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# On the Use of Fines and Lottery Prizes to Increase Voter Turnout

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## Abstract

We consider implementation issues regarding two mechanisms that have been used to increase voter turnout in elections: fines and lotteries. We focus on the amount of the fine or lottery prize needed to achieve full participation. We then propose a combined, self-financing mechanism by which the fines imposed on non-participants are used to finance the prize that is awarded by lottery to one of the individuals choosing to participate in voting. We argue that this combined mechanism has some advantages over the other two mechanisms and merits consideration.


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## 1. Introduction

Voter turnout in voluntary democratic elections has been declining in recent years in many countries of the world (see, e.g., Wattenberg (2002)). This decline may reflect a number of factors including disenchantment with available choices, population growth, or a higher opportunity cost to voting. Whether and how to arrest this decline has been the subject of a large literature (see, e.g., Birch (2009) for a survey).

One approach to increasing voter turnout has been to make voting compulsory (as is currently done in 29 countries including one-fourth of all democracies) through the use of fines or other sanctions for non-participation. For example, the Australian Electoral Commission currently fines non-voters \$20 if they cannot provide a reason for their failure to vote.[1] Proponents of such fine-based compulsory voting mechanisms argue that the resulting increase in participation conveys a greater legitimacy upon electoral outcomes – that democracy works best as a mechanism for aggregating information only if there is full participation. On the other hand, opponents of compulsory voting argue that the right to vote implies a right not to vote (i.e., to abstain) and do not agree that full participation is necessary to achieve efficient information aggregation.

An alternative to compulsory voting and the associated "stick" of fines for non-participation is to encourage participation (but to continue to allow abstention) through the "carrot" of prizes awarded randomly to those voluntarily choosing to participate in voting. The use of prizes awarded by a lottery to increase participation in public good campaigns has already been proposed by Morgan (2000) and is the subject of a large literature. In Duffy and Matros (2013) we contribute to that literature by proposing and analyzing *self-financed* prize-based mechanisms, where the prize is awarded only if the prize-based mechanism raises funds for a public good in excess of the cost of the prize and here we apply this same idea to voting.

The use of prizes to lure voters to the polls has been implemented in a municipal election in Norway in 1995 and in a parliamentary election in Bulgaria in 2005 with mixed results regarding turnout.[2] In the U.S., a \$1 million turnout lottery was proposed but voted down in Arizona in 2006 (Archibald (2006), Ornstein (2012)). Opponents of using lottery prizes to increase voter turnout argue that voting is a "civic duty" that would be cheapened by awarding a prize for voting and that those likely to be enticed to show up to vote only by the addition of a lottery prize would be unlikely to acquire information about the issues or candidates that were on the ballot. Here we abstract from such information gathering issues and the morality of awarding prizes for voting and focus on how fines and lottery prize mechanisms would need to be *implemented* in order to raise voter turnout, in particular to achieve full participation. Surprisingly, we have found little literature on this subject.

Specifically, we first show the conditions necessary under both types of mechanisms to achieve full participation in voting by all eligible voters. We then propose a third mechanism,

[1] Source: Australian Election Commission website, http://www.aec.gov.au/.

[2] The Norway lottery offered the single winner a travel voucher to the warm south (via the local airport) worth 10,000 Norwegian krone (1,600 USD) and was associated with a near 10 percent increase in turnout relative to the prior election. The Bulgarian lottery offered several prizes including a car valued at 15,000 Euros, computer equipment, and mobile phones. However, turnout in the Bulgarian election declined by close to 10 percent from the prior election. Neither lottery scheme seems to have been repeated. See Ellis et al. (2006) for further details.

which we believe is new to the literature, that combines these two mechanisms: fines collected from non-participants are used to finance a prize awarded by lottery to one voting participant. We argue that our new fine-financed lottery prize mechanism overcomes some implementation issues associated with the fine-only or lottery prize-based mechanisms and is also capable of delivering full participation in voting among the electorate.

## 2. Related Literature

Manic (2011) considers some issues regarding the use of lottery prizes to increase voter turnout in the context of a two-player game. León (2011) examines data from a natural field experiment in Peru where fines for abstention were reduced and reports that the reduction in the fine lead to a significant decrease in voter turnout. An analysis of the use of lottery prizes versus fines as mechanisms to increase voter turnout in large elections is found in Gerardi et al. (2009), which is the closest paper to this one. Those authors study a Condorcet jury model set-up where the common goal of voters is to determine the true binary state of the world via their choices under majority rule (e.g., convict the guilty, choose the best candidate for the state of the world, etc.). Gerardi et al. show that if voting in this setting is both costly and voluntary (abstention allowed), then awarding a fixed prize of value $V$ to one randomly selected agent who chose to vote can increase turnout as it lowers the expected cost of voting, and raises the efficiency of the election. They also provide some experimental evidence on the impact of lotteries and fines and find, counter to their theoretical predictions, that efficiency and welfare are highest in their baseline treatment with no inducements (lotteries or fines) to vote, a consequence of over-participation in voting by subjects placed in that setting.

Gerardi et al. (2009) is a good first effort at exploring a prize-based mechanism for improving turnout but it remains incomplete in at least two respects. First, they only consider asymptotic welfare results for large electorates, i.e., they obtain results only in the limiting case where the population size $N \to \infty$. Thus they do not explicitly consider the trade-off between a larger turnout and a lowered expected value of the prize; indeed their experiment involves small, fixed electorates of size $n = 5$, and so it is not clear that their theoretical predictions are relevant to their experimental environment. By contrast, in this paper we consider the consequences of lottery prize voting mechanisms for finite electorate sizes. Second they do not discuss where prize amount, $V$, awarded by the lottery mechanism comes from or how it might be endogenously financed, which is a major unresolved issue in the practical implementation of prize–based voter turnout mechanisms. They also do not discuss what is done with fine revenues that are collected. One simple solution is to use the sum of the fines assessed on all those failing to participate to finance the prize that is randomly awarded to an individual choosing to vote, thus neatly connecting the revenue stream from non-participants to participants. This fine-financed prize-based mechanism is the new, third mechanism that we explore in this paper.

The model we work with is not the Condorcet jury model but rather the team participation game model of voting due to Palfrey and Rosenthal (1983). This model abstracts from issues of information aggregation and focuses on turn-out behavior, which is, after all, the primary focus of the participation mechanisms that we explore. This model is also one that readily accommodates political parties, whereas the Condorcet jury model is really most appropriate to understanding a single group of actors, a committee or jury who share a common goal. We note that while we use the set-up of Palfrey and Rosenthal, we also abstract from most of the strategic behavior embodied in such models, choosing to focus simply on full participation equilibria, as this helps to clarify implementation issues associated with the various participation mechanisms.

## 3. Full Participation in Two-Party Elections

We suppose that there are just two parties, $A$ and $B$, and there is an electorate consisting of $N > 1$ voters. We assume that party $A$ has $\alpha N > 0$ supporters while party $B$ has $(1-\alpha) N > 0$ supporters where $0 < \alpha < 1$. All voters must simultaneously decide whether to vote or to abstain. In other words, each player has just two actions. The winning party is determined by majority rule.

We assume that a neutral election designer knows the total size of the electorate $N$, e.g., due to pre-registration requirements, but does not know the *composition* of support for the two parties, i.e., the designer does not know $\alpha$. Therefore, the designer's goal is to achieve full participation in the election by all eligible voters as this best reflects the will of the electorate. Under this maintained assumption, we consider three different mechanisms: (i) a fine for non-participation, (ii) a fixed prize awarded by lottery to one participant, and (iii) a fine-financed prize awarded by lottery.

We assume that a voter also knows the total size of the electorate $N$, but does not know $\alpha$. Our results will not change if a voter knows $\alpha$. We assume that if a voter casts her vote, she votes sincerely for the party she supports. If party $A$ or party $B$ wins the election, each supporter for the winning party gets a positive benefit, $W > 0$, from winning while each supporter for the losing party gets a benefit of 0. Voting is costly. Each voter incurs a fixed and known cost, $c > 0$, to voting. Alternatively we could allow for a distribution of voting costs over some fixed interval $[0, c]$, without changing any of our results.

### 3.1 Fines for Non-Participation

We first consider the case where each voter has to pay a fine, $f > 0$, if she abstains. In this case, a player's expected payoff is

$$\Pr\left[win, \text{if abstain}\right] W - f,$$

if she abstains, where $\Pr\left[win, \text{ if abstain}\right]$ is the probability that her party wins the election if her action is to abstain. Similarly, a player's expected payoff is

$$\Pr\left[win, \text{if vote}\right] W - c,$$

if she votes, where $\Pr\left[win, \text{ if vote}\right]$ is the probability that her party wins the election if her action is to vote.

We obtain the following result for the minimal fine that can guarantee full participation.

**Proposition 1** *If $\alpha \neq 1/2$, the minimal fine that guarantees full participation in the election is $\underline{f} = c$. If $\alpha = 1/2$, the minimal fine that guarantees full participation is $\underline{f} = \max\{c - .5W, 0\}$. If the fine $f \in \left[\underline{f}, +\infty\right)$, then there exists a full participation Nash equilibrium.*

The pivotal case where $\alpha = 1/2$ can result in a lower minimal fine for a full participation equilibrium, however, more generally, the fine will equal the cost of voting.

In a recent survey on the determinants of voter turnout Blais (2006) notes that the existing literature provides "precious little" in the way of guidance as to how "tough" sanctions for non-voting must be. Here we provide a simple, "rational-choice" answer to this issue: in general, the fine must be at least $c$, the cost of voting. We further observe that with a single exception ($\alpha = 1/2$) this minimal fine is independent of $\alpha$ and $N$ so the election designer can impose the minimal fine even without knowing the composition of support for the two parties as well as the actual numbers of voters; it generally suffices to know only the voting cost, $c$, (or the upper bound on the distribution of voting costs).

### 3.2 A Fixed Prize for Voting Awarded by a Lottery

We next consider the case where each voter choosing to participate in the election gets a lottery ticket for her participation. We assume that after voting has taken place, one lottery ticket holder is randomly selected to receive a prize, $V > 0$. We note that there could be more than one prize; specifically, nothing in our analysis would change if $V$ was divided up equally among all those who participated in voting. However, here we stick with the single-winner-as-determined-by-lottery set-up as that is the environment that has been proposed and considered for implementation in the field. In that case, a player's expected payoff is given by:

$$\Pr\left[win, \text{ if abstain}\right] W,$$

if she abstains, where $\Pr\left[win, \text{ if abstain}\right]$ is the probability that her party wins the election if her action is to abstain. Similarly, a player's expected payoff is

$$\Pr\left[win, \text{ if vote}\right] W - c + \Pr\left[\text{lottery win}\right] V,$$

if she votes, where $\Pr\left[win, \text{ if vote}\right]$ is the probability that her party wins the election if her action is to vote and $\Pr\left[\text{lottery win}\right]$ is the probability that she wins the lottery prize, $V$.

We obtain the following result for which the lottery prize mechanism can guarantee full participation.

**Proposition 2** *If $\alpha \neq 1/2$, the minimal fixed prize that guarantees full participation in the election is $\underline{V} = cN$. If $\alpha = 1/2$, the minimal fixed prize that guarantees full participation is $\underline{V} = \max\{(c - .5W)N, 0\}$. If the prize $V \in [\underline{V}, +\infty)$, then there exists a full participation Nash equilibrium.*

A proof of this proposition is similar to the proof of Proposition 1 and is thus omitted (but available on request).

Note that the minimal fixed lottery prize is increasing in the size of the electorate, $N$. An important implication of this observation is that fixed-prized-based mechanisms that insure full participation will be more costly the greater is the size of the electorate, $N$.

### 3.3 A Fine-Financed Prize Awarded by Lottery

There are problems with both the fine and the lottery prize mechanisms for increasing turnout. In order to obtain full participation, the minimal fixed lottery prize amount must increase with the population size, $N$. However, our model does not explain where the lottery prize money would come from. As for the fine mechanism, while fines are collected, the model is silent about the use of such fine revenue. In this section, we propose and analyze a simple solution to these two problems: a fine-financing lottery prize mechanism in which fines from non-participation are used exclusively to finance the prize awarded by lottery to one voting participant. Thus, a difference from the fixed-prize lottery is that the size of prize awarded is now endogenous and equal to the sum of all fines for non-participation that are collected. However, as we are only considering a full participation equilibrium, all fines and the lottery prize itself will be zero in any such equilibrium. The latter observation addresses concerns not only about lottery financing but also moral issues with paying people to vote. Indeed our mechanism delivers full participation without any fines being levied or prizes being awarded in equilibrium – a "something for nothing" result that should appeal to the politicians that must approve of election rules.

Specifically we consider the situation where a voter gets a lottery ticket for participation in an election but faces a fine, $f > 0$, for abstention. Among all those participating in voting, one person is chosen at random to receive a prize having a promised value $V = f \sum_{i=1}^{N} I_i \geq 0$, where $I_i = 1$ if voter $i$ abstains and 0 if voter $i$ votes. Therefore, a player's expected payoff is

$$\Pr\left[win, \text{ if abstain}\right] W - f,$$

if she abstains, where $\Pr\left[win, \text{ if abstain}\right]$ is the probability that her party wins the election if her action is abstain. Similarly, a player's expected payoff is

$$\Pr\left[win, \text{ if vote}\right] W - c + \Pr\left[\text{lottery win}\right] V,$$

if she votes, where $\Pr\left[win, \text{ if vote}\right]$ is the probability that her party wins the election if her action is vote and $\Pr\left[\text{lottery win}\right]$ is the probability that she wins the lottery prize.

We obtain the following main result.

**Proposition 3** *If $\alpha \neq 1/2$, the minimal fine that guarantees full participation in the election is $\underline{f} = c$. If $\alpha = 1/2$, the minimal fine that guarantees full participation is $\underline{f} = \max\{c - .5W, 0\}$. If the fine $f \in \left[\underline{f}, +\infty\right)$, then there exists a full participation Nash equilibrium.*

Notice that Proposition 3 is identical to Proposition 1. Therefore, both mechanisms: either a fine or a fine-financing lottery mechanism should produce the same outcome. In both cases, the minimal fine is generally independent of the values of $N$ and $\alpha$. This means that the election designer can impose such a fine without knowing the composition of support for the two parties as well as the actual numbers of voters, though some knowledge of voting cost, $c$, (or the upper bound to voting costs) is required.

## 4. Conclusions

We have explored conditions under which three mechanisms intended to affect voter turnout can implement a full participation equilibrium. The difficulty with the lottery prize-only mechanism is that the size of lottery prize needed to ensure full participation must

Table 1: Fines for Not Voting in Selected Countries with Compulsory Voting Laws

| Country | Fine Amount (among other sanctions) | US Dollar Value |
|---|---|---|
| Argentina | 10-20 Argentine pesos[a] | $ 2-4. |
| Australia | 20 Australian dollars[a] | $ 20. |
| Belgium | 50-125 Euros[a] | $ 66-166. |
| Brazil | 1.06-3.51 Brazilian real[b] | $ 0.5-1.75 |
| Cyprus | 342 Euros (maximum)[c] | $ 450. |
| Ecuador | 34.40 US dollars[d] | $ 34.40. |
| Liechtenstein | 20 Swiss francs[a] | $ 20.50 |
| Luxembourg | 100-250 Euros[e] | $ 200-330. |
| Nauru | 50 Australian dollars[f] | $ 50. |
| Paraguay | 31,000-63,000 Paraguayan guaraní[g] | $ 7-14. |
| Peru | 18-72 Peruvian nuevo soles[h] | $ 8-26. |
| Singapore | 5 Singapore dollars[a] | $ 4. |
| Switzerland† | 3 Swiss francs[a] | $ 3.20 |
| Turkey | 5 Turkish lira[i] | $ 2.60 |
| Uruguay | 1 Uruguayan readjustable unit[j] | $ 650. |

†Only in one canton, Schaffhausen.

Sources: The list of countries imposing fines for non-participation in voting comes from the IDEA database, http://www.idea.int/vt/. Other sources for precise fine amounts are a: López-Pintor and M. Gratschew (2002); b: Power (2009); c: Malkopoulou (2009); d: *Ecuador Times*, March 1, 2011; e: Luxembourg Chambre des Députés, http://www.ipu.org/parline/reports/2191_B.htm; f: Republic of Nauru *Electoral Act 1965* July 12, 2012; g: *ABC Color* (Paraguay) October 6, 2011 h: *Radio Programas del Perú* Notícias October 2, 2010; i: *Turkish Daily News* July 21, 2007; j: *El País* (Uruguay) August 3, 2009.

increase with the size of the electorate and the financing of this fixed prize is left unspecified. From a social welfare perspective, fine-based mechanisms including our fine-financed prize mechanism dominate the prize-only mechanism as under the fine-based mechanisms, there is no need to fund the prize (funding is endogenous) and in any full participation equilibrium the threatened fines are never levied (and no prize is awarded). The latter observation helps us understand why lottery prize mechanisms, while much discussed as a means of increasing voter turnout, have rarely been implemented. By contrast, implementation of fine-based mechanisms requires only information about the cost of voting or on the upper bound of the distribution of voting costs, and such mechanisms are commonly used in a number of countries. Indeed, fines for non-participation in countries with compulsory voting laws are generally low – see Table 1 – and in most cases would seem to roughly approximate the cost (opportunity and other costs) associated with the act of voting – the minimal fine needed for full participation in our Propositions 1 and 3.[3]

[3]These monetary fines are not necessarily the only sanction for non-participation in voting; sanctions can be more costly (depending on one's valuation) and may include disenfranchisement from future voting, difficulties in acquiring passports or even jail time (see López-Pintor and Gratschew (2002) for some country-specific details). On the other hand, in many countries the fines can often be waived with appropriate

We believe that the new fine-financing lottery mechanism we propose in this paper is an attractive option for political reasons as our mechanism is explicit about where the money to finance a lottery prize comes from and how fine revenues get spent even though in any full participation equilibrium no fines would actually be collected and therefore the value of the endogenously determined lottery prize would be zero.

Our paper serves to highlight a difference between "threats" and "promises" (in the terminology of Schelling (1960)). The threat of a fine for non-participation, if successful, does not have to be carried out while the promise of a prize for voting, if successful, has to be kept, and in the case of lottery prizes alone, that promise is costly; hence the benefit of our fine-financing lottery prize scheme.

## Appendix

**Proof of Proposition 1.**

We are looking for an equilibrium with full participation. In this case, we must have

$$\Pr\left[win, \text{if abstain}\right] W - f \leq \Pr\left[win, \text{ if vote}\right] W - c \tag{1}$$

for each voter. Suppose that $|\alpha N - (1-\alpha) N| \geq 2$, or none of the players is pivotal in the case of full participation. (Remember that we assume that if a voter casts her vote, she votes sincerely for the party she supports.) In this case,

$$\Pr\left[win, \text{if abstain}\right] = \Pr\left[win, \text{ if vote}\right]$$

and condition (1) becomes

$$c \leq f. \tag{2}$$

Suppose that $\alpha N - (1-\alpha) N = 1$, or each supporter of party $A$ is pivotal and none of the supporters of party $B$ is pivotal in the case of full participation. Then, party $A$ has exactly one extra supporter, or

$$\Pr\left[win, \text{ if abstain}\right] = 0.5 < 1 = \Pr\left[win, \text{ if vote}\right]$$

and condition (1) for each supporter of party $A$ becomes

$$c - 0.5W \leq f. \tag{3}$$

Note that condition (1) for each supporter of party $B$ is (2).

Finally, suppose that $\alpha N = (1-\alpha) N$, or each player is pivotal in the case of full participation. Then, both parties have the same number of supporters, or

$$\Pr\left[win, \text{ if abstain}\right] = 0 < 0.5 = \Pr\left[win, \text{ if vote}\right]$$

and condition (1) for each player becomes (3). Hence, if $\alpha = (1-\alpha)$, then condition

$$f \geq \max\left\{c - 0.5W,\ 0\right\}$$

explanations or excuses and enforcement varies widely. Nevertheless, it is widely acknowledged that voter turnout is significantly higher, on average, in countries with compulsory voting laws than in countries without such laws (e.g., Jackman (1987), Panagopoulous (2008), Singh (2011)).

guarantees full participation. Otherwise, condition (2) ensures full participation. ■

**Proof of Proposition 3.**

We are looking for an equilibrium with full participation. In this case, it must be

$$\Pr\left[win, \text{ if abstain}\right] W - f \leq \Pr\left[win, \text{ if vote}\right] W - c + \Pr\left[\text{lottery win}\right] V \tag{4}$$

for each player, where

$$\Pr\left[\text{lottery win}\right] = 1/N, \text{ and } V = 0 \times f = 0,$$

because of full participation.

Suppose that $|\alpha N - (1-\alpha) N| \geq 2$, or none of the players is pivotal in the case of full participation. Then,

$$\Pr\left[win, \text{ if abstain}\right] = \Pr\left[win, \text{ if vote}\right]$$

and condition (4) becomes

$$c \leq f. \tag{5}$$

Suppose that $\alpha N - (1-\alpha) N = 1$, or each supporter of party $A$ is pivotal in the case of full participation. In this case

$$\Pr\left[win, \text{ if abstain}\right] = 0.5 < 1 = \Pr\left[win, \text{ if vote}\right]$$

and condition (4) for each member of party $A$ becomes

$$(c - 0.5W) \leq f. \tag{6}$$

Note that condition (4) for each member of party $B$ is

$$c \leq f. \tag{7}$$

Finally, suppose that $\alpha N = (1-\alpha) N$, or each player is pivotal in the case of full participation. Then,

$$\Pr\left[win, \text{ if abstain}\right] = 0 < 0.5 = \Pr\left[win, \text{ if vote}\right]$$

and condition (4) for each player becomes

$$(c - 0.5W) \leq f. \tag{8}$$

Hence, if $\alpha = (1-\alpha)$, then condition

$$f \geq \max\left\{c - 0.5W,\ 0\right\}$$

guarantees full participation. Otherwise, condition (7) ensures full participation. ■

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