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Campaign Promises vis-à-vis Cost of Betrayal

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Partially Binding Platforms: Campaign Promises vis-à-vis Cost of Betrayal

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Abstract

This study examines and models the effects of partially binding campaign platforms in a political competition. Here, a candidate who implements a policy that differs from the platform must pay a cost of betrayal, which increases with the size of the discrepancy. I also analyze endogenous decisions by citizens to run for an election. In particular, the model is able to show two implications that previous frameworks have had difficulty with. First, candidates with different characteristics have different probabilities of winning an election. Second, even knowing that he/she will lose an election, a candidate will still run, hoping to make an opponent's policy approach his/her own policy.

Keywords: political competition, endogenous candidates, campaign promises

JEL Classification Numbers: C72, D72

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1 Introduction

Before an election, candidates announce platforms, and the winner implements a policy after the election. Although politicians usually betray their platforms, such betrayal by the winner could prove costly. For example, in 1988 in the United States, George H. W. Bush promised, "read my lips, no new taxes," but he increased taxes after becoming the president. The media and voters marked this betrayal, and he lost the 1992 presidential election.[1] On the other hand, in his 1992 campaign, Bill Clinton promised to "end welfare as we know it." In the 1994 midterm election, the Republican Party gained a majority of seats in the House of Representatives. The Congress pressured Clinton to keep his platform, and hence, it became difficult for him to betray his platform, and he signed the welfare reform bill in 1996 (Weaver (2000) Ch. 5). Politicians decide policy on the basis of their platforms and the perceived cost of betrayal, and hence, platforms should be considered as partial commitment devices to restrict a candidate's future policy choice.

However, most studies in the literature do not consider platforms as a partial commitment device, and instead, introduce two polar assumptions about platforms. First, models with *completely binding platforms* suppose that a politician cannot implement any policy other than the platform. This is similar to the case in electoral competition models in the Downsian tradition.[2] Second, models with *nonbinding platforms* suppose that a politician can implement any policy freely without any cost. For example, this approach is taken in citizen-candidate models[3] and retrospective voting models.[4] Neither model captures how, for example, Bush betrayed his platform and was then punished for doing so by the electorate, or how Clinton kept his platform because of pressure from the Congress. To consider the effects of platforms on political competition, it is important to bridge these two settings; as Persson and Tabellini (2000) indicate, "(it) 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).

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

[2] Namely, models based on those proposed by Downs (1957) and Wittman (1973).

[3] For example, the models proposed by Osborne and Slivinski (1996) and Besley and Coate (1997).

[4] For example, the models proposed by Barro (1973) and Ferejohn (1986).

I build a model with *partially binding platforms*, which supposes that although a candidate can choose any policy, there is a cost for betrayal. The policy to be implemented is affected by, but may be different from, the platform because of a cost of betrayal that increases with the degree of betrayal. If politicians betray platforms, the people and media criticize them, they must address their electorate's complaints, their approval ratings may fall, and the possibility of them losing the next election might increase—as in the case of Bush.[5] A stronger party or the Congress may discipline such politicians, as in the case of Clinton.[6] On the basis of such costs of betrayal and the platform, the winner decides on the policy to be implemented after the election. This paper considers a model of political competition with a one-dimensional policy space. One candidate prefers to implement a policy to the left of the median voter's ideal policy, and the other candidate, to the right. Candidates announce their platforms before the election, and the winner chooses a policy to be implemented after the election. Politicians care about (1) the probability of winning; (2) the policy to be implemented; and (3) the cost of betrayal. I also analyze citizens' endogenous decisions to run on the basis of a simplified version of the citizen-candidate model.

Partially binding platforms can explain the following observations from real elections, which cannot be explained by the models of completely binding or nonbinding platforms. Usually, in real elections, candidates have asymmetric characteristics; for example, their preferences and costs differ, and their ideal policies are not equidistant from that of the median voter. Moreover, we frequently observe asymmetric outcomes, where one candidate has a higher probability of winning than the other. It seems that some candidates avoid compromising on their principles to please voters and accept a lower probability of winning than their opponent, even though their probability of winning would be higher on compromising. There are two aspects of such observations, which cannot be explained by using previous

[5] Some papers show the relationship between the media and the credible commitment of politicians. Reinikka and Svensson (2005) study the newspaper campaign in Uganda and show that it reduces corruption. Djakov et al. (2003) empirically show that policymaking is distorted if the media is owned by the government.

[6] Cox and McCubbins (1994) and Aldrich (1995) emphasize this point from the historical aspects of American parties. Snyder and Groseclose (2000) and McCarty et al. (2001) empirically show that there are various party disciplines in the US Congress. McGillivray (1997) compares high and low disciplines in trade policies.

frameworks.

First, it is difficult to show asymmetric electoral outcomes in previous frameworks. In the model of completely binding platforms, both candidates propose the median voter's ideal policy, regardless of characteristics, and hence, have the same probability (50%) of winning.[7] In the models of nonbinding platforms, voters expect candidates' ideal policies to be implemented if they win. Then, only the candidate whose ideal policy is closer to the median policy can win, and any other characteristic does not affect the electoral outcome. On the other hand, in the model of partially binding platforms, candidates with asymmetric characteristics can and will choose different platforms and policies to be implemented, since if their characteristics differ, one candidate may have a greater incentive to win—and would actually win—the election. It induces an asymmetric outcome to an election. This paper shows that an electoral outcome is asymmetric in equilibrium when two candidates have different characteristics. Additionally, this paper proposes a method to derive the winner and analyzes three examples using this method. First, a more moderate candidate whose ideal policy is closer to the median policy wins against a more extreme candidate (Corollary 4). Although this implication is the same as in the models of nonbinding platforms, this outcome is derived endogenously and not exogenously as in those models. Second, if a candidate's cost of betrayal is higher than that of the opponent with the *same degree of betrayal*,[8] the former candidate wins (Corollary 5). If the cost is lower with the same degree of betrayal, a candidate will betray his/her platform more severely such that the *realized* cost of betrayal is higher, and hence, this candidate has a lower incentive to win. Third, a less policy-motivated candidate wins against a more policy-motivated candidate (Corollary 6).

The second aspect is that in existing frameworks, it is also difficult to explain why a

[7] If uncertainty about preference of voters is introduced, although the two parties may not choose the median policy, the electoral outcome will be symmetric.

[8] To be precise, suppose that the function of the cost of betrayal is $\lambda c(d)$, where d is the distance between a platform and a policy; then, the former candidate has a higher λ. For example, unlike young politicians, some senior politicians may not be as concerned about future elections or their party's discipline. In addition, if the media supports one candidate, this candidate's betrayal may not be announced to the public, in which case, the cost of betrayal would be low for such candidates.

candidate runs even though he/she may lose in a two-candidate model. In the models of completely binding platforms, both candidates have an equal probability of winning, and hence, an explicit loser does not exist. In the models of non-binding platforms, the winner will implement his/her ideal policy after election, which means that the loser's decision to run does not affect the winner's policy. Thus, the loser does not have any reason to run. On the other hand, the model of partially binding platforms used in this paper shows that even though a candidate is aware that he/she will lose, he/she may not deviate by withdrawing and runs in order to induce the opponent to approach the median policy and thus the loser's ideal policy. For example, in the US 2010 preliminary election of the Republican Party, one purpose of the Tea party-endorsed candidates was to induce Republican candidates or officeholders to be more conservative, which they succeeded in doing (Skocpol and Williamson (2012)). To my knowledge, this paper is the first to show that the loser runs even in a one-shot two-candidate competition. In obtaining this implication, the concept of partial bindingness is critical since the loser can change the winner's policy by entering the race.

1.1 Related Literature

Osborne and Slivinski (1996) give a reason why some candidates run for election even though they might lose. They assume nonbinding platforms, and hence, a candidate cannot induce the opponent to compromise more, because the policy to be implemented is given as an ideal policy. Thus, the reason a candidate runs to lose is different in their study and my paper. According to Osborne and Slivinski (1996), the loser runs to change the identity of the winner, that is, to decrease an undesirable candidate's probability of winning. On the other hand, in my paper, the loser runs to induce the winner to approach the loser's ideal policy. Moreover, in Osborne and Slivinski (1996), a candidate who runs and is certain to lose never appears in a two-candidate competition.[9]

Some previous studies have considered an idea similar to the cost of betrayal. In particular, Banks (1990) and Callander and Wilkie (2007) show that a platform can signal a policy

[9] Wada (1996, Ch. 2) also shows that some candidates may run even though they will lose, by using a different model framework. Ishihara's (2013) result on using a repeated two-candidate competition model is similar to that of my study, which analyzes a one-shot game.

to be implemented. However, there are two important differences between my paper and theirs. First, in their papers, candidates automatically implement their own ideal policies after an election. However, if there is a cost of betrayal, a rational candidate would wish to adjust the policy to be implemented to reduce the cost after an election. Second, Banks (1990) and Callander and Wilkie (2007) consider that candidates care about policy only when they win—their utility is set to zero when they lose, regardless of what policy their opponent implements. However, *policy-motivated* candidates should care about policy when they lose.[10]

I relax these assumptions and make more reasonable ones by examining rational choices regarding a policy to be implemented and candidates who care about policy regardless of election results. These two differences are critical to obtaining my result. First, if candidates implement their own ideal policies automatically, it is impossible to induce the opponent to approach the median policy. Thus, for the loser, there is no way to change the opponent's policy. Second, if a candidate does not care about policy when he/she loses, the loser does not have an incentive to change the opponent's policy, because his/her utility is zero regardless of the opponent's policy to be implemented. Thus, these two differences give a *way* and an *incentive* to induce the opponent to approach the median policy, and thus, the loser's ideal policy.[11]

Few previous papers consider platforms as a partial commitment device. Austen-Smith and Banks (1989) consider a two-period game based on a retrospective voting model in which the probability of winning in the next election decreases if office-motivated candidates betray the platform. Grossman and Helpman (2005, 2008) 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

[10] Huang (2010) shows a model in which candidates strategically choose both a platform and a policy to be implemented, but do not care about policy when they lose.

[11] Note that they introduce asymmetric information whereas my model has complete information. Other papers also consider that a completely binding platform is a signal for the functioning of the economy (Schulz (1996)), the candidate's degree of honesty (Kartik and McAfee (2007)), and a political motivation (Callander (2008)). Asako (2012) analyzes partially binding platforms having asymmetric information about the positions of candidates' ideal policies.

punishes them. On the other hand, my model is based on the prospective-voting and two-candidate competition models, and assumes that candidates who are policy motivated decide on both a platform and a policy.[12]

Finally, this paper also relates to "valence." Several past studies consider the effects of a candidate's character or personality as indicated by Stokes (1963) as valence, and show an asymmetric probability of winning in a political competition.[13] These past studies assume that the valence of a candidate is given exogenously, and voters care not only about the policy but also about the valence, and suggest that therefore, such an advantaged candidate with a good valence has a higher probability of winning an election. On the other hand, my paper derives an asymmetric probability of winning endogenously.

The rest of this paper is organized as follows. Section 2 presents the model, and Section 3 analyzes the equilibrium of political competition, given two candidates. Section 4 analyzes the endogenous decision to run, and Section 5 concludes.

2 Setting

In this model, the policy space is $\Re$. There is a continuum of voters, and their ideal policies are distributed on some interval of $\Re$. This distribution function is continuous and strictly increasing, which means there exists a unique median voter's ideal policy (the median policy), x_m. Then, assume that this distribution is symmetric and single-peaked about x_m.

Suppose there are two potential candidates, and each decides whether to run for office.[14]

[12] Austen-Smith and Banks (1989) consider only a decrease in the probability of winning as the cost of betrayal, and Grossman and Helpman (2005, 2008) consider only a party's discipline as the cost of betrayal. However, as indicated, the cost of betrayal in this paper also includes many types of costs such as a decrease in approval ratings or a negotiation cost with the Congress; therefore, I include these in the current term as the cost of betrayal.

[13] Namely, Ansolabehere and Snyder (2000), Groseclose (2001), Aragones and Palfrey (2002), Kartik and McAfee (2007), and Callander (2008).

[14] When three or more candidates run, it is well known that there are many equilibria in a multi-candidate competition, assuming completely binding platforms (see Adams, Merrill III, and Grofman (2005)). Such problems arise even when analyzing partially binding platforms. Moreover, in past studies based on a citizen-candidate framework, equilibria tended to feature one or two candidates only. Thus, we consider just two

Denote x_i as the ideal policy of potential candidate (or voter) i. If a candidate wins, he/she will obtain a benefit from holding office, $b > 0$, which is not related to the ideal policy. However, candidates do have to pay a cost for running, $k > 0$.

In the second period, each candidate announces a platform, denoted by $z_i \in \Re$. On observing the available platforms, voters can ascertain correctly the policy to be implemented by each candidate, since they have complete information. Based on the (expected) policy to be implemented, all voters cast their votes according to the plurality rule; that is, the candidate with the most votes wins. Note that voting is sincere. I rule out weakly dominated voting strategies. In the last period, the winning candidate, i, decides on the actual policy to be implemented, denoted by χ_i.

The voter and candidate experience a disutility if the implemented policy differs from their ideal policy. In line with Calvert's (1985) study, this disutility is represented by $-\beta u(|\chi - x_i|)$, where χ represents the policy implemented by the winner. Assume that $u(.)$ satisfies $u(0) = 0$, $u'(d) > 0$, and $u''(d) \geq 0$ when $d > 0$. The level of political motivation is $\beta \in (0, \infty)$, in which a higher or lower β means a candidate is more policy motivated or more office motivated, respectively. Without loss of generality, for now, I assume $\beta = 1$ for both candidates. I discuss the case in which candidates have different β values later.

If the implemented policy is not the same as that of the platform, the winning candidate incurs a cost of betrayal. The function describing this cost is $\lambda c(|z_i - \chi_i|)$. Assume that $c(.)$ satisfies $c(0) = 0$, $c'(0) = 0$, $c'(d) > 0$, and $c''(d) > 0$ when $d > 0$. Here, $\lambda > 0$ represents the relative importance of betrayal. In the last period, the winning candidate chooses a policy that maximizes $-u(|\chi - x_i|) - \lambda c(|z_i - \chi|)$. Denote $\chi_i(z_i) = argmax_\chi\ -u(|\chi - x_i|) - \lambda c(|z_i - \chi|)$. Therefore, if the candidate runs and wins, the utility is $-u(|\chi_i(z_i) - x_i|) - \lambda c(|z_i - \chi_i(z_i)|) + b - k$. If the candidate runs but loses, the utility is $-u(|\chi - x_i|) - k$. I assume $b > k$. In other words, potential candidates have an incentive to run if they will definitely win by announcing their ideal policy as their platform (i.e., $z_i = x_i = \chi_i(z_i)$ and $-u(|x_i - x_i|) - \lambda c(|x_i - x_i|) = 0$). Furthermore, assume that if no candidate enters the election, all obtain a payoff of $-\infty$, as in Osborne and Slivinski's (1996) study. Since I assume $b > k$, even if a status-quo policy is introduced, at least one candidate will enter the race. Hence, the position of a status-quo

potential candidates to simplify the analysis.

policy does not matter.

The equilibrium concept is a subgame perfect Nash equilibrium. I restrict the analysis to a pure strategy equilibrium. I also concentrate on the typical case in which one candidate's ideal policy is to the left of the median policy, x_m, while that of the other candidate is to the right. Here, the candidate whose ideal policy is to the left of the median policy is denoted as candidate L, and the other is candidate R (i.e., $x_L < x_m < x_R$). In summary, the timing of events is as follows.

1. Two potential candidates decide whether to run. If no candidate enters the election, all voters and potential candidates obtain a payoff of $-\infty$.

2. The candidates who decide to run announce their platforms.

3. Voters vote. The candidate with the most votes wins. If only one candidate runs, this candidate wins with a probability of 1.

4. The winning candidate chooses the policy to be implemented.

3 Political Competition

This section analyzes the scenario after period 2, that is, the no-entry model in which the two potential candidates have already decided to run. I ignore the cost of running because it is a sunk cost at this stage.

3.1 Policy and its Convergence to the Median Policy

In the last period, the winning candidate implements the policy that maximizes the utility after a win, $-u(|\chi_i(z_i) - x_i|) - \lambda c(|z_i - \chi_i(z_i)|)$, given z_i.

Lemma 1 *Consider that $u''(d) > 0$, for any $d > 0$. In equilibrium, $\chi_i(z_i)$ satisfies*

$$\lambda = \frac{u'(|\chi_i(z_i) - x_i|)}{c'(|z_i - \chi_i(z_i)|)}, \tag{1}$$

given $z_i \neq x_i$. If λ goes to infinity, $\chi_i(z_i)$ converges to z_i. If λ goes to zero, $\chi_i(z_i)$ converges to x_i.

The policy to be implemented will lie somewhere between the platform policy and the ideal policy, as shown in Figure 1. When λ increases, the policy the winning candidate chooses to implement approaches the platform policy. Similarly, when λ decreases, the implemented policy approaches the ideal policy. If the policy a candidate chooses to implement lies closer to the median policy than that of the opponent, this candidate is certain to win.

[Figure 1 here]

There are three additional implications. First, if the disutility function is linear, given platform z_i, the winner may prefer to implement x_i rather than $\chi_i(z_i)$, which satisfies (1). Here, I denote $u'(d) = \overline{u} > 0$, which is constant for all $d \geq 0$ because $u(.)$ is a linear function.

Corollary 1 *Consider that $u''(d) = 0$, for all $d \geq 0$. Then, given $z_i \neq x_i$, if λ is sufficiently low such that $\lambda < \overline{u}/c'(|z_i - x_i|)$, the winner implements x_i. Otherwise, the winner implements $\chi_i(z_i)$, which satisfies (1).*

Proof See Appendix A.1.

However, a candidate never chooses $z_i \neq x_i$ and $\chi_i(z_i) = x_i$ in equilibrium. This is because, in committing to x_i, it is better to choose $z_i = \chi_i(z_i) = x_i$, as there is then no need to pay the cost of betrayal. Thus, if a decision on z_i is included in the analyses, then in equilibrium, a candidate will either choose $\chi_i(z_i)$, which satisfies (1), or $z_i = \chi_i(z_i) = x_i$, as Corollary 3 shows. Thus, this boundary case is trivial.

Second, if a candidate's platform approaches his/her own ideal policy, the cost of betrayal and the disutility from winning decreases. In other words, if a candidate compromises more toward the median voter, his/her expected utility from winning decreases.

Corollary 2 *As z_i approaches x_i, $u(|\chi_i(z_i) - x_i|)$ and $c(|z_i - \chi_i(z_i)|)$ decrease.*

Proof See Appendix A.2.

Third, if the benefit from holding office b is very large, candidates are less concerned about the cost of betrayal, and hence, the policies they choose to implement converge to the median policy. That is, both candidates will implement the median policy, as in the basic Downsian model. Denote $z_i(\chi) = \chi_i^{-1}(\chi)$, such that candidate i implements χ when he/she announces platform $z_i(\chi)$ where $z_i(\chi) \neq \chi$.

Lemma 2 *If $b > \lambda c(|z_i(x_m) - x_m|)$, for both $i = L$ and R, both candidates announce $z_i(x_m)$ and implement x_m in equilibrium.*

Proof See Appendix A.3.

This result is less interesting, and hence, I assume that at least one candidate has $b < \lambda c(|z_i(x_m) - x_m|)$, in what follows. Note that with asymmetric characteristics, even if one candidate, i, has $b \geq \lambda_i c(|z_i(x_m) - x_m|)$, he/she may not commit to implementing the median policy when the other candidate, j, has $b < \lambda_j c(|z_i(x_m) - x_m|)$ because i can win even if i's policy does not converge to the median policy.

3.2 Candidates with Symmetric Characteristics

This subsection analyzes two candidates who have symmetric cost and disutility functions and whose ideal policies are equidistant from the median policy, $x_m - x_L = x_R - x_m$.

3.2.1 Platforms

First, the policies candidates choose to implement never overlap, and they also never choose a policy that is more extreme than their own ideal policy.

Lemma 3 *In equilibrium, the pair of platforms, $\{z_L, z_R\}$, satisfies $x_L \leq \chi_L(z_L) \leq x_m \leq \chi_R(z_R) \leq x_R$, where $x_L < x_m < x_R$.*

Proof See Appendix A.4.

However, there is a possibility that candidates' platforms may encroach on the opponent's side of the policy space (i.e., $z_R < x_m < z_L$), which I do allow for. See Appendix B.1 for more details.

When candidate i wins, the utility of i is $-u(|\chi_i(z_i) - x_i|) - \lambda c(|z_i - \chi_i(z_i)|) + b$. When opponent j wins, the utility of i is $-u(|\chi_j(z_j) - x_i|)$. In equilibrium, these two utilities must be the same.

Proposition 1 *Suppose $u''(d) > 0$, for any $d > 0$. Suppose also that two symmetric candidates choose to run. The pair of platforms, $\{z_L, z_R\}$, is an equilibrium strategy if and only* *if*

$$-u(|\chi_i(z_i) - x_i|) - \lambda c(|z_i - \chi_i(z_i)|) + b = -u(|\chi_j(z_j) - x_i|), \tag{2}$$

for $i, j = L, R$ *and* $i \neq j$. *Such an equilibrium strategy exists, and is symmetric and unique.*

Proof See Appendix A.5.

The main idea of the proof is as follows. When two candidates will tie, if $-u(|\chi_i(z_i) - x_i|) - \lambda c(|z_i - \chi_i(z_i)|) + b > -u(|\chi_j(z_j) - x_i|)$, each candidate prefers to be certain of winning because his/her utility will be higher than when the opponent wins. If a candidate approaches x_m, he/she is certain of winning. Therefore, the candidate will deviate in this direction. If $-u(|\chi_i(z_i) - x_i|) - \lambda c(|z_i - \chi_i(z_i)|) + b < -u(|\chi_j(z_j) - x_i|)$, the candidate would actually prefer the opponent to win. In this case, the candidate deviates away from x_m, and so is certain to lose. I assume $b < \lambda c(|z_i(x_m) - x_m|)$, and hence, $\chi_i(z_i)$ and $\chi_j(z_j)$ should diverge to satisfy equation (2).

On the other hand, if the disutility function is linear, and $x_R - x_L$ is quite small, a candidate does not mind if the opponent wins, because the opponent's ideal policy is similar to his/her own ideal policy. Therefore, the candidates may prefer to stay with their ideal policies.

Corollary 3 *Consider that* $u''(d) = 0$*, for all* $d \geq 0$*. Then, if* $(u(x_R - x_L) - b)/2 < \lambda c(|z_i(x_i) - x_i|)$*, the candidates choose* $z_i = x_i = \chi_i(x_i)$ *in equilibrium. Otherwise, the candidates choose* $\{z_L, z_R\}$*, which satisfies (2).*

Proof See Appendix A.6.

3.2.2 Comparative Statistics: Cost of Betrayal

Suppose the following assumption.

Assumption 1 $c'(d)/c(d)$ *strictly decreases with* d*, and goes to infinity as* d *goes to zero.*

This assumption means that the relative marginal cost decreases as $|z_i - \chi_i|$ increases. For example, if the function is monomial, this assumption holds, and will be satisfied by many polynomial functions. Therefore, this assumption is quite weak.

This subsection shows the comparative statistics of the relative importance of betrayal, λ. To commit to implementing the same policy, a candidate needs to pay a larger cost of betrayal when λ decreases.

Proposition 2 *Suppose Assumption 1 holds. Suppose also that two symmetric candidates choose to run. Then, the realized cost of betrayal, $\lambda c(|z_i - \chi_i(z_i)|)$, decreases with λ, given the policy to be implemented. The realized cost of betrayal goes to zero as λ goes to infinity, and the candidates' policies and platforms converge to x_m.*

Proof See Appendix A.7.

Note that, with complete information, voters can correctly guess the policy a candidate will implement by observing the announced platform. Thus, to win the election, the position of the policy that will be implemented is more important than the position of the platform. This is the reason I investigate the realized cost of betrayal given the policy to be implemented (i.e., the electoral outcome).[15]

When λ increases, a candidate does not want to betray the platform. Therefore, $|z_i - \chi_i(z_i)|$ and $c(|z_i - \chi_i(z_i)|)$ decrease, and the decrease in $c(|z_i - \chi_i(z_i)|)$ is faster than the increase in λ. As a result, $\lambda c(|z_i - \chi_i(z_i)|)$ decreases with λ. When $\lambda c(|z_i - \chi_i(z_i)|)$ goes to zero, $b > \lambda c(|z_i(x_m) - x_m|)$ since $b > 0$. From Lemma 2, both candidates will implement x_m. Therefore, if λ reaches infinity, the two candidates converge to the median policy, as in the case of completely binding platforms. However, when $\lambda < \infty$, they prefer to diverge. As λ goes to zero, the policy the candidates would choose to implement converges to their respective ideal policies.[16] Therefore, completely binding and nonbinding platforms

[15] By using one more assumption, the following implication is obtained. To announce the same campaign platform (instead of the same implemented policy), a candidate also needs to pay a larger cost of betrayal when λ decreases, if $u''(.) = 0$ or λ is sufficiently large with $u''(d) > 0$, for $d > 0$. However, if λ is small, the implication becomes the inverse of that just described if $u''(d) > 0$. Here, a change in λ induces a change in the policy to be implemented, which also induces a change in disutility. As a result of this effect, the implication may change, depending on λ. However, if the policy to be implemented changes, the electoral outcome may also change. Thus, it is appropriate to fix the implemented policy to analyze the effect of λ, given the electoral outcome. The details are discussed in Appendix B.2.

[16] If $u(.)$ is linear and λ is sufficiently low, a candidate promises the ideal policy as a platform from Corollary 3.

are extreme cases of partially binding platforms.

3.3 Candidates with Asymmetric Characteristics

3.3.1 Equilibrium

This section shows that the model of partially binding platforms can predict the winner when candidates have asymmetric characteristics (such as having asymmetric ideal policies, λ and β). This section also shows the basic method for deriving a winner.

I denote

$$\Psi_i(z_i, z_j) \equiv -u(|\chi_i(z_i) - x_i|) - \lambda c(|z_i - \chi_i(z_i)|) - (-u(|\chi_j(z_j) - x_i|)).$$

That is, $\Psi_i(z_i, z_j)$ refers to the difference between the utility of candidate i when candidate i wins $(-u(|\chi_i(z_i) - x_i|) - \lambda c(|z_i - \chi_i(z_i)|))$ and the utility of i when the opponent, j, wins $(-u(|\chi_j(z_j) - x_i|))$, ignoring the fixed values, b and k. When the candidates tie, a candidate will want to make ensure its win by approaching the median policy if $\Psi_i(z_i, z_j) + b > 0$, but will want to lose if $\Psi_i(z_i, z_j) + b < 0$. The candidate with the higher $\Psi_i(z_i, z_j)$ has the greater incentive to win. Therefore, $\Psi_i(z_i, z_j)$ refers to the *degree of incentive to win*.

I also denote

$$d_i \equiv |\chi_i(z_i) - x_m| \text{ such that } \Psi_i(z_i, z_j) + b = 0 \text{ and } |\chi_i(z_i) - x_m| = |\chi_j(z_j) - x_m| \qquad (3)$$

when $b < \lambda c(|z_i(x_m) - x_m|)$. That is, candidate i is indifferent between winning and losing when the opponent's policy is equidistant from x_m as the own policy, and this distance is d_i. When $b \geq \lambda c(|z_i(x_m) - x_m|)$, since a candidate has an incentive to commit to implement x_m, $\Psi_i(z_i, z_j) + b > 0$ for all symmetric pairs of $\chi_i(z_i)$ and $\chi_j(z_j)$ $(\Psi_i(z_i(x_m), z_j(x_m)) + b \geq 0)$. In this case, suppose that $d_i = 0$. From Corollary 2 and Proposition 1, (i) $\Psi_i(z_i, z_j) + b > 0$ if $|\chi_i(z_i) - x_m| = |\chi_j(z_j) - x_m| > d_i$, (ii) $\Psi_i(z_i, z_j) + b < 0$ if $|\chi_i(z_i) - x_m| = |\chi_j(z_j) - x_m| < d_i$ (and $d_i > 0$), and (iii) the value of d_i is uniquely determined. In words, if the distance between $\chi_i(z_i)$ and x_m ($\chi_j(z_j)$ and x_m) is longer than d_i, i has an incentive to win while i does not have such an incentive if this distance is shorter than d_i. Then, suppose $d_i < d_j$, that is candidate i has an incentive to commit to a more moderate policy in the event of a tie with $\Psi_j(z_j, z_i)+b=0$. In this situation, the following proposition shows that candidate i announces a platform such that the policy he/she will choose to implement is slightly closer to the median policy than that of j, ensuring that, in equilibrium, i will win.

One technical issue is that equilibrium may not exist in a deterministic model with a continuous policy space. Suppose L wins with certainty; that is, L commits to $|\chi_L(z_L)-x_m| < |\chi_R(z_R)-x_m|$, a more moderate policy than that of R. In this case, L prefers to move to a more extreme policy such that L would still win against R, but the policy L would implement would be closer to his/her ideal policy. Note that such a policy exists because the policy space is continuous.

On the other hand, if a discrete policy space is introduced in the above case, L may not be able to find such a policy. Suppose we have a grid of evenly spaced policies. The distance between sequential policies is $\epsilon > 0$. The other settings remain the same. Note that the purpose of introducing a discrete policy space is to ensure equilibrium, not to show new implications from a discrete case. Thus, assume that ϵ is a very small value so that the situation is almost the same as that of a continuous policy space.[17] In the following, I assume such a discrete policy space.

Proposition 3 *Consider a case of discrete policy space. Suppose $d_i < d_j$. Then, there exists an equilibrium, and the pair of platforms $\{z_i, z_j\}$ is an equilibrium strategy if and only if*

$$\begin{aligned} \Psi_i(z_i, z_j)+b &> 0 \text{ and } \Psi_j(z_j, z_i)+b \leq 0 \text{ or} \\ \Psi_i(z_i, z_j)+b &\geq 0 \text{ and } \Psi_j(z_j, z_i)+b < 0, \end{aligned} \tag{4}$$

where $\chi_i(z_i)$ is closer to x_m than $\chi_j(z_j)$ by ϵ; that is, $\chi_L(z_L) = x_m - (\chi_R(z_R) - x_m) + \epsilon$ if $i = L$, and $\chi_R(z_R) = x_m + (x_m - \chi_L(z_L)) - \epsilon$ if $i = R$. In equilibrium, i is certain to win, and hence, there is no equilibrium in which both candidates have the same probability of winning.

Proof See Appendix A.8.

The intuition is as follows. Suppose that candidate i has a greater incentive to approach x_m than opponent j when they tie with $\Psi_j(z_j, z_i)+b=0$ ($d_i < d_j$). Then, a pair of platforms

[17] In particular, assume that there exist discrete policies, χ_i and χ_j, such that $\Psi_i(z_i, z_j)+b=0$ and $|\chi_i - x_m| = |\chi_j - x_m|$, for $i = L$ and R, and $i \neq j$. Therefore, d_i exists, as defined by (3).

exists, $\{z_i, z_j\}$, such that the policies each will choose to implement are equidistant from the median policy ($|\chi_i(z_i) - x_m| = |\chi_j(z_j) - x_m|$), and candidate j has an incentive to lose ($\Psi_j(z_j, z_i) + b < 0$), while candidate i has an incentive to win ($\Psi_i(z_i, z_j) + b > 0$). In equilibrium, candidate i announces such a platform, while candidate j announces a slightly more extreme platform than that of i (by ϵ) and so chooses to lose. Figure 2 shows the policies to be implemented, given such platforms.

[Figure 2 here]

Note that in this equilibrium, i wins, and j loses with certainty. There does not exist any equilibrium where a candidate's probability of winning is less than 1 and more than 0. Note also that since the policy implemented by the winner is only slightly (ϵ) closer to the median policy than that of the loser, vote shares between the two candidates are very close to 50%.

Equilibrium satisfies $\Psi_i(z_i, z_j) + b > 0$ and $\Psi_j(z_j, z_i) + b \leq 0$, or $\Psi_i(z_i, z_j) + b \geq 0$ and $\Psi_j(z_j, z_i) + b < 0$. As a result, multiple equilibria exist. Denote $\overline{z}_i$ as the most extreme platform of i, and $\underline{z}_i$ as the most moderate platform of i among all possible equilibrium platforms. More precisely, $\overline{z}_i$ satisfies $\Psi_j(\overline{z}_j, \overline{z}_i) + b = 0$ where $|\chi_i(\overline{z}_i) - x_m| = |\chi_j(\overline{z}_j) - x_m|$, and $\underline{z}_i$ satisfies $\Psi_i(\underline{z}_i, \underline{z}_j) + b = 0$ where $|\chi_i(\underline{z}_i) - x_m| = |\chi_j(\underline{z}_j) - x_m|$ if $b < \lambda_i c(|z_i(x_m) - x_m|)$. If $b \geq \lambda_i c(|z_i(x_m) - x_m|)$, $\underline{z}_i = z_i(x_m)$, which is the platform committing to implement the median policy. Any platform between $\overline{z}_i$ and $\underline{z}_i$ can be an equilibrium strategy of the winner i. Figure 2 also shows the positions of $\chi_i(\overline{z}_i)$ and $\chi_i(\underline{z}_i)$.

3.3.2 Winner of an Asymmetric Election

From Proposition 3, if candidate i has a greater incentive to approach x_m (i.e., $\Psi_i(z_i, z_j)$ is greater than $\Psi_j(z_j, z_i)$ in the event of a tie with $\Psi_j(z_j, z_i) + b = 0$), then, in equilibrium, candidate i always wins. This implies that to find the winner of an asymmetric election, it is sufficient to compare candidates' degrees of incentive to win. This can be given as follows.

In order to prove that i wins against j, assume that the policies each would implement are initially fixed at symmetric positions (i.e., $|\chi_i(z_i) - x_m| = |\chi_j(z_j) - x_m|$). This implies that the electoral outcome (a tie) is fixed by fixing the policies to be implemented. Note that because voters have complete information, they can correctly guess the policy each candidate would implement, making the positions of these policies critical to the electoral outcome. Suppose also that two candidates are initially symmetric (i.e., they have symmetric cost and disutility functions, and their ideal policies are equidistant from the median policy) and indifferent between winning and losing, that is, $\Psi_i(z_i, z_j) + b = \Psi_j(z_j, z_i) + b = 0$. Then, differentiate $\Psi_j(z_j, z_i)$ by the parameter of a candidate's characteristic (such as x_j, λ_j, or β_j). Now, suppose j's parameter value is higher than that of i. If $\Psi_j(z_j, z_i)$ decreases with this parameter value, it means that $\Psi_j(z_j, z_i)$ is lower than $\Psi_i(z_i, z_j)$ in a tie with $\Psi_j(z_j, z_i)+b = 0$. Hence, i is certain to win, according to Proposition 3.

In the following subsections, I use the above method to show the asymmetric electoral outcomes for asymmetric ideal policies, asymmetric costs of betrayal, and asymmetric policy motivations. Although I only consider these basic characteristics, this model could be used to derive more implications by adding other characteristics (e.g., competence and valence) or other players (e.g., special interest groups and media).

3.3.3 Asymmetric Ideal Policies

Assume that $x_R - x_m \neq x_m - x_L$; that is, the position is asymmetric. The cost and disutility functions are the same for both candidates. Suppose also the following assumption.

Assumption 2 *$u''(d)/u'(d)$ is non-increasing in d.*

This assumption means that the Arrow-Pratt measure of absolute risk aversion is non-increasing in $|\chi_i(z_i) - x_i|$. If the function is monomial, this assumption holds, and will be satisfied by many polynomial functions.

Corollary 4 *Suppose Assumptions 1 and 2, and that two candidates run. Furthermore, suppose that candidate i is more moderate (i.e., $|x_i - x_m| < |x_j - x_m|$), but that the candidates are symmetric in all other respects. Then, in equilibrium, we have the following: (i) when $u''(d) > 0$, for any $d > 0$, candidate i wins with certainty, and the expected utility from winning is higher than the expected utility from losing; and (ii) when $u''(d) = 0$, for all $d \geq 0$, the result is either a tie or candidate i wins with certainty.*

Proof See Appendix A.9.

A more moderate candidate, whose ideal policy is closer to the median policy, will not severely betray his/her platform after an election. On the other hand, in order to implement the same policy, a more extreme candidate will pay a higher cost of betrayal, because he/she will betray the platform more severely. Hence, his/her degree of incentive to win decreases to avoid paying such a high cost of betrayal. As a result, the more moderate candidate wins.

When the candidates' utility functions are linear, they tie in most cases. When a candidate has a linear utility function, the policy he/she will implement is not affected by the ideal policy, x_i. Therefore, the situation is the same for both candidates, and they have the same probability of winning. However, if the moderate candidate's ideal policy is very close to x_m, the moderate candidate does not have an incentive to approach x_m from his/her ideal policy, and the extreme candidate does not have an incentive to win even though the moderate candidate announces x_i. Thus, the moderate candidate announces his/her ideal policy as the platform, and then implements it after he/she wins. This case is similar to Corollary 3, but the moderate candidate wins with certainty, since his/her ideal policy is closer to the median policy.

3.3.4 Asymmetric Costs of Betrayal

Assume that λ is not the same for both candidates. However, their ideal policies and disutility functions are symmetric.

Corollary 5 *Suppose Assumption 1, and that two candidates run. Suppose also that candidate i has a higher relative importance of betrayal (i.e., $\lambda_i > \lambda_j$), but that the candidates are symmetric in all other respects. Then, in equilibrium, candidate i wins with certainty. The expected utility from winning is higher than, or the same as, the expected utility from losing.*

Proof See Appendix A.10.

When a candidate has a lower λ, he/she will betray the platform more severely, and hence, the realized cost of betrayal is higher, as shown in Proposition 2. Therefore, such a candidate has a lower degree of incentive to win because he/she wishes to avoid paying the high cost of betrayal. As a result, the candidate with the higher λ wins.

3.3.5 Asymmetric Political Motivations

Suppose that the level of political motivation, β, differs from 1. Furthermore, assume that β is not the same for both candidates. However, their ideal policies and cost functions are symmetric. That is, the utility following a win is $-\beta_i u(|\chi_i(z_i) - x_i|) - \lambda c(|z_i - \chi_i(z_i)|) + b$ and the utility when the opponent wins is $-\beta_i u(|\chi_j(z_j) - x_i|)$. Thus, the degree of incentive to win is $\Psi_i(z_i, z_j) = -\beta_i u(|\chi_i(z_i) - x_i|) - \lambda c(|z_i - \chi_i(z_i)|) + \beta_i u(|\chi_j(z_j) - x_i|)$. Note that a higher or lower β_i means a candidate is more policy motivated or more office motivated, respectively.

Corollary 6 *Suppose Assumption 1, and that two candidates run. Suppose also that candidate i is less policy motivated (i.e., $\beta_i < \beta_j$), but that the candidates are symmetric in all other respects. Then, in equilibrium, candidate i wins with certainty. The expected utility from winning is higher than the expected utility from losing.*

Proof See Appendix A.11.

A less policy-motivated candidate is less concerned about policy and does not betray the platform so severely, and hence, has a lower cost of betrayal and a higher degree of incentive to win. On the other hand, a more policy-motivated candidate will betray the platform more severely, which induces a higher cost of betrayal. As a result, a less policy-motivated candidate wins the election.

3.4 Functional Example and Applications

This subsection shows a functional example as an overview of the implications described so far. Suppose a linear disutility function, $\beta_i u(|\chi - x_i|) = \beta_i |\chi - x_i|$, and a quadratic cost function, $\lambda_i c(|z_i - \chi_i(z_i)|) = \lambda_i (z_i - \chi_i(z_i))^2$.

3.4.1 Equilibrium

From (1), the policies to be implemented are

$$\chi_L(z_L) = z_L - \frac{\beta_L}{2\lambda_L} \text{ and } \chi_R(z_R) = z_R + \frac{\beta_R}{2\lambda_R},$$

assuming $z_L - \beta_L/2\lambda_L > x_L$ and $z_R + \beta_R/2\lambda_R < x_R$ (Corollary 1). The cost of betrayal is $\beta_i^2/(4\lambda_i)$, which decreases with λ_i (Proposition 2).

Then, the degrees of incentive to win are

$$\Psi_R(z_L, z_R) = \beta_R\left(\chi_R(z_R) - \chi_L(z_L)\right) - \frac{\beta_R^2}{4\lambda_R} \text{ and}$$

$$\Psi_L(z_L, z_R) = \beta_L\left(\chi_R(z_R) - \chi_L(z_L)\right) - \frac{\beta_L^2}{4\lambda_L}$$

First, when b is sufficiently high that $b > \beta_i^2/4\lambda_i$ for both $i = L$ and R, both candidates have an incentive to win, even if $\chi_L(z_L) = \chi_R(z_R) = x_m$. Thus, both candidates commit to implementing the median policy, and they tie (Lemma 2).

Now, suppose that at least one candidate has $b < \beta_i^2/4\lambda_i$, and the ideal policies of L and R are symmetric. For a symmetric pair of $\chi_L(z_L)$ and $\chi_R(z_R)$, i is indifferent between winning and losing if $\Psi_i(z_i, z_j) + b = 0$, that is,

$$\chi_R(z_R) - \chi_L(z_L) = \frac{\beta_i}{4\lambda_i} - \frac{b}{\beta_i},$$

which is $2d_i$ according to (3) when $\beta_i/(4\lambda_i) - b/\beta_i \geq 0$. If $\max\{0, \beta_L/(4\lambda_L) - b/\beta_L\} < \beta_R/(4\lambda_R) - b/\beta_R$ ($d_L < d_R$), there exists a symmetric pair of $\chi_L(z_L)$ and $\chi_R(z_R)$ such that

$$\begin{aligned}
\max\left\{0, \frac{\beta_L}{4\lambda_L} - \frac{b}{\beta_L}\right\} &\leq \chi_R(z_R) - \chi_L(z_L) < \frac{\beta_R}{4\lambda_R} - \frac{b}{\beta_R} \text{ or} \\
\max\left\{0, \frac{\beta_L}{4\lambda_L} - \frac{b}{\beta_L}\right\} &< \chi_R(z_R) - \chi_L(z_L) \leq \frac{\beta_R}{4\lambda_R} - \frac{b}{\beta_R}.
\end{aligned}$$

Note that since $b < \beta_R^2/4\lambda_R$, $\beta_R/(4\lambda_R) - b/\beta_R > 0$. In equilibrium, L commits to implementing $\chi_L(z_L)$, which satisfies the above condition. Then, R does not have an incentive to commit to $\chi_R(z_R)$ such that $\chi_R(z_R) - x_m = x_m - \chi_L(z_L)$, and thus, L wins with certainty. More precisely, in equilibrium, L commits to implementing $\chi_L(z_L)$, which satisfies

$$x_m - \left(\frac{\beta_R}{8\lambda_R} - \frac{b}{2\beta_R}\right) \leq \chi_L(z_L) \leq \min\left\{x_m, x_m - \left(\frac{\beta_L}{8\lambda_L} - \frac{b}{2\beta_L}\right)\right\},$$

and R commits to implementing $x_m + (x_m - \chi_L(z_L)) + \epsilon$ (Proposition 3). In this case, L announces $z_L \in [\overline{z}_L, \underline{z}_L]$, such that

$$\begin{aligned}
\overline{z}_L &= x_m - \left(\frac{\beta_R}{8\lambda_R} - \frac{b}{2\beta_R}\right) + \frac{\beta_L}{2\lambda_L} \\
\underline{z}_L &= \min\left\{x_m + \frac{\beta_L}{2\lambda_L}, x_m - \left(\frac{\beta_L}{8\lambda_L} - \frac{b}{2\beta_L}\right) + \frac{\beta_L}{2\lambda_L}\right\}.
\end{aligned}$$

The value of $\beta_i/(4\lambda_i) - b/\beta_i$ decreases with λ_i and increases with β_i. Thus, if λ_L is higher than λ_R (with $\beta_L = \beta_R$), L wins (Corollary 5). If β_L is lower than β_R (with $\lambda_L = \lambda_R$), L also wins with certainty (Corollary 6).

Suppose that $x_R - x_m > x_m - x_L$; that is, R is a more extreme candidate than L, and $\lambda_L = \lambda_R$ and $\beta_L = \beta_R$. In this case, both candidates tie in equilibrium if R still has an incentive to win ($\Psi_R(z_R, z_L) + b \geq 0$) when L chooses $x_L = z_L = \chi_L(z_L)$. In this equilibrium, candidates commit to implementing

$$\chi_L(z_L) = x_m - \left(\frac{\beta}{8\lambda} - \frac{b}{2\beta}\right),\ \chi_R(z_R) = x_m + \left(\frac{\beta}{8\lambda} - \frac{b}{2\beta}\right),$$

which satisfy (2). On the other hand, if R does not have an incentive to win against L when L chooses $x_L = z_L = \chi_L(z_L)$; that is,

$$2\beta(x_m - x_L) - \frac{\beta^2}{4\lambda} + b < 0,$$

then L chooses $x_L = z_L = \chi_L(z_L)$, and R commits to implementing a more extreme policy than x_L. In this case, L wins with certainty in equilibrium (Corollary 4 (ii)).

3.4.2 Application 1: Cost of Betrayal

The model of partially binding platforms can be applied to some other topics as follows.

The value of λ is decided by many factors. For example, when the freedom of the press is curtailed, λ is low, because the media will not report politicians' betrayals. When a large special interest group supports politicians, the politicians are assured of a large number of votes in an election, and the probability of their losing the next election is quite low. Therefore, in this case, the candidate is less concerned about the cost of betrayal. If a party or the parliament is lacking in power, λ is low because these institutions are less able to enforce discipline.

In other words, λ can be interpreted as the level of a democracy's maturity. Some political scientists and economists indicate that politicians in mature democracies have a greater ability to make binding platforms. For example, in immature democracies, politicians have strong relationships with specific groups of voters.[18] If the democracy is mature, it supports

[18] Robinson and Verdier (2013) and Keefer and Vlaicu (2008) study clientelism. Gehlbach et al. (2010)

freedom of the press and government transparency. In addition, strong parties monitor the politicians, who therefore do not betray their platforms as often or as easily.[19] Thus, the value of λ is higher in mature democracies and lower in immature democracies.[20] According to Proposition 2, when the maturity of a democracy increases, the policies to be implemented converge to x_m, and politicians do not often renege on their platforms. In an immature democracy, the divergence in policies to be implemented is large, and politicians tend to betray their platforms quite severely.

Moreover, the candidate may make decisions that affect the value of λ. For example, sometimes he/she decides to influence the media. If the candidate is able to control the media, the cost of betrayal, λ, decreases, and he/she can betray the platform more easily. This seems favorable to candidates, although they usually support freedom of the press, even when the media criticize them. There is another case. In Japan, since 2003, the Democratic Party of Japan has issued *manifestos*. In a manifesto, the party records its platform, allowing voters and the media to compare it to the policy implemented after the election. Before 2003, candidates and parties revealed their platforms in speeches, campaign posters, and discussions with the media, but there were no official written records of their platforms. Thus, after 2003, it became easier to check whether the governing party betrayed its platforms. For parties, the publication of a manifesto increases the cost of betrayal, which seems detrimental to their interests. However, other parties also began issuing manifestos from 2003 onward (Kanai, 2003).

One reason is that a higher λ means a higher probability of winning. Moreover, since the expected utility from winning is not lower than the expected utility from losing (Corollary 5), if candidates can change λ, they will choose a value that is as high as possible in equilibrium. Sometimes, politicians prefer to use explicit and impressive words, promising, for example,

analyze transition economies, especially Russia, in which platforms are nonbinding, whereas platforms are completely binding in mature democracies.

[19] Cox and McCubbins (1994), Aldrich (1997), Djankov et al. (2003), and Reinikka and Svensson (2005) indicate these points.

[20] In fact, using cross-country data, Keefer (2007) shows the differences between younger and older democracies, and that these differences arise from the inability of younger democracies to offer credible platforms to voters.

to "end welfare as we know it." Such words are easy to remember, and hence, increase the value of λ.

3.4.3 Application 2: Seniority of Candidates

Older (or more senior) politicians may have a lower value of λ. They tend to be less concerned about the next election or their party's discipline because they may retire before the next election. In such a case, the value of λ could be asymmetric. According to my model with asymmetric candidates, if a candidate is older, he/she will betray the platform more severely, and hence, the probability of winning decreases. This is one type of the "last-term problem."[21]

However, at the same time, the political motivation may also differ depending on seniority. Younger politicians may care more about policy (and so have a higher β) than older politicians, since many of these policies are likely to impact the younger candidate's future political career.

Suppose R is more policy motivated but has a higher relative importance of betrayal, that is, $\beta_L < \beta_R$ and $\lambda_L < \lambda_R$ (and $x_R - x_m = x_m - x_L$). According to my interpretation, R is younger (or less senior) than L. From the numerical example, if

$$b\left(\frac{1}{\beta_L} - \frac{1}{\beta_R}\right) > \frac{1}{4}\left(\frac{\beta_L}{\lambda_L} - \frac{\beta_R}{\lambda_R}\right), \tag{5}$$

L wins with certainty. Since $\beta_L < \beta_R$, the left-hand side of (5) is positive. If $\lambda_L/\lambda_R \geq \beta_L/\beta_R$, L still wins with certainty since the right-hand side of (5) is non-positive. However, it is not obvious if $\lambda_L/\lambda_R < \beta_L/\beta_R$. In this case, if b is sufficiently high, L wins with certainty, but if b is sufficiently low, R wins with certainty since if b is sufficiently large, the difference in λ is not so critical. One possible interpretation of b is related to politicians' wages. Thus, the above implication suggests that a higher wage induces older (or more senior) politicians to win, while a lower wage induces younger (or less senior) politicians to win. For instance, by using the data on Brazil's municipal government, Ferraz and Finan (2011) show that a higher pay induces senior politicians to win.

[21] Zupan (1990), Carey (1994), and Figlio (1995, 2000) demonstrate the last-term problem, which describes how a retirement decision induces political shirking.

Similarly, the model of partially binding platforms can show and analyze asymmetric electoral outcomes for candidates with different characteristics and is applicable in cases other than the above topics as well.

4 Endogenous Candidates

This section analyzes candidates' decisions to run. There are two potential candidates in the district, and they decide whether to run for office. There are two possible cases: (1) the two potential candidates are symmetric, and (2) they are asymmetric (about ideal policies, λ and β).

In a two-candidate competition, when one candidate deviates by withdrawing, the remaining candidate who runs can announce his/her own ideal policy as his/her platform and will implement it after an election because he/she no longer has a rival.

4.1 Symmetric Two-candidate Equilibrium

Suppose that two potential candidates are symmetric. As in Section 3.2, suppose $\beta_i = \beta_j = 1$ and $\lambda_i = \lambda_j = \lambda$. Suppose also $u''(d) > 0$ for any $d > 0$. Denote z_i^* and z_j^* as the unique equilibrium pair of platforms when two symmetric candidates run; that is equation (2) holds. For candidate i, the utility when he/she runs is $[-u(|\chi_i(z_i^*) - x_i|) - \lambda c(|z_i^* - \chi_i(z_i^*)|) - u(|\chi_j(z_j^*) - x_i|) + b]/2 - k$. The utility of i when he/she does not run is $-u(|x_i - x_j|)$. Because condition (2) holds, $[-u(|\chi_i(z_i^*) - x_i|) - \lambda c(|z_i^* - \chi_i(z_i^*)|) - u(|\chi_j(z_j^*) - x_i|) + b]/2 = -u(|\chi_j(z_j^*) - x_i|)$. Therefore, both candidates do not deviate by withdrawing if

$$k \leq u(|x_i - x_j|) - u(|\chi_j(z_j^*) - x_i|) \tag{6}$$

for $i, j = L, R$ and $i \neq j$. If (6) does not hold, an equilibrium where only one candidate runs exists. In such an equilibrium, one candidate announces his/her ideal policy as a platform and implements it after an election. Note that since the payoff for all players is $-\infty$ if no one runs, this candidate never deviates by not running. Therefore, if k is sufficiently low and/or $|x_i - x_j|$ is sufficiently large, a symmetric two-candidate equilibrium exists.

Corollary 7 *Suppose $u''(d) > 0$ for any $d > 0$. A symmetric two-candidate equilibrium exists if two potential candidates satisfy equation (6). Otherwise, one potential candidate runs and wins.*

4.2 Asymmetric Two-candidate Equilibrium

In general, potential candidates may not be symmetric, and hence, I suppose two asymmetric potential candidates. Suppose candidate j is the loser (with a more extreme ideal policy, lower relative importance of betrayal, or more policy motivation) and candidate i is the winner. Furthermore, suppose i announces $\overline{z}_i$, as introduced in Section 3.3.1. For the loser, j, the utility when he/she runs is $-\beta_j u(|\chi_i(\overline{z}_i) - x_j|) - k$. The utility of j when he/she does not run is $-\beta_j u(|x_i - x_j|)$. It is always $-u(|\chi_i(\overline{z}_i) - x_j|) \geq -u(|x_i - x_j|)$. Thus, the loser j does not deviate by withdrawing, if

$$k \leq \beta_j u(|x_i - x_j|) - \beta_j u(|\chi_i(\overline{z}_i) - x_j|). \tag{7}$$

For the winner i, the utility when he/she runs is $-\beta_i u(|\chi_i(\overline{z}_i) - x_i|) - \lambda_i c(|\overline{z}_i - \chi_i(\overline{z}_i)|) + b - k$. The utility of i when he/she does not run is $-\beta_i u(|x_i - x_j|)$. Thus, the winner i does not deviate by not running, if

$$k \leq \beta_i u(|x_i - x_j|) - \beta_i u(|\chi_i(\overline{z}_i) - x_i|) - \lambda_i c(|\overline{z}_i - \chi_i(\overline{z}_i)|) + b. \tag{8}$$

As I have shown, in any case (Corollaries 4, 5, and 6), the winner's expected utility is higher than or the same as the loser's expected utility, and hence, $-\beta_i u(|\chi_i(\overline{z}_i) - x_i|) - \lambda_i c(|\overline{z}_i - \chi_i(\overline{z}_i)|) + b \geq -\beta_j u(|\chi_i(\overline{z}_i) - x_j|)$. However, if candidates have asymmetric policy motivations, $\beta_i < \beta_j$, which means $\beta_i u(|x_i - x_j|) < \beta_j u(|x_i - x_j|)$. When $\beta_j - \beta_i$ is sufficiently small and b is high, (8) holds if (7) holds. This implies that when the loser j does not deviate, the winner i also does not deviate. When $\beta_j - \beta_i$ is sufficiently large and b is small, (7) holds if (8) holds. This means that when the winner i does not deviate, the loser j also does not deviate. Note that a sufficiently large $\beta_j - \beta_i$ means that β_i is small. It means that candidate i cannot get sufficient benefits even if he/she is certain to run and win, and hence, (8) becomes a critical condition in this case. In either case, if the cost of running is sufficiently small, then both asymmetric candidates do not have an incentive to deviate by withdrawing.

If (7) or (8) is not satisfied, an equilibrium exists in which only i or j runs. If (7) is satisfied with inequality, but (8) is not satisfied, only candidate j runs. Similarly, if (8) is satisfied with inequality, but (7) is not satisfied, only candidate i runs.[22] If neither inequality is satisfied, either of the two potential candidates runs.[23] In either case, one candidate announces his/her ideal policy and implements it. Therefore, if k is sufficiently low and/or $|x_i - x_j|$ is sufficiently large, an asymmetric, two-candidate equilibrium exists.

Note that candidate i's platform $\overline{z}_i$ is the most extreme platform among all possible equilibrium platforms. Thus, if $\overline{z}_i$ satisfies (7) and (8), other possible equilibrium platforms also satisfy them.

Proposition 4 *An asymmetric two-candidate equilibrium exists if two potential candidates satisfy equations (7) and (8).*

In such an equilibrium, the loser j runs in order to induce the winner i to approach j's ideal policy even though j loses the election. If j deviates by not running, i will implement his/her ideal policy x_i. On the other hand, i will approach the median policy (and hence, j's ideal policy) more closely if j runs. Therefore, j runs to induce i to approach x_j, even though it is certain j will lose.

In the models of non-binding platforms, the winner will implement his/her ideal policy after an election, which means that the loser's decision to run does not affect the winner's policy. Thus, the loser does not have any reason to run. In the models of completely binding platforms, since both candidates have an equal probability (50%) of winning, an explicit

[22] Condition (7) ((8)) means that, for j (i), the expected utility when both candidates run is greater than or equal to the utility when only opponent i (j) runs. Suppose that (7) is satisfied with inequality, but (8) is not satisfied. Then, first, if only i runs, j has an incentive to deviate by running. Second, if only j runs, i does not have an incentive to run (and j does not have an incentive to deviate). Third, if both candidates run, i has an incentive to deviate by not running. Thus, there exists only one equilibrium, namely only j runs. The inverse case is also true.

[23] To be precise, (i) if both (7) and (8) are satisfied with equality, or (ii) if one of them is satisfied with equality and the other is not satisfied, there exists an equilibrium in which either of the two potential candidates runs.

loser does not exist. Thus, the setting of a partially binding platform is important to derive such strategic behaviors.

5 Conclusion

This paper examined the effects of partially binding platforms in elections. Partially binding platforms show the following two implications. First, when candidates have different characteristics, one candidate has a higher probability of winning. Second, even if a candidate knows that he/she will lose an election, this loser runs to induce the opponent to approach the loser's ideal policy.

These implications need to be investigated in more detail. One possible area of future research is to endogenize the cost of betrayal. In this paper, the cost of betrayal just depends on the degree of betrayal, but it may be decided endogenously. For example, one kind of cost of betrayal is a decrease in the probability of winning in the next election. In order to analyze such reputational costs, a dynamic model comprising two or more periods should be analyzed. Second, depending on the economic situation, the cost of betrayal and/or the ideal policies of candidates or voters change before and after an election. For example, if an economic depression or a natural disaster occurs after an election, voters may allow politicians to betray their platforms by changing taxes. This is another important topic to discuss when considering what happens after an election. Third, models of completely binding or nonbinding platforms used to analyze political competition are applied to many other topics as well. As this paper shows, partially binding platforms induce many different predictions, and therefore, the applications of a model of partially binding platforms is an interesting subject for future research. Several possible applications are shown in Section 3.4, but it is highly likely that many more possible applications exist—for example, the effects of special interest groups, media, or other candidates' characteristics—which are not discussed in this paper.

A Proofs

A.1 Corollary 1

With $u''(d) = 0$, for all $d \geq 0$, condition (1) is

$$\lambda = \frac{\overline{u}}{c'(|z_i - \chi_i(z_i)|)},$$

which does not depend on the position of x_i. If $\lambda < \frac{\overline{u}}{c'(|z_i - x_i|)}$, $\chi_i(z_i)$, which satisfies (1), is further away from z_i than x_i. However, if a candidate chooses x_i rather than this $\chi_i(z_i)$, the disutility is minimized at $u(0) = 0$, and the cost of betrayal also decreases. Thus, a candidate chooses x_i if $\lambda < \frac{\overline{u}}{c'(|z_i - x_i|)}$. $\square$

A.2 Corollary 2

Suppose Candidate L, without loss of generality. Note that an increase in z_L means that z_L moves further from the ideal policy, x_L. Rewrite (1) as $\lambda c'(z_L - \chi_L(z_L)) = u'(\chi_L(z_L) - x_L)$, and differentiate it by z_L. Then, it becomes

$$\lambda c''(z_L - \chi_L(z_L)) \left(1 - \frac{\partial \chi_L(z_L)}{\partial z_L}\right) = u''(\chi_L(z_L) - x_L) \frac{\partial \chi_L(z_L)}{\partial z_L}$$

$$\Rightarrow \frac{\partial \chi_L(z_L)}{\partial z_L} = \frac{\lambda c''(z_L - \chi_L(z_L))}{u''(\chi_L(z_L) - x_L) + \lambda c''(z_L - \chi_L(z_L))} \in (0, 1).$$

Differentiate $u(\chi_L(z_L) - x_L)$ by z_L. Then,

$$\frac{\partial u(\chi_L(z_L) - x_L)}{\partial z_L} = u'(\chi_L(z_L) - x_L) \frac{\partial \chi_L(z_L)}{\partial z_L} > 0.$$

Differentiate $\lambda c(z_L - \chi_L(z_L))$ by z_L. Then,

$$\frac{\partial \lambda c(z_L - \chi_L(z_L))}{\partial z_L} = \lambda c'(z_L - \chi_L(z_L)) \left(1 - \frac{\partial \chi_L(z_L)}{\partial z_L}\right) > 0.$$

$\square$

A.3 Lemma 2

Existence: Suppose that both candidates commit to implementing the median policy ($\chi_i(z_i) = \chi_j(z_j) = x_m$). Then, the expected utility for candidate i is $-u(|x_m - x_i|) + \frac{1}{2}\left(-\lambda c(|z_i(x_m) - x_m|) + b\right)$.

If i deviates to lose by committing to a more extreme policy, i's expected utility is $-u(|x_m - x_i|)$. Thus, if $b > \lambda c(|z_i(x_m) - x_m|)$, candidate i does not deviate.

Uniqueness: First, suppose that $\chi_i(z_i) \neq x_m$, $\chi_j(z_j) \neq x_m$, and $|\chi_i(z_i) - x_m| > |\chi_j(z_j) - x_m|$: thus, i loses. The expected utility of i is $-u(|\chi_j(z_j) - x_i|)$. If i deviates to commit to a policy, χ_i', which is slightly closer to x_m than $\chi_j(z_j)$, and which is also closer to x_i than x_m, the expected utility is $-u(|\chi_i' - x_i|) - \lambda c(|z_i(\chi_i') - \chi_i'|) + b$ since i will win for sure. Thus, if $u(|\chi_j(z_j) - x_i|) - u(|\chi_i' - x_i|) - \lambda c(|z_i(\chi_i') - \chi_i'|) + b > 0$, candidate i deviates. First, $-\lambda c(|z_i(\chi_i') - \chi_i'|) + b > 0$ since $\lambda c(|z_i(\chi_i') - \chi_i'|) < \lambda c(|z_i(x_m) - x_m|)$ from Corollary 2, and $b > \lambda c(|z_i(x_m) - x_m|)$. Second, if $\chi_j(z_j)$ is further away from x_i than x_m, $u(|\chi_j(z_j) - x_i|) - u(|\chi_i' - x_i|) > 0$. If $\chi_j(z_j)$ is closer to x_i than x_m, $u(|\chi_j(z_j) - x_i|) - u(|\chi_i' - x_i|)$ is only slightly lower than but almost the same as zero. Thus, $u(|\chi_j(z_j) - x_i|) - u(|\chi_i' - x_i|) - \lambda c(|z_i(\chi_i') - \chi_i'|) + b > 0$.

Second, suppose that $\chi_i(z_i) \neq x_m$, $\chi_j(z_j) \neq x_m$, and $|\chi_i(z_i) - x_m| = |\chi_j(z_j) - x_m|$: thus, there is a tie. The expected utility of i is $\frac{1}{2}\left(-u(|\chi_i(z_i) - x_i|) - \lambda c(|z_i - \chi_i(z_i)|) + b - u(|\chi_j(z_j) - x_i|)\right)$. If i deviates to commit to a policy, χ_i', which is slightly closer to x_m than $\chi_i(z_i)$, and which is also closer to x_i than x_m, the expected utility is $-u(|\chi_i' - x_i|) - \lambda c(|z_i(\chi_i') - \chi_i'|) + b$ since i will win for sure. From the same reason as above, $-u(|\chi_i' - x_i|) - \lambda c(|z_i(\chi_i') - \chi_i'|) + b > -u(|\chi_j(z_j) - x_i|)$. If $\chi_i(z_i)$ is further away from x_i than x_m, $-u(|\chi_i(z_i) - x_i|) - \lambda c(|z_i - \chi_i(z_i)|) < -u(|\chi_i' - x_i|) - \lambda c(|z_i(\chi_i') - \chi_i'|)$. If $\chi_i(z_i)$ is closer to x_i than x_m, $-u(|\chi_i' - x_i|) - \lambda c(|z_i(\chi_i') - \chi_i'|)$ is only slightly lower than but almost the same as $-u(|\chi_i(z_i) - x_i|) - \lambda c(|z_i - \chi_i(z_i)|)$. Thus, $\frac{1}{2}\left(-u(|\chi_i(z_i) - x_i|) - \lambda c(|z_i - \chi_i(z_i)|) + b - u(|\chi_j(z_j) - x_i|)\right)$ is lower than $-u(|\chi_i' - x_i|) - \lambda c(|z_i(\chi_i') - \chi_i'|) + b$, and as such, i deviates in this way.

Third, suppose that $\chi_i(z_i) \neq x_m$ and $\chi_j(z_j) = x_m$: thus, i loses. The expected utility of i is $-u(|x_m - x_i|)$. If i deviates to commit a policy x_m, the expected utility is $-u(|x_m - x_i|) + \frac{1}{2}(-\lambda c(|z_i(x_m) - x_m|) + b)$ since they tie. Because $b > \lambda c(|z_i(x_m) - x_m|)$, i deviates in this way. Thus, when at least one candidate does not choose $z_i(x_m)$, there is no equilibrium in the case of $b > \lambda c(|z_i(x_m) - x_m|)$. □

A.4 Lemma 3

First, suppose that L's policy is more extreme than his/her ideal policy, $\chi_L(z_L) < x_L$. That is, $\chi_L(z_L) < x_L < x_m < x_R < x_m + (x_m - \chi_L(z_L))$. There are five possible positions of

$\chi_R(z_R)$: (1) $\chi_R(z_R) \le \chi_L(z_L)$; (2) $x_m + (x_m - \chi_L(z_L)) \le \chi_R(z_R)$; (3) $\chi_L(z_L) < \chi_R(z_R) < x_R$; (4) $x_R < \chi_R(z_R) < x_m + (x_m - \chi_L(z_L))$; and (5) $\chi_R(z_R) = x_R$.

- In cases (1) and (2), L wins with certainty or has a 50% probability of winning. Both candidates have an incentive to deviate to choose $z_i = x_i = \chi_i(z_i)$, and so definitely win with the maximized expected utility from winning (i.e., b).
- In cases (3) and (4), R wins with certainty. Here, R has an incentive to deviate to choose $z_R = x_R = \chi_R(z_R)$, but still definitely wins with the maximized expected utility from winning.
- In case (5), R wins with certainty. Here, L has an incentive to deviate to choose $z_L = x_L = \chi_L(z_L)$, and so has a 50% chance of winning with the maximized expected utility from winning.

For the same reasons, if $x_R < \chi_R(z_R)$, there is no equilibrium.

Next, suppose that L's policy encroaches on R's side of the policy space, $x_m < \chi_L(z_L)$. Here, there are three possible positions of $\chi_L(z_L)$: (A) $x_m - (\chi_L(z_L) - x_m) < x_L < x_m < x_R < \chi_L(z_L)$; (B) $x_m - (\chi_L(z_L) - x_m) = x_L < x_m < x_R = \chi_L(z_L)$; and (C) $x_L < x_m - (\chi_L(z_L) - x_m) < x_m < \chi_L(z_L) < x_R$. In each case, there are five possible positions of $\chi_R(z_R)$: (1) $\chi_R(z_R) < x_m - (\chi_L(z_L) - x_m)$; (2) $\chi_L(z_L) < \chi_R(z_R)$; (3) $\chi_R(z_R) = x_m - (\chi_L(z_L) - x_m)$; (4) $\chi_L(z_L) = \chi_R(z_R)$; and (5) $x_m - (\chi_L(z_L) - x_m) < \chi_R(z_R) < \chi_L(z_L)$.

- Suppose (A):
  - In cases (1) and (2), L wins with certainty. Here, L has an incentive to deviate to choose $z_L = x_L = \chi_L(z_L)$ and still definitely wins with the maximized expected utility from winning.
  - In cases (3) and (4), they tie. Both candidates have an incentive to deviate to choose $z_i = x_i = \chi_i(z_i)$ and definitely win with the maximized expected utility from winning.
  - In case (5), R wins with certainty. If $\chi_R(z_R) \neq x_R$, R has an incentive to deviate to choose $z_R = x_R = \chi_R(z_R)$ and still definitely wins with the maximized expected

utility from winning. If $\chi_R(z_R) = x_R$, L has an incentive to deviate to choose $z_L = x_L = \chi_L(z_L)$ and has a 50% chance of winning with the maximized expected utility from winning.

- Suppose (B):
  - In cases (1) and (2), L wins with certainty. Here, L has an incentive to deviate to choose $z_L = x_L = \chi_L(z_L)$ and still definitely wins with the maximized expected utility from winning.
  - In cases (3) and (4), they tie. Here, L has an incentive to deviate to choose $z_L = x_L = \chi_L(z_L)$ and has a 50% chance of winning with the maximized expected utility from winning.
  - In case (5), R wins with certainty. Here, R has an incentive to deviate to choose $\chi_R(z'_R)$ such that $\chi_R(z'_R)$ is closer to x_R than $\chi_R(z_R)$, but is still closer to x_m than $\chi_L(z_L)$.
- Suppose (C):
  - In cases (1) and (2), L wins with certainty. Here, L has an incentive to deviate to choose $\chi_L(z'_L)$ such that $\chi_L(z'_L)$ is closer to x_L than $\chi_L(z_L)$, but is still closer to x_m than $\chi_R(z_R)$.
  - In cases (3) and (4), they tie. Here, if L deviates to choose $x_m - (\chi_L(z_L) - x_m)$, the expected utility increases.
  - In case (5), R wins with certainty. Here, R has an incentive to deviate to choose $\chi_R(z'_R)$ such that $\chi_R(z'_R)$ is closer to x_R than $\chi_R(z_R)$, but is still closer to x_m than $\chi_L(z_L)$.

For the same reasons, if $\chi_R(z_R) < x_m$, there is no equilibrium. $\square$

A.5 Proposition 1

Sufficient Condition

If the pair of platforms satisfies condition (2) and is symmetric, it is in equilibrium. If no one deviates, the payoff for candidate i is $\frac{1}{2}[-u(|\chi_i(z_i)-x_i|)-\lambda c(|z_i-\chi_i(z_i)|)+b-u(|\chi_j(z_j)-x_i|)]$.

If candidate i deviates to any policy that diverges from x_m, he/she is certain to lose, and the payoff becomes $-u(|\chi_j(z_j) - x_i|)$. The change in payoff from this deviation is $\frac{1}{2}[-u(|\chi_i(z_i)-x_i|)-\lambda c(|z_i-\chi_i(z_i)|)+b+u(|\chi_j(z_j)-x_i|)]$. From (2), it is zero, and therefore, there is no profitable deviation that diverges from x_m.

If the candidate deviates to a more moderate platform, say z_i', he/she is certain to win. Suppose that the candidate deviates from z_i to z_i'. After this deviation, the payoff becomes $-u(|\chi_i(z_i') - x_i|) - \lambda c(|z_i' - \chi_i(z_i')|) + b$. The change in the payoff from this deviation is $-u(|\chi_i(z_i')-x_i|)-\lambda c(|z_i'-\chi_i(z_i')|)+b-\frac{1}{2}(-u(|\chi_i(z_i)-x_i|)-\lambda c(|z_i-\chi_i(z_i)|)+b-u(|\chi_j(z_j)-x_i|))$. Since $-u(|\chi_i(z_i)-x_i|)-\lambda c(|z_i-\chi_i(z_i)|)+b = -u(|\chi_j(z_j)-x_i|)$, from (2), this can be rewritten as $-u(|\chi_i(z_i') - x_i|) - \lambda c(|z_i' - \chi_i(z_i')|) + b - (-u(|\chi_i(z_i) - x_i|) - \lambda c(|z_i - \chi_i(z_i)|) + b)$. From Corollary 2, $-u(|\chi_i(z_i')-x_i|) < -u(|\chi_i(z_i)-x_i|)$ and $\lambda c(|z_i'-\chi_i(z_i')|) > \lambda c(|z_i-\chi_i(z_i)|)$. Thus, the change in the payoff from this deviation is negative. Therefore, there is no profitable deviation approaching x_m. As a result, the two platforms satisfy (2) and are symmetric. Therefore, this is a state of equilibrium.

Necessary Condition

To show the necessary condition, I use a contradiction; that is, if this pair does not satisfy equation (2) or is not symmetric, it is not in equilibrium.

First, if the pair of platforms is asymmetric, one candidate loses and the other wins. The winning candidate prefers another platform that has a higher utility, that is, one that approaches his/her own ideal point, x_i, but still wins. Thus, the asymmetric position is not in equilibrium. In what follows, I assume that the candidates' platform positions (and policies they would implement) are symmetric.

Second, if equation (2) is not satisfied with a pure strategy, it is not in equilibrium. If $-u(|\chi_i(z_i) - x_i|) - \lambda c(|z_i - \chi_i(z_i)|) + b < -u(|\chi_j(z_j) - x_i|)$ and there is a tie, the candidate has an incentive to deviate to lose. Then, he/she can choose any platform that is worse for the median voter, and lose. Before this deviation, the expected utility is $\frac{1}{2}[-u(|\chi_i(z_i)-x_i|)-\lambda c(|z_i-\chi_i(z_i)|)+b-u(|\chi_j(z_j)-x_i|)]$. After the deviation, it is $-u(|\chi_j(z_j)-x_i|)$. Thus, this candidate can increase his/her utility by $\frac{1}{2}[u(|\chi_i(z_i)-x_i|)+\lambda c(|z_i-\chi_i(z_i)|)-b-u(|\chi_j(z_j)-x_i|)]$ from this deviation. Since $-u(|\chi_i(z_i)-x_i|)-\lambda c(|z_i-\chi_i(z_i)|)+b < -u(|\chi_j(z_j)-x_i|)$, any candidate will deviate.

If $-u(|\chi_i(z_i)-x_i|)-\lambda c(|z_i-\chi_i(z_i)|)+b > -u(|\chi_j(z_j)-x_i|)$ and there is a tie, then the candidate has an incentive to deviate to be certain of winning. The candidate can move slightly to a platform that is better for the median voter and be certain to win. Assume that the deviation to approach x_m is minor. Before this deviation, the utility is $\frac{1}{2}[-u(|\chi_i(z_i)-x_i|)-u(|\chi_j(z_j)-x_i|)-\lambda c(|z_i-\chi_i(z_i)|)+b]$. After the deviation, it is slightly lower than $-u(|\chi_i(z_i)-x_i|)-\lambda c(|z_i-\chi_i(z_i)|)+b$. This candidate can increase his/her utility by slightly less than $\frac{1}{2}[u(|\chi_j(z_j)-x_i|)-u(|\chi_i(z_i)-x_i|)-\lambda c(|z_i-\chi_i(z_i)|)+b]$ from this deviation. Since $-u(|\chi_i(z_i)-x_i|)-\lambda c(|z_i-\chi_i(z_i)|)+b > -u(|\chi_j(z_j)-x_i|)$ and the policy space is continuous, there exists a platform that can increase the candidate's utility, and hence, either candidate has an incentive to deviate.

Finally, suppose that a candidate chooses a mixed strategy. Denote $\hat{z}_i$ as the platform under which the utilities, should either candidate win, are the same. That is, $-u(|\chi_i(\hat{z}_i)-x_i|)-\lambda c(|\hat{z}_i-\chi_i(\hat{z}_i)|)+b = -u(|\chi_j(\hat{z}_j)-x_i|)$. If this mixed strategy is discrete, a candidate whose mixed strategy includes a more extreme platform than $\hat{z}_i$, has an incentive to deviate slightly to approach the median policy, because the probability of winning increases discretely with only a slight increase in the cost of betrayal and the disutility. If all strategies in a discrete mixed strategy are more moderate than $\hat{z}_i$, a candidate deviates to lose. If a mixed strategy is distributed on a continuous policy space, the probability of winning is zero when a candidate announces the most extreme platform in his/her mixed strategy, given that the two candidates' positions are symmetric. Then, a candidate never chooses such a platform. As a result, equation (2) is the necessary condition.

Existence and Uniqueness

As I have shown, for both candidates, the policies to be implemented must be symmetric in equilibrium. In this subsection, I show that such a unique, symmetric equilibrium exists. To prove this, I consider the simultaneous and symmetric move of both candidates' policies. From condition (2),

$$u(|\chi_j(z_j) - x_i|) - u(|\chi_i(z_i) - x_i|) + b = \lambda c(|z_i - \chi_i(z_i)|). \tag{9}$$

When $z_i = x_i$ for both candidates, $z_i = x_i = \chi_i$. Therefore, the left-hand side of (9) is $u(|x_R - x_L|) + b$. When $\chi_i = x_m$ for both candidates, the left-hand side is b. The value of the left-hand side continuously and strictly decreases to b as $\chi_i(z_i)$ and $\chi_j(z_j)$ approach x_m. When $z_i = x_i = \chi_i$, the cost of betrayal is zero. The right-hand side is positive, continuous, and increasing as $\chi_i(z_i)$ approaches x_m, from Corollary 2. There exists a point at which the value of the left-hand side is the same as the cost of betrayal, because I assume $b < \lambda c(|z_i(x_m) - x_m|)$. The left-hand side strictly decreases, and the cost of betrayal increases as $\chi_i(z_i)$ approaches x_m. Hence, this point is unique. $\square$

A.6 Corollary 3

When a candidate chooses $z_i = x_i$, the expected utility is $-\frac{1}{2}u(x_R - x_L) + \frac{1}{2}b$, because $u(x_i - x_i) = 0$. When the candidate commits to a policy that is slightly closer to the median policy than his/her ideal policy, and wins, the expected utility is slightly lower than $-\lambda c(|z_i(x_i) - x_i|) + b$. As a result, if $\frac{1}{2}(u(x_R - x_L) - b) < \lambda c(|z_i(x_i) - x_i|)$, the candidate has no incentive to deviate to be certain of winning when he/she chooses $z_i = x_i = \chi_i(x_i)$. Otherwise, candidates have an incentive to commit to implementing a policy that is more moderate than x_i. Therefore, they choose $\{z_L,\ z_R\}$, which satisfies (2). $\square$

A.7 Proposition 2

Fix $\chi_i(z_i)$, and denote it as $\bar{\chi}_i$. Denote $z_i(\bar{\chi}_i)$ as the platform that commits to $\bar{\chi}_i$; that is, $\bar{\chi}_i = \chi_i(z_i(\bar{\chi}_i))$. Differentiate $\lambda c(|z_i(\bar{\chi}_i) - \bar{\chi}_i|)$ by λ, yields

$$c(|z_i(\bar{\chi}_i) - \bar{\chi}_i|) + \lambda c'(|z_i(\bar{\chi}_i) - \bar{\chi}_i|)\frac{\partial z_i(\bar{\chi}_i)}{\partial \lambda}. \tag{10}$$

Differentiate equation (1) by λ, yields $1 = -\frac{u'(|\bar{\chi}_i - x_i|)c''(|z_i(\bar{\chi}_i)-\bar{\chi}_i|)\frac{\partial z_i(\bar{\chi}_i)}{\partial \lambda}}{c'(|z_i(\bar{\chi}_i)-\bar{\chi}_i|)^2}$.

Thus, $\frac{\partial z_i(\bar{\chi}_i)}{\partial \lambda} = -\frac{c'(|z_i(\bar{\chi}_i)-\bar{\chi}_i|)^2}{u'(|\bar{\chi}_i - x_i|)c''(|z_i(\bar{\chi}_i)-\bar{\chi}_i|)}$. Moreover, $\lambda = \frac{u'(|\bar{\chi}_i - x_i|)}{c'(|z_i(\bar{\chi}_i)-\bar{\chi}_i|)}$ in equilibrium, from Lemma 1. Substitute these into (10). Then, (10) becomes

$$c(|z_i(\bar{\chi}_i) - \bar{\chi}_i|) - \frac{c'(|z_i(\bar{\chi}_i) - \bar{\chi}_i|)^2}{c''(|z_i(\bar{\chi}_i) - \bar{\chi}_i|)},$$

which is negative, from Assumption 1.

From condition (1), $\lambda c(|z_i - \chi_i(z_i)|) = \frac{c(|z_i-\chi_i(z_i)|)}{c'(|z_i-\chi_i(z_i)|)}u'(|\chi_i(z_i) - x_i|)$. If λ goes to infinity, $|z_i - \chi_i(z_i)|$ converges to 0 from Lemma 1, and thus, $\frac{c(|z_i-\chi_i(z_i)|)}{c'(|z_i-\chi_i(z_i)|)}$ decreases to zero from Assumption 1. From Lemma 3, $|\chi_i(z_i) - x_i|$ does not exceed $|x_m - x_i|$ in equilibrium, and as such, $|\chi_i(z_i) - x_i|$ goes to a certain positive value ($|z_i - x_i| \in (0, \infty)$) when λ goes to infinity. Therefore, $u'(|\chi_i(z_i) - x_i|)$ goes to a certain positive value when $u''(|\chi_i(z_i) - x_i|) > 0$, which is a constant positive value when $u''(|\chi_i(z_i) - x_i|) = 0$. As a result, the cost of betrayal, $\lambda c(.)$, approaches zero as λ goes to infinity, and then, $b > \lambda c(|z_i(x_m) - x_m|) = 0$ since $b > 0$. Hence, both candidates choose $\chi_i(z_i) = \chi_j(z_j) = x_m$ from Lemma 2. □

A.8 Proposition 3

Sufficient Condition and Existence

If the pair of platforms satisfies condition (4), $\chi_i(z_i) = x_m - (\chi_R(z_R) - x_m) + \epsilon$ if $i = L$, and $x_m + (x_m - \chi_L(z_L)) - \epsilon$ if $i = R$, then this pair is in equilibrium. Candidate j has $\Psi_j(z_j, z_i) + b \leq 0$, which means that j does not have an incentive to deviate by approaching the median policy and winning against (or tying with) i. From any other possible deviation, j has the same expected utility, because he/she still loses. Thus, there is no profitable deviation for j. Candidate i has $\Psi_i(z_i, z_j) + b \geq 0$, which means that i does not have an incentive to deviate and lose. Moreover, i cannot find a policy that is more extreme than $\chi_i(z_i)$ but that still wins against j, because no such policy exists when $\chi_i(z_i) = x_m - (\chi_R(z_R) - x_m) + \epsilon$ if $i = L$, and $x_m + (x_m - \chi_L(z_L)) - \epsilon$ if $i = R$. Thus, there is no profitable deviation for i. As a result, this is a state of equilibrium. Such an equilibrium exists since $d_i < d_j$ and $d_j > 0$.

Necessary Condition

To show the necessary condition, I use a contradiction. First, there is no equilibrium in which the winner commits to implementing a policy that is closer to x_m than the opponent's policy by more than ϵ. That is, $\chi_L(z_L) \geq x_m - (\chi_R(z_R) - x_m) + 2\epsilon$ or $\chi_R(z_R) \leq x_m + (x_m - \chi_L(z_L)) - 2\epsilon$. The winner has an incentive to deviate by choosing $\chi_L(z_L) = x_m - (\chi_R(z_R) - x_m) + \epsilon$ or $\chi_R(z_R) = x_m + (x_m - \chi_L(z_L)) - \epsilon$, that is, committing to a policy that is closer to his/her ideal policy, and still wins. In what follows, I exclude such cases.

Second, because $d_i < d_j$, there is no possibility of satisfying both $\Psi_i(z_i, z_j) + b = 0$ and $\Psi_j(z_j, z_i) + b = 0$ at the same time with $|\chi_i(z_i) - x_m| = |\chi_j(z_j) - x_m|$. Therefore, no symmetric equilibrium exists in which both candidates have the same probability of winning, according to Proposition 1.

Third, suppose that $\chi_i(z_i) = x_m - (\chi_R(z_R) - x_m) + \epsilon$ if $i = L$ and $x_m + (x_m - \chi_L(z_L)) - \epsilon$ if $i = R$. Because $d_i < d_j$, and ϵ is very small, it is not possible to satisfy both $\Psi_i(z_i, z_j) + b \leq 0$ and $\Psi_j(z_j, z_i) + b > 0$ at the same time, or to satisfy both $\Psi_i(z_i, z_j) + b < 0$ and $\Psi_j(z_j, z_i) + b \geq 0$ at the same time. If $\Psi_i(z_i, z_j) + b < 0$ and $\Psi_j(z_j, z_i) + b < 0$, this is not a state of equilibrium because i wants to deviate to lose. Furthermore, if $\Psi_i(z_i, z_j) + b > 0$ and $\Psi_j(z_j, z_i) + b > 0$, this is not in equilibrium because j wants to win with certainty (or with a 50% chance) by approaching the median policy.

As a result, condition (4), along with $\chi_i(z_i) = x_m - (\chi_R(z_R) - x_m) + \epsilon$ if $i = L$ and $x_m + (x_m - \chi_L(z_L)) - \epsilon$ if $i = R$, is the necessary condition. $\square$

A.9 Corollary 4

Suppose that the two candidates are originally symmetric (i.e., they have symmetric cost and disutility functions, and their ideal policies are equidistant from the median policy), and they announce symmetric platforms. Thus, they will implement χ_L and χ_R, which are also symmetric. Moreover, both candidates initially have $\Psi_i(z_i, z_j) + b = 0$. Then, consider that R becomes more extreme than L (i.e., x_R increases). If $\Psi_R(z_R, z_L)$ decreases, then from Proposition 3, a more moderate L wins against a more extreme R, with certainty.

Denote $z_R(\chi_R) = \chi_R^{-1}(\chi_R)$, which is the platform committing a candidate to χ_R. Fix χ_L

and χ_R, and assume that χ_L and χ_R are symmetric. Differentiate $u(x_R-\chi_L)-u(x_R-\chi_R)-\lambda c(\chi_R-z_R(\chi_R))$ by x_R, which gives $u'(x_R-\chi_L)-u'(x_R-\chi_R)+\lambda c'(\chi_R-z_R)(\frac{\partial z_R(\chi_R)}{\partial x_R})$. Now, differentiate equation (1) by x_R. Then, $\frac{\partial z_R(\chi_R)}{\partial x_R} = -\frac{u''(x_R-\chi_R)c'(\chi_R-z_R(\chi_R))}{u'(x_R-\chi_R)c''(\chi_R-z_R(\chi_R))} < 0$. Moreover, $\lambda = \frac{u'(x_R-\chi_R)}{c'(\chi_R-z_R(\chi_R))}$ in equilibrium, from Lemma 1. After substituting these into the above equation, we have

$$u'(x_R-\chi_L)-u'(x_R-\chi_R)-\frac{u''(x_R-\chi_R)c'(\chi_R-z_R(\chi_R))}{c''(\chi_R-z_R(\chi_R))}. \tag{11}$$

If (11) is negative, $\Psi_R(z_R,z_L)$ becomes lower than $\Psi_L(z_L,z_R)$ when R becomes more extreme, which means that R will lose. Equation (11) is negative if

$$\frac{u'(x_R-\chi_L)-u'(x_R-\chi_R)}{u''(x_R-\chi_R)} < \frac{c'(\chi_R-z_R(\chi_R))}{c''(\chi_R-z_R(\chi_R))}. \tag{12}$$

Since this was originally $\Psi_i(z_i,z_j)+b=0$ and $\lambda = \frac{u'(x_R-\chi_R)}{c'(\chi_R-z_R)}$,

$$\frac{u(x_R-\chi_L)-u(x_R-\chi_R)}{u'(x_R-\chi_R)} < \frac{c(\chi_R-z_R(\chi_R))}{c'(\chi_R-z_R(\chi_R))}. \tag{13}$$

From Assumption 1, $\frac{c'(\chi_R-z_R(\chi_R))}{c''(\chi_R-z_R(\chi_R))} > \frac{c(\chi_R-z_R(\chi_R))}{c'(\chi_R-z_R(\chi_R))}$; that is, the right-hand side of (12) is higher than the right-hand side of (13). If $\frac{u'(x_R-\chi_L)-u'(x_R-\chi_R)}{u''(x_R-\chi_R)} \leq \frac{u(x_R-\chi_L)-u(x_R-\chi_R)}{u'(x_R-\chi_R)}$, (12) holds. This equation can be changed to $\frac{u'(x_R-\chi_L)}{u''(x_R-\chi_R)} - \frac{u(x_R-\chi_L)}{u'(x_R-\chi_R)} \leq \frac{u'(x_R-\chi_R)}{u''(x_R-\chi_R)} - \frac{u(x_R-\chi_R)}{u'(x_R-\chi_R)}$. If $x_R-\chi_L = x_R-\chi_R$, both sides are the same. If $x_R-\chi_L$ increases, the left-hand side decreases or does not change. The reason is as follows. Differentiate the left-hand side with respect to $x_R-\chi_L$, which gives $\frac{u''(x_R-\chi_L)}{u''(x_R-\chi_R)} - \frac{u'(x_R-\chi_L)}{u'(x_R-\chi_R)}$. This value is non-positive because $\frac{u'(x_R-\chi_R)}{u''(x_R-\chi_R)} \leq \frac{u'(x_R-\chi_L)}{u''(x_R-\chi_L)}$ when $x_R-\chi_L > x_R-\chi_R$ from Assumption 2. As a result, the left-hand side of (12) is lower than or the same as the left-hand side of (13). Therefore, (12) holds. As a result, the candidate with a lower $|x_i-x_m|$ (L in this case) wins.

Consider $|x_i-x_m| < |x_j-x_m|$. Then, candidate i wins with certainty and, for candidate i, $\Psi_i(z_i,z_j)+b$ is not negative. That is, $-u(|x_i-\chi_i(z_i)|)-\lambda_i c(|z_i-\chi_i(z_i)|)+b \geq -u(|x_i-\bar{\chi}_j|)$, where $\bar{\chi}_j$ satisfies $|x_m-\chi_i(z_i)| = |x_m-\bar{\chi}_j|$. Since $|x_i-x_m| < |x_j-x_m|$, $-u(|x_i-\bar{\chi}_j|) > -u(|x_j-\chi_i(z_i)|)$, and then, $-u(|x_i-\chi_i(z_i)|)-\lambda_i c(|z_i-\chi_i(z_i)|)+b > -u(|x_j-\chi_i(z_i)|)$. The left-hand side is the (expected) utility for candidate i (utility from winning) and the right-hand side is the (expected) utility for candidate j (utility from losing).

When the candidates have a linear utility function, $u'(x_R-\chi_L) = u'(x_R-\chi_R)$ and $\frac{\partial z_R(\chi_R)}{\partial x_R} = 0$, the change in both sides of the first-order condition is zero as x_R changes.

Thus, regardless of the position of the candidates, they still tie if they have an incentive to approach x_m more than x_i. If both candidates (or either) do not have such an incentive and choose $x_i = z_i = \chi_i(x_i)$, a more moderate candidate is certain to win. $\square$

A.10 Corollary 5

Suppose that the two candidates are originally symmetric (i.e., they have symmetric cost and disutility functions, and their ideal policies are equidistant from the median policy), and they announce symmetric platforms. Thus, they will implement χ_L and χ_R, which are also symmetric. Moreover, originally, both candidates have $\Psi_i(z_i, z_j)+b = 0$. Then, consider that R's relative importance of betrayal, λ, becomes lower than that of L's (i.e., λ_R decreases). If $\Psi_R(z_R, z_L)$ decreases, from Proposition 3, L, who has a higher λ_L, always wins against R, who has a lower λ_R.

Now, fix χ_L and χ_R, and assume that χ_L and χ_R are symmetric. Differentiate $u(x_R - \chi_L) - u(x_R - \chi_R) - \lambda_R c(\chi_R - z_R(\chi_R))$ with respect to λ_R, which yields $-c(\chi_R - z_R(\chi_R)) + \lambda_R c'(\chi_R - z_R(\chi_R))\frac{\partial z_R(\chi_R)}{\partial \lambda_R}$. Differentiate equation (1) with respect to λ_R. Then, $\frac{\partial z_R}{\partial \lambda_R} = \frac{c'(\chi_R - z_R(\chi_R))^2}{u'(x_R-\chi_R)c''(\chi_R - z_R(\chi_R))} > 0$. Moreover, $\lambda_R = \frac{u'(x_R-\chi_R)}{c'(\chi_R - z_R(\chi_R))}$ in equilibrium, from Lemma 1. Substituting these values in the above equation, we get $-c(\chi_R - z_R(\chi_R)) + \frac{c'(\chi_R - z_R(\chi_R))^2}{c''(\chi_R - z_R(\chi_R))}$, which is positive, from Assumption 1. As a result, the candidate with a higher λ_i (L, in this case) always wins.

For candidate i, the utility when he/she wins is higher than or equal to the utility when the opponent wins; that is, $-u(|x_i - \chi_i(z_i)|) - \lambda_i c(|z_i - \chi_i(z_i)|) + b \geq -u(|x_i - \bar{\chi}_j|)$, where $\bar{\chi}_j$ satisfies $|x_m - \chi_i(z_i)| = |x_m - \bar{\chi}_j|$. Since $|x_i - x_m| = |x_j - x_m|$, $-u(|x_i - \bar{\chi}_j|) = -u(|x_j - \chi_i(z_i)|)$. Therefore, $-u(|x_i - \chi_i(z_i)|) - \lambda_i c(|z_i - \chi_i(z_i)|) + b \geq -u(|x_j - \chi_i(z_i)|)$. The left-hand side is the (expected) utility of i (from winning), and the right-hand side is the (expected) utility of j (from losing). $\square$

A.11 Corollary 6

Suppose that two candidates are originally symmetric (i.e., they have symmetric cost and disutility functions, and their ideal policies are equidistant from the median policy), and they announce symmetric platforms. Thus, they will implement χ_L and χ_R, which are also symmetric. Moreover, both candidates initially have $\Psi_i(z_i, z_j) + b = 0$. Then, consider that R becomes more policy motivated than L (i.e., β_R increases). If $\Psi_R(z_R, z_L)$ decreases, then from Proposition 3, the less policy-motivated L always wins against a more policy-motivated R.

Now, fix χ_L and χ_R and assume that χ_L and χ_R are symmetric. Differentiate $\beta_R u(x_R - \chi_L) - \beta_R u(x_R - \chi_R) - \lambda c(\chi_R - z_R(\chi_R)) + b$ with respect to β_R, which yields $u(x_R - \chi_L) - u(x_R - \chi_R) + \lambda c'(\chi_R - z_R(\chi_R))(\frac{\partial z_R(\chi_R)}{\partial \beta_R})$. Differentiate equation (1), $\lambda = \frac{\beta_R u'(x_R - \chi_R)}{c'(\chi_R - z_R(\chi_R))}$, with respect to β_R. We get $\frac{\partial z_R}{\partial \beta_R} = -\frac{c'(\chi_R - z_R(\chi_R))}{\beta_R c''(\chi_R - z_R(\chi_R))} < 0$. Moreover, $\lambda = \frac{\beta_R u'(x_R - \chi_R)}{c'(\chi_R - z_R)}$ in equilibrium, from Lemma 1. On substituting these into the above equation, we have

$$u(x_R - \chi_L) - u(x_R - \chi_R) - u'(x_R - \chi_R)\frac{c'(\chi_R - z_R(\chi_R))}{c''(\chi_R - z_R(\chi_R))}. \tag{14}$$

Since this was originally $\Psi_i(z_i, z_j) + b = 0$ and $\lambda = \frac{\beta_R u'(x_R - \chi_R)}{c'(\chi_R - z_R(\chi_R))}$, (13) is satisfied in the proof of Corollary 4. From Assumption 1, $\frac{c'(\chi_R - z_R(\chi_R))}{c''(\chi_R - z_R(\chi_R))} > \frac{c(\chi_R - z_R(\chi_R))}{c'(\chi_R - z_R(\chi_R))}$, and thus, (14) is negative. Therefore, the candidate with a lower β_i (L, in this case) always wins.

Consider $\beta_i < \beta_j$. Then, i always wins, which means that in equilibrium, $\Psi_i(z_i, z_j) + b$ is not negative for i. That is, $-\beta_i u(|x_i - \chi_i(z_i)|) - \lambda_i c(|z_i - \chi_i(z_i)|) + b \geq -\beta_i u(|x_i - \bar{\chi}_j|)$, where $\bar{\chi}_j$ satisfies $|x_m - \chi_i(z_i)| = |x_m - \bar{\chi}_j|$. Note that if $\Psi_i(z_i, z_j) + b < 0$, i does not have an incentive to win in equilibrium. Since $\beta_i < \beta_j$, $-\beta_i u(|x_i - \bar{\chi}_j|) > -\beta_j u(|x_j - \chi_i(z_i)|)$, and hence, $-\beta_i u(|x_i - \chi_i(z_i)|) - \lambda_i c(|z_i - \chi_i(z_i)|) + b > -\beta_j u(|x_j - \chi_i(z_i)|)$. The left-hand side is the (expected) utility of i (from winning), and the right-hand side is the (expected) utility of j (from losing). $\square$

B Discussion

B.1 Position of the Platforms and a Probabilistic Model

This paper allows for the possibility that platforms encroach on the opponent's policy space, that is, $z_R < x_m < z_L$. This appendix discusses and justifies such cases.

In my model, there is no overlap between polices to be implemented, that is, $\chi_L(z_L) \leq$

$x_m \leq \chi_R(z_R)$ in equilibrium, from Lemma 3. On the other hand, there is a possibility that the platforms are further from the candidate's ideal policy than the median policy. In other words, platforms may encroach on the opponent's policy space, that is, $z_R < x_m < z_L$. This could happen when $u(|\chi_j(x_m) - x_i|) - u(|\chi_i(x_m) - x_i|) + b > \lambda c(|x_m - \chi_i(x_m)|)$. If this equation holds, the candidates have an incentive to compromise more when their platforms are the same as x_m. Fortunately, this point should not be a serious problem for the following two reasons.

First, for simplification, my model assumes that candidates know every decision-relevant fact about voter preferences. If candidates are uncertain about voter preferences—that is, a probabilistic voting model is considered—the above situation does not hold in many cases. That candidates have a greater divergence of policies in a probabilistic model is well known (Calvert (1985)). Thus, the platform can enter the candidate's own side in a probabilistic voting model.

Second, the platform may encroach on the opponent's policy space. There are two main parties in Japan: the Liberal Democratic Party (LDP), which supports increased public work to sustain rural areas, and the Democratic Party of Japan (DPJ), which supports economic reforms and the reduction of government debt. In 2001, Prime Minister Junichiro Koizumi, a member of the LDP, promised to implement radical economic reforms, which were also suggested by the DPJ, including a reduction in government works and debt. Thus, Koizumi and the LDP promised policies advocated by DPJ (Mulgan (2002) pp. 56–57). Moreover, in the 2007 Upper House election, the LDP and Prime Minister Shinzo Abe promised continued implementation of Koizumi's economic reforms, while the DPJ promised some policies to recover and support rural areas.[24] This was a complete reversal of the original stance of the parties. My model can explain both cases in which the platforms encroach or do not encroach on the opponent's side.

[24] See "Abe Stumbles on Japan," *The Economist*, July 30, 2007.

B.2 Fixing the Platform

Proposition 2 shows that the realized cost of betrayal decreases with λ, given the policy to be implemented. This appendix shows that the realized cost of betrayal also decreases with λ, given the platform, if $u''(.) = 0$ or if λ is sufficiently high with $u''(d) > 0$ for $d > 0$.

Fix z_i, and denote it as z_i'. Differentiate $\lambda c(|z_i' - \chi_i(z_i')|)$ by λ. Then, it becomes

$$c(|z_i' - \chi_i(z_i')|) - \lambda c'(|z_i' - \chi_i(z_i')|)\frac{\partial \chi_i(z_i')}{\partial \lambda}. \tag{15}$$

Differentiate (1) by λ. Then, $\frac{\partial \chi_i(z_i')}{\partial \lambda} = \frac{c'(|z_i'-\chi_i(z_i')|)^2}{u''(|\chi_i(z_i')-x_i|)c'(|z_i'-\chi_i(z_i')|)+u'(|\chi_i(z_i')-x_i|)c''(|z_i'-\chi_i(z_i')|)}$. Moreover, $\lambda = \frac{u'(|\chi_i(z_i')-x_i|)}{c'(|z_i'-\chi_i(z_i')|)}$ is in equilibrium from Lemma 1. Substitute these in (15). Then, (15) becomes

$$c(|z_i' - \chi_i(z_i')|) - \frac{u'(|\chi_i(z_i') - x_i|)c'(|z_i' - \chi_i(z_i')|)^2}{u''(|\chi_i(z_i') - x_i|)c'(|z_i' - \chi_i(z_i')|) + u'(|\chi_i(z_i') - x_i|)c''(|z_i' - \chi_i(z_i')|)}. \tag{16}$$

If it is negative, the realized cost of betrayal decreases with λ when the platforms are fixed. It is negative if

$$\frac{u''(|\chi_i(z_i') - x_i|)}{u'(|\chi_i(z_i') - x_i|)} < \frac{c'(|z_i' - \chi_i(z_i')|)}{c(|z_i' - \chi_i(z_i')|)} - \frac{c''(|z_i' - \chi_i(z_i')|)}{c'(|z_i' - \chi_i(z_i')|)}.$$

If $u''(|\chi_i(z_i') - x_i|) = 0$, (16) is negative since $\frac{c'(|z_i'-\chi_i(z_i')|)}{c(|z_i'-\chi_i(z_i')|)} > \frac{c''(|z_i'-\chi_i(z_i')|)}{c'(|z_i'-\chi_i(z_i')|)}$ from Assumption 1. Suppose $u''(|\chi_i(z_i') - x_i|) > 0$. I introduce the following new assumption.

Assumption 3 $\frac{c'(d)}{c(d)} - \frac{c''(d)}{c'(d)}$ *and* $\frac{u''(d)}{u'(d)}$ *are non-increasing in d, and go to infinity as d goes to zero.*

If the function is monomial, these assumptions hold, and many polynomial functions satisfy them. If λ increases to infinity, $|\chi_i(z_i') - x_i|$ increases to $|z_i' - x_i|$, and $|z_i' - \chi_i(z_i')|$ decreases to zero. Then, while $\frac{u''(|\chi_i(z_i')-x_i|)}{u'(|\chi_i(z_i')-x_i|)}$ decreases to $\frac{u''(|z_i'-x_i|)}{u'(|z_i'-x_i|)}$, $\frac{c'(|z_i'-\chi_i(z_i')|)}{c(|z_i'-\chi_i(z_i')|)} - \frac{c''(|z_i'-\chi_i(z_i')|)}{c'(|z_i'-\chi_i(z_i')|)}$ increases to infinity. On the other hand, if λ decreases to zero, $|\chi_i(z_i') - x_i|$ decreases to zero, and $|z_i' - \chi_i(z_i')|$ increases to $|z_i' - x_i|$. Then, while $\frac{c'(|z_i'-\chi_i(z_i')|)}{c(|z_i'-\chi_i(z_i')|)} - \frac{c''(|z_i'-\chi_i(z_i')|)}{c'(|z_i'-\chi_i(z_i')|)}$ decreases to $\frac{c'(|z_i'-x_i|)}{c(|z_i'-x_i|)} - \frac{c''(|z_i'-x_i|)}{c'(|z_i'-x_i|)}$, $\frac{u''(|\chi_i(z_i')-x_i|)}{u'(|\chi_i(z_i')-x_i|)}$ increases to infinity. Thus, if λ is sufficiently high, (16) is negative.

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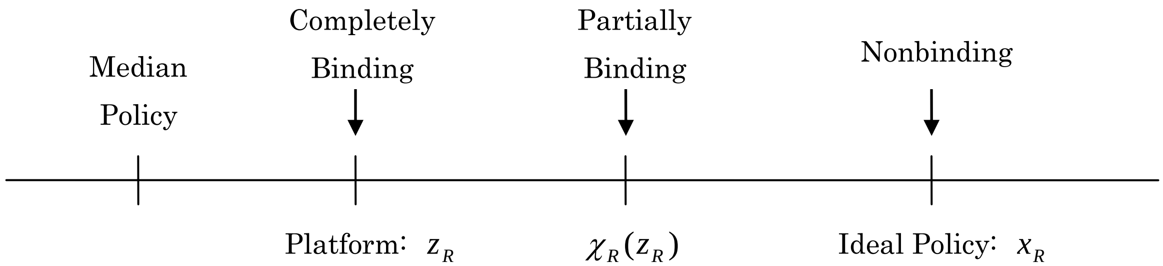

Figure 1: Complete, Non- and Partially Binding Platforms

In models of completely binding platforms, candidates implement their platform. In models of nonbinding platforms, candidates implement their ideal policy. In the model of partially binding platform, candidates will implement a policy that is between their platform and ideal policy.

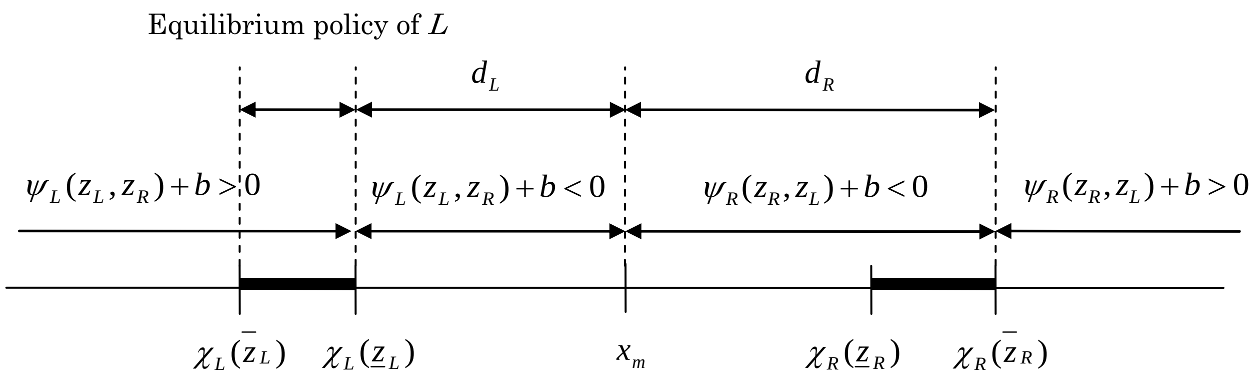

Figure 2: Candidates Having Asymmetric Characteristics

Suppose $d_L < d_R$. Then, candidate L has an incentive to win $(\psi_L(z_L, z_R)+b>0)$ while candidate R does not have it $(\psi_R(z_R, z_L)+b<0)$ when both candidates' *symmetric* policies are within the bold area. Candidate L announces a platform such that his/her policy is within the bold area, and R loses.