The Voters' Curses

Why We Need Goldilocks Voters

Supplemental Appendix: Representative voter set-up

A Equilibrium definition and 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 $\mu(m_j, x) \equiv \mu_j$ the voter's posterior belief that candidate j is competent conditional on observing m_j and her attention x. Finally, denote voter's electoral strategy (probability of electing candidate 1): $s_1(m_1, m_2, x) \in [0,1]$.

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

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

1) $s_1(m_1, m_2, x) = \begin{cases} 1 \\ 1/2 \\ 0 \end{cases} \Leftrightarrow E_\mu(u_v(p_1, x)|m_1, \sigma_1) \gtreqless E_\mu(u_v(p_2, x)|m_2, \sigma_2)$*;*

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

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

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

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

5) $\mu(m_j, x)$ *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}):

$$\mu_j p_j(c)G + (1 - \mu_j)p_j(n)L > \mu_{-j}p_{-j}(c)G + (1 - \mu_{-j})p_{-j}(n)L \tag{A.1}$$

Let $\Gamma(\sigma_j(t), \sigma_{-j}) = E\left[\mathbb{I}_A + \frac{\mathbb{I}_B}{2} \middle| p_j(t), y_j(t); \sigma_{-j}\right]$ be 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}, where A is the event "equation (A.1) holds" and B is the event "both sides of (A.1) are equal." The expectation operator is over the probability of successful communication with candidate $j \in \{1, 2\}$, candidate $-j$ and candidate $-j$'s type. $\Gamma(\sigma_j(t), \sigma_{-j})$ is increasing with $\mu(p_j(t), x)p_j(c)G + (1 - \mu(p_j(t), x))p_j(n)L$ and $\mu(\emptyset, x)p_j(c)G + (1 - \mu(\emptyset, x))p_j(n)L$.

Lemma A.1. *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 (A.1)): $L \geq \mu_{-j}p_{-j}(c)G+(1-\mu_{-j})p_{-j}(n)L$. When communication with the voter is not successful, a non-competent candidate j is elected with strictly positive probability if and only if: $(1-\mu(\emptyset,x))L \geq \mu_{-j}p_{-j}(c)G+(1-\mu_{-j})p_{-j}(n)L$. Given the properties of the communication cost functions and $y_j(n) > 0$, we have $\mu(\emptyset, x) \in (0,1)$. Then it must be that: $(1-\mu(\emptyset,x))L > L$. 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 $(0,0)$. □

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).

Lemma A.2. *In any equilibrium, a candidate's probability of winning the election is (weakly) greater after successful communication.*

Proof. Fix candidate $-j$'s strategy σ_{-j}. Using Lemma A.1, 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 A.1, a type n exerts zero communication effort. Successful communication thus reveals a candidate is competent and implements the new policy. By (A.1), 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).[2] Successful communication thus weakly increases the voter's posterior about j's competence. By (A.1), the probability she elects candidate j is higher. □

Proof of Lemma 1. 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 A.1, 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 (A.1), 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 A.1, $\forall t \in \{c, n\}\ \sigma(t) = (1, 0)$ is weakly dominated by $(0, 0)$. So on the equilibrium path, $p = 1 \Rightarrow y > 0$. □

Proof of Proposition 1. Given $x = 0$, we have $m_j = \emptyset,\ \forall y_j \in [0, 1],\ j \in \{1, 2\}$. Using (A.1), the voter's expected policy payoff from electing candidate $j \in \{1, 2\}$ is 0. Consequently, candidate j's probability of winning the election does not depend on his or his opponent's

[2] This can also be shown by contradiction using a similar reasoning as in Lemma A.1. If $y(n) > y(c)$, then a type n has a profitable deviation to zero communication effort so it cannot be an equilibrium strategy.

platform choice: $\Gamma(\sigma_j(t), \sigma_{-j}) = 1/2,\ \forall \sigma_j(t),\ \sigma_{-j},\ t \in \{c, n\},\ j \in \{1, 2\}$. Using a similar reasoning as in Lemma A.1, a type $t \in \{c, n\}$ candidate $j \in \{1, 2\}$ has no incentive to deviate from $\sigma_j(t) = (0, 0)$. Given $\sigma_j(t) = (0, 0)$ and communication is costly, the voter has no incentive to exert strictly positive communication effort. Hence, the proposed strategies constitute an equilibrium for all parameter values (notice that the voter elects candidate $j \in \{1, 2\}$ with probability $1/2$ in such an equilibrium). □

Lemma A.3. *A separating equilibrium exists only if* $\mu(m_1 = \emptyset, x^*)G = \mu(m_2 = \emptyset, x^*)G$ *where* x^* *is the voter's equilibrium level of attention.*

Proof. The proof is by contradiction. Suppose candidates play a separating strategy and that without loss of generality that $\mu(m_1 = \emptyset, x^*)G > \mu(m_2 = \emptyset, x^*)G$. Since (by Lemma 1) $y_j^*(n) = 0,\ j \in \{1, 2\}$, the above inequality implies that the voter always elects candidate 1 when communication with both candidates is unsuccessful, by (A.1). A type n candidate 2's expected utility is thus 0. A type n candidate 2 has a profitable deviation from the separating strategy. We claim that when he commits to the new policy and exerts the communication effort $\hat{y}_2(n)$ which maximizes his expected utility, he gets a strictly positive expected payoff (we formally prove this claim in Lemma 4). Hence, a separating equilibrium cannot exist. □

Proof of Lemma 2. By Lemma 1, 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 communication effort (y_{-j}) and the voter's attention (x). His expected utility, when he chooses communication effort y_j, is:

$$V_j(1, y_j; c) = q\left(y_j x(1 - y_{-j}x) + \frac{y_j x y_{-j} x + (1 - y_j x)(1 - y_{-j}x)}{2}\right)(1 - k_c) + (1 - q)\left(y_j x + \frac{1 - y_j x}{2}\right)(1 - k_c) - C(y_j) \tag{A.2}$$

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 A.3); 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 $y_j x$). 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: $\max_{y_j\in[0,1]} \left(\frac{1+y_j x}{2}\right)(1-k_c) - q(1-k_c)\frac{y_{-j}x}{2} - C(y_j)$. We get the following First-Order Condition (FOC):

$$C'(y_j(c)) = \frac{1-k_c}{2}x \tag{A.3}$$

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

$$\max_{x\in[0,1]} \left\{q^2G + (1-q)q\left(y_2 xG + (1-y_2 x)\frac{G}{2}\right) + (1-q)q\frac{G}{2}(1+y_1 x) - C_v(x)\right\}$$

In a separating equilibrium, the voter randomizes between both candidates when communication with both is unsuccessful (Lemma A.3). She also randomizes when communication with both is successful since both candidates are competent. When communication is successful only with candidate 1 (2), she elects candidate 1 (2). We thus have the following FOC:

$$C_v'(x^*) = q(1-q)\frac{G}{2}(y_1+y_2) = q(1-q)Gy_1 \tag{A.4}$$

Where the second equality comes from the fact that $y_1 = y_2$ by (A.3). We can see that $y^*(c)$

and x^* ($j \in \{1,2\}$) 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 1, it must be the players' equilibrium communication strategies.

Denote: $h(x) = q(1-q)G(C')^{-1}\left(\frac{1-k_c}{2}x\right) - C_v'(x)$. Since $C_v(\cdot)$ and $C(\cdot)$ are thrice continuously differentiable, the function $h(\cdot)$ is twice continuously differentiable. A necessary and sufficient condition for the existence of a strictly positive $y_1^*(c)$ and x^*, $j \in \{1,2\}$ is that the function $h(x)$ has a 0 on $(0,1)$. Given the properties of the communication cost functions, $h(0) = 0$ and $h(1) < 0$. Therefore, it is sufficient that $h'(0) > 0$. We have:

$$h'(x) = \frac{q(1-q)G\frac{1-k_c}{2}}{C''\left((C')^{-1}\left(\frac{1-k_c}{2}x\right)\right)} - C_v''(x) \tag{A.5}$$

Since $C_v''(0) = C''(0) = 0$ by assumption, we have that $h'(0)$ has the same sign as $q(1-q)G\frac{1-k_c}{2}$ so $h'(0) > 0$ (i.e., $h'(x) \xrightarrow{x\to 0} +\infty$). Hence there exists a strictly positive solution to (3)-(4). This solution is unique if $h''(x) \leq 0$. Using chain rules, we get:

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

Since $C(\cdot)$, $C'(\cdot)$ and $C_v'(\cdot)$ are convex, we have that $h''(\cdot) \leq 0$. This implies that the equilibrium communication strategies are unique as claimed. □

Lemma A.4. *We have: $C''(y^*(c))C_v''(x^*) > q(1-q)G\frac{1-k_c}{2}$, 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 2, we know that we must have: $h'(x^*) < 0$ (since $h(x) \xrightarrow{x\to 1} -\infty$ and $h''(x) \leq 0$). Using (A.5) and $C'(y^*(c)) = \frac{1-k_c}{2}x^*$ by Lemma 2, we get $h'(x^*) = \frac{q(1-q)G\frac{1-k_c}{2} - C''(y^*(c))C_v''(x^*)}{C''(y^*(c))}$. Since $C''(y^*(c)) > 0$, $C''(y^*(c))C_v''(x^*) -$

$q(1-q)G\frac{1-k_c}{2} > 0$. □

Proof of Lemma 3. By the Implicit Function Theorem (IFT), we have $\frac{\partial y^*(c)}{\partial G}C''(y^*(c)) = \frac{1-k_c}{2}\frac{\partial x^*}{\partial G}$ and $\frac{\partial x^*}{\partial G}C_v''(x^*) = q(1-q)G\frac{\partial y^*(c)}{\partial G} + q(1-q)x^*$. Rearranging yields $\frac{\partial x^*}{\partial G} = \frac{q(1-q)x^* C''(y^*(c))}{C''(y^*(c))C_v''(x^*) - q(1-q)G\frac{1-k_c}{2}}$. By Lemma A.4, $\frac{\partial x^*}{\partial G} > 0$ and consequently, $\frac{\partial y^*(c)}{\partial G} > 0$. □

Lemma A.5. *When candidates play a separating strategy, x^* and $y^*(c)$ decrease with k_c.*

Proof. Similar reasoning as for the proof of Lemma 3. □

Proof of Lemma 4. When a competent candidate $j \in \{1,2\}$ chooses $p_j = 1$, he gets:

$$V_j(1, y_j^*(c); c) = \frac{1 + y_j^*(c)x^* - qy_{-j}^*(c)x^*}{2}(1-k_c) - C(y_j^*(c)) \tag{A.6}$$

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

$$V_j(0, 0; c) = \frac{1-q}{2} + q\frac{1 - y_{-j}^*(c)x^*}{2} \tag{A.7}$$

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 1, he does not exert any communication effort when he chooses $p_j = 0$. A competent candidate's incentive compatibility constraint (IC) is thus:

$$\frac{1 + y_j^*(c)x^* - qy_{-j}^*(c)x^*}{2}(1-k_c) - C(y_j^*(c)) \geq \frac{1-q}{2} + q\frac{1 - y_{-j}^*(c)x^*}{2} \tag{A.8}$$

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 $C'(\hat{y}_j(n)) = \frac{1-k_n}{2}x^*$. By a similar reasoning as above, a non-competent candidate j's (IC) is:

$$\left(\frac{1+\hat{y}_j(n)x^* - qy^*_{-j}(c)x^*}{2}\right)(1-k_n) - C(\hat{y}_j(n)) \leq \frac{1-q}{2} + q\frac{1-y^*_{-j}(c)x^*}{2} \tag{A.9}$$

The claim holds by inspection of (A.8) and (A.9) □

Lemmas A.6 and A.7 are preliminary results to prove Proposition 2.

Lemma A.6. *When candidates play a separating strategy,*

(i) An increase in G or a decrease in k_c relaxes the incentive compatibility constraint of a competent candidate $j \in \{1, 2\}$;

(ii) An increase in G or a decrease in k_c or k_n tightens the incentive compatibility constraint of a non-competent candidate $j \in \{1, 2\}$.

Proof. Start with a competent candidate. By the Envelope Theorem, we do not need to consider the effect of G or k_c on $y^*_j(c)$, $j \in \{1, 2\}$. By Lemma 3, an increase in G increases a competent candidate $-j$'s and the voter's attention. G has no direct effect on a competent candidate's expected payoff from committing to the new policy (see (A.6)) and to the status quo policy (see (A.7)). Therefore, by Lemma 4, an increase in G relaxes the incentive compatibility constraint of a competent candidate j. A decrease in the policy cost k_c increases the expected payoff from committing to the new policy (does not affect the expected payoff from committing to the status quo policy). Since a decrease in k_c also increases a competent candidate $-j$'s communication effort and the voter' level of attention (Lemma A.5), it relaxes a competent candidate j's incentive compatibility constraint by Lemma 4. The reasoning is exactly reversed for a non-competent candidate (noting that the inequality is reversed in

(A.9) compared to (A.8)). □

Lemma A.7. *There exist a unique* $\overline{k_c} > 0$ *and a unique* $\overline{k_n} : [0,1) \to [0,1]$ *which satisfy* $k_c < \overline{k_n}(k_c)$, $\forall k_c \in (0, \overline{k_c})$ *such that for any given* $k_c \in (0, \overline{k_c})$ *and any given* $k_n \in (k_c, \overline{k_n}(k_c))$, *there exist unique* $\underline{G} > 0$, $\underline{G} < \overline{G} < 1$ *such that a separating equilibrium exists if and only if* $G \in [\underline{G}, \overline{G}]$.

Proof. Necessity. Denote $\overline{k_c}$, the unique solution to the equation $V_j(1, y_j^*(c); c) = V_j(0, 0; c)$ evaluated at $G = 1$.[3] To see that it exists, notice that for $k_c = 0$, $V_j(1, y_j^*(c); c) > V_j(0, 0; c)$, while for $k_c = 1$, $V_j(1, y_j^*(c); c) < V_j(0, 0; c)$. Uniqueness follows from Lemma A.6. If $k_c > \overline{k_c}$, (A.8) is never satisfied. Assume then that $k_c < \overline{k_c}$. There then exists a unique $\underline{G} \in (0,1)$ such that (A.8) holds if and only if $G \geq \underline{G}$. 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 $p_j = 0$. Since $k_c > 0$, we must have $V_j(1, y_j^*(c); c) < V_j(0, 0; c)$ when $G = 0$. Since $k_c < \overline{k_c}$, $V_j(1, y_j^*(c); c) > V_j(0, 0; c)$ evaluated at $G = 1$ (by Lemma A.6). This guarantees existence since all communication efforts and the voter's attention are continuous in G. By Lemma A.6, a competent candidate j's incentive compatibility constraint relaxes as G increases (i.e., the difference $V_j(1, y_j^*(c); c) - V_j(0, 0; c)$ increases with G). This guarantees uniqueness of $\underline{G}$. Existence and uniqueness of $\overline{k_n}(k_c) \in (0,1)$ and $\overline{G} \in (0,1)$ when $k_n < \overline{k_n}(k_c)$ follows a similar reasoning.[4] Notice that for all $k_c < \overline{k_c}$, $\overline{k_n}(k_c) > k_c$. Suppose not. Then by Lemma A.6 and the definition of $\overline{k_c}$, $V_j(1, \hat{y}_j(n); n) < V_j(0, 0; n)$ as $k_n \to k_c$. But this contradicts the

[3]The properties of the communication cost functions guarantee that $y^*(c)$ and x^* are continuous and bounded in G. This implies that communication efforts, the voter's attention, and the expected payoffs are well defined at $G = 1$.

[4]The only difference is that the upper bound on k_n depends on k_c, $\overline{k_n}(k_c)$, since a non-competent candidate j's incentive compatibility constraint depends on k_c through the voter's attention and a competent candidate $-j$'s communication effort, see (A.9)).

definition of $\overline{k_n}(k_c)$.

Sufficiency. Consider the following assessment:

(i) Candidates' strategies are: $\sigma_j = ((1, y^*(c)), (0, 0)),\ j \in \{1, 2\}$, $y^*(c)$ defined in Lemma 2;

(ii) The voter's communication strategy is x^*, defined in Lemma 2;

(iii) The voter's electoral strategy is: $s(m_1 = 1, m_2 = \emptyset, x^*) = 1,\ s(m_1 = \emptyset, m_2 = 1, x^*) = 0,\ s(m_1 = \emptyset, m_2 = \emptyset, x^*) = s(m_1 = 1, m_2 = 1, x^*) = 1/2$.

The voter's electoral strategy is a best response to the candidates' strategies given the voter's Bayesian posterior. The voter's attention and candidates' communication efforts are best responses according to Lemma 2. Lastly, given $k_c \in (0, \overline{k_c})$, $k_n \in (k_c, \overline{k_n}(k_c))$, and $G \in [\underline{G}, \overline{G}]$, the candidates' policy choices (and strategies) are incentive compatible by the reasoning above. Thus, the separating assessment described above is an equilibrium according to Definition 1. □

Proof of Proposition 2. The proof follows directly from Lemma A.7. □

Proof of Proposition 3. Suppose $k_c < \overline{k_c}$ and $k_n < \overline{k_n}(k_c)$ so there exist $\underline{G}$, $\overline{G}$ such that a separating equilibrium exists $\forall G \in [\underline{G}, \overline{G}]$ (Proposition 2). 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 C for more details). Therefore, there exists a non-empty open set of policy costs such that $V_v(\overline{G}) > V_v^e(G^W)$, with $G^W > \overline{G}$.[5] □

[5]In Appendix C, we show that there exists $\breve{k}_n(G, k_c) > k_c$ 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: $\{k_c \in (0, \overline{k_c}),\ k_n \in (0, \overline{k_n}(0)) | k_c < k_n < \min\{\breve{k}_n(\overline{G}, k_c), \overline{k_n}(k_c)\}\}$ (it can be shown that $\overline{k_n}(k_c)$ is decreasing with k_c, details available upon request). This set is non-empty since when k_n tends to k_c, it can be checked that $\overline{G} \to \underline{G}$ and $k_c < \min\{\breve{k}_n(\underline{G}, k_c), \overline{k_n}(k_c)\}$.

Lemma A.8. *There exists a continuous mapping* $\widehat{k_n} : [0,1] \times [0,1] \to (k_c, 1]$ *such that for a given* G*, the voter's attention in a separating assessment is strictly greater than the voter's attention in all other possible assessments for all* $k_n \in (k_c, \widehat{k_n}(G, k_c))$*.*

Proof. Denote $\tau = -L/G$ and $\alpha_j = xy_j$ the probability of successful communication with candidate $j \in \{1, 2\}$. In a separating assessment, the voter's attention and competent candidates' communication efforts are defined by the system of equations (3)-(4). Using a similar reasoning as in Lemma 2 and the assumptions that $\tau > q/(1-q)$, we can show that in a pooling assessment ($p_j(t) = 1, \ \forall j \in \{1,2\}, \ t \in \{c, n\}$), the voter's attention and competent candidates' communication efforts are defined by: $C'(y^p(c)) = (1-k_c)x^p/2$, $C'(y^p(c)) = (1-k_c)x^p/2$, and $C'_v(x^p) = q(1-q)(1+\tau)G(y^p(c) - y^p(n))$. Using a similar reasoning as in Lemma 2, 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 level of attention by the voter, denoted by x^p. Using the same reasoning as in Lemmas 3, A.4, and A.5, we can show that the voter's attention and competent candidates' communication efforts are continuously increasing with G and k_n and continuously decreasing with k_c. Since x^* does not depend on k_n, as $k_n \to 1$, $x^p > x^*$ (since $y^p(n) \to 0$ and $(1+\tau)G > G$). Inversely, as $k_n \to k_c$, we have $x^p \to 0$ (since $y^p(n) \to y^p(c)$) 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).

We now compare the voter's level of attention in a separating assessment with her level of attention in an assessment when (without loss of generality) candidate 1 pools on the new policy independent of his type ($p_1(c) = p_1(n) = 1$) and candidate 2 pools on the status quo policy ($p_2(c) = p_2(n) = 0$). The voter's attention and candidate 1's communication efforts are defined by: $C_v'(x^{p_1}) = qGy_1^{p_1}(c) + (1-q)y_1^{p_1}(n)L$ and $C'(y_1^{p_1}(t)) = (1-k_t)x^{p_1},\ t \in \{c, n\}$ (see Appendix C for more details). For our claim, we simply need to consider the highest level of attention by the voter, denoted x^{p_1}.

Using the same reasoning as in Lemmas 3, A.4, and A.5, we can show that the voter's attention and a competent candidate 1's communication effort are continuously increasing with G and k_n and continuously decreasing with k_c. Since $\tau > q/(1-q)$, there exists $\acute{k}_n^{p_1}(G, k_c) > k_c$ such that as $k_n \to \acute{k}_n^{p_1}(G, k_c)$, $x^{p_1} \to 0$.[6] and so $x^{p_1} < x^*$. As $k_n \to 1$, we have $x^* < x^{p_1}$ (since $y_1^{p_1}(n) \to 0$ and $qG > q(1-q)G$). By the Intermediate Value Theorem, there exists a unique $\widehat{k}_n^{p_1}(G, k_c) \in (k_c, 1)$ such that $x^{p_1} < x^*$ for all $k_n < \widehat{k}_n^{p_1}(G, k_c)$.

We now compare the voter's level of attention in a separating assessment with her level of attention in an asymmetric assessment when (without loss of generality) candidate 1 pools on the new policy ($p_1(c) = p_1(n) = 1$) and candidate 2 separates ($p_2(c) = 1,\ p_2(n) = 0$). The voter elects candidate 1 only if communication with candidate 1 is successful *and* communication with candidate 2 is not successful. Denote x^a the voter's attention and $y_j^a(t),\ j \in \{1, 2\}$ is a type $t \in \{c, n\}$ candidate j's communication effort in this asymmetric assessment. The voter's attention and candidates' communication efforts are defined by (for more details see Appendix C): $C_v'(x^a) = q(1-q)Gy_1^a(c) + (1-q)^2 Ly_1^a(n) + q(1-q)(L-G)(1-2\alpha_2^a(c))y_1^a(n)$, $C'(y_1^a(t)) = (q(1-\alpha_2^a(c)) + (1-q))x^a(1-k_t),\ t \in \{c, n\}$, $C'(y_2^a(c)) = (q\alpha_1^a(c) + (1-q)\alpha_1^a(n))x^a(1-k_c)$ As above, we only need to consider the solution with the highest voter's attention (supposing it exists), denoted x^a. The voter's attention and candidates' communication efforts are continuous in G, k_n and k_c. In Appendix C, we show that the associated communication subform admits an equilibrium only

[6]Since $y_1^{p_1}(n) \to y_1^{p_1}(c)$ as $k_n \to k_c$, $qGy_1^{p_1}(c) + (1-q)y_1^{p_1}(n)L < 0$. The voter then pays no attention to the campaign and by Lemma 1, the assessment cannot be an equilibrium.

if: $qGy_1^a(c) + (1-q)Ly_1^a(n) + q(L-G)(1-\alpha_2^a(c))y_1^a(n) \geq 0$. We also prove that there exists $\acute{k}_n^a(G,k_c) > k_c$ such that this condition is never satisfied whenever $k_n \leq \acute{k}_n^a(G,k_c)$. At $k_n = \acute{k}_n^a(G,k_c)$, we have x^a defined as the solution to $C_v'(x^a) = q(1-q)(G-L)\alpha_2^a(c)y_1^a(n)$. There are two possibilities. (i) $x^a \geq x^*$ and in this case, we denote $\widehat{k_n}^a(G,k_C) = \acute{k}_n^a(G,k_C)$. (ii) $x^a < x^*$ and there exists $\widehat{k_n}^a(G,k_C) \in (\acute{k}_n^a(G,k_C),1]$ such that for all $k_n < \widehat{k_n}^a(G,k_C)$, $x^* > x^a$ ($\acute{k}_n^a(G,k_c) > k_c$ guarantees $\widehat{k_n}^a(G,k_c) > k_c$).[7]

The thus claim holds for $\widehat{k_n}(G,k_c) = \min\{\widehat{k_n}^p(G,k_c), \widehat{k_n}^{p_j}(G,k_c), \widehat{k_n}^a(G,k_c)\}$. □

Proof of Proposition 4. Define $\widehat{\widehat{k_n}}(k_c) = \min_{G\in[0,1]} \widehat{k_n}(G,k_c)$. Note that $\widehat{\widehat{k_n}}(k_c) > k_c$ by Lemma A.8. For $k_c \in (0,\overline{k_c})$ and $k_n \in (k_c, \min\{\widehat{\widehat{k_n}}(k_c), \overline{k_n}(k_c)\})$ (a non-empty interval), the voter pays strictly more attention in a separating assessment than in other assessment for all G (Lemma A.8). This directly implies point (i). Point (ii) follows from the fact that x^* is increasing with G. Point (iii) from the fact that the highest level of attention is unique and equal to x^* evaluated at $G = \overline{G}$. □

[7] As $k_n \to 1$, $y_1^a(n) \to 0$ so $C_v'(x^a) = q(1-q)Gy_1^a(c)$. If $q(1-\alpha_2^a(c)) + (1-q) > 1/2$ (always satisfied when $q < 1/2$), then $y_1^a(c) > y^*(c)$ and $x^a > x^*$ at $k_n = 1$. In this case, denote $\widehat{k_n}^a(G,k_c) = \min\{k_n \in (k_c,1) | x^a = x^*\}$ and $\widehat{k_n}^a(G,k_c) < 1$. Otherwise, it is possible (but not guaranteed) that for all $k_n > k_c$, $x^a < x^*$. Denote then $\widehat{k_n}^a(G,k_C) = 1$.