

The Voters' Curses; Why We Need Goldilocks Voters*

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Abstract

Scholars have long deplored voters' lack of interest in politics and argued greater political engagement would improve democratic responsiveness. We present a theory of elections built upon a formal model where successful communication of political messages during campaigns requires efforts by politicians and a representative voter. The voter's interest in politics affects the effectiveness of the electoral process as screening and disciplining device. The electoral process performs poorly *and* the voter's level of political activity is low when the voter cares little about politics—this is the *curse of the apathetic voter*—, or cares a lot about politics—this is the *curse of the engaged voter*. Consequently, an engaged voter is not always an active voter and fostering political engagement (e.g., by lowering the cost of political information or facilitating policy changes) might have negative consequences on voter attention to politics and welfare.

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1 Introduction

Democracies require an active electorate to perform well. A representative’s incentive to act in voters’ interests depends on their attention and oversight (Tocqueville, 1840; Mill, 1861). The extent to which voters are able to fulfill their democratic duties, however, is heavily debated. Some argue that voters are incompetent (Campbell et al., 1960), do not have consistent political beliefs (Converse, 1964), and tend to reward or punish politicians based on outcomes politicians have no control over (Achen and Bartels, 2004). Others argue that voters “are not fools” (Key, 1966); they make the best possible choice given the alternatives and the information available to them (Downs, 1957). Despite these disagreements about voters’ abilities, these scholars share a common premise: an engaged electorate would increase the responsiveness of the democratic system. “Citizens do need to be more engaged in politics” and policies should be oriented towards the fulfillment of this goal, claim Delli Carpini and Keeter (1996, p.21).

We formally investigate this premise through the lense of a theory of elections where we distinguish between voters’ *engagement*—that is, their incentive to pay attention to politics—and their *attention*—that is, their cognitive involvement with the electoral process. Consistent with previous theories of democratic politics, we find that when voters have weak incentive to pay attention to politics, the performance of the democratic system—measured in term of voters’ welfare—declines. We term this phenomnom the *curse of the apathetic voter*. More surprisingly, we uncover a *curse of the engaged voter*. Greater political engagement might decrease substantially voters’ welfare and level of political activity. We show that the electoral process loses its effectiveness as screening and disciplining device when voters are highly engaged and politicians rationally anticipate the electoral consequences of choosing distinct platforms. Consequently, voters’ lack of attention to politics is not equivalent to voters’ lack of interest, but reflects the activities of political elites. Our results have important policy implications suggesting that well-intentioned interventions aimed at encouraging an engaged electorate might prove unsuccessful or even counterproductive.

Our theory builds upon a formal model of elections where a representative voter chooses between two candidates, who can be either competent or non-competent.¹ Candidates commit either to a status quo policy or to some new policy, which is costly to implement. The new policy is beneficial to the voter only if implemented by a competent candidate, and welfare-damaging, otherwise. How much the voter cares about politics is captured by her gain from policy change.

¹Henceforth, we use the pronoun ‘she’ and ‘he’ for the voter and politician, respectively.

The voter does not know candidates' competence or platforms. Unlike competence, platforms can be communicated to the voter during the electoral campaign. Building on Dewatripont and Tirole (2005), we propose a novel theory of electoral campaigns where electoral communication requires effort from both candidates *and* the voter. Our modeling approach to electoral campaigns follows Zaller's (1992, p.42) "reception axiom," which states that "the greater a person's level of cognitive engagement with an issue, the more likely he or she is to be exposed to and comprehend—in a word, receive—political messages concerning that issue." Higher communication efforts increase the probability the voter learns a candidate's platform, which reveals perfectly what the candidate will do in office. However, this information is only an indirect and imperfect signal of the candidate's competence (and consequently, the voter's payoff from the new policy). The key theoretical innovation of this paper is that the quality of this signal is endogenous to politicians' equilibrium behaviors *and* the voter's concerns.

For the voter, the electoral process performs best (her welfare is maximized) when competent politicians commit to the new policy, while incompetent politicians choose the status quo policy. Owing to our novel theory of communication, the existence of such a separating equilibrium depends not only on candidates' payoffs, but also on the voter's. This welfare-maximizing separating equilibrium exists if and only if the voter's gain from change is in an intermediate range. A separating equilibrium does not exist when the representative voter's political engagement is low. Even if (only) competent candidates were to propose the new policy, the voter would exert little communication effort. The resulting low probability that the voter learns a candidate's platform means that competent candidates have little electoral incentive to run on the new policy. Consequently, they would deviate and run on the status quo policy. When political engagement is low, the voter would pay *too little* attention to politics to sustain the welfare-maximizing separating equilibrium; this is the *curse of the apathetic voter*.

More surprisingly, a separating equilibrium does not exist when political engagement is high. If only competent candidates were to propose the new policy, the voter would exert high communication effort. The resulting high probability of successful communication would depress the electoral chances of non-competent candidates who commit to the status quo policy. Consequently, these candidates would deviate and mimic competent candidates by campaigning on the new policy. When political engagement is high, the voter would pay *too much* attention to politics to sustain the welfare-maximizing separating equilibrium; this is the *curse of the engaged voter*.

Our theory indicates that like Goldilocks who “likes her porridge not too cold, not too hot, likes it just right,” voters should care about politics not too little and not too much.

The rest of the paper is organized as follows. In the next section, we review the literature on voters’ behaviors and electoral accountability. In Section 3, we present our theory of elections and some general preliminary results. In Section 4, we describe the curse of the apathetic voter and the curse of the engaged voter. In Section 5, we study the voter’s attention and welfare in different equilibria. In Section 6, we discuss the implications of our results. Section 7 concludes. Proofs are collected in Appendix A. In a supplemental appendix, we show that provided that the screening problem faced by the voter is severe enough, the separating equilibrium on which this paper focuses (i.e., where candidates commit to the new policy only if competent) is welfare maximizing (Appendix B).²

2 Literature review

It has long been recognized that the responsiveness of democratic systems decreases when voters are not politically engaged (Tocqueville, 1840; Mill, 1861). However, the extent to which voters have the capacity to fulfill their democratic duty has been heavily debated by several generations of scholars. Copious studies document voters’ incompetence (Campbell et al., 1960; Delli Carpini and Keeter, 1996), lack of consistent beliefs (Lippmann, 1925; Converse, 1964; Zaller, 1992), or lack of abilities to discern between competent and non-competent politicians (Achen and Bartles, 2004; Wolfers, 2007; Leigh, 2009; Healy and Malhotra, 2009). Other scholars have argued that “voters are not fools,” they make the best possible choice given the alternatives available to them (Key, 1966), the information presented to them (Popkin, 1991; Sniderman et al., 1993; Lupia and McCubbins, 1998) and the cost and benefit of collecting political information (Downs, 1957; Page, 1978).

Despite these major disagreements about voters’ competence, both strands of the literature share two common features. First, they focus exclusively on voters. The electoral process is unidirectional, from political elites to voters, and the political environment matters inasmuch as it affects the amount or quality of information provided to voters. Consequently, a common policy recommendation is to provide voters with “access to better information about public policy” (Page

²The supplemental appendix can be found on the authors’ websites: <https://sites.google.com/site/carloprato1982/research> and <http://home.uchicago.edu/swolton/Research.html>

and Shapiro, 1992, p.398). But the electoral process should be seen as a bidirectional process. Voters' political engagement affects politicians' platforms and communication, which, in turn, influence information available to voters and how politically active they are.

Second, the literature on voters' behaviors argues that a more engaged electorate would improve the responsiveness of the democratic system. Campbell et al. (1960, pp.541-2) argue that popular elections perform well as a device of control only if the citizenry has clear goals and sufficient information. Without adequate political engagement, voters risk being manipulated by political or economic elites (Delli Carpini and Keeter, 1996; Jacobs and Shapiro, 2000; Stokes, 2001). This literature does not study how increased political engagement influences political elites' behaviors.

Recent works in the political agency literature point out the importance of considering the strategic interdependency between voters and politicians. Once the interactions between political actors are taken into account, voters might be hurt when they become more informed or sophisticated since politicians are induced to pander too often to voters (Prat, 2005; Fox, 2007; Fox and Van Weelden, 2012), to promote too many policy changes (Levy, 2007), or to behave too uniformly (Ashworth and Bueno de Mesquita, 2013). These papers focus on the effect of exogenous information on voters' welfare. But voters' information depends on how much they care about and pay attention to politics, which are at the center of our theory.

In this paper, we equate voters' attention to politics with attention to electoral campaigns. This follows a long research tradition which has stressed the importance of electoral campaigns for the functioning of democracy (Key, 1966; Page and Brody, 1972; Page, 1978; Alvarez, 1997). During campaigns, voters learn about candidates and their platforms (Franklin, 1991; Briens and Wattember, 1996; Freedman et al., 2004) and candidates "*inform, persuade, and mobilize*" voters (Norris, 2002 p.128, emphasis in the text; see also Salmore and Salmore, 1989; Holbrook, 2011). As illustrated by John Zaller's "reception axiom," the effect of an electoral campaign on voters' electoral decision depends on how much attention voters pay to it (McAllister, 2002; Franz, 2011; Murphy, 2011).

Our focus on electoral communication adds to a recent line of research which departs from the canonical Hotelling-Downs models of the electoral process (Persson and Tabellini, 2000) and acknowledges that it is costly to reach voters. Electoral communication serves to inform voters about a candidate's platform or valence (Prat, 2002; Coate, 2004a and b; Ashworth, 2006; Wittman, 2007; Prato and Wolton, 2014a), to change their evaluation of candidates by increas-

ing name recognition (Grossman and Helpman, 1996), or to increase the salience of some issues (Aragonès et al., 2014). Other papers highlight how voters can use campaign performance to learn about candidates’ competence, but assume costless dissemination of information (Bhattacharya, 2012; Dewan and Hortala-Vallve, 2013). Unlike our paper, these work suppose voters are passive recipients of electoral information.

An exception is Hortala-Vallve et al. (2013) where voters need to pay a cost to learn candidates’ platforms, but politicians can reach the voters costlessly (for an application to democratic consolidation, see also Svulik, 2013).³ Their focus is on the control of candidates vis-a-vis redistributive issues, not the selection of competent politicians who deliver beneficial policy changes.

3 A theory of elections and preliminary results

Our theory of elections builds upon a formal model featuring a one-period, three-player game with two candidates (1 and 2) and a representative voter. The candidates compete for an elected office, which they value. Before the campaign, each candidate $j \in \{1, 2\}$ privately observes his type $t \in \{c, n\}$ (where c denotes competent and n denotes non-competent politician), and chooses a platform: either the status quo policy ($p_j = 0$) or some new policy ($p_j = 1$), which is costly to implement. It is common knowledge that the proportion of competent candidates is $Pr(t = c) = q$.

The new policy is beneficial to the voter (compared to the status quo policy) only if it is implemented by a competent politician. It can be thought of as an experiment where success does not depend on the state of the world (as in Callander 2011a and b), but on a politician’s competence.⁴ The new policy can be a change of economic paradigm such as Latin America countries moving from import substitution industrialization to free market in the 1980’s. It can also take the form of institutional reforms such as decentralization in Bolivia in 1994 (Grindle, 2000). It can be related to an overhaul of an important issue such as environmental policy (e.g., Nixon’s reform in 1970), health care policy (e.g., Obama’s reform in 2009-2010), or labor market policy (e.g., the reforms in New Zealand in the 1990’s). Using Carmines and Stimson’s (1980)

³Several other papers examine voters’ incentives to acquire information (Austen-Smith and Feddersen, 2009; Gershkov and Szentes, 2009; Oliveros, 2013; Tyson, 2013). However in these models, voters choose between fixed alternatives and so these papers cannot study the strategic interdependence between voters and politicians.

⁴For example, competent politicians are more successful at crafting the scope and pacing of new policies and determining the compensation of winners and losers resulting from it (Haggard and Webb, 1993). They might be less likely to pander to vested interests (Krueger, 1993). Badly engineered policy changes impose a large cost on society as the experience of Latin America in the 1980s illustrates (Dornbusch, 1988; Krueger, 1993).

terminology, the new policy corresponds to a *hard issue*, a technical issue with little prior presence in public discussion.

In line with the literature on voters’ behavior, we consider an imperfectly informed voter. The voter does not know candidates’ competence and platforms. The voter can learn candidates’ platforms only if she pays attention to the electoral campaign. We assume that how informed the voter is depends on her and candidates’ communication efforts. We model electoral communication as a team problem, building on Dewatripont and Tirole (2005). A player exerts communication effort at a cost, and other players do not observe his effort. When candidate j exerts communication effort $y_j \in [0, 1]$ and the voter exerts communication effort $x_j \in [0, 1]$ toward candidate j , the probability that the voter observes the candidate’s platform is $y_j x_j$ (Figure 1). After the campaign, the voter elects one of the two candidates, denoted by $e \in \{1, 2\}$.

Notice that our assumptions regarding the campaigning technology imply that fixing the voter’s effort, greater communication effort by a candidate (e.g., increased number of ads) increases the probability that the voter becomes informed about what the candidate will do if elected. In turn, for a given number of ads from a candidate, greater communication effort by the voter increases the probability she learns the candidate’s platform. Our campaigning technology satisfies Zaller (1992)’s reception axiom, which states that greater cognitive engagement with an issue increases the probability a voter receives a candidate’s message. It is also in line with empirical evidence documenting that voters learn incrementally (Neuman et al., 1992).

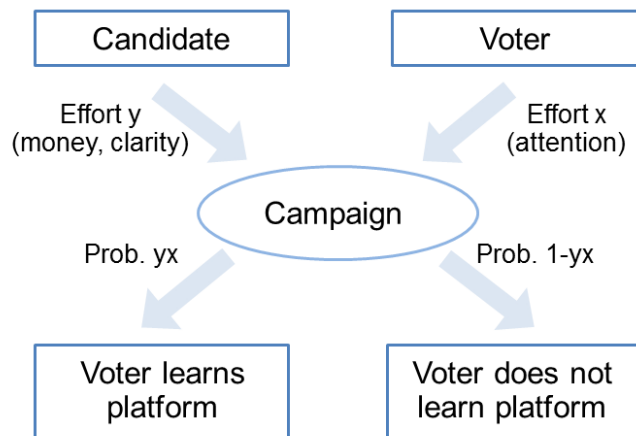


Figure 1: Campaign as a team effort

The voter’s utility function depends on the policy implemented by the elected candidate. When a candidate implements the status quo policy, the voter’s payoff is (normalized to) 0. When a

candidate implements the new policy, the voter’s payoff depends on the politician’s competence. When the elected politician is competent, the voter gets a utility gain of $G > 0$. When he is non-competent, she experiences a utility loss of $L < 0$.⁵ We refer to the parameter G as the *gain from change* for the voter. Below (Section 6), we relate the voter’s gain from change to her political engagement (how much she cares about politics).

As explained above, listening to candidates is costly for the voter (captured by the cost function $C_v(\cdot)$). This cost can be understood as the effort required to decipher a candidate’s message or the opportunity cost of paying attention to the campaign instead of undertaking other activities.⁶ The voter’s utility function is:

$$u_v(p_e, x_1, x_2) = \begin{cases} p_e G - C_v(x_1) - C_v(x_2) & \text{if } e \text{ is competent} \\ p_e L - C_v(x_1) - C_v(x_2) & \text{otherwise} \end{cases} \quad (1)$$

Candidates are office-motivated, and we normalize their payoff from being outside of office to 0. If elected, a politician gets a payoff of 1 if he implements the status quo policy and $1 - k_t$, $t \in \{c, n\}$ if he implements the new policy ($p = 1$). The policy cost of implementing the new policy depends on the politician’s competence: $0 < k_c < k_n < 1$. As noted by Hall and Deardoff (2006), any policy change entails a cost for politicians promoting it: cost of collecting information, striking a bargain with veto players, etc. We suppose that a competent politician is more able to undertake these tasks.⁷

We also suppose that communicating with the voter is costly for candidates (function $C(\cdot)$). Candidates can make broad statements without substance or announcements detailing a specific plan to action (Dewan and Hortola-Vallve, 2013). We focus on the second type of discourse, which we deem more costly than vague statements. This cost captures the difficulty of defining and disseminating (i.e., airing ads, organizing meetings, conventions, press conferences, etc.) a clear and effective message to the voter in a noisy environment.

⁵The main results of this paper (the existence of a curse of the apathetic voter and a curse of the engaged voter) would go through if there are $N > 1$ voters instead of one as long as there is sufficient commonality of interest between voters. In this case, voters’ level of attention is still directly affected by G , which is the key force driving our results.

⁶For example, it could represent the opportunity cost of watching parties’ nominating convention in the U.S., candidates’ press conferences, or news reports about candidates, rather than more entertaining TV programs. The assumption that the communication effort is directed simplifies the analysis without affecting the main results.

⁷A type c candidate’s policy cost can also be lower if politicians care about their place in history books, which depends on the impact of policy changes (Howell, 2013). While it complicates the analysis, our results hold in an environment in which politicians care about the voter’s welfare (as long as its weight in their utility function is less than the value of holding office).

Candidate j ($j \in \{1, 2\}$)'s utility is:

$$u_j(p_j, y_j; t) = \begin{cases} 1 - k_t p_j - C(y_j) & \text{if elected} \\ -C(y_j) & \text{otherwise} \end{cases} \quad (2)$$

To summarize, the timing of the game is:

1. Nature draws the candidates' type: $t \in \{c, n\}$, $j \in \{1, 2\}$.
2. Candidate $j \in \{1, 2\}$ observes (only) his type and chooses a platform: the status quo policy ($p_j = 0$), or the new policy ($p_j = 1$).
3. The electoral campaign takes place. Candidates 1 and 2, and the voter exert communication efforts: y_1 , y_2 , and $\mathbf{x} = (x_1, x_2)$, respectively. With probability $y_j x_j$, communication is successful: the voter observes candidate j 's platform (p_j). Otherwise, the voter does not learn p_j .
4. The voter elects one of the two candidates: $e \in \{1, 2\}$.
5. The elected candidate e implements p_e and payoffs are realized.

The set-up studied in this paper is the simplest to convey the intuition for our results. Candidates can only communicate their platform; they cannot credibly reveal their type to the voter directly.⁸ For analytical tractability, we assume that candidates implement the policy they have chosen.⁹ This implies that communication affects only candidates' chances of being elected, not their payoff once in office. Lastly, in the present set-up, the assumption that candidates are symmetric is key to derive our results. In a previous draft of the manuscript (Prato and Wolton, 2013), we extend our theoretical model to include asymmetries and show our main results still hold true.

In what follows, we assume the following.

Assumption 1. $-L/G = \tau > \frac{q}{1-q}$

⁸The main results of this paper still hold when the voter receives a signal of the candidate's competence as long as this signal is sufficiently noisy. This is because the voter does not care about competence per se, but wants to elect a competent candidate *who commits to the new policy*. Therefore, the voter always has some incentive to exert communication effort to learn about a candidate's platform. Consequently, the mechanism driving the curse of the apathetic voter and the curse of the engaged voter (described below) is still present with noisy signals.

⁹This can be justified by assuming, for example, that, in an unmodeled period 2, the voter receives information about candidates' platforms and is able to hold his elected representative accountable if she does not uphold his commitment.

Assumption 1 implies that the voter, absent updates on her prior about candidate j 's type, prefers the status quo policy to the new policy. Therefore, a competent politician who chooses $p_j = 1$ must convince the voter that he is competent in order to be elected.

Assumption 2. *The cost functions $C_v(\cdot)$ and $C(\cdot)$ satisfy the following properties:*

- i: $C_v(\cdot)$ and $C(\cdot)$ are twice continuously differentiable;*
- ii: $C'_v(0) = 0 = C'(0)$ and $\lim_{x \rightarrow 1} C'_v(x) = \infty = \lim_{y \rightarrow 1} C'(y)$;*
- iii: $C''_v(0) = 0 = C''(0)$ and $C''_v(x) > 0, \forall x \in (0, 1], C''(y) > 0, \forall y \in (0, 1]$;*
- iv: The third derivatives exist and satisfy: $C'''_v(\cdot) \geq 0$ and $C'''(\cdot) \geq 0$ on $[0, 1]$.*

Assumptions 2.i and 2.ii are analogous to assumptions on the communication cost function in Dewatripont and Tirole (2005). Assumption 2.iii is a sufficient condition for competent candidates and the voter to exert strictly positive communication effort when candidates play a separating strategy profile (i.e., only competent candidates commit to the new policy).¹⁰ Assumption 2.iv guarantees that the equilibrium communication strategies are unique when candidates play a separating strategy profile, and does not drive any result.

The equilibrium concept is Perfect Bayesian Equilibrium (PBE) in pure strategies (with the caveat that the voter tosses a fair coin to decide which candidate to elect when indifferent), and excluding weakly-dominated strategies. A formal definition of the equilibrium can be found in Appendix A (see Definition 1). Henceforth, the term ‘equilibrium’ refers to this class of equilibria.

We now present some general properties of the voter and candidates’ equilibrium strategies starting with the voter’s electoral decision. The voter elects the candidate who gives her the highest expected payoff given her beliefs about the candidates’ competence. Successful electoral communication simply reveals a candidate’s platform, not his competence. However, it acts as a signal of competence. Successful communication always raises the voter’s equilibrium posterior that the candidate is competent and as a consequence, his electoral chances.

Lemma 1. *In any equilibrium, a candidate’s probability of winning the election is (weakly) greater after successful communication.*

¹⁰We assume that $C''_v(0) = 0 = C''(0)$ for exposition purposes. It is sufficient that the second derivatives of both communication cost functions are bounded above at 0.

Given the voter’s electoral rule, we consider when a candidate chooses to invest in informative communication. We find that candidates do not always engage in costly communication.

Lemma 2. *In any equilibrium, a candidate exerts strictly positive communication effort if and only if he commits to the new policy ($p = 1$).*

Due to the absence of a policy cost, committing to the status quo policy ($p = 0$) can be understood as a default option for a politician. A candidate has no incentive to pay a cost to reveal that he commits to his default option. Consequently, the voter places high probability on a candidate promising no change when communication is unsuccessful, implying a candidate must exert some strictly positive communication effort when he commits to the new policy. An important consequence of Lemma 2 is that a candidate faces a double cost when he chooses $p = 1$. First, he must pay a policy cost (k_t), but only if he is elected. Second, he must incur a communication cost $C(y)$, borne regardless of the electoral outcome.

4 The voter’s curses

In this section, we describe the curse of the apathetic voter and the curse of the engaged voter. We study under which conditions there exists an equilibrium when candidates commit to the new policy only if competent. We will refer to this equilibrium as separating (slightly abusing the usual terminology). We focus on this equilibrium because for a given gain from change (G), the voter’s welfare is maximized when candidates play a separating strategy as long as the screening problem faced by the voter is serious enough (see Appendix B).¹¹ By Lemmas 1 and 2, a separating equilibrium exists only if for a competent candidate, the electoral reward for committing to the new policy is greater than the policy cost and the communication cost; this is a competent candidate’s incentive compatibility constraint. A non-competent candidate’s incentive compatibility constraint is the reverse inequality: his policy cost must be large enough so that he chooses the status quo policy.

We first study the players’ communication strategies when candidates play a separating strategy. The next lemma shows that candidates’ and the voter’s equilibrium communication strategies

¹¹When non-competent politicians’ policy cost is large, the screening problem faced by the voter is relatively mild and an asymmetric assessment where a candidate chooses the new policy independent of his competence and his opponent chooses the new policy only if competent might lead to a better expected welfare for the voter (see Appendix B for more details).

are unique.

Lemma 3. *Suppose a separating equilibrium exists. The equilibrium communication efforts are unique and satisfy:*

i. non-competent candidates exert no communication effort: $y_j^(n) = 0$, $j \in \{1, 2\}$;*

ii. competent candidates and the voter exert strictly positive communication efforts: $y_1^(c) = y_2^*(c) \equiv y^*(c) > 0$ and $x_1^* = x_2^* \equiv x^* > 0$, where $y^*(c)$ and x^* are the solution of:*

$$C'(y^*(c)) = (1 - k_c) \frac{x^*}{2} \quad (3)$$

$$C'_v(x^*) = q(1 - q)G \frac{y^*(c)}{2} \quad (4)$$

A non-competent politician does not need to invest in communication since he commits to the status quo policy, the default option (see Lemma 2). A competent candidate and the voter exert strictly positive communication efforts. Their level of effort equalizes the marginal benefit of an additional unit of communication effort with its marginal cost. The marginal benefit for a competent candidate is equal to the increased probability of being elected times the payoff from being in office. The voter invests in communication to avoid an electoral mistake: electing a non-competent candidate $-j$ (where $-j$ denote candidate j 's opponent) when candidate j is competent and commits to the new policy ($j \in \{1, 2\}$). The marginal benefit of communication effort is a reduction in the probability of electing the wrong candidate times the utility gain from avoiding such an electoral mistake.

For the voter, he benefit of avoiding an electoral mistake increases with the gain from change. Therefore, the voter's attention to the electoral campaign is higher as the benefit to selecting the right kind of politicians increases. Due to the complementarity in the campaigning technology ($y_j * x_j$), as the voter pays more attention, it becomes easier for candidates to reach her. The benefit of investing in communication increases for a competent candidate who consequently exerts more communication effort. A competent candidate's benefit from holding office depends on the cost of implementing the new policy (k_c). When this cost is high, the benefit from holding office is low and competent candidates exert low communication effort. As a consequence of the complementarity in communication, the voter's communication effort also decreases with the policy cost.

Lemma 4. *When candidates play a separating strategy, the voter's and competent candidates' communication efforts (respectively, x^* and $y^*(c)$): i. increase with the gain from change (G); ii. decrease with competent politicians' policy cost (k_c).*

Our next result shows how the communication efforts by the voter and a competent candidate influence the incentives to commit to the new policy for the opposing candidate.

Lemma 5. *When candidates play a separating strategy, an increase in the communication efforts of the voter or competent candidate $j \in \{1, 2\}$:*

- i. relaxes the incentive compatibility constraint of a competent candidate $-j$;*
- ii. tightens the incentive compatibility constraint of a non-competent candidate $-j$.*

When the voter pays more attention to candidates' messages, the return on committing to the new policy increases for *both* competent and non-competent candidates. This is a consequence of two cumulative effects. First, the voter learns candidates' platform (in particular, candidates' commitment to the new policy) with greater probability. Consequently, a competent candidate is more likely to be elected and thus has more incentives to promise changes. Inversely, a non-competent candidate is less likely to be elected and has fewer incentives to commit to the status quo policy. As such, electoral competition increases the incentives of a non-competent candidate to commit to harmful policy change.¹² This level effect of increased attention is the key mechanism driving our results, and does not depend on the campaigning technology used in this paper.¹³

Greater voter attention also has a second effect. It increases the efficiency of candidates' communication efforts and consequently, the return on communication for candidates committing to the new policy. As explained above, candidates in turn have greater incentive to propose policy change. This complementary effect depends on our assumptions on the campaigning technology, but it is only second-order to derive our results.

Using Lemmas 4 and 5, we can determine under which conditions a separating equilibrium exists. The next proposition first shows that a separating equilibrium exists if and only if the voter's gain from change is in an intermediate range.

¹²The idea that electoral competition encourages risk-taking is also present in Dewan and Hortala-Vallve (2013).

¹³A similar logic explains why the incentive to commit to the new policy for a candidate from one party depends on his opponent's communication effort.

Proposition 1. *There exists an open non-empty set of policy costs (k_c, k_n) such that there exist a unique $\underline{G} > 0$ and $\overline{G} \in (\underline{G}, \infty)$ such that a separating equilibrium exists if and only if the voter's gain from change is in an intermediate range:*

$$\underline{G} \leq G \leq \overline{G}$$

As a direct consequence of Proposition 1, we find a non-monotonic relationship between the voter's gain from change and the voter's welfare (see Figure 3b below for an illustration).

Corollary 1. *There exists a non-empty open set of policy costs such that an increase in the voter's gain from change decreases the voter's (ex-ante) expected equilibrium welfare.*

Suppose only competent types commit to the new policy and the gain from change is low. The benefit of avoiding an electoral mistake is low so the voter exerts little communication effort (Lemma 4). This means that the probability that the voter learns a candidate's platform is low and a competent candidate has little electoral incentive to commit to the new policy, which is costly to implement. Consequently, a competent candidate deviates and proposes the status quo policy so a separating strategy cannot be an equilibrium. When the voter has little to gain from the new policy, she would exert *too* little communication effort for a separating equilibrium to exist. This is *the curse of the apathetic voter*.

Conversely, suppose candidates play a separating strategy and the gain from change is high. The benefit of avoiding an electoral mistake is high so the voter pays a lot of attention to the campaign. There is a high probability that the voter learns a candidate's platform and so a high electoral reward for committing to the new policy. Consequently, a non-competent candidate mimics a competent one by committing to the new policy and a separating equilibrium cannot exist. When the voter has a lot to gain from the new policy, she would exert *too* high a communication effort for a separating equilibrium to exist. This is *the curse of the engaged voter*.

The existence of a separating equilibrium also depends on competent politicians' policy cost. We know that a candidate's incentive to commit to the new policy depends on the voter and his opponent's communication efforts (Lemma 5), which depend on the policy cost of implementing the new policy (Lemma 4). Surprisingly, we find that a separating equilibrium exists only if competent politicians' policy cost is sufficiently high.

Proposition 2. *There exist unique $\underline{k}_c(G), \underline{k}_n(G) \in [0, 1)$ such that a separating equilibrium exists only if $k_c \geq \underline{k}_c(G)$ and $k_n \geq \underline{k}_n(G)$. The lower bound $\underline{k}_c(G)$ is increasing with G (strictly if $\underline{k}_c(G) > 0$).*

Corollary 2. *There exists a non-empty open set of policy costs such that a decrease in a competent politician's policy cost (k_c) decreases the voter's expected equilibrium welfare.*

Suppose candidates play a separating strategy (i.e., only competent politicians commit to the new policy) and competent candidates' policy cost (k_c) is low. Competent candidates have a lot to gain from being in office and implementing the new policy. Consequently, they exert high communication effort when they propose policy change. Due to the complementarity in the campaigning technology, the voter also exerts high communication effort. It is thus very likely that the voter learns a competent candidate's commitment to the new policy. The electoral reward for committing to the new policy is then high, while the probability of winning the election for a non-competent candidate when he proposes the status quo policy is low (because a competent opponent's electoral chances are high). As a result, a non-competent candidate prefers to deviate and commit to the new policy. A separating strategy cannot be part of an equilibrium.

Proposition 2 also indicates that the optimal policy cost from the voter's perspective depends on the gain from change. When the gain from change is high, the voter pays great attention to the campaign and consequently, competent candidates exert high communication effort. This implies that the policy cost for competent politician needs to be large to sustain a separating equilibrium. Inversely, when the gain from change is low, a low policy cost for competent politicians is optimal for the voter.

Figure 2 illustrates the main results of this section. It represents competent and non-competent candidates' incentive compatibility constraints as a function of the policy costs. The area in blue in the figure corresponds to parameter values where both incentive compatibility constraints are satisfied (a separating equilibrium exists). The comparison of Figures 2a and 2b shows the effect of an increase in the gain from change on the existence of the separating equilibrium. An increase in G increases a competent candidate's incentive to commit to the new policy: his incentive compatibility constraint shifts right. But this increase also reduces a non-competent candidate's incentive to commit to the status quo policy: his incentive compatibility constraint shifts upward. Consequently, there exists policy costs such that a separating equilibrium exists when the gain from change is G , but does not exist when it is G' strictly greater than G (the dark purple area

in Figure 2b). Figure 2 also describes why a decrease in the competent politician’s policy cost can have a negative consequence on the existence of a separating equilibrium. A reduction in k_c implies more communication effort by competent candidates and the voter which leads to lower incentive to commit to the status quo policy for the non-competent politician: his incentive compatibility constraint is decreasing with the competent politician’s policy cost.

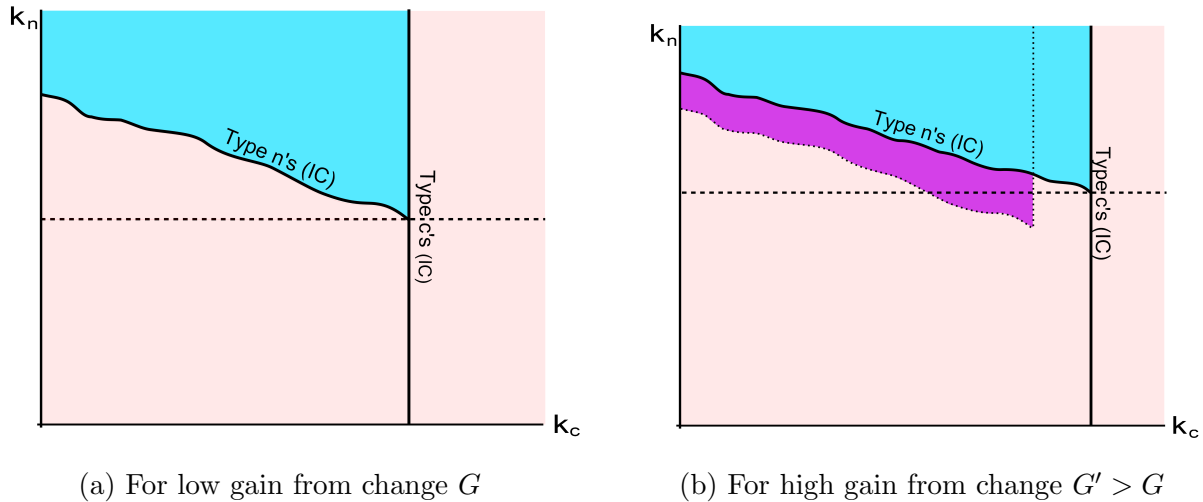


Figure 2: Equilibrium conditions

The blue area in the figure corresponds to policy costs such that a separating equilibrium exists. (IC) stands for incentive compatibility constraint.

5 Voter’s attention and welfare

The previous section establishes that the welfare-maximizing separating equilibrium exists only under specific conditions. When a separating equilibrium does not exist, multiple equilibria are possible. An equilibrium where no candidate commits to the new policy always exists. When the ratio of the gain over the loss from change is sufficiently large, there exists an asymmetric equilibrium when one candidate commits to the new policy independent of his competence, whereas his opponent commits to the status quo policy whether competent or non-competent.¹⁴ There might exist also an equilibrium when both candidates commit to the new policy regardless of their competence. In these last two possible equilibria, electoral communication is not aimed at learning candidates’ platforms, but serves as an imperfect screening device. The reason is that competent politicians exert more communication effort owing to their lower policy cost ($k_c < k_n$). Successful

¹⁴We show the existence of such an equilibrium and discuss its implications in a companion paper (Prato and Wolton, 2014b).

communication is thus a positive signal of a candidate's competence.

All these candidates for equilibrium share two common features when the voter's screening problem is severe enough (k_n is not too large). First, the voter's expected welfare is lower than when candidates play a separating strategy (see Appendix B for more details). Second, as the next proposition shows, the voter's attention to politics is lower than in the welfare-maximizing separating equilibrium. When no candidate proposes the new policy, the voter has nothing to gain from listening to the electoral campaign and so exerts no effort. When a non-competent candidate 1 and/or candidate 2 propose the new policy, the voter has less to gain from successful communication since she might elect the wrong kind of politician who implements a welfare-reducing policy change. Consequently, she again pays less attention to the campaign than she would when candidates commit to the new policy only when competent. Politicians' equilibrium behavior places limits on how active the voter can be. The voter's attention to electoral campaigns does not determine how much she learns from it, but rather *what* the voter can learn from the campaign determines how much attention she pays to it.

Proposition 3. *Denote $\bar{x}(G)$ the voter's highest combined equilibrium communication effort as a function of the gain from change. There exists a non-empty open set of policy costs such that:*

- i. $\bar{x}(G) = 2x^*(G), \forall G \in [\underline{G}, \bar{G}];$*
- ii. $\bar{x}(G) < \bar{x}(\underline{G})$ for all $G < \underline{G};$*
- iii. there exists $\hat{G} > \bar{G}$ such that $\bar{x}(G) < \bar{x}(\bar{G})$ for all $G \in (\bar{G}, \hat{G}).$*

Figure 3 illustrates how the voter's curses affect negatively her welfare and level of attention to politics. Figure 3a shows the voter's communication effort towards candidate 1 as well as candidate 1's expected communication effort as a function of the gain from change G . When a separating equilibrium exists ($G \in [\underline{G}, \bar{G}]$), the voter pays a lot of attention to politics since platforms are a perfect signal of candidates' competence. When the gain from change is below \underline{G} , a separating equilibrium does not exist due to the curse of the apathetic voter. An equilibrium when no candidate proposes the new policy exists, and the voter exerts no communication effort. When the gain from change is above \bar{G} , a separating equilibrium does not exist due to the curse of the engaged voter. A non-competent candidate 1 commits to the new policy. After successful communication, the voter is not certain she faces a competent candidate who will implement a welfare-improving pol-

icy change. This uncertainty reduces the benefit from successful communication, and consequently the voter’s equilibrium communication effort towards candidate 1.

Figure 3b shows the voter’s expected equilibrium welfare as a function of her gain from change. As indicated above, the voter’s expected welfare is highest in a separating equilibrium. When no candidate proposes the new policy, the voter gets a payoff of 0. When candidate 1 commits to the new policy independent of his competence, the voter gets a strictly positive expected payoff since electoral communication acts as an imperfect screening device. A competent candidate exerts more effort since he has more to gain from being in office and implementing the new policy ($k_c < k_n$). Successful communication is a sufficiently accurate signal of competence so that the voter’s expected welfare is higher than when every candidate proposes the status quo policy.

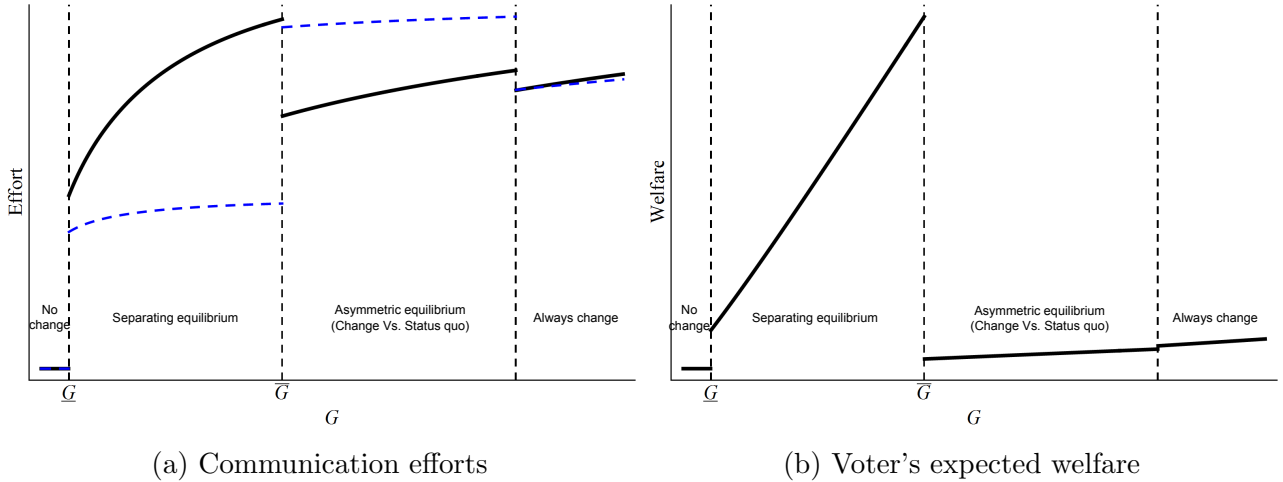


Figure 3

In Figure 3a, the dark line is the voter’s communication effort toward party 1 candidate; the blue dotted line is party 1 candidates’ average communication effort. In Figure 3b, the dark line is the voter’s expected equilibrium welfare.

$$\begin{aligned}
 & \text{(Parameter values: } q = 1/2, k_c = 1/4, k_n = 1/2, \tau = 1.01, \\
 & C_v(x) = (1/5)(x + (1-x)\log(1-x) - x^2/2), C(y) = (1/10)(y + (1-y)\log(1-y) - y^2/2)).
 \end{aligned}$$

6 Implications

Our result suggests that the electoral process performs best (i.e., the voter’s welfare is maximized) when two conditions are met. First, the gain from change is intermediary (Proposition 1). Second, the cost of implementing policy change is sufficiently high (Proposition 2).

In our theory, the gain from change captures the voter’s political engagement (how much she cares about politics). Consequently, our first condition has important implications for voters’ role

in democracy. Scholars have long debated voters’ capacity to fulfill their democratic duties, with some arguing that voters are at best incompetent (e.g., Campbell et al., 1960; Converse, 1964; Achen and Bartles, 2004) and others asserting that they are no fools (e.g., Key, 1966; Page, 1978; Lupia and McCubbins, 1998). But all scholars agree that a more engaged electorate would improve the chances that politicians act in the voters’ interests. Our paper shows that this claim needs to be qualified. The curse of the engaged voter implies that when the voter’s political engagement is high, the electoral process becomes too responsive and loses its effectiveness as screening and disciplining device. Politicians start to propose the policy preferred by voters regardless of their ability to adequately satisfy the voters’ demand for change. The voter faces the risk of electing non-competent politicians who implement welfare-reducing policy changes and consequently, reduces her attention to politics (Proposition 3) and might be worse off (Corollary 1).

Our theory implies that political engagement can have negative consequences for the electorate even when one considers fully *rational* voters who are motivated by selecting the *right* kind of politician. This conclusion complements the well-known danger of the “transient impulses” of passion which can lead to undesirable political outcomes (e.g., Federalist no.71). Another consequence of our results is that how much voters care about politics cannot be inferred from how much attention voters pay to politics. High political engagement can be associated with relatively low levels of political activity because of the behavior of political elites.

A common proposal to foster political engagement is to decrease the cost of political information (e.g., Page and Shapiro, 1992; Delli Carpini and Keeter, 1996). Recently scholars have argued that this goal can be accomplished through increased subsidies for public service (Soroka et al., 2013; O’Mahen, 2013). As the next proposition shows, our theory predicts this policy would have an ambivalent effect on voter welfare.¹⁵ It would alleviate the curse of the apathetic voter and facilitate welfare-improving policy change when the voter is disengaged. But it would also exacerbate the curse of the engaged voter and impede welfare-improving policy change when the voter’s political engagement is high.

Proposition 4. *Suppose that the voter’s cost of communication decreases from $C_v(x)$ to $\check{C}_v(x) = \lambda C_v(x)$, with $\lambda < 1$. There exist non-empty open sets of policy costs, λ and gain from change G such that the voter’s expected equilibrium welfare and level of attention are lower with $\check{C}_v(\cdot)$ than*

¹⁵No paper tests the effect of lower cost of political communication on voter welfare. However, a recent empirical study by Hodler et al. (2012) shows that increasing political engagement by reducing the cost of voting might lead to worse policies for voters.

$C_v(\cdot)$.

As stated above, a second favorable condition for welfare-improving policy change is that (for a given level of political engagement) the cost of implementing the new policy is sufficiently high (Proposition 2). This policy cost depends on the institutional environment faced by elected politicians such as the number of veto players, supermajority requirement, constraints on the use of emergency procedures, etc.. Our results indicate that increasing the status quo bias in institutions (i.e., increasing the policy costs) can improve the voter's welfare. Our argument is unrelated to the traditional idea of preventing a tyranny of the majority (Federalist no.10 and 51).¹⁶ Greater policy costs imply less communication effort by a competent politician when he commits to the new policy. This softens electoral competition and partially mutes the curse of the engaged voter. A non-competent candidate who commits to the status quo policy still has a relatively high probability of winning the election and less incentive to propose harmful policy change. Greater status quo bias also increases non-competent politicians' policy cost, which further decreases their incentives to promise changes. Paradoxically, an institutional environment *ex ante* less favorable to policy change might actually promote policy change. The reason is that high policy costs preserve the effectiveness of the electoral process as a screening and disciplining device, especially in times when political engagement is high.

However, there exists a trade-off in the design of institutions. Imposing a relatively high policy cost ensures that commitment to the new policy still signals a candidate's competence when political engagement is high. But it also exacerbates the curse of the apathetic voter. The voter is less able to incentivize competent politicians to propose the new policy when political engagement is low. If crises correspond to a time when the gain from change is high (as in, for example, Drazen and Grilli, 1993), then the optimal degree of status quo bias in institutions depends on how frequent crises are—particularly, but not exclusively, economic crises. If crises are recurrent, the curse of the engaged voter should be the main concern and a high status quo bias in institutions might be optimal. Inversely, if crises are rare, the curse of the apathetic voter is the main problem and policy costs should be low.¹⁷

¹⁶Our argument is also different than Gehlbach and Malesky's (2010), who show that additional veto players can be beneficial because they increase the cost of buying votes for an organized minority who wishes to stall welfare-improving reforms, and Hao Li (2001), who demonstrates that an institutional status quo bias can mitigate free riding problems in a group. Closest to our argument is Fu and Li (2014) who show that greater institutional status quo can improve the voter's welfare by reducing the risk of welfare-reducing policy innovations. Unlike our paper, this comes at the cost of reducing the probability of reform and the voter's ability to screen competent politicians.

¹⁷In the latter case, institutional change is more complicated since a decrease in policy costs has conflicting effects:

7 Conclusion

In this paper, we show that the commonly believed premise that a more engaged electorate improves the performance of the democratic process needs to be qualified. In line with previous theories, we find that there exists a curse of the apathetic voter: the voter needs to care sufficiently about politics to incentivize politicians to act in her interests. More surprisingly, our theory shows that there exists also a curse of the engaged voter: too much incentive to pay attention to politics lowers the voter's equilibrium welfare and level of political activity due to the behavior of political elites. The electoral process thus performs best when voters are like Goldilocks: they care not too little and not too much about politics.

Our theory yields two important predictions for the study of voters' behavior and democracy. First, it is not possible to infer from voters' level of political activity how much they care about politics. Second, policies meant to increase voters' political engagement (such as decreasing the cost of acquiring political information or facilitating policy changes) might have unintended, negative consequences on voters' welfare and attention to politics as a consequence of the curse of the engaged voter.

Our paper is a first step towards a better understanding of voters' and politicians' strategic choices of attention and communication, as well as their influence on the performance of the democratic process. As such, the use of a representative voter and a common value environment seem natural. We are aware, however, that these assumptions might conceal interesting effects which deserve further attention in future research. Future work, as such, would do well to explore the influence of special interest groups and of varied groups of voters with distinct policy preferences on policy-making.

both competent and non-competent politicians have greater incentives to commit to the new policy. This again justifies institutions making implementation of policy changes difficult.

Appendix A: Proofs

We first introduce some notation. Denote by $\sigma_j(t) = (p_j(t), y_j(t)) \in \{0, 1\} \times [0, 1]$ the strategy (policy choice and communication effort) of a type $t \in \{c, n\}$ candidate $j \in \{1, 2\}$. The tuple of strategies is denoted by $\sigma_j \equiv (\sigma_j(c), \sigma_j(n))$. Denote by $m_j \in \{\emptyset, p_j\}$ the outcome of electoral communication: whether the voter observes candidate j 's platform. If $m_j = \emptyset$ ($m_j = p_j$), communication has been unsuccessful (successful). We also denote by $\mu(m_j, x_j) \equiv \mu_j$ the voter's posterior belief that candidate j is competent conditional on observing m_j and her communication effort x_j . Finally, denote voter's electoral strategy (probability of electing candidate 1): $s_1(m_1, m_2, \mathbf{x}) \in [0, 1]$.

Definition 1. *The players' strategies form a Perfect Bayesian Equilibrium if the following conditions are satisfied¹⁸*

$$1) s_1(m_1, m_2, \mathbf{x}) = \begin{cases} 1 \\ 1/2 \\ 0 \end{cases} \Leftrightarrow E_\mu(u_v(p_1, x_1, x_2) | m_1, \sigma_1) \begin{matrix} \geq \\ \equiv \\ \leq \end{matrix} E_\mu(u_v(p_2, x_1, x_2) | m_2, \sigma_2);$$

$$2) y_j(t, p_j) = \arg \max_{y \in [0, 1]} E(u_j(p_j, y; t) | \mathbf{x}, s_1, \sigma_{-j}), \quad j \in \{1, 2\}, \quad t \in \{c, n\};$$

$$3) \mathbf{x} = \arg \max_{(x, x') \in [0, 1]^2} E(u_v(p_e, x, x') | s_1, \sigma_1, \sigma_2);$$

$$4) \forall j \in \{1, 2\}, \quad t \in \{c, n\},$$

$$p_j(t) = \begin{cases} 1 \\ 0 \end{cases} \Leftrightarrow E(u_j(1, y_j(t, 1); t) | \mathbf{x}, s_1, \sigma_{-j}) \begin{matrix} \geq \\ \leq \end{matrix} E(u_j(0, y_j(t, 0); t) | \mathbf{x}, s_1, \sigma_{-j});$$

$$5) \mu(m_j, x_j) \text{ satisfies Bayes' rule whenever possible.}$$

Note that condition 1) is equivalent to: after observing m_j and m_{-j} , the voter elects candidate $j \in \{1, 2\}$ with probability 1 rather than his opponent ($-j$) if and only if ($\forall m_j, m_{-j}, \sigma_j$, and σ_{-j}):

$$\mu_j p_j(c)G + (1 - \mu_j) p_j(n)L > \mu_{-j} p_{-j}(c)G + (1 - \mu_{-j}) p_{-j}(n)L \quad (5)$$

Denote also $\Gamma(\sigma_j(t), \sigma_{-j})$ the probability that a type $t \in \{c, n\}$ candidate j is elected when he plays strategy $\sigma_j(t)$ and his opponent plays σ_{-j} . We have: $\Gamma(\sigma_j(t), \sigma_{-j}) = E[\mathbb{I}_A + \frac{\mathbb{I}_B}{2} | p_j(t), y_j(t); \sigma_{-j}]$, where A is the event: 'equation (5) holds' and B is the event when both sides of (5) are equal. The expectation operator is over the probability of successful communication with candidate $j \in \{1, 2\}$,

¹⁸When indifferent, we suppose that candidates follow the strategy which maximizes the voter's welfare as it is usual.

candidate $-j$ and candidate $-j$'s type. $\Gamma(\sigma_j(t), \sigma_{-j})$ is increasing with $\mu(p_j(t), x_j)p_j(c)G + (1 - \mu(p_j(t), x_j))p_j(n)L$ and $\mu(\emptyset, x_j)p_j(c)G + (1 - \mu(\emptyset, x_j))p_j(n)L$.

Lemma 6. *There is no equilibrium in which $p_j(c) = 0$ and $p_j(n) = 1$.*

Proof. The proof is by contradiction. First, suppose a non-competent candidate j plays $\sigma_j(n) = (1, y_j(n))$, $y_j(n) > 0$ and a competent candidate j chooses $p_j(c) = 0$. When communication with the voter is successful, a non-competent candidate j is elected with strictly positive probability if and only if (by (5)): $L \geq \mu_{-j}p_{-j}(c)G + (1 - \mu_{-j})p_{-j}(n)L$. When communication with the voter is not successful, a non-competent candidate j is elected with strictly positive probability if and only if: $(1 - \mu(\emptyset, x_j))L \geq \mu_{-j}p_{-j}(c)G + (1 - \mu_{-j})p_{-j}(n)L$. Under Assumption 2 and $y_j(n) > 0$, we have $\mu(\emptyset, x_j) \in (0, 1)$. Then it must be that: $(1 - \mu(\emptyset, x_j))L > L$. Therefore, a type n candidate's probability of being elected is strictly greater when $m_j = \emptyset$. Because a candidate always values being in office ($k_n < 1$) and communication is costly, $\sigma_j(n) = (1, y_j(n))$ is strictly dominated by $\sigma_j(n) = (1, 0)$. Hence we have reached a contradiction. Suppose a non-competent candidate j plays $\sigma_j(n) = (1, 0)$. Since the voter never observes his platform, his choice of $p_j(n)$ does not affect his probability of being elected. Since the new policy is costly ($k_n > 0$), it must be that $\sigma_j(n) = (1, 0)$ is weakly dominated by $(0, 0)$. \square

A non-competent candidate never wants to choose $p = 1$ when a competent type chooses $p = 0$. By separating, he simultaneously lowers the probability of election and his expected payoff conditional on election (due to the policy cost).

Proof of Lemma 1. Fix candidate $-j$'s strategy σ_{-j} . Using Lemma 6, we need to consider only three cases: 1) $p_j(c) = 0$, $p_j(n) = 0$, 2) $p_j(c) = 1$, $p_j(n) = 0$, and 3) $p_j(c) = 1$, $p_j(n) = 1$. In case 1), successful communication has no impact on the probability of being elected since the voter's payoff does not depend on a candidate's type. In case 2), using a similar reasoning as in the proof of Lemma 2, a type n exerts zero communication effort. Successful communication thus reveals a candidate is competent and implements the new policy. By (5), candidate j 's probability of winning the election is higher after successful communication. In case 3), at the communication stage, both types solve the same maximization problem modulo the policy cost. A type n 's value of office is lower under the assumption that $k_c < k_n$. Therefore, a type c 's communication effort is weakly higher (as a result of condition 2 in Definition 1).¹⁹ Successful communication thus weakly

¹⁹This can also be shown by contradiction using a similar reasoning as in Lemma 6. If $y(n) > y(c)$, then a type n has a profitable deviation to zero communication effort so it cannot be an equilibrium strategy.

increases the voter's posterior regarding candidate j 's competence. By (5), the probability she elects candidate j is higher. \square

Proof of Lemma 2. Necessity. We prove the counterpart: $p_j = 0 \Rightarrow y_j = 0$. On the equilibrium path, given $p_j(t)$, the maximization problem of a type $t \in \{c, n\}$ candidate $j \in \{1, 2\}$ chooses $y_j(t)$ is: $\max_{y \geq 0} \Gamma((p_j(t), y), \sigma_{-j})(1 - p_j(t)k_t) - C(y)$, $j \in \{1, 2\}$ $t \in \{c, n\}$. The solution $y_j(t)$ affects $\Gamma(\cdot; \cdot)$ only through the probability that the voter observes $m_j(t) = p_j(t)$. Using Lemma 6, we just need to focus on two cases: 1) $p_j(c) = p_j(n) = 0$ and 2) $p_j(c) = 1$ and $p_j(n) = 0$. In case 1), since the voter anticipates correctly candidates' strategies in equilibrium, communication has no effect on a candidate's electoral chances. Since communication is costly, it must be that: $y_j(t) = 0$. In case 2), by (5), a type n candidate j wants to minimize the probability that the voter observes $m_j = 0$. Since communication is costly, it must be that a type n candidate j chooses $y_j(n) = 0$ when $p_j(n) = 0$ and $p_j(c) = 1$.

Sufficiency. Now consider the case of a candidate choosing $p = 1$. Using a similar reasoning as in Lemma 6, $\forall t \in \{c, n\}$ $\sigma(t) = (1, 0)$ is weakly dominated by $(0, 0)$. So on the equilibrium path, $p = 1 \Rightarrow y > 0$. \square

Lemma 7. *A separating equilibrium exists only if $\mu(m_1 = \emptyset, x_1^*)G = \mu(m_2 = \emptyset, x_2^*)G$ where $\mathbf{x}^* = (x_1^*, x_2^*)$ is the voter's equilibrium communication efforts.*

Proof. The proof is by contradiction. Suppose without loss of generality that $\mu(m_1 = \emptyset, x_1^*)G > \mu(m_2 = \emptyset, x_2^*)G$. Since by Lemma 2, we must have $y_j^*(n) = 0$, $j \in \{1, 2\}$, the above inequality implies that the voter always elects candidate 1 when both candidates' communication is not successful by (5). A type n candidate 2's expected utility is thus 0. If a type n candidate 2 pretends to be competent by choosing strategy $\hat{\sigma}_2(n) = (1, \hat{y}_2(n))$, where $\hat{y}_2(n)$ is his optimal communication effort, his expected utility is strictly positive (see the proof of Lemma 9 for more details). Therefore, a type n candidate 2 prefers to commit to the new policy and a separating equilibrium cannot exist. \square

Proof of Lemma 3. By Lemma 2, we have: $y_j^*(n) = 0$, $j \in \{1, 2\}$. Consider now a competent candidate $j \in \{1, 2\}$. When choosing his communication effort, he takes as given his opponent's (y_{-j}) and the voter's ($\mathbf{x} = (x_1, x_2)$) communication efforts. His expected utility, when he chooses

communication effort y_j , is:

$$V_j(1, y_j; c) = q \left(y_j x_j * (1 - y_{-j} x_{-j}) + \frac{y_j x_j * y_{-j} x_{-j}}{2} + \frac{(1 - y_j x_j)(1 - y_{-j} x_{-j})}{2} \right) (1 - k_c) \\ + (1 - q) \left(y_j x_j + \frac{1 - y_j x_j}{2} \right) (1 - k_c) - C(y_j) \quad (6)$$

When a competent candidate j faces a competent opponent, he wins with probability 1 when he communicates successfully with the voter and his opponent does not; with probability 1/2 when both communicate successfully (since the voter is indifferent) and when both are unsuccessful (by Lemma 7); and probability 0, otherwise. When he faces a non-competent candidate, he wins the election with probability 1 when communication is successful (this occurs with probability $y_j x_j$). When communication is unsuccessful, he wins with probability 1/2. In all cases, he has to pay his cost of communication. A competent candidate gets $1 - k_c$ when he gets elected, and 0 otherwise.

After rearranging, we get that a competent candidate 1 chooses his communication effort y_j to maximize: $\max_{y_j \in [0,1]} \left(\frac{1+y_j x_j}{2} \right) (1 - k_c) - q(1 - k_c) \frac{y_{-j} x_{-j}}{2} - C(y_j)$. We get the following First-Order Condition (FOC):

$$C'(y_j(c)) = \frac{1 - k_c}{2} x_j$$

Now let's consider the voter's communication effort. Her maximization problem is:

$$\max_{x_1, x_2 \in [0,1]^2} \left\{ \begin{array}{l} q^2 * G + \overbrace{(1 - q)}^1 \overbrace{\frac{2}{q}}^2 (y_2 x_2 * G + (1 - y_2 x_2) * \frac{G}{2}) \\ + (1 - q) q \frac{G}{2} (1 + y_1 x_1) - C_v(x_1) - C_v(x_2) \end{array} \right\}$$

In a separating equilibrium, the voter randomizes between both candidates when communication with both is successful or unsuccessful (Lemma 7). When communication is successful only with candidate 1 (2), she elects candidate 1 (2). We thus have the following FOC:

$$C'_v(x_j^*) = q(1 - q) \frac{G}{2} y_j, \quad j \in \{1, 2\}$$

We can see that $y_j^*(c)$ and x_j^* ($j \in \{1, 2\}$) are defined by the system of two equations (3) and (4). We now show there exists a unique strictly positive solution to this system of equations. By Lemma 2, it must be the players' equilibrium communication strategies.

Denote: $h(x) = q(1 - q) \frac{G}{2} (C')^{-1} \left(\frac{1 - k_c}{2} x \right) - C'_v(x)$. By Assumption 2, this function is continuously

differentiable. A necessary and sufficient condition for the existence of a strictly positive $y_j^*(c)$ and x_j^* , $j \in \{1, 2\}$ is that the function $h(x)$ has a 0 on $(0, 1)$. Under Assumption 2, $h(0) = 0$ and $\lim_{x \rightarrow 1} h(x) = -\infty$. Therefore, it is sufficient that $h'(0) > 0$. We have:

$$h'(x) = \frac{q(1-q)\frac{G}{2}\frac{1-k_c}{2}}{C''\left((C')^{-1}\left(\frac{1-k_c}{2}x\right)\right)} - C''_v(x^*) \quad (7)$$

By Assumption 2.iii, we have that $h'(0)$ has the same sign as $q(1-q)\frac{G}{2}\frac{1-k_c}{2}$ so $h'(0) > 0$ (i.e., $h'(x) \xrightarrow{x \rightarrow 0} +\infty$). Hence there exists a strictly positive solution to (3) and (4).

This solution is unique if $h''(x) \leq 0$. Using chain rules, we get:

$$h''(x) = -\frac{q(1-q)\frac{G}{2}\left(\frac{1-k_c}{2}\right)^2 C''' \left((C')^{-1} \left(\frac{1-k_c}{2} x \right) \right)}{C'' \left((C')^{-1} \left(\frac{1-k_c}{2} x \right) \right)^3} - C'''_v(x)$$

Since $C(\cdot)$, $C'(\cdot)$ and $C'_v(\cdot)$ are convex, we have that $h''(\cdot) \leq 0$. This implies that $y_1^*(c) = y_2^*(c)$ and $x_1^* = x_2^*$ and the equilibrium communication strategies are unique as claimed. \square

Lemma 8. *We have: $C''(y^*(c))C''_v(x^*) > q(1-q)\frac{G}{2}\frac{1-k_c}{2}$, where $y^*(c)$ and x^* are the unique strictly positive solutions to (3) and (4).*

Proof. Using the properties of $h(x)$, defined in the proof of Lemma 3, we know that we must have: $h'(x^*) < 0$ (since $h(x) \xrightarrow{x \rightarrow 1} -\infty$ and $h''(x) \leq 0$). Using (7) and $C'(y^*(c)) = \frac{1-k_c}{2}x^*$ by Lemma 3, we get $h'(x^*) = \frac{q(1-q)\frac{G}{2}\frac{1-k_c}{2} - C''(y^*(c))C''_v(x^*)}{C''(y^*(c))}$. Since $C''(y^*(c)) > 0$, $C''(y^*(c))C''_v(x^*) - q(1-q)\frac{G}{2}\frac{1-k_c}{2} > 0$. \square

Proof of Lemma 4. We only show point 1. Point 2. follows using a similar reasoning. By the Implicit Function Theorem (IFT), we have:

$$\begin{aligned} \frac{\partial y^*(c)}{\partial G} C''(y^*(c)) &= \frac{1-k_c}{2} \frac{\partial x^*}{\partial G} \\ \frac{\partial x^*}{\partial G} C''_v(x^*) &= q(1-q)\frac{G}{2} \frac{\partial y^*(c)}{\partial G} + q(1-q)\frac{x^*}{2} \end{aligned}$$

Rearranging, we get:

$$\frac{\partial x^*}{\partial k_c} = \frac{q(1-q)\frac{x^*}{2} C'''(y^*(c))}{C''(y^*(c))C''_v(x^*) - q(1-q)\frac{G}{2}\frac{1-k_c}{2}}$$

By Lemma 8, $\frac{\partial x^*}{\partial G} > 0$ and consequently, $\frac{\partial y^*(c)}{\partial G} > 0$. \square

Proof of Lemma 5. When a competent candidate $j \in \{1, 2\}$ chooses $p_j = 1$, he gets:

$$V_j(1, y_j^*(c); c) = \frac{1 + y_j^*(c)x_j^* - qy_{-j}^*(c)x_{-j}^*}{2}(1 - k_c) - C(y_j^*(c)) \quad (8)$$

When he deviates and chooses to campaign on the status quo policy ($p = 0$), he gets:

$$V_j(0, 0; c) = \frac{1 - q}{2} + q \frac{1 - y_{-j}^*(c)x_{-j}^*}{2} \quad (9)$$

A competent candidate j has a 50% chance of being elected against a non-competent candidate and against a competent candidate when communication is not successful. He gets 1 when he is elected, since he does not implement the new policy. By Lemma 2, he does not exert any communication effort when he chooses $p_j = 0$. A competent candidate's incentive compatibility constraint (IC) is thus:

$$\frac{1 + y_j^*(c)x_j^* - qy_{-j}^*(c)x_{-j}^*}{2}(1 - k_c) - C(y_j^*(c)) \geq \frac{1 - q}{2} + q \frac{1 - y_{-j}^*(c)x_{-j}^*}{2} \quad (10)$$

For a non competent candidate j , denote $\hat{y}_j(n)$ his communication effort when he deviates and campaigns on the new policy. Using a similar reasoning as in the proof of Lemma 2) $\hat{y}_j(n)$ is defined by:

$$C'(\hat{y}_j(n)) = \frac{1 - k_n}{2} x_j^* \quad (11)$$

Using a similar reasoning as above, we get that a non competent candidate j 's (IC) is:

$$\left(\frac{1 + \hat{y}_j(n)x_j^* - qy_{-j}^*(c)x_{-j}^*}{2} \right) (1 - k_n) - C(\hat{y}_j(n)) \leq \frac{1 - q}{2} + q \frac{1 - y_{-j}^*(c)x_{-j}^*}{2} \quad (12)$$

The claim holds by inspection of (10) and (12) □

Lemmas 9-13 are preliminary results to prove Propositions 1 and 2.

Lemma 9. *There exist a unique $k_c^* : \mathbb{R}_+ \rightarrow (0, 1)$ and $k_n^* : \mathbb{R}_+ \times [0, 1] \rightarrow (0, 1)$ such that*

i. A type c 's (IC) is satisfied only if $k_c \leq k_c^(G)$*

ii. A type n 's (IC) is satisfied only if $k_n \geq k_n^(G, k_c)$*

Proof of Lemma 9. We show that there exists a unique $k_c^* \in (0, 1)$ such that (10) is satisfied only if $k_c \leq k_c^*(G)$. By Lemmas 3 and 4, we know that $y_j^*(c) = y^*(c)$, $j \in \{1, 2\}$ and $x_j^* = x^*$, $j \in \{1, 2\}$

and the communication efforts are decreasing with k_c . Using the Envelope Theorem (and (3)), we get from (8):

$$\begin{aligned} \frac{dV_j(1, y^*(c); c)}{dk_c} &= -\frac{1 + qy^*(c)x^*}{2} + \frac{(1 - q)y^*(c)\partial x^*/\partial k_c - qx^*\partial y^*(c)/\partial k_c}{2}(1 - k_c) \text{ (using FOC)} \\ &< -q\frac{x^*\partial y^*(c)/\partial k_c}{2}(1 - k_c) < -q\frac{x^*\partial y^*(c)/\partial k_c}{2} \end{aligned}$$

We also have from (9):

$$\frac{dV_j(0, 0; c)}{dk_c} = -q\frac{y^*(c)\partial x^*/\partial k_c + x^*\partial y^*(c)/\partial k_c}{2} > -q\frac{x^*\partial y^*(c)/\partial k_c}{2}$$

Therefore, $d(V_j(1, y^*(c); c) - V_j(0, 0; c))/dk_c < 0$. If it exists, there is a unique $k_c^*(G)$ such that (10) is satisfied for all $k_c \leq k_c^*(G)$. Given that x^* and $y^*(c)$ depend on G , $k_c^*(\cdot)$ is a function of G . (10) is always satisfied as $k_c \rightarrow 0$ and never satisfied as $k_c \rightarrow 1$. By the Intermediate Value Theorem, $k_c^*(G)$ exists and $k_c^*(G) \in (0, 1)$.

We now show that there exists a unique $k_n^* : \mathbb{R}_+ \times [0, 1) \rightarrow [0, 1]$ such that (12) is satisfied $\forall k_n \geq k_n^*(G, k_c)$. For uniqueness, note that the left hand side of (12) is strictly decreasing with k_n (by the Envelope Theorem), whereas the right hand side does not depend on k_n . To prove the existence of $k_n^*(G, k_c)$, we apply the same reasoning as for the existence of $k_c^*(G)$. By inspection of (12), given that $y^*(c)$ and x^* depend on k_c and G , $k_n^*(\cdot)$ depends on k_c and G . \square

Lemma 10. $k_c^*(G)$ is increasing with $y^*(c)$ and x^* .

Proof. We ignore the argument in k_c^* for simplicity. By (10) and Lemma 9, k_c^* is defined as the unique solution to $k_c^* = \frac{y^*(c)x^* - 2C(y^*(c))}{1 + (1 - q)y^*(c)x^*}$.²⁰ The left-hand side is increasing with x^* . To see that it is increasing with $y^*(c)$, denote $R(y^*(c)) = \frac{y^*(c)x^* - 2C(y^*(c))}{1 + (1 - q)y^*(c)x^*}$ and $S(y^*(c)) = (x^* - 2C'(y^*(c)))(1 + (1 - q)y^*(c)x^*) - (1 - q)x^*(y^*(c)x^* - 2C(y^*(c)))$. We have: $\text{sign}(R'(y^*(c))) = \text{sign}(S(y^*(c)))$.

$$\begin{aligned} S(y^*(c)) &= (x^* - (1 - k_c^*)x^*)(1 + (1 - q)y^*(c)x^*) - (1 - q)x^*(y^*(c)x^* - 2C(y^*(c))) \\ &= x^*k_c^*(1 + (1 - q)y^*(c)x^*) - (1 - q)x^*(y^*(c)x^* - 2C(y^*(c))) \\ &= qx^*(x^*y^*(c) - 2C(y^*(c))) > 0 \end{aligned}$$

The first line comes from (3), the last line from the definition of $k_c^*(\cdot)$ and $k_c^*(\cdot) > 0$ by Lemma

²⁰Remember that in the definition of k_c^* , $y^*(c)$ and x^* are both evaluated at $k_c = k_c^*$ (see Lemma 9).

Lemma 11. $k_n^*(G, k_c)$ is increasing with $y^*(c)$ and x^* (and does not depend on $\hat{y}^*(n)$).

Proof. Ignoring the argument in k_n^* for simplicity. By (12) and Lemma 9, k_n^* is defined by: $k_n^* = \frac{\hat{y}^*(n)x^* - 2C(\hat{y}^*(n))}{1 + \hat{y}^*(n)x^* - qy^*(c)x^*}$. By inspection, it is increasing with $y^*(c)$. Regarding x^* , we know that $\partial k_n^*/\partial x^*$ has the same sign as: $\hat{y}^*(n)(1 + \hat{y}^*(n)x^* - qy^*(c)x^*) - (\hat{y}^*(n) - qy^*(c))(\hat{y}^*(n)x^* - 2C(\hat{y}^*(n)))$ which reduces to: $\hat{y}^*(n) + (\hat{y}^*(n) - qy^*(c))2C(\hat{y}^*(n))$. Since $\hat{y}^*(n) - qy^*(c) > -1$ and $\hat{y}^*(n) > \hat{y}^*(n)x^*$. We have $\hat{y}^*(n) + (\hat{y}^*(n) - qy^*(c))2C(\hat{y}^*(n)) > \hat{y}^*(n)x^* - 2C(\hat{y}^*(n)) > 0$. (We know from Lemma 9 that $k_n^* > 0 \Leftrightarrow \hat{y}^*(n)x^* - 2C(\hat{y}^*(n)) > 0$). By the Envelope Theorem, k_n^* does not depend on $\hat{y}^*(n)$. □

Lemma 12. We have that: i. $\partial k_c^*(G)/\partial G > 0$, and ii. $\partial k_n^*(G, k_c)/\partial G > 0$ and $\partial k_n^*(G, k_c)/\partial k_c < 0$.

Proof. This follows directly from Lemmas 4, 10, and 11. □

Corollary 3. $\forall k_c \leq k_c^*(G)$, we have: $k_n^*(G, k_c) \geq k_c^*(G)$, with strict inequality if $k_c < k_c^*(G)$.

Proof. In what follows, we ignore the gain from change to alleviate the exposition. The results hold for all G . From Lemma 12, we know that $k_n^*(k_c)$ is decreasing with k_c . It is thus sufficient to prove that $k_n^*(k_c^*) = k_c^*$ to prove the corollary. Suppose $k_c = k_c^*$. When (slightly abusing notation) $k_n = k_c^*$, $\hat{y}^*(n) = y^*(c)$ and $V(1, \hat{y}^*(n); n) = \frac{1 + y^*(c)x^* - (1-q)y^*(c)x^*}{2}(1 - k_c^*) - C(\hat{y}^*(n)) = V(0, 0; n)$, where the last equality follows from the definition of k_c^* . This implies that $k_n^*(k_c^*) = k_c^*$. □

Lemma 13. There exist a unique $\bar{k}_c > 0$ and a unique $\bar{k}_n : [0, 1) \rightarrow [0, 1]$ which satisfy $k_c < \bar{k}_n(k_c)$, $\forall k_c \in (0, \bar{k}_c)$ such that for any given $k_c \in (0, \bar{k}_c)$ and any given $k_n \in (k_c, \bar{k}_n(k_c))$, there exist unique $\underline{G} > 0$, $\underline{G} < \bar{G} < \infty$ such that a separating equilibrium exists if and only if $G \in [\underline{G}, \bar{G}]$.

Proof. Necessity. Denote $\bar{k}_c = \lim_{G \rightarrow \infty} k_c^*(G)$.²¹ If $k_c > \bar{k}_c$, (10) is never satisfied. Assume then that $k_c < \bar{k}_c$. We know that $k_c^*(G)$ increases with G (Lemma 12). We also have: $\lim_{G \rightarrow 0} k_c^*(G) = 0$. To see that, note that $x^* = 0$ when $G = 0$. This implies $y^*(c) = 0$. A competent candidate gets $(1 - k_c)/2$ if he chooses $p_j = 1$ and $1/2$ if he chooses $p_j = 0$. We thus have: $\lim_{G \rightarrow 0} k_c^* = 0 < k_c < \bar{k}_c$. By the Intermediate Value Theorem and Lemma 12, there exists a unique \underline{G} such that $k_c^*(\underline{G}) = k_c$ and $k_c^*(G) > k_c$, $\forall G > \underline{G}$.

²¹Assumption 2 guarantees that $y^*(c)$ and x^* are continuous and bounded in G . This implies that $k_c^*(G)$ is continuous and bounded in G (see the proof of Lemma 9). Therefore, the limit is well-defined.

We now define the upper bound on G . A separating equilibrium exists only if $k_n \geq k_n^*(G, k_c)$. Denote $\bar{k}_n(k_c) = \lim_{G \rightarrow \infty} k_n^*(G, k_c)$. By Lemma 9, $\bar{k}_n(0) < 1$. Since $k_n^*(G, k_c)$ decreases with k_c , we have: $\bar{k}_n(k_c) < 1$. Since $k_n^*(G, k_c)$ increases with G (see Lemma 12), $\forall k_n < \bar{k}_n(k_c)$, there exists a unique $\bar{G} < \infty$ such that $\forall G \geq \bar{G}$, $k_n^*(G, k_c) \geq k_n$. Given $k_n^*(k_c, \underline{G}) = k_c < k_n$ (the equality comes from Corollary 3 and the definition of \underline{G} , i.e. $k_c = k_c^*(\underline{G})$), $\bar{G} > \underline{G}$. Given any $k_c \in (0, \bar{k}_c)$ and $k_n \in (k_c, \bar{k}_n(k_c))$, we thus have that there exist unique $\underline{G} > 0$ and $\bar{G} < \infty$ such that a separating equilibrium exists only if $G \in [\underline{G}, \bar{G}]$.

Sufficiency. Consider the following assessment:

- The candidates' strategies are: $\sigma_j = ((1, y^*(c)), (0, 0))$, $j \in \{1, 2\}$, $y^*(c)$ defined in Lemma 3;
- The voter's communication strategy is: $\mathbf{x}^* = (x^*, x^*)$, x^* defined in Lemma 3;
- The voter's electoral strategy is: $s(m_1 = 1, m_2 = \emptyset, \mathbf{x}^*) = 1$, $s(m_1 = 1, m_2 = 1, \mathbf{x}^*) = 1/2$, $s(m_1 = \emptyset, m_2 = 1, \mathbf{x}^*) = 0$, $s(m_1 = \emptyset, m_2 = \emptyset, \mathbf{x}^*) = 1/2$

The voter's electoral strategy is a best response to the candidates' strategies given the voter's Bayesian posterior. The communication efforts are best responses according to Lemma 3. Lastly, given $k_c \in (0, \bar{k}_c)$, $k_n \in (k_c, \bar{k}_n(k_c))$, and $G \in [\underline{G}, \bar{G}]$, the candidates' policy choices (and strategies) are incentive compatible by the reasoning above and Lemma 9. Thus, the separating assessment described above is an equilibrium according to Definition 1. \square

Proof of Proposition 1. The proof follows directly from Lemma 13. \square

Proof of Corollary 1. Denote $V_v^e(G)$ the voter's maximal ex-ante expected equilibrium welfare as a function of G . Suppose $k_c < \bar{k}_c$ and $k_n < \bar{k}_n(k_c)$ so there exist \underline{G} , \bar{G} such that a separating equilibrium exists $\forall G \in [\underline{G}, \bar{G}]$ (Proposition 1). For a given G , the voter's expected payoff is strictly higher in a separating assessment than in any other assessment for a non-empty open set of policy costs (see Appendix B for more details). Therefore, there exists a non-empty open set of policy costs such that $V_v^e(\bar{G} - \delta) > V_v^e(\bar{G} + \delta)$, with $\delta > 0$.²² \square

Proof of Proposition 2. Denote $\underline{k}_n(G) = k_c^*(G)$. By Lemma 9 and Corollary 3, a separating equilibrium does not exist when $k_n \leq k_c^*(G)$. Suppose $k_n \geq \underline{k}_n(G)$. From Lemma 9, we know that a

²²In Appendix B, we show that there exists $\check{k}_n(G, k_c) > k_c$ such that the voter's ex-ante expected welfare is highest when candidates play a separating strategy. The claim thus holds true for the following set: $\{k_c \in (0, \bar{k}_c), k_n \in (0, \bar{k}_n(0)) \mid k_c < k_n < \min\{k_n(\bar{G}, k_c), \bar{k}_n(k_c)\}\}$ ($\bar{k}_n(k_c)$ is decreasing with k_c). This set is non-empty since when k_n tends to k_c , $\bar{G} \rightarrow \underline{G}$ and $k_c < \min\{k_n(\underline{G}, k_c), \bar{k}_n(k_c)\}$.

separating equilibrium exists only if $k_n \geq k_n^*(G, k_c)$. Suppose $k_n > k_n^*(G, 0)$. By Lemma 9 and Lemma 12, we know that a separating equilibrium exists $\forall k_c \leq k_c^*(G)$. Denote: $\underline{k}_c(G) = 0 < k_c^*(G)$, $\underline{k}_c(G)$ is constant in a neighborhood of G in this case. Suppose now $k_n \leq k_n^*(G, 0)$. Implicitly define $\underline{k}_c(G)$ as $k_n = k_n^*(G, \underline{k}_c(G))$. By Corollary 3 ($k_n^*(G, k_c^*(G)) = k_c^*(G) < k_n$), Lemma 12 ($k_n^*(\cdot)$ decreases with k_c), and the Intermediate Value Theorem, $\underline{k}_c(G)$ exists, is unique and satisfies $\underline{k}_c(G) < k_c^*(G)$. Furthermore, $k_n \geq k_n^*(G, k_c) \Leftrightarrow k_c \geq \underline{k}_c(G)$. Using the definition of $\underline{k}_c(G)$, Lemma 12, and the Implicit Function Theorem, $\underline{k}_c(G)$ is strictly increasing with G . \square

Proof of Corollary 2. Suppose G and k_n are such that $k_n \in (k_c^*(G), k_n^*(G, 0)]$ (this interval is non-empty since $k_n^*(G, k_c)$ is decreasing with k_c , which implies $k_c^*(G) = k_n^*(G, k_c^*(G)) < k_n^*(G, 0)$). Denote $k_c^h = \underline{k}_c(G) + \gamma$ and $k_c^l = \underline{k}_c(G) - \gamma$, with $\gamma > 0$. A separating assessment maximizes the voter's ex-ante expected welfare (see Appendix B). We thus have that there exists $\bar{\gamma} > 0$ such that $\forall \gamma \in [0, \bar{\gamma}]$, the voter is better off when $k_c = k_c^h$ (since a separating equilibrium exists) than when $k_c = k_c^l$ (since a separating equilibrium does not exist). Hence, the claim holds. \square

Lemma 14. *There exists $\widehat{k}_n : \mathbb{R}_+ \times [0, 1] \rightarrow (k_c, 1]$ continuous in both arguments such that for a given G , the voter's combined communication effort in a separating assessment is strictly greater than the voter's combined communication effort in all other possible assessments for all $k_n \in (k_c, \widehat{k}_n(G, k_c))$.*

Proof. In a separating assessment, the voter's and competent candidates' communication efforts are defined by the system of equations (3)-(4). Using a similar reasoning as in Lemma 3 and Assumption 1, we can show that in a pooling assessment ($p_j(t) = 1, \forall j \in \{1, 2\}, t \in \{c, n\}$), the communication efforts are defined by:

$$\begin{aligned} C'(y^p(c)) &= \frac{1 - k_c}{2} x^p \\ C'(y^p(n)) &= \frac{1 - k_n}{2} x^p \\ C'_v(x^p) &= q(1 - q)(1 + \tau) \frac{G}{2} (y^p(c) - y^p(n)) \end{aligned}$$

Using a similar reasoning as in Lemma 3, there exists at least one positive solution to this system of equations. For our claim, we simply need to consider the solution with the highest communication effort by the voter, denoted x^p . Using the same reasoning as in Lemmas 4 and 8, we can show that

the voter's and competent candidates' communication efforts are continuously increasing with G and k_n and continuously decreasing with k_c .

Now, as $k_n \rightarrow 1$, it is clear that $x^p > x^*$ (since $y^p(n) \rightarrow 0$ and $(1 + \tau)G > G$). Inversely, as $k_n \rightarrow k_c$, it is clear that $x^p \rightarrow 0$ (since $y^p(n) \rightarrow y^p(c)$) and so $x^p < x^*$. By the Intermediate Value Theorem, there exists a unique $\widehat{k}_n^p(G, k_c) \in (k_c, 1)$ such that $x^p < x^*$ for all $k_n < \widehat{k}_n^p(G, k_c)$ (since both x^p and x^* are continuous in G and k_c , $\widehat{k}_n^p(G, k_c)$ is continuous in G and k_c).

Using a similar logic (for details, see Appendix B), we show that:

- i) in an assessment when $p_j(c) = p_j(n) = 1$ and $p_{-j}(c) = p_{-j}(n) = 0$, there exists a unique $\widehat{k}_n^{pj}(G, k_c) \in (k_c, 1]$ (continuous in G and k_c) such that the voter's communication effort towards candidate j in this assessment denoted x_j^{pj} satisfies $x_j^{pj} < 2x^*$ for all $k_n < \widehat{k}_n^{pj}(G, k_c)$ (continuous in G and k_c) for all $j \in \{1, 2\}$ (by Lemma 2, $x_{-j}^{pj} = 0$);
- ii) in an assessment when $p_j(c) = p_j(n) = 1$ and $p_{-j}(c) = 1, p_{-j}(n) = 0$, there exists $\widehat{k}_n^a(G, k_c) \in (k_c, 1]$ (continuous in G and k_c) such that the voter's communication effort towards candidate j in this assessment denoted x_j^a satisfies $x_1^a + x_2^a < 2x^*$ for all $k_n < \widehat{k}_n^a(G, k_c)$ for all $j \in \{1, 2\}$.

The claim holds for $\widehat{k}_n(G, k_c) = \min\{\widehat{k}_n^p(G, k_c), \widehat{k}_n^{pj}(G, k_c), \widehat{k}_n^a(G, k_c)\}$. \square

Lemma 15. *For all $k_c \in (0, \overline{k}_c)$, there exists $\widehat{k}_n(k_c) > k_c$ such that for all $k_n \in (k_c, \widehat{k}_n(k_c))$, we have: $k_n < \widehat{k}_n(\overline{G}, k_c)$.*

Proof. Suppose $\widehat{k}_n(G, k_c)$ is decreasing with G . The reasoning extends easily to the other cases (just replace $\widehat{k}_n(\overline{G}, k_c)$ by $\min_{G \in (0, \overline{G}]}$ $\widehat{k}_n(G, k_c)$ below). From Lemma 14, we know that $\widehat{k}_n(G, k_c) > k_c, \forall G$. From the proof of Proposition 2, we have that $\overline{G} \rightarrow \underline{G}$ as $k_n \rightarrow k_c$. Slightly abusing notation, this implies that $k_n = k_c < \widehat{k}_n(\underline{G}, k_c) = \widehat{k}_n(\overline{G}, k_c)$. By continuity of $\widehat{k}_n(G, k_c)$ in G and k_c , there exists $\widehat{k}_n(k_c) > k_c$ such that $\forall k_n \in (k_c, \widehat{k}_n(k_c))$ we have: $k_n < \widehat{k}_n(\overline{G}, k_c)$. \square

Proof of Proposition 3. For $k_c \in (0, \overline{k}_c)$ and $k_n \in (k_c, \widehat{k}_n(k_c))$, we have that the voter exerts strictly more communication effort in a separating assessment than in other assessment for all $G \leq \overline{G}$ (Lemmas 14 and 15). This directly implies point i.. Point ii. follows from the fact that x^* is increasing with G . Point iii. from the fact that the maximum combined communication effort is unique and equal to $2x^*$ at $G = \overline{G}$. \square

Lemma 16. *There exist non-empty open sets of policy costs \mathcal{K}^G and $\underline{\lambda}^G \in [0, 1)$ such that for all $\lambda \in (\underline{\lambda}^G, 1)$, there exists a non-empty open set $\mathcal{G}^{\lambda^G} \subset \mathbb{R}_+$ such that the voter's expected equilibrium welfare is lower with $\check{C}_v(\cdot)$ than $C_v(\cdot)$ for all $G \in \mathcal{G}^{\lambda^G}$.*

Proof. When the communication cost function is $\check{C}_v(x)$, equations (3) and (4) become:

$$\begin{aligned} C'_v(\check{x}_j^*) &= q(1-q) \frac{G/\lambda}{2} \check{y}^*(c) \\ C'(\check{y}^*(c)) &= \frac{1-k_c}{2} \check{x}_j^* \end{aligned}$$

A decrease in the communication cost function is thus equivalent to an increase in the gain from change G . We know there exists a non-empty open set of policy costs such that an increase in G can decrease the voter's welfare (Corollary 1). Denote this set \mathcal{K}^G .

Suppose there exists $G^h \in [\underline{G}, \overline{G})$ such that $\forall G > \overline{G}$, the voter's expected equilibrium welfare satisfies $V_v^e(G) < V_v^e(G^h)$. Then denote $\underline{\lambda}^G = 0$ and for all $\lambda \in (0, 1)$, the claim holds for $\mathcal{G}^{\lambda^G} = (\max\{G^h, \lambda \overline{G}\}, \overline{G})$. Suppose there is no such G^h . For all $G \in [\underline{G}, \overline{G}]$, define the function $\phi : [\underline{G}, \overline{G}] \rightarrow (\overline{G}, \infty)$ as $\phi(G) = \arg \min \{Z \in (\overline{G}, \infty) \mid V_v^e(G) = V_v^e(Z)\}$. Define also $\underline{\lambda}^G = \max_{G \in [\underline{G}, \overline{G}]} \frac{G}{\phi(G)}$. By Corollary 1, $\underline{\lambda}^G < 1$. And the claim holds true for $\mathcal{G}^{\lambda^G} = (\max\{\underline{G}, \underline{\lambda}^G \overline{G}\}, \overline{G})$. \square

Lemma 17. *There exist non-empty open sets of policy costs \mathcal{K}^x and $\underline{\lambda}^x \in [0, 1)$ such that for all $\lambda \in (\underline{\lambda}^x, 1)$, there exists a non-empty open set $\mathcal{G}^{\lambda^x} \subset \mathbb{R}_+$ such that the voter's attention is lower with $\check{C}_v(\cdot)$ than $C_v(\cdot)$ for all $G \in \mathcal{G}^{\lambda^x}$.*

Proof. Using Proposition 3 and a similar reasoning as in Lemma 16, we can show that there exists $\underline{\lambda}^x \in [0, 1)$ and \mathcal{K}^x such that the claim holds true for $\lambda \in (\underline{\lambda}^x, 1)$, $(k_n, k_c) \in \mathcal{K}^x$, and $G \in \mathcal{G}^{\lambda^x} = (G_l, \overline{G})$, where G_l is a lower bound satisfying $G_l < \overline{G}$. \square

Proof of Proposition 4. Using Lemmas 16 and 17, there exist an open set of policy costs $\mathcal{K}^G \cap \mathcal{K}^x$ (from Corollary 1 and Proposition 3, one can check that the intersection is not empty) and $\underline{\lambda} = \max\{\underline{\lambda}^G, \underline{\lambda}^x\} \in [0, 1)$ such that the claim holds true for the non-empty sets $\mathcal{K}^G \cap \mathcal{K}^x$, $(\underline{\lambda}, 1)$, and $\mathcal{G}^\lambda = \mathcal{G}^{\lambda^G} \cap \mathcal{G}^{\lambda^x}$ (which is non empty by Lemmas 16 and 17). \square

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