Wisdom of the Crowd?
Information Aggregation in Representative Democracy

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Abstract

The Condorcet Jury Theorem and subsequent literature establish the feasibility of information aggregation in a common-value environment with exogenous policy options: a large electorate of imperfectly informed voters almost always selects the correct policy option. Rather than directly voting for policies, citizens in modern representative democracies elect candidates who make strategic policy commitments. We show that intermediation by candidates sometimes improves policy choices and sometimes impedes information aggregation. Somewhat paradoxically, the possibility of information aggregation by voters encourages strategic conformism by candidates. Correlated information or partisan biases among voters can mitigate the political failure we uncover. We also discuss possible institutional solutions.

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1 Introduction

Why democracy? A prominent justification is its superior ability to channel the wisdom of the crowd (Schwartzberg, 2015). At the core of this argument is the Condorcet Jury Theorem, "the jewel of the crown of epistemic democrats" (List and Goodin, 2001, p. 283). Democratic procedures—specifically, elections—can successfully aggregate information dispersed across a large electorate. As a result, elections help to avoid policy mistakes and produce better outcomes than alternative and more restrictive procedures (Condorcet, 1785).

For the Condorcet Jury theorem to apply, voters need to be offered distinct policy choices. In canonical approaches, this is simply taken as given. In modern democracies, however, the options available to voters result from strategic considerations by candidates. Voters do not choose between policies; they elect representatives. Does intermediation by candidates impede or improve the commonly recognized wisdom of the crowd?

This paper shows that political intermediation can have a substantial impact on the information aggregation properties of elections. When candidates are (i) primarily motivated by selecting good policy or (ii) the quality of their information is *not too high*, the probability of a policy mistake vanishes as the number of voters grows large, at a faster rate than in the canonical Condorcet Jury setting with exogenous policy options. Conversely, when candidates are primarily office-motivated or sufficiently well informed, policy mistakes always happen with positive probability even with an arbitrarily large electorate.

Paradoxically, this political failure is driven by the possibility of information aggregation *when candidates propose different policies*. This property encourages candidates to engage in strategic conformism, i.e, convergence to the ex ante popular policy option. Intermediation by candidates can thus undermine information aggregation.

In a series of extensions, we clarify the scope of this political failure and examine possible institutional solutions. We show that when candidates are relatively well informed, a partisan electorate that is biased in favor of a specific candidate can mitigate strategic conformism. We also highlight that fully liberalized (i.e., open to all citizens) candidate entry and primary elections alleviate the issue we uncover, but do not fully eliminate it.

Formally, this paper introduces electoral competition within the canonical set-up of Feddersen and Pesendorfer (1996). A large number of voters select one of two candidates, who make binding policy commitments. There are two possible policy options and two possible states of the world. Voters and candidates privately observe binary, conditionally independent signals about the state: the signal realization is either fully informative or completely uninformative.[1] The precision of candidates' information can differ from that of voters. Voters prefer the policy to match the state, while candidates also value holding office.

When the two policy options are exogenously presented to voters, Feddersen and Pesendorfer establish that information aggregation is feasible: the correct policy is implemented with probability approaching one as the electorate grows large—consistent with Condorcet's early intuition and in line with the epistemic defence of electoral democracy. In our set-up, the policy alternatives offered to the electorate are instead chosen by candidates.

When candidates converge, the election is decided by idiosyncratic factors—for simplicity, the flip of a coin. When instead candidates propose distinct policy options, there is always a sequence of equilibria whose associated probability that the correct policy is selected approaches one in the limit. *From the candidates' perspective,* in any of these sequences a large electorate behaves like a single perfectly informed voter. This equivalence does not depend on the way citizens' information is modeled or on their voting strategies. It just requires that information aggregation be feasible with distinct policy options.

In light of this observation, the feasibility of information aggregation in our set-up hinges on whether candidates have sufficient incentives to make the right policy commitments when facing a single, fully informed voter. We first establish that it is individually rational for an informed candidate to propose the policy that matches the state, for both electoral reasons as well as policy reasons. Consequently, if one candidate is informed, information aggregation is guaranteed. This, in turn, indicates that the feasibility of information aggregation depends on candidates' behavior *when uninformed*. Unless they diverge, the probability of a policy mistake remains strictly positive even if the electorate grows arbitrarily large.

[1]Our assumptions on candidates' information and the binary policy space guarantee that the implementation of the wrong policy can only be driven by candidates' strategic incentives. It cannot result from 'honest mistakes' or from the impossibility of all policy options to be simultaneously offered.

When do uninformed candidates have sufficient incentives to diverge? The answer depends on the balance between the benefit from holding office and the cost of implementing the wrong policy. On the one hand, the candidate proposing the ex ante unpopular option (the one less likely to match the state) can improve his electoral chances by switching. On the other hand, this deviation carries the risk of a policy mistake, which occurs when the other candidate is also uninformed and ex-ante less likely state is realized.

The greater his office-motivation and the higher the likelihood of facing an informed opponent, the more tempting it is for an uninformed candidate to propose the ex ante popular option. Consequently, divergence by uninformed candidates is incentive compatible only if politicians are sufficiently policy-motivated or sufficiently likely to be uninformed. When this is not the case, uninformed candidates play a conformist strategy and converge to the ex ante popular option. This makes policy mistakes unavoidable: due to candidates' electoral incentives, information aggregation is infeasible.

Intermediation by candidates, however, can also improve information aggregation. When candidates' policy motivation is sufficiently large or the quality of their information not too high, the likelihood that the correct policy is implemented is higher than in the canonical set-up with exogenous policy options. Informed candidates, you will recall, always choose the right policy, and this reduces the risk of policy mistakes for all finitely sized electorates.

Our analysis implies that when intermediation by candidates is taken into account, the idea that citizens are always presented with relevant policy options—one of the key assumptions of the Condorcet Jury Theorem—does not necessarily hold, and its key conclusions do not extend. For instance, correlation in information necessarily worsens policy decisions with exogenous policy options (Ladha, 1992). In our set-up, instead, correlated information may encourage uninformed candidates to diverge *precisely because* it sometimes leads to the election of the wrong candidate, which weakens the incentive for strategic conformism.

The political failure we document is mitigated, but not eliminated, by fully liberalizing candidate entry. When citizen simultaneously choose whether or not to run at a cost before voting, entry becomes a form of volunteer game. Unless candidates are designated *after learning the state* or decide whether to enter in a pre-determined order, would-be entrants play a mixed strategy, with the possibility of no one entering always a possibility. A more structured form of competition—primaries—generally (but not always) reduces the risk of strategic conformism, as voters have multiple chances of screening candidates. Assuming that voters have a partisan bias toward one candidate reduces the incentives for strategic conformism by encouraging the trailing candidate to distinguish himself from his more popular opponent. Contaminating voters' motivation of selecting the right policy can actually be a blessing for information aggregation.

Our results show that explicitly accounting for representation reveals unstated scope conditions for the epistemic defence of democracy. In doing so, it highlights the importance of non-epistemic arguments in favor of democracy (e.g., legitimacy and fairness). With strategic candidates, democracy, as we model it, resembles epistocracy (Landa and Pevnick, 2020) rather than a pure version of direct democracy as implied by a strict interpretation of the Condorcet Jury setting. And like epistocracy, representative democracy fails when candidates' motivations are too different from voters'.

2 Related Literature

Our work connects two strands of literature on electoral institutions and political failures: failures caused by the behavior of voters and failures due to the behavior of candidates.[2]

Most of the literature on information aggregation is devoted to the behavior of voters. Starting with Austen-Smith and Banks (1996), scholars have largely confirmed Condorcet's early insight about the wisdom of the crowd: in common-value settings, large electorates almost always select the right policy in plurality voting (e.g., Feddersen and Pesendorfer, 1997; Wit, 1998; Myerson, 1998; McMurray, 2012), unless second-order uncertainty is present (Mandler, 2012) or the signal space has lower cardinality than the policy space (Barelli et al., 2019). Neither condition holds in our setting.[3]

The assumption of common values is crucial. When voters do not share the same policy preferences, several authors (e.g., Castanheira, 2003a,b; Kim and Fey, 2007; Gül and

[2] There is a large literature in political theory on the arguments in favor or against the epistemic approach to which we cannot do justice here. See Schwartzberg (2015) for a recent review.

[3] Outside of the plurality rule, scholars have showed that approval voting helps information aggregation (Bouton and Castanheira, 2012), while unanimity rules (Feddersen and Pesendorfer, 1998; Bouton et al., 2018) and sequential voting (Piketty, 2000) often hinder it.

Pesendorfer, 2009; Meirowitz and Shotts, 2009; Myatt, 2016; Acharya, 2016; Bhattacharya, 2013, 2018; Ali et al., 2017) have shown that the outcomes of majority voting under imperfect and perfect information are generally different.[4] In our setting, conversely, the only source of preference heterogeneity is candidates' office-motivation.

Existing studies on *candidate-driven* political failures, instead, largely focus on the interplay between electoral incentives and informational frictions. In these theories, politicians' reputational concerns lead them to ignore their private information and engage in either pandering (Canes-Wrone et al., 2001; Maskin and Tirole, 2004; Heidhues and Lagerlöf, 2003) or posturing (Fox and Stephenson, 2011; Acemoglu et al., 2013; Kartik et al., 2015; Kartik and Van Weelden, 2018; Almasi et al., 2018). By contrast, in this paper there are no reputational concerns: voters care about policies and not about whether a candidate is informed.

Only a few papers study candidate-driven failures in Condorcet Jury settings. Razin (2003) and McMurray (2017) show that in the absence of policy commitments, information aggregation is only feasible when politicians share voters' policy preferences. Other scholars study the incentives of a single strategic policy-maker (Aytimur and Bruns, 2015; Battaglini, 2017; Bond and Eraslan, 2010; Martinelli, 2001; Gül and Pesendorfer, 2009), rather than two candidates competing against each other. In line with these papers, we largely abstract from the question of *why* policy-making authority is delegated. Rather, we explore how decision-makers' incentives interact with voters' incentives.

Closest to our approach are Gratton (2014) and McMurray (2018), who find that electoral competition benefits an imperfectly informed electorate when either politicians are perfectly informed (Gratton, 2014) or the states of the world are equally likely (McMurray, 2018). This paper shows that when states are not equally likely and candidates are not perfectly informed, the same office-motivation that brings informed candidates to propose correct policies in the above settings can also induce strategic conformism among uninformed candidates.[5]

[4]Note that these issues are generally understood as information *equivalence* problems, which are distinct from the information *aggregation* properties of electoral systems.

[5]In Gratton (2014) and McMurray (2018), the policy and state spaces are arbitrarily large. Our results can be extended to these settings (after appropriately adjusting our notion of information aggregation). However, we focus on a binary policy space to (i) minimize analytic complexity, (ii) maintain comparability with the Feddersen-Pesendorfer benchmark, and (iii) ensure the possibility of information aggregation even if all candidates are poorly informed.

3 Baseline Model

The game features an electorate of $2n+1$ citizens and two candidates (A and B) competing for an elected office. Candidate $J \in \{A, B\}$ chooses platform $x_J \in \{0, 1\}$. Each citizen $i \in N$ has a chance to make an electoral decision $a_i \in \{\phi, A, B\}$, where ϕ denotes abstention and $J \in \{A, B\}$ a vote for J. The impact of platform x_J depends on the realization of an underlying state of the world $z \in \{0, 1\}$, drawn by Nature at the beginning of the game. The common knowledge prior satisfies $Pr(z = 0) = \alpha < 1/2$.

Each citizen wants the policy to match the realization of the state, and her preferences are represented by the following utility function:

$$U(x, z) = \begin{cases} 0 & \text{if } x = z \\ -1 & \text{if } x \neq z \end{cases} \tag{1}$$

Due to the symmetry in payoffs and the assumption that $z = 0$ is less likely, in what follows we refer to $x = 0$ as the ex ante unpopular policy and $x = 1$ as the ex ante popular one.

As in Feddersen and Pesendorfer (1996), we assume that citizen i is selected by Nature to vote with probability $1-p_\phi$. The parameter $p_\phi \in (0, 1)$ captures, for instance, the probability of being sick on the day of the vote and guarantees that a voter is always pivotal with strictly positive probability. Henceforth, we refer to selected citizens as voters.

Candidates share citizens' policy preferences but also value holding office. Candidate J's utility function takes the following form:

$$U_J(x, z, e) = \begin{cases} \omega + (1-\omega)U(x, z) & \text{if } e = J \\ (1-\omega)U(x, z) & \text{otherwise} \end{cases}, \tag{2}$$

where e denotes the identity of the elected candidate and $\omega \in [0, 1]$ captures the extent of candidates' office-motivation relative to their policy payoff.

After the realization of state z, citizens and candidates receive a signal about z. Before choosing his platform x_J, candidate $J \in \{A, B\}$ observes a message $m_J \in M := \{\emptyset, 0, 1\}$. Similarly, citizen i receives a message $m_i \in M$ before being selected by Nature and eventually making her electoral decision. Message $m \in \{0,1\}$ fully reveals the realized state of the world—$Pr(z = y|m = y) = 1,\ y \in \{0,1\}$—whereas message $m = \emptyset$ is completely uninformative—$Pr(z = 0|m = \emptyset) = \alpha$. All messages are independently drawn conditional on the realized state of the world. It is common knowledge that m_J reveals the state with probability $\pi \in (0,1)$ and that m_i reveals the state with probability $q \in (0,1)$.

The timing of the game is as follows:

1. Nature draws $z \in \{0,1\}$.
2. Candidate $J \in \{A,B\}$ privately observes $m_J \in M$. He then chooses $x_J \in \{0,1\}$.
3. Citizen $i \in N$ observes $m_i \in M$ and $(x_A, x_B) \in \{0,1\}^2$. She is then selected to vote with probability $1 - p_\phi$, and if selected, makes her electoral decision $a_i \in \{\phi, A, B\}$.
4. The candidate who receives the most votes is elected (with ties decided by a fair coin toss) and implements his platform.
5. The game ends, and payoffs are realized.

Our equilibrium concept is Perfect Bayesian Nash Equilibrium (PBE) with three additional requirements. First, in line with the literature, we focus on *voter-symmetric* equilibria in which citizens who observe the same message choose the same strategy. Second, we assume that voters receive an arbitrarily small (and unmodeled) symmetric valence shock that determines their electoral decision when indifferent. Third, we assume that both candidates face an arbitrarily small probability of mistake $\delta > 0$ (i.e., with probability δ, J "trembles" and proposes $y \in \{0,1\}$ when his strategy prescribes $x \neq y$).

Throughout the paper, we use the following notation. In a size $2n+1$ electorate, for each candidate J, a pure strategy is a mapping $x_J^n : M \to \{0,1\}$. A mixed strategy is denoted by $\gamma_J^n : \{0,1\} \times M \to \Delta\{0,1\}$, where ΔS denotes the set of probability distributions over the set S. For each voter i, a pure strategy is a mapping $a_i^n : M \times \{0,1\}^2 \to \{\phi, A, B\}$, and a mixed strategy is denoted by $\tau_i^n : \{\phi, A, B\} \times M \times \{0,1\}^2 \to \Delta\{\phi, A, B\}$. $\gamma^n := (\gamma_A^n, \gamma_B^n)$ denotes a tuple of candidate strategies and $\tau^n = \{\tau_i^n\}_{i=1}^{2n+1}$ a tuple of voter strategies. In what follows, we say that an informed candidate *follows his signal* if $x_J^n(m) = m \in \{0,1\},\ J \in \{A,B\}$ and an informed voter *follows her signal* if she votes for the candidate proposing the correct policy when candidates diverge.

We adapt Battaglini's (2017) definition of information aggregation to our setting. Let $\Pr(x, z; \gamma^n, \tau^n, \delta)$ be the probability that policy $x \in \{0, 1\}$ is chosen under state $z \in \{0, 1\}$ given a strategy profile (γ^n, τ^n), an electorate of size $2n + 1$, and a probability of making a mistake of δ. The overall probability that the correct policy is implemented is then:

$$Q(\gamma^n, \tau^n, \delta) = \alpha \Pr(0, 0; \gamma^n, \tau^n, \delta) + (1 - \alpha) \Pr(1, 1; \gamma^n, \tau^n, \delta).$$

Definition 1. *Information aggregation is feasible if and only if for all* $\epsilon > 0$*, there exists* $\delta(\epsilon) > 0$ *and a sequence of equilibria* $\{\gamma^n, \tau^n\}_{n=0}^{\infty}$ *such that* $\lim_{n\to\infty} Q(\gamma^n, \tau^n, \delta) > 1 - \epsilon$ *for all* $\delta \in (0, \delta(\epsilon))$.

Definition 1 only requires the existence of a sequence of equilibria in which the probability that the policy matches the state converges to one. We say that information aggregation is feasible for a particular sequence of equilibria if that sequence satisfies Definition 1.

Remarks on the set-up

Before proceeding to the analysis, a few remarks are in order. First, our main result on information aggregation does not hinge on the restriction to voter-symmetric equilibria (see footnote 8 and Appendix D), nor on the presence of the tremble δ, which guarantees equilibrium existence when information aggregation is infeasible.[6]

Second, in some models of information aggregation, voters receive noisy signals. We instead build on Feddersen and Pesendorfer (1996), where voters are either perfectly informed about the the state of the world or completely uninformed.[7] This assumption is not crucial. Our conclusions rely on the possibility of information aggregation when candidates propose divergent platforms, not on the way in which we model voters' individual information.

Third, our framework arguably stacks the deck *against* a strong effect of candidate intermediation. The assumption that informed candidates perfectly learn the state helps to achieve information aggregation, since noisy signals carry the risk of honest mistakes: can-

[6] On a positive level, our results also hold if we assume that voters face a small probability of misperceiving candidates' platforms, but this alternative approach would complicate our welfare results.

[7] Feddersen and Pesendorfer (1996) also allow for partisan voters, whose deterministic voting behavior does not respond to information about policy. Their presence in our model would not affect our main result.

didates proposing the same mistaken platform while following their signal (see, e.g., Laslier and Van der Straeten, 2004). As long as at least one candidate is informed and follows his signal, in our set-up, the risk of a policy mistake vanishes with the size of the electorate.

Finally, our assumption that voters randomize when indifferent does impact our results (that voters do so *uniformly* is less consequential, as shown in subsection 5.1). Supplemental Appendix C shows that when voters can play coordinated strategies, information aggregation is always feasible. Coordination, however, is fragile to additional non-policy considerations driving voter behavior. In line with a large literature that abstracts away from coordination, in our set-up, these considerations take the form of an unmodeled valence shock.

4 Electoral incentives and information aggregation

We begin with two preliminary observations. First, information aggregation is feasible if voters are always presented with distinct alternatives. Second, in any sequence of equilibria for which information aggregation is feasible, the behavior of the electorate approaches that of a fully informed voter. A direct consequence of this second observation is that if information aggregation is feasible, it is optimal for informed candidates to follow their signal (see Gratton, 2014, for a similar result).

Lemma 1. *In any sequence of equilibria for which information aggregation is feasible, there exists* $\overline{n}^{inf}$ *such that for all* $n \geq \overline{n}^{inf}$, $x_J(m) = m$ *for all* $m \in \{0, 1\}$ *and* $J \in \{A, B\}$.

Voters can never fully infer the state from candidates' platforms, owing to the trembling probability δ. Uninformed voters, therefore, always face the risk of making an electoral mistake because they can be pivotal under both realizations of the state. In line with Feddersen and Pesendorfer (1996), the swing voter's curse implies that in a large electorate, uninformed voters abstain, thereby delegating electoral decision-making to the informed voters (see Lemma A.1 in Supplemental Appendix A). As a result, the probability that the correct policy is chosen conditional on divergence goes to one as the electorate grows large.

This, in turn, encourages an informed candidate to follow his signal, for both electoral and policy reasons. Electorally, following the signal can only increase his winning probability:

from at most 1/2 (i.e., only when his opponent also fails to match the state) to at least 1/2 (i.e., 1/2 when his opponent matches the state and strictly more when he does not). From a policy perspective, following the signal can only reduce the probability of a policy mistake.

Lemma 1 also implies that equilibria with strategic candidates must be qualitatively distinct from the ones arising with exogenous policy options. Indeed, intermediation by candidates must reduce the competition among ideas in elections: distinct policy options cannot be offered with probability one in the limit because informed candidates have too much of an incentive to act on their information. This, however, benefits voters: with probability at least $\pi^2(1-\delta)^2$, *both* candidates offer the correct policy.

To examine the feasibility of information aggregation, however, we also need to consider the incentives of *uninformed candidates.* In particular, information aggregation is feasible only if uninformed candidates propose divergent platforms with probability one (otherwise, they converge to the wrong policy with positive probability, which violates Definition 1).

Under what conditions will uninformed candidates diverge? Suppose first that candidates only care about policy outcomes, not gaining office (i.e., $\omega = 0$). It is then individually rational for candidates to diverge when uninformed: one (say, A) proposing 0, the other (B) offering 1. In that case, information aggregation is feasible. If at least one candidate is informed, the correct policy is almost always—modulo the probabilistic tremble δ—offered. If both candidates are uninformed, the electorate is presented with distinct options and by the logic of Feddersen and Pesendorfer (1997), voters are able to select the candidate proposing the correct policy with probability approaching one. Since candidates only care about policy outcomes, they seek to minimize the risk of a policy mistake and thus prefer to diverge when uniformed.

Suppose, instead, that candidates only care about being elected (i.e., $\omega = 1$). In this case, uninformed candidates are essentially playing a zero-sum game with an unobserved state. When candidates choose the same policy, they have the same chances of winning. When they diverge, the state (due to information aggregation conditional on divergence) determines who wins. Since one realization of the state is more likely than the other, neither player will find it profitable to propose $x = 0$, the policy option that is *less likely* to match the state. For this reason, full divergence by uninformed candidates cannot be part of an equilibrium, and information aggregation is infeasible.

Building on the two extreme cases above, we can describe the key trade-off behind the feasibility of information aggregation. When n is arbitrarily large (so that informed candidates follow their signals) and his opponent $-J$ chooses $x = 1$ when uninformed, candidate J's winning probability increases as he switches from the ex-ante unpopular policy $x = 0$ to the ex-ante popular policy $x = 1$. His chances improve from $\alpha\left(1 - \pi + \pi\frac{1}{2}\right)$ (when $x_J = 0$, J wins only if the state is $z = 0$: with probability one when his opponent $-J$ proposes $x = 1$ and with probability 1/2 when $-J$ also proposes $x = 0$, in which case voters randomize) to $\frac{1}{2}(1 - \alpha + \alpha(1 - \pi))$ (when $x_J = 1$, J wins whenever $-J$ also proposes $x = 1$ and the voters' randomization favors J). Hence, J's electoral benefit of switching to $x = 1$ equals

$$\omega\left[\frac{1}{2}(1 - \alpha + \alpha(1 - \pi)) - \alpha\left(1 - \pi + \pi\frac{1}{2}\right)\right] = \omega\frac{1 - 2\alpha}{2}$$

This deviation, however, increases the risk of policy mistake from (approximately) zero to $\alpha(1 - \pi)$—when the state is $z = 0$ and J's uninformed opponent also proposes $x = 1$. Hence, the policy loss from switching to $x = 1$ equals

$$(1 - \omega)\alpha(1 - \pi)$$

Combining the two, we obtain that information aggregation is feasible if and only if candidates either care enough about policy relative to office or are relatively unlikely to be informed (which increases the policy loss), i.e., $\left(\frac{1}{2} - \alpha\right)\omega < \alpha(1 - \pi)(1 - \omega)$. Rearranging the condition above, we obtain the following result.[8]

Proposition 1. *Information aggregation is feasible if and only if*

$$\frac{\omega}{1 - \omega} < \frac{2\alpha}{1 - 2\alpha}(1 - \pi). \tag{3}$$

[8]Observe that Condition (3) always holds when the state is distributed uniformly ($\alpha = 1/2$). As a result, full information aggregation is always feasible then, as in McMurray (2018). Further, the restriction on symmetric voting strategy guarantees that Condition (3) is both necessary and sufficient. In Appendix D, we allow for equilibria with non-symmetric voting strategies. We then show that (i) Condition (3) is only sufficient, and (ii) there exists a second threshold for $\frac{\omega}{1-\omega}$ above which information aggregation is necessarily infeasible (see Proposition D.1). In short, the logic of Proposition 1 extends to non-symmetric voting strategies.

We can use Proposition 1 to better understand the consequences of candidate intermediation by comparing our findings to those emerging from the case of exogenous policy options (i.e., the canonical Condorcet Jury setting). When candidates are poorly informed or primarily policy-motivated—i.e, Condition (3) holds—intermediation by candidates yields a higher probability of selecting the correct policy.[9] While the benefit of candidates' intermediation diminishes as the electorate grows large, it is strictly positive for any finite electorate. More interestingly, when candidates are well informed or primarily office-motivated—i.e., Condition (3) does not hold—then intermediation by candidates leads to a strictly lower probability of selecting the correct policy.

More formally, intermediation by candidates *improves policy-making* if there exist a sequence of equilibria and a finite n^b such that for all $n \geq n^b$ there exists $\delta^n > 0$ such that if $\delta < \delta^n$, the probability that the correct policy is implemented is strictly greater with candidates' intermediation than with exogenous policy options (in which case, Feddersen and Pesendorfer, 1997, show that for n large enough there is a unique sequence of equilibria and this sequence aggregates information). In turn, candidate intermediation *worsens policy-making* if there exists n^w such that for all finite $n \geq n^w$ and for all $\delta \in (0, 1)$, the probability that the correct policy is implemented *in all sequences of equilibria* is strictly lower with candidates' intermediation than with exogenous policy options. Despite the relatively stringent requirement for worsening policy-making, we obtain the following proposition.[10]

Proposition 2. *Intermediation by candidates (i) improves policy-making if Condition (3) holds and (ii) worsens policy-making if Condition (3) fails.*

What happens when information aggregation is infeasible? Electoral incentives, we have seen, push uninformed candidates towards conformism. In equilibrium, uninformed candidates both propose the ex ante popular policy $x = 1$ (i.e., $x^n_A(\emptyset) = x^n_B(\emptyset) = 1$).[11] The correct

[9]For a similar result in a setting with perfectly informed candidates, see Gratton (2014).

[10]When we relax the restriction to voter-symmetric equilibria, the statement Proposition 2 remains almost unchanged but for point (ii) in which the failure of Condition (3) would be replaced by a slightly more stringent condition (for an intermediate range of ω, we could not rank outcomes in the two settings).

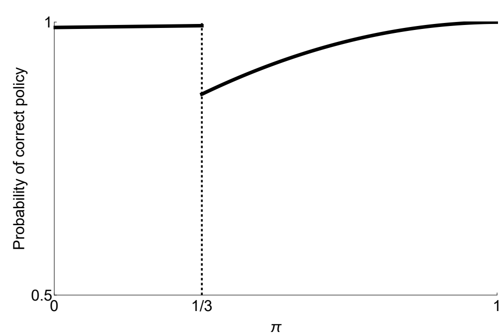
[11]Assuming that candidates tremble with probability δ is essential for the existence of a sequence of equilibria when Condition (3) fails. Absent this, when candidates follow their signal and $x^n_A(\emptyset) = x^n_A(\emptyset) = 1$, platform $x = 0$ fully reveals that the state is $z = 0$, which leads uninformed voters to vote for the candidate proposing it. When uninformed voters are in the majority ($q < 1 - q$), this leads uninformed candidates to deviate from their prescribed strategies and choose $x = 0$. $\delta > 0$ eliminates this problem.

policy is implemented unless the state is $z = 0$ and both candidates are uninformed, i.e., with probability $1 - \alpha(1-\pi)^2$. As a result, the quality of equilibrium electoral decision-making is strictly increasing with π.

Remark 1. *If Condition (3) fails, the limit probability that the correct policy is implemented is strictly increasing with π.*

Combining Proposition 1 and Remark 1 reveals that a high probability that candidates are informed (π) is a mixed blessing for the electorate. On the one hand, since informed candidates propose the correct policy in equilibrium, π increases the probability that the correct policy is implemented holding candidates behavior constant. On the other hand, a higher π reduces the policy loss associated with strategic conformism, thereby encouraging it.[12] Due to this second effect, an increase in π can lead to a significant decrease in voters' expected utility—an affine transformation of the probability of a policy mistake. For example, in Figure 1, the probability that the correct policy is implemented in the limit is 99% when π tends to zero and approximately 92% when $\pi = 0.5$.

Figure 1: Policy-making and Candidate Information



The figure represents the probability that the correct policy is implemented ($Q(\gamma^n, \tau^n, \delta)$) as n goes to infinity in a sequence of voter-symmetric equilibria as a function of π. Parameter values $\alpha = 0.3$, $\omega = 0.5$, $\delta = 0.01$.

[12]Since uninformed candidates cause the infeasibility of information aggregation, information aggregation is always feasible when candidates are fully informed ($\pi = 1$), in line with results in Gratton (2014).

5 Limitations and Solutions

In this section, we turn to the scope of the political failure we identified in the previous section. Since strategic conformism stems from the possibility of information aggregation when candidates diverge, we first study how an imperfect electorate—one that due to information or partisan leanings might fail to select the correct policy option—affect the political failure we identify. We then discuss how political institutions—i.e., the process through which candidates emerge—can improve or exacerbate strategic conformism.

5.1 Imperfect electorate

In the baseline model, citizens receive conditionally independent signals and only care about whether the policy matches the state. Below we briefly describe how our results change when each of these assumptions is relaxed.

We first introduce the possibility of correlated information. As Ladha (1992, p. 624) notes, citizens "share common information, communicate, or are influenced by various school of thoughts or opinion leaders." To capture the idea that correlation in information might reduce the chances that a large electorate selects the right policy, we assume that at the beginning of the game, Nature determines whether citizens receive conditionally independent private signals $m_i \in \{\emptyset, z\}$, with $Pr(m_i = z) = q$, or whether all citizens observe the same public signal $m^P \in \{\emptyset, z\}$, with $Pr(m^P = z) = q^P$. We assume that citizens can distinguish between a private and a public signal and that Nature selects the latter with probability ρ. Our baseline model corresponds to the case of $\rho = 0$. On the other extreme, $\rho = 1$ can be thought of as a small electorate.

Whenever citizens receive an uninformative public signal (probability $\rho(1 - q^P)$), there is a risk of a policy mistake since voters can only rely on their common posterior $\beta(\emptyset, x_A, x_B)$.[13] However, candidates also have greater incentives to propose divergent policies when uninformed *because* the electorate cannot perfectly identify the correct policy in case of divergence. So, the presence of correlated information might encourage uninformed candidates to play divergent strategies while carrying the risk of a policy mistake when candidates diverge.

[13] Notice that $\delta > 0$ ensures that the posterior is not degenerate.

The proposition below shows that when the overall risk of a policy mistake is not too large—i.e., $\rho(1-q^P)$ is small and candidates are relatively well-informed—correlated information can improve the quality of policy-making.

Proposition 3. *When* $\frac{1}{2(1-\alpha)} < \pi < 1 - \rho(1-q^P)$*, there exists a non-empty open interval* $(\underline{\omega}, \overline{\omega})$ *such that when* $\omega \in (\underline{\omega}, \overline{\omega})$ *there exists a sequence of equilibria in the correlated-signal model whose limit probability that the correct policy is implemented is strictly higher than in the baseline model.*

This result can also be contrasted to the findings in Levy and Razin (2015). There, the failure to account for correlation in signals facilitates information aggregation because it helps voters overcome their partisan biases. Here, introducing correlated signals facilitates information aggregation because it reduces incentives for strategic conformism. Depending on the source of the political failure, correlation in information can either help or hurt voters.[14]

We now endow the electorate with additional partisan motivations in the form of an additive common payoff $\xi \in (0,1)$ associated with electing B (who can then be thought of as the leading candidate). Notice that $\xi < 1$ implies that in a large electorate, the partisan bias ξ only matters when candidates converge, leading voters to choose B in that case.

In this context, candidate A has an incentive to distinguish himself from candidate B, who then has to take into account A's behavior. These incentives are especially strong when candidates are uninformed and, thus, cannot fully anticipate the policy consequences of their policy proposal. The partisan bias creates an incentive for the uninformed type of candidate A to choose the ex ante sub-optimal policy (0) effectively gambling on its ex-post optimality. When the probability that a candidate is informed is sufficiently high, B's behavior will not be too responsive to the incentives generated by the uninformed A's choice of $x = 0$. Candidate B still chooses the ex ante optimal policy 1 unless he learns that the state is $z = 0$. As a result, partisan bias can discourage strategic conformism.

[14]Ignorance about candidates' platforms (in line with the evidence in Campbell et al., 1980; Delli Carpini and Keeter, 1996; Achen and Bartels, 2017, among others) could be another informational obstacle that the electorate faces. It turns out that political ignorance—i.e., citizens receiving conditionally independent signals of candidates' platforms—is neutral when it comes to information aggregation: if information aggregation is feasible in the baseline model (i.e., condition (3) holds), then it is also feasible with political ignorance, as only fully informed citizens will vote in a large electorate. (Details available upon request.)

Proposition 4. *With partisan bias, information aggregation is feasible if and only if:*

$$(\alpha - (1-\alpha)\pi)\frac{\omega}{1-\omega} \leq (1-\pi)(1-\alpha). \tag{4}$$

For all $\pi > \max\left\{\frac{\alpha}{1-\alpha} - \frac{1-2\alpha}{2\alpha}, 0\right\}$*, feasible information aggregation is easier to obtain (in the sense of set inclusion) with partisan bias than without.*

5.2 Political Institutions

Our main result shows that candidates' strategic platform choice can undermine the benefit of majority voting in pairwise comparisons. Reducing the process of how alternatives are selected to the choices of two candidates ignores a broad set of political institutions that in a representative democracy determines the selection of candidates. Does explicitly considering these institutions exacerbate or mitigate the problem we identify? We consider two possibilities: fully decentralized entry and party primaries.

In Supplemental Appendix B.3, we study an extension of our baseline model in which citizens, after observing their message, simultaneously decide whether to run at cost $C < \omega$. This amended set-up resembles a volunteer dilemma, with a twist: the value of volunteering (i.e., running) depends on the number of citizens who have already thrown their hat into the electoral ring.[15] The Appendix shows that any symmetric equilibrium with positive probability of entry *requires* information aggregation to be infeasible (Lemma B.10). Intuitively, a vanishing likelihood of a policy mistake implies that the net expected value of entering must be negative.[16]

The result has its limitations: with sequential (and predictable) entry of ideologically committed candidates, information aggregation would be feasible. This suggests that institutions structuring candidate entry—e.g., political parties—can help address the issues associated with fully liberalized access to candidacy. We explicitly consider the possibility of closed primaries in Appendix B.4. Within each party, a representative party member who

[15]When $C > \omega$, each voter wants the correct policy to be implemented but prefers somebody else to run. The set-up is even closer to a volunteer game, and in any symmetric equilibrium, the probability that at least one citizen runs is strictly *decreasing* with the size of the electorate. Details upon request.

[16]By the same logic, information aggregation remains infeasible (under some parameter values) even after considering asymmetric equilibria in which a few citizens are "designated" to run.

(i) maximizes the nominee's general-election winning chances and (ii) is fully informed about the state chooses between two partially informed candidates.

We find that primaries generally improve the quality of policy-making, but do not guarantee that information aggregation is feasible for all parameter values (Proposition B.1). Intuitively, the presence of multiple candidates (a primary rival and two primary candidates in the other party) reduces both the electoral gain and the policy downside of proposing a conformist platform ($x = 1$ instead of $x = 0$) for an uninformed candidate. When $z = 0$ is not too unlikely, the first effect dominates, and primaries lead to a lower risk of mistakes in the limit. In contrast, when the prior about the state is sufficiently lopsided, the second effect dominates, and primaries can actually exacerbate strategic conformism relative to the baseline model.

6 Conclusion

This paper uncovers a novel political failure. When candidates' office-motivation is large relative to the policy cost of implementing the wrong policy, the wisdom of the crowd—the ability of a large electorate to aggregate information—encourages uninformed candidates to converge to the ex ante popular policy. Candidates' strategic conformism then impedes the competition among ideas and renders information aggregation infeasible.

This failure has interesting implications. Assuming that the electorate imperfectly aggregates information—e.g., due to correlated signals—or voters are not solely policy-motivated—e.g., due to partisan preferences—can curb strategic conformism and can even improve policy-making. Accepting these imperfections, perhaps paradoxically, helps rather than hurts epistemic defenses of democracy. Political institutions can also mitigate this political failure, but it is hard to fully eliminate it. Liberalizing candidate entry generates its own issues, not too dissimilar to those that happen in volunteer games. Primaries, by improving screening, generally diminish the undesirable consequences of strategic conformism, though in some cases can also worsen it.

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