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Partially Binding Platforms and the Advantages of Being an Extreme Candidate

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Abstract

This paper develops a political-competition model in which platforms are partially binding: a candidate who implements a policy that is different from her platform must pay a cost of betrayal that increases with the size of the discrepancy. I also suppose that voters are uncertain about candidate preferences for policies. If voters believe that a candidate is likely to be extreme, there exists a semiseparating equilibrium: an extreme candidate mimics a moderate candidate with some probability, and with the remaining probability, he announces a platform that commits to the implementation of a more moderate policy. Although an extreme candidate will implement a more extreme policy than a moderate candidate in equilibrium, partial pooling ensures that voters prefer an extreme candidate who does not pretend to be moderate over an uncertain candidate announcing a moderate candidate's platform. As a result, a moderate candidate never has a higher probability of winning than an extreme one.

Keywords: Electoral Competition; Campaign Promise; Signaling Game
JEL classification: C72, D72, D82

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1 Introduction

Before an election, candidates announce platforms, and the winner implements their policy after the election. Politicians usually betray their platforms but if the winner betrays her platform, such betrayal should be costly. For example, in 1988, George H. W. Bush promised "read my lips, no new taxes," but he increased taxes after he became President. The media and voters visibly noted this betrayal, and he lost the 1992 presidential election.[1] Based on this "cost of betrayal" and his platform, the winner decides on a policy after election.

However, most past studies use one of two polar assumptions about platforms. First, models with *Completely Binding Platforms* suppose that a politician cannot implement any policy other than the platform.[2] Second, models with *Nonbinding Platforms* suppose that a politician can implement any policy freely without any cost.[3] In other words, a politician implements her ideal policy regardless of the platform. Neither model captures how, for example, Bush betrayed his platform, and then was punished for doing so by the electorate. As Persson and Tabellini (2000) indicate, "(i)t is thus somewhat schizophrenic to study either extreme: where platforms have no meaning or where they are all that matter. To bridge the two models is an important challenge (p. 483)."

In this paper, I build a model with partially binding platforms that incorporates the two settings described above as extreme cases.[4] My model with *Partially Binding Platforms* supposes that a candidate can choose any policy, but that betrayal is costly, and that the "cost of betrayal" increases with the degree of betrayal. If politicians betray their platforms, the people and the media criticize the politicians, who must answer to their complaints and who may face falling approval ratings and the possibility of losing the next election increasing.[5] A stronger party or the Congress may discipline politicians.[6] In addition to the cost of betrayal, I introduce asymmetric information by assuming that candidate policy preferences are private information. Politician preferences may change depending on surrounding condi-

[1] Campbell (2008) indicates that "President George H. W. Bush lost in 1992 partly because he reneged on his "no new taxes" pledge of the 1988 campaign" (p. 104).

[2] This is the case in electoral competition models in the Downsian tradition (Downs (1957), Wittman (1973)).

[3] For example, this approach is taken in citizen-candidate models, such as Besley and Coate (1997) and Osborne and Slivinski (1996) and retrospective voting models such as Barro (1973) and Ferejohn (1986).

[4] I also study partially binding platforms in Asako (2010).

[5] Some papers show the relationship between the media and the credible commitment of politicians. Reinikka and Svensson (2005) show that newspaper campaigns reduce corruption in Uganda. Djankov et al. (2003) empirically show that policy making is distorted if the media is owned by the government.

[6] Cox and McCubbins (1994) and Aldrich (1995) show this using historical data on US parties. Snyder and Groseclose (2000) and McCarty et al. (2001) empirically show that there are various degrees of party discipline in the US Congress. McGillivray (1997) compares high and low discipline in trade policy.

tions or the particularly important issues in an election. In particular, when candidates are not famous, it is difficult to know their preferred policies.

The striking result is that an extreme candidate may have a higher probability of winning compared with a moderate candidate. Moreover, in equilibrium, an extreme candidate will implement a policy further from the median policy than would a moderate candidate, so partially binding platforms can induce *ex post* inefficiency.

The model supposes a two-candidate political competition in a one-dimensional policy space. One candidate's ideal policy is to the left of the median voter's ideal policy, whereas the other candidate's ideal policy is to the right, and candidates are fully policy-motivated. Each candidate is one of two types, moderate or extreme, and a moderate type's ideal policy is closer to the median policy than is an extreme type's ideal policy. A candidate knows her own type, but voters and the opposition do not. Before the election, candidates announce platforms. The winner decides on the policy to be implemented based on her platform and the cost of betrayal. An increase in the possibility of losing the next election is one important factor that determines the cost of betrayal, and it is a problem for dynamic electoral situations. However, there also exist other types of costs of betrayal that are not dynamic problems, such as party discipline[7] or a decrease of current approval ratings. Thus, for simplicity, I consider the cost of betrayal as a current term to include all types of such costs.

If voters and the opposition believe *ex ante* that a candidate is likely to be an extreme type, a semiseparating equilibrium exists. In a semiseparating equilibrium, an extreme type chooses a mixed strategy. With some probability, the extreme type announces the same platform as the moderate type, but with the remaining probability, the extreme type compromises more by announcing a platform further from his ideal policy than a moderate type's platform. In the later case, the extreme type reveals his type to voters, and the implemented policy approaches the median policy. An extreme type will always implement a policy that is further from the median policy than a moderate type. However, voters remain uncertain about the type of candidate who announces a moderate type's platform. In equilibrium, a majority of voters chooses an extreme type who compromises to avoid electing an extreme type who mimics a moderate type but will implement a very extreme policy. Thus, an extreme type has a higher probability of winning.

The importance reason for this extreme type's advantage is that an extreme type has a stronger incentive to prevent the opposition from winning because an extreme type's ideal

[7] Grossman and Helpman (2005, 2008) consider party discipline as a cost of betrayal.

policy is further from the opposition's policy than is a moderate type. On the other hand, a moderate type accepts a lower probability of winning because the opposition's policy is closer to her own ideal policy. Thus, an extreme type has an incentive to choose the above mixed strategy to increase the probability of winning, and he can do it because platforms are partially binding and there is asymmetric information about the candidate's type. My paper can describe this reasonable incentive of an extreme type by introducing two reasonable assumptions: i.e., partially binding platforms and uncertainty about the candidate's type.

If platforms are nonbinding, an extreme type must implement his ideal policy, so he cannot use the above strategy. Banks (1990) shows that a moderate type may defeat an extreme type under nonbinding platforms even if there is a cost of betrayal and asymmetric information about the candidates' ideal policies. If platforms are completely binding, the ideal policy is irrelevant, so both types of candidates commit to implementing the median policy, as in the basic Downsian model. Asako (2010) shows that, under partially binding platforms with complete information, a moderate type may defeat an extreme type.

Some past studies consider the similar idea of a cost of betrayal. In particular, Banks (1990) and Callander and Wilkie (2007) suppose that the platform may be a signal of an implemented policy. In their papers, candidates implement their own ideal policies automatically after an election, so they consider nonbinding platforms. A candidate does not want to announce a platform that is far from her ideal policy because of the cost of betrayal. However, if there is such a cost of betrayal, a rational candidate should want to adjust the implemented policy to reduce this cost after an election. I examine rational choices regarding an implemented policy after an election, given the platform and the cost of betrayal.[8]

Several papers discuss similar ideas of partially binding platforms. Harrington (1993) and Aragones et al. (2007) show that, in a repeated game, it is possible that two candidates will never betray their platforms; that is, nonbinding platforms can be completely binding in equilibrium. Austen-Smith and Banks (1989) consider a two-period game based on a retrospective voting model in which, if office-motivated candidates betray the platform, the probability of winning in the next election decreases. Grossman and Helpman (2005, 2008)

[8] Banks (1990) and Callander and Wilkie (2007) have two additional settings that differ from mine. First, they consider that candidates do not care about policy if they lose, but they should care about it when they are policy motivated in the real world. Second, they consider a continuum type of candidate, and voters do not know whether that candidate's position is on the right side or left side of the median policy. However, voters should have more information at least in relation to the party to which a candidate belongs. With these two strong assumptions, it is impossible to describe the above extreme candidate's incentive. I also relax these assumptions to more reasonable ones, and show the above extreme candidate's incentive. Even if candidates care abour policy after losing (and the types are discrete) in Banks (1990) and Callander and Wilkie (2007), an extreme type still cannot win over a moderate type when platforms are not partially binding.

develop a legislative model in which office-motivated parties announce platforms before an election, and the victorious legislators, who are policy-motivated, decide policy. If legislators betray the party platform, the party punishes them. On the other hand, my model is based on the prospective and two-candidate competition model, and considers that candidates who are policy-motivated decide on both a platform and a policy. Additionally, these past studies consider the case of complete information.[9]

Section 2 of this paper presents the model, Section 3 analyzes political equilibriums and shows a brief example, and Section 4 concludes the paper. All proofs are presented in the appendix.

2 Setting

The policy space is $\Re$. There is a continuum of voters, and their ideal policies are distributed on some interval of $\Re$. The distribution function is continuous and strictly increasing, so there is a unique median voter's ideal policy, x_m. There are two candidates, L and R, and each candidate is one of two types, moderate or extreme. Let x_i^M and x_i^E denote the ideal policies, respectively, for the moderate and extreme types, where $i = L$ or R, and $x_L^E < x_L^M < x_m < x_R^M < x_R^E$. Superscripts M and E represent moderate and extreme types, respectively, and the moderate type's ideal policy is closer to the median policy. Assume $x_m - x_L^t = x_R^t - x_m$ for $t = M$ or E, that is, the ideal policies of the same type are equidistant from the median policy. A candidate knows her own type, but voters and the opposition have uncertainty about the candidate's type. For both candidates, $p^M \in (0, 1)$ is the prior probability that the candidate is a moderate type, and the prior probability that the candidate is an extreme type is $p^E = 1 - p^M$.

After the types of candidates are decided, each candidate announces a platform, denoted by $z_i^t \in \Re$, where $i = L$ or R and $t = M$ or E. On the basis of these platforms, voters decide on a winner according to a majority voting rule. After an election, the winning candidate decides the implemented policy, denoted by χ_i^t, where $i = L$ or R and $t = M$ or E.

If the implemented policy is different from the candidate's ideal policy, the candidate experiences a disutility. This disutility is represented by $-v(|\chi - x_i^t|)$, where $i = L$ or R, $t = M$ or E, and χ is the policy implemented by the winner. Assume that $v(.)$ satisfies $v(0) = 0$, $v'(0) = 0$, $v'(d) > 0$ and $v''(d) > 0$ when $d > 0$.

[9] Some other papers assume that a completely binding platform is a signal for something other than ideal policies, such as the functioning of the economy (Schulz, 1996), the candidate's political motivation (Callander, 2007) and the candidate's degree of honesty (Kartik and McAfee, 2007).

If the implemented policy is not the same as the platform, the winning candidate needs to pay some costs. The function describing a cost of betrayal is $c(|z_i - \chi|)$. Assume that $c(.)$ satisfies $c(0) = 0$, $c'(0) = 0$, $c'(d) > 0$ and $c''(d) > 0$ when $d > 0$.

Moreover, I assume throughout that $\dfrac{c'(d)}{c(d)}$ and $\dfrac{v'(d)}{v(d)}$ decreases as d increases, and one or all of them is strictly decreasing. This assumption means that the relative marginal cost and disutility decrease as $|z_i^t - \chi|$ ($|x_i^t - \chi|$) increases. For example, if the function is monomial, this assumption holds, and many polynomial functions satisfy them.[10].

After an election, the winning candidate chooses a policy that maximizes $-v(|\chi - x_i^t|) - c(|z_i - \chi|)$. Note that $\chi_i^t(z_i) = argmax_\chi \ -v(|\chi - x_i^t|) - c(|z_i - \chi|)$.

Upon observing a platform, the utility of voter n when candidate i with type t wins is $-u(|\chi_i^t(z_i) - x_n|)$. Assume that $u(.)$ satisfies $u'(|\chi_i^t(z_i) - x_n|) > 0$ when $|\chi_i^t(z_i) - x_n| > 0$. Let $p_i(t|z_i)$ denote the voters' revised beliefs that candidate i is type t upon observing the platform, z_i. The expected utility of voter n when a winner is candidate i who promises z_i is $U_n(z_i) = -p_i(M|z_i)u(|\chi_i^M(z_i) - x_n|) - p_i(E|z_i)u(|\chi_i^E(z_i) - x_n|)$. Note that a continuum of voters means sincere voting; that is, I rule out weakly dominated voting strategies. Assume that all voters and the opposition have the same beliefs about a candidate's type.

Let $Prob_i^t(win|z_j^s, z_i^t)$ denote the probability of winning of the type-t candidate i, given z_j^s and z_i^t. Let $F_i^t(.)$ denote the distribution function of the mixed strategy chosen by a candidate i of type t. The expected utility of the type-t candidate i who promises z_i^t before an election is:

$$\begin{aligned}
& V_i^t((F_j^M(z_j^M), F_j^E(z_j^E)), z_i^t) \\
= & \sum_{s=M,E} \left[p^s \int_{z_j^s} Prob_i^t(win|z_j^s, z_i^t) dF_j^s(z_j^s) \right] \left[-v(|\chi_i^t(z_i^t) - x_i^t|) - c(|z_i^t - \chi_i^t(z_i^t)|) \right] \\
- & \sum_{s=M,E} p^s \int_{z_j^s} (1 - Prob_i^t(win|z_j^s, z_i^t)) v(|\chi_j^s(z_j^s) - x_i^t|) dF_j^s(z_j^s), \qquad (1)
\end{aligned}$$

where $i, j = L, R$ and $t = M, E$. The first term indicates when the candidate wins against each type of opponent. The second term indicates when the candidate loses to each type of opponent. In summary, the timing of events and a political equilibrium are as follows.

1. Nature decides each candidate's type, and a candidate knows her own type.

2. The candidates announce their platforms.

[10]The case without this assumption is discussed in Appendix B

3. Voters vote.

4. The winning candidate chooses which policy to implement.

Definition 1 *A political equilibrium is a perfect Bayesian equilibrium in the game played by two candidates. A political equilibrium has a distribution function $F_i^t(.)$, the implemented policy $\chi_i(z_i)$ and the voters' belief $p_i(t|z_i)$, where $i = L, R$ and $t = M, E$ such that:*

1. *For all z_i in the support of $F_i^t(.)$;*

   $V_i^t((F_j^M(z_j), F_j^E(z_j)), z_i) \geq V_i^t((F_j^M(z_j), F_j^E(z_j)), z_i') \; \forall z_i'$.

2. *The voters' posterior beliefs conditional on the platforms $p_i(t|z_i)$ must satisfy Bayes' rule whenever z_i is in support of $F_i^t(.)$. Voters and the opposition have the same off-path beliefs.*

3. $\chi_i^t(z_i) = argmax_\chi \; -v(|\chi - x_i^t|) - c(|z_i - \chi|)$.

3 Political Equilibrium

When one voter n prefers candidate R to L, other voters to the right of voter n also prefer R because their positions are further to the right and their beliefs are the same. Therefore, if the candidate chooses any platform that is more attractive to the median voter than the opposition's platform, the candidate is certain to win.

Following an election, the winning candidate implements a policy that maximizes utility following a win, $-v(|\chi_i^t(z_i^t) - x_i^t|) - c(|z_i^t - \chi_i^t(z_i^t)|)$. In equilibrium, the implemented policy is between the platform and the candidate's ideal policy. If voters know the candidate's type (ideal policy), they can also know the future implemented policy, given the platform and the cost of betrayal.

Lemma 1 *The implemented policy $\chi_i^t(z)$ satisfies $v'(|\chi_i^t(z) - x_i^t|) = c'(|z - \chi_i^t(z)|)$, and $\chi_i^t(z) \in (x_i^t, z)$, when $z > x_i^t$ and $\chi_i^t(z) \in (z, x_i^t)$, when $z < x_i^t$.*

In equilibrium, there is the possibility that platforms enter on the opposition side, i.e., $z_R^t < x_m < z_L^t$. This paper allows this situation and does not restrict candidates announcing their platforms only on their own halves of the policy space. If candidates are uncertain about voters' preferences—that is, a probabilistic model is considered—the above situation does not hold in many cases. It is well known that candidates have a greater divergence of policies in a probabilistic model. (Asako (2010) also provides details.) Basically, the introduction of a probabilistic model simply increases the divergence, and this is not the purpose of this paper. Thus, this paper concentrates on a deterministic model. Note that, in equilibrium, the implemented policies do not enter the opposition's side of the policy space.

3.1 Pooling Equilibrium

This section shows that a pooling equilibrium exists if the prior belief that a candidate is a moderate type, p^M, is sufficiently high. A semiseparating equilibrium will be discussed in the next section.

3.1.1 The Definition

If both types of the opposition announce the same platform z_j, the expected utility of candidate i when the opposition wins is $-p^M v(|x_i^t - \chi_j^M(z_j)|) - (1-p^M)v(|x_i^t - \chi_j^E(z_j)|)$ where $i, j = L, R$, $i \neq j$ and $t = M, E$. The utility of i when candidate i of type-t wins is $-v(|x_i^t - \chi_i^t(z_i^t)|) - c(|z_i^t - \chi_i^t(z_i^t)|)$. Let $z_i^t(z_j)$ denote the platform where both (expected) utilities are the same for a type-t candidate, where $t = M, E$ fix z_j.

Assume that both types of opponents announce the platform, z_j, and the probability that the opposition who announces z_j is a moderate type is $q \in [0, 1]$. Then, the following holds. If the (expected) utilities when the candidate wins and the opposition wins are the same, a moderate type's platform is closer to the candidate's ideal policy than is an extreme type's platform, while a moderate type's implemented policy is closer to the median policy than is an extreme type's policy. The following lemma[11] and Figure 1 summarizes this situation.

Lemma 2 *Suppose that the opposition announces the same platform z_j regardless of type. Let q denote the probability that the opposition who announces z_j is a moderate type. For any $q \in [0, 1]$, if the (expected) utilities when the candidate wins and the opposition wins are the same, an extreme type announces a platform that is further from the candidate's ideal policy ($|z_i^M(z_j) - x_i^t| < |z_i^E(z_j) - x_i^t|$) but will implement a more extreme policy than will a moderate type ($|\chi_i^E(z_i^E(z_j)) - x_m| > |\chi_i^M(\hat{z}_i^M(z_j)) - x_m|$).*

Following an election, an extreme type will betray the platform more severely and pay a higher cost of betrayal, so the implemented policy will be more extreme.

[11] This lemma is based on Proposition 4 in Asako (2010). Note that, in a political equilibrium, the platform, z_i^t, satisfies $x_L^t \leq \chi_L^t(z_L^t) \leq x_m \leq \chi_R^t(z_R^t) \leq x_R^t$, which is shown by Lemma 2 in Asako (2010). See Asako (2010) for more details.

Conversely, before an election, an extreme type finds it especially costly for the opposition to win, more so than does a moderate type. The ideal policy of an extreme type is further from the median policy than is a moderate type's, which means that an extreme type's ideal policy is also further from the opposition's implemented policy. Thus, an extreme type has a higher disutility, so the platform of a moderate type $z_i^M(z_j)$ is closer to the candidate's ideal policy than is the platform of an extreme type, $z_i^E(z_j)$. This result is the critical one when there is asymmetric information about the candidate's type. With asymmetric information, voters cannot observe the future implemented policy, and they can observe only platforms upon which an extreme type has a stronger incentive to compromise more. Therefore, there may exist a chance for an extreme type to win, which I will show in the following.

Let z_i^{M*} denote the situation where the (expected) utilities when the candidate wins and the opposition wins are the same for a moderate type when both types announce the same platform, and both candidate's platforms are symmetric. That is, $z_i^{M*} = z_i^M(z_j^{M*})$ and $z_j^{M*} = z_j^M(z_i^{M*})$, where $z_i^M - x_m = x_m - z_j^M$.

The utility when the candidate wins should be the same as or higher than the expected utility when the opposition wins in the symmetric pooling equilibrium. If not, a candidate has an incentive to lose, as it is better for the opposition to win. Therefore, in a symmetric pooling equilibrium, both types should announce a platform which is the same as or closer to x_i^t than z_i^{M*} because $|z_i^{M*} - x_R^t| < |z_i^E(z_j^{M*}) - x_i^t|$ from Lemma 2.

Lemma 3 *If a symmetric pooling equilibrium exists, the utility when the candidate wins is the same as or higher than the expected utility when the opposition wins.*

Finally, the off-path beliefs of voters should be discussed. From Lemma 3, voters can surmise that candidates never choose platforms where the utility when the candidate wins is lower than the expected utility when the opposition wins. If the utility when the candidate wins is higher than the expected utility when the opposition wins, candidates have an incentive to win with certainty, if there is a way to do so. If a platform is closer to the candidate's ideal policy than z_i^{M*}, both types have an incentive to win by approaching the median policy if possible. Thus, it is reasonable that if platforms are closer to the candidate's ideal policy than z_i^{M*}, voters surmise there is a positive probability that a candidate is a moderate type. This should be the same as a prior belief because a pooling equilibrium is analyzed. However, if the platform is further from the candidate's ideal policy than z_i^{M*}, voters can surmise that a candidate must be an extreme type because a moderate type has no incentive to compromise more than z_i^{M*}, but an extreme type may have an incentive as shown by Lemma 2. For the above reason, I deduce the following assumptions about off-path beliefs.

Assumption 1 *If the platform is further from the candidate's ideal policy than z_i^{M*}, $p_i(M|z) = 0$. If the platform is closer to the candidate's ideal policy than z_i^{M*}, $p_i(M|z) = p^M$.*

3.1.2 The Equilibrium

With Assumption 1, a pooling equilibrium under which both types announce z_i^{M*} may exist. A pooling equilibrium under which both types announce a platform that is closer to the candidate's ideal policy than z_i^{M*} does not exist because both types have an incentive to approach the median policy and win with certainty. Moreover, platforms are always symmetric and candidates tie in a pooling equilibrium. If the platforms are not symmetric, one of the two candidates will win with certainty. The winner prefers to approach their own ideal policy, x_i^t, and still win over the opposition. The winner can do this because the policy space is continuous.[12] When an extreme type chooses z_i^{M*}, this candidate has no incentive to deviate to any platform that is closer to his ideal policy than z_i^{M*}. From Assumption 1, the belief for this candidate is still p^M from this deviation and hence, this candidate will be certain to lose and the expected utility decreases.

Finally, I show whether an extreme type deviates from z_i^{M*} to any platform that is further from his ideal policy than z_i^{M*}. Voters do not know the type in a pooling equilibrium so the expected utility of voters is the weighted average of the utility between a moderate type and an extreme type. On the other hand, if an extreme type deviates, the expected utility of voters from choosing such an extreme type is the utility to choose an extreme type from Assumption 1. If an extreme type's platform commits to an implemented policy, which is sufficiently closer to the median policy, this extreme type can win over an uncertain opposition who chooses a pooling-equilibrium's platform. I denote z_i' such that $-p^M u(|\chi_j^M(z_j^{M*}) - x_m|) - (1-p^M)u(|\chi_j^E(z_j^{M*}) - x_m|) = -u(|\chi_i^E(z_i) - x_m|)$. That is, at z_i',

[12] Asymmetric platforms may be equilibriums with specific off-path beliefs such as $p_i(M|z) = 0$ for all off-path beliefs. However, it is less interesting so I do not discuss such cases by assuming Assumption 1. When Assumption 1 does not hold, other pooling equilibriums may exist. For example, in Assumption 1, if z_i^{M*} is replaced by any platform—say z_i^{M**}, which is closer to the candidate's ideal policy than z_i^{M*}—it could be a political equilibrium in which both types announce z_i^{M**}. If $p_i(M|z)$ is lower than p^M when the platform is closer to the candidate's ideal policy than z_i^{M*}, another platform which is closer to the candidate's ideal policy than z_i^{M*} may also be a pooling equilibrium. However, such off-path beliefs cannot be justified in the above manner. A pooling equilibrium with z_i^{M*} can exist in a broader case than Assumption 1. For example, when the platform is further from the candidate's ideal policy than z_i^{M*}, $p_i(M|z)$ could be slightly higher than zero. However, to avoid presenting the complicated conditions for off-path beliefs, I assume Assumption 1 as the following results do not change much, even when broader cases are allowed.

voters are indifferent between z_i' and z_j^{M*}. If an extreme type announces a platform further away from his ideal policy than z_i', this candidate can win over an uncertain opposition. Figure 2 shows z_i' using R's case.

The expected utility when an extreme type stays in a pooling equilibrium is:

$$\begin{aligned} V_i^E((z_j^{M*}, z_j^{M*}), z_i^{M*}) &= \frac{1}{2}\big[-p^M v(|\chi_j^M(z_j^{M*}) - x_i^E|) - (1-p^M)v(|\chi_j^E(z_j^{M*}) - x_i^E|) \\ - \;\; & v(|\chi_i^E(z_i^{M*}) - x_i^E|) - c(|\chi_i^E(z_i^{M*}) - z_i^{M*}|)\big]. \end{aligned} \tag{2}$$

An extreme type never deviates to $z_i \in [z_i', z_i^{M*})$ because the probability of winning decreases significantly. When the extreme type deviates to z_i, which is slightly further away from the ideal policy than z_i', the expected utility is slightly lower than:

$$V_i^E((z_j^{M*}, z_j^{M*}), z_i') = -v(|\chi_i^E(z_i') - x_i^E|) - c(|\chi_i^E(z_i') - z_i'|).$$

Note that if a candidate commits to a more moderate policy, the cost of betrayal and the disutility following a win increase. An extreme type can increase the expected utility from this deviation if:

$$V_i^E((z_j^{M*}, z_j^{M*}), z_i^{M*}) < V_i^E((z_j^{M*}, z_j^{M*}), z_i'), \tag{3}$$

If (3) does not hold, an extreme type does not deviate. If (3) holds, a pooling equilibrium does not exist because an extreme type deviates.

Proposition 1 *Suppose Assumption 1. If and only if (3) does not hold, a pooling equilibrium where all types announce z_i^{M*} exists.*

When z_i' is closer to z_i^{M*}, then the inequality (3) tends to hold. Suppose that voters have a linear disutility function. Suppose also that L chooses z_L^{M*} as a pooling equilibrium, and R is an extreme type. If p^M is high, the extreme-type R needs to compromise greatly to win because the expected policy to be implemented by L with z_L^{M*} is closer to the implemented policy when L is moderate, $\chi_L^M(z_L^{M*})$. That is, in Figure 2, z_R' is very far from the ideal policy, x_R^E, so this compromise decreases the expected utility of the extreme-type R. However, if p^M is sufficiently low, the expected policy to be implemented by L is closer to the implemented policy when L is extreme, $\chi_L^E(z_L^{M*})$, so, if R compromises slightly, the implemented policy of R becomes better for the median voter. In Figure 2, z_R' is closer to z_R^{M*}. Candidate R may be able to increase the expected utility because the probability of winning increases without a great increase in the cost of betrayal and the disutility following a win. From these reasons, if p^M is sufficiently low, the extreme type will deviate, and a pooling equilibrium does not exist.[13]

3.2 Semiseparating Equilibrium

3.2.1 The Definition

If (3) holds, a semiseparating equilibrium exists. In a semiseparating equilibrium, a moderate type chooses a pure strategy, z_i^*. The value of z_i^* satisfies the following equation,

$$\begin{aligned} & -\frac{p^M}{p^M+\sigma^M(1-p^M)}v(|\chi_j^M(z_j^*)-x_i^M|)-\frac{\sigma^M(1-p^M)}{p^M+\sigma^M(1-p^M)}v(|\chi_j^E(z_j^*)-x_i^M|) \\ = \; & -v(|\chi_i^M(z_i^*)-x_i^M|)-c(|\chi_i^M(z_i^*)-z_i^*|)) \end{aligned} \tag{4}$$

where σ^M is the probability that an extreme type (opposition) pretends to be moderate by announcing z_j^*, and z_R^* and z_L^* are symmetric, $z_R^*-x_m=x_m-z_L^*$. The left-hand side is the utility when the opposition promising z_j^* wins, and the right-hand side is the utility when the candidate wins. That is, a moderate type is indifferent between winning and losing when the opposition announces z_j^*.

An extreme type chooses a mixed strategy. If this mixed strategy does not include z_i^*, this is a separating case as discussed in Section 3.3. Thus, one platform in a mixed strategy should be z_i^* in a semiseparating equilibrium. To have a mixed strategy, an extreme type chooses any platform that is further from his ideal policy than z_i^* and reveals his own type to voters.

There are two types of semiseparating equilibrium. The first is a *continuous semiseparating equilibrium*, and the second is a *two-policy semiseparating equilibrium*. In both types, an extreme type chooses z_i^* with the probability σ^M, and, with the probability $1-\sigma^M$, an extreme type reveals his type. In a continuous semiseparating equilibrium, an extreme type also has a distribution function, $F(.)$, with support $[\bar{z}_L, \underline{z}_L]$ for L and $[\underline{z}_R, \bar{z}_R]$ for R. More specifically, the distribution is $(1-\sigma^M)F(.)$. In a two-policy semiseparating equilibrium, an extreme type chooses one platform, $\bar{z}_i$, with the probability $1-\sigma^M$. In a two-policy semiseparating equilibrium, a mixed strategy includes only two policies, z_i^* and $\bar{z}_i$, while a continuous semiseparating equilibrium includes z_i^* and a continuous support.

Now, I suppose that the positions of platforms, σ^M and $F(.)$ are symmetric for both

[13] If voters have a strictly convex disutility function ($u(.)$), they care about the expected utility instead of the expected policy, and the expected utility to choose a candidate in a pooling equilibrium becomes lower than the linear utility function's case, so an extreme type will deviate in broader cases.

candidates. It means that both candidates' platforms and $F(.)$ are symmetric about the median policy, and both candidates have the same value of σ^M. However, I will show that they are always symmetric in a semiseparating equilibrium.

Definition 2 *A continuous semiseparating equilibrium is a collection* $(z_i^*, \sigma^M, F(.), \Pi)$ *and a two-policy semiseparating equilibrium is a collection* $(z_i^*, \sigma^M, \bar{z}_i, \Pi)$ *where* z_i^* *is a platform chosen by a moderate type,* σ^M *is the probability of choosing* z_i^* *in an extreme type's mixed strategy,* $F(.)$ *is a distribution function with the support of* $[\bar{z}_L, \underline{z}_L]$ *for* L *and* $[\underline{z}_R, \bar{z}_R]$ *for* R*, and* Π *is a scalar, such that: (a.1)* $\Pi = V_i^E(z_i) = V_i^E(z_i^*)$ *for all* z_i *in support of* $F(.)$ *in a continuous semiseparating equilibrium; (a.2)* $\Pi = V_i^E(z_i^*) = V_i^E(\bar{z}_i)$ *in a two-policy semiseparating equilibrium; and (b) Definition 1 holds. All variables of both candidates are symmetric.*

The value of the expected utility is Π, and $V_i^t(.)$ is the expected utility given that an opposition takes an equilibrium strategy that is symmetric to the candidate where $i = L, R$ and $t = M, E$. Condition (a) implies that an extreme type is indifferent to all platforms in a mixed strategy, whereas (b) implies there is no incentive to change the platform for both types and voters' beliefs are based on Bayes' rule. Figure 3 summarizes the above definition. I also employ a similar off-path beliefs in Assumption 1.

Assumption 2 *If the platform is further from the candidate's ideal policy than* z_i^**, then* $p_i(M|z_i) = 0$*. If the platform is closer to the candidate's ideal policy than* z_i^**, then* $p_i(M|z_i) = \frac{p^M}{p^M+\sigma^M(1-p^M)}$.

If the platform is further from her ideal policy than z_i^*, a moderate type has an incentive to lose to an opposition who announces z_j^* while an extreme type may not have such an incentive, from Lemma 2[14], so $p_i(M|z_i) = 0$. If the platform is closer to their ideal policies than z_i^*, moderate and extreme types have an incentive to approach the median policy, so the probability that a candidate is a moderate type should be the same as the posterior belief on z_i^*.[15] Assumption 2 is a more general definition of Assumption 1 that includes the

[14] A semiseparating equilibrium is the case of Lemma 2 with $q = \frac{p^M}{p^M+\sigma^M(1-p^M)}$ and $z_j = z_j^*$.

[15] Even though $p_i(M|z_i)$ is lower than $\frac{p^M}{p^M+\sigma^M(1-p^M)}$ (such as p^M), the semiseparating equilibrium defined in Definition 2 still exists, but other semiseparating equilibriums may also exist. When Assumption 2 does not hold, there exist other semiseparating equilibriums. For example, in Assumption 2, if z_i^* is replaced by any platform that is closer to the candidate's ideal policy than z_i^{M*}, a moderate type chooses this platform. However, as I will show, even though other semiseparating equilibriums exist, they have almost the same characteristics, so I concentrate only on a semiseparating equilibrium defined by Definition 2 by assuming Assumption 2.

possibility that an extreme type chooses a mixed strategy. When $\sigma^M = 1$, it is the same as Assumption 1, so Assumption 2 is in turn a more general version of Assumption 1.

3.2.2 The Equilibrium

To have a mixed strategy as the equilibrium, an extreme type needs to be indifferent among all platforms in the support of the mixed strategy.[16] When an extreme type chooses any platform that is further from his ideal policy than z_i^*, the disutility following a win and the cost of betrayal are higher than in the case where an extreme type chooses z_i^*. Thus, an extreme type who chooses a platform which is further from the ideal policy than z_i^* needs to win over an opposition who chooses z_j^*. I denote $\bar{z}_i$ such that $-\frac{p^M}{p^M + \sigma^M(1-p^M)}u(|\chi_j^M(z_j^*) - x_m|) - \frac{\sigma^M(1-p^M)}{p^M + \sigma^M(1-p^M)}u(|\chi_j^E(z_j^*) - x_m|) < -u(|\chi_i^E(\bar{z}_i) - x_m|)$. That is, voters are indifferent between z_j^* and $\bar{z}_i$. However, to simplify, I now assume that if an extreme type announces $\bar{z}_i$, this extreme type can win over the opposition who announces z_j^*. I will show that this assumption can be relaxed at the end of this section. In the following, I first discuss a two-policy semiseparating equilibrium, and then a continuous semiseparating equilibrium.

Two-policy Semiseparating Equilibrium

Without loss of generality, let us focus on R's expected utility and choices. When an extreme type announces z_R^*, the candidate ties with an opposition announcing z_L^* but loses to the other oppositions. Thus, the expected utility when an extreme type chooses z_R^* to pretend to be moderate is as follows.

$$\begin{aligned} V_R^E(z_R^*) &= \frac{1}{2}\Big[-p^M v(|\chi_L^M(z_L^*) - x_R^E|) - \sigma^M(1-p^M)v(|\chi_L^E(z_L^*) - x_R^E|) \\ &- (p^M + \sigma^M(1-p^M))\big[v(|\chi_R^E(z_R^*) - x_R^E|) + c(|\chi_R^E(z_R^*) - z_R^*|)\big]\Big] \\ &- (1-\sigma^M)v(|\chi_L^E(\bar{z}_L) - x_R^E|), \end{aligned} \tag{5}$$

When an extreme type announces $\bar{z}_R$, he wins against an opponent announcing z_L^*, but ties with an opposition announcing $\bar{z}_L$. Thus, in a two-policy semiseparating equilibrium, the

[16]To determine the mixed strategy (especially in a continuous semiseparating equilibrium), I build on techniques introduced by Burdett and Judd (1983). They consider price competition and show that firms randomize over different prices when there is a possibility that consumers will observe only one price. Just as Burdett and Judd (1983) show that firms are indifferent over a range of prices, I show that an extreme type is indifferent over a range of platforms.

expected utility when an extreme type chooses $\bar{z}_R$ is as follows:

$$V_R^E(\bar{z}_R) = (p^M + \sigma^M(1-p^M))\big[-v(|\chi_R^E(\bar{z}_R) - x_R^E|) - c(|\chi_R^E(\bar{z}_R) - \bar{z}_R|)\big]$$
$$- \quad \frac{1}{2}(1-\sigma^M)(1-p^M)\big[v(|\chi_L^E(\bar{z}_L) - x_R^E|) + v(|\chi_R^E(\bar{z}_R) - x_R^E|) + c(|\chi_R^E(\bar{z}_R) - \bar{z}_R|)\big]. \quad (6)$$

In a two-policy semiseparating equilibrium, Π and σ^M are determined by:

$$V_i^E(z_i^*) = V_i^E(\bar{z}_i) = \Pi.$$

When an extreme type announces $\bar{z}_R$, his disutility following a win and the cost of betrayal are higher, but the probability of winning is also higher than the case when an extreme type announces z_R^*. Thus, an extreme type is indifferent between $\bar{z}_R$ and z_R^*. If (3) holds, $V_R^E(z_R^*) < V_R^E(\bar{z}_R)$ at $\sigma^M = 1$. When σ^M converges to zero, the situation converges to a completely separating case in which an extreme type announces $\bar{z}_R$ and never mimics a moderate type. As voters surmise that a candidate announcing z_L^* is a moderate type who will implement very moderate policy, an extreme type needs to compromise greatly. This means that $V_R^E(z_R^*)$ is higher than $V_R^E(\bar{z}_R)$ when σ^M is closer to zero. All functions are continuous, so there exists a value of σ^M, which satisfies $V_R^E(z_R^*) = V_R^E(\bar{z}_R)$.

Consider a σ^M under which $V_R^E(z_R^*) = V_R^E(\bar{z}_R)$. Under such $\bar{z}_R$, if:

$$-v(|\chi_R^E(\bar{z}_R) - x_R^E|) - c(|\chi_R^E(\bar{z}_R) - \bar{z}_R|) \leq -v(|\chi_L^E(\bar{z}_L) - x_R^E|), \quad (7)$$

then an extreme type has no incentive to compromise to win over an extreme-type opposition announcing $\bar{z}_L$. Therefore, a two-policy semiseparating equilibrium exists. An extreme type with $\bar{z}_R$ does not want to deviate to lose because that would mean the candidate loses not only to an opposition with $\bar{z}_L$ but also to an opposition with z_L^*, so such deviation decreases the expected utility. Suppose that an extreme type announces a platform that is lower (further from his ideal policy) than $\bar{z}_R$, instead of announcing $\bar{z}_R$. Then, this extreme type has an incentive to deviate to $\bar{z}_R$. The reason is as follows. The probability of winning against the opposition announcing z_L^* is unchanged, and the cost of betrayal and the disutility following a win decreases with such a deviation, and when (7) holds, an extreme type has an incentive to lose to an extreme-type opposition announcing $\bar{z}_L$. If a platform is higher than $\bar{z}_R$, an extreme type cannot win even over an opposition announcing z_L^*. Thus, an extreme type will announce $\bar{z}_R$ with $1-\sigma^M$, and z_R^* with σ^M in equilibrium.

Continuous Semiseparating Equilibrium

If (7) does not hold, an extreme type still has an incentive to compromise more than $\bar{z}_R$ to win over an extreme-type opposition announcing $\bar{z}_L$, so a continuous semiseparating equilibrium exists instead of a two-policy semiseparating equilibrium. In a continuous semiseparating equilibrium, when an extreme type announces z_R^*, the expected utility is:

$$\begin{aligned} V_R^E(z_R^*) &= \frac{1}{2}\Big[-p^M v(|\chi_L^M(z_L^*) - x_R^E|) - \sigma^M(1-p^M)v(|\chi_L^E(z_L^*) - x_R^E|) \\ &- (p^M + \sigma^M(1-p^M))\big[v(|\chi_R^E(z_R^*) - x_R^E|) + c(|\chi_R^E(z_R^*) - z_R^*|)\big]\Big] \\ &- (1-\sigma^M)(1-p^M)\int_{\bar{z}_L}^{\underline{z}_L} v(|\chi_L^E(z_L) - x_R^E|)dF(z_L). \end{aligned} \tag{8}$$

The platform $\bar{z}_R$ is used as the highest bound of the support of $F(.)$ in a continuous semiseparating equilibrium. When an extreme type announces $\bar{z}_R$, such an extreme type wins over an opposition announcing z_L^*, but loses to the other extreme-type opposition who compromises. Thus, in a continuous semiseparating equilibrium, the expected utility when an extreme type chooses $\bar{z}_R$ is as follows:

$$\begin{aligned} V_R^E(\bar{z}_R) &= (p^M + \sigma^M(1-p^M))\big[-v(|\chi_R^E(\bar{z}_R) - x_R^E|) - c(|\chi_R^E(\bar{z}_R) - \bar{z}_R|)\big] \\ &- (1-\sigma^M)(1-p^M)\int_{\bar{z}_L}^{\underline{z}_L} v(|\chi_L^E(z_L) - x_R^E|)dF(z_L). \end{aligned} \tag{9}$$

In this case, (5) and (6) are replaced by (8) and (9). For the same reasons as in the case of the two-policy semiseparating equilibrium, there exists a value of σ^M under which $V_R^E(z_R^*) = V_R^E(\bar{z}_R)$.[17] In a continuous semiseparating equilibrium, an extreme type has the distribution $F(.)$ on some policies. The distribution function, $F(.)$, satisfies the following lemma.

Lemma 4 *Suppose that a continuous semiseparating equilibrium exists. In such an equilibrium, $F(.)$ is continuous with connected support.*

Because of this distribution, for R, when a supporting platform becomes smaller continuously, the probability of winning increases continuously, while the cost of betrayal and the disutility following a win increases. Therefore, there exist combinations of $\underline{z}_R$ and $F(.)$ under which an extreme type is indifferent among any platform in the connected policies. This

[17] Actually, the platform $\bar{z}_R$ in a continuous semiseparating equilibrium is slightly lower than one in a two-policy semiseparating equilibrium. See Appendix A.3.6.

platform, $\underline{z}_R$, is another lowest bound of the support of $F(.)$. From Lemma 4, $F(\underline{z}_L) = 0$, so, when an extreme type chooses $\underline{z}_R$, the probability of winning is one. The expected utility when an extreme type chooses $\underline{z}_R$ is as follows:

$$V_R^E(\underline{z}_R) = -v(|\chi_R^E(\underline{z}_R) - x_R^E|) - c(|\chi_R^E(\underline{z}_R) - \underline{z}_R|).$$

The expected utility when an extreme type chooses any $z'_R \in (\underline{z}_R, \bar{z}_R)$ is:

$$\begin{aligned} &V_R^E(z_R'^M)(1-p^M)F(z'_R))\left[-v(|\chi_R^E(z'_R) - x_R^E|) - c(|\chi_R^E(z'_R) - z'_R|)\right] \\ &-(1-\sigma^M)(1-p^M)\int_{z'_L}^{z_L} v(|\chi_L^E(z_L) - x_R^E|)dF(z_L). \end{aligned} \tag{10}$$

An extreme type should be indifferent among all platforms in the support of a mixed strategy, so $\underline{z}_i$ and $F(.)$ are decided by:

$$V_i^E(\underline{z}_i) = V_i^E(z'_i) = \Pi.$$

For all z'_i, when an extreme type's platform becomes further from his ideal policy, the disutility following a win and the cost of betrayal increase, but the probability of winning also increases so the extreme type is indifferent among these platforms. Given this behavior of the extreme type, does the moderate type want to deviate by approaching the median policy? A moderate type has no incentive to win over an extreme-type opposition who compromises because such an extreme-type opposition compromises sufficiently and will implement a policy that is closer to a moderate type's ideal policy.

The Advantages of Being an Extreme Candidate

In both types of semiseparating equilibriums, an extreme type has a positive probability of choosing a moderate type's platform, z_i^*, and induces voters to remain uncertain about the candidate's type with z_i^*. The majority of voters prefers an extreme type who compromises to an uncertain type promising z_i^*, to avoid choosing an extreme type who pretends to be moderate and implements a very extreme policy. Therefore, an extreme type who compromises wins over a moderate type and an extreme type who mimics a moderate type. As Figure 3 shows, an extreme type implements more extreme policy than does a moderate type regardless of a platform in the mixed strategy, and an extreme type who compromises will implement a more moderate policy than an extreme type who pretends to be moderate. In addition, strategies of candidates are always symmetric in a semiseparating equilibrium with Assumption 2.

Proposition 2 *Suppose Assumption 2 holds. If (3) holds, then a continuous or a two-policy semiseparating equilibriums exists as a political equilibrium. In a continuous semiseparating equilibrium, $\chi_i^E(\underline{z}_i)$ is more extreme than $\chi_i^M(z_i^*)$. In a two-policy semiseparating equilibrium, $\chi_i^E(\bar{z}_i)$ is more extreme than $\chi_i^M(z_i^*)$. All variables of both candidates are symmetric in equilibrium.*

Several semiseparating equilibriums may exist as, in a continuous semiseparating equilibrium, both $\underline{z}_i$ and $F(.)$ are decided by a single equation. However, all semiseparating equilibriums have the same characteristics discussed above.

I assume that if an extreme type announces $\bar{z}_i$, this extreme type can win over the opposition who announces z_j^* even though voters are indifferent between z_j^* and $\bar{z}_i$. In a continuous semiseparating equilibrium, this assumption is not critical. If the support of an extreme type's mixed strategy is $[\underline{z}_i, \bar{z}_i)$ and z_i^*, the results do not change. On the other hand, in a two-policy semiseparating equilibrium, it is critical. However, if a policy space is discrete, the results do not change. Suppose there are a large number of policy choices, and the distance between sequential policies is ϵ. If ϵ is very close to zero, the situation is almost the same as a continuous policy space, and there exist $\bar{z}_L + \epsilon$ and $\bar{z}_R - \epsilon$ which can replace $\bar{z}_i$, and the results do not change.

3.3 Separating Equilibrium and Welfare Analysis

This section shows that a separating equilibrium where a moderate type wins against an extreme type does not exist. A separating equilibrium where an extreme type wins against a moderate type may exist and will be briefly discussed in Appendix B, but it means that an extreme type still has advantages.

In a separating equilibrium, the utility of i when the candidate i wins is $-v(|x_i^t - \chi_i^t(z_i^t)|) - c(|z_i^t - \chi_i^t(z_i^t)|)$, and the utility of i when a *same-type* opposition wins is $-v(|x_i^t - \chi_j^t(z_j^t)|)$. I denote $\hat{z}_i^t$ as the platform under which both utilities are the same for a type-t candidate, and they are symmetric, that is, $\hat{z}_R^t - x_m = x_m - \hat{z}_L^t$. Such platforms satisfy the following lemma for the same reason as Lemma 2.

Lemma 5 *The extreme type's platform, $\hat{z}_i^E$, is further from the candidate's ideal policy than is the moderate type's platform, $\hat{z}_i^M$ ($\hat{z}_R^M - \hat{z}_L^M > \hat{z}_R^E - \hat{z}_L^E$) but the moderate type's implemented policy, $\chi_i^M(\hat{z}_i^M)$, is closer to the median policy than is the extreme type's policy, $\chi_i^E(\hat{z}_i^E)$ ($\chi_R^E(\hat{z}_R^E) - \chi_L^E(\hat{z}_L^E) > \chi_R^M(\hat{z}_R^M) - \chi_L^M(\hat{z}_L^M)$).*

Figure 4 shows the positions of $\hat{z}_R^t$ and $\chi_R^t(\hat{z}_R^M)$. Does a separating equilibrium where a moderate type wins against an extreme type exist? The answer is no. Under the separating case, an extreme type always has an incentive to pretend to be moderate.

Proposition 3 *A separating equilibrium in which a moderate type wins against an extreme type does not exist, regardless of the off-path beliefs.*

First, regardless of the off-path beliefs, an extreme type should announce $\hat{z}_i^E$ in a separating equilibrium where a moderate type wins. If the utility when the candidate wins is higher than the utility when a same-type opposition wins, an extreme-type candidate has an incentive to win with certainty against the extreme-type opposition, and this is made possible by approaching the median policy, regardless of the off-path beliefs. If, for a moderate type, the utility when the candidate wins is lower than the utility when a moderate opposition wins, this moderate type has an incentive to lose to the moderate opposition. Thus, a moderate type never announces a platform that is further from her ideal policy than $\hat{z}_i^E$ from Lemma 5. Suppose that a moderate type wins against an extreme type, that is, $|x_m - \chi_i^E(\hat{z}_i^E)| > |x_m - \chi_i^M(z_i^M)|$, where z_i^M is a moderate type's platform, as shown in Figure 4 using the case of R.[18] If an extreme type deviates to a moderate type's platform (from $\hat{z}_R^E$ to $\hat{z}_R^M$ in Figure 4), an extreme type can gain a higher probability of winning. With this deviation, the future implemented policy moves from $\chi_R^E(\hat{z}_R^E)$ to $\chi_R^E(\hat{z}_R^M)$ in Figure 4, so an extreme type can implement a policy closer to his ideal policy. As a result, the disutility following a win and the cost of betrayal decreases, so an extreme type can increase his expected utility from this deviation[19].

In addition, if Assumption 2 is assumed, a moderate type should choose $\hat{z}_i^M$ if a separating equilibrium exists. In Assumption 2, as $\sigma^M = 0$, if the platform is more extreme than $\hat{z}_i^M$, then the off-path beliefs are $p_i(M|z_i) = 1$. If the platform is closer to her ideal policy than $\hat{z}_i^M$, a moderate type has an incentive to win with certainty against the moderate-type opposition. Given the above off-path beliefs, a moderate type can then increase her probability of winning by approaching the median policy until $\hat{z}_i^M$. This means that a separating equilibrium does not exist given Assumption 2.

Corollary 1 *Suppose Assumption 2. Then, a separating equilibrium does not exist.*

[18] Figure 4 uses $\hat{z}_i^M$ instead of z_i^M, but the results are the same with any z_i^M when a moderate type wins against an extreme type.

[19] Proposition 3 is true even if z_R^M and z_L^M are asymmetric. One important feature is that at least one of the moderate types of both candidates has a higher probability of winning than an extreme type.

With Assumption 2, there always exists a political equilibrium from Propositions 1 and 2, and it is not a separating equilibrium from Corollary 1. The following proposition summarizes the above points.

Corollary 2 *Suppose Assumption 2 holds. A political equilibrium exists and is either a pooling equilibrium or a semiseparating equilibrium.*

Do partially binding platforms with incomplete information lead to an *ex post* efficient aggregation of preferences? Suppose that one candidate is a moderate type, and another candidate is an extreme type. *Ex post*, the optimal candidate is a moderate type. In a pooling equilibrium, a campaign platform has no means to choose the optimal candidate. The expected probability of getting a moderate type is the same as the prior belief *ex ante*. In a semiseparating equilibrium, the first best is a moderate type for the majority of voters, but an extreme type has a higher expected probability of winning than a moderate type, so the probability of choosing an extreme type is higher than the prior belief.

Corollary 3 *Partially binding platforms with incomplete information lead to an ex post inefficient aggregation of preferences.*

3.4 Example from Turkey

Following is an example of a semiseparating equilibrium with extreme parties winning an election. There are three important characteristics of a semiseparating equilibrium. First, one party (candidate) compromises greatly, and voters guess that this party is an extreme type. Second, voters are uncertain about the opposition's type. Third, the party that compromises wins. This section illustrates this case using an example from Turkey.

In Turkish politics, there are two large groups, political Islam and secular parties. Broadly speaking, secularists, represented by parties such as the Republican People's Party (CHP), support the democratic systems and politico-religious separation. Political Islam, represented by the Justice and Development Party (AKP), wants to introduce Islamic doctrines into some policies. In recent years, the AKP and the prime minister, Recep Erdogan, have supported the politico-religious separation and promoted the AKP as the party of reform, a party that supports democratic systems, including politico-religious separation (Dagi (2006)). Most citizens support secularism in Turkey, and the AKP's promises were almost the same as those encapsulated in the opposition's policies. Nevertheless, voters realized that the AKP is the extreme Islamic party. This situation can be interpreted as the AKP compromising greatly, but voters guessing that this party is an extreme type.

In the 2007 Turkey presidential election, the Turkish military, which supports secularism, stated that "the Turkish armed forces have been monitoring the situation with concern." People interpreted this as a threat of a coup, and started to worry that the secular parties would support extreme secular policies such as using violence against Political Islam. Thus, voters were uncertain about the secular party's type. The Turkish case is also an example that if voters come to believe that a party is an extreme type (lower p_M), then the extreme party has a higher probability of winning.

As a result, the AKP, an extreme type, won the 2007 (and 2002) elections, even though it represents political Islam.

I showed the example of a semiseparating equilibrium. As my model is simple, it is difficult to find examples that exactly match with my model, but there may exist some examples explained by my main point. That is, my model describes that an extreme candidate or party compromises greatly and wins because this extreme candidate or party wants to prevent the opposition winning. This is one important reason why extremists run, compromise and win.

4 Conclusion

This paper examines the effects of partially binding platforms in electoral competition. When there is asymmetric information, voters cannot always determine a candidate's political preferences. If the probability that a candidate is moderate is sufficiently low, there exists a semiseparating equilibrium: an extreme candidate pretends to be moderate with some probability and, with the remaining probability, reveals his own preferences and approaches the median voter's ideal policy. When one candidate is moderate, and another candidate is extreme, an extreme candidate who reveals his preference type will defeat a moderate (uncertain) candidate even though the extreme candidate will implement more extreme policy than the moderate candidate will. In any equilibrium, a moderate candidate never has a higher probability of winning than an extreme candidate.

This paper is the first to show such advantages of being an extreme candidate in the framework of the political-competition model, and indicate that the important reason for this advantage is that an extreme candidate has a stronger incentive to prevent the opposition from winning. However, this model is simple, based on a framework such as one-shot voting game, so much more work is needed to investigate an extreme candidate's incentives and behaviors.

A Proofs

A.1 Lemma 2

Consider a case of R without loss of generality. Let $\chi_L^M = \chi_L^M(z_j)$ and $\chi_L^E = \chi_L^E(z_j)$, given z_j. Let χ_R^t denote the situation where the (expected) utilities when the candidate wins and when the opposition wins are the same, given z_j. That is, $\chi_R^t = \chi_R^t(z_R^t(z_j))$. This means that:

$$qv(x_R^t - \chi_L^M) + (1-q)v(x_R^t - \chi_L^E) - v(x_R^t - \chi_R^t) = c(\chi_R^t - z_R^t(\chi_R^t)). \tag{11}$$

where $z_R^t(\chi_R^t)$ represents the platform committing the candidate to χ_R^t. Then, I differentiate both sides of (11) by x_R^t, given the opposition's strategies (χ_L^E and χ_L^E). The differential of the left-hand side by x_R^t is $qv'(x_R^t-\chi_L^M)+(1-q)v'(x_R^t-\chi_L^E)-v'(x_R^t-\chi_R^t)+\dfrac{\partial\chi_R^t}{\partial x_R^t}(v'(x_R^t-\chi_R^t))$. The differential of the right-hand side by x_R^t is $c'(\chi_R^t - z_R^t(\chi_R^t))(\dfrac{\partial\chi_R^t}{\partial x_R^t} - \dfrac{\partial z_R^t(\chi_R^t)}{\partial\chi_R^t}\dfrac{\partial\chi_R^t}{\partial x_R^t} - \dfrac{\partial z_R^t(\chi_R^t)}{\partial x_R^t})$. Both of these differentials should be the same. From Lemma 1, $v'(x_R^t-\chi_R^t) = c'(\chi_R^t-z_R^t(\chi_R^t))$, so the condition becomes:

$$qv'(x_R^t - \chi_L^M) + (1-q)v'(x_R^t - \chi_L^E) - v'(x_R^t - \chi_R^t) = -v'(x_R^t - \chi_R^t)(\frac{\partial z_R^t(\chi_R^t)}{\partial\chi_R^t}\frac{\partial\chi_R^t}{\partial x_R^t} + \frac{\partial z_R^t(\chi_R^t)}{\partial x_R^t}). \tag{12}$$

Suppose Lemma 1. I fix χ_R^t and differentiate $v'(x_R^t - \chi_R^t) = c'(\chi_R^t - z_R^t(\chi_R^t))$ by x_R^t, then $\dfrac{\partial z_R^t(\chi_R^t)}{\partial x_R^t} = -\dfrac{v''(x_R^t - \chi_R^t)c'(\chi_R^t - z_R^t(\chi_R^t))}{v'(x_R^t - \chi_R^t)c''(\chi_R^t - z_R^t(\chi_R^t))} < 0$. I substitute this into (12), so it becomes:

$$\frac{\partial\chi_R^t}{\partial x_R^t} = \frac{\frac{v''(x_R^t-\chi_R^t)c'(\chi_R^t-z_R^t(\chi_R^t))}{c''(\chi_R^t-z_R^t(\chi_R^t))} - (qv'(x_R^t - \chi_L^M) + (1-q)v'(x_R^t - \chi_L^E) - v'(x_R^t - \chi_R^t))}{v'(x_R^t - \chi_R^t)\frac{\partial z_R^t(\chi_R^t)}{\partial\chi_R^t}}. \tag{13}$$

If (13) is positive, an extreme type will implement a more extreme policy than a moderate type. In the same way as deriving $\frac{\partial z_R^t(\chi_R^t)}{\partial x_R^t}$, $\dfrac{\partial z_R^t(\chi_R^t)}{\partial\chi_R^t} = 1 + \dfrac{v''(x_R^t - \chi_R^t)c'(\chi_R^t - z_R^t(\chi_R^t))}{v'(x_R^t - \chi_R^t)c''(\chi_R^t - z_R^t(\chi_R^t))} > 0$. To prove that (13) is positive, it is sufficient to show that the numerator of (13) is positive. In other words:

$$\frac{qv'(x_R^t - \chi_L^M) + (1-q)v'(x_R^t - \chi_L^E) - v'(x_R^t - \chi_R^t)}{v''(x_R^t - \chi_R^t)} < \frac{c'(\chi_R^t - z_R^t(\chi_R^t))}{c''(\chi_R^t - z_R^t(\chi_R^t))}. \tag{14}$$

Note that, from (11) and Lemma 1:

$$\frac{qv(x_R^t-\chi_L^M)+(1-q)v(x_R^t-\chi_L^E)-v(x_R^t-\chi_R^t)}{v'(x_R^t-\chi_R^t)}=\frac{c(\chi_R^t-z_R^t(\chi_R^t))}{c'(\chi_R^t-z_R^t(\chi_R^t))}. \tag{15}$$

As $\frac{c'(d)}{c(d)}$ strictly decreases as d increases, $\dfrac{c'(\chi_R^t-z_R^t(\chi_R^t))}{c''(\chi_R^t-z_R^t(\chi_R^t))}>\dfrac{c(\chi_R^t-z_R^t(\chi_R^t))}{c'(\chi_R^t-z_R^t(\chi_R^t))}$. The right-hand side of (14) is higher than the left-hand side of (15). If $\dfrac{qv'(x_R^t-\chi_L^M)+(1-q)v'(x_R^t-\chi_L^E)-v'(x_R^t-\chi_R^t)}{v''(x_R^t-\chi_R^t)}<\dfrac{qv(x_R^t-\chi_L^M)+(1-q)v(x_R^t-\chi_L^E)-v(x_R^t-\chi_R^t)}{v'(x_R^t-\chi_R^t)}$, (14) holds. This equation can be changed to $q\left(\dfrac{v'(x_R^t-\chi_L^M)}{v''(x_R^t-\chi_R^t)}-\dfrac{v(x_R^t-\chi_L^M)}{v'(x_R^t-\chi_R^t)}\right)$ $+(1-q)\left(\dfrac{v'(x_R^t-\chi_L^E)}{v''(x_R^t-\chi_R^t)}-\dfrac{v(x_R^t-\chi_L^E)}{v'(x_R^t-\chi_R^t)}\right)<\dfrac{v'(x_R^t-\chi_R^t)}{v''(x_R^t-\chi_R^t)}-\dfrac{v(x_R^t-\chi_R^t)}{v'(x_R^t-\chi_R^t)}$. As $\frac{v'(d)}{v(d)}$ strictly decreases as d increases, the right-hand side is positive. If $x_R^t-\chi_L^E=x_R^t-\chi_L^M=x_R^t-\chi_R^t$, both sides are the same. If $x_R-\chi_L^k$, where $k=M$ or E increases, the left-hand side decreases. The reason is as follows. I differentiate $\left(\dfrac{v'(x_R^t-\chi_L^k)}{v''(x_R^t-\chi_R^t)}-\dfrac{v(x_R^t-\chi_L^k)}{v'(x_R^t-\chi_R^t)}\right)$ with respect to $x_R-\chi_L^k$, then $\dfrac{v''(x_R^t-\chi_L^k)}{v''(x_R^t-\chi_R^t)}-\dfrac{v'(x_R^t-\chi_L^k)}{v'(x_R^t-\chi_R^t)}$. This value is negative because $\dfrac{v'(x_R^t-\chi_R^t)}{v''(x_R^t-\chi_R^t)}<\dfrac{v'(x_R^t-\chi_L^k)}{v''(x_R^t-\chi_L^k)}$ when $x_R^t-\chi_L^k>x_R^t-\chi_R^k$ and $v''(.)>0$. As a result, the left-hand side of (14) is lower than the left-hand side of (15), so (14) holds. This result can be derived even if only $\frac{c'(d)}{c(d)}$ or $\frac{v'(d)}{v(d)}$ strictly decreases as d increases. Thus, (13) is positive. It also means that $qv(|x_i^t-\chi_j^M(z_j^M)|)+(1-q)v(|x_i^t-\chi_j^E(z_j^E)|)-v(x_i^t-\chi_i^t(z_i^t))-c(\chi_i^t(z_i^t)-z_i^t)$ is higher for an extreme type.

To determine the effect on platforms, it is sufficient to know the sign of $\frac{\partial z_R^t(\chi_R^t)}{\partial x_R^t}+\frac{\partial z_R^t(\chi_R^t)}{\partial \chi_R^t}\frac{\partial \chi_R^t}{\partial x_R^t}$. From the above, it is: $-\dfrac{v''(x_R^t-\chi_R^t)c'(\chi_R^t-z_R^t(\chi_R^t))}{v'(x_R^t-\chi_R^t)c''(\chi_R^t-z_R^t(\chi_R^t))}$ $+\dfrac{1}{v'(x_R^t-\chi_R^t)}\dfrac{v''(x_R^t-\chi_R^t)c'(\chi_R^t-z_R^t(\chi_R^t))}{c''(\chi_R^t-z_R^t(\chi_R^t))}-\dfrac{1}{v'(x_R^t-\chi_R^t)}(qv'(x_R^t-\chi_L^M)+(1-q)v'(x_R^t-\chi_L^E)-$ $v'(x_R^t-\chi_R^t))$. It is $-\dfrac{qv'(x_R^t-\chi_L^M)+(1-q)v'(x_R^t-\chi_L^E)-v'(x_R^t-\chi_R^t)}{v'(x_R^t-\chi_R^t)}<0$. As a result, a more extreme type promises a more moderate platform. □

A.2 Lemma 4

If $F(.)$ has a discontinuity at some policy, say z_i', i.e., $F(z_i'+)>F(z_i'-)$, there is a strictly positive probability that an opposition also chooses z_j' (the probability density function is $f(z_j')>0$). If this candidate compromises infinitesimally, this increases the probability of winning by $\frac{1}{2}f(z_j')>0$. On the other hand, as this compromise is minor, the expected utility changes by slightly less than $\frac{1}{2}f(z_j')[-v(|x_i-\chi_i^E(z_i')|)-c(|z_i'-\chi_i^E(z_i')|)-(-v(|x_i-\chi_j^E(z_j')|))]$, and it is positive (or negative). This implies that if $F(.)$ has a discontinuity, it cannot be part of a continuous semiseparating equilibrium.

Assume $F(.)$ is constant on some region $[z_1, z_2]$ in the convex hull of the support. If a candidate chooses z_1, this candidate has an incentive to deviate to z_2 because the probability of winning does not change, but the implemented policy will approach the candidate's own ideal policy, so the expected utility increases. Thus, the support of $F(.)$ must be connected. □

A.3 Proposition 2

A.3.1 Define σ^M and Π

First, a continuous semiseparating equilibrium is discussed. The value of σ^M is decided at the point under which the extreme type's expected utilities under z_i^* and $\bar{z}_i$ are the same, that is, $V_i^E(z_i^*) = V_i^E(\bar{z}_i)$, defined by (8) and (9).

$$\begin{aligned} & \frac{1}{2}[-\frac{p^M}{p^M+\sigma^M(1-p^M)}v(|\chi_j^M(z_j^*)-x_i^E|)-\frac{\sigma^M(1-p^M)}{p^M+\sigma^M(1-p^M)}v(|\chi_j^E(z_j^*)-x_i^E|) \\ - \quad & v(|\chi_i^E(z_i^*)-x_i^E|)-c(|\chi_i^E(z_i^*)-z_i^*|)] \\ = \quad & -v(|\chi_i^E(\bar{z}_i)-x_i^E|)-c(|\chi_i^E(\bar{z}_i)-\bar{z}_i|) \end{aligned} \tag{16}$$

When $\sigma^M = 1$, the left-hand side is lower than the right-hand side because (3) holds. When σ^M goes to 0, if the left-hand side is higher than the right-hand side, the value of $\sigma^M \in (0,1)$ under which an extreme type is indifferent between z_i^* and $\bar{z}_i$ exists. The following condition means that the left-hand side is higher than the right-hand side of (16) when σ^M goes to zero.

$$\begin{aligned} & -\frac{1}{2}[v(|\chi_j^M(z_j^*)-x_i^E|)+v(|\chi_i^E(z_i^*)-x_i^E|)+c(|\chi_i^E(z_i^*)-z_i^*|)] \\ > \quad & -v(|\chi_i^E(\bar{z}_i)-x_i^E|)-c(|\chi_i^E(\bar{z}_i)-\bar{z}_i|). \end{aligned} \tag{17}$$

First, $-v(|\chi_i^E(z_i^*)-x_i^E|)-c(|\chi_i^E(z_i^*)-z_i^*|) > -v(|\chi_i^E(\bar{z}_i)-x_i^E|)-c(|\chi_i^E(\bar{z}_i)-\bar{z}_i|)$ as $\bar{z}_i$ is more moderate than z_i^*. Second, $\bar{z}_i$ is the platform under which an extreme type can win over a moderate type who announces z_i^*. When σ^M goes to zero, voters guess that a candidate announcing z_i^* is a moderate type. It means that, from the definition of $\bar{z}_i$, an extreme type's implemented policy, $\chi_i^E(\bar{z}_i)$, needs to be more moderate than a moderate type's implemented policy, $\chi_i^M(z_i^*)$. From Lemma 2, a moderate type has a greater incentive to compromise about the *implemented policy* than an extreme type, and a moderate type is indifferent to winning or losing at z_i^*. It means that $-v(|\chi_j^M(z_j^*) - x_i^E|) > -v(|\chi_i^E(\bar{z}_i) - x_i^E|) - c(|\chi_i^E(\bar{z}_i) - \bar{z}_i|)$. As a result, (17) holds, so if (3) holds, a value of σ^M under which an extreme type is indifferent between $\bar{z}_i$ and z_i^* exists. The value of Π is the same as $V_i^E(z_i^*) = V_i^E(\bar{z}_i)$.

A.3.2 The Other Bound of Support for the $F(.)$

At $\underline{z}_i$, the expected utility is $V_i^E(\underline{z}_i)$. If:

$$-v(|\chi_i^E(\bar{z}_i) - x_i^E|) - c(|\chi_i^E(\bar{z}_i) - \bar{z}_i|) > -v(|\chi_j^E(\bar{z}_j) - x_i^E|), \tag{18}$$

$V_i^E(\underline{z}_i)$ is higher than $V_i^E(\bar{z}_i)$, when $\underline{z}_i = \bar{z}_i$, so $\bar{z}_i \neq \underline{z}_i$ in equilibrium, and it means that a continuous semiseparating equilibrium exists. If (18) does not hold, the extreme bound and the moderate bound are equivalent (a two-policy semiseparating equilibrium). Suppose that (18) holds. In equilibrium, $V_i^E(\underline{z}_i)$ and $V_i^E(\bar{z}_i)$ should be the same, so $\underline{z}_i$ and $F(.)$ should satisfy the following equation. Suppose R without loss of generality.

$$\begin{aligned} & -v(|\chi_R^E(\underline{z}_R) - x_R^E|) - c(|\chi_R^E(\underline{z}_R) - \underline{z}_R|) \\ = \; & (p^M + \sigma^M(1-p^M))\left[-v(|\chi_R^E(\bar{z}_R) - x_R^E|) - c(|\chi_R^E(\bar{z}_R) - \bar{z}_R|)\right] \\ & -(1-\sigma^M)(1-p^M)\int_{\bar{z}_L}^{\underline{z}_L} v(|\chi_L^E(z_L) - x_R^E|)dF(z_L). \end{aligned} \tag{19}$$

I assume that the two candidates' positions are symmetric, so when $\underline{z}_R$ decreases, $\underline{z}_L$ increases. Then, $V_R^E(\bar{z}_R)$ increases because $\int_{\bar{z}_L}^{\underline{z}_L} v(|\chi_L^E(z_L) - x_R^E|)dF(z_L)$ decreases while $V_i^E(\underline{z}_i)$ decreases, and $F(.)$ also adjusts the value of $\int_{\bar{z}_L}^{\underline{z}_L} v(|\chi_L^E(z_L) - x_R^E|)dF(z_L)$. Thus, there exist combinations of $\bar{z}_i$ and $F_j(.)$ that satisfy (19).

I denote $\hat{z}_i^E$ such that $-v(|\chi_j^E(\hat{z}_j^E) - x_i^E|) = -v(|\chi_i^E(\hat{z}_i^E) - x_i^E|) - c(|\chi_i^E(\hat{z}_i^E) - \hat{z}_i^E|)$. The moderate bound, $\underline{z}_i$, should be more extreme than $\hat{z}_i^E$. If $\underline{z}_i$ is more moderate than $\hat{z}_i^E$, it means $-v(|\chi_j^E(\underline{z}_j) - x_i^E|) > -v(|\chi_i^E(\underline{z}_i) - x_i^E|) - c(|\chi_i^E(\underline{z}_i) - \underline{z}_i|)$. Thus, an extreme type with $\underline{z}_i$ has an incentive to lose to an extreme-type opposition with a platform close to $\underline{z}_j$. Any platform in the support of $F(.)$, say z_i', needs to satisfy $-v(|\chi_j^E(z_j') - x_i^E|) > -v(|\chi_i^E(z_i') - x_i^E|) - c(|\chi_i^E(z_i') - z_i'|)$ to avoid deviating to lose. Therefore, $\chi_i^E(\underline{z}_i)$ is more extreme than $\chi_i^M(z_i^*)$ as $\chi_i^E(\hat{z}_i^E)$ is more extreme than $\chi_i^M(z_i^*)$.

A.3.3 Define $F(.)$

I focus on the expected utility of R without loss of generality. Let $X(z'_L) = \int_{z'_L}^{z_L} v(|\chi_L^E(z_L) - x_R^E|)dF(z_L)$. For any $z'_R \in (\underline{z_R},\ \bar{z}_R)$, the expected utility should be the same as Π. It means that:

$$F_X(z'_R) = \frac{\Pi + v(|\chi_R^E(z'_R) - x_R^E|) + c(|\chi_R^E(z'_R) - z_R'^M)X(z'_L)}{(1-\sigma^M)(1-p^M)(v(|\chi_R^E(z'_R) - x_R^E|) + c(|\chi_R^E(z'_R) - z'_R|))}. \tag{20}$$

The distribution function, $F_X(.)$, is defined by (20) for any platform in the support of $F(.)$, given $X(z'_L)$. When $F_X(z'_R) = 0$, it is $\Pi + v(|\chi_R^E(z'_R) - x_R^E|) + c(|\chi_R^E(z'_R) - z_R'^M)X(z'_L) = 0$. This equation holds if and only if $z'_R = \underline{z_R}$ and $X(z'_L) = 0$ to have $\Pi = V_R^E(\underline{z}_R)$. If and only if $z'_L = \underline{z}_L$, $X(z'_L) = 0$, so, when z'_R and z'_L goes to $\underline{z}_R$ and $\underline{z}_L$, $F(z'_R)$ goes to zero.

When $F(z'_R) = 1$, it is $\Pi = (p^M + \sigma^M(1-p^M))(-v(|\chi_R^E(z'_R) - x_R^E|) - c(|\chi_R^E(z'_R) - z_R'^M)(1-p^M)X(z'_L)$. This equation holds if and only if $z'_R = \bar{z}_R$ and $X(z'_L) = \int_{\underline{z}_L}^{\bar{z}_L} v(|\chi_L^E(z_L) - x_R^E|)dF(z_L)$ to have $\Pi = V_R^E(\bar{z}_R)$. It means that when z'_R and z'_L goes to $\bar{z}_R$ and $\bar{z}_L$, $F(z'_R)$ goes to one.

When z'_L satisfies $|z'_L - x_m| = |z'_R - x_m|$, that is, $F(.)$ is symmetric for both candidates, the value of $X(z'_L)$ increases continuously (because $F(.)$ is continuous with connected support from Lemma 4) as z'_R (z'_L) becomes more extreme. Therefore, if the platform moves from $\underline{z_R}$ to $\bar{z}_R$, $F(z'_R)$ increases from zero to one. Thus, if $F(.)$ is symmetric for both candidates, $F_i(.)$ can be defined for $i = L, R$.

A.3.4 An Extreme Type Does Not Deviate

An extreme type does not deviate to a more moderate platform than $\underline{z_i}$ as the probability of winning is still one, but the cost of betrayal and the disutility following a win increase.

If an extreme type deviates to any platform that is more extreme than z_i^* or between z_i^* and $\bar{z}_i$, from Assumption 1, this candidate is certain to lose. Therefore, the expected utility is:

$$\begin{aligned} & -p^M v(|\chi_j^M(z_j^*) - x_i^E|) - \sigma^M(1-p^M)v(|\chi_j^E(z_j^*) - x_i^E|) \\ - \quad & (1-\sigma^M)(1-p^M)\int v(|\chi_j^E(z_j) - x_i^E|)dF(z_j). \end{aligned} \tag{21}$$

Subtracting (21) from $V_i^E(z_i^*)$ yields:

$$
\begin{aligned}
& -v(|\chi_i^E(z_i^*) - x_i^E|) - c(|\chi_i^E(z_i^*) - z_i^*|) + \frac{p^M}{p^M + \sigma^M(1-p^M)} v(|\chi_j^M(z_j^*) - x_i^E|) \\
+ \quad & \frac{\sigma^M(1-p^M)}{p^M + \sigma^M(1-p^M)} v(|\chi_j^E(z_j^*) - x_i^E|). \qquad (22)
\end{aligned}
$$

A moderate type is indifferent to winning and losing at z_i^*, that is, (4) holds. Thus, from Lemma 2, the value of (22) is positive, and this deviation decreases the expected utility. Note that, in this case, $q = \frac{p^M}{p^M + \sigma^M(1-p^M)}$.

A.3.5 A Moderate Type Does Not Deviate

I focus on R without loss of generality. When a moderate type chooses z_R^*, the expected utility is as follows:

$$
\begin{aligned}
& \frac{1}{2}\big[-p^M v(|\chi_L^M(z_L^*) - x_R^M|) - \sigma^M(1-p^M) v(|\chi_L^E(z_L^*) - x_R^M|) \\
- \quad & (p^M + \sigma^M(1-p^M))[v(|\chi_R^M(z_R^*) - x_R^M|) + c(|\chi_R^M(z_R^*) - z_R^*|)]\big] \\
- \quad & (1-\sigma^M)(1-p^M) \int_{\bar{z}_L}^{\underline{z}_L} v(|\chi_L^E(z_L) - x_R^M|) dF(z_L). \qquad (23)
\end{aligned}
$$

As a moderate type is indifferent between winning and losing at z_R^*, a moderate type is indifferent regarding whether to deviate to any platform that is more extreme than z_R^* or between z_R^* and $\bar{z}_R$. The second possible deviation involves deviating to any platform in $z_R' \in [\underline{z}_R, \bar{z}_R]$. For an extreme type, the candidate is indifferent between z_R^* and z_R'. It means that:

$$
\begin{aligned}
& (p^M + \sigma^M(1-p^M))(v(|\chi_R^E(z_R') - x_R^E|) + c(|\chi_R^E(z_R') - z_R'|)) \\
- \quad & \frac{1}{2}\Big[p^M v(|\chi_L^M(z_L^*) - x_R^E|) + \sigma^M(1-p^M) v(|\chi_L^E(z_L^*) - x_R^E|) \\
+ \quad & (p^M + \sigma^M(1-p^M))(v(|\chi_R^E(z_R^*) - x_R^E|) + c(|\chi_R^E(z_R^*) - z_R^*|))\Big] \\
= \quad & (1-\sigma^M)(1-p^M) \int_{\bar{z}_L}^{z_L'} v(|\chi_L^E(z_L) - x_R^E|) dF(z_L) \\
- \quad & (1-\sigma^M)(1-p^M)(1-F(z_L'))\big[v(|\chi_R^E(z_R') - x_R^E|) + c(|\chi_R^E(z_R') - z_R'|)\big]. \qquad (24)
\end{aligned}
$$

A moderate type has no incentive to deviate to z_i' if:

$$
\begin{aligned}
& (p^M+\sigma^M(1-p^M))(v(|\chi_R^M(z_R')-x_R^M|)+c(|\chi_R^M(z_R')-z_R'|)) \\
- & \frac{1}{2}\Big[p^M v(|\chi_L^M(z_L^*)-x_R^M|)+\sigma^M(1-p^M)v(|\chi_L^E(z_L^*)-x_R^M|) \\
+ & (p^M+\sigma^M(1-p^M))(v(|\chi_R^M(z_R^*)-x_R^M|)+c(|\chi_R^M(z_R^*)-z_R^*|))\Big] \\
> & (1-\sigma^M)(1-p^M)\int_{\bar{z}_L}^{z_L'} v(|\chi_L^E(z_L)-x_R^M|)dF(z_L) \\
- & (1-\sigma^M)(1-p^M)(1-F(z_L'))\big[v(|\chi_R^M(z_R')-x_R^M|)+c(|\chi_R^M(z_R')-z_R'|)\big]. \qquad (25)
\end{aligned}
$$

I ignore $(1-\sigma^M)(1-p^M)$ and differentiate the right-hand side of the above equations with respect to x_R^t to obtain $\int_{\bar{z}_L}^{z_L'} v'(|x_R^t-\chi_L^E(z_L)|)dF(z_L)-(1-F(z_R'))v'(|x_R^t-\chi_R^t(z_R')|)$. This is positive because the opposition's implemented policy is further from the ideal policy compared with z_R', so the right-hand side of (24) is higher than the right-hand side of (25). From (16), at $z_R'=\bar{z}_R$, the left-hand side of (24) is zero. From (4), the left-hand side of (25) is $(p^M+\sigma^M(1-p^M))(v(|\chi_R^M(z_R')-x_R^M|)+c(|\chi_R^M(z_R')-z_R'^M+\sigma^M(1-p^M))(v(|\chi_R^M(z_R^*)-x_R^M|)+c(|\chi_R^M(z_R^*)-z_R^*|))$, so it is positive as z_R' is smaller than z_R^*. I differentiate the left-hand side with respect to z_R'. Note that σ^M and z_R^* are already decided, so only z_R' changes. Then, $(p^M+\sigma^M(1-p^M))[-v'(|x_R^t-\chi_R^t(z_R')|)\dfrac{\partial\chi_R^t(z_R')}{\partial z_R'}+c'(|\chi_R^t(z_R')-z_R'|))\dfrac{\partial\chi_R^t(z_R')}{\partial z_R'}-c'(|\chi_R^t(z_R')-z_R'|)]$. I ignore $p^M+\sigma^M(1-p^M)$. From Lemma 1, it is negative, that is, $-v'(|x_R^t-\chi_R^t(z_R')|)<0$. This implies that if z_R' becomes smaller, then the left-hand sides of both equations increase. The next problem is the degree of an increase. Differentiating $-v'(|\chi_R^t(z_R')-x_R^t|)$ with respect to x_i^t yields:

$$
-v''(|x_R^t-\chi_R^t(z_R')|)(1-\frac{\partial\chi_R^t(z_R')}{\partial x_R^t}). \qquad (26)
$$

I differentiate (16) with respect to x_R^t, then $0<\dfrac{\partial\chi_R^t(z_R')}{\partial x_R^t}=\dfrac{v''c'}{v''c'+c''v'}<1$. Thus, the value of (26) is negative. This implies that if x_R^t is more extreme, the increase of the left-hand side is lower when z_R' becomes smaller. At $z_R'=\bar{z}_R$, the left-hand side of (24) is lower than the right-hand side of (25). If z_R' becomes more moderate, both left-hand sides increase, but an increase of (25) is higher than an increase of (24). As a result, for all z_R', the left-hand side of (24) is lower than the right-hand side of (25), so (25) is satisfied.

Finally, as a moderate type has no incentive to deviate to $\underline{z}_R$, a moderate type does not deviate to any policy that is more moderate than $\underline{z}_R$.

A.3.6 A Two-policy Semiseparating Equilibrium

When (18) does not hold, a two-policy semiseparating equilibrium exists. When an extreme type chooses z_i^*, the expected utility is $V_i^E(z_i^*)$, defined by (5). The expected utility when the candidate chooses $\bar{z}_i$ is $V_i^E(\bar{z}_i)$, defined by (6). When $\sigma^M = 1$, $V_i^E(\bar{z}_i)$ is higher than $V_i^E(z_i^*)$ as it is assumed that (3) holds. Assume $\bar{\sigma}^M$, which satisfies (16). If (18) does not hold, then $V_i^E(\bar{z}_i)$ is lower than $V_i^E(z_i^*)$ at $\bar{\sigma}^M$. When σ^M increases continuously from $\bar{\sigma}^M$, $V_i^E(\bar{z}_i)$ increases and $V_i^E(z_i^*)$ decreases continuously, so there exists a σ^M under which $V_i^E(\bar{z}_i) = V_i^E(z_i^*)$, and such σ^M should be higher than $\bar{\sigma}^M$.

The platform $\bar{z}_i$ should be such that $\chi_i^E(\bar{z}_i)$ is between $\chi_i^M(z_i^*)$ and $\chi_i^E(z_i^*)$ if $p^M > 0$ and $\sigma^M > 0$ because in this region, there exists a policy that voters prefer the expected implemented policy of a candidate with z_i^*. Thus, $\chi_i^E(\bar{z}_i)$ is more extreme than $\chi_i^M(z_i^*)$.

An extreme type does not deviate for the same reason as in Section A.3.4. If an extreme type deviates to any platform that is more moderate than $\bar{z}_i$, the expected utility changes by $\frac{(1-\sigma^M)(1-p^M)}{2}\left[v(|\chi_j^E(\bar{z}_j) - x_i^E|) - v(|\chi_i^E(\bar{z}_i) - x_i^E|) - c(|\chi_i^E(\bar{z}_i) - \bar{z}_i|)\right]$. This is negative because (18) does not hold.

A moderate type does not deviate to any policy that is more extreme than $\bar{z}_i$ for the same reason as in Section A.3.5. A moderate type does not deviate to $\bar{z}_i$ if:

$$\begin{aligned}
& (p^M + \sigma^M(1-p^M))[v(|\chi_i^M(\bar{z}_i) - x_i^M|) + c(|\chi_i^M(\bar{z}_i) - \bar{z}_i|) \\
- \; & v(|\chi_i^M(z_i^*) - x_i^M|) - c(|\chi_i^M(z_i^*) - z_i^*|)] \\
- \; & (1-\sigma^M)(1-p^M)\frac{1}{2}\Big[v(|\chi_j^E(\bar{z}_j) - x_i^M|) \\
- \; & v(|\chi_i^M(\bar{z}_i) - x_i^M|) - c(|\chi_i^M(\bar{z}_i) - \bar{z}_i|)\Big] > 0. \qquad (27)
\end{aligned}$$

As $\bar{z}_i$ is more moderate than z_i^*, $v(|\chi_i^M(\bar{z}_i) - x_i^M|) + c(|\chi_i^M(\bar{z}_i) - \bar{z}_i|) - v(|\chi_i^M(z_i^*) - x_i^M|) - c(|\chi_i^M(z_i^*) - z_i^*|)$ is positive. For an extreme type, $v(|\chi_j^E(\bar{z}_j) - x_i^E|) - v(|\chi_i^E(\bar{z}_i) - x_i^E|) - c(|\chi_i^E(\bar{z}_i) - \bar{z}_i|)$ is negative because (18) does not hold. As (13) in Section 2 is positive, its value for a moderate type is lower than for an extreme type, so $v(|\chi_j^E(\bar{z}_j) - x_i^M|) - v(|\chi_i^M(\bar{z}_i) - x_i^M|) - c(|\chi_i^M(\bar{z}_i) - \bar{z}_i|)$ is negative for a moderate type too. As a result, (27) is satisfied. In addition, a moderate type has no incentive to deviate to any policy that is more moderate than $\bar{z}_i$ because $v(|\chi_j^E(\bar{z}_j) - x_i^M|) - v(|\chi_i^M(\bar{z}_i) - x_i^M|) - c(|\chi_i^M(\bar{z}_i) - \bar{z}_i|)$ is negative.

A.3.7 Asymmetric Equilibrium

Does there exist an asymmetric equilibrium in which candidates choose asymmetric platforms or different values of σ^M or $F(.)$? First, suppose that the support of $F(.)$ is asymmetric. Then, the probability of winning is constant in some regions of the support for at least one candidate, and it cannot be an equilibrium for the reason explained in Lemma 4. As I showed in Section A.3.3, $F(.)$ must be symmetric in equilibrium when the support is symmetric. Second, suppose that moderate types' platforms are asymmetric. Note that a moderate type should be indifferent to winning or losing in equilibrium, so I assume that a moderate type is indifferent to winning or losing. Note also that z_i^* and z_j^* are symmetric, and Assumption 2 defines off-path beliefs, based on such z_i^*. If a moderate type announces a more extreme platform than z_i^*, an extreme type does not have an incentive to announce it and will announce a slightly more moderate platform than a moderate type's choice. The off-path beliefs are still p^M, so the probability of winning increases, and an extreme type still has an incentive to compromise when a moderate type is indifferent to winning and losing from Lemma 2. Assume that a moderate type does not announce a more extreme platform than z_i^*. A moderate type is indifferent to winning or losing at z_i^* so if a moderate type compromises more than z_i^* when a moderate-type opposition announces z_i^*, or a more moderate platform, it means that such a moderate type will deviate to lose from Lemma 2. Therefore, an asymmetric equilibrium does not exist with Assumption 2. $\square$

A.4 Lemma 5

To prove this, I show that as $x_R - x_L$ increases, $z_R - z_L$ decreases and $\chi_R(z_R) - \chi_L(z_L)$ increases, if the utilities when the candidate wins and the opposition wins are the same. The way to prove this is the same as explained in Lemma 2, except that (11) is replaced by $v(x_R + \chi_R - 2x_m) - v(x_R - \chi_R) = c(\chi_R - z_R(\chi_R))$, where $x_R - \chi_L = (x_R - x_m) + (\chi_R - x_m) = x_R + \chi_R - 2x_m$, because the platforms are symmetric. I differentiate both sides of (11) by x_R. Then, (13) is replaced by:

$$\frac{\partial \chi_R}{\partial x_R} = \frac{\frac{v''(x_R - \chi_R)c'(\chi_R - z_R(\chi_R))}{c''(\chi_R - z_R(\chi_R))} - (v'(x_R - \chi_L) - v'(x_R - \chi_R))}{v'(x_R - \chi_L) + v'(x_R - \chi_R)\frac{\partial z_R(\chi_R)}{\partial \chi_R}}. \tag{28}$$

For the same reason as explained in Lemma 2, it is positive. Moreover, the final equation of Lemma 2, $\frac{\partial z_R^t(\chi_R^t)}{\partial x_R^t} + \frac{\partial z_R^t(\chi_R^t)}{\partial \chi_R^t}\frac{\partial \chi_R^t}{\partial x_R^t}$, is replaced by:

$$-\frac{v''(x_R-\chi_R)c'(\chi_R-z_R(\chi_R))}{v'(x_R-\chi_R)c''(\chi_R-z_R(\chi_R))}+\frac{\frac{v''(x_R-\chi_R)c'(\chi_R-z_R(\chi_R))}{c''(\chi_R-z_R(\chi_R))}-(v'(x_R-\chi_L)-v'(x_R-\chi_R))}{v'(x_R-\chi_L)+v'(x_R-\chi_R)\frac{\partial z_R(\chi_R)}{\partial \chi_R}}\frac{\partial z_R(\chi_R)}{\partial \chi_R}. \tag{29}$$

Even though $v'(x_R - \chi_L)$ exists in the denominator, the value is still negative because the positive part of the above equation is still lower than the negative part. □

A.5 Proposition 3

Suppose there is a separating equilibrium where a moderate type wins against an extreme type. As I discussed, regardless of the off-path beliefs, an extreme type should announce $\hat{z}_i^E$ in a separating equilibrium where a moderate type wins. If a moderate type never announces a platform that is further from her ideal policy than $\hat{z}_i^E$, an extreme type has an incentive to mimic a moderate type to obtain a higher probability of winning, a lower cost of betrayal and a lower disutility following a win. Therefore, it is sufficient to show that a moderate type will announce a platform closer to her ideal policy than $\hat{z}_i^E$ in a separating equilibrium where a moderate type wins.

First, suppose z_R^M and z_L^M are symmetric, that is, $|z_R^M - z_m| = |x_m - z_L^M|$. If the symmetric separating equilibrium exists, the utility when the candidate i wins $(-v(|x_i^M - \chi_i^M(z_i^M)|) - c(|z_i^M - \chi_i^M(z_i^M)|))$ should be the same as or higher than the utility when a moderate-type opposition wins $(-v(|x_i^M - \chi_j^M(z_j^M)|))$. If not, the candidate has an incentive to lose, at least against the same-type opposition. This means that a moderate type never announces a platform further from her own ideal policy than $\hat{z}_i^M$. From Lemma 5, $\hat{z}_i^M$ is closer to the moderate type's own ideal policy than is $\hat{z}_i^E$.

Second, suppose that z_R^M and z_L^M are asymmetric. In this case, one moderate-type candidate wins against the moderate-type opposition with certainty. Without loss of generality, suppose that the moderate-type R wins against the moderate-type L, that is, $\chi_R^M(z_R^M) - x_m < x_m - \chi_L^M(z_L^M)$, and the moderate-type R wins against the extreme-type L. Note that extreme types announce symmetric platforms as they announce $\hat{z}_i^E$ if a separating equilibrium exists. Assume that z_R^M is further from the candidate's own ideal policy than $\hat{z}_R^E$ $(x_R^E - z_R^M > x_R^E - \hat{z}_R^E)$. I will show that this cannot be an equilibrium. There are three cases to illustrate this.

The first case is that the moderate-type L loses to or has the same probability of winning as the extreme-type R $(\chi_R^E(\hat{z}_R^E) - x_m \leq x_m - \chi_L^M(z_L^M))$. Regardless of off-path beliefs, if the moderate-type R's platform approaches $\hat{z}_R^E$, this moderate-type R can win against both moderate and extreme types of L, and the disutility following a win and the cost of betrayal decreases as the platform approaches her ideal policy. There exists such a platform as a policy space is continuous. Thus, z_R^M is never further from the candidate's own ideal policy than $\hat{z}_R^E$ in equilibrium.

The second case is that the moderate-type L wins against the extreme-type R ($\chi_R^E(\hat{z}_R^E) - x_m > x_m - \chi_L^M(z_L^M)$) when the moderate-type L announces a platform further from her own ideal policy than $\hat{z}_L^M$. From Lemma 5, if both moderate-type candidates announce platforms further from their ideal policies than $\hat{z}_i^M$, the utility when the candidate wins is lower than the utility when the moderate-type opposition wins for both moderate-type candidates. This means that the moderate-type R has an incentive to lose to the moderate-type L.

The final case is that the moderate-type L wins against the extreme-type R ($\chi_R^E(\hat{z}_R^E) - x_m > x_m - \chi_L^M(z_L^M)$) when the moderate-type L announces a platform that is the same as or closer to her own ideal policy than $\hat{z}_L^M$. If an extreme-type L deviates to a moderate-type L's platform (z_L^M), the extreme-type L can win against the extreme-type R with certainty and so gain a higher probability of winning. With this deviation, an extreme type can implement a policy closer to his ideal policy with a lower cost of betrayal as z_L^M is closer to his ideal policy than $\hat{z}_i^E$ from Lemma 5. Therefore, in this case, an extreme-type L always deviates to mimic a moderate-type L. $\square$

B A Separating Equilibrium

This appendix briefly explains two cases where a separating equilibrium may exist, and an extreme type wins against a moderate type with certainty.

First, depending on off-path beliefs other than Assumption 2, a separating equilibrium where an extreme type wins may exist. Assume that off-path beliefs are $p_i(M|z_i) = 0$ for any platform; that is, voters always surmise that a candidate is an extreme type. Suppose that an extreme type announces $\hat{z}_i^E$, and a moderate type announces $\hat{z}_i'$ such that a moderate type will implement more extreme policy than an extreme type, that is, $|x_m - \chi_i^E(\hat{z}_i^E)| < |x_m - \chi_i^M(\hat{z}_i')|$. Because of the above off-path beliefs, even though a moderate type approaches the median policy, voters think that this candidate is an extreme type. To increase the probability of winning, a moderate type needs to announce a platform that is very far from her ideal policy. This greatly increases the disutility following a win and the cost of betrayal, and may decrease the expected utility of a moderate type. In this case, a moderate type does not deviate from $\hat{z}_i'$. If $\chi_i^M(\hat{z}_i')$ is very far from the median policy, the expected utility decreases when an extreme type mimics a moderate type because the probability that the moderate-type opposition wins increases greatly. Therefore, an extreme type does not deviate either. As a result, there can be a separating equilibrium where an extreme type wins against a moderate type. Even though off-path beliefs $p_i(M|z_i)$ are higher than zero, when they are sufficiently small, a separating equilibrium where an extreme type wins exists.

Second, this paper assumes that $\dfrac{c'(d)}{c(d)}$ and $\dfrac{v'(d)}{v(d)}$ decrease as d increases, and one or all of them is strictly decreasing. If this assumption is not satisfied, a separating equilibrium may exist, and an extreme type always wins over a moderate type. This assumption is critical to derive Lemma 5. To be precise, the critical condition to derive Lemma 5 is (14). If the above assumption is satisfied, then (14) is also satisfied. If (14) is not satisfied, $\chi_R^E(\hat{z}_R^E) - \chi_L^E(\hat{z}_L^E) < \chi_R^M(\hat{z}_R^M) - \chi_L^M(\hat{z}_L^M)$ if the utilities when the candidate wins and when the same-type opposition wins are the same in a separating equilibrium. In other words, an extreme type will implement a more moderate policy than will a moderate type. The median voter prefers to choose an extreme type. A moderate type does not have an incentive to pretend to be extreme because a moderate type needs to more closely approach the median policy. She does not have such an incentive because the utility when the candidate wins becomes lower than the utility when the same-type opposition wins.

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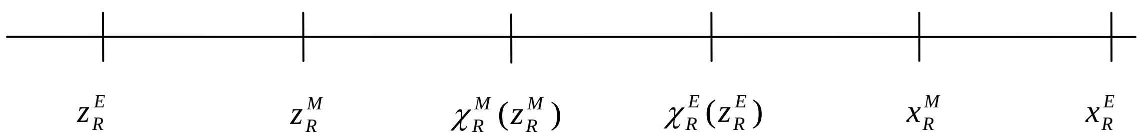


Figure 1: Lemma 2

The ideal policy is x_R^t. Suppose that the (expected) utilities when the candidate wins and the opposition wins are the same when both types of the opposition L announce the same platform. While an extreme type's implemented policy $\chi_R^E(z_R^E)$ is further from the median policy than a moderate type's policy $\chi_R^M(z_R^M)$, a moderate type's platform z_R^M is closer to the candidate's ideal policy than an extreme type's platform z_R^E.

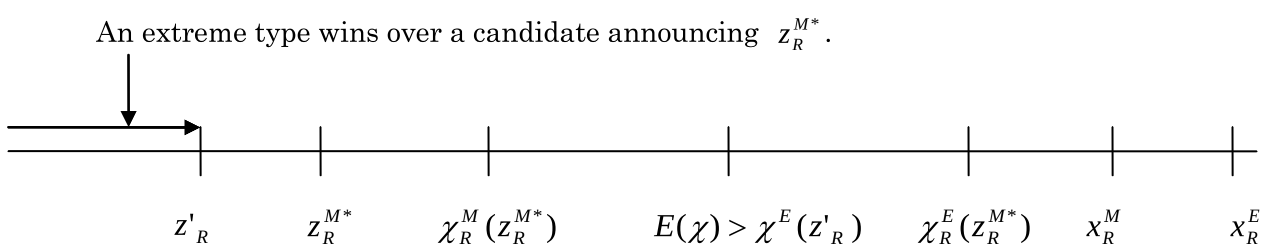
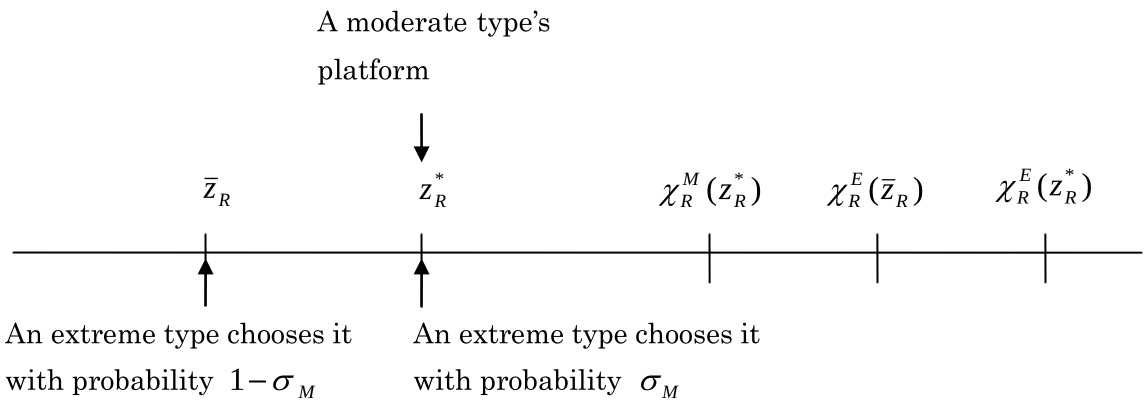
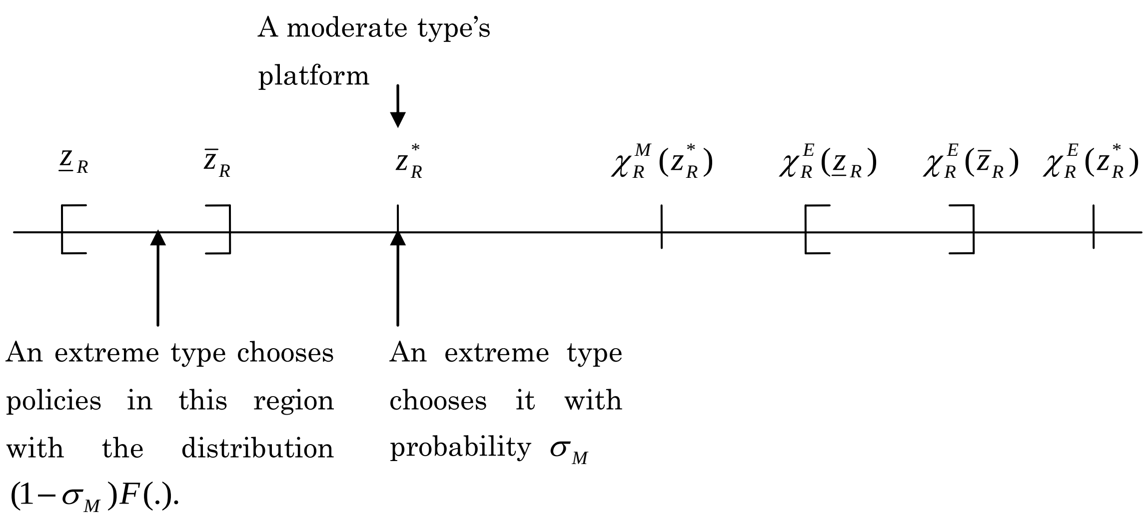


Figure 2: Pooling Equilibrium

The platform is z_R, the implemented policy is $\chi_R^t(z_R)$, and the ideal policy is x_R^t. Let $E(\chi) = p^M \chi_R^M(z_R^{M*}) + (1-p^M)\chi_R^E(z_R^{M*})$ denote the expected policy implemented by a party announcing z_R^{M*}. If an extreme type's platform is more moderate than z'_R, such an extreme type is more attractive to the median voter than a candidate with z_R^{M*}.



(a) A two-policy semiseparating equilibrium



(b) A continuous semiseparating equilibrium

Figure 3: Semiseparating Equilibrium

The platform is z_R, and the implemented policy is $\chi_R^t(z_R)$. A moderate type's platform is z_R^*. Voters prefer to choose an extreme type who compromises rather than a candidate announcing z_R^* when an extreme type announces $\bar{z}_R$ or a more moderate platform. A moderate type's implemented policy, $\chi_R^M(z_R^*)$, is more moderate than any extreme type's implemented policy. If an extreme type pretends to be moderate, this extreme type's implemented policy, $\chi_R^E(z_R^*)$, is more extreme than an implemented policy when an extreme type compromises, $[\chi_R^M(\underline{z}_R),\ \chi_R^M(\bar{z}_R)]$.

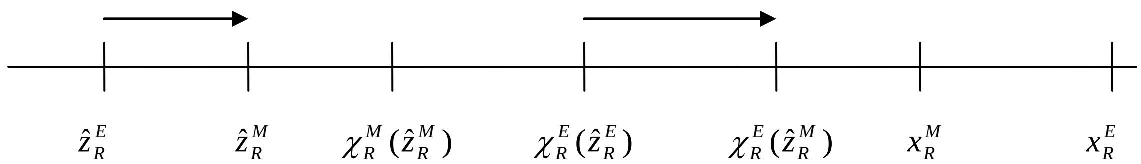


Figure 4: Separating Equilibrium

For a candidate of type *t*, the platform is $\hat{z}_R^t$, the implemented policy is $\chi_R^t(\hat{z}_R)$, and the ideal policy is x_R^t. An extreme type has an incentive to pretend to be moderate by choosing the moderate type's platform $\hat{z}_R^M$ because the probability of winning increases, and the implemented policy approaches the ideal policy (the implemented policy is $\chi_R^E(\hat{z}_R^M)$ when an extreme type announces $\hat{z}_R^M$).