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Notes

Approval voting and scoring rules with common values ☆

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Abstract

We compare approval voting with other scoring rules for environments with common values and private information. For finite electorates, the best equilibrium under approval voting is superior to plurality rule or negative voting. For large electorates, if any scoring rule yields a sequence of equilibria that efficiently aggregates information, then approval voting must do so as well.

JEL classification: D71; D72

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1. Introduction

We compare the ability of approval voting to aggregate private information in elections with common values versus other scoring rules such as plurality rule or the Borda count. Our main results demonstrate the advantages of approval voting in aggregating information and their proofs illuminate a basic mechanism: its flexibility allows approval voting to outperform plurality or

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negative voting in finite elections, and in large elections, mixing ballots under approval voting can approximate the outcome of an arbitrary scoring rule.

Our paper adds to an active literature that studies information aggregation for multiple candidates, where a common theme is the superiority of approval voting over other institutions.[3] This comparison is currently understood mainly for special environments with specific restrictions on the support of possible values. Goertz and Maniquet (2011) consider a class of environments where voters are indifferent between the two inferior candidates. Within this class, approval voting is the only scoring rule that admits an informationally efficient limit equilibrium. Bouton and Castanheira (2012) consider the divided majority problem, where a majority block of voters shares a common preference for two candidates over a third minority candidate but has incomplete information about which of the two preferred candidates is superior, and show that approval voting yields a unique limit equilibrium that efficiently aggregates information while plurality rule can have multiple equilibria. This advantage for divided majority problems is shown for small electorates in theory and in experiments by Bouton et al. (2016). Our main substantive contribution is to understand the performance of approval voting under arbitrary forms of common preference.

Our main methodological contribution is to adapt the following insight due to McLennan (1998): in a common-value election, a strategy that maximizes utility is an equilibrium. Therefore, any voting rule that provides more flexibility for voters to express their information cannot leave voters any worse off. Approval voting can replicate any plurality rule outcome by having voters submit ballots supporting a singleton set of candidates, so approval voting must be weakly better under common values. For arbitrary scoring rules beyond plurality rule, approval voting can arbitrarily approximate any outcome with appropriate mixing of ballots. The main benefit of our approach is that it illuminates an essential advantage of approval voting in common-value environments, namely the flexibility it affords the voters in adapting their votes to their information.

McLennan's observation makes no assumptions on the information or preferences of the voters, so is general enough to apply to arbitrary environments with common values. However, we do not explicitly construct equilibria and instead focus attention on efficiency bounds. While our assumptions are more general than those in the literature, our conclusions are commensurately less sharp. We cannot speak to the uniqueness of equilibrium nor to its characterization. An analysis of inefficient equilibria is more delicate and requires direct consideration of the environment. For example, Goertz and Maniquet (2011) present one environment with inferior limit equilibria under approval voting while Bouton and Castanheira (2012) show that the unique limit equilibrium of approval voting for the divided majority problem is efficient.

Our analysis is limited to scoring rules, hence excludes some prominent voting systems such as instant runoff. Simple examples demonstrate that feasible conditional outcomes under instant runoff cannot be replicated by approval voting.[4] However, these examples are knife-edge when the number of signals is greater than or equal to the number of candidates. For such environments, Barelli, Bhattacharya, and Siga (personal communication, June 16, 2016) recently proved a general efficiency result that establishes as a corollary the efficiency of information aggregation in large elections for a generic set of statistical environments. When there are strictly fewer sig-

[3] A related literature considers approval voting as a method to aggregate preferences with private values. For example, Giles and Postl (2014) characterize Bayesian equilibria and evaluate approval voting within the class of all scoring rules.

[4] We thank an anonymous referee for observing this possibility and providing an example. To our knowledge, he or she is the first to understand this point that had been previously unnoticed in the literature.