IDEOLOGUES, IDEALISTS, AND THE INFLEXIBILITY OF GROUPS

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We’d all like to vote for the best man but he’s never a candidate.— Frank Hubbard

Abstract

Our model considers a majority election where voters with private values decide whether to commit to a policy at date 0 or postpone the decision. Voters are aware that their individual rankings of policies may change after date 0 according to common or idiosyncratic shocks. We show that in equilibrium groups will often commit hastily even when each individual has a preference for flexibility. This lowers the expected utility of all voters. Inefficiency arises both for sincere and for strategic voters, but is more pervasive in the latter case. This amounts to choosing an ideologue over an idealist.

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1 INTRODUCTION

Voters are often aware that their ranking of policies might change after an election. The following question then arises naturally: When do voters choose to defer the decision and make a more informed choice at the next date? One of our points of departure from the usual model is that candidates and policies are not synonymous. We demonstrate how the standard model of voting can, in this setting, generate counterintuitive conclusions. To the extent that our predictions diverges from intuition one can treat our work as a formal exposition of the discomfort that models of pivotal voting generate. On the other hand, some observations turn out to be rationalized by the standard model.

Here is a striking example of the phenomena we have in mind. In October 1992, the Swedish Nuclear Fuel and Waste Management Company (SKB), an organization charged with the responsibility of safely disposing nuclear waste, proposed to conduct a study to determine the feasibility of locating a repository. One of the towns to be evaluated was Storuman, in northern Sweden. The findings of the SKB would not be binding on the city and if Storuman were deemed feasible it would still be up to the city council to decide, in keeping with public opinion and the interest of the city, whether to allow SKB to actually build a nuclear waste dump. A 1995 referendum asked “whether SKB should be allowed to continue the search for a final repository location in Storuman”. The outcome was an overwhelming ‘no’ (70.5%): Voters opted to reject it outright rather than allow more information to be disclosed by a non-binding scientific study.

Existing explanations of the inefficiency of groups, discussed in detail later, rely critically on a high probability that a substantial part of the current majority will change its mind. We believe many situations are better described by assuming that this probability is small. In the context of the above example, our model suggests that voters might have been driven by the fear that even if they themselves are not persuaded, others could change their minds.

For ease of exposition we consider the following scenario. An election is in the offing, and the result hinges on one issue: How best to respond to an adversary that will threaten national security if it has weapons of mass destruction (henceforth WMD). A simple majority election is held between two candidates $B$ and $U$, whose electoral platforms will be described shortly. When they go to the polls, voters are divided on how to respond to the potential WMDs. Some support a direct confronta-
tion (policy 0), while the less hawkish voters prefer a diplomatic response (policy 1). Initially more people are hawkish. Henceforth the “type” of a voter at any date is defined to be his preferred policy (0 or 1) at that date. However voters are aware that their types may change after the election in response to shocks described below. The game ends with the elected candidate picking one of the two policies 0 and 1. A voter gets a unit of utility if and only if the chosen policy is his new type.

We now describe the shocks. With some probability conclusive scientific evidence will come to the fore, either for or against the said opponent being a threat, and cause all voters to agree on what the right policy is; this we call a common shock. To illustrate, if it is discovered that the enemy was close to arming missiles even the pacifist prefer war; similarly, everybody prefers a diplomatic response if scientists find that the adversary is incapable of producing WMDs (say the country is technologically unable to refine uranium).

But it is quite likely that there won’t be such conclusive evidence; in this case voters experience either idiosyncratic ranking shocks or no shocks (in the latter case types are the same before and after the election). Idiosyncratic shocks, if any, may run in either direction: If the left-wing media runs editorials condemning the war, a type-0 who reads it could change to type-1. We model this as follows: With probability \( \theta_1 \) an idiosyncratic shock causes type-0 voters to become type-1 with a small probability \( p \) independently of one another. Similarly an idiosyncratic shock towards 0 has conditional probability \( \theta_0 \) and makes each type-1 into a type-0 with probability \( p \) independently.

Finally we come to the candidates. \( B \), is the ideologue/biased candidate who implements policy 0 irrespective of the post-shock rankings; \( U \), is the idealist/unbiased candidate who credibly promises to wait until voters learn their final rankings, and to then pick the policy preferred by the majority. Electing \( B \) is like committing to an alternative, while \( U \) amounts to deferring the decision.

Who stands a better chance of winning the (simple) majority election? One might expect \( U \) to be the natural choice, especially when there is a significant probability that policy 0 will be bad for all voters. (Note that in the case of a common shock, \( U \) always implements what everyone prefers.) We find, perhaps counterintuitively, that voters may prefer \( B \), thereby committing to a policy rather than waiting to learn their final rankings. Political satirist Frank Hubbard’s quip, quoted at the start of the paper, could be turned on its head—(Often) we wouldn’t like to vote for the best man even if he were a candidate!
The next two paragraphs explain the intuition for the rational voter.\footnote{The rational voters’ strategies constitute an equilibrium, whereas the sincere one votes without taking any strategic considerations into account. Proofs in section 3 cover the case of the sincere voter.} For intuition, we make the following simplifications. Assume shocks are towards 1 only, i.e. either there is a common shock making all voters type-1’s, or idiosyncratic shocks change each type-0 voter into type-1 with a small probability $p$ independently of the other voters. Idiosyncratic shocks are more likely than a common shock. Also rule out by assumption the event where there are no shocks.

Strikingly enough, it can be an equilibrium for type-1’s to vote $U$ and type-0’s to vote $B$, who is the more likely winner. Consider a rational type-0 voter. He is aware that his vote matters only when he is pivotal, i.e. the election is close. In this case, no matter how small $p$ is, idiosyncratic shocks are enough to swing the majority from type-0 to type-1. Each type-0 voter thinks that, conditional on idiosyncratic shocks, he himself won’t change (because $p$ is small) while sufficiently many other voters will flip and lead $U$ to choose policy 1 at the next date whereas our voter would still want policy 0. He therefore votes for $B$, who is committed to policy 0, to guard against other type-0 voters changing their views later. When we compare our work to previous work on commitment bias, this will emerge as one of our key insights: This inefficiency can hurt both groups within the population, including the current majority. Even when type-0 is better off under $U$ he could vote for $B$ because $U$ is bad precisely in those cases where his vote matters.

After describing the related literature, we present the model (section 2) and consider the sincere and the rational voter in turn. Section 3 discusses further implications of the model, including that for candidate entry.

1.1 RELATED LITERATURE

Our work is related to several strands of literature. The first link is to a long literature documenting why groups choose inefficiently and might be conservative. The second link is to a long literature on electoral competition and pandering, including the recent work of Maskin and Tirole (2004) and Callander (2008). Finally this forms part of the extensive literature on pivotal voting and information aggregation.

Hao (2001) shows that conservatism may be a way to increase private incentives to gather evidence and improve the quality of the group decision. This is very different from our model, where information is available at no cost. Like us, Friedenberg
et al. (2008) argues that ideologically committed candidates can often do better than idealistic or pragmatic ones, but the models and mechanisms are very different.

The status-quo bias in reform is well documented—welfare-improving reforms are defeated by the status-quo; see for example Samuelson and Zeckhauser (1988). Fernandez and Rodrik (1991) [henceforth FR] provides an explanation in the context of trade reforms, to our knowledge the first that does not appeal to risk-aversion. Their explanation is based on the identity of the winners being unknown at the time of voting. All voters of the majority group are ex-ante identical and hence maximize the expected value of the group, behaving in effect like the representative voter of the group.

Our mechanisms are very different—in this paper the strategic interaction of voters generates inefficiency, whereas FR’s inefficiency is independent of strategic considerations. Indeed, both rational and sincere voting generate the same results in FR because each voter has a weakly dominant strategy to vote for the policy he prefers in expectation whether or not he is strategic.

This allows us to contrast the predictions for sincere and rational voters. We find that an electorate with strategic voters does no better than one with sincere voters, and indeed strictly worse in many situations. Strategies of others are not relevant for a voter in FR; effectively, each voter has a choice between two lotteries that are independent of the types and strategies of other voters. In contrast to FR, our rational voter takes others’ equilibrium strategies into account as candidate U’s policy depends on the electorate’s final rankings. Even when we are faced with the same ranking shocks, it is possible that the electorate chooses B but any individual alone would choose U. Each voter is wary that others might change their minds. The second substantive distinction is that inefficiency survives in our model even when the “idiosyncratic” shock is unlikely to precipitate a large change, i.e. when $p$ is small. Our model is also different in that voters choose between candidates rather than policies; we also add a common shock for realism and as a test of the robustness of our model.

This brings us to related literature that uses the concept of strategic voting, first introduced in Theory of Voting by Farquharson (1969). More recently this has been exploited in several papers—for example Austen-Smith and Banks (1996), Feddersen and Pesendorfer (1997), and Meirowitz (2006)—to analyze information aggregation.

\[^{2}\text{RB first drew our attention to this paper, and pointed out a very natural link between our work and theirs.}\]
Feddersen et al. finds that in a large election a vanishingly small proportion of the electorate votes informatively,\(^3\) but information is almost perfectly aggregated and the efficient decision is taken. We show that the equilibrium may not be efficient, \textit{even when all agents vote informatively}. In our model being pivotal is informative about the distribution of rankings at the next date, and therefore about \(U\)'s policy.

It is worth pointing out that one can interpret our model as showing that efficiency results might not survive some natural variations.

Our work may also be linked to models of candidate location, notably the pioneering work of Downs and Hotelling. In our model a candidate with an extreme position beats an unbiased candidate. While the valence aspect of voting has long been discussed informally in political science (Stokes (1963) is a standard reference), Callander (2008) proposed the idea that candidates wish to be perceived as ideological. Thus in Kartik et al. (2007) candidates do not converge to the median to avoid being seen as pandering to voters. Details are contained in a subsequent section. Our model provides a different reason for being committed to an ideology.

\section{The Model}

We present below a simple model, chosen with analytical tractability in mind, that captures the features mentioned in the introduction. There are two dates \((\tau = 0, 1)\), an odd number\(^4\) of voters indexed \(1, 2, \ldots, 2n + 1 \ (n > 1)\), and a binary policy space \(A = \{0, 1\}\). Define voter \(i\)'s type \(t_\tau^i \in A\) at date \(\tau\) as the policy he ranks higher at date \(\tau\). Implicitly this definition assumes for simplicity that there are no ties.

At date 0, nature draws each voter's initial type \(t_0^i \in \{0, 1\}\) from a Bernoulli distribution with \(\Pr\{t_0^i = 0\} = q \in (0.5, 1)\); this corresponds to there being more hawks than doves at the initial date. Although a voter does not know the exact types of the others, he has a general sense of the dispersion in opinion: voter \(i\)'s type \(t_0^i\) is private information, but \(q\) is common knowledge. Elections are held at date 0 as well. After the elections, each voter's type changes to \(t_1^i\) according to a stochastic process described shortly. Fig. 1 below shows the temporal structure of the game.

\(^3\)To vote informatively is to condition the vote on one's signal. Voting games also have equilibria where all voters cast their ballots for the same candidate. In keeping with the standard practice we look at informative symmetric equilibria.

\(^4\)Our calculations would be different if we also considered an even number of voters, because then we would also have to deal with ties. However the intuition should go through.
The election is not over policies, but between two candidates—U and B. Candidate B is known to be an ideologue committed to policy 0. The idealist U credibly promises to implement the ex-post social optimum policy if elected. If policy \( a \in A \) is implemented at date 1, voter \( i \)'s utility is given by

\[
u_i(a; t_1^i) = \begin{cases} 
1 & \text{if } a = t_1^i \\
0 & \text{otherwise}
\end{cases} .
\]

Utilities are earned at date 1; there is no discounting. When we interpret our model as one of timing of group decisions, B is an immediate decision while U is deferring decision until more information arrives. It is important to note that our voters can use Bayesian reasoning, and the result does not arise from their inability to foresee that they may change.

**Fig.1: Timeline**

Voters’ types change over time in response to new events (shocks).\(^5\) With probability \( \delta \), a common shock hits; all voters then prefer policy 0 with probability \( \pi \) or policy 1 with probability \( 1 - \pi \). With probability \( 1 - \delta \), there is no common shock. Conditional on this event there are idiosyncratic shocks towards policy 0 with probability \( \theta_0 \) and towards policy 1 with probability \( \theta_1 \), and with probability \( 1 - \theta_0 - \theta_1 \) there is no change i.e. \( t_1^i = t_0^i \forall i \). An idiosyncratic shock towards 0 makes each type-1 voter switch to type-0 with probability \( p \) independently,\(^6\) while type-0 voters are unaffected; if the idiosyncratic shock is towards 1 then all type-1’s stay put but each

\(^5\)We should mention that what we call ranking shocks have in the macroeconomics literature been referred to as preference shocks.

\(^6\)Independence is merely for tractability, and could be replaced by a weak correlation between changes in types; we thank RA and MB for this observation.
type-0 changes to type-1 with probability $p$ independently of the others. Fig. 2 illustrates the shocks. In a realistic case one would expect $\delta < 0.5$, because conclusive evidence that persuades everyone is much less likely than idiosyncratic shocks.

![Fig. 2: Shocks](image)

A comment on our model is in order. There are alternative ways to model an idiosyncratic shock towards 0. One is to have changes occurring in both directions and letting $p$ be the net shock towards 0. In this formulation each type changes into the other with a net movement of $p$. We chose the other formulation of unidirectional shocks, where the algebra is cleaner; our results should go through with the first formulation. We also focus on pure-strategy symmetric Nash equilibria [henceforth

\[7\text{One can imagine yet another formulation, where the shocks are zero mean. This interpretation of} \]

\[7\text{We also focus on pure-strategy symmetric Nash equilibria [henceforth} \]
PSNE]; we discuss this later in more detail.

2.1 THE SINCERE VOTER

The sincere voter does not necessarily play a best response to the strategies of the other voters, but instead picks the candidate who is more likely to agree with him at date 1 given the unconditional distribution of types. When he is not pivotal his vote does not affect the result; when he is indeed pivotal, his vote may differ from that of the rational voter. While falling short of rationality in one of many ways, the sincere voter provides the most natural and useful benchmark against which to compare the rational voter; this also facilitates comparison with previous work. An interesting point emerges from the comparison: When voters are strategic the outcome could be worse than when they are sincere. As we shall see, the sincere voter can only generate one of two forms of inefficiency. Another important motivation is that our sincere voter is similar to Harsanyi’s rule-utilitarian voter [12].

Since $q > 0.5$, the vote of the type-0 voter determines the outcome of the election in a large population. Proposition 1 below shows that the type-0’s vote $U$ when either (1) type-0’s are expected to be in a majority at date 1, or (2) type-1’s are expected to be in a majority at date 1, and any particular type-0 voter is very likely to switch to type-1 at the next date i.e. $p$ is ‘high’. He votes $B$ only when the majority is likely to be at 1 at the next date but he is very likely to stay put i.e. $p$ is ‘low’. In other words, he prefers to commit and safeguard his interests today if and only if he thinks he will be in the minority at the next date.

Proposition 1 Let $q \in (0.5, 1)$ and suppose $n$ is large enough. Let $p^* := \frac{1}{2} \left( 1 - \frac{\delta(1-\pi)}{\theta_1} \right)$.

(i) If $q(1-p) < 1/2$, sincere type-0 agents strictly prefer to vote $B$ if $p < p^*$ and for $U$ if $p > p^*$.

(ii) If $q(1-p) > 1/2$, sincere type-0 agents prefer to vote $U$.

(iii) The sincere type-1 voters always prefer to vote for $U$.

(iv) When $q(1-p) < 1/2$ and $p < p^*$, the probability that $B$ wins goes to 1 as $n \to \infty$.

Proof Let $u_i(C, t_i^0)$ denote the expected utility of voter $i$ when candidate $C \in \{B, U\}$ wins and $i$’s date 0 type is $t_i^0 \in \{0, 1\}$.

idiosyncratic change as a random noise is not what we have in mind, but our qualitative implications would not be sensitive to this assumption.
SINCERE TYPE-0 VOTER: The expected utility of a sincere type-0 voter $i$ when $B$ is elected is given by

$$u_i(B, 0) = 1 - (1 - \delta) \theta_1 p - \delta (1 - \pi).$$

Voter $i$ gets 1 except in two cases captured by the negative terms above. The second term is the loss incurred when the voter sways to an idiosyncratic 1-shock and the third term is due to a common 1-shock.

In order to derive the utility $u_i(U, 0)$ we first define the following probabilities. For any pair $(a, b) \in A \times A$, let $Q^a_b(1)$ be the probability that the date 1 majority is at $a$, conditional on an idiosyncratic 1-shock and $t_1^i = b$. Similarly $Q^a_b(0)$ is the probability that the majority is at $a$, conditional on an idiosyncratic 0-shock and $t_1^i = b$. Note that the superscript denotes the majority, the subscript denotes the voter, and the policy in parentheses is the direction of the idiosyncratic shock. Using the above notation,

$$Q^0_1(1) := \Pr \left\{ \left\{ j \neq i : t_j^1 = 0 \right\} \geq n + 1 \mid \text{idiosyncratic 1-shock}, t_1^i = 1 \right\}$$

$$Q^1_0(1) := \Pr \left\{ \left\{ j \neq i : t_j^1 = 1 \right\} \geq n + 1 \mid \text{idiosyncratic 1-shock}, t_1^i = 0 \right\}, \text{and}$$

$$Q^1_0(0) := \Pr \left\{ \left\{ j \neq i : t_j^1 = 0 \right\} \leq n - 1 \mid \text{idiosyncratic 0-shock}, t_1^0 = t_1^i = 0 \right\}.$$

Let $Q^1_0$ be the probability that type-1’s are in a majority at date 0 conditional of voter $i$ being of type-0.

$$Q^1_0 := \Pr \left\{ \left\{ j \neq i : t_j^0 = 0 \right\} \leq n - 1 \mid t_0^i = 0 \right\}$$

If $\gamma = q(1 - p)$ and $\psi = q + (1 - q)p$, we have

$$Q^0_1(1) := \sum_{j=n+1}^{2n} \binom{2n}{j} \gamma^j (1 - \gamma)^{2n-j}, Q^1_0(1) := \sum_{j=0}^{n} \binom{2n}{j} \gamma^j (1 - \gamma)^{2n-j},$$

$$Q^1_0(0) := \sum_{j=0}^{n-1} \binom{2n}{j} \psi^j (1 - \psi)^{2n-j}, Q^1_0 = \sum_{j=0}^{n-1} \binom{2n}{j} \psi^j (1 - \psi)^{2n-j}.$$
When \( U \) is elected, the expected utility of a type-0 voter is

\[
u_i(U, 0) = 1 - (1 - \delta) \theta_1 p Q_1^0(1) - (1 - \delta) \theta_1 (1 - p) Q_0^1(1) \\
- (1 - \delta) \theta_0 Q_0^1(0) - (1 - \delta) (1 - \theta_0 - \theta_1) Q_1^0.
\]

The four negative terms correspond to the potential sources of loss under \( U \): (i) when an idiosyncratic 1-shock hits and voter \( i \) changes to type-1, while type-0’s are a majority; (ii) when an idiosyncratic 1-shock hits and voter \( i \) remains 0 but the majority is at 1 at date 1; (iii) the majority is at 1 after an idiosyncratic 0-shock while voter \( i \) remains type-0; and (iv) the majority is at 1 in the initial draw given that \( i \) is type-0 and there is no shock. Note that \( U \) always gives a utility of 1 when a common shock hits. The type-0 voter casts the ballot for \( B \) if

\[
u_i(B, 0) > u_i(U, 0) \iff (1 - \delta) \theta_1 p + \delta (1 - \pi) < (1 - \delta) \theta_1 p Q_1^0(1) + (1 - \delta) \theta_1 (1 - p) Q_0^1(1) \\
+ (1 - \delta) \theta_0 Q_0^1(0) + (1 - \delta) (1 - \theta_0 - \theta_1) Q_1^0.
\]

When the above inequality is reversed they vote for \( U \). First note that \( q > 0.5 \Rightarrow \lim_{n \to \infty} Q_0^1(0) = \lim_{n \to \infty} Q_1^0 = 0 \); these limits do not depend on the value of \( p \). Conditional on an idiosyncratic shock towards 1, the probability that an arbitrary voter is type-0 at date 1 is \( q(1 - p) \). Define the random variable \( X_0(1) \sim \text{Binomial}(2n, q(1 - p)) \) as the number of \( j \) out of \( 2n \) (not \( 2n + 1 \)) who have \( t_j^1 = 0 \) after an idiosyncratic 1-shock; then

\[
\Pr \{X_0(1) \geq n + 1\} = \Pr \left\{ \frac{1}{2n} X_0(1) \geq \frac{1}{2} + \frac{1}{2n} \right\}.
\]

The Weak Law of Large Numbers guarantees that

\[
\lim_{n \to \infty} \Pr \left\{ \left| \frac{1}{2n} X_0(1) - q(1 - p) \right| < \epsilon \right\} = 1 \text{ for any } \epsilon > 0.
\]

Case 1: If \( q(1 - p) > 0.5 \), there exists a small enough \( \epsilon > 0 \) so that

\[
Q_1^0(1) = \Pr \left\{ \frac{1}{2n} X_0(1) > \frac{1}{2} + \frac{1}{2n} \right\} \geq \Pr \left\{ \left| \frac{1}{2n} X_0(1) - q(1 - p) \right| < \epsilon \right\} \uparrow 1.
\]

It follows that

\[
q(1 - p) > 0.5 \Rightarrow \lim_{n \to \infty} Q_1^0(1) = 1 \text{ and } \lim_{n \to \infty} Q_0^1(1) = 0.
\]
Substituting the above limits in (2), asymptotically \( i \) strictly prefers to vote \( B \) iff \( \delta (1 - \pi) < 0 \), which is never the case.

Case 2: When \( q(1 - p) < 0.5 \), the date 1 majority is expected to be at 1 and by a logic similar to Case 1 above it follows that

\[
q(1 - p) < 0.5 \Rightarrow \lim_{n \to \infty} Q_0^1(1) = 0 \quad \text{and} \quad \lim_{n \to \infty} Q_1^0(1) = 1.
\]

From (2), \( i \) strictly prefers to vote for \( \begin{cases} B \\ U \end{cases} \) for large \( n \) if \( p \begin{cases} < \\ > \end{cases} \frac{1}{2} \left( 1 - \frac{\delta(1 - \pi)}{\delta + (1 - \delta) \theta_0 p} \right) \).

**SINCERE TYPE-1 VOTER:** A type-1 voter’s expected utility from \( B \) is given by

\[
u_i(B, 1) = \delta \pi + (1 - \delta) \theta_0 p.
\]

He gets a utility of 1 iff he switches to 0 himself, in response to either an idiosyncratic or a common 0-shock. Define the following quantities—\( P_b^a(0) \) is the probability that the majority is at \( a \) following an idiosyncratic 0-shock and \( t_i^1 = b \); \( P_b^a(1) \) is the corresponding probability when the idiosyncratic shock is towards 1 rather than 0. His utility from voting \( U \) is

\[
u_i(U, 1) = \delta + (1 - \delta) \theta_0 p P_0^0(0) + (1 - \delta) \theta_0 (1 - p) P_1^0(0) + (1 - \delta) \theta_1 P_1^1(0) + (1 - \delta) (1 - \theta_0 - \theta_1) Q_0^1.
\]

As before, \( Q_0^1 \) is the probability that the initial draw has more type-1’s. By arguments similar to those for the sincere type-0 voter above,

\[
q > 0.5 \Rightarrow \lim_{n \to \infty} P_0^0(0) = 1 \quad \text{and} \quad \lim_{n \to \infty} P_1^1(0) = 0 \quad \text{and} \quad \lim_{n \to \infty} Q_0^1 = 0.
\]

Substituting the above limits into equation (2), we see that asymptotically a sincere voter \( i \) of type 1 casts his ballot for \( B(U) \) when

\[
\delta \pi \begin{cases} > \\ < \end{cases} \frac{1}{2} \left( 1 - \frac{\delta(1 - \pi)}{\delta + (1 - \delta) \theta_1} \right) \lim_{n \to \infty} P_1^1(1).
\]

Case 1: When \( q(1 - p) > 0.5 \), we have \( \lim_{n \to \infty} P_1^1(1) = 0 \). Voter \( i \) strictly prefers \( B(U) \), for large \( n \), according as \( \delta \pi \begin{cases} > \\ < \end{cases} \delta \). Since \( \delta(1 - \pi) \geq 0 \), he always (weakly)
prefers to vote for $U$.

Case 2: When $q(1 - p) < 0.5$, we have $\lim_{n \to \infty} P^1_1(1) = 1$. For large $n$, he votes for $B(U)$ according as $\delta \pi \begin{cases} > \delta + (1 - \delta) \theta_1. \text{ Since } \delta (1 - \pi) + (1 - \delta) \theta_1 \geq 0, \text{ he always} \\ < \end{cases}$ (weakly) prefers to vote for $U$. Note that $\delta (1 - \pi) > 0$ is a sufficient condition for $i$ to strictly prefer to vote for $U$.

THE WINNING CANDIDATE:
Consider large $n$. When either (1) $q(1 - p) > 0.5$, or (2) when $q(1 - p) < 0.5$ and $p > \frac{1}{2} \left(1 - \frac{\delta (1 - \pi)}{(1 - \delta) \theta_1}\right)$, both the type-0’s and 1’s vote $U$ and he wins with probability 1. When $q(1 - p) < 0.5$ but $p < \frac{1}{2} \left(1 - \frac{\delta (1 - \pi)}{(1 - \delta) \theta_1}\right)$, the type-0’s vote $B$ while the 1’s vote $U$; since $q > 0.5$, $B$ wins with probability greater than one half. His probability of winning is

$$Pr\{B \text{ wins}\} = \sum_{k=n+1}^{2n+1} \binom{2n}{k} q^k (1 - q)^{2n-k} \geq \frac{1}{2} \forall n.$$  

Furthermore, $Pr\{B \text{ wins}\} \to 1$ as $n \to \infty$.

Fig. 3 captures how the type-0 voters behave. In regions II and IV, the type-0 voter elects $U$ because he expects to remain in the majority even if there is an idiosyncratic shock, and has nothing to lose by voting $U$; when there is a common 1-shock, he is better off with $U$ because $B$ will still continue to implement policy 0; with a common 0-shock, both $B$ and $U$ pick 0. In region I, a majority is expected to prefer policy 1 at date 1; since $p$ is high each type-0 expects to switch and be in the subsequent majority. So he votes for $U$. Finally in region III, the sincere type-0 voter picks the socially suboptimal candidate $B$ because the majority is likely to prefer 1 at the next date, but given that $p$ is small he would probably stay put at 0.
2.2 THE RATIONAL VOTER

We have seen above that the sincere voter of type-\(a\) maximizes the value of group-\(a\), because he is in effect the representative agent of the group. This is easy to see: All agents of a group are ex-ante identical, and the probabilities that appear in the decision of the sincere voter are the expected proportions in the representative agent’s decision problem. For example, the probability \(p\) of switching can be interpreted as the expected proportion of type-0’s who switch when there is an idiosyncratic 1-shock. But the situation is very different when we require the strategies to constitute a Nash equilibrium. We conjecture the following Nash equilibrium in pure strategies: Each voter of type-0 votes \(B\), and all type-1’s vote \(U\); then we solve for the
range of parametric values where this is indeed the case.\footnote{In fact this equilibrium is even trembling-hand perfect. Our focus is on symmetric equilibria, where all voters of a type vote the same way.}

Let $u_i(c \mid c_0, c_1; t^0_i, \text{piv})$ denote the utility of the pivotal voter of date 0 type $t^0_i$ when he votes for candidate $c$, the type-0’s vote for candidate $c_0$ and the type-1’s vote for candidate $c_1$. Consider a pivotal type-0 voter. The utility of voting for $B$ is the same as that for the sincere voter:

$$u_i(B \mid B, U; 0, \text{piv}) = 1 - \delta(1 - \pi) - (1 - \delta) \theta_1 p.$$ 

The utility of voting for $U$ is now different from that for the sincere voter:

$$u_i(U \mid B, U; 0, \text{piv}) = 1 - (1 - \delta) \theta_1 (1 - p) \{1 - (1 - p)^n\}.$$ 

Utility from $U$ is 1 whenever there is a common shock, no shock, or an idiosyncratic 0-shock. If an idiosyncratic 1-shock arrives, the type-0 voter gets utility 1 if nobody switches or if he himself switches. The pivotal voter strictly prefers $B$ when

$$u_i(B \mid U, U; 0, \text{piv}) > u_i(U \mid B, U; 0, \text{piv})$$

$$\Leftrightarrow \delta(1 - \pi) + (1 - \delta) \theta_1 p < (1 - \delta) \theta_1 (1 - p) \{1 - (1 - p)^n\}. \quad (2)$$

This inequality admits of an intuitive explanation. The LHS of (4) is the loss from voting for $B$ and getting him elected— the first term is the loss when the entire population switches to type-1 at date 1, the second is the loss when voter $i$ idiosyncratically switches (and finds himself on the wrong side vis-a-vis $B$). The RHS is the loss when $U$ is elected; this loss happens only when $i$ switches idiosyncratically to $i$. The pivotal voter reacts very differently to the possibility of an idiosyncratic switch depending on who is in power— $B$ or $U$. When $B$ is in power, $i$ loses when he himself switches irrespective of what the others do. When $U$ is in power, $i$ is no longer afraid that he will switch; instead what he fears is staying put when others switch. The above inequality captures exactly this asymptotic trade-off. We prove the asymptotic proposition first because this allows us to explicitly solve for a threshold level of $p$. The result for finite $n$ is in proposition 6.
Proposition 2 (Asymptotic Result in $n$) Define $p^* := \frac{1}{2} \left( 1 - \frac{\delta(1-\pi)}{(1-\delta)\theta_1} \right)$. When $q \in (0.5, 1)$ and $n \geq N$, the following is a PSNE:

(i) When $p < p^*$ all type-0’s vote B and all type-1’s vote U; B wins with a probability that tends to 1 in large populations;

(ii) When $p \geq p^*$, all voters (type-0 and type-1) vote U.

Proof Let $p < p^* := \frac{1}{2} \left( 1 - \frac{\delta(1-\pi)}{(1-\delta)\theta_1} \right)$. As $n \to \infty$, $(1-p)^n \to 0$; so a sufficient condition for (3) to hold is

$$\delta(1-\pi) + (1-\delta) \theta_1 p < (1-\delta) \theta_1 (1-p).$$

(3)

Then we can find a large enough integer $N$ such that when $n \geq N$, type-0 voters cast their ballots for B if type-1 voters conform to the conjectured equilibrium strategy. Since $q > 0.5$, the Weak Law of Large Numbers ensures that with a very high probability type-0’s are a majority on election day, which in turn implies that B wins with almost probability 1 in a large population.

Finally to show that the above is indeed a Nash equilibrium, we show that the pivotal type-1’s will vote $U$. Expected utility from $B$ is

$$u_i (B \mid B, U; 1, \text{ piv}) = \delta \pi + (1-\delta) \theta_0 p,$$

noting that a pivotal type-1 voter $i$ expects to get a utility of 1 iff $t_i^1 = 1$; this can happen only if player $i$ himself switches from type-1 to type-0 in response to either a common or an idiosyncratic shock.

The expected utility of a pivotal type-1 voter from $U$ is

$$u_i (U \mid B, U; 1, \text{ piv}) = (1-\delta) (1-\theta_0 - \theta_1) + \delta + (1-\delta) \theta_1 + (1-\delta) \theta_0 (1-p)^{n+1} + (1-\delta) \theta_0 p.$$

The first term is the probability that there are no shocks; the second is the probability that there is a common shock; the third is that there is an idiosyncratic shock towards 1; the fourth term is the probability that there is an idiosyncratic shock towards 0 but none of the types change, leading to type-1s staying in the majority at date 1; the final term captures that $i$ himself changes in response to idiosyncratic shock towards 0, leading to types-0s being in a majority at date-1.
Type-1’s always prefer $U$ since

$$(1 - \delta) (1 - \theta_0) + \delta (1 - \pi) \geq 0 \Rightarrow u_i (U | B, U; 1, \text{piv}) > u_i (B | B, U; 1, \text{piv}).$$

When $p \geq p^*$, we can use similar reasoning to conclude that all voters prefer $U$ to $B$. Candidate $B$ is valuable to voter $i$ of type-0 only in as much as he guards against the possibility of policy 1 being chosen while $i$ remains a type-0 because others have flipped. A large $p$ makes $i$ very likely to switch to an idiosyncratic shock; so he does not fear being left in the minority.

For large $n$, there are two forms of inefficiencies illustrated above. The first, which corresponds to region III of Fig. 3 and is exhibited by both sincere and rational voters, was discussed in Section 2.1. The difference between the sincere and the rational voter is in region IV: The rational voter prefers the committed candidate even when he ex-ante expects to remain in the majority following an idiosyncratic shock. This happens because conditional on being pivotal, the value of $q$ is irrelevant. In contrast to the decision of the sincere voter for large $n$, his decision depends only on the value of $p$ and not that of $q$. However the socially optimal choice depends on $q$; hence the inefficiency. The interaction among rational voters enters through the size of the population: When $n$ is larger it is more likely the case that, starting from a situation where his vote matters, a type-0 voter will be in the minority if he does not switch following an idiosyncratic shock. The proposition below summarizes this.

**Corollary 3** Let $p < \frac{1}{2} \left(1 - \frac{\delta (1 - \pi)}{(1 - \delta) \theta_1}\right)$ and $p < 1 - \frac{1}{2q}$. All sincere voters vote $U$, whereas the pivotal type-0 and type-1 voters cast their ballots for $B$ and $U$ respectively when $n$ is large. Therefore, sincere voting results in election of $U$ while pivotal voting most likely results in the committed candidate $B$ being elected. If $B$ wins, he implements the sub-optimum policy with probability at least $\delta (1 - \pi) > 0$.

**Remark 1** For all $n > 2$, not necessarily large, and $q > 0.5$ the probability of an inefficient decision is bounded below by $\delta (1 - \pi) / 2$. This follows since $B$ wins with a probability bounded below by 0.5 for all $n > 2$. 

ROBUSTNESS

The equilibrium in which type 0’s vote B and type 1’s vote for U is said to be informative as the vote carries information about the signal. This equilibrium is a strict equilibrium, which satisfies a very stringent test of robustness due to Okada (1981): An equilibrium $\sigma$ is said to be strictly perfect if $\exists \epsilon > 0$ such that for any sequence $\langle \sigma^k \rangle$ of strategy profiles satisfying

1. $\langle \sigma^k \rangle$ is totally mixed,
2. $\sigma^k \to \sigma$ as $k \to \infty$,
3. $|\sigma^k_j - \sigma_j| < \epsilon \ \forall k \ \forall j$, we have $\sigma_i$ is a best response to $\sigma^k_{-i}$ for any $i,k$.

Proposition 4 (Strict Perfection) The informative equilibrium is strictly perfect.

Proof As in the above definition, take a sequence of slightly trembled strategy profiles $\sigma^k$ converging to the informative equilibrium $\sigma$. Fix a type-0 voter $i$. Let $N_0$ be the number of voters other than $i$ who are type-0 of date 0, and let $N_B$ be the number of voters other than $i$ who vote for B at date 0. What makes B attractive to type-0 is the insurance B provides against an idiosyncratic 1-shock. When the trembles are small, Bayes’ rule implies that conditional on the event $\{N_B = n\}$ it is very likely the case that $\{N_0 = n\}$. Then,

$$\Pr \{N_0 = n \mid N_B = n, \sigma^k\} = \frac{\Pr \{N_B = n \mid N_0 = n, \sigma^k\} \Pr \{N_0 = n\}}{\sum_m \Pr \{N_B = n \mid N_0 = m, \sigma^k\} \Pr \{N_0 = m\}}.$$ 

For $m \neq n$ all probabilities of the form $\Pr \{N_B = n \mid N_0 = m\}$ go to 0 as the trembles go to 0. Hence $\Pr \{N_0 = n \mid N_B = n, \sigma^k\} \to 1$. But we already know that the conditional on the event $\{N_0 = n\}$ the pivotal type-0 voter will cast his ballot for B. Hence it is a best response for player $i$ to vote for B when the others follow the trembled strategies. It is easy to check that type-1’s vote for U when type-0s vote for B with a high probability. ■

In particular this property (strict perfection) implies that the informative equilibrium is trembling hand-perfect a la’ Selten (1975).\(^9\) So far our analysis has looked at

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\(^9\)Wu and Jiang (1962) defined an equilibrium of a game as essential if any game with slightly perturbed payoffs has an equilibrium close to that of the original game. This is an even stronger refine-
pure strategy equilibria. Mixed strategy equilibria would not satisfy the strong robustness criterion proposed above. The above thus suggests that the informative equilibrium is a natural and robust construction.

Although finding all the mixed strategy equilibria of voting games is usually a daunting if not impossible task, we are fortunately able to prove that asymptotically efficient mixed equilibria as defined below do not exist. Let the typical mixed strategy as a function of $n$ be denoted by $(\alpha^n, \beta^n)$, where $\alpha^n(\beta^n)$ is the probability that a type-0(1) votes for $B$. If $\exists$ a sequence of probabilities $(\alpha^n, \beta^n)$ such that $\sigma^n := (\alpha^n, \beta^n)$ is an equilibrium for each $n$ and the probability of $U$ winning is less than 0.5 for at most finitely many values of $n \in \mathbb{N}$, we say that $(\sigma^n)_{n \geq 1}$ is asymptotically efficient. The corresponding sequence of equilibria is, with some abuse of terminology, referred to as a asymptotically efficient mixed equilibrium. Let $p < 1 - \frac{1}{2q}$ (i.e. $q(1 - p) > \frac{1}{2}$) and $p < p^*$; then we show that there are no mixed efficient equilibria.

**Proposition 5 (No Efficient Mixed Equilibria)** Mixed asymptotically efficient equilibria do not exist.

**Proof** Fix a typical pivotal voter, say voter $2n + 1$. Number the other voters such that voters $1, \ldots, n$ vote for $B$ and voters $n + 1, \ldots, 2n$ vote for $U$; denote this pivotal event by $P_{iv}$. Define $x_B^n$ and $x_U^n$ respectively as the probabilities voter $j$ is type-0 conditional on the fact that he voted for $B(U)$. Let

$$T_B^n := n - \sum_{i \leq n} t_i^0, T_U^n := n - \sum_{k \geq n + 1} t_k^0$$

denote, respectively, the actual number of type-0s, among $j < 2n + 1$, who voted for $B$ and $U$ respectively. Let $T^n := T_B^n + T_U^n$ denote the total number of type-0 voters. If $1 \leq i < j \leq n$, the types of $i \neq j$ are independent conditional on both having voted for $B$ or both having voted $U$. In other words,

$$\Pr\{t_i^0 = 0, t_j^0 = 0 \mid i, j \text{ voted } B\} = \Pr\{t_i^0 = 0 \mid i, j \text{ voted } B\} \times \Pr\{t_j^0 = 0 \mid i, j \text{ voted } B\},$$

e tc., which follow from explicitly calculating the conditional probabilities. Also note that the conditional variances of the random variables $t_i^0$ are bounded above by 1 irrespective of the value of $\alpha^n$ and $\beta^n$. All expectations and probabilities below are
conditioned on the event \( Piv \). From Chebyshev’s inequality it then follows that

\[
\Pr\left\{ \left| \frac{T^n_B}{n} - x^n_B \right| > \epsilon \right\} \leq \frac{1}{n\epsilon^2},
\]

which implies that

\[
\Pr\left\{ \left| \frac{T^n_B}{n} - x^n_B \right| > \epsilon \right\} < \epsilon \quad \forall n > N_1.
\]

Similarly

\[
\Pr\left\{ \left| \frac{T^n_U}{n} - x^n_U \right| > \epsilon \right\} < \epsilon \quad \forall n > N_1.
\]

Therefore if \( n > N_1 \) the actual proportion \( T^n \) of type-0 voters (excluding our pivotal voter \( 2n + 1 \)) lies within \( 2\epsilon \) of \( x^n_B + x^n_U \) w.p. at least \( 1 - 2\epsilon \).

Let \( Z^n \) denote the actual proportion of voters who will be type 0 at date 1, conditional on \( Piv \) and an idiosyncratic 1-shock; henceforth probabilities are conditioned on the intersection of these two events. We have

\[
E(Z^n) := \frac{x^n_B + x^n_U}{2} \cdot (1 - p) =: z^n,
\]

As above, Chebyshev’s inequality implies that \( \exists N_2 > N_1 \) such that

\[
\Pr\left\{ \left| Z^n - z^n \right| > \epsilon \right\} < \epsilon, \forall n > N_2.
\]

Take any \( n > N_2 \).

Case 1: If \( z^n > 0.5 + \epsilon \), the actual proportion of type-0s at date 1 will be greater than 0.5 with probability at least \( 1 - \epsilon \). So if \( \epsilon < p/2 \) is small enough a type 0 pivotal voter would not be worried about idiosyncratic shocks and would therefore strictly prefer to vote for \( U \).

Case 2: If \( z^n < 0.5 - \epsilon \), the actual proportion of type-0s at date 1 will be below 0.5 with probability at least \( 1 - \epsilon \). So a pivotal type-0 voter would be worried about idiosyncratic shocks and would strictly prefer to vote for \( B \), as in Proposition 2.

Thus the only case when a type-0 might be willing to mix (for \( n > N_2 \)) is if \( 0.5 - \epsilon \leq z^n \leq 0.5 + \epsilon \). But \( 0.5 - \epsilon \leq z^n \) implies that \( x^n_B + x^n_U > \frac{1 - 2\epsilon}{1 - p} \). But then the expected proportion of type-0 voters conditional on an idiosyncratic 0 shock is at least \( \frac{1 - 2\epsilon}{2(1 - p)} + \frac{1}{2} p \); since this is greater\(^{10}\) than 0.5 for large \( n \) it almost certainly the

\[^{10}\text{Note that } \frac{1 - 2\epsilon}{2(1 - p)} + \frac{1}{2} p = \frac{1 - 2\epsilon + p(1 - p)}{2(1 - p)} = \frac{1 + p - 2\epsilon}{2(1 - p)}. \text{ Given that } p > 2\epsilon, \text{ the second term is positive and the fraction is strictly greater than one-half.}\]
case that a pivotal type-1 will get a utility of almost 1 from electing $U$ if she changes in response to an idiosyncratic shock towards 0. Thus, as in Proposition 2, her utility from voting for $U$ is strictly higher than that from voting for $B$; therefore a pivotal type-1 voter will not mix.

In other words we have shown that we cannot have a sequence of totally mixed equilibria that takes us close to efficiency. Finally we need to show that there is no equilibrium in which only one of the two types mix; this follows readily from the assumed asymptotic efficiency.

**FINITE POPULATION PROPERTIES**

Instead of an asymptotic result in $n$, the following proposition shows, as a function of $p$, exactly how many voters are required for the ideologue to win. It also establishes that when the probability of a common shock is small such an equilibrium will always exist for 5 or more voters.

**Proposition 6 (Finite n Result)** Define $k(\delta, \pi, \theta_1) := \frac{\delta(1-\pi)}{(1-\delta)\theta_1}$.

(i) All type-0’s voting for $B$ and all type-1’s voting for $U$ is a PSNE when $n + 1 > \frac{\ln(1-2p-k)}{\ln(1-p)}$, provided the expression on the right is well defined; $B$ is then more likely to win the election than $U$.

(ii) When the probability of a common shock is small enough, for any $n \geq 2$ there are values $p, \overline{p} \in (0, 1)$ such that the above is an equilibrium for $p < p < \overline{p}$.

(iii) The set of values of $p$ for which the above equilibrium exists is monotonic in $n$.

**Proof** Type-0 voters cast their ballot for $B$ when

$$\delta(1-\pi) + (1-\delta)\theta_1 p < (1-\delta)\theta_1 (1-p) \{1 - (1-p)^n\}.$$  \hspace{1cm} (4)

Part (i): First note that, as in proposition 2, the type-1 voters do not want to vote $B$. This part of the proposition now follows from rearranging the inequality.

Part (ii): When there is no common shock the condition above reduces to

$$g(p) := 1 - 2p - (1-p)^{n+1} > 0.$$  \hspace{1cm} (5)
Note that \( g(0) = 0 \) and \( g'(0) = n - 1 > 0 \) for \( n \geq 2 \); \( g(p) > 0 \) for all \( p \in (0, p^*) \) for some \( p^* \). In other words, \( B \) is the more likely winner for this range of values of \( p \). The second part of the proposition follows from the continuity of the LHS and the RHS of inequality (1).

Part (iii): For given values of the parameters other than the population size, the right hand side of inequality (4) is increasing in \( n \). Hence the inequality holds for \( n_2 > n_1 \) if it holds for \( n_1 \).

3 DISCUSSION

Interpreting the model as a choice between deciding now or later suggests why some groups push for an early vote even if they might be able to learn something useful by delaying the vote. For example, newspapers document the case where Republicans, seeing an opportunity, forced a quick vote and swift rejection of Democratic lawmaker Rep. John Murtha’s call for an immediate troop withdrawal from Iraq. Our model suggests that what might have led Republicans to swiftly put it to vote is the very fear that delaying might lead to small yet critical defections. This logic survives even if voters foresee that they might be committing to a policy possibly disastrous for society.

In an article published in the Op-Ed section of the \( L.A. \) Times,\(^{11} \) Bruce Schulman argues that changing sides has been costly in American politics of late. Candidates spend resources trying to explain away changes in their stand on key issues, from affirmative action to foreign policy. Even fairly incontrovertible evidence of having changed does not dissuade them for arguing otherwise. Schulman suggests that political candidates do not wish to come across as opportunists who pander to the electorate for political gain.

This line of reasoning is also explored by Callander and then Kartik and McAfee, who modify the Hotelling/Downs model of electoral competition to give voters with an explicit preference for candidates with character. Our paper offers a different explanation for why political candidates might prefer to commit to an ideology rather than update their stands as new information becomes available. In an environment with changing preferences, the best conceivable flip-flopper, one who adjusts his po-

sition to what is best for society at large, cannot expect to win against an ideologue. Office seeking candidates might therefore prefer to be perceived as having ideological biases although the electorate does not intrinsically value this trait.

Even decades after Farquharson introduced the concept of pivotal voting in his classic monograph, its predictions are debated in the literature. On the one hand there is work (for example Austen-Smith and Banks, and Feddersen and Pesendorfer) using the pivotal calculus; recent studies find their predictions consistent with the data. On the other hand, Margolis and some others have argued that the amount of sophistication needed to sustain some of the equilibria is too much to expect. Surely voters don’t calculate a complicated probability of being pivotal, and mix with the exact probability required to make others play their role! Myerson expresses concerns about mixed asymmetric strategies.

The previous sections assumed that the voting rule used at date 0 is the same as the decision rule used at date 1 by the unbiased candidate $U$. Recall that an interpretation of our framework, one that we mention earlier, is the choice between acting now or waiting; with this interpretation it is indeed natural to suppose that the voting rule at 0 and $U$’s rule at 1 are the same. But if we think of it as an electoral contest, one is naturally led to investigate the properties when the two rules are different. This section accordingly looks at an $m$-rule at date 0, to be defined shortly. What if we carry out the analysis for a range of such voting rules? We shall continue to focus our attention on large electorates. Suppose now that the committed candidate $B$ and unbiased candidate $U$ contest in an election where $B$ wins if he receives a fraction $m > \frac{1}{2}$ or more of the votes and $U$ wins otherwise.

As one would expect, increasing $m$ from $\frac{1}{2}$ makes it difficult for $B$ to win, and helps mitigate the inefficiency generated by the pivotal voter. However the inefficient equilibrium can be shown to be robust in a large range of $(m, p)$ values.

4 CONCLUSION

The electoral system is prone to widespread inefficiency when we relax the assumption that voters’ rankings of policies are unchanged from the time they vote and the time a policy is implemented. This paper illustrates two forms of inefficiency. When

\[\text{At the risk of being redundant, we should like to emphasize that while the voting rule has been altered, candidate } K \text{ remains committed to implementing the policy that is preferred by the majority at date 1.}\]
voters who are in a majority today are more likely to be in a minority tomorrow, they oppose social-welfare improving policies. This inefficiency requires a probability of idiosyncratic switching large enough to reduce the ex-ante majority to an ex-post minority.

However, a large range of electoral situations is better described by assuming that the probability of voters changing idiosyncratically is small. In contrast to the existing literature, we find that even in this case there is a stark inefficiency—In the unique informative symmetric pure strategy Nash equilibrium voters prefer to elect the ideologue rather than elect an idealist who waits for all information to be revealed and thereafter takes the optimal decision. The key to understanding this paradoxical result is that the pivotal voter finds himself in a fragile majority that is easily overturned; even though such a situation is (unconditionally) unlikely, he bases his vote on this situation and commits to the alternative that he currently prefers. This continues to hold even if there is a sizeable chance that everybody will dislike the committed candidate’s choice due to a common shock. This can also be viewed as a paradox for the standard equilibrium model of voting.

References


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