Lies, Damned Lies, and Political Campaigns

Steven Callander, Northwestern University*
Simon Wilkie, Caltech†

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Abstract

Despite a pervasive presence in politics, lying has not traditionally played a role in formal models of elections. In this paper we develop a model that allows candidates in the campaign stage to lie about their policy intentions if elected to office, and in which the willingness to lie varies across candidates. We find that the electoral environment favors candidates more willing to lie, but to a lesser degree than may be expected and to such a reduced extent that more honest candidates are often successful. Most notably, we find that the possibility that some candidates will lie more than others significantly affects the behavior of all candidates, implying that misleading conclusions will be drawn if homogeneous candidate honesty is assumed.

*Assistant Professor of Managerial Economics and Decision Sciences at the Kellogg School of Management, Northwestern University, Evanston, IL 60208; scal@kellogg.northwestern.edu.

†Assistant Professor of Economics in the Division of Humanities and Social Sciences, Caltech, Pasadena, CA 91125, wilkie@hss.caltech.edu.

1 Introduction

> "People never lie so much as after a hunt, during a war or before an election."
> – Otto Von Bismark.

After the act of voting itself, lying is arguably the most common feature of any electoral environment. Candidates lie to hide some characteristic or preference from voters in an effort to appear more attractive. It might be concluded, therefore, that the more willing a candidate is to lie the more effective they will perform politically; indeed, as a candidate willing to lie can promise everything that an honest candidate can promise plus more, a basic conclusion may be that more capable liars will dominate those less so and consequently almost always win elections.

We explore this logic formally and find it to be partly true but mostly false. We show that electoral competition imposes a natural constraint on the advantage of lying that, significantly, binds even in the absence of a direct voter preference for honesty. We find that the electoral environment does favor candidates who are more willing to lie but to a lesser degree than intuition – or popular observation – would suggest, and to such a reduced extent that more honest candidates are victorious in a significant proportion of elections. Further, and most significantly, we show that the possibility that some candidates will lie more than others dramatically affects the behavior of *all* candidates: that is, candidates of all levels of honesty choose radically different policy platforms than they otherwise would. Immediately, this finding implies that, although candidates with a high willingness to lie are favored, an ex-ante assumption that candidates are all equally willing to lie produces a misrepresentation of the competitive forces facing candidates and yields misleading conclusions.

The intuition and results we present turn on a very simple fact: for lying to be effective it must be believed. Consider, for example, the problem of a median voter facing the choice between two candidates, one with a platform at her preferred policy and one slightly divergent. In standard models lying is prohibited and so in such an environment the voter must possess a strict preference for the convergent candidate (as campaign promises translate directly to policy outcomes). If the connection between words and deeds is relaxed, however, and lying permitted then the voter's optimal action will depend on the relative honesty of the respective candidates. If the voter believes that the divergent platform will produce a more centrist final policy (as the candidate is constrained in his campaign announcement by his reluctance to lie) then the voter will support the more distant candidate. Thus, the convergent candidate is not believed precisely because he pandered completely to the preferences of the median voter, he was not believed and, therefore, his greater ability to lie is of no benefit.

We show that the requirement of believability present in this example is binding generally and impacts significantly the nature of electoral competition. The model we develop allows for the willingness of candidates to lie to be one of two types (and independent of policy intentions). We show that precisely because the candidates more willing to lie will "say anything to be elected" their campaign announcements are less informative about policy intentions. Consequently, ceteris paribus, voters endogenously develop a preference for less dishonest candidates. This induced preference has a powerful effect on the behavior of strategic candidates if (as assumed here) a candidate's willingness to lie is private information. With private types a subtle but significant incentive for imitation among candidates is induced that ameliorates the advantage of candidates more willing to lie.

Continuing the previous example: if voters prefer a divergent platform to a centrist platform then candidates most willing to lie will be induced to imitate less dishonest candidates and offer the divergent platform. Ironically, therefore, the greater flexibility of candidates most willing to lie induces endogenously a voter preference that in turn induces these candidates to not utilize that very flexibility. Most powerfully, this logic holds even if almost all candidates are of the type most willing to lie. Moreover, the resultant equilibrium effect not only increases the political power of more honest candidates, but induces more policy divergence – from both types of candidate – than would otherwise arise. In equilibrium we find this divergence to correlate well with empirical observation.

An important corollary of our results relates to the median voter theorem of Black (1948, 1958) and its empirical implications. Implicit in our argument and the example above is the possibility that the more centrist candidate may lose the election (this outcome also arises in the equilibrium we present). Observationally, therefore, such a result would appear to violate the logic of the median voter theorem. However, as should be clear from our arguments, such a conclusion would be spurious. Our results expose a subtlety in voter preference that implies the power of the median voter, although still driving group choice, need not translate to electoral outcomes such that the most centrist candidate is always selected.

The ability and willingness of candidates to lie has not traditionally played a role in formal studies of elections despite the litany of mistruths and broken promises in real politics. Despite its absence, the results developed here do relate to the notion of pandering that arises in standard models. The conjunction of campaign promises and policy choices in standard models, however, implies that pandering requires compromise on actual policy and not merely rhetoric as is the case here. This difference – between words and actions – produces vastly different intuitions about the nature and advantage of pandering. In standard models (without lying) the median voter reaction to pandering is unambiguously positive: the candidate that panders the most – i.e., announces the most centrist platform – will produce the more preferable policy outcome and should be supported. In contrast, if lying is allowed (as may reasonably be assumed) then the advantage to pandering is not unambiguous and, in fact, natural limits exist on its effectiveness. This possibility provides insight into the nature of electoral competition and suggests why a "race towards the centre" is not always observed in elections.

The source of a candidate's ability to lie can be many and varied. We caution against interpreting the willingness of a candidate to lie as purely a moral issue. In essence lying is an ability, and variations of this ability, as well as the willingness to utilize it, can arise for a variety of moral, personal, or societal reasons. For example, party affiliations as well as political histories often impose constraints on what can be credibly claimed by different politicians. Regardless of the source, however, it would seem more reasonable to assume than to not that variation exists in both the ability and willingness of candidates to misrepresent their true intentions. Such an assumption is the starting point for the analysis presented herein.

The remainder of the paper is organized as follows. The following section presents the model and in Section 3 general equilibrium properties are derived. In Section 4 we impose a standard equilibrium refinement to produce more precise predictions. In Section 5 the model and results are related to several literatures and matched to empirical observations. Section 6 concludes.

2 The Model

We build upon a model of electoral competition with incomplete information due to Banks (1990).[1] To the best of our knowledge, this paper is the first (and still one of the few) to not explicitly bind candidates to implement their campaign platforms if elected.[2] The model is as follows. There are two candidates, each of whom possesses a true policy intention that they will implement if elected to office; thus each candidate is assumed to have already solved for their optimal behavior once in office and the post-election stage is modeled in reduced form.[3] The candidates simultaneously announce campaign platforms from which the voters attempt to infer the candidates' true intentions (which is private information). A key feature of the model is that candidates bear costs from announcing policy platforms different from their true policy positions (i.e., from lying) where these costs increase with the distance between the announced and the true position. From their inferences, voters select a candidate to support and by majority rule a winner is determined. Once in office the winning candidate's policy intention is implemented and payoffs realized. We extend the framework of Banks by allowing candidates to be endowed with differing willingness' to lie in their policy pronouncements, and for this willingness to also be private information.

Consider a policy space $P \subseteq \Re$, a closed convex interval with $|P| = 2D$, where without loss of generality we assume that the midpoint of P is zero: $P = [-D, D]$. There are two candidates, A and B, whose "types," or true policy preferences are two dimensional. We formalize a candidate's willingness, or propensity, to lie as a cost variable. With probability q a candidate is "low cost" and with probability $(1 - q)$ a candidate is "high cost." Candidates of all types are free to make any policy announcement they wish, however, they incur a cost, parameterized by k, dependent on their type if they lie and implement a policy different from their campaign announcement. The strength of this cost for high cost candidates is $k = K$, and as K increases high cost types are less willing to lie; for $K = \infty$ these

[1] A similar model was proposed by Bernheim (1994) in an analysis of social conformity.

[2] Harrington (1993a) also relaxes this constraint in examining the connection between reelection pressures and campaign promises. Like Banks (1990), Harrington does not allow for variation in the willingness of candidates to lie that is the focus here.

[3] See Levitt (1996) for evidence that a candidate's own ideology will be the primary determinant of behavior once elected to office. Analyzing a different problem, a similar reduced form assumption is also employed in Harrington (1993b).

candidates always reveal truthfully their policy intentions. For simplicity we suppose that low cost types do not incur any such cost (i.e., $k = 0$) and thus are prepared to say "whatever it takes" to get elected.[4] Therefore, low cost types are more willing liars than high cost types. Both candidate types also have true policy positions, α and β, that are assumed to be independent and identically distributed random variables with cumulative distribution $F(.)$ and density $f(.)$, where $f(x) > 0$ for all $x \in P$ and $f(.)$ is symmetric about zero. These are the policies the candidates will implement if elected to office.[5] F and q are common knowledge and independent, so a candidate's ideal point and cost are ex-ante uncorrelated. Thus, a key – and intentional – feature of our model is that high and low cost types differ only in their willingness to lie, allowing the benefits (or drawbacks) of lying to be most clearly exposed.

A mixed strategy $\sigma_j(\alpha, k)$ for candidate $j \in \{A, B\}$ maps j's ideal point, $\alpha \in P$, and willingness to lie, $k \in \{0, K\}$, into a probability distribution over possible policy platforms in P. Denote by $\sigma_j(p|\alpha, k)$ the probability that candidate j locates at policy announcement $p \in P$ given type $\{\alpha, k\}$. Also, denote by $s_j(\alpha, k) \subset P$ the support for any mixed strategy $\sigma_j(\alpha, k)$ (i.e., $\sigma_j(p|\alpha, k) > 0 \Rightarrow p \in s_j(\alpha, k)$). If $s_j(\alpha, k)$ is a singleton then candidate j is playing a pure strategy.

There exists a finite set $N = \{1, 2, ..., n\}$ of voters, where n is odd. All voters have quadratic utility over the policy space,

$$u_i(\alpha) = -(p - p_i)^2$$

where p_i is voter i's ideal point and α is an implemented policy. We further assume that the median voter $v \in N$ has an ideal point equal to the midpoint of the policy space: $p_v = 0$. Given beliefs $\mu_A(p)$ concerning candidate A's true policy position after observing policy announcement p, i's expected utility from A winning the election is

$$Eu_i(\mu_A) = -(\overline{\alpha} - p_i)^2 - \sigma^2_\alpha,$$

where $\overline{\alpha}$ is the mean and σ^2_α is the variance associated with the density $\mu_A(.)$. It should be noted that voter utility does not depend directly on a candidate's

[4] This restriction simplifies considerably the analysis and an analytic solution is obtained for what is a multidimensional, multiple sender signaling game. Despite the simplification, the essential intuition of electoral competition between heterogeneous candidates is captured; results of Stamland (1994, 1999) for unbounded signaling spaces suggest that the intuition uncovered here extends to more general environments.

[5] These policy intentions need not reflect exactly candidates' ideal points, although they may be dependent.

willingness to lie or announced platform. Rather, voters are only concerned with the policy position that is ultimately implemented.

The voters select candidates (vote) after observing the announced policy platforms. Thus, a strategy for voter i is a function

$$r_i : P \times P \to \left\{0, \frac{1}{2}, 1\right\},$$

where $r_i(p_A, p_B)$ is the probability that i votes for candidate A, given that i observes announced positions p_A and p_B; the probability that i votes for B is then $1 - r_i(p_A, p_B)$. Thus, we assume no abstention. If voters have a strict preference for one candidate then they vote for that candidate. If they are indifferent over candidates then they randomize equally. Let $r(.) = (r_1(.), ..., r_n(.))$ summarize the voters' strategies. For any $\{p_A, p_B\} \in P \times P$, let

$$\begin{aligned} v_A(p_A, p_B) &= \left|\{i \in N : r_i(p_A, p_B) = 1\}\right|, \\ v_B(p_A, p_B) &= \left|\{i \in N : r_i(p_A, p_B) = 0\}\right|, \end{aligned}$$

be the number of individuals voting with probability one for A and for B, respectively. For announced policy positions $\{p_A, p_B\}$, the probability that candidate A is elected is given by $\lambda(p_A, p_B)$: therefore, $\lambda(p_A, p_B) = 0$ if $v_B(p_A, p_B) \geq \frac{n+1}{2}$, $\lambda(p_A, p_B) = 1$ if $v_A(p_A, p_B) \geq \frac{n+1}{2}$, and $\lambda(p_A, p_B) = \left[\left\{\left(\frac{1}{2}\right)^{(n-v_A-v_B)}\right\} . \sum_{j=\frac{n+1}{2}-v_A}^{n-v_A-v_B} \binom{n-v_A-v_B}{j}\right]$ otherwise (the probability that A receives a majority of votes). For mixed strategies σ_A and σ_B denote this probability by $\lambda(\sigma_A, \sigma_B)$.

Candidates derive utility from winning office captured by the function $\psi(\alpha, k, p_A)$. For tractability we assume ψ takes the form:

$$\psi(\alpha, k, p_A) = y - k.(\alpha - p_A)^2$$

where α is the candidate's ideal policy and what he will implement if elected, and p_A is the announced policy platform. Thus, the utility from winning derived by high cost types is a function of the distance between, as Banks (1990) puts it, "what they say" and "what they do." Losing candidates do not bear any such cost since it is only the winning candidate's true position (and veracity) which is ultimately revealed. The value of $k \in \{0, K\}$ indicates the cost of announcing a platform different from α. Also, we assume that $y > 0$, so that a candidate can always receive a higher payoff from some announcement, if elected, than from not being elected (that is, the benefits of office are strictly positive).

Therefore, for announced platforms $\{p_A, p_B\}$ utility for candidate A is given by $U(\alpha, k, p_A, r(p_A, p_B)) = \lambda(p_A, p_B) . \psi(\alpha, k, p_A)$. Expected utility over possible types of the opposing candidate is denoted $EU(\alpha, k, p_A, \sigma_B)$ for announcement p_A and opponent strategy σ_B. Utility representations for candidate B are expressed analogously.

3 Equilibrium Behavior

3.1 Electoral Equilibrium

We begin by examining strategies that constitute sequential equilibrium behavior (Kreps and Wilson (1982)). In what follows we restrict attention to sequential equilibrium strategies that are symmetric with respect to candidates and the origin. That is, $\{\alpha, k\} = \{\beta, k\} \Rightarrow \sigma_A(\alpha, k) \equiv \sigma_B(\beta, k)$ and $\sigma_A(p|\alpha, k) = \sigma_A(-p| - \alpha, k)$ for all $p \in P$, which allows subscripts on candidate strategies to be dropped.[6] As any two low cost candidates both incur zero costs from a particular policy announcement, regardless of their true ideal points, we assume that all such candidates play the same (possibly mixed) strategy; that is, $\sigma(\alpha', 0) \equiv \sigma(\alpha'', 0)$ for all $\alpha', \alpha'' \in P$. This restriction simplifies the specification of results without substantively changing the nature of the equilibria. To simplify notation denote the support for the strategy of low cost candidates by s^f where $s^f = \{p \in P : \sigma(p|\alpha, 0) > 0 \text{ for some } \alpha \in P\}$.

In Section 2 it was assumed that voters play weakly dominant strategies and mix equally if indifferent over candidates. Combining these assumptions with the requirements of sequential equilibrium we produce the following definition of an electoral equilibrium:[7]

[6] Banks (1990) considers asymmetric strategies in only one instance and shows that some pooling equilibria exist that are not symmetric with respect to the origin. These equilibria also exist here, although they will not be considered. See footnote 12 on page 16.

[7] This definition merely extends that proferred by Banks to the more general environments analyzed here.

Definition 1 *An electoral equilibrium of the above model consists of strategies* $\sigma^*(.), r_i^*(.)$ *and beliefs* $\mu_A^*(.), \mu_B^*(.)$ *such that*
(1) $\forall \{\alpha, k\} \in \{P, \{0, K\}\}, \ \sigma^*(p'|\alpha, k) > 0 \Rightarrow$
$p' \in \arg\max_{p\in P} \left[q \int EU(\alpha, k, p, \sigma^*(\beta, 0)) f(\beta) d\beta + (1-q) \int EU(\alpha, k, p, \sigma^*(\beta, K)) f(\beta) d\beta\right];$
(2) $\forall i \in N$*, and* $\forall (p_A, p_B) \in P \times P$*,*

$$r_i^*(p_A, p_B) = \begin{cases} 1 \\ \frac{1}{2} \\ 0 \end{cases} \text{as} \int u_i(\alpha) \mu_A^*(\alpha|p_A) d\alpha \begin{matrix} > \\ = \\ < \end{matrix} \int u_i(\beta) \mu_B^*(\beta|p_B) d\beta;$$

(3) if $T(p) \cup s^f \neq \emptyset$*, then* $\mu^*(t_A|p)$ *is the conditional probability (relative to the priors* $f(.)$ *and* q*) that* $\alpha \in t \cap \left(T(p) \cup s^f\right)$ *given* $\alpha \in \left(T(p) \cup s^f\right)$ *and* $T(p) = \{\alpha \in P|\sigma(p|\alpha, K) > 0\}$*, where* $t \in P$*.*

Condition (1) states that each candidate chooses his announcement to maximize expected utility, given the strategy of the other candidate and the strategies of voters. Condition (2) gives the weak dominance and indifference assumptions described above and implies that all voters hold the same beliefs in and out of equilibrium. Condition (3) requires that voters use Bayes' rule to update their beliefs when an equilibrium announcement is made.

The assumption of quadratic utilities and the equilibrium condition that all voters possess the same beliefs for all possible announcements imply that we can reduce the complexity of calculating electoral equilibria. For any beliefs $\mu_A(.), \mu_B(.)$, where the means of these densities $\overline{\alpha}, \overline{\beta}$ differ, there exists a unique position $\overline{p} \in P$ defined by

$$\overline{p} = \frac{\overline{\alpha} - \overline{\beta}}{2} + \frac{\sigma_\alpha^2 - \sigma_\beta^2}{2\left(\overline{\alpha} - \overline{\beta}\right)}$$

such that all voters with $p_i < \overline{p}$ should vote for one candidate, and all voters with $p_i > \overline{p}$ should vote for the other candidate. If $\overline{\alpha} = \overline{\beta}$ then $\overline{p}$ is undefined. If $\sigma_\alpha^2 = \sigma_\beta^2$ then all voters are indifferent between voting for A and B. If $\sigma_\alpha^2 \neq \sigma_\beta^2$ then all voters vote for the candidate with the lower variance. Thus, given beliefs $\mu_A(.), \mu_B(.)$, if the median voter is not indifferent between voting for A and B, then whomever v votes for wins the election. If v is indifferent then each candidate wins with probability $\frac{1}{2}$, whether other voters are indifferent or not. Thus, the following simplification can be made,

$$U(\alpha, k, p_A, r(p_A, p_B)) = \psi(\alpha, k, p_A) .r_v(p_A, p_B)$$

Denote by $r_v(p_A, \sigma_B(\alpha, k))$ the probability that the median voter supports candidate A given announcement p_A and that B is type $\{\alpha, k\}$. Therefore, the probability that a candidate of type $\{\alpha, k\}$ wins the election after announcing $p_A \in s(\alpha, k)$ and facing σ_B is then

$$\lambda(p_A, \sigma_B) = q \int r_v(p_A, \sigma_B(\alpha, 0)) f(\beta) d\beta + (1-q) \int r_v(p_A, \sigma_B(\alpha, K)) f(\beta) d\beta$$

Denote the set of electoral equilibrium strategies in the model by Γ_e. Thus, for all $\sigma(.), r(.) \in \Gamma_e$ and all $p \in s_A(\alpha, k)$ the candidate incentive compatibility constraint can be written as

$$\lambda(p, \sigma_B) . \psi(\alpha, k, p) \geq \lambda(p', \sigma_B) . \psi(\alpha, k, p') \quad \forall p' \in P \tag{1}$$

3.2 Results

The framework developed above creates a two-sender signaling problem. The model substantially complicates that considered by Banks (1990) as the presence of senders with different signaling costs confounds the inference problem faced by voters. The results that follow focus on the subtle but potent equilibrium effects arising from the interaction of types. Even in the presence of these effects, however, the behavior of high cost candidates must satisfy several basic properties which we now develop.

High Cost Candidates

The following two results reflect basic properties of signaling games and are implied almost directly by Equation 1 (they hold also in the model of Banks (1990) with only high cost candidates). Of course, these properties do not hold for low cost candidates, the behavior of whom we will deal with momentarily. All proofs are gathered in the Appendix.

Proposition 1 *For all $\sigma(.), r(.) \in \Gamma_e$, and $\alpha, \alpha' \in P$ such that $\alpha < \alpha'$ then* $\max[s(\alpha, K)] \leq \min[s(\alpha', K)]$.[8]

Thus, in all electoral equilibria, high cost candidates who are "more extreme" in their true policy positions will make announcements which are (weakly) farther from the median than more moderate candidates. The next proposition shows that this implies these extreme candidates are elected (weakly) less often.

[8] By the assumption of symmetric strategies, behavior for $\alpha < 0$ is defined implicitly.

Proposition 2 *For all* $\sigma(.), r(.) \in \Gamma_e$, *if* $|\alpha| < |\alpha'|$, $p \in s(\alpha, K)$ *and* $p' \in s(\alpha', K)$ *then* $\lambda(p, \sigma) \geq \lambda(p', \sigma)$.

In the case of all candidates being high cost ($q = 0$) it has been shown by Banks (1986) that the set Γ_e of electoral equilibria is quite large, and little of substantive value can be added to the above propositions without restricting out-of-equilibrium beliefs. In contrast, if the pool of candidates includes both high and low cost types ($q > 0$) then several strong statements about imitation and the nature of equilibrium can be made with only the requirements of electoral equilibrium. These statements are now developed, beginning with the behavior of low cost candidates.

Low Cost Candidates

Low cost candidates are not burdened with signaling costs and so do not face a trade-off between policy location and the probability of victory. With all announcements equally costly (i.e., zero cost), the utility of low cost types is maximized when their probability of victory is maximized. Thus, in equilibrium all low cost types must have equal probability of victory, regardless of their true policy intentions, and, more importantly, this probability must be at least as big as for all high cost candidates. These features are summarized in the following proposition.

Proposition 3 *For all* $\sigma(.), r(.) \in \Gamma_e$, $\forall \alpha$ *and* $\forall p \in s(\alpha, 0)$, $\lambda(p, \sigma)$ *is constant and* $\lambda(p, \sigma) \geq \max \lambda(\alpha', \sigma)$ *for any* $\alpha' \in s(\alpha', K)$.

This obvious proposition implies the corollary that the high cost types that mix in equilibrium is only finite in number (as for low cost types λ must be constant across the support of a strategy whereas ψ varies). Thus, the probability that a high cost type is mixing in equilibrium is zero.

Corollary 1 *For all* $\sigma(.), r(.) \in \Gamma_e$, *the set of high cost candidates that play a mixed strategy has measure zero; i.e.,* $|\{\alpha | \sigma(p|\alpha, K) = 1$ *for some* $p\}| = 1$.

Subsequent results can be used to further show that in equilibrium mixing can only occur for one type of high cost candidate. Therefore, to avoid the complication of unneeded generality, we hereafter focus on pure strategies for high cost types.[9] We abuse the notation for the support of a mixed strategy and denote a pure strategy by $s(\alpha, K)$.

Imitate and Obscure: High and Low Cost Candidates

The capabilities of low cost candidates dominate those of high cost candidates and so a reasonable conjecture may be that low cost types dominate electoral outcomes. To dominate elections, however, the low cost types must appeal to the median voter by announcing platforms that appeal to her. If all low cost candidates make such announcements, then this behavior begs the question of how voters should perceive these announcements, particularly as they are concerned with policy outcomes and not campaign rhetoric? Suppose, for example, the median voter favors one particular centrist campaign announcement over all other possible announcements. Immediately, Proposition 3 implies that all low cost candidates must announce the favored platform. Consequently, voters can't differentiate among the low cost types and the median voter's expectations over policy outcomes must span the entire space P. Our first key observation, therefore, is that low cost candidates cannot fool voters into believing they offer centrist platforms, and that this inability undermines their ability to dominate elections. Significantly, this inability is not in spite of their campaign flexibility but because of it.

The above logic still leaves open the question: if convergence does not deceive voters, how then should low cost candidates behave? Remarkably, we show that the inability of low cost candidates to separate from each other in their campaign behavior – and, thus, their greater campaign flexibility – actually becomes a burden and, in an attempt to avoid being exposed as low cost types, they are induced to imitate high cost candidates. The following three results characterize the nature of the incentive to imitate and show that it serves to constrain tightly the behavior available to low cost candidates in equilibrium.

To deal with the possibility for imitation in several forms we develop the following terminology. We say that a candidate is *separating* if voters can precisely identify his true policy preference; that is, $\{\alpha, k\}$ is separating if $\mu(\alpha | s(\alpha, k)) = 1$. By assumption, it is possible only for high cost types to separate. A candidate is said to be *pooling* if he is choosing the identical policy platform as other candidates of similar cost; that is, $\{\alpha, k\}$ is pooling

[9] Banks (1990) only considers pure strategies. We allow greater generality here as mixed stategies are used in equilibrium by low cost candidates.

if there exists a $\{\alpha', k\}$ such that $s(\alpha, k) = s(\alpha', k)$. Also by assumption, it must be that all low cost candidates are pooling. A high cost candidate is said to be *imitated* if a low cost candidate announces the same policy platform; that is, $s(\alpha, K) \in s^f$. If a candidate is neither pooling nor separating (and thus he must be imitated), then we will say that he is *obscured*. Therefore, an obscured high cost candidate is distinguishable by his action from other high cost candidates, but not from imitating low cost candidates.

We begin our analysis of imitation by characterizing the requirements such that imitation is not induced. The requirements are tight and are described in Proposition 4. The logic of this result is simple. To satisfy Proposition 3 voters must weakly prefer announcements in s^f to those outside. As low cost types are pooling, then, by Proposition 1, it must be that high cost candidates are also all pooling.

Proposition 4 *If in equilibrium* $\nexists \alpha'$ *such that* $s(\alpha', K) \in s^f$ *then* $s(\alpha, K)$ *is constant for all* $\alpha \in [0, D)$. *Further,* $\min s^f \geq \max\{s(\alpha, K), 2D - s(\alpha, K)\}$. *If* $K > \hat{K}$, *where* $\psi\left(D, \hat{K}, \frac{D}{2}\right) = 0$, *then such an equilibrium does not exist.*

Thus, for voters to be able to distinguish in equilibrium completely between low and high cost candidates (i.e., no imitation), the candidates must all pool with their own types such that voters are unable to distinguish at all between candidates of different policy preferences (and, indeed, low cost types must pool at extreme locations). An important implication of Proposition 4 is that, if high cost candidates are separating, low cost candidates must be imitating. Thus, even under the weak requirement of electoral equilibrium, equilibria – if they exist – require a trade-off between distinguishing low cost from high cost candidates and moderate from extreme candidates (i.e., equilibrium either separates low from high cost types, or candidates with extreme policy intentions from those with moderate policy intentions).

For all behavior of high cost candidates other than allowed in Proposition 4, low cost candidates must be imitating. The following result establishes several properties of imitation in equilibrium.

Proposition 5 *For all* $\sigma(.), r(.) \in \Gamma_e$, *if* $s(\hat{\alpha}, K) \in s^f$ *for any* $\hat{\alpha} \in P$ *then* $\exists \alpha'$ *such that* $\forall \alpha \in [0, \alpha'), s(\alpha, K) \in s^f$ *and* $\forall \alpha \in (\alpha', D], s(\alpha, K) \notin s^f$.

Proposition 5 shows two things: (i) that low cost candidates can not just imitate the high cost candidate at the median and that imitation must be more general, and (ii) if low cost candidates imitate a high cost candidate then they must also imitate all high cost candidates that are more centrist in their ideal points. Immediately, this finding implies that voters will be more able to identify the true policy intentions of extreme candidates than centrist ones.[10] The arguments leading to Proposition 5 imply the following corollary.

Corollary 2 *For all* $\sigma(.), r(.) \in \Gamma_e$, *if* $\exists \alpha', \alpha'' \in (-D, D)$ *such that* $s(\alpha', K) \in s^f$ *and* $s(\alpha'', K) \notin s^f$ *then for all* $p \in s^f$ *there must exist an* α *such that* $s(\alpha, K) = p$.

Thus, although low cost candidates incur the same costs for all policy announcements, in any electoral equilibrium that conveys policy information to the voters (i.e., not completely pooling) low cost candidates must always imitate a high cost type. Therefore, the preference that voters develop endogenously in equilibrium for high cost types restricts completely the possible policy platforms of low cost types.

The above results have described the restrictions that imitation places on the equilibrium strategies of low cost candidates. Restrictions also apply to the behavior of high cost candidates. We close this section with a characterization of the behavior of high cost candidates when obscured by low cost candidates.

Lemma 1 *For all* $\sigma(.), r(.) \in \Gamma_e$, *if* $s(\alpha, K) \in s^f \ \forall \alpha \in [0, \alpha']$, *then* $s(\alpha, K) = \alpha$ *if* $s(\alpha, K)$ *is continuously increasing.*

Thus, if candidates are obscured then they must be announcing their true policy preferences. Remarkably, the threat of imitation reduces the pressure on high cost types to converge and allows them to announce platforms that are less costly to them. In fact, during the campaign they must "tell the truth" to voters and campaign on their true policy intentions. Paradoxically, the addition of rabid liars into the candidate pool actually increases the amount of truthfulness in elections. It is also possible for the strategies of imitated types to increase discontinuously (e.g., a series of pools) and restrictions can be placed on the nature of these discontinuities. However, in the following section these possibilities will be eliminated by an equilibrium refinement and as such we will not explore them here. We now turn to the refinement.

[10] See Blomberg and Harrington (2000). Connections between the model and empirical observations will be discussed extensively in Section 5.

4 Refined Equilibrium Behavior

4.1 Universally Divine Electoral Equilibrium

The results of Section 3 restrict significantly the behavior of candidates in equilibrium. However, the set Γ_e is still too large for precise predictions and comparative statics. To further refine this set we will impose, as did Banks (1990), the requirement of universal divinity due to Banks and Sobel (1987). Universal Divinity requires that, for every out-of-equilibrium announcement, voters decide which type of candidate is most likely to "defect" from the equilibrium and make such an announcement, and then place probability one on that type of candidate making the announcement. This refinement is more restrictive than is required for the following results; it is employed here because it is both simple and widely recognized. Essentially, all that is required for the current results is that some probability is shifted from those less likely to defect to those more likely to defect.

For all $\sigma(.), r(.) \in \Gamma_e$, let $\theta(\alpha, k, p|\sigma(.), r(.))$ be the probability of election which makes a candidate of type $\{\alpha, k\}$ indifferent between making his equilibrium announcement (and receiving his equilibrium utility) and announcing the out-of-equilibrium position p. For low cost types $\theta(\alpha, 0, p) = \lambda(p', \sigma)$ for all $p' \in s^f$, and for high cost types:

$$\theta(\alpha, K, p) = \frac{\lambda(s(\alpha, K), \sigma) . \psi(\alpha, k, s(\alpha, K))}{\psi(\alpha, k, p)}$$

If voters adopt a new strategy $r'(.)$ where the resulting probability of election $\lambda'(\alpha, k)$ at p was greater than $\theta(\alpha, k, p)$, then this type would rather announce p than $s(\alpha, k)$, thus defecting from the equilibrium. For any electoral equilibrium $s(.), r(.) \in \Gamma_e$, we say that $\{\alpha', k'\}$ is "more likely" to defect to p than $\{\alpha, k\}$ if $\theta(\alpha, k, p) > \theta(\alpha', k', p)$; that is, the set of voter strategies for which $\{\alpha', k'\}$ would want to defect is larger (by inclusion) than for $\{\alpha, k\}$. The criterion of universal divinity due to Banks and Sobel (1987) requires that, at out-of-equilibrium announcements p, voters should assign positive probability only to those candidate types that are most likely to defect.

Definition 2 *A universally divine electoral equilibrium is an electoral equilibrium satisfying the following condition: if* $T(p) \cup s^f = \emptyset$, *then* $\mu^*(\alpha'|p) > 0$ *only if, for some* k', $\{\alpha', k'\} = \arg\min_{\{\alpha,k\}} \theta(\alpha, k, p|\sigma^*(.), r^*(.))$.

4.2 Benchmark Results

Let Γ_u denote the set of universally divine electoral equilibrium strategies. Not surprisingly, the set Γ_u is much smaller than the set Γ_e. We begin our analysis with some benchmark results. If $q = 0$ then this model collapses to that of Banks (1990) in which all candidates are high cost. Banks proved the following two results. Define K^* as the value of K which solves $\psi(D, K, 0) = 0$. Thus, if $K = K^*$ then a candidate who is of the most extreme type $(\alpha = D)$ will be indifferent between announcing the median position and losing the election.

Proposition 6 (Banks (1990)) *Suppose $q = 0$. If $K < K^*$, then for all $s(.), r(.) \in \Gamma_u$, $s(.) = 0$, $\forall \alpha \in P$.*[11]

Therefore, if the costs are sufficiently low, the only universally divine equilibrium is for all candidates to pool at the same announcement.[12] Thus, without sufficient costs, the candidates are indistinguishable to the voters who respond by picking a winner randomly. Banks' second result is to show that if costs are instead above the threshold K^* then there is some separation of policy platforms.

Proposition 7 (Banks (1990)) *Suppose $q = 0$. If $K > K^*$, then the unique universally divine equilibrium is of the following form:*
(i) $\forall \alpha \in [0, \alpha(K)]$, $s(\alpha) = 0$
(ii) $\forall \alpha \in (\alpha(K), D]$, $s(\alpha)$ is strictly increasing (i.e. separating)

Thus, with sufficiently high costs, centrist candidates pool at the median and the more extreme candidates separate and are distinguishable to the voters. Before considering the complete model we move to the opposite extreme of that considered by Banks and suppose that all candidates are low cost. This produces the following obvious result.

[11] Banks (1990) states this result with instead the weak inequality $K \leq K^*$. However, there exist other equilibria at $K = K^*$, although they are substantively the same as they differ only on a non-measurable set (at only one point). The variation is that it may now be the case that $s(D, K) > 0$. This strategy still supports an equilibrium as the extreme type is indifferent between losing with certainty and winning at zero.

[12] Banks (1990) does not make the restriction that strategies be symmetric about zero in this result. In this environment he shows that there exists a continuum of equilibria in which all voters pool at a single point in some interval around the median voter; and as K increases the interval collapses. We restrict attention to symmetric strategies as it simplifies the statement of the current result as well as being imposed in all other results.

Proposition 8 *Suppose* $q = 1$. *Then any* $\sigma(\alpha, 0)$ *is supportable as a universally divine electoral equilibrium.*

With only low cost candidates the election campaign is one of cheap talk and the set of equilibrium actions can not be pinned down at all. Alternatively, this case can be thought of as the limit of the model with high cost candidates and the cost of lying approaching zero; i.e., $K \to 0$. This alternate view of the case in which all candidates are low cost is able to select a unique equilibrium out of the equilibrium set of Proposition 8; in the selected equilibrium all candidates announce policy platforms at zero (as the conditions of Proposition 6 are satisfied). Regardless of the view taken, the equilibria for the case of candidates all being low cost provide a startling benchmark when compared to the full model with both low and high cost candidates, highlighting how the behavior of low cost candidates is affected by even the smallest presence of high cost candidates.

4.3 Existence and Characterization

We turn now to the complete model in which both low and high cost candidates are possible. We prove the existence of equilibrium and show that all such equilibria must belong to a restricted class of strategies. To understand the incentives when high and low cost candidates coexist it is important to understand the inferences of the median voter in Proposition 7. If the median voter observes a policy platform at zero (her ideal point) then she can not be sure of the policy that will be implemented, but she does know that it must be in the interval $[0, \alpha(K)]$. Obviously the voter strictly prefers such a lottery to the certain outcome of the first separating type $\alpha(K)$.

Now, if the strategies of high cost candidates are left unchanged, adding a small fraction of low cost candidates to the type space does not upset the intuition of Banks. By Proposition 3 the low cost candidates must join the pool at the median. In this case the median voter, if observing a campaign announcement of zero, believes final policy to be in the interval $[0, \alpha(K)]$ with probability $\frac{(1-q)\frac{\alpha(K)}{D}}{(1-q)\frac{\alpha(K)}{D}+q}$ and over the entire space $[0, D]$ with probability $\frac{q}{(1-q)\frac{\alpha(K)}{D}+q}$. The presence of low cost candidates reduces the utility of the median voter, although for small enough q she still strictly prefers the lottery over the certain policy $\alpha(K)$, and thus the equilibrium of Banks still exists.[13]

[13]The critical value α' varies with q, although it varies continuously and for small values

For larger q, however, the logic of Banks equilibrium result breaks down and the centrist equilibrium no longer exists. In this case the first separating candidate (a high cost type at $\alpha(K,q)$) is preferred by the median voter to an announcement at zero. If the centrist announcement is from a high cost candidate then the voter would receive a preferred outcome, however this is outweighed by the high probability that the candidate is low cost and potentially deliver an extreme policy. Thus, in equilibrium the centrist equilibrium breaks down and the behavior of high cost candidates is significantly affected by the presence of low cost candidates. Further, we show also that the converse holds: that the policy platforms of low cost candidates are affected significantly by the presence of high cost candidates. We develop these equilibria by construction, beginning with the incentives of high cost candidates.

In any equilibrium, if the high cost candidates do not pool, the low cost types must be imitating, thus creating one, or a series, of campaign announcements over which the median voter is indifferent. For any such imitation to constitute equilibrium behavior it must be that such announcements are preferred to announcements by separating types. The equilibrium of Banks breaks down as the pool at zero is too unattractive to entice more extreme high cost types to join. Therefore, to construct an equilibrium the set of announcements potentially made by low cost types – s^f – must be made more attractive to induce high cost types to join (to the extent that the pool is preferred by voters over any remaining separating types). Such an attraction can only be achieved by moving the pool away from zero and towards the policy preferences of the separating high cost candidates. Proposition 9 proves, for any universally divine equilibrium, that the nature of divergence must satisfy a particular class of strategies, what we refer to as "Cut-Point" strategies.

Definition 3 *A "Cut-Point" strategy is of the following form*[14]*: for* $K > 0$,
(i) $\forall \alpha \in [0, \alpha')$, $s(\alpha, K) = \alpha$
(ii) $\forall \alpha \in [\alpha', \alpha'')$, $s(\alpha, K) = \alpha'$
(iii) $\forall \alpha \in [\alpha'', D]$, $s(\alpha, K)$ *is strictly increasing (separating)*

Proposition 9 *Suppose* $q \in [0, 1)$. *Every universally divine equilibrium requires high cost candidates to play a Cut-Point strategy.*

of q this argument must still hold.

[14] The restriction to strategies that are symmetric around zero implies that strategies for types with $\alpha < 0$ are defined implicitly.

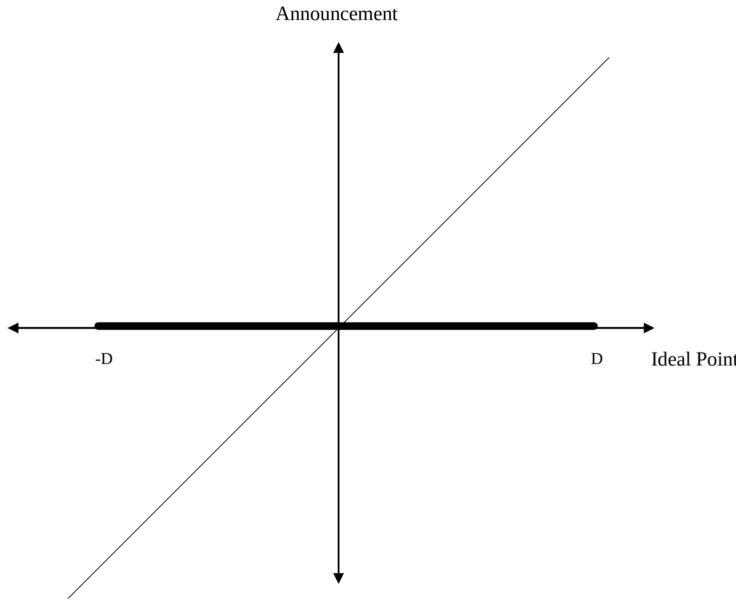

Figure 1: $\alpha' = 0$; $\alpha'' = D$

Thus the behavior of high cost candidates is pinned down in equilibrium. Note that the equilibria derived by Banks (1990) for $q = 0$ require high cost candidates to use a Cut-Point strategy (for Proposition 6 $\alpha' = 0, \alpha'' = D$; and for Proposition 7 $\alpha' = 0, \alpha'' < D$). Similar equilibria may exist in the general model. However, with both high and low cost candidates possible, it is not required in equilibrium for all pooling strategies to converge to the ideal policy of the median voter. For non-centrist pools $\alpha' > 0$ and the behavior of centrist high cost candidates is consistent with Lemma 1.

The variety of equilibria that can arise within the family of Cut-Point strategies are depicted in Figures 1, 2, and 3. In Figures 1 and 2 the pool of high cost candidates is at zero (i.e., $\alpha' = 0$), and we say this equilibrium is "centrist." In contrast, in Figure 3 $\alpha' > 0$ and the pool is separated from the median voter. In this case the equilibrium is "non-centrist." Further, we abuse notation and refer to an equilibrium as "separating" if $\alpha'' < D$ and some high cost candidates separate. Thus, the equilibria depicted in Figures 2 and 3 are separating, and that depicted in Figure 1 is not.

With respect to standard signaling models the possibility that $\alpha' > 0$ is unusual as it requires the announcements of high cost candidates to strictly

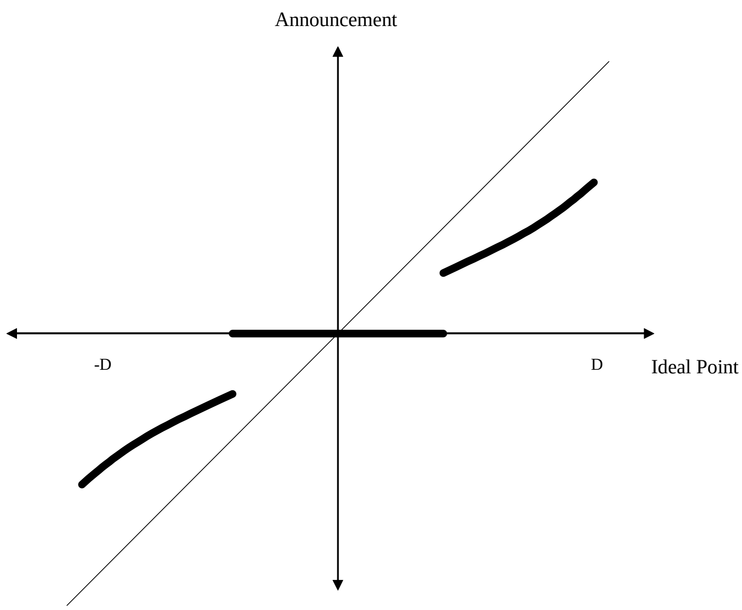

Figure 2: $\alpha' = 0$; $\alpha'' < D$

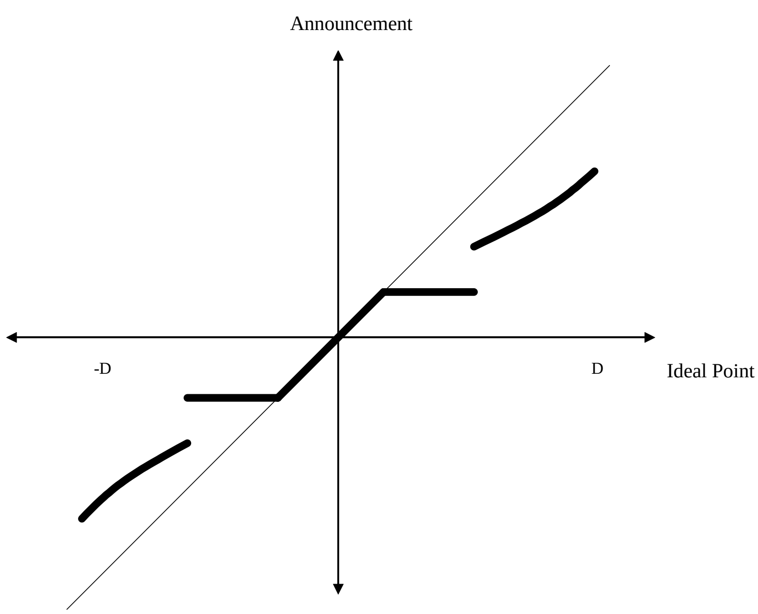

Figure 3: $\alpha' > 0$; $\alpha'' < D$

increase, then pool, and again strictly increase as their true policy preferences become more extreme.[15] Such unusual behavior is supported in equilibrium here precisely because of the presence of low cost candidates and the strategy they play. Lemma 2 characterizes the behavior that is required of low cost candidates to support equilibrium.

Lemma 2 *Suppose $q \in (0,1)$ and that high cost candidates are using a Cut-Point strategy. If $K > K^*$ then every universally divine equilibrium requires $[0, \alpha') \subseteq s^f \subseteq [0, \alpha']$.*

Thus low cost candidates are required to mix over all policy announcements up to and possibly including the pool (if the pool is at zero then low cost candidates must locate there). This implies that if $\alpha' > 0$ then the centrist high cost candidates are obscured by low cost candidates. Consequently, by Proposition 3 the median voter must be indifferent over all such announcements (including by continuity the pool) for this behavior to be supported as an equilibrium. For any announcement $\tilde{\alpha}$ in $[0, \alpha')$ the median voter faces a lottery over a high cost candidate with preferred policy $\tilde{\alpha}$ and a low cost candidate with preferred policy anywhere in the policy space. Thus, as the announcement increases the weight of expectation the median voter places on a low cost candidate must be decreasing for indifference to be maintained. The following proposition shows that there always exists a α' and a corresponding mixing strategy such that this indifference is achieved, and therefore that a universally divine electoral equilibrium exists.[16]

Proposition 10 *A universally divine equilibrium exists for all $q \in [0,1]$.*

It follows immediately that in all such equilibria low cost candidates are imitating if $K > K^*$. It also follows that in any such equilibrium $\alpha'' > \alpha'$, and some high cost candidates pool at the announcement α'. If there was not a pool at α' then there would be a discontinuity in λ at α' and high cost types $\alpha' + \varepsilon$ would have the incentive to deviate and announce α'. If $K \leq K^*$ then a universally divine equilibrium is for all candidates to pool at zero, although there also exist other uninformative equilibria as specified in Proposition 4.

[15] The standard equilibrium in signaling models is for there to be at most one break in the strategy, and for this to be a break from a pool to separating. See Banks and Sobel (1987) or Cho and Kreps (1987) for examples and derivations of these equilibria.

[16] It is possible to characterize these equilibrium requirements quite precisely. However, they do not add significantly to the intuition of the previous results and we will not explore them in any detail here.

4.4 Comparative Statics

The results so far have shown that a universally divine equilibria exists, and that in equilibrium high cost candidates employ one of a unique family of Cut-Point strategies. The equilibrium itself is not unique and, in fact, within the family of cut-point strategies there typically exists a continuum of equilibria. The equilibria vary in the critical values α' and α'', requiring the low cost types to mix in different proportions. As α' increases more low cost types are required to maintain indifference along the region $[0, \alpha')$, and thus the upper bound is the equilibrium when, to maintain voter indifference, all low cost types are required in the interval $[0, \alpha')$ (at which point $\alpha' \notin s^f$). On the other hand, as α' decreases, the expected utility of voters from announcements in $[0, \alpha']$ decrease as the probability of the candidate being low cost increases. Eventually, it may be, as outlined above, that this expectation becomes so unattractive that the median voter prefers the first separating high cost candidate over the pool. The critical point of indifference between these choices provides the lower boundary for α' in equilibrium. If the proportion of low cost types is not insignificant then this lower bound may be greater than zero, precluding Cut-Point equilibria with small α'. A significant implication of this intuition is formalized in the following proposition.

Proposition 11 *Suppose $q \in (0, 1)$. There exists a K' and q' such that $\forall K > K'$, and $q > q'$, $\alpha' = 0$ is not supportable as an universally divine equilibrium.*

This result implies, as argued earlier, that the centrist equilibria of Banks (1990) may still exist for small q. However, if the proportion of low cost types is too high (i.e., as q increases) then this preference will eventually break down, and so too the equilibrium.[17] Thus, for large enough q, and costs K, all universally divine electoral equilibria involve a non-centrist Cut-Point strategy, an example of which is depicted in Figure 3. Significantly, distributions of political positions taking this structure are often observed empirically; we discuss this and other connections in the following section.

[17] To formalize the critical values, define $\hat{k}$ as the value of k that solves $\psi(\alpha^{ce}, k, 0) = 0$, where α^{ce} is voters' certainty equivalent policy platform with respect to a random draw of low cost types. Therefore, if $K > \hat{k}$ then a neighborhood of types around type $\{\alpha^{ce}, K\}$ will never pool at zero. Thus, for all $K > \hat{k}$ there exists a $\hat{q}(K)$ such that $\forall q > \hat{q}(K)$ the Cut-Point strategy in which $\alpha' = 0$ (i.e., pool at zero) does not constitute a universally divine electoral equilibrium.

We conclude by deriving a simple limit result as the announcement costs of high cost candidates becomes large. Banks (1990) showed for the case of $q = 0$ that $K \to \infty \Rightarrow \alpha'' \to 0$ and all types separate (recall, with $q = 0$ it must be that $\alpha' = 0$). Thus, as signaling costs increase the electoral campaign fully reveals to voters the true policy preferences of voters. If, however, candidates can be both low or high cost then this result no longer holds as for small α'' voters must prefer the first separating type to a selection out of the pool of imitated types. Consequently, with heterogeneous candidate flexibility the electorate can not approach full informativeness even as signaling costs become large.

Corollary 3 *Suppose $q > 0$ and that $K \to \infty$. Then there exists an $\hat{\alpha} > 0$ such that in all universally divine electoral equilibria $\alpha' > \hat{\alpha}$, and α'' is arbitrarily close to α'.*

5 Discussion

5.1 Equilibrium Characteristics

Many features of the Cut-Point equilibria approximately correspond to empirical regularities and provide insight into previously unexplained phenomena. We address briefly some of the most interesting equilibrium characteristics.

Voter Learning: For more extreme policy announcements voters are more certain of the actual policy that will be implemented. Further, candidates that announce more extreme policy platforms are more likely to be high cost and policy inflexible. These equilibrium characteristics are closely related and appear regularly in the empirical literature (see Blomberg and Harrington (2000) for an explicit consideration). In equilibrium voters are unsure about a candidate's true policy intentions which may be interpreted as political ambiguity. Unlike standard conceptions of ambiguity as flowing from deliberate obfuscation, the ambiguity here arises due to limitations of the electoral mechanism as a conveyor of information.

Median Voter Theorem: The candidate announcing a platform nearest the median voter does not necessarily win the election (within the central obscured and pooling intervals) and, thus, observationally it may appear the median voter theorem fails. Clearly, however, to conclude violation of the median voter theorem would be spurious as it is very much the preferences of the median voter that is driving group choice. Our result suggests a subtlety in the median voter theorem and holds particular importance for any empirical tests of such.

The Advantage of Political Constraint: Despite their policy inflexibility, high cost candidates often win election in equilibrium, even beating low cost candidates. Surprisingly, if $\alpha' > 0$ then high cost candidates are not required to sacrifice completely their policy preferences to be able to compete effectively; in fact, the welfare of some high cost candidates is improved by the presence of low cost candidates as the incentives to imitate and differentiate allow them to reduce their cost of campaigns and campaign at their preferred policy location.

Policy Divergence: If in equilibrium $\alpha' > 0$ then measure zero candidates converge on the median voter (see Figure 3). Further, a significant fraction of candidates cluster at two distinct non-centrist points. Divergence and clustering of policy platforms are both commonly observed in real plurality rule elections. For the case of the U.S. this is documented by Alesina and Rosenthal (1995, chapter 2).[18] Remarkably, the divergence that arises in equilibrium can exist even when almost all candidates are low cost and have zero announcement costs (i.e., as $q \to 1$).

Electoral Pandering: Related to the observation of policy divergence is the issue of electoral pandering. Our model and equilibria suggest an explanation for why candidates diverge and do not pander entirely to the median voter; most significantly, the explanation arising from our model does not require uncertainty about the location of the median voter (Wittman (1983), Calvert (1985)) and can exist even when almost all candidates are low cost (and have complete freedom to move about the policy space). In the equilibrium low cost candidates wish to impress the median voter and are free to take any campaign platform to do so. Unfortunately for them, however, the constraints of the signaling mechanism – and their own flexibility – imply that no such points exist. After observing a centrist announcement a voter can not be sure if the announcement represents the candidate's true policy intention or whether the candidate is a low cost opportunist. Equilibrium requires that this uncertainty exactly balance such that the median voter is indifferent over all announcements in $[0, \alpha']$. Consequently, there is no value

[18] In our model the clustering of campaign platforms will not – by design – translate to analogous clustering of policy outcomes. In multiple period models, in which the incentive to signal, imitate and pool also applies to actual policy choices, then such effects may be observed.

for candidates in converging, consistent with the absence of a successful "race towards the middle" in real elections.

Political Motivation: The model of high and low cost candidates presented here bears some similarity to the debate over whether candidates are policy or office motivated (Wittman (1983), Calvert (1985)). Heterogeneity in motivations may similarly create asymmetries in the ability of candidates to move about the policy space. Interpreted in this context, our results suggest that policy constrained candidates may fare better in electoral competition than previously thought (see Calvert (1985)).

5.2 Related Literature

The model and results of this paper share several common features with the models of hierarchies developed in a series of papers by Harrington (1998, 1999a, 1999b, 2000) and may be best seen as their complement. In models of repeated interaction among pairs of agents that are either "flexible" or "rigid," Harrington develops two fundamental results: that agent flexibility may work against an agent in the long run, and that successful agents (those that rise to the top of hierarchies) may appear to have motivations that differ from their true motivations.

In an explicit electoral setting, Harrington (2000) shows how the electoral selection process may produce higher level office holders who appear to be something they are not. Harrington assumes that all candidates are office motivated and chase the median voter in every period, and that voters have an exogenous preference for stability in policy. Essentially, the candidates that are successful in elections and move to higher offices are those that are fortunate enough to have a stable electorate requiring little policy deviation. Consequently, higher office holders exhibit policy consistency and appear to be policy motivated despite their true motivation solely being to win office. Harrington (1998) is a broader version of this model and allows for agent heterogeneity, although not strategic behavior. Again under pairwise matching, Harrington shows how rigid agents will outperform flexible agents in the long run and dominate higher positions in a hierarchy. Harrington (1999a) allows for strategic behavior but restricts candidates to be homogeneous. He shows that candidates who have a preference for higher positions will be policy consistent at lower levels but then act opportunistically upon reaching higher levels. Harrington (1999b) studies stable distributions of rigid and flexible candidates if agents entering the hierarchy choose their behavior rule and naively imitate successful agents at the top of the hierarchy.

Our results also have a direct application to the apparently unrelated field of social and group behavior. Bernheim (1994) develops a model of individual choice and social conformity that shares many structural features with the model of Banks (1990). In Bernheim's model agents have a preference for social status as well as consumption. Each agent has spatial preferences over the characteristics of a good, modeled as varying across a single dimension. Status is presumed to depend on these predispositions such that centrist preferences are more highly desired, although preferences are private information and can only be inferred from an agent's action. This formulation can be seen to correspond closely to that of Banks with preferences equating to preferred policies and the attractiveness of centrist choices reflecting the power of the median voter. Continuing the similarity, Bernheim assumes that agents have equal costs in consuming goods that do not correspond to their ideal point.

Achieving results substantively similar to those of Banks, Bernheim interprets the convergence of choice as an explanation of social conformity and the evolution of social norms. Under this interpretation, the extension incorporated here corresponds loosely to the inclusion of "social sheep," individuals solely concerned with conforming and possessing status within a group. Our results then suggest that the inclusion of these types counterintuitively make conforming less desirable, leading to consumption decisions more in line with agents' true consumption preferences and less tailored to achieving social status. Also, if pools in equilibrium are interpreted as customs or fads then the inclusion of social sheep provides an alternative explanation for the simultaneous existence of multiple fads.[19]

As a final note, our model bears some resemblance to work on nonspatial characteristics in candidate competition. Papers in this stream suppose that voters are interested in exogenous characteristics of candidates other than their policy announcements, typically taking the form of "valence factors" (Stokes (1963), and more recently Aragones and Palfrey (2002) and Groseclose (2001)). A possible interpretation for the results presented here is as a foundation for the existence of particular valence factors and an exploration of their strategic manipulation.

[19] Bernheim in fact goes further and characterizes the possibility for asymmetric equilibria and shows that as a model of consumption there may also exist fully separating equilibria.

6 Conclusion

Political candidates possess different capabilities in competing for and performing in office, a crucial example of which is their ability and willingness to lie. In this paper we develop a model of electoral competition to explore the impact of heterogeneity in the willingness of candidates to lie on political behavior and outcomes. Consistent with accepted wisdom, we find that candidates more willing to lie are favored in elections. However, the advantage held by willing liars is not as dominant as previously thought and more honest candidates are not always defeated. Most significantly, the presence of each candidate type has a significant impact on the behavior of all other candidates.

Within the boundaries of an electoral campaign we have identified an incentive for imitation among political actors in order to influence an audience. It would seem reasonable to conclude that this incentive is not confined to election campaigns and in fact permeates throughout other pockets of the political environment. Exploring these possibilities in settings such as the legislature and judiciary would seem a potentially profitable direction for future work.

7 Appendix

Several proofs are omitted for brevity: Proposition 1 is identical to Proposition 1 in Banks (1990) with only adjustments in notation; Propositions 3 and 8 are obvious and stated without proof. The following definitions and notation will be used in several proofs: (i) t^r such that $\forall \alpha \in t^r \subseteq P, s(\alpha, K) \in s^f$; (ii) set $Eu_v(\mu_A) = Eu_v(b, c)$ where b is the support and c the density of μ_A (c will be left unspecified when obvious); (iii) $\alpha^{ce} \in [0, D]$ is the certainty equivalent that satisfies $Eu_v([0, D], 2f(.)) = Eu_v(P, f(.)) = Eu_v(\alpha^{ce}, 1)$ (and so the median voter is indifferent between the implementation of this certainty equivalent and a random draw over all ideal points); (iv) Recall $T(p) = \{\alpha \in P | \sigma(p|\alpha, K) > 0\}$, and so for pure strategies $T(p) = \{\alpha \in P | s(\alpha, K) = p\}$.

Proof of Proposition 2: Suppose not: thus $\lambda(p, \sigma) < \lambda(p', \sigma)$, and by Proposition 1, it must be that $p' \in s^f$ and $p \notin s^f$. Thus $Eu_v(\alpha^{ce}, 1) > Eu_v(T(\alpha), .) > Eu_v(T(\alpha'), .)$. However, as $Eu_v(T(0), .) > Eu_v(\alpha^{ce}, 1)$ it must be that $Eu_v(\mu(s(0, K))) > Eu_v(\mu(s(\alpha', K)))$, violating Proposition

3.

Proof of Corollary 1: Let $s, s' \in s(\alpha, K)$ for some $\alpha \in (0, D)$ where $s < s'$. Equilibrium requires that $\lambda(s,\sigma)\psi(\alpha, K, s) = \lambda(s',\sigma)\psi(\alpha, K, s')$. As $\psi(\alpha, K, s) \neq \psi(\alpha, K, s)$ it must be that $\lambda(s,\sigma) \neq \lambda(s,\sigma)$. If $s, s' \notin s^f$ and $\nexists \hat{\alpha} \neq \alpha$ s.t. $\sigma(s|\hat{\alpha}, K)$ or $\sigma(s'|\hat{\alpha}, K) > 0$ then $\lambda(s,\sigma) = \lambda(s',\sigma)$ but $\psi(\alpha, K, s) \neq \psi(\alpha, K, s')$: no equilibrium. So (α, K) must pool or be obscured at s or s'. Suppose pooling: $\exists \hat{\alpha}$ s.t. $\sigma(s|\hat{\alpha}, K) > 0$. By Proposition 1, $\hat{\alpha} < \alpha$ and $\forall \bar{\alpha} \in (\hat{\alpha}, \alpha), \sigma(s|\bar{\alpha}, K) = 1$. Thus, a measurable interval of types play a pure strategy (likewise if $\sigma(s'|\hat{\alpha}, K) > 0$), and so the measure of high cost candidates mixing must be zero. If instead $s \in s^f$, $s' \notin s^f$ (otherwise $\lambda(\alpha, K, s) = \lambda(\alpha, K, s')$) consider $s_1', s_2' \in s(\alpha_1, K)$ for some $\alpha_1 \in (0, \alpha)$ where $s_1 < s_1'$. By Proposition 2 and the arguments above it must be $\lambda(s_1, \sigma) > \lambda(s_1', \sigma) \geq \lambda(s, \sigma)$, which violates Proposition 3. By Propositions 1 and 3 $\max s^f = s$, and so for $\alpha' > \alpha$ to mix there must be pooling and the result is proven.

Proof of Proposition 4: Thus $t^r = \varnothing$. If $s(\alpha, K)$ is not constant then by Proposition 1, $T(0) = [0, \alpha']$ for some $\alpha' < 1$ and $Eu_v(T(0), .) > Eu_v(\alpha^{ce}, 1) \Rightarrow \lambda(s(0, K), \sigma) > \sigma(p, \sigma)\ \forall p \in s^f$, thus violating Proposition 3. Further, if $\min\{p|p \in s^f\} < \max\{s(\alpha, K), 2D - s(\alpha, K)\}$ then $\exists \tilde{\alpha}$ such that $\psi(\tilde{\alpha}, K, \min_\alpha s^f) > \psi(\tilde{\alpha}, K, s(\tilde{\alpha}, K))$. As $\lambda(\alpha, k) = \frac{1}{2}\ \forall \alpha, k$, the deviation is profitable, violating the equilibrium requirements. If $K > \hat{K}$ then $\exists \alpha$ s.t. $EU(\alpha, K, \alpha, \sigma) > EU(\alpha, K, s(\alpha, K), \sigma)$ and an equilibrium does not exist.

Proof of Proposition 5: By assumption t^r is non-empty. Suppose $0 \notin t^r$, then $T(s(0, K)) = [0, \alpha']$ for some $\alpha' < \min(\alpha|\alpha \in t^r)$ and $Eu_v([0, \alpha'], .) > Eu_v(\alpha^{ce}, 1), Eu_v(T(\alpha), .|\forall \alpha \in t^r)$, which implies $Eu_v([0, \alpha'], .) > Eu_v(\mu(\alpha))$ for all $\alpha \in s^f$. As this violates Proposition 3 it must be that $0 \in t^r$.

Suppose t^r is not convex: $\exists \alpha_1 < \alpha_2 < \alpha_3$ s.t $\alpha_1, \alpha_3 \in t^r$ but $\alpha_2 \notin t^r$. If $\alpha_3 \leq \alpha^{ce}$ then $Eu_v(\mu(s(\alpha_2, K))) > Eu_v(\mu(s(\alpha_3, K)))$, in violation of Proposition 3. If $\alpha_3 > \alpha^{ce}$ then $\exists \alpha < \alpha_3$ s.t. $Eu_v(\mu(s(\alpha, K))) > Eu_v(\mu(s(\alpha_3, K)))$ unless $s(\alpha, K) = s(\alpha_3, K)$. The first inequality violates Proposition 3, and the second equality, combined with $\alpha_2 \notin t^r$, violates Proposition 1. Therefore, t^r must be convex.

Suppose $t^r = 0$. If $s(\alpha, K)$ is not constant for all $\alpha \in (0, D)$ then there exists an α_1 such that $Eu_v(\mu(s(\alpha_1, K))) > Eu_v(\alpha^{ce}, 1)$, thus violating Proposition 3. Therefore, for all $\alpha \in (0, D)$ set $s(\alpha, K) = \kappa > s(0, K)$. For $\alpha_2 < \frac{\kappa}{2}$, $\psi(\alpha_2, K, s(0, K)) > \psi(\alpha_2, K, \kappa)$. Thus, by Proposition 3, a deviation by type α_2 to $s(0,K)$ is profitable and $t^r \neq \{0\}$.

Proof of Corollary 2: By Proposition 5 there exists an $\alpha' \in (0,1)$ s.t. $s(\alpha,K) \in s^f \ \forall\, \alpha \in [0,\alpha']$. Suppose $\exists\, p \in s^f$ s.t. $s(\alpha,K) \neq p$ for any α. Then it must be that $Eu_v(\mu(s(0,K))) > Eu_v(\alpha^{ce},1) \Rightarrow \lambda(s(0,K),\sigma) > \sigma(p,\sigma)$ in violation of Proposition 3.

Proof of Lemma 1: Suppose $s(\alpha,K)$ is continuously increasing $\forall \alpha \in T(0) = [0,\alpha']$ and $s(\hat{\alpha},K) < \hat{\alpha}$ for some $\hat{\alpha} \in [0,\alpha']$.

Consider the deviation $\tilde{s}(\hat{\alpha},K) = s(\tilde{\alpha},K)$ where $\tilde{\alpha} = \frac{s(\hat{\alpha},K)+\min[\hat{\alpha},s(\tilde{\alpha},K)]}{2} < \alpha'$. As t^r is convex and by Proposition 3, $\lambda(s(\hat{\alpha},K),\sigma) = \lambda(s(\tilde{\alpha},K),\sigma)$ and $\psi(\hat{\alpha},K,s(\hat{\alpha},K)) < \psi(\hat{\alpha},K,s(\tilde{\alpha},K))$. Therefore the deviation is profitable: no equilibrium. For $s(\alpha',K) > \alpha'$ for some α' analogous arguments apply, and the result is proven.

Proof of Proposition 9: Let $\sigma(.)$ be any strategy satisfying incentive compatibility (Equation 1)and define

$$\theta(\alpha,K,p) = \frac{\lambda(s(\alpha,K),\sigma).\psi(\alpha,k,s(\alpha,K))}{\psi(\alpha,k,p)} \tag{2}$$

Since in equilibrium $\lambda(.).\psi(.)$ is continuous in α, $\theta(.)$ is continuous also and is differentiable everywhere except at the jump discontinuities of $s(.)$. For low cost types, $\theta(\alpha,0,p) = \lambda(\alpha,0)$ and $\frac{\partial\theta}{\partial\alpha} = 0$. For high cost types,

$$\frac{\partial\theta(\alpha,K,p)}{\partial\alpha} = \frac{\left\{\begin{array}{c} \psi(\alpha,K,p).\left[\begin{array}{c} \frac{\partial\lambda}{\partial\alpha}.\psi(\alpha,K,s(\alpha,K)) \\ +\lambda(\alpha,K).\left(\frac{\partial\psi(\alpha,K,s(\alpha,K))}{\partial\alpha} + \frac{\partial\psi(\alpha,K,s(\alpha,K))}{\partial s}.\frac{\partial s}{\partial\alpha}\right) \end{array}\right] \\ -\frac{\partial\psi(\alpha,K,p)}{\partial\alpha}.\lambda(\alpha,K).\psi(\alpha,K,s(\alpha,K)) \end{array}\right\}}{[\psi(\alpha,K,p)]^2} \tag{3}$$

Constrained types fall into one of three categories: (i) Separating. If $s(\alpha,K)$ is separating at α then $\lambda(\alpha,K) = (1-q)\,2\,(1-F(\alpha))$ and $\frac{\partial\lambda}{\partial\alpha} = -(1-q)\,2f(\alpha)$. Incentive compatibility implies that utility is maximized for type $\{\alpha,K\}$ at announcement α. Thus, the first order necessary condition for an equilibrium is that $s(.)$ satisfy

$$\frac{\partial\left[(1-q)\,2\,(1-F(\alpha')).\psi(\alpha,K,s(\alpha',K))\right]}{\partial\alpha'}\Big|_{\alpha'=\alpha} = 0$$

or

$$-f(\alpha).\psi(\alpha,K,s(\alpha,K)) + \frac{\partial\psi(\alpha,K,s(\alpha,K))}{\partial s}.\frac{\partial s(\alpha,K)}{\partial\alpha}(1-F(\alpha)) = 0$$

Combining these relationships, (3) can be simplified to[20]

$$\frac{\partial\theta\left(\alpha,K,p\right)}{\partial\alpha}=\lambda\left(\alpha,K\right)\frac{\left\{\begin{array}{c}\psi\left(\alpha,K,p\right).\left(\frac{\partial\psi(\alpha,K,s(\alpha,K))}{\partial\alpha}\right)\\ -\frac{\partial\psi(\alpha,K,p)}{\partial\alpha}.\psi\left(\alpha,K,s\left(\alpha,K\right)\right)\end{array}\right\}}{\left[\psi\left(\alpha,K,p\right)\right]^{2}} \tag{4}$$

(ii) Pooling. If $\{\alpha,K\}$ pools then $\frac{\partial\lambda}{\partial\alpha}=0$ and $\frac{\partial s}{\partial\alpha}=0$, so Equation 4 holds for these types also. (iii) Obscured. $\psi\left(\alpha,K,\alpha\right)=y$ and $\frac{\partial\lambda}{\partial\alpha}=0$. Therefore,

$$\frac{\partial\theta\left(\alpha,K,p\right)}{\partial\alpha}=-\frac{\partial\psi\left(\alpha,K,p\right)}{\partial\alpha}\lambda\left(\alpha,K\right)\psi\left(\alpha,K,p\right)/\left[\psi\left(\alpha,K,p\right)\right]^{2} \tag{5}$$

the sign of which is determined by $-\frac{\partial\psi(\alpha,K,p)}{\partial\alpha}$.

The proof will proceed by considering all possible functional forms for $s\left(.\right)$ – that satisfy previous results – and eliminating all but those that are Cut-Point. To eliminate possible equilibria we consider "out-of-equilibrium" announcements and by signing the above identities identify the type most likely to deviate. For any strategy σ the out-of-equilibrium announcements consist of those "between" the jumps in the strategy $s\left(.\right)$ for high cost candidates as well as at the "end" of the policy space. (Flexible candidates can only locate at distinct points from high cost candidates if $s\left(.\right)$ is constant; in which case high cost candidates are playing a Cut-Point strategy and the result holds.)

We begin by noting that if all $\alpha\in\left(\alpha',\alpha''\right)$ are separating then $s\left(\alpha,K\right)\leq\alpha$. To see this, suppose not and consider the deviation of type α to $s\left(\tilde{\alpha},K\right)$ where $s\left(\tilde{\alpha},K\right)=\max\left[\alpha,\frac{s(\alpha,K)+s(\alpha',K)}{2}\right]$. By Proposition 2, and because $\psi\left(\alpha,K,s\left(\alpha,K\right)\right)<\psi\left(\alpha,K,s\left(\tilde{\alpha},K\right)\right)$, this deviation is profitable and $s\left(.\right)$ can't support an equilibrium.

Part 1: $s\left(0,K\right)=x>0$. By Proposition 1 $T\left(0\right)=\emptyset$, and so Corollary 2 and Proposition 4 imply $0\notin s^{f}$: thus the announcement of 0 is not played in equilibrium. If voters observe the out-of-equilibrium announcement $p=0$ then $\mu\left(\{0,K\}\left|0\right.\right)=1$. This follows from: (i) for separating types $\frac{\partial\psi((\alpha,K,p))}{\partial\alpha}<\frac{\partial\psi((\alpha,K,s))}{\partial\alpha}<0$ and $\psi\left(\left(\alpha,K,s\right)\right)>\psi\left(\left(\alpha,K,p\right)\right)$, therefore $\frac{\partial\theta}{\partial\alpha}>0$; (ii) if for pooling types $s\left(\alpha,K\right)\leq\alpha$ then case (i) applies, so consider an arbitrary pool of types $\left[\alpha',\alpha''\right]$ s.t. $s\left(\alpha'',K\right)\geq\alpha''$. $\lambda\left(s\left(\alpha,K\right),\sigma\right)$ is constant $\forall\alpha\in\left[\alpha',\alpha''\right]$

[20] Note that the q terms cancel out and leave the exact same expression as in Banks (1990; although there are several typos in his statements).

and $\alpha' = \arg\min\left[\psi\left(\alpha, k, s\left(\alpha, K\right)\right)\right] = \arg\max\left[\psi\left(\alpha, k, p\right)\right]$. Therefore, $\alpha' = \arg\min\left[\theta\left(\alpha, K, p\right)\right]$; (iii) for obscured types $\frac{\partial\psi(\alpha,K,0)}{\partial\alpha} < 0 \Rightarrow \frac{\partial\theta}{\partial\alpha} > 0$ also; (iv) as $\psi\left(0, K, x\right) < \psi\left(0, K, 0\right), \theta\left(0, K, 0\right) < \lambda\left(0, K\right) = \lambda\left(\alpha, 0\right) = \theta\left(\alpha, 0, p\right)$. As $\mu\left(\{0, K\}\,|0\right) = 1 \Rightarrow \lambda\left(0, \sigma\right) = 1$ and $\psi\left(0, K, 0\right) = y$ the deviation to $\tilde{s}\left(0, K\right) = 0$ is profitable and so in equilibrium $s\left(0, K\right) = 0$.

If $\forall\alpha$, $s\left(\alpha, K\right) = 0$ then a Cut-Point strategy is used, so hereafter assume this is not the case. By Propositions 4 and 5 $\exists\overline{\alpha} > 0$ s.t. all types $\{\alpha, K\}$ where $\alpha \in [0, \overline{\alpha})$ are imitated.

Part 2: If all $\alpha \in [0, x_1)$ are obscured then $s\left(\alpha, K\right) = \alpha$ by Proposition 5. If types $(x_1, x_2]$ are separating (ignoring for the moment the behavior of type x_1) then $\lambda\left(\alpha, K\right)$ is discontinuous at x_1. For $\varepsilon \to 0^+$, $\psi\left(x_1 + \varepsilon, K, s\left(x_1 - \varepsilon, K\right)\right) \to y$ and $\lambda\left(x_1 - \varepsilon, \sigma\right).\psi\left(x_1 + \varepsilon, K, s\left(x_1 - \varepsilon, K\right)\right) > \lambda\left(x_1 + \varepsilon, \sigma\right).\psi\left(x_1 + \varepsilon, K, s\left(x_1 + \varepsilon, K\right)\right)$. Thus, the deviation $\tilde{s}\left(x_1 + \varepsilon, K\right) = x_1 - \varepsilon$ is profitable, and in equilibrium $s\left(\alpha, K\right)$ can't jump from obscured to separating (jumps must be to pooling). If types (x_1, x_2) pool then similar arguments prove $\forall x \in (x_1, x_2)$ that $s\left(x, K\right) = x_1$ and that $\lambda\left(x, \sigma\right) = \lim_{\varepsilon\to 0}\lambda\left(x_1 - \varepsilon, \sigma\right)$. By Proposition 1 $s\left(x_1, K\right) = x_1$ also.

Part 3: Suppose $\forall\alpha \in [\alpha_1, \alpha_2)$, $s\left(\alpha, K\right) = \alpha_1$, where $\alpha_1 = 0$ or $[0, \alpha_1)$ are obscured. If all $\alpha \in (\alpha_2, \alpha_2 + \beta)$ are obscured then $s\left(\alpha_2 + \varepsilon, K\right) = \alpha_2 + \varepsilon$ for all $\varepsilon \in (0, \beta)$. Consider type $\{\alpha_2 - \omega, K\}$ and the deviation $\tilde{s}\left(\alpha_2 - \omega, K\right) = \alpha_2 + \omega$ where $\omega > 0$. By Proposition 3, $\lambda\left(\alpha_1, \sigma\right) = \lambda\left(\alpha_2 + \omega, \sigma\right)$, and as $\psi\left(\alpha_2 - \omega, K, \alpha_2 + \omega\right) > \psi\left(\alpha_2 - \omega, K, \alpha_1\right)$ for small enough ω, the deviation is profitable and an equilibrium strategy can't jump from pooling to obscured. Note also that a jump from separating can't be made to obscured (as t^r is convex). Therefore, any obscured types must be located only in the most centrist interval of types.

Part 3b: Again let all $\alpha \in [\alpha_1, \alpha_2)$ be pooling and suppose voters observe the out-of equilibrium announcement $p \in \left(s\left(\alpha_1, K\right), s\left(\alpha_2, K\right)\right)$, as by Corollary 2 $p \notin s^f$. (If α_2 also pools and the pooling interval is closed then set $p \in \left(s\left(\alpha_1, K\right), \lim_{\varepsilon\to 0} s\left(\alpha_2 + \varepsilon, K\right)\right)$; in equilibrium type $\{\alpha_2, K\}$ must be indifferent between pooling and separating). Consider the following partition:

(i) obscured types in $[0, \alpha_1)$: $\frac{\partial\psi(\alpha,K,p)}{\partial\alpha} > 0 \Rightarrow \frac{\partial\theta(\alpha,K,p)}{\partial\alpha} < 0$.
(ii) $\alpha \in [\alpha_1, p]$: $\frac{\partial\psi(\alpha,K,p)}{\partial\alpha} > 0 > \frac{\partial\psi(\alpha,K,s(\alpha,K))}{\partial\alpha} \Rightarrow \frac{\partial\theta(\alpha,K,p)}{\partial\alpha} < 0$.
(iii) $\alpha \in (p, \alpha_2)$: $0 > \frac{\partial\psi(\alpha,K,p)}{\partial\alpha} > \frac{\partial\psi(\alpha,K,s(\alpha,K))}{\partial\alpha}$ and $\psi\left(\alpha, K, p\right) > \psi\left(\alpha, K, s\left(\alpha, K\right)\right) \Rightarrow \frac{\partial\theta(\alpha,K,p)}{\partial\alpha} < 0$.
(iv) $\alpha > \alpha_3$: arguments (i) and (ii) from Part 1$\Rightarrow \frac{\partial\theta(\alpha,K,p)}{\partial\alpha} > 0$.

As $\psi(\alpha_2, K, p) > \psi(\alpha_2, K, s(\alpha_1, K))$ and $\lambda(s(\alpha, K), \sigma) = \theta(\alpha, 0, p)$, voter beliefs must be $\mu(\{\alpha_2, K\}|p) = 1$. Suppose $\{\alpha_2, K\}$ is pooling with other high cost types (α_2, α_3). If $\{\alpha_2, K\}$ deviates and announces $p = s(\alpha_2, K) - \varepsilon$, then $\lambda(p, \sigma) - \delta > \lambda(\alpha_2, \sigma)$ for some $\delta > 0$. As $\psi(\alpha_2, K, p) \to \psi(\alpha_2, K, s(\alpha_2, K))$ as $\varepsilon \to 0$, the deviation is profitable. Thus, if high cost types (α_1, α_2) pool then high cost types (α_2, α_3) must separate.

Part 4: Let high cost types (α_2, α_3) be separating and that there is a jump at α_3. By Proposition 5 types (α_3, α_4) can't be imitated. If they are separating then ψ is discontinuous but λ is continuous: therefore $\psi.\lambda$ is discontinuous, violating the equilibrium condition. So types (α_3, α_4) must pool, which we assume is at m.

Consider an out-of-equilibrium announcement $p \in (s(\alpha_3, K), \min[m, \alpha_3])$ and again partition the type space (recall that $s(\alpha, K) < \alpha$ if separating):
(i) obscured types: $\frac{\partial\psi(\alpha,K,p)}{\partial\alpha} > 0 \Rightarrow \frac{\partial\theta(\alpha,K,p)}{\partial\alpha} < 0$.
(ii) $p > \alpha > s(\alpha, K)$: $\frac{\partial\psi(\alpha,K,p)}{\partial\alpha} > 0 > \frac{\partial\psi(\alpha,K,s(\alpha,K))}{\partial\alpha} \Rightarrow \frac{\partial\theta(\alpha,K,p)}{\partial\alpha} < 0$.
(iii) $\alpha_3 > \alpha > p > s(\alpha, K)$: $0 > \frac{\partial\psi(\alpha,K,p)}{\partial\alpha} > \frac{\partial\psi(\alpha,K,s(\alpha,K))}{\partial\alpha}$ and $\psi(\alpha, K, p) > \psi(\alpha, K, s(\alpha, K)) \Rightarrow \frac{\partial\theta(\alpha,K,p)}{\partial\alpha} < 0$.
(iv) $\alpha > \alpha_3$: arguments (i) and (ii) from Part 1$\Rightarrow \frac{\partial\theta(\alpha,K,p)}{\partial\alpha} > 0$.
If α_3 separates then $\psi(\alpha_3, K, p) > \psi(\alpha_3, K, s(\alpha_3, K))$ and $\lambda(s(\alpha, K), \sigma) = \theta(\alpha, 0, p)$, so voter beliefs must be $\mu(\{\alpha_3, K\}|p) = 1$. By the equilibrium condition α_3 must be indifferent between pooling and separating and so the same beliefs arise if α_3 pools. Thus, for small δ, a deviation by type $\{\alpha_3, K\}$ to $\tilde{s}(\alpha_3, K) = s(\alpha_3, K) + \delta$ is profitable as $\lambda(s(\alpha_3, K), K) = \lambda(\tilde{s}(\alpha_3, K), K)$ and $\psi(\alpha_3, K, p) > \psi\alpha_3, K, s(\alpha_3, K)$. Hence, a separating interval of types must continue all the way to the boundary at $\alpha = D$, and the result is proven.

Proof of Lemma 2: As $k > k^*$ it must be that $s(D, K) > 0$, and Proposition 4$\Rightarrow t^r \neq \emptyset$. From Proposition 5 $\exists\alpha'$ *s.t.* $\forall\alpha \in [0, \alpha')$, $s(\alpha, K) \in s^f$ and $\forall\alpha \in (\alpha', D]$, $s(\alpha, K) \notin s^f$, and from Corollary 2 $s^f = \cup_{\alpha\in[0,\alpha']} s(\alpha, K)$. In the proof of Proposition 9 it was shown that as α increases obscured can't jump to separating and pooling can't jump to obscured: therefore, $[0, \alpha') \subseteq s^f$ and $s(\alpha, K) \notin s^f$ $\forall\alpha > \alpha''$, and the result follows.

Proof of Proposition 10: *Part 1:* Let $q \in (0, 1)$ (see Propositions 6, 7, and 8 for $q = 0, 1$) and consider firstly out-of-equilibrium announcements. By Proposition 9 and Lemma 2 possible deviations are all $p \in (\alpha', s(\alpha'', K))$ and $p > s(D, K)$. Consider these in turn. The proof of Proposition 9 showed that all deviations $p \in (\alpha', s(\alpha'', K)) \Rightarrow \mu(\{\alpha'', K\}|p) = 1$. As $\lambda(s(\alpha'', K), \sigma) = \lambda(p, \sigma)$ and $\psi(\alpha'', K, p) < \psi(\alpha'', K, s(\alpha'', K))$ the deviation isn't profitable. Consider instead $p > s(D,K)$ which is analyzed in two cases. (i) If $\{D,K\}$ is separating then $\lambda(s(D,K),\sigma) = 0$ and $\forall p > s(D,K)$, $\theta(D,K,p) = 0 < \theta(\alpha,k,p)$ for all $\alpha < D$ and $k \in \{0,K\}$. Voter beliefs are then $\mu(\{D,K\}|p) = 1$, implying $\lambda(p,\sigma) = 0$. Type $\{D,K\}$ is indifferent between the equilibrium strategy and deviating, and all other types strictly worse off. Thus, the equilibrium is sustained. (ii) If $\{D,K\}$ is pooling then by Proposition 9 the pool is at α' and voters are indifferent over all equilibrium announcements. It must be that $\alpha' = 0$ as $\alpha' > 0 \Rightarrow Eu_v(0,1) > Eu_v(\alpha^{ce},1) > Eu_v(\mu(\alpha'))$ and so $\nexists\sigma(.,0)$ to maintain voter indifference (as the imitation by high cost candidates only moves Eu towards $Eu_v(\alpha^{ce},1)$). Consider all $p > 0$ that are not played in equilibrium (Proposition 4 implies that such points exist) and partition the space as follows for high cost types:

(i) $\alpha > p$: $\frac{\partial\psi(\alpha,K,p)}{\partial\alpha} > 0 > \frac{\partial\psi(\alpha,K,s(\alpha,K))}{\partial\alpha} \Rightarrow \frac{\partial\theta(\alpha,K,p)}{\partial\alpha} < 0$.

(ii) $p > \alpha$: $0 > \frac{\partial\psi(\alpha,K,p)}{\partial\alpha} > \frac{\partial\psi(\alpha,K,s(\alpha,K))}{\partial\alpha}$ and $\psi(\alpha,K,p) > \psi(\alpha,K,s(\alpha,K)) \Rightarrow \frac{\partial\theta(\alpha,K,p)}{\partial\alpha} < 0$.

For low cost types $\lambda(s(\alpha,K),\sigma) = \theta(\alpha,0,p)$. If $p < 2D$ then $\psi(D,K,p) > \psi(D,K,s(D,K))$ implying $\mu(\{D,K\}|p) = 1$. Thus $\lambda(p,\sigma) = 0$ and no type has incentive to deviate. If $p > 2D$ then $\psi(D,K,p) < \psi(D,K,s(D,K))$ implying $\mu(k=0|p) = 1$. Thus $\lambda(p,\sigma) = \lambda(s(\alpha,k),\sigma)$ $\forall\alpha,k$ and no type has incentive to deviate.

Part 2: Let $k \leq k^*$ and so $s(\alpha,K) = 0$ $\forall\alpha$. Therefore, the only in-equilibrium deviation is $\tilde{s}(\alpha,K) \in s^f$ which by Proposition 4 is not a profitable deviation for low cost types. As all types pool it must be $\lambda(0,\sigma) = \lambda\left(s^f,0\right)$ (as s^f is a singleton) low cost types can't profitably deviate and thus a universally divine equilibrium exists.

Part 3: Hereafter set $k > k^*$. We now construct an equilibrium such that $\alpha' \notin s^f$. For a given triple $\{k,q,\alpha'\}$ the separating segment of $s(\alpha,K)$ satisfying incentive compatibility, including the cut-point α'', is uniquely defined (see Banks (1990)). $\alpha'' < D$ for $\alpha' = 0$ and $\frac{d\alpha''(k,q,\alpha')}{d\alpha'} > 0$ (as the pool becomes more attractive to separating types). Thus, $Eu_v([0,\alpha''(k,q,0)],.) > Eu_v(\alpha^{ce},1)$ and for some $\bar{\alpha}'$, $Eu_v([\bar{\alpha}',\alpha''(k,q,\bar{\alpha}')],.) = Eu_v(\alpha^{ce},1)$.

Let the low cost types mix over $[0,\alpha')$, with density $g(.)$ where $\alpha' > 0$. $Eu_v(\mu(\alpha))$ is a weighted average over $\{\alpha,K\}$ and α^{ce} (the equivalent of the random selection of a low cost type). Define $CE(\alpha)$ that satisfies $Eu_v(\mu(\alpha)) = Eu_v(CE(\alpha),1)$ $\forall\alpha \in [0,\alpha')$. Set $\hat{\alpha}'$ to be the type that satisfies

$\left[\frac{(1-q)F\left(\frac{\alpha'}{D}\right)}{q+(1-q)F\left(\frac{\alpha'}{D}\right)} \int_0^{\alpha'} f(\alpha)\, d\alpha + \alpha^{ce} . \frac{q}{q+(1-q)F\left(\frac{\alpha'}{D}\right)} \right] = \alpha'$ (the LHS is the expected policy outcome of all obscured and imitating types). If $\alpha' \leq \hat{\alpha}'$ there exists a $\bar{g}(\alpha|\alpha')$ s.t. $CE(\alpha_1) = CE(\alpha_2)\ \forall \alpha_1, \alpha_2 \in [0, \alpha')$ (voters are indifferent over all announcements; this is not possible for $\alpha' > \hat{\alpha}'$ as $Eu_v(CE(\alpha'), 1) < Eu_v(\hat{\alpha}', 1)$ and so there must exist a $\tilde{\alpha}$ s.t. $Eu_v(CE(\tilde{\alpha}), 1) > Eu_v(\hat{\alpha}', 1)$). Set $g(.) = \bar{g}(\alpha|\alpha')$. As $\alpha' \to 0, CE(\alpha) \to \alpha^{ce}$ and so for small α', $Eu_v([\alpha', \alpha''(k, q, \alpha')], .) > Eu_v(CE(\alpha), 1)$. For $\alpha' < \hat{\alpha}'$, $\frac{dCE(\alpha)}{d\alpha'} < 0$. Therefore, by continuity $\exists\ \breve{\alpha}' < \hat{\alpha}'$ s.t. $Eu_v(CE(\breve{\alpha}'), 1) = Eu_v([\breve{\alpha}', \alpha''(k, q, \breve{\alpha}')], .)$. We claim the parameters $\breve{\alpha}'$ and $\alpha''(k, q, \breve{\alpha}')$ and $\bar{g}(\alpha|\breve{\alpha}')$ constitute a universally divine electoral equilibrium.

Part 4: To complete the proof and prove the claim we need only check deviations to equilibrium actions of other types. By construction $\lambda(\alpha_1, \sigma) = \lambda(\alpha_2, \sigma) > \lambda(\alpha_3, \sigma)\ \forall \alpha_1, \alpha_2 \in [0, \breve{\alpha}']$ and $\alpha_3 > \breve{\alpha}'$: thus by Proposition 3 low cost types do not deviate; further, $\forall \alpha \in [0, \breve{\alpha}'], \psi(\alpha, k, \alpha) = y$ and so obscured types cannot profit from deviation; $\forall \alpha \in (\breve{\alpha}', \alpha''(k, q, \breve{\alpha}')], \psi(\alpha, k, \breve{\alpha}') > \psi(\alpha, k, \tilde{\alpha})$ for $\tilde{\alpha} < \breve{\alpha}'$ and pooling types do not deviate towards the median. Type $\{\alpha''(k, q, \breve{\alpha}'), K\}$ is indifferent between the announcements $\breve{\alpha}'$ and $s(\alpha'', K)$. Therefore, high cost types $\alpha \in (\breve{\alpha}', \alpha''(k, q, \breve{\alpha}'))$ and $\alpha > \hat{\alpha}''$ cannot profitably deviate.

Proof of Proposition 11: Set $\alpha' = 0$ and define $\hat{k}$ s.t. $\psi\left(\alpha^{ce}, \hat{k}, 0\right) = 0$; thus for $K > k'$ type $\{\alpha^{ce}, K\}$ must separate. As $q \to 1$, $CE(0) \to \alpha^{ce}$ and $\exists \hat{q}$, s.t. $\forall q > \hat{q}$, $Eu_v(CE(0), 1) < Eu_v(\alpha'', 1)$, violating the equilibrium condition. As $\frac{d\alpha''(q,k,0)}{dk} < 0$ the result is proven.

Proof of Corollary 3: As $k \to \infty$, $s(\alpha, K) \to \alpha$ and so $\alpha''(q, k, \alpha') \to \alpha'$. Suppose the claim is not true and $\alpha' \to 0$ for $q > 0$. Then $CE(\alpha) \to \alpha^{ce}$ and for small enough α', $Eu_v(CE(0), 1) < Eu_v(\alpha'', 1)$ which violates the equilibrium condition. Therefore, the claim is true and the result proven.

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