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When costly voting is beneficial☆

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ABSTRACT

We present a costly voting model in which each voter has a private valuation for their preferred outcome of a vote. When there is a zero cost to voting, all voters vote and hence all values are counted equally regardless of how high they may be. By having a cost to voting, only those with high enough values would choose to incur this cost. We show that, by adding this cost, welfare may be enhanced even when the cost of voting is wasteful. Such an effect occurs when there is both a large enough density of voters with low values and the expected value of voters is high enough.

1. Introduction

> " The object of our deliberations is to promote the good purposes for which elections have been instituted, and to prevent their inconveniences."
>
> (Edmund Burke as cited in Lakeman and Lambert, 1959, p. 19)

Groups within society often have to make collective decisions. In order to reach correct social decisions, the valuations of all those affected by the decision should be aggregated. By leaving some out, a group may reach an incorrect decision. For example, take a committee that must decide an issue at a meeting. Each member has a certain private value to the results of the decision reached by the committee. The committee's social value of the decision is the sum of the individual private values and, hence, aggregation is necessary to reach the correct decision. This scenario fits many decision problems such as public good provision where aggregation is the basis of cost-benefit tests or many of the issues that are decided by the California ballot propositions.

A common method to reach a decision is to have a majority vote.[1] Since each member of the committee has information that is relevant to the decision, we would normally think that ensuring all to participate in voting would improve the final outcome. In fact, many countries (including Argentina, Australia, Belgium, and Greece) have compulsory voting to ensure inclusion.[2] There is, however, significant difference between aggregating all private values and using a vote while ensuring full participation of all voters.

In social valuation, the strength of preference counts. In majority voting, the options for expressing preference for any particular alternative are limited to either voting for it, or not voting for it (that is, vote for an alternative or abstain).[3] This means that with majority voting it is not possible to demonstrate intensity of preferences.[4] One

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[1] See Drexl and Klein (2013) and Gershkov et al. (2017).
[2] Enforcement ranges from fines (Australia) to disenfranchisement (Belgium) or making it difficult to obtain a passport or driver's license (see The Guardian, July 4, 2005).
[3] Among the rare exceptions are reality TV shows such as Pop Idol where individuals can vote more than once (and pay for each vote).
[4] As mentioned by Mueller (2003, page 104): "Majority rule records only these ordinal preferences for each individual on the issue pair. The condition for the Pareto optimality of the supply of the public goods requires information on the relative intensity of individual preferences. "

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voter mildly in favor of an alternative exactly offsets another voter who is strongly opposed. The addition of voters that do not have strong preferences can distort election outcomes. Indeed, in Australia where voting is mandatory, "donkey votes" (those that simply were cast by order of a ballot) give a 1% edge to those listed first (see Orr, 2002 and King and Leigh, 2009).

Several voting mechanisms to replace simple majority voting have been proposed to ameliorate this problem. One method is to combine the voting on several issues that are decided sequentially by allowing voters to store votes (or use future votes) to indicate intensity (see Casella, 2005; Casella and Gelman, 2008; Casella et al., 2006; Casella, 2011; Jackson and Sonnenschein, 2007; Engelmann and Grimm, 2012). One may also give voters extra votes that can be used on issues that are more important to them (see Hortala-Vallve, 2012). Vote trading can also be allowed (see Casella et al., 2014), or votes can be bought or sold on the open market (see Casella et al., 2012; Lalley and Weyl, 2018).[5] Finally, Bognar et al. (2015) find the optimal dynamic voting mechanism given that votes are costly.

While these variations may improve welfare, for good reason, there may be resistance to moving away from simple majority voting for making decisions.[6] In this paper, we suggest that welfare can also improve while keeping the mechanism of majority voting by ensuring that voters who have only mild feelings about the alternatives are excluded via costly voting.[7] We do see such issues as relevant in elections. In the UK it is common for parties to charge for voting on the choice of party leader. In 2015, the UK Labour party lowered the cost of voting to £3 (∼$4) and streamlined the process for registering. This may have helped Corbyn to victory. Ironically, in 2016, for party leadership the cost of voting was raised to £25 (∼$33) with a less convenient sign-up period. Eaton (2016) claimed that this would more likely eliminate less passionate centrists.

We can see how costly voting can shift the outcome to socially efficient one by deterring voters in the following example. There are two options: A and B. If one voter values option A at 20 utils and option B at 0 and two voters value option B at 6 and option A at 0, then costless voting will result in option B with total utility of 12. However, imposing a voting cost of 6 will deter those preferring option B from voting. The welfare from costly voting will be 20 utils minus a cost of 6 utils (since there will be only one voter) resulting in an overall improvement. However, it is possible that the outcome of the vote is shifted to being socially efficient, but the cost involved in voting is too high to improve welfare. This can happen if each voter that prefers option B has a value of 9 for B, instead of 6. To deter voting for option B, the cost would have to be 4.5 or higher. (Each voter either moves the outcome from a tie to win or a loss to a tie, which is worth half the value.) This would more than offset the gain from shifting the winning option from B to A in overall surplus of 2.

Our paper determines the properties of the distribution of values (when unknown), that ensure that the imposition of a wasteful cost of voting will ex-ante improve welfare. We use a model with a continuous distribution of values both when there is a fixed number of supporters for each outcome and when there is aggregate supporter uncertainty, more specifically, where each supporter randomly (iid) supports each outcome. We find that whether costly voting is superior to costless voting requires that the expected value of a voter times the density of the lowest voters be larger than one for fixed supporters (or 1/2 with aggregate supporter uncertainty). Intuitively, the density of the lowest voters determines how many voters will be eliminated by the cost while the expected value is the benefit due to leaving out a voter that has a low value of the outcome (increasing the likelihood that someone with a higher value will win). We also show that a government would never want to have mandatory voting by imposing fines or subsidizing voting but would wish to implement a poll tax (a charge for voting) if it is politically practical. Finally, we show that for a fixed level of equilibrium voting, the utilitarian outcome is more likely with a uniform cost of voting than with a random cost.

Krishna and Morgan (2015) also recognize that costly voting deters those with low values more than those with high values. In their model, majority voting with costly voting leads to the utilitarian outcome being more likely to being chosen. Whether or not having a cost to voting is overall beneficial is not addressed.[8] Börgers (2000, 2004) asks a question in the spirit of our analysis. Namely, whether a reduction of the costs of voting can be damaging.[9] While he graphically shows such a possibility, in his model a sufficient reduction would always be beneficial, since while there is uncertainty for which alternative a voter prefers, there is no difference in intensity of preference for a particular alternative.[10]

Our paper also relates to the public good provision literature. Ledyard and Palfrey (1994, 1999, 2002) look at mechanisms including simple voting schemes for providing public goods. In Palfrey and Ledyard, the voting options are to provide or not provide a public good where provision could have a loss for those that have little value for it and have to pay for it. In this paper we have two options each with non-negative value and voting can potentially have a cost.

While less related, the Condorcet Jury literature models voting by a group of individuals with a common value over two alternatives (see Young, 1988). Krishna and Morgan (2012) show that as the cost of voting goes to zero, voluntary voting is the optimal mechanism. Ghosal and Lockwood (2009) have combined the common value in the Condorcet Jury literature with the private value of alternatives and comparisons in Börgers (2004). They find that if the voters put a high weight on personal preferences then there is an inefficiently high voter turnout and in the case voters care more about the common aspect then there is an inefficiently low voter turnout. Information acquisition has been studied in the Condorcet Jury literature by allowing voters to buy information about the common feature of the alternatives (see Persico, 2004; Gerardi and Yaniv, 2008).

The lobbying literature models a similar problem (see Austen–Smith and Wright, 1992; Baye et al., 1993; Che and Gale, 1998, 2006, Kaplan and Wettstein, 2006). The method of reaching a group decision is by allowing would-be voters to send a signal of how much they care: by lobbying. With this method, we would expect that voters with strong preferences or special interest groups to have greater

[5] If it is known who has better information or likely to care more about an issue, then votes can be given different weights as in Budescu and Chen (2014).

[6] Britian's 2011 attempt to move from the first-past-the-post to alternative-vote was soundly defeated (see BBC News, May 7, 2011).

[7] There is a widely held belief that costly voting is detrimental since it deters voting (and is a cost to those that do vote). The fact that a cost doesn't seem to deter everyone in practice leads to the literature explaining the paradox of why people vote (see Dhillon and Peralta, 2002 for an overview).

[8] Krishna and Morgan (2011) have a version of Krishna and Morgan (2015) but with a common element (competency). With large numbers of voluntary voters, the welfare optimizing candidate is elected. We and this literature also build upon Bulkley et al. (2001) and Osborne et al. (2000) that establish that when voting is costly the outcome of the voting game will have an equilibrium in which only voters with high values (from the extremes) will participate.

[9] Krasa and Polborn (2009) vary the Börgers model by allowing for ex-ante asymmetry of preferences over alternatives.

[10] It is possible to see how Börgers (2000) works with a simple numerical example: There are two voters, V_1 and V_2, and two candidates, A and B. Each voter has a 50% chance of preferring each candidate and values their candidate winning at 1 (and the other at 0). If the cost of V_1 voting is $0.25 - \epsilon$ and V_2 voting is $0.25 - 2\epsilon$, then both will vote and the total surplus will be $1.5 - 0.5 + 3\epsilon$. Note the expected value when both vote is the average of when they agree, value of 2, and when they disagree, value of 1. Also, note that the expected benefit for a voter voting (given the other voter votes) is 0.25. This is since half the other voter agrees with a voters choice and the other half, it moves from a loss to a tie. If costs increase such that the cost of V_1 voting is $0.25 + \epsilon$ and V_2 voting is $0.25 - \epsilon$, then only V_2 would vote yielding a surplus of $1.5 - 0.25 + \epsilon$. Of course, if voting costs drop to zero, both will vote and surplus will be 1.5.