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Article

Electoral Competition with Strategic Disclosure

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Abstract: Recent developments in information and communication technologies allow candidates for office to engage in sophisticated messaging strategies to influence voter choice. We consider how access to different technologies influence the choice of policy platforms by candidates. We find that when candidates can target messages to specific voter groups, platforms are more likely to be inefficient. In particular, when candidates can run targeted campaigns, they commit to projects that benefit small groups even when the social cost of these projects outweigh their benefits. Our results are robust to negative advertising.

Keywords: electoral competition; multidimensional policy space; microtargeting; office-motivated candidates; negative campaigning; strategic disclosure

JEL Classification: D72; D83; M37

1. Introduction

The advent of widespread internet use and rapidly improving computing power have fundamentally changed the tools available to advertisers. The 2018 Politics Issue of the MIT Technology Review illustrates how candidates in the last three US presidential races have used some of the same tools to reach the right voters with the right messages.[1] While candidates have always tailored campaign rhetoric to different groups, the scope for targeting has grown dramatically in recent years.[2] Political consulting companies, such as Catalist and CampaignGrid, have developed databases that include hundreds of millions of voters.[3] "Psychographic" advertising techniques exploit detailed data on individual preferences and lifestyle to improve targeting beyond demographics. Originally developed for commercial uses, these techniques have recently been adapted for electoral purposes.[4] This paper investigates how improvements in message targeting by candidates influence political competition.

We study a model in which two office-motivated candidates choose platforms and messages. Our model can be interpreted as describing voters divided into N interest groups, each seeking a

1 See "US election campaign technology from 2008 to 2018, and beyond" by A. Howard.
2 Gentzkow and Shapiro [1] document that online media has significantly larger ideological segregation than other forms of political information transmission. For an example of "traditional" ways to reach specific parts of the electorate, see the analysis of TV campaign ads during the 2000, 2004 and 2008 US presidential races in Ridout et al. [2].
3 On its website, Catalist advertises a database of approximately 240 million unique current voting-age individuals. CampaignGrid reports a database of more than 200 million voter profiles. For a general overview of data available for electoral campaigns in the US and Canada, see Bennet [3], for the UK see Anstead [4], for India see the article "Why India has nothing to fear from rightful use of big data" (*The Economic Times*, April 01, 2018).
4 Goldfarb and Tucker [5], Section 6.1, review the recent literature on personalized advertising. The article from *The Economic Times* mentioned in footnote 3, as well as the issue of the MIT Technology Review mentioned above summarize the state of the art (as of 2018) for advertising techniques used in electoral campaigns.

specific public good to be financed with national taxation. A platform can target any of those N groups by committing to provide the desired public good. Alternatively, a candidate can opt for a platform that does not promise any public good.

Our major departure from canonical models of targeting in politics [6,7] is to consider voters that are not perfectly informed about platforms even when those platforms may target their interests. We model voters as being either *informed* or *uninformed* about platforms. Informed voters observe all components of the chosen platforms. Uninformed voters, however, must rely on (truthful) messages from candidates. Uninformed voters receive a message from each candidate and each message reports whether the candidate has committed to provide a particular public good, or has committed not to provide that particular good.

We first consider a benchmark scenario in which all voters are informed, and show that candidates commit to whichever platform is socially efficient. We then consider three games that differ in the degree to which candidates can control their messages. These games correspond to different levels of sophistication in communication technologies. We first consider random messages. When messages are beyond the candidates' control, candidates commit to socially efficient platforms, as in the full-information benchmark. We then consider issue selection, i.e., we let each candidate control which message about his platform reaches the voters, yet all voters must receive the same message. In this game, candidates commit to efficient platforms as long as some voters are informed.

Finally, we consider microtargeting. We model microtargeting as candidates having the ability to target different groups of voters with different messages. We show that as long as the fraction of informed voters is not too large, equilibria in which all candidates commit to socially inefficient platforms exist. Furthermore, if informed voters are sufficiently rare, all equilibria are of this nature. Our main contribution is thus to highlight how message targeting can lead to inefficiencies in political platforms.

With microtargeted messages, inefficiencies arise when both of the following conditions hold. First, providing any public good is inefficient, so the unique efficient platform does not promise any public good. Second, informed voters are rare. When providing public goods is inefficient, the efficient platform does not promise any public good and ensures more votes from informed voters than any other platform. Doing so is costly, however, in that it forgoes sending targeted messages to uninformed voters who benefit from a specific public good. Promising a public good and targeting messages in this way increases the candidate's vote share among uninformed voters compared to choosing the platform that does not promise any public good. Thus, if sufficiently few voters are informed, none of the candidates commit to the efficient platform.

When efficient equilibria do not exist, there exist instead equilibria in which all candidates commit to provide a public good. In these equilibria candidates would benefit from deviating to the efficient platform if they could credibly communicate their deviation to all voters. Since messages are unidimensional, and different voters can be targeted with different messages, candidates cannot credibly communicate such a deviation if, for example, voters are skeptical and interpret any message reporting that some public good is not being financed as a signal that some other public good is being financed. Thus, the ability to fine tune political messages can, somewhat paradoxically, make it harder to communicate with voters.

We extend the model to show that this conclusion is robust to both limits on the targetability of platforms and negative advertising. When we restrict the targetability of platforms, but not messages, the qualitative results are unchanged. We model negative advertising by allowing one candidate to reveal the other candidate's platform. While efficient equilibria always exist under negative advertising, so too do inefficient equilibria for some parameter values.

While our model emphasizes simple messages, our results are also robust to relatively complex messages. The key restriction on message complexity is that candidates cannot perfectly reveal their entire platform to voters. In this sense, our study of communication technologies focuses on segmented media consumption rather than increasingly complex campaigning. While widespread internet media consumption does increase availability of complex information, it is widely recognized that even highly skilled and motivated agents fail to process all available information [8,9]. Indeed, this appears to be the case for voters as well [10]. One possible explanation is that in reality, the policy space has a large number of dimensions and it is potentially hard for voters to predict many issues on which the policymaker will be asked to make a decision while in office. Even given the opportunity, it is unlikely voters would choose to inform themselves on the minutiae of every dimension of policy space [11].

Our results suggest that providing additional flexibility in how candidates target messages to voters may harm the performance of the electoral system. In particular, our model suggests that the combination of detailed voter data and segregation of media consumption due to social media can erode the incentives for candidates to choose efficient policies. While we do not explicitly model the media, our model suggests that media competition, insofar as it segments the market even further, encourages inefficient outcomes of political competition.

The concern that better targeting of political messages might distort the choice of electoral platforms is discussed informally in Elmendorf and Wood [12]. Political microtargeting has also raised distinct and somewhat complementary concerns. First, as the Cambridge Analytica scandal has highlighted, voters' data could be collected in ways that violate individuals' privacy.[5] Furthermore, voters could be manipulated by candidates making false claims (see, for example, [13]). In the language of the economics of advertising, we focus on the informative content of political ads, while concerns over false claims or fake news are closely related to the persuasive role of these messages. Bagwell [14] describes the distinction between informative and persuasive views of advertising.

We discuss the related literature in Section 2. We describe the baseline model in Section 3, and analyze it in Section 4. Section 5 extends the model to include limited policy targetability and negative advertising. Section 6 concludes. The Appendix contains the proofs of the results that are not proved in the text.

2. Relevant Literature

Two strands of literature relate most closely to our paper. One literature considers the role of media and information transmission in politics. The other literature concerns itself with policy targeting, and more specifically with the tradeoff that candidates face between more easily targeted (inefficient) policies and broader (efficient) public goods projects. We discuss these two pieces of literature in turn.

The notion that voters are not perfectly informed is not controversial. Several papers have developed theories of political competition when voters have inaccurate perceptions of candidates' policy positions. The most similar paper to ours is Schipper and Woo [15]. Like us, they consider a game where candidates send messages to voters revealing portions of their multidimensional policy platform. They also consider different messaging technologies which correspond to what we call issue selection and microtargeting. A major difference with our work is that they consider exogenous platforms. Moreover, in their model, electoral competition with microtargeting is equivalent to electoral competition with full information. In our model, microtargeting may result in inefficient equilibria, whereas under full information, equilibria are always efficient. The difference in conclusions is due to message sophistication. While we allow microtargeting in the sense of sending a separate message to each voter, we do not let candidates send complex messages revealing their positions on multiple public goods.

Gratton et al. [16] also consider the question of strategic information revelation by candidates for office. In their model, candidates are vertically differentiated and choose when, if ever, to reveal their

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5 On March 17, 2018, *The Guardian* and *The New York Times* described the process by which Cambridge Analytica collected detailed data on individual voters through use of a Facebook app: "How Trump Consultants Exploited the Facebook Data of Millions" and "Revealed: 50 million Facebook profiles harvested for Cambridge Analytica in major data breach".

type to voters. The main concern is a tradeoff between credibility and scrutiny: high-quality candidates disclose information earlier in expectation, but this allows more time for voters to learn more about the disclosure. Our model differs in two ways. We study horizontal competition between candidates of equal quality and all information revealed is immediately verifiable costlessly. Nevertheless, we share the broad interest in strategic information disclosure when this disclosure may not be fully revealing.

Tyson [11] considers a model where a subset of voters are uninformed about a state variable that determines what the efficient policy is. He studies the decision of voters to become informed and turn out to vote, but leaves their set of alternatives fixed. Instead, in our model access to information is beyond the control of voters and we focus on which choices politicians will make in terms of both policy and information disclosure.

Ogden [17] analyzes platform choice by politicians who are competing in a Hotelling-Downs setting where voters observe platforms with noise. His main result is that platforms diverge unless observed without error. Similarly, in our model, platforms are efficient if they are observed by a large enough fraction of voters. We differ by studying a multidimensional issue space and considering different messaging technologies instead of the degree of noise around platform observation.

Aragonès et al. [18] study a model of issue selection featuring endogenous platforms. In their model, candidates invest in both platform quality and issue-specific advertising. As we consider issue selection in the sense of politicians sending all voters the same message, our model relies on horizontal rather than vertical competition. Our results under the issue selection technology align most closely with what they term the “homogenization effect” and positive issue races where candidates compete to provide extremely high-quality platforms. Demange and Van der Straeten [19] study a model at the intersection of Ogden [17] and Aragonès et al. [18] where investment in an issue reduces noise about the policy platform, and platforms are exogenous.

The second strand of literature concerns itself with policy targeting in models of redistributive politics. Conventional wisdom holds that politicians target resources towards groups of voters who are more responsive to policy [20,21]. One large debate in the literature is which groups of voters are more responsive: a party’s core voters or swing voters. Dixit and Londregan [20] generalize two major models [6,22] to highlight the relevant tradeoffs. When parties are homogeneous in their ability to provide benefits to each group of voters, they should target resources to groups with a larger proportion of swing voters. On the other hand, if there are large differences in parties’ abilities to provide benefits to a group, perhaps due to providing better suited public goods, parties should target core voters. Our model abstracts from this debate by shutting down both mechanisms that generate targeted transfers. Candidates are symmetric in their ability to provide resources to each group and groups are symmetric in their share of swing voters. Instead, we highlight how asymmetric information can create targeted transfers even in environments with no inherent incentive to target under full information.

The theory of targeting in politics has in part developed by comparing different electoral systems [7,23,24]. Our model shares some features with this literature, particularly in how we model voter preferences. Furthermore, similar to Lindbeck and Weibull [6] and Lizzeri and Persico [7], but differing from Chari et al. [25], we study national candidates who do not represent a single district. Our results on targeting, therefore, are not due to politicians providing benefits to their limited constituency at the expense of the electorate.

A main distinguishing feature between our model and the targeting literature is that we do not assume that all voters are perfectly informed about policy. This feature of our model is closest to a model presented in Mayhew [26] (pp. 52–61). In that model, politicians prefer to provide targeted transfers to their constituents instead of public goods because voters can be certain that the politician deserves credit for the targeted transfers. Our model differs in that voters are not perfectly informed about the politician’s platform rather than whether the politician was pivotal in providing the public good. This gives rise to a setting where politicians are more likely to choose targeted policies when they also have a greater ability to target messages and control voter information.

A closely related literature is an intersection of these two strands focusing on the role of media in politics. We share the typical probabilistic voting setup of Strömberg [27], but differ from that paper, Besley and Prat [28], Duggan and Martinelli [29] and Bernhardt et al. [30] by not focusing on the role of (strategic) media actors. While (potentially biased) media surely play an important role in political outcomes [31], we instead study direct communication by candidates for office. Our focus is on the increased ability to target advertisements to voters which is distinguished by its increasing independence from third-party moderation (e.g., via internet advertising).

The two most closely related papers to ours from this literature are Eguia and Nicolò [32] and Gavazza and Lizzeri [33]. In Eguia and Nicolò [32], the authors consider a similar model where each group of voters is potentially uninformed about policies targeting other groups, but are informed about policies targeting their own group. Candidates' platforms may be fully revealed to all voters by some exogenously determined process. The authors then show that equilibria are efficient if voters are sufficiently unlikely to be informed. This stark difference in conclusion is due to two differences in the model. First, candidates may provide public goods to multiple groups of voters in their model. This gives rise to a natural incentive to target under full information, even when universal provision is efficient since candidates can exclude a single group to the benefit of others, giving rise to standard "minimum winning coalition" logic. Second, platforms may be fully revealed exogenously to all voters instead of endogenously partially and asymmetrically revealed. The ability to strategically share partial information with voters is the crucial driver of our results. Gavazza and Lizzeri [33] share the information structure of Eguia and Nicolò [32] but in a model where transfers are always inefficient. We share their conclusion that more information improves efficiency, but differ in our focus on endogenizing the information available to voters.

Finally, Balart et al. [34] study a spatial model of communication technology and advertising expenditure. In their model, candidates first choose platforms. The level of polarization of the platforms determines endogenously the share of informed voters, after which parties choose the level of advertising expenditure. In their model, developments in communication technology are measured by the effectiveness of advertising expenditure. In contrast, our model considers communication technologies in which we explicitly model the increased effectiveness by expanding candidate flexibility over communication. We share similar conclusions in that Balart et al. [34] find that increased effectiveness of advertising drives polarization and increased campaign expenditure, whereas we find that the most flexible communications technologies may lead candidates to select inefficient policy platforms in equilibrium.

3. Model

We build a probabilistic voting model where voters have preferences similar to Lindbeck and Weibull [6] but candidates strategically disclose only a subset of their platform. Differing from other probabilistic voting models, we simplify the setting to one where all voter groups are symmetric with respect to candidates. We make this choice because it removes all incentives for targeting transfers under full information and highlights that our results are due to communication and information asymmetries.

Electoral Competition. There are two candidates (he), a and b, and a measure one of voters (she). Candidates compete in a plurality election by committing to platforms. A platform is an N-dimensional vector that contains *positions* on $N \geq 2$ *issues*. For each issue $n \in \{1, .., N\}$, a platform contains either the *targeted* position t_n, or the *generic* position g_n. A platform can contain, at most, one targeted position. We refer to the platform that contains only generic positions as the *generic platform* and to the platform that contains targeted position t_n as *targeted platform* n.

Voters are heterogeneous in their preferences and in their ability to observe platforms. Every voter belongs to one of N equally sized (interest) groups. For every issue n, position t_n yields utility $u > 0$

to voters in group n and $-d < 0$ to other voters, while position g_n yields 0 to all voters. We assume $(N-1)d > u$, i.e., the generic platform is the only efficient platform.[6] A fraction $\rho \in (0,1)$ of voters in each group observes the candidates' entire platforms. We refer to these voters as *informed*. The remaining $1-\rho$ voters are *uninformed*. Uninformed voters observe one position from each candidate's platform determined by the message they receive (described below). Uninformed voters in the same group observe the same positions. Voters vote for one of the candidates, and the candidate with the most votes wins the election and implements his platform.

Disclosure. We consider three games corresponding to three different communication technologies. We refer to these games as the *game with random disclosure*, the *game with issue selection* and the *game with microtargeting*. Under random disclosure, after the candidates have selected their platforms, one position at random from each of the two platforms is disclosed to all voters. Each position is equally likely to be disclosed.[7] In the game with issue selection, each candidate selects an issue, and every voter observes the candidate's position on that issue. In the game with microtargeting, each candidate can choose a different position to report to each group of voters.

We make the following restriction on voters' beliefs. Let x and y be two uninformed voters. If in equilibrium candidate i's strategy prescribes the same disclosure for the two voters, then x and y form the same beliefs upon observing the same position of candidate i. Please note that we require x and y to hold the same beliefs both on and off the equilibrium path. This assumption has two implications. First, in the game with random disclosure and the game with issue selection, all uninformed voters, regardless of their group, hold the same beliefs both on and off the equilibrium path. Second, in the game with microtargeting uninformed voters in the same group hold the same beliefs both on and off the equilibrium path.

Timeline. First, candidates simultaneously commit to their platforms. Candidates also choose messages at this stage (under the constraints of the communication technology available to them). Second, uninformed voters receive messages revealing one position from a's platform and one position from b's platform, while informed voters observe both platforms. All voters observe the realization of their idiosyncratic preference shocks (described below) and then cast their votes. The winner of the election is determined, and the winner's platform is implemented.

Payoffs. If candidate $x \in \{a,b\}$ is elected, voter i in group m obtains payoffs $U^x_{i,m}$, where:

$$U^a_{i,m} = \sum_{n=1}^{N} u_m(s^a_n) + \epsilon_i, \quad U^b_{i,m} = \sum_{n=1}^{N} u_m(s^b_n).$$

$s^x_n \in \{g_n, t_n\}$ is the position of candidate x's platform on issue n, while $u_m : \{s^x_1, .., s^x_N\} \to \{-d, 0, u\}$ maps each s^x_n into the corresponding utility for a voter in group m. Voter i's idiosyncratic preference

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6 In the next section we discuss the nature of equilibria if $(N-1)d \leq u$.

7 Please note that we do not assume disclosure to be independent across candidates. Positive correlation between positions disclosed from the two platforms is indeed quite realistic, as a certain issue might raise to prominence in the public discourse during the campaign (we thank an anonymous referee for raising this point).

shock ϵ_i is distributed uniformly on $\left[-\frac{1}{2}, \frac{1}{2}\right]$. We assume that the variance of this shock is large compared to the size of the payoffs that is:[8]

$$\frac{1}{2} > u + (N-1)d.$$

As we assume that voters vote sincerely (see below), an informed voter in group m votes for candidate a with probability

$$\pi^C_{m,a} := \frac{1}{2} + \sum_{n=1}^{N} \left(u_m(s^a_n) - u_m(s^b_n) \right).$$

An uninformed voter in group m, upon observing candidate a's position on issue x (that is, s^a_x) and candidate b's position of issue y (that is, s^b_y) votes for a with probability

$$\pi^P_{m,a} := \frac{1}{2} + \sum_{n=1}^{N} \left(\mathbb{E}_m \left[u_m(s^a_n) | s^a_x \right] - \mathbb{E}_m \left[u_m(s^b_n) | s^b_y \right] \right),$$

where $\mathbb{E}_m$ denotes the voter's expectation conditional on the observed positions. Aggregating over voters, the share of votes for candidate a is (almost surely)

$$\sigma_a := \frac{1}{N} \sum_{m=1}^{N} (\rho \pi^C_{m,a} + (1-\rho)\pi^P_{m,a}),$$

while the share of votes of candidate b is $\sigma_b = 1 - \sigma_a$. Candidates seek to maximize their vote share.

Strategies and equilibrium. The definition of a strategy for the candidates depends on the game considered. In each game, a candidate's strategy selects a platform. In the game with issue selection, each candidate's strategy specifies a single truthful message revealing one position from his platform to all uninformed voters. In the game with microtargeting, each candidate's strategy specifies N truthful messages, each revealing one position from his platform to uninformed voters of one group.

A voter strategy maps her information into a choice of vote. We focus on pure-strategy Nash equilibria in which voters vote for a candidate whose platform they believe will ensure them the highest utility, and off-path beliefs satisfy the restriction mentioned above. We will refer to these as equilibria for convenience. We say that an equilibrium is efficient if the election is won with probability 1 by a candidate that has selected the generic platform, and is inefficient otherwise.

4. Analysis

To establish a benchmark, we first consider the case when all voters are informed.[9] Without uninformed voters, messages are irrelevant and the distinction among the three games is immaterial. Our first proposition states that under perfect observability electoral competition induces candidates to select the generic platform. The proof is in the text.

Proposition 1. *Let $\rho = 1$. In all three games, equilibria exist and are efficient.*

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[8] This assumption ensures that candidates get a benefit in terms of vote share from their choice of platform proportional to the benefit that voters receive. All our results hold *verbatim* if we assume ϵ_i is distributed uniformly on $\left[-\frac{1}{2\theta}, \frac{1}{2\theta}\right]$ for some θ, as long as $\frac{1}{2\theta} > u + (N-1)d$.

[9] This case is outside the setting described in the previous section, as we assumed $\rho \in (0,1)$.

The proof is immediate. An informed voter in group m votes for candidate a with probability $\pi^C_{m,a}$. Aggregating over voters, candidate a's vote share is

$$\sigma_a = \frac{1}{2} + \frac{1}{N}\sum_{m=1}^{N}\pi^C_{m,a} = \frac{1}{2} + \frac{1}{N}\sum_{m=1}^{N}\sum_{n=1}^{N}\left(u_m(s^a_n) - u_m(s^b_n)\right).$$

For any choice of platform by candidate b, candidate a maximizes σ_a by choosing an efficient platform. Symmetrically, for any choice of platform by candidate a, candidate b maximizes σ_b by choosing an efficient platform. Thus, in equilibrium both candidates commit to the generic platform. The intuition is straightforward: a candidate's vote share is proportional to the utility that his platform ensures to all voters. Thus, an efficient platform maximizes each candidate's vote share.[10]

The same logic applies to an alternative benchmark where candidates cannot send any messages. In a game with no messaging, candidates' platform choices have no effect on their vote share among uninformed voters. Therefore, candidates select platforms to maximize their vote share among informed voters only. The equilibria of such a game are identical to equilibria of a game with perfect observability. Proposition 1 establishes that all equilibria are efficient in this scenario as well. We focus next on settings in which some voters are uninformed, and some informative messages are sent.

4.1. Random Disclosure and Issue Selection

We consider first the games in which microtargeting is not an option. In these games all uninformed voters observe the same position. The next proposition (partially) characterizes the equilibria in these games. The proofs of this and subsequent results are in Appendix A.

Proposition 2. *In the game with random disclosure and in the game with issue selection, equilibria exist and are all efficient.*

In all games we consider, the generic platform ensures more votes from informed voters than a targeted one. The way platforms map into votes from uninformed voters is less straightforward, as these voters only observe one position.

Consider first random disclosure. Suppose a candidate is expected to commit to the generic platform. A deviation to a targeted platform cannot ensure more votes from uninformed voters for the deviating candidate, as all uninformed voters have access to the same information, and there is no platform that is more desirable *on average* for voters than the generic platform. This argument proves existence of an efficient equilibrium. We rule out inefficient equilibria using a similar argument: if a candidate is expected to commit to a targeted platform, a deviation to the generic one never lowers his share of votes from uninformed voters.

Consider now the game with issue selection. In this game candidates have control over messages, but can only select message profiles such that all uninformed voters receive the same message. The arguments used to prove that an efficient equilibrium exists and is unique are similar to the random disclosure case. A targeted platform cannot ensure a candidate's vote share from uninformed voters larger than the generic one, regardless of which position the candidate discloses, as voters, on average, prefer the generic platform, and average preferences determine vote shares

So far we have established that as long as all uninformed voters have access to the same information, electoral competition induces candidates to commit to the efficient platform, regardless of whether candidates control which position is disclosed.

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10 This is expected as, under perfect observability, our model is a simpler version of Lindbeck and Weibull [6] where voter groups have equal responsiveness to policy.

4.2. Microtargeting

We now relax the constraints on candidates' choice of messages to allow them to send separate messages to each group of voters. The next proposition characterizes equilibria for $N \geq 3$, while $N = 2$ is considered in Proposition 4.

Proposition 3. *Consider the game with microtargeting, and $N \geq 3$. An equilibrium exists. Moreover:*

- *for $\rho < \frac{u-d}{(N-2)d}$ every equilibrium is inefficient;*
- *for $\rho \in \left[\frac{u-d}{(N-2)d}, \frac{u+d}{Nd}\right]$ there exist efficient as well as inefficient equilibria;*
- *for $\rho > \frac{u+d}{Nd}$ every equilibrium is efficient.*

The existence as well as the uniqueness of efficient equilibria for a sufficiently large share of informed voters are, in our view, unsurprising. As ρ gets close to 1 the game resembles the benchmark game with perfect information. As stated in Proposition 1, in this case candidates opt for the generic platform.

We find more striking the existence and the uniqueness of inefficient equilibria for a sufficiently large share of uninformed voters. In these equilibria both candidates commit to a targeted platform.[11] We sketch, in turn, the arguments we use to prove existence and uniqueness of inefficient equilibria.

To prove existence, we construct an equilibrium in which both candidates commit to some targeted platform, and uninformed voters are *skeptical*: they believe a candidate has committed to a targeted platform that ensures them $-d$ unless they observe the position that ensures them u.[12] For these beliefs, a deviation to the generic platform reduces the share of votes from uninformed voters as it results in all uninformed voters incorrectly believing that the candidate has committed to some targeted platform ensuring them $-d$. While this deviation costs the candidate votes from uninformed voters, it increases the candidate's vote share from informed voters. Thus, these inefficient equilibria exist as long as the fraction of informed voters is not too large (we show in the proof that this condition amounts to $\rho \leq \frac{u+d}{Nd}$).

We prove that for $\rho < \frac{u-d}{(N-2)d}$ all equilibria are inefficient using the following argument. In any efficient equilibrium at least one candidate, denote him x, commits to the generic platform and there must be at least one position $s_n^x = g_n$ that is observed by at most one group of voters. Candidate x could deviate to targeted platform n and reveal $s_n^x = t_n$ to uninformed voters in group n, while leaving the choice of issue on which to report his position unchanged for all other groups. Uninformed voters in group n and in at most one other group would be aware of this deviation, while uninformed voters in at least $N-2$ groups would be unaware of it. If $u > d$, this deviation increases candidate x's share of votes from uninformed voters. If moreover ρ is sufficiently small (as we show in the proof, this amounts to $\rho < \frac{u-d}{(N-2)d}$), then the deviation is profitable.

The simplicity of messages relative to platforms is crucial for our results with microtargeting. Intuitively, with richer messages, fewer groups, or simpler platforms, candidates could fully reveal their platform to all groups with their messages. Proposition 4 and Proposition 6, below, explore settings where candidates can fully reveal their platform.

Proposition 3 suggests some interesting comparative statics. Unsurprisingly, a large share of informed voters is associated with efficient equilibria. The relation between equilibrium efficiency and the benefit to receiving a targeted policy, u, is instead non-monotonic. For large u ($u \geq d(N-1)$)

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[11] A hypothetical equilibrium in which a candidate commits to a targeted platform and the other commits to the generic one would be efficient, as the candidate committing to the generic platform would always win the election, due to voters holding correct beliefs on path.

[12] Please note that skeptical beliefs require voters from different groups to interpret the same out-of equilibrium position in different ways. This does not contradict our equilibrium restriction on beliefs, as on path these voters observe different positions.

targeted platforms are efficient, and so are all equilibria: while we have not considered this parametric region in our analysis, proving that for parameters in this region in equilibrium both candidates choose a targeted platform is straightforward. For smaller u ($u < d(N-1)$), efficient equilibria exist and inefficient equilibria can be ruled out only if u is sufficiently small relative to ρ to dissuade candidates from committing to inefficient targeted platforms.[13] In the limit, as u approaches 0, efficient equilibria always exist, and if additionally $\rho > \frac{1}{N}$, only efficient equilibria exist. A symmetric exercise can be done for d.

Finally, we show that as positions become more narrowly targeted, inefficient equilibria become easier to sustain. Specifically, we consider what happens as N gets larger, yet u also changes, so that $\frac{u-(N-1)d}{N}$ does not change. In this case, the social welfare associated with a targeted policy stays constant, while the benefits accrue to a smaller group. Let $K = \frac{u-(N-1)d}{N}$. We can write the two thresholds from Proposition 3 as $\frac{u-d}{(N-2)d} = 1 + \frac{KN}{(N-2)d}$ and $\frac{u+d}{Nd} = 1 + \frac{K}{d}$. The first threshold becomes larger as N increases. As the benefit becomes more narrowly targeted, $\frac{(N-1)d}{N}$ increases. Thus, $\frac{u}{N}$ must also increase for $K = \frac{u}{N} - \frac{(N-1)d}{N}$ to hold. As a result, inefficient equilibria become easier to sustain, as deviations from a targeted platform to the generic one result in a loss of votes from uninformed voters proportional to $\frac{u}{N}$. The second threshold is constant with respect to N for constant K. To complete the comparative statics over N, the next proposition characterizes the equilibria for $N = 2$.

Proposition 4. *In the game with microtargeting and $N = 2$, equilibria exist and are all efficient.*

When only two targeted platforms are available, a candidate that commits to the generic platform can credibly show to any uninformed voter that he did not commit to the platform ensuring her $-d$. Doing so simply requires candidate x to send message $s_1^x = g_1$ to voters in group 2 and $s_2^x = g_2$ to voters in group 1. In this context, the generic platform is a candidate's optimal choice.

5. Extensions

The core components of our model can be generalized in many directions. One could, for example, consider what would happen if informed voters only observed subsets of platforms. This is perhaps a more natural assumption; even if candidates have well-defined positions on all possible issues during the campaign, they rarely disclose all of them publicly. In this case, even informed voters may lack information on some components of candidate platforms. It is easy to verify that our games with a fraction ρ of informed voters are for all practical purposes identical to games in which every informed voter observes m issues, selected at random, from each platform and the fraction of informed voters is $\frac{\rho N}{m}$. It should also be straightforward to extend our analysis to allow for heterogeneity in the size of the groups, variance of the idiosyncratic shock across groups, or in the payoffs associated with targeted platforms.[14]

We present here two extensions that shed further light on the inefficiencies in the game with microtargeting. First, we consider elections in which candidates can only choose policies to target a subset of groups. Second, we allow candidates to use "negative advertising". We model negative advertising as candidates having the ability to send messages disclosing a position from their opponent's platform.

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[13] At the same time, as u increases the loss of social welfare associated with inefficient platforms changes in a non-monotonic, convex way.

[14] The first two of these features are common for probabilistic voting models and generate targeted transfers. We suppress them in our main analysis to shut off an alternate rationale for targeting.

5.1. Limited Policy Targeting

This subsection generalizes the game with microtargeting by assuming that candidates can select a targeted position only on one of the first $M \leq N$ issues.[15] We call this the game with limited policy targeting. The next two propositions characterize the equilibria of this game. They show that the size of M affects the prevalence, but not the existence, of inefficient equilibria. As the number of available targeted platforms decreases, it becomes easier to sustain equilibria in which candidates commit to the generic platform. As long as candidates can choose among different targeted platforms, however, the existence of inefficient equilibria is not affected by the size of M.

Proposition 5. *Consider the game with limited policy targeting. Let $M > 1$, $N > 2$, and define $\overline{n} := \max\{n \in \{1,..,N\} | n \leq \frac{N}{M}\}$. Equilibria exist, and in equilibrium:*

- *if $\rho < \frac{u-\overline{n}d}{d(N-(1+\overline{n}))}$ every equilibrium is inefficient;*
- *if $\rho \in \left[\frac{u-\overline{n}d}{d(N-(1+\overline{n}))}, \frac{u+d}{Nd}\right]$ both efficient and inefficient equilibria exist;*
- *if $\rho > \frac{u+d}{Nd}$ every equilibrium is efficient.*

As long as $M > 1$, inefficient equilibria exist. To prove the existence of inefficient equilibria we construct, once more, equilibria in which uninformed voters hold skeptical beliefs. In these equilibria, candidates do not find it profitable to commit to the generic platform because uninformed voters interpret a disclosure of a generic position as a signal that the candidate committed to a targeted platform that yields them $-d$. Inefficient equilibria require at least 2 possible targeted platforms; otherwise, a candidate could fully reveal his commitment to the generic platform to all voters.

Nevertheless, as M decreases, efficient equilibria exist for a larger interval of values of ρ.[16] To minimize the incentive for a candidate to deviate from the generic platform, every uninformed voter should expect to observe $s_n^x = g_n$ for some $n \in \{1,..,M\}$. As M decreases, the share of uninformed voters expecting to observe $s_n^x = g_n$ can get larger for all $n \in \{1,..,M\}$. As a result, more uninformed voters are aware of any eventual deviation to a targeted platform, thus making such deviation less profitable for a candidate.

In the extreme case where $M = 1$, all uninformed voters would observe a deviation from equilibrium. Thus, efficient equilibria exist for any fraction of informed voters. Intuitively, this is because each candidate can credibly commit to each voter to not target any other voter. Proposition 6 also records that all equilibria are efficient if $M = 1$. This is also intuitive, as candidates can credibly communicate to all voters their choice of platform, corresponding to the result in Proposition 1.[17]

Proposition 6. *Consider the game with M targeted platforms. Let $M = 1$. Equilibria exists and are efficient.*

5.2. Negative Advertising

This subsection generalizes the game with microtargeting by allowing candidates to disclose a position from either platform. The game with negative advertising differs from the game with microtargeting only in one aspect: candidates observe their opponent's platform and, for each group of voters, they can opt to disclose a position from their own platform, or from the other candidate's platform. Proposition 7 records that in this case, efficient equilibria exist for all parameter values, while inefficient equilibria exist for the same parameter values as in the game with microtargeting.

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15 The game with random disclosure and the game with issue selection could be generalized in the same way. Equilibria in those games are efficient regardless of the size of M.

16 To verify this, observe that larger M yield smaller $\overline{n}$, and $\frac{u-\overline{n}d}{d(N-(1+\overline{n}))}$ is decreasing in $\overline{n}$.

17 The proof of Proposition 6 is available upon request.

Proposition 7. *In the game with negative advertising, efficient equilibria exist. Moreover, if $N > 2$ and $\rho \leq \frac{u+d}{Nd}$, there exist also inefficient equilibria.*

The possibility to disclose a position from the opponent's platform ensures that efficient equilibria exist. In these equilibria candidates commit to the generic platform as they anticipate that if they were to deviate to a targeted platform, the opponent would disclose their targeted position. The possibility to disclose a position from the opponent's platform does not, however, rule out inefficient equilibria. To show existence of inefficient equilibria we rely, once again, on skeptical beliefs of uninformed voters. We let candidates commit to a targeted platform and uninformed voters believe that a candidate has chosen a platform yielding $-d$ unless they are shown evidence that he chose the platform that yields them u. If the share of informed voters is sufficiently small, a deviation to the generic platform is not profitable.

6. Conclusions

We have shown how policy targeting, when coupled with message targeting, can lead to inefficiencies in candidates' choice of platforms. While models of policy targeting abound in the literature on electoral competition, these models usually do not distinguish between policy and communication. We view this paper as a first step in a larger research program that differentiates between these types of targeting and studies their interaction.

Our model relies on some voters being largely uninformed about policy platforms. These uninformed voters base their decisions on simple, but truthful, messages from candidates revealing a subset of policy platforms. Our model recovers the standard efficient allocation when policy is perfectly observable by all voters. When candidates can reveal different components of their platform to different groups of voters, candidates trade off the gain in votes from targeting a subset of uninformed voters at the cost of losing some votes from informed voters. When the share of informed voters is sufficiently small, equilibria under microtargeting are inefficient.

In this paper, we present a very simple model which distinguishes between targeted policies and targeted communication. Much of the literature on policy targeting has instead explored how the incentives to target differ by electoral system. Such an extension of our model would also be interesting. Similarly, considering a richer menu of policies or exploring competition with more than two candidates could generate more nuanced predictions. As more data about voters become available, politicians can learn more about and better differentiate between narrow groups of voters. It would be interesting to explore the effects of this knowledge coupled with a superior ability to target messages. More broadly, the increased availability of voters' data and simultaneous advances in marketing techniques have made targeted political communication a timely and policy relevant area of research: Andrew Yang has made individual property rights over personalized data a central plank of his 2020 US presidential primary platform.

Finally, testing our model empirically would be interesting but also poses some challenges. The share of informed voters, returns to targeted policies, and costs of financing targeted policies are essential to the predictions of our model, but difficult to measure in practice. Given such measures, an ideal empirical setting would consider multiple constituencies with exogenous variation in the ability of candidates to target ads. One possible way would be to exploit variation in internet penetration across districts as targeting online advertising is substantially more flexible than alternative forms of media. An alternative test could exploit the share of informed voters, holding constant the ability to target. Such a test could exploit variation in self-sought information on platforms (e.g., measured via online search frequency across districts) as a proxy for informed voters since such information cannot be targeted as precisely. Both methods, however, rely on satisfactory proxies for the previously mentioned unobserved parameters.

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Appendix A. Proofs of Propositions

Proof of Proposition 2. An efficient platform ensures more votes from informed voters than an inefficient one in all the games we consider (see Proposition 1). Call this Observation 1.

Consider first the game with random disclosure. Let $\mathbb{E}[\pi_{m,a}^{P*}]$ denote candidate a's expected vote share from uninformed voters in group m in equilibrium. Let instead $\mathbb{E}[\pi_{m,a}^{P\dagger}]$ denote a's expected vote share from uninformed voters in group m if a deviates to an out-of-equilibrium platform while b does not. Then a's expected gain (or loss) of votes from uninformed voters as a result of the deviation is

$$\sum_{m=1}^{N} \mathbb{E}[\pi_{m,a}^{P*}] - \sum_{m=1}^{N} \mathbb{E}[\pi_{m,a}^{P\dagger}] =$$

$$\sum_{m=1}^{N} (\mathbb{E}[\pi_{m,a}^{P*}] - \mathbb{E}[\pi_{m,a}^{P\dagger}]) =$$

$$\sum_{m=1}^{N}\sum_{n=1}^{N}\left(\frac{\mathbb{E}_m[\sum_{i=1}^{N} u_m(s_i^a)|s_n^{a*}]) - \mathbb{E}_m[\sum_{i=1}^{N} u_m(s_i^a)|s_n^{a\dagger}]}{N}\right),$$

where s_n^{a*} and $s_n^{a\dagger}$ denote the positions of candidate a on issue n, in equilibrium and following the deviation, respectively. Clearly this difference is independent of the platform choice of b, and independent of the correlation between disclosures from the two candidate's platform. We will repeatedly take advantage of this observation in our proof.

We first show that there exists an equilibrium in which both candidates commit to the generic platform (this equilibrium is efficient). A deviation in this equilibrium amounts to committing to a targeted platform. Suppose candidate a deviates to targeted platform 1. If uninformed voters observe $s_n^a = g_n$ for $n \neq 1$, the deviation leaves the share of votes from uninformed voters for candidate a unchanged. If instead they observe $s_1^a = t_1$, the share of votes for candidate a from uninformed voters changes by $(1-\rho)\frac{u-(N-1)d}{N} < 0$ as a result of the deviation. Hence $\sum_{m=1}^{N} \mathbb{E}[\pi_{m,a}^{P*}] - \sum_{m=1}^{N} \mathbb{E}[\pi_{m,a}^{P\dagger}] = (1-\rho)\frac{u-(N-1)d}{N^2} < 0$. Observation 1 implies that the deviation is not profitable. By symmetry of targeted platforms and candidates, candidates have no profitable deviation, thus we have indeed constructed an equilibrium.

To show that all equilibria are efficient, we prove by contradiction that in equilibrium both candidates commit to the generic platform. Suppose in equilibrium candidate a commits to targeted platform 1. Consider a deviation to the generic platform. The share of uninformed-voter votes for candidate a changes only if $s_1^a = g_1$ is disclosed. In this case, either all uninformed voters believe that candidate a has committed to some targeted platform $n \neq 1$, then candidate a's share of votes from uninformed voters does not change as a result of the deviation, or else they all believe that he has committed to the generic platform, hence his share of votes from uninformed voters changes by $(1-\rho)\frac{(N-1)d-u}{N} > 0$. As the deviation increases the share of votes from informed voters (Observation 1), the deviation is profitable, yielding a contradiction.

Consider now the game with issue selection. We first show that there exists an efficient equilibrium in which candidates commit to the generic platform. To check that there does not exist a profitable deviation, note that in equilibrium all uninformed voters hold the same beliefs both on and off path, hence any deviation that changes uninformed voters' beliefs cannot increase the share of votes from uninformed voters. Thus, by Observation 1, there is no profitable deviation.

Next, we establish that all equilibria are efficient. Suppose in equilibrium candidate x commits to targeted platform n. Consider a deviation that requires to commit to the generic platform. This deviation increases the share of votes from informed voters. Regardless of the choice of disclosure in equilibrium and the choice of disclosure associated with the deviation, the share of votes from uninformed voters cannot get smaller as a result of the deviation, as all uninformed voters hold the same beliefs both on and off path. The deviation is thus profitable. □

Proof of Proposition 3. We say that an uninformed voter holds *skeptical beliefs* if, upon observing an out-of-equilibrium position $s^x_n = g_n$, she believes that candidate x's platform yields her utility $-d$.

In the first half of the proof we show that inefficient equilibria exists if and only if $\rho \leq \frac{u+d}{Nd}$. We begin by showing that an inefficient equilibrium exists if $\rho \leq \frac{u+d}{Nd}$. Consider a tentative equilibrium in which both candidates commit to targeted platform 1 and disclose, respectively, positions s^a_n and s^b_n to uninformed voters in group n, while uninformed voters hold skeptical beliefs. It is easy to check that a deviation that requires to commit to targeted platform 1 while changing the choice of disclosure, or to commit to a different targeted platform together with some choice of disclosure, cannot be profitable. Consider a deviation that requires to commit to the generic platform. The deviation ensures $\rho\frac{(N-1)d-u}{N}$ extra votes from informed voters. At the same time, as a result of the deviation, for any choice of disclosure all uninformed voters believe that the candidate's platform yields them $-d$; hence the deviation results in a loss of $(1-\rho)\frac{u+d}{N}$ votes from uninformed voters. As long as $\rho \leq \frac{u+d}{Nd}$ this deviation is not profitable, and therefore there is no profitable deviation, and our tentative equilibrium is indeed an equilibrium.

Next we show that inefficient equilibria exist only if $\rho \leq \frac{u+d}{Nd}$. We do so by showing that in equilibrium both candidates commit to the generic platform if $\rho > \frac{u+d}{Nd}$. Suppose in equilibrium candidate x commits to targeted platform n. Consider a deviation that requires to commit to the generic platform while leaving unchanged the choice of issues to report on. The deviation cannot decrease the share of votes from uninformed voters that do not belong to group n, regardless of the issue on which they observe candidate x's position. Thus, as a result of the deviation candidate x loses, at most, $(1-\rho)\frac{u+d}{N}$ votes from uninformed voters. As the deviation yields $\rho\frac{(N-1)d-u}{N}$ additional votes from informed voters, the deviation is profitable if $\rho > \frac{u+d}{Nd}$.

In the second half of the proof we establish that efficient equilibria exist if and only if $\rho \geq \frac{u-d}{d(N-2)}$. We begin by showing that if $\rho \geq \frac{u-d}{d(N-2)}$ then there exists an equilibrium in which both candidates commit to the generic platform and report to group 1 about (their position on) issue 2, to group 2 about issue 3 and so on, and to group N about issue 1, while uninformed voters hold skeptical beliefs. Deviating to a different disclosure while committing to the generic platform is not profitable. Consider a deviation that requires to commit to targeted platform 1, while disclosing $s^x_1 = t_1$ to uninformed voters in groups 1 and N, and disclosing as required by the equilibrium strategy to all other uninformed voters. The deviation is not profitable as long as: $\rho\frac{u-(N-1)d}{N} + (1-\rho)\frac{u-d}{N} \leq 0$, or equivalently: $\rho \geq \frac{u-d}{d(N-2)}$. Whenever this deviation is not profitable, there is no profitable deviation.

We conclude by showing that all equilibria are inefficient if $\rho < \frac{u-d}{d(N-2)}$. Suppose in equilibrium candidate x is expected to commit to the generic platform. Please note that there must be at least one position that is reported to no more than one group of voters. Let g_n be such a position. Consider a deviation that requires to commit to targeted platform n, while disclosing $s^x_n = t_n$ to group n and any group that in equilibrium observes $s^x_n = g_n$, while leaving the disclosure unchanged for all other groups. The deviation is profitable as long as $\rho\frac{u-(N-1)d}{N} + (1-\rho)\frac{u-d}{N} > 0$, or equivalently $\rho < \frac{u-d}{d(N-2)}$. This concludes the proof. □

Proof of Proposition 4. We first show that an efficient equilibrium exists. Consider a strategy that requires candidate x to commit to the generic platform while disclosing $s^x_1 = g_1$ to uninformed voters in group 2 and $s^x_2 = g_2$ to uninformed voters in group 1. Consider a candidate equilibrium in which both candidates adopt the strategy just defined and uninformed voters hold skeptical beliefs (see the proof of Proposition 3 for a definition of skeptical beliefs). To verify that candidates do not have a profitable deviation, note first that a deviation that requires to commit to the generic platform and adopt a different disclosure results in a smaller share of votes from uninformed voters and does not change the share of votes from informed voters. At the same time, a deviation that requires to commit to a targeted platform cannot be profitable, as it results in a change in the share of votes from uninformed voters not larger than $\frac{(1-\rho)u-d}{2} < 0$, and in a reduction in the share of votes from informed voters.

Next, we show that all equilibria are efficient. Suppose that in equilibrium candidate x is expected to commit to a targeted platform. Consider a deviation that requires to commit to the generic platform while disclosing $s_1^x = g_1$ to uninformed voters in group 2 and $s_2^x = g_2$ to uninformed voters in group 1. This deviation results in a larger share of votes from informed voters, and also ensures that every uninformed voter expects a utility at least as large as 0 from candidate x's platform. As targeted platforms ensure less than 0 to the average voter, candidate x's share of votes from uninformed voters increases as a result of the deviation. □

Proof of Proposition 5. The proof that inefficient equilibria exist if and only if $\rho \leq \frac{u+d}{Nd}$ is the same as in the proof of Proposition 3.

We establish here that efficient equilibria exist if and only if $\rho \geq \frac{u-\overline{n}d}{d(N-(1+\overline{n}))}$. We first establish that there exists an equilibrium in which both candidates commit to the generic platform and disclose in a way that ensures that for each $n \in \{1,..,M\}$: $s_n^a = g_n$ (respectively, $s_n^b = g_n$) is disclosed to at least $\overline{n}$ different groups, and voters in group n do not observe $s_n^a = g_n$ (respectively, $s_n^b = g_n$). Suppose moreover that voters hold skeptical beliefs (as defined in the proof of Proposition 3). Deviating to a different disclosure while committing to the generic platform is not profitable. Please note that for any candidate x there is at least one issue $n \in \{1,..,M\}$ such that candidate x discloses s_n^x to $\overline{n}$ groups. Let issue 1 be such an issue. Consider a deviation that requires to commit to targeted platform 1, while disclosing $s_1^x = t_1$ to group 1 and disclosing positions from the same issues as prescribed by the equilibrium strategy to all others. The deviation is not profitable as long as: $\rho\frac{u-(N-1)d}{N} + (1-\rho)\frac{u-\overline{n}d}{N} \leq 0$, or equivalently: $\rho \geq \frac{u-\overline{n}d}{d(N-(1+\overline{n}))}$. It is immediate that whenever this deviation is not profitable, then all deviations are not profitable.

Next, we show that all equilibria are inefficient if $\rho < \frac{u-\overline{n}d}{d(N-(1+\overline{n}))}$. Suppose in equilibrium candidate x commits to the generic platform. Please note that there must be at least one issue $n \in \{1,..,M\}$ such that voters in no more than $\overline{n}$ groups observe $s_n^a = g_n$. Let issue 1 be such an issue. A deviation to targeted platform 1 is profitable as long as $\rho\frac{u-(N-1)d}{N} + (1-\rho)\frac{u-\overline{n}d}{N} > 0$, or equivalently: $\rho < \frac{u-\overline{n}d}{d(N-(1+\overline{n}))}$. □

Proof of Proposition 7. We first show that an efficient equilibrium exists. Consider the following strategies. Both candidates commit to the generic platform and, as long as they do not observe a deviation by the other candidate, they disclose their own position on issue 1 to all uninformed voters. If candidate x deviates to targeted platform n, the other candidate reports $s_n^x = t_n$ to all uninformed voters. Uninformed voters believe that a candidate has committed to the generic platform, unless they observe a targeted position from his platform. It is easy to check that there is no profitable deviation for the candidates.

Next, we show that inefficient equilibria exist if $\rho \leq \frac{u+d}{Nd}$. Consider the following strategies: both candidates commit to targeted platform 1, and disclose their own position on issue n to uninformed voters in group n, regardless of the choice of platform of the other candidate. Uninformed voters believe that a candidate has committed a platform that ensures them $-d$ unless either they observe that the candidate has committed to the platform that ensures them u, or, for $N = 3$, they observe two positions showing that the candidate has not committed to either of the two platforms that ensure them $-d$. A deviation to commit to a different targeted platform cannot be profitable regardless of the choice of disclosure. A deviation to the generic platform results in the same payoff regardless of what position is disclosed. Such a deviation is profitable if and only if $\rho\frac{((N-1)d-u)}{N} \geq (1-\rho)\frac{u+d}{N}$, which is equivalent to $\rho \geq \frac{u+d}{Nd}$. □

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