, if elitism arises, then Conditions 1 and 2 hold.

Step 2. Suppose that Conditions 1 and 2 hold. Suppose for a contradiction that there is an equilibrium $\mathcal{C}$ such that $k \in \mathcal{C}$ for some $k \in \mathcal{L}$. There are two cases: *(1)* $n = 1$; *(2)* $n > 1$.

(1) If $n = 1$, then $\mathcal{C} = \{k\} \subset \mathcal{L}$. As $\mathcal{C}$ is an equilibrium, using (2) and (3) together with the fact that $n_{-i} = n - 1$ for all $i \in \mathcal{C}$ and $n_{-i} = n$ for all $i \in \mathcal{I} \setminus \mathcal{C}$ in (5) and (6),

$$\theta(k) + \beta + \gamma(k)w(k) - \delta \geq w(k), \tag{20}$$

$$\theta(i) + w(i) \geq \frac{1}{2}\left(\theta(i) + \beta + \gamma(i)w(i) - \delta\right) + \frac{1}{2}\left(\theta(i) + w(i) - \delta\right) \quad \forall i \in \mathcal{I} \setminus \{k\}. \tag{21}$$

Inequality (21) can be rewritten as

$$2\delta \geq \beta + (\gamma(i) - 1)w(i) \quad \forall i \in \mathcal{I} \setminus \{k\},$$

which, due to $\mathcal{H} \setminus \{k\} \neq \emptyset$ and $\mathcal{L} \setminus \{k\} \neq \emptyset$ (because $I_h > 1$ and $I_l > 1$), implies that

$$2\delta \geq \beta + \max\{(\gamma_l - 1)w_l, (\gamma_h - 1)w_h\},$$

which establishes a contradiction because Condition 1 holds.

(2) Suppose that $n > 1$. As $\mathcal{C}$ is an equilibrium, using (2) and (3) together with the fact that $n_{-i} = n - 1$ for all $i \in \mathcal{C}$ and $n_{-i} = n$ for all $i \in \mathcal{I} \setminus \mathcal{C}$ in (5) and (6),

$$\frac{1}{n}\left(\theta(i) + \beta + \gamma(i)w(i) - \delta\right) + \frac{n-1}{n}\left(\theta(i) + w(i) - \delta\right) \geq \theta(i) + w(i) \quad \forall i \in \mathcal{C}, \tag{22}$$

$$\theta(i) + w(i) \geq \frac{1}{n+1}\left(\theta(i) + \beta + \gamma(i)w(i) - \delta\right) + \frac{n}{n+1}\left(\theta(i) + w(i) - \delta\right) \quad \forall i \in \mathcal{I} \setminus \mathcal{C}. \tag{23}$$

As $k \in \mathcal{L}$, for $k \in \mathcal{C}$, Inequality (22) can be rewritten as

$$\beta + (\gamma_l - 1)w_l \geq n\delta. \tag{24}$$

It follows by (4) that $n < I_l$ and $n < I_h$ as $\beta + \max\{(\gamma_l - 1)w_l, (\gamma_h - 1)w_h\} \geq \beta + (\gamma_l - 1)w_l$. Inequality (23) can be rewritten as

$$(n+1)\delta \geq \beta + (\gamma(i) - 1)w(i) \quad \forall i \in \mathcal{I} \setminus \mathcal{C},$$

which, due to $\mathcal{H} \setminus \mathcal{C} \neq \emptyset$ (because $n < I_h$), implies that

$$(n+1)\delta \geq \beta + (\gamma_h - 1)w_h. \tag{25}$$

From Condition 2 together with (24) follows that

$$\begin{aligned}
& (\gamma_h - 1)w_h > (\gamma_l - 1)w_l + \delta\left(1 - \left(\frac{\beta + (\gamma_l - 1)w_l}{\delta} - \left\lfloor \frac{\beta + (\gamma_l - 1)w_l}{\delta} \right\rfloor\right)\right) \\
\iff \quad & \frac{\beta + (\gamma_h - 1)w_h}{\delta} > \frac{\beta + (\gamma_l - 1)w_l}{\delta} + 1 - \frac{\beta + (\gamma_l - 1)w_l}{\delta} + \left\lfloor \frac{\beta + (\gamma_l - 1)w_l}{\delta} \right\rfloor \\
\implies \quad & \frac{\beta + (\gamma_h - 1)w_h}{\delta} > \left\lfloor \frac{\beta + (\gamma_l - 1)w_l}{\delta} \right\rfloor + 1 \geq n + 1 \\
\implies \quad & \beta + (\gamma_h - 1)w_h > (n+1)\delta,
\end{aligned}$$

which contradicts (25).

Combining *(1)* and *(2)*, if Conditions 1 and 2 hold, then there is no equilibrium $\mathcal{C}$ such that $k \in \mathcal{C}$ for some $k \in \mathcal{L}$. Therefore, if Conditions 1 and 2 hold, then elitism arises. ■

Corollary 1

Proof. I construct parameter examples for each Case *(1)* and *(2)* that satisfy Conditions 1 and 2 so that elitism arises by Proposition 2.

(1) Fix any finite $w_l > 0$, $w_h > w_l$, $\beta \geq 0$, and $\delta > 0$. Pick large enough finite $\theta(i) > 0$ so that $\theta(i) + \beta > \delta$ for all $i \in \mathcal{I}$, implying that $\theta(k_h) + \beta > \delta$ and $\theta(k_l) + \beta > \delta$. Since $w_h > w_l > 0$, $\delta/(w_h - w_l) + 1$ and $(2\delta - \beta)/w_h + 1$ are some finite numbers. There is a large enough finite $\hat{\gamma}$ such that $\hat{\gamma} > \max\{\delta/(w_h - w_l) + 1, (2\delta - \beta)/w_h + 1\} > 1$. It follows that $(\hat{\gamma} - 1)(w_h - w_l) > \delta$. By continuity, there is a small enough $\epsilon > 0$ such that $(\hat{\gamma} - 1)w_h - ((\hat{\gamma} + \epsilon) - 1)w_l > \delta$. Let $\gamma_h = \hat{\gamma}$ and $\gamma_l = \hat{\gamma} + \epsilon$. Then, first, $\gamma_l > \gamma_h = \hat{\gamma} > 1$ so that $\gamma_l \geq 1$ and $\gamma_h \geq w_l/w_h$ as required. Second, it follows from $\gamma_h = \hat{\gamma} > (2\delta - \beta)/w_h + 1$ that $\beta + \max\{(\gamma_l - 1)w_l, (\gamma_h - 1)w_h\} \geq \beta + (\gamma_h - 1)w_h > 2\delta$ so that Condition 1 holds. Third, it follows from $(\gamma_h - 1)w_h - (\gamma_l - 1)w_l = (\hat{\gamma} - 1)w_h - ((\hat{\gamma} + \epsilon) - 1)w_l > \delta$ that Condition 2 holds. Finally, pick any finite $I_l > 1$ and $I_h > 1$ that satisfy Inequality (4) and let $v = w_l$, $\phi_l = \gamma_l - 1$, and $\phi_h = \gamma_h - w_l/w_h$. Then $\gamma_l > \gamma_h$ and Conditions 1 and 2 hold.

(2) Fix any finite $w_l > 0$, $w_h > w_l$, $v \geq w_l$, $\beta \geq 0$, and $\delta > 0$. Pick large enough finite $\theta(i) > 0$ so that $\theta(i) + \beta > \delta$ for all $i \in \mathcal{I}$, implying that $\theta(k_h) + \beta > \delta$ and $\theta(k_l) + \beta > \delta$. Since $w_h > w_l > 0$, $\delta/(w_h - w_l) + 1$ and $(2\delta + w_h - \beta - v)/w_h$ are some finite numbers. There is a large enough finite $\hat{\phi}$ such that $\hat{\phi} > \max\{\delta/(w_h - w_l) + 1, (2\delta + w_h - \beta - v)/w_h\} > 1$. It follows that $(\hat{\phi} - 1)(w_h - w_l) > \delta$. By continuity, there is a small enough $\epsilon > 0$ such that $(\hat{\phi} - 1)w_h - ((\hat{\phi} + \epsilon) - 1)w_l > \delta$. Let $\phi_h = \hat{\phi}$ and $\phi_l = \hat{\phi} + \epsilon$. Then, first, $\phi_l > \phi_h = \hat{\phi} > 1$ so that $\phi_l \geq 0$ and $\phi_h \geq 0$ as required. Second, it follows from $\phi_h = \hat{\phi} > (2\delta + w_h - \beta - v)/w_h$ and (1) that $\beta + \max\{(\gamma_l - 1)w_l, (\gamma_h - 1)w_h\} \geq \beta + (\gamma_h - 1)w_h = \beta + (v/w_h + \phi_h - 1)w_h = \beta + v + (\phi_h - 1)w_h > 2\delta$ so that Condition 1 holds. Third, using (1), $(\gamma_h - 1)w_h - (\gamma_l - 1)w_l = (v/w_h + \phi_h - 1)w_h - (v/w_l + \phi_l - 1)w_l = (\phi_h - 1)w_h - (\phi_l - 1)w_l = (\hat{\phi} - 1)w_h - ((\hat{\phi} + \epsilon) - 1)w_l > \delta$ so that Condition 2 holds. Finally, pick any finite $I_l > 1$ and $I_h > 1$ that satisfy Inequality (4). Then $\phi_l > \phi_h$ and Conditions 1 and 2 hold. ■

Corollary 2

Proof. I construct a parameter example that captures both Cases *(1)* and *(2)* and does not satisfy Condition 1 so that elitism does not arise by Proposition 2.

Fix any finite $I_l > 2$, $I_h > 2$, $w_l > 0$, $w_h > w_l$, and let $0 < \beta = \delta < w_h - w_l < 2\delta$, $v = w_l$, $\phi_l = 0$, $\phi_h = 2\delta/w_h$, and, for all $i \in \mathcal{I}$, $\theta(i) = \delta$, implying that $\theta(i) + \beta > \delta$ for all $i \in \mathcal{I}$ and thus $\theta(k_h) + \beta > \delta$ and $\theta(k_l) + \beta > \delta$. Then $\phi_h > \phi_l$ and $\gamma_h > \gamma_l$ because, using (1), $\gamma_l = v/w_l + \phi_l = w_l/w_l = 1$ and $\gamma_h = v/w_h + \phi_h = w_l/w_h + 2\delta/w_h > 1$ since $2\delta > w_h - w_l$. Further, $(\gamma_l - 1)w_l = 0$ and $(\gamma_h - 1)w_h = (w_l/w_h + 2\delta/w_h - 1)w_h = 2\delta - (w_h - w_l) > 0$ so that $\beta + \max\{(\gamma_l - 1)w_l, (\gamma_h - 1)w_h\} = \delta + 2\delta - (w_h - w_l) < 2\delta$ since $\delta < w_h - w_l$, which also implies that $(\beta + \max\{(\gamma_l - 1)w_l, (\gamma_h - 1)w_h\})/\delta = (\delta + 2\delta - (w_h - w_l))/\delta < 2$ so that Inequality (4) is satisfied as $I_l > 2$ and $I_h > 2$. Then $\phi_h > \phi_l$ and $\gamma_h > \gamma_l$ and Condition 1 does not hold. ■

Proposition 3

Proof. Suppose that $\beta \geq \delta$. I proceed in two steps. **Step 1** establishes that if $(\phi_h - 1)w_h - (\phi_l - 1)w_l > \delta$, then elitism arises for all $v \geq w_l$. **Step 2** establishes that if elitism arises for all $v \geq w_l$, then $(\phi_h - 1)w_h - (\phi_l - 1)w_l > \delta$.

Step 1. Suppose that $(\phi_h - 1)w_h - (\phi_l - 1)w_l > \delta$. Fix any $v \geq w_l$. Using (1),

$$\begin{aligned}
(\gamma_h - 1)w_h - (\gamma_l - 1)w_l &= (v/w_h + \phi_h - 1)w_h - (v/w_l + \phi_l - 1)w_l \\
&= v + (\phi_h - 1)w_h - v - (\phi_l - 1)w_l \\
&= (\phi_h - 1)w_h - (\phi_l - 1)w_l \\
&> \delta \\
&\geq \delta\left(1 - \left(\frac{\beta + (\gamma_l - 1)w_l}{\delta} - \left\lfloor \frac{\beta + (\gamma_l - 1)w_l}{\delta} \right\rfloor\right)\right),
\end{aligned}$$

so that Condition 2 holds. From Remark 1 follows that Condition 1 holds as well because $\beta \geq \delta$. Thus, elitism arises by Proposition 2. Since $v \geq w_l$ was arbitrary, elitism arises for all $v \geq w_l$.

Step 2. I proceed by contraposition. Suppose that $(\phi_h - 1)w_h - (\phi_l - 1)w_l \leq \delta$. I show that there is a $v \geq w_l$ such that elitism does not arise. Fix $v > w_l$ such that $h(v) = 0$, where $h : [w_l, \infty) \to \mathbb{R}$ is given by

$$h(x) = \frac{\beta + x + (\phi_l - 1)w_l}{\delta} - \left\lfloor \frac{\beta + w_l + (\phi_l - 1)w_l}{\delta} \right\rfloor - 1,$$

which is negative at $x = w_l$, strictly increasing in x, and approaching infinity with x approaching infinity. Then $(\beta + v + (\phi_l - 1)w_l)/\delta$ is an integer. Thus, by (1),

$$\frac{\beta + (\gamma_l - 1)w_l}{\delta} = \frac{\beta + v + (\phi_l - 1)w_l}{\delta} = \left\lfloor \frac{\beta + v + (\phi_l - 1)w_l}{\delta} \right\rfloor = \left\lfloor \frac{\beta + (\gamma_l - 1)w_l}{\delta} \right\rfloor.$$

Therefore, using (1),

$$\begin{aligned}
(\gamma_h - 1)w_h - (\gamma_l - 1)w_l &= (v/w_h + \phi_h - 1)w_h - (v/w_l + \phi_l - 1)w_l \\
&= v + (\phi_h - 1)w_h - v - (\phi_l - 1)w_l \\
&= (\phi_h - 1)w_h - (\phi_l - 1)w_l \\
&\leq \delta \\
&= \delta \left(1 - \left(\frac{\beta + (\gamma_l - 1)w_l}{\delta} - \left\lfloor \frac{\beta + (\gamma_l - 1)w_l}{\delta} \right\rfloor\right)\right),
\end{aligned}$$

so that Condition 2 does not hold. Thus, given v, elitism does not arise by Proposition 2. ■

Proposition 4

Proof. Fix any $m \leq \bar{m} \equiv w_h - w_l$. Then, using $\gamma_h w_h \leq v + m$ and $\gamma_l w_l \geq v$, it follows that $(\gamma_h - 1)w_h = \gamma_h w_h - w_h \leq v + m - w_h \leq v + \bar{m} - w_h = v + w_h - w_l - w_h = v - w_l \leq \gamma_l w_l - w_l = (\gamma_l - 1)w_l$. Thus, Condition 2 does not hold, and elitism does not arise by Proposition 2. ■

Proposition 5

Proof. Suppose that (8) holds. There are two cases: *(1)* $2\delta \geq \beta + \max\{(\gamma_l - 1)w_l, (\gamma_h - 1)w_h\}$; *(2)* $2\delta < \beta + \max\{(\gamma_l - 1)w_l, (\gamma_h - 1)w_h\}$. From (1) follows with $v \geq w_l$ and $\phi_l \geq 0$ that $\gamma_l w_l \geq w_l$. Therefore, $(\gamma_l - 1)w_l \geq 0$ so that $\max\{(\gamma_l - 1)w_l, (\gamma_h - 1)w_h\} \geq 0$. I show that an equilibrium with a higher-income candidate exists in general by separately describing and verifying an equilibrium with a higher-income candidate for each case.

(1) Suppose that $2\delta \geq \beta + \max\{(\gamma_l - 1)w_l, (\gamma_h - 1)w_h\}$. Let $\mathcal{C} = \{k_h\}$ so that $n = 1$. Recall that $k_h \in \mathcal{H}$. Using (2) and (3) together with the fact that $n_{-i} = n - 1$ for all $i \in \mathcal{C}$ and $n_{-i} = n$ for all $i \in \mathcal{I} \setminus \mathcal{C}$ in (5) and (6), $\mathcal{C}$ is an equilibrium if and only if

$$\theta(k_h) + \beta + \gamma(k_h)w(k_h) - \delta \geq w(k_h), \tag{26}$$

$$\theta(i) + w(i) \geq \frac{1}{2}\left(\theta(i) + \beta + \gamma(i)w(i) - \delta\right) + \frac{1}{2}\left(\theta(i) + w(i) - \delta\right) \quad \forall i \in \mathcal{I} \setminus \{k_h\}. \tag{27}$$

Inequality (26) holds because $k_h \in \mathcal{H}$ and $(\gamma_h - 1)w_h \geq \delta - \beta - \theta(k_h)$ by (8) so that

$$\theta(k_h) + \beta + \gamma_h w_h - \delta \geq w_h.$$

Inequality (27) can be rewritten as

$$2\delta \geq \beta + (\gamma(i) - 1)w(i) \quad \forall i \in \mathcal{I} \setminus \{k_h\},$$

which holds as $2\delta \geq \beta + \max\{(\gamma_l - 1)w_l, (\gamma_h - 1)w_h\} \geq \beta + (\gamma(i) - 1)w(i)$ for all $i \in \mathcal{I} \setminus \{k_h\}$. That is, $\mathcal{C}$ is an equilibrium. Thus, an equilibrium with a higher-income candidate exists.

(2) Suppose that $2\delta < \beta + \max\{(\gamma_l - 1)w_l, (\gamma_h - 1)w_h\}$. Pick $n \in \mathbb{N}$ such that

$$n < \frac{\beta + \max\{(\gamma_l - 1)w_l, (\gamma_h - 1)w_h\}}{\delta} \leq n + 1. \tag{28}$$

It follows that $n \geq 2$. By (4), $n < I_l$ and $n < I_h$. Consider any $\mathcal{C} \subset \mathcal{H}$ such that $|\mathcal{C}| = n$. That is, there are $n \geq 2$ higher-income candidates. Using (2) and (3) together with the fact that $n_{-i} = n - 1$ for all $i \in \mathcal{C}$ and $n_{-i} = n$ for all $i \in \mathcal{I} \setminus \mathcal{C}$ in (5) and (6), $\mathcal{C}$ is an equilibrium if and only if

$$\frac{1}{n}\left(\theta(i) + \beta + \gamma(i)w(i) - \delta\right) + \frac{n-1}{n}\left(\theta(i) + w(i) - \delta\right) \geq \theta(i) + w(i) \quad \forall i \in \mathcal{C}, \tag{29}$$

$$\theta(i) + w(i) \geq \frac{1}{n+1}\left(\theta(i) + \beta + \gamma(i)w(i) - \delta\right) + \frac{n}{n+1}\left(\theta(i) + w(i) - \delta\right) \quad \forall i \in \mathcal{I} \setminus \mathcal{C}. \tag{30}$$

Inequality (30) can be rewritten as

$$(n+1)\delta \geq \beta + (\gamma(i) - 1)w(i) \quad \forall i \in \mathcal{I} \setminus \mathcal{C},$$

which holds by (28) because $\beta + (\gamma(i) - 1)w(i) \leq \beta + \max\{(\gamma_l - 1)w_l, (\gamma_h - 1)w_h\} \leq (n+1)\delta$ for all $i \in \mathcal{I} \setminus \mathcal{C}$. As $\mathcal{C} \subset \mathcal{H}$, Inequality (29) can be rewritten as

$$\beta + (\gamma_h - 1)w_h \geq n\delta. \tag{31}$$

There are two cases: *(a)* $(\gamma_h - 1)w_h \geq (\gamma_l - 1)w_l$; *(b)* $(\gamma_h - 1)w_h < (\gamma_l - 1)w_l$.

(a) If $(\gamma_h - 1)w_h \geq (\gamma_l - 1)w_l$, then $\max\{(\gamma_l - 1)w_l, (\gamma_h - 1)w_h\} = (\gamma_h - 1)w_h$, and it follows directly from (28) that (31) and thus (29) holds.

(b) If $(\gamma_h - 1)w_h < (\gamma_l - 1)w_l$, then $\max\{(\gamma_l - 1)w_l, (\gamma_h - 1)w_h\} = (\gamma_l - 1)w_l$, and $(\beta + (\gamma_l - 1)w_l)/\delta > n$ from (28) so that (31) and thus (29) holds because by (8),

$$\begin{aligned}
& (\gamma_h - 1)w_h \geq (\gamma_l - 1)w_l - \delta\left(1 - \left(\frac{\beta + (\gamma_h - 1)w_h}{\delta} - \left\lfloor \frac{\beta + (\gamma_h - 1)w_h}{\delta} \right\rfloor\right)\right) \\
\iff \quad & \frac{\beta + (\gamma_h - 1)w_h}{\delta} \geq \frac{\beta + (\gamma_l - 1)w_l}{\delta} - 1 + \frac{\beta + (\gamma_h - 1)w_h}{\delta} - \left\lfloor \frac{\beta + (\gamma_h - 1)w_h}{\delta} \right\rfloor \\
\implies \quad & \left\lfloor \frac{\beta + (\gamma_h - 1)w_h}{\delta} \right\rfloor \geq \frac{\beta + (\gamma_l - 1)w_l}{\delta} - 1 > n - 1
\end{aligned}$$

$$\implies \quad \frac{\beta + (\gamma_h - 1)w_h}{\delta} \geq \left\lfloor \frac{\beta + (\gamma_h - 1)w_h}{\delta} \right\rfloor \geq n$$
$$\implies \quad \beta + (\gamma_h - 1)w_h \geq n\delta.$$

That is, $\mathcal{C}$ is an equilibrium. Thus, an equilibrium with a higher-income candidate exists. Combining *(1)* and*(2)*, an equilibrium with a higher-income candidate exists if (8) holds. ■

Corollary 3

Proof. I construct parameter examples for each Case *(1)*–*(4)* that satisfy Inequality (8) so that an equilibrium with at least one higher-income candidate exists by Proposition 5.

(1) Fix any finite $I_l > 1$, $I_h > 1$, $w_l > 0$, $w_h > w_l$ and let $v = w_l$, $\phi_l = \phi_h = 0$, $\beta = \delta = w_h - w_l > 0$, and, for all $i \in \mathcal{I}$, $\theta(i) = \delta$, implying that $\theta(i) + \beta > \delta$ for all $i \in \mathcal{I}$ and thus $\theta(k_h) + \beta > \delta$ and $\theta(k_l) + \beta > \delta$. Then $(\gamma_h - 1)w_h = v - w_h = w_l - w_h = -\delta < 0$ and $(\gamma_l - 1)w_l = v - w_l = w_l - w_l = 0$. Since $I_l > 1$, $I_h > 1$, $\beta = \delta$, and $\max\{(\gamma_l - 1)w_l, (\gamma_h - 1)w_h\} = \max\{0, -\delta\} = 0$, Inequality (4) is satisfied. Since $\theta(i) = \beta = \delta$ for all $i \in \mathcal{I}$, the first element of the set on the right-hand side of Inequality (8) equals $\delta - \beta - \theta(k_h) = \delta - \delta - \delta = -\delta$. Since $(\gamma_l - 1)w_l = 0$, $(\gamma_h - 1)w_h = -\delta$, and $\beta = \delta$ so that $(\beta + (\gamma_h - 1)w_h)/\delta = (\delta - \delta)/\delta = 0$, the second element of the set on the right-hand side of Inequality (8) equals $-\delta$ as well. Then Inequality (8) is satisfied and $(\gamma_h - 1)w_h < 0$.

(2) See the proof of *(1)* for an example with $\phi_l = \phi_h = 0$ that satisfies Inequality (8).

(3) Fix any finite $\beta \geq 0$ and $\delta > 0$. Fix a $w_l > 0$ and a $w_h > w_l$ such that $w_h - w_l < \delta$. Next, fix any finite $v \geq w_l$ and pick a finite $\phi_h \geq 1$ such that $(\beta + v + (\phi_h - 1)w_h)/\delta = (\beta + (\gamma_h - 1)w_h)/\delta = \lfloor (\beta + (\gamma_h - 1)w_h)/\delta \rfloor$. Let $\phi_l = (\delta - (w_h - w_l) + \phi_h w_h)/w_l > 0$, which implies that, first, $\phi_l w_l - \phi_h w_h = \delta - (w_h - w_l) > 0$ and thus $\phi_l w_l > \phi_h w_h$ and, second, $(\phi_h - 1)w_h = (\phi_l - 1)w_l - \delta$ and thus $(\gamma_h - 1)w_h = (\gamma_l - 1)w_l - \delta = (\gamma_l - 1)w_l - \delta(1 - ((\beta + (\gamma_h - 1)w_h)/\delta - \lfloor (\beta + (\gamma_h - 1)w_h)/\delta \rfloor))$. Pick large enough finite $\theta(i) > 0$ so that $(\gamma_h - 1)w_h \geq \delta - \beta - \theta(i)$ and $\theta(i) + \beta > \delta$ for all $i \in \mathcal{I}$, implying that $(\gamma_h - 1)w_h \geq \delta - \beta - \theta(k_h)$, $\theta(k_h) + \beta > \delta$, and $\theta(k_l) + \beta > \delta$. Finally, pick finite $I_l > 1$ and $I_h > 1$ that satisfy Inequality (4). Then Inequality (8) is satisfied and $\phi_l w_l > \phi_h w_h$.

(4) See the proof of *(3)* for an example with $\phi_l > \phi_h$ that satisfies Inequality (8) because $\phi_l = (\delta - (w_h - w_l) + \phi_h w_h)/w_l > \phi_h$ if and only if $\delta + (\phi_h - 1)(w_h - w_l) > 0$, while $\delta > 0$, $w_h > w_l$, and $\phi_h \geq 1$. ■

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