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Specialized Elections

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Abstract

This paper introduces ***specialized elections.*** *A specialized election randomly assigns each voter to one election, freeing her of voting responsibilities in other elections. By reducing voters' responsibilities, specialized elections encourage more information acquisition. Specialized elections also make campaigning less costly. A shortcoming of specialized elections is the increase in outcome variance resulting from the sampling effect. Whether or not specialized elections improve democratic outcomes hinges upon the tradeoff between more informed voters and greater outcome variance. Sufficient conditions are derived for the increase in information to generate an outcome nearer to that which would be chosen by a fully informed electorate.*

Everybody's ignorant, just on different subjects. -WILL ROGERS

The beginning of wisdom in democratic theory is to distinguish between the things that people can do and the things that people cannot do. -E.E. SCHATTSCHNEIDER

1. Introduction:

In the United States, citizens are obliged to cast ballots in numerous elections. They are asked to select representatives, to choose from among government reorganization proposals, to endorse tax and public utility reforms, and to retain or replace scores of judicial appointments. These responsibilities are often framed as opportunities - the opportunity to determine the country's direction, to provide input into the local school's educational policy, or to decide on a proposed convention center. To cast ballots which promote her reasoned preferences, a voter allocates time to becoming informed about each decision. This task competes for the voter's attention with, among other diversions, work, family obligations, and leisure. As a result, the task of becoming informed prior to making electoral decisions is allotted a small block of time. As depicted below, with many decisions competing for that time, only a small amount of time is allocated per election.

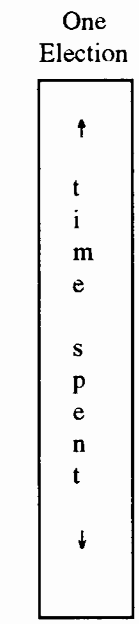
Multiple Elections

1	2	3	4	5	6	7
	↑ time ↓				↑ time ↓	

As the number of elections confronting a voter grows, the time allocated per issue shrinks, creating a tenuous link between what would be the voter's informed preferences and the actual ballots she casts. Empirical studies verify the existence of enormous numbers of inadequately informed voters in judicial, local, and state elections as well as in ballot

referenda (Campbell, etal. 1960, 1976, 1980, Cronin 1989).[1]

This paper advocates an alternative democratic mechanism, a *specialized election*, which, by encouraging more information acquisition per election, reduces the tendency towards an under-informed electorate. In a specialized election each voter is randomly assigned to one election. Rather than allocating a little time to each of many decisions, a voter can dedicate a significant time block to a single election. As shown below, the effect is to rotate the rectangle, and to produce more informed voting decisions. The gain from this division of labor does not come without costs. A subset of voters, as opposed to the entire population of voters, determines winning candidates and propositions, thereby creating a sampling effect.



If electoral decisions required little thought, rotating the rectangle would have few advantages. Some social scientists have argued that strong political parties can serve as signalling institutions. Voters who share a parties' interests can follow the lead of the party (Schattschneider 1960). Therefore, voters need not be very well informed to guarantee representative outcomes. Arguing along these lines, specialized elections would less effectively aggregate

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[1] More interesting than the data are the humorous anecdotes which result from under-informed voters. For example, in the 1986 Illinois Democratic Primary, Janice Hart defeated Aurelia Pucinski in the race for Secretary of State, and Mark Fairchild defeated George Sangmeister for Lieutenant Governor. Hart and Fairchild were followers of Lyndon LaRouche, whose policies lie far outside the democratic mainstream. Most evidence, including exit polling and Mike Royko's column, supports the conjecture that many voters cast ballots based upon the relative familiarity of the candidates' names. Also in Chicago, in 1988, following a loss four years earlier, L. Michael Getty changed his name to the more Irish sounding Michael Brennen Getty and won a judicial seat. More recently, Yakov M. Fox changed his name to Michael J. Fox. Despite these "Family Ties" he did not win.

preferences given the sampling effect.

However, in primaries, municipal bond issues, non partisan judicial elections, and ballot referenda, parties often refrain from endorsing candidates and initiatives. Furthermore, in recent years voters have become less strongly attached to parties. Without party guidance, voters confronted with a political decision often express raw opinion, which may differ from reasoned opinion (Yankelovich 1992). Nowhere is this more apparent than in ballot referenda.

Ballot referenda often emanate from populist causes and provoke emotional responses. Should property taxes be lowered? Should landlords be required to truthfully reveal heating costs of apartments? Referenda may also purposefully confuse voters with complex and/or misleading language. A survey of four western states found that over half of all voters admit general confusion over the referenda put before them (Cronin 1989). Worse yet, purposefully misleading ballot referenda may lead to manipulated outcomes. In the 1980 California general election, over half of all voters, according to exit polls, misunderstood a "yes means no" rent control measure and voiced the wrong preferences (Schmidt 1988). In many states, citizens deciding whether or not to create a state lottery were led to believe that lottery receipts would increase funds for education.[2]

The large number of elections exacerbates the problems created by the

[2] What actually occurred is that lottery receipts were earmarked for education, but money from the general fund was taken away.

complexity of the decisions.[3] Fishkin (1991) notes that in the United States, the general tendency has been towards majoritarian democracy. He cites as examples the constitutional amendment providing for the direct election of senators and the replacement of smoked filled rooms with open presidential primaries. According to Fishkin, the trend towards majoritarianism, given its susceptibility to tyranny, may not represent progress. Similar concerns over two hundred years ago lead to America's choice of a representative republic.

The remainder of this paper critical examines specialized elections. Section 2 defines multiple, traditional, and specialized elections and briefly confronts the issue of randomized electors. Section 3 stresses the informational advantages of specialized elections. Section 4 compares specialized and traditional elections. The conclusion contrasts and compares specialized elections with proposed alternative democratic institutions.

2. Specialized Elections:

Specialized elections are based on the concept of improvement through task specialization. The advantages of specialization have long been a touchstone of economic theory.[4] Left to fend for themselves, few people would be able to produce

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[3] Recently, the number of ballot referenda appears to be growing, see New York Times, Nov. 5 1990. In the past, a great many issues were decided by referenda. For example, in California general elections between 1912 and 1936 an average of 22.8 measures appear.

[4] Recall Adam Smith's description of a pin factory.

much more than a subsistence level of clothes, food, and shelter.[5] By concentrating on specific tasks, individuals enhance their ability to perform those tasks. Specialized elections offer a similar opportunity. By reducing the number of elections assigned to each voter, specialized elections enable each voter to allocate more time to each decision. Stable election assignments, (for example reallocation of voters to elections once each decade) might allow voters to acquire expertise.

Before proceeding with the main argument, some definitions are necessary. We refer to an election with more than one decision as a *multiple election* and to a multiple election in which each voter casts ballots in every election as a *traditional election*. In a *specialized election* each voter may vote only in the one randomly assigned election.[6] For example, suppose that a multiple election consists of sixty judicial retention elections. If the elections were to be decided by a specialized election, then each voter and each judge would be assigned a random integer from {1,2,.,60}. A voter would cast a ballot only in the election of the judge whose number agrees with her own.

Not all elections would have to be included in a specialized election. Given their importance, Presidential, Senatorial, Congressional, Gubernatorial and Mayoral elections should be decided traditionally. These *prominent elections* receive tremendous

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[5] Among others, Thomas Paine (1961) and Thomas Sowell (1981) both make this point.

[6] A distinction should be drawn between specialization (random partitioning of voters) and districting, (geographic partitioning of voters). The latter limits the public servants' constituencies to their electing district creating two distortions: First, winners reflect their locality and not the entire polity. Second, once in office, public officials' incentives may be biased towards satisfying the special interests of their constituents. Both districting and specialized elections limit the ability of voters to voice preferences over a slate of candidates. For example, a voter might prefer to have a judiciary composed of equal numbers of conservative and liberal judges or representatives. A voter cannot articulate such preferences when limited to participating in one election.

media attention (perhaps misdirected), and their winners determine the country's direction. Moreover, these prominent campaigns often fund and promote voter registration drives. Excluding citizens from prominent elections may undermine the democratic process by alienating voters. The remaining *nominent elections*, such as races for county offices, judicial positions, and university trusteeships, receive much less public attention.

Admittedly, specialized elections breed reliance on the efforts of others, but to argue they lead to unrepresentative influence and/or control is specious. First, no one is denied access to information. Second, random assignments guarantee broadly representative outcomes. Third, specialized elections would include mostly judicial elections, ballot referenda, and elections for boards of trustees and county commissioners. Excluding a voter from participating in the selection of the county drain commissioner probably would not substantially weaken a country's democratic foundation.[7]

Specialized elections pose other difficulties as well, not the least of which are how to implement the randomization process and how to prevent its corruption. The random matching of voters to elections is an unsettling feature of specialized elections an may create substantial personal effects. Imagine, for example, the anger of a political candidate not allowed to cast a ballot in her own election! These concerns, as well as the general distrust of randomizing processes, argue against specialized

[7] To argue that a move to specialized elections would deprive citizens of significant levels of control seems silly given that others have control over our supply of food, the building of our homes, the maintenance of our health, and the education of our children.

elections. And yet, randomization lies at the core of the notion of democracy. The originators of democracy, the Greeks, relied on randomization to select supervisory boards and other decision making bodies.[8] Two salient modern examples are juries and military drafts.[9]

3. Informational Advantages:

This section motivates and formalizes the informational advantages of specialized elections. The analysis emphasizes three advantages of specialized elections. First, specialized elections provide incentives for a rational voter to acquire more information per election. Second, by reducing the number of officials who must be monitored, specialized elections enhance recollection of previously acquired information. And third, specialized elections increase the return to money spent informing voters. We discuss each advantage in turn.

To prove that specialized elections increase the expected amount of acquired information per election, we assume voters are utility maximizing agents. Utility maximization models are difficult to apply to the question of voter participation. Downs' (1957) original argument that citizens vote only if the utility gain from voting, $p_{change} \cdot d_{party}$, is greater than the disutility from voting (finding a parking spot) has not

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[8] See Fishkin (1991) p84 for an interesting story from Demosthenes about two brothers who were not allowed to have the same name, because by doing so they would compromise the random selection mechanism. The more articulate brother would always be chosen.

[9] Historically, the American military draft has chosen a nonrepresentative sample of the population to risk their lives for their country. Of late, this recognition of this inequality has become a political issue at the level of individual actors.

been substantiated empirically (Barry 1970).[10] The argument for specialized elections relies on citizens obtaining utility from making a better informed vote. Once a citizen decides to devote time to voting, perhaps an irrational choice, the subsequent decision of how to allocate that time among elections can be rationally based. Few would dispute that voters spend more time learning about the presidential candidates than about prospective community college trustees.[11] The model put forth takes the decision to vote as given and examines only the allocation of time to various elections.

We assume that each voter has a Cobb-Douglass utility function defined over time spent at work, z, time spent at leisure, x, and time spent gathering information about L elections, $\mathbf{t} = (t_1,..t_L)$.

$$u[z,x,(t_1,t_2,t_L)] = a \cdot \ln(z) + b \cdot \ln(x) + \sum_{i=1}^{L} [w_i \cdot \ln(t_i)]$$

where $\mathbf{w}$ equals the vector of weights attached to the elections. A voter's budget constraint is given by:

$$1 = z + x + \sum_{i=1}^{L} t_i$$

Letting $$SUM = a + b + \sum_{i=1}^{L} w_i$$

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[10] p_{change} is the probability of casting the tie breaking vote. d_{party} is the utility difference to the voter of the two tied candidates. Sense of civic responsibility, wealth, and education level are all better predictors of voter turnout than Down's variable.

[11] Similarly, one could argue that the decision to attend a Chicago Bears game in the dead of winter may be irrational, given that the game can be seen on television for free. However, once the decision to attend the game has been made, decisions about what type of clothes to wear appear rational, i.e. few fans attend in swimming trunks.

The utility maximizing vector, (z^*,x^*,t^*) equals (a/SUM, b/SUM, **w**/SUM).

Without loss of generality assume that the first N elections are nominent election (N < L) and that the voter was assigned to election 1 in the specialized election. The voter now sets $w_i = 0$ for i = 2 to N, since she does not vote in those elections, and the weight attached to the one nominent election also changes, to w_1'. This latter effect occurs because the voter has a slightly greater probability of breaking a tie and has more incentive to cast an informed vote.

Letting $$SUM' = a + b + w_1' + \sum_{i=N+1}^{L} w_i$$

and solving for the utility maximizing vector, we obtain that:

$t_1 = w_1' / SUM'$

$t_i = 0$ for i = 2 to N

$t_i = w_i / SUM'$ for i = N+1 to L

It can easily be shown that the time spent on the one nominent election necessarily increases and the time spent on the prominent elections (N+1 through L) increases provided that SUM > SUM'.[12]

Specialized election may also enable voters to better recollect public official's actions and decisions. In a fully informed democracy, a judge who commits a laudable (or illegal) act, expects to gain (suffer) in subsequent elections. With over one hundred

[12] If the total weight attached to all of the nominent elections initially is larger than the weight attached to the one nominent election after the imposition of the specialized election then it follows that SUM > SUM'.

public officials to monitor, voters may forget whether Judge Adams fixed traffic tickets and Judge Jefferson won a humanitarian award or vice versa. Assigned at most one judge, a voter is more likely to recall such salient events.[13] Obviously, the benefits of recollection depend upon stable voter assignments to nominent elections.

Specialized elections also increase incentives for certain forms of campaigning. If candidates know which voters are assigned to their election, they have incentives to undertake mass mailings and door to door campaigns, which previously may not have been feasible. In a population of one million voters and one hundred nominent elections, each election would be decided by ten thousand voters. One hundred volunteers each soliciting one hundred potential voters could canvass the entire random "district." The potential for increased campaigning complements the first two effects. Candidates in a specialized election confront an electorate both more interested in receiving information and more likely to retain it.

Finally, as the arguments above suggest, specialized elections should decrease the probability a voter encounters an unanticipated election; an election unknown to a voter until she confronts it in the voting booth. Thus, specialized elections should diminish the number of citizens voters who cast name recognition votes.

4. The Model:

Formal comparison of traditional and specialized elections requires performance

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[13] Some judges in Cook County, Illinois, who were found guilty in the Greylord Scandal were subsequently returned to the bench. It is doubtful that this was due as much to widespread public support as to voter ignorance.

criteria. In this paper, we focus on the ability of specialized elections to generate more representative outcomes. To begin, we define as the *full information election outcome* that result which would occur if each voter cast her full information ballot. The closer an election outcome is to this ideal, the better the outcome. There exists a variety of criteria by which to measure the distance between election outcomes: First, are the winning alternatives the same? Second, how different are the percentages of votes won? Or third, how many voters cast their full information ballots? While the last question can be ruled out given that empirical testing would be problematic, the second question deserves consideration, especially given the importance of mandates. The first question (Do the outcomes agree?) is the most important and simplest to analyze.

In the mathematical model presented below all decisions are binary (yes/no), and the information on which decisions are based consists of a set of discrete items.[14] The following notation is used throughout the analysis:

Notation:

M	*= number of voters*
M_y	*= the set of full information yes voters*
M_n	*= the set of full information no voters*
N	*= number of nominent election combined into a specialized election*
δ	*= 1/N, the proportion of voters in each specialized election*
x_i	*= the ith person's vote,* $x_i \in \{0,1\}$
K	*= set of information relevant to the election*
$P(K)$	*= the power set of K*

The relevant information, K, can be partitioned into two sets for each voter: known and unknown information, where the latter can become known at some cost.

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[14] The model easily can be extended to the multiple alternative case.

The ballot cast by a voter depends upon her known information. We call the subset of K known by voter i her *information set*. The ith voter's decision rule, v_i, is a map from the set of all information sets, P(K) into {0,1}, where 0 denotes "no" and 1 denotes "yes". Formally:

$$v_i : P(K) \rightarrow \{0,1\}$$

If she were fully informed, voter i would make the decision $v_i(K)$, which we abbreviate as $full_i$. An information set $I \in P(K)$ is *misleading* if $v_i(I)$ does not equal $full_i$.

A voter i's known information may either be part of her environment (exogenous information) or acquired through search (endogenous information). Voter i's known information can be written:

$$k(N) = k_{ex}(N) + k_{end}(k_{ex}, N)$$

where k = total information, k_{ex} = exogenous information, k_{end} = endogenous information. The two types of information are summed because a rational voter would never acquire information she already possessed. The exogenous information, k_{ex}, is a function of N because better data recollection and increased campaign incentives effect the amount of known information. The endogenous information, k_{end}, depends on the exogenous information set and on the number of nominent elections combined in the specialized election. For large N, the voter has few ballots to cast and can spend more time gathering information on each election. The model is consistent with bayesian decision making with search costs where a rational voter searches until the expected increases from doing so are offset exactly by the costs.

The power set of K, P(K), also characterizes the set of possible exogenous information sets. We assume that k_{ex} is a random variable and that $f_i(k_{ex})$ equals the probability distribution over voter i's exogenous information set. The probability that voter i casts a yes ballot can be written as:

$$x_i(N) = \sum_{k_{ex} \epsilon P(K)} f_i(k_{ex}) \cdot v_i[k_{ex}(N) + k_{end}(k_{ex},N)]$$

In other words, the probability that voter i casts a yes ballot can be written as a function of N, the number of nominent elections in the specialized election, or alternatively as a function of δ. Let $x_i(\delta)$ denote the binomially distributed random variable representing voter i's decision, $x(\delta)$ equal the sum of all of the $x_i(\delta)$'s, and $z(\delta)$ equal the sum of the $x_i(\delta)$'s for those i's participating in a given specialized election. Let $X(\delta)$ and $Z(\delta)$ refer to the corresponding *percentages* of yes votes. The following formulae for means and variances can be derived (the proof for $Var[Z(\delta)]$ is in the appendix):

$$E[X(\delta)] \qquad = M^{-1} \cdot \sum_{i=i}^{M} E[x_i(\delta)] = x(\delta)_\mu / M = X(\delta)_\mu$$

$$E[Z(\delta)] \qquad = X(\delta)_\mu = Z(\delta)_\mu$$

$$Var[X(\delta)] \qquad = M^{-2} \cdot \sum_{i=1}^{M} \{E[x_i(\delta)] \cdot (1-E[x_i(\delta)])\} = (\sigma_{X(\delta)})^2$$

$$Var[Z(\delta)] \qquad = (\delta^{-1}-1) \cdot Z_\mu \cdot (1-Z_\mu)/(M-1) + [1-(\delta^{-1}-1)/(M-1)] \cdot (\sigma_{X(\delta)})^2$$

$$= (\sigma_{Z(\delta)})^2$$

Hereafter, we condense the notation and refer to $X(\delta)$ and $Z(\delta)$ as simply X and

Z. We also introduce the variable, Y, which equals Z(1), the percentage of yes votes if there is only one nominent election. In other words, Y corresponds to the traditional election outcome. It follows that $\sigma_Y = \sigma_{Z(1)} = \sigma_{X(1)}$. For M large, the following claim can be made:

Claim 1: For Large M, the random variables X, Y, and Z are normally distributed with means and variances $(X_,,(\sigma_X)^2)$, $(Y_,,(\sigma_Y)^2)$, and $(Z_,,(\sigma_Z)^2)$ respectively.

pf: Each vote can be interpreted as a draw from a distribution of finite variance. Therefore, the Central Limit Theorem applies. See Billingsley (1986).

Expected Outcome :

For convenience, hereafter we assume that the full information winner is yes. A question of primary interest is when the expected percentage of yes votes in a specialized election exceeds the number of yes votes in a traditional election. Example 1 below describes a scenario in which this occurs:

> ***Example 1:*** *M = 1,000,000 δ=.01, Suppose that there are 520,000 voters who would vote yes with full information and 480,000 who would vote no. Suppose that in a traditional election the full information yes voters cast no ballots with probability p_y which is uniformly distributed on [.2,.3], and that the full information no voters cast yes ballots with probability p_n which is uniform on [.15,.25]. The expected number of yes voters is:*
>
> $$540{,}000 \cdot (1-.25) + 460{,}000 \cdot (.2) = 497{,}500$$
>
> *If as a result of the reduction of issue responsibility in a specialized election the error distribution ranges decrease by only 20%, i.e. p_y is uniform on [.16,.24] and p_n is uniform on [.12,.20], then the expected number of yes votes is greater than 500,000:*
>
> $$540{,}000(1-.2) + 460{,}000(.16) = 432{,}000 + 73{,}600 = 505{,}600$$

We now derive sufficient conditions for a specialized election to have a higher expected yes vote than a traditional election. The information acquisition model described above introduced misleading information sets. The probability of error equals the probability of possessing a misleading information set. Let

$$r_i(\delta) = E[\,|\,x_i(\delta)\text{-}full_i\,|\,]$$

be the expected distance of each voter from her full information vote. Recall that M_y is the set of full information yes voters, and M_n is the set of full information no voters. Let $A = |\,M_y\,| - |\,M_n\,|$, the full information margin of victory. If error functions are identical across voters and decreasing in the number of nominent elections, i.e. $r_i(\delta) = r(\delta)$ for all i and $dr/d\delta > 0$, then the expected number of yes votes in an election equals:

$$|\,M_y\,| \cdot (1\text{-}r(\delta)) + |\,M_n\,| \cdot r(\delta) = |\,M_y\,| - A \cdot r(\delta)$$

This implies that a specialized election has a higher expected number of yes votes. However, identical errors is a much stronger condition than necessary. The following weaker condition is sufficient for a specialized election to have more expected yes votes:

Assumption 2 (A2) $\sum_{i \iota M_y} [r_i(1)\text{-}r_i(\delta)] \geq \sum_{i \iota M_n} [r_i(1)\text{-}r_i(\delta)]$

A2 says that the aggregate error of yes voters must decrease by more than the aggregate error of no voters in the switch from a traditional election to a specialized election. In other words, if the yes voters improve their votes in aggregate by as much as the no voters, then the expected number of yes votes increases. Note that this was true in example 1 from Section 4. Since $| M_y |$ exceeds $| M_n |$, A2 is violated only when the increased information resulting from specialized elections proves misleading. We can now prove the following claim:

Claim 2: Given A2, the percentage of yes votes in a specialized election exceeds the number in a traditional election.

pf: see appendix.

Outcome Variance:

A shortcoming of specialized elections is that they increase outcome variance. As variance increases so does the probability of obtaining an incorrect outcome given a correct expected outcome increases. Conversely, given an incorrect expected vote, greater variance increases the probability of obtaining the full information outcome. The variance of z has two components: the sampling variance from a hypergeometric distribution and the variance in the population itself. The variance in a specialized election is minimized when the latter component, $\sigma_{X(s)}$, equals 0, which corresponds to specialization as full information. The following claim shows, given a technical assumption, that even when a specialized election creates perfectly informed voters that a traditional election has less outcome variance.

Claim 3: If $Z_\mu \cdot (1-Z_\mu) > (4N-4)^{-1}$ then a specialized election has higher outcome variance than a traditional election.

pf: see appendix.

The condition in Claim 3 holds for all reasonable values of Z_μ, the expected percentage of yes votes, and N, the number of nominent elections. If only thirteen nominent elections are combined in a specialized election, then the inequality becomes $Z_\mu \cdot (1-Z_\mu) > 1/48$, which is equivalent to saying that the percentage of yes voters in the specialized election exceeds 98%. As the number of nominent elections increases, the condition becomes even less restrictive.

By including variance in our analysis, we can determine precisely when a specialized election yields the full information outcome with higher probability than a traditional election. In a traditional election, the probability of obtaining yes, the full information outcome equals:

$$N[(Y_\mu - .5)/\sigma_Y)]$$

Whereas in a specialized election the probability of obtaining yes equals:

$$N[(Z_\mu - .5)/\sigma_Z)]$$

The following claim and its corollaries can now be shown:

Claim 4: The probability of obtaining the full information outcome in a specialized election is higher than in a traditional election if and only if $(Z_*-0.5)/\sigma_Z \geq (Y_*-0.5)/\sigma_Y$

pf: Follows from the monotonicity of $N(\cdot)$.

Corollary 4.1 If $Z_* > 0.5 > Y_*$ than probability of obtaining the full information outcome in a specialized election is higher than in a traditional election.

pf: Follows from Claim 4.

If both types of elections are more likely to return the incorrect outcome, the specialized election is generally preferred.

Corollary 4.2: If $Y_* < Z_* < 0.5$ and if $Z_* \cdot (1-Z_*) > (4N-4)^{-1}$ than probability of obtaining the full information outcome in a specialized election is higher than in a traditional election.

pf: Follows from Claim 4 and Claim 2.

A specialized election may be preferred even when the traditional election has the correct expected outcome.

Corollary 4.3: $0.5 < Y_* < Z_*$ then the probability of obtaining the full information outcome in a specialized election is higher than in a traditional election if

$$(Z_* - 0.5) \,/\, (Y_* - 0.5) > [\, N \cdot V_Z + O(1) \,]^{1/2} \,/\, \sigma_Y$$

where $V_Z = Z_* \cdot (1-Z_*) \cdot (M-1)^{-1}$ and $O(1)$ is small.

pf. see appendix:

To provide some intuition, we can approximate the inequality in Corollary 4.3 as

$$(Z_\mu - 0.5) > \text{constant} \cdot \sqrt{N} \cdot (Y_\mu - 0.5)$$

In other words, Z_μ must be $\sqrt{N}$ times a constant as far from 50% as Y_μ. Assume that the constant equals one.[15] In the case of one hundred nominent elections, if a traditional election had an expected outcome of 51% yes votes, then the specialized election would need an expected outcome of over 60% yes votes to be preferred.

A danger of specialized elections is that the greater variance could lead to the incorrect outcome, even if the expected outcome is correct. As Table 1 shows this is not likely. As a rule of thumb: *except in very close elections the only consideration should be whether the expected outcome is the full information outcome.* Even if Z_μ = 51%, there is less than a 2% chance of the specialized election returning the wrong result.

5. Conclusion:

A corollary to Schattschneider's comment about wisdom in democratic theory is that an informed electorate is critical to an effective democracy. When the electorate sufficiently demonstrates its inability to make informed choices, alternative mechanisms need to be considered. One alternative is to absolve citizens of a portion of their responsibilities. Not surprisingly, this "solution" has periodically been advocated. An example is the American Bar Association's (ABA) proposal earlier this century to replace direct election of judges with merit selection procedures. Presumably, part of

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[15] The size of the constant depends on σ_Y and Z_μ. The constant should not be too mush larger than one.

the ABA's motivation for this proposal was because they felt that determining judges' competency was one of "the things that people cannot do."[16]

More recently, theorists have proposed complementary institutions. Dahl (1989) and Fishkin (1991) advocate creating small, randomly selected opinion making bodies. These assemblies would promote deliberative, and possibly even consensual, decisions. Here again, arguments against these institutions mention the possibility of bias from taking samples. Given the relative size of the samples taken, the random districting of citizens in a specialized elections creates substantially less sample bias than the selection of a random deliberative body. It follows that in two specialized districts, aggregate preferences should be roughly similar. This similarity of preferences offers the opportunity for improved democratic outcomes through specialization - the opportunity to bring the pin factory to democracy. Voters free ride off the efforts of others and return the favor through their own informed decisions. In addition, candidates confront a more attentive and smaller electorate. Fewer financial and media resources are necessary to mount and sustain an effective campaign.

Specialized elections offer the possibility of reducing voter effort, improving results, and retaining equality. They also open the door for even more decisions to be brought before the electorate. The prospect of fifteen or twenty ballot initiatives and sixty judicial elections need not create havoc in a democracy which uses specialized

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[16] Since their adoption in many states and counties, merit selection procedures have not been proven more effective, much less a panacea. Retention elections -- where voters are only given the option of ousting sitting judges -- designed to ensure responsiveness and accountability, have proven to be no more than rubber stamps. Almost no judges lose retention elections. In Missouri, the first state to adopt merit selection, voters retained appointees in 178 of the first 179 judicial retention elections (Dubois 1980).

elections. Finally, although the discussion has been limited to political decisions, specialized election could be used in any organization with a large membership, including corporations, interest groups, professional societies, and unions.

Table 1

One Million Voters

Probability of Full Information Outcome

$Z_r(1-Z_r) = 0.2$

	N = 100	N = 25	N = 10
exp(yes)	$\delta = 0.01$	$\delta = 0.04$	$\delta = 0.1$
.60	1.0 (20.42)	1.0 (40.96)	1.0 (65.09)
.59	1.0 (18.31)	1.0 (36.73)	1.0 (58.37)
.58	1.0 (16.22)	1.0 (32.53)	1.0 (51.72)
.57	1.0 (14.15)	1.0 (28.38)	1.0 (45.13)
.56	1.0 (12.10)	1.0 (24.27)	1.0 (38.59)
.55	1.0 (10.06)	1.0 (20.18)	1.0 (32.09)
.54	1.0 (8.03)	1.0 (16.11)	1.0 (25.63)
.53	1.0 (6.02)	1.0 (12.07)	1.0 (19.20)
.52	1.0 (4.01)	1.0 (8.02)	1.0 (12.79)
.51	.977 (2.00)	1.0 (4.02)	1.0 (6.38)
.505	.841 (1.00)	.977 (2.01)	.999 (3.19)
.501	.579 (0.20)	.655 (0.40)	.739 (0.64)

Table 1 shows that if N = 100 ($\delta = .01$) and the expected margin of victory is 2%,(a 51-49% vote), then the wrong outcome will occur only 2.2% of the time. The increased variance resulting from the specialized election, is not of great importance. Variance matters only for those elections that would have been very close had everyone voted and been perfectly informed.

Appendix

Derivation of Var[Z(δ)]

$$\text{Var}[Z] = (\delta \cdot M)^{-2} \cdot [\ E\{\text{Var}[z \mid x]\} + \text{Var}\{E[z \mid x]\}\ ]$$

Solving for each term separately, we obtain:

$$\begin{aligned}
E\{\text{Var}[z \mid x]\} &= E\{\delta M \cdot x \cdot (M-x) \cdot (M-\delta M) \ /\ [M^2 \cdot (M-1)]\} \\
&= E\{(\delta-\delta^2) \cdot x \cdot (M-x) \ /\ (M-1)\} \\
&= (\delta-\delta^2) \cdot (\ M \cdot E[x] - E[x^2]\ ) \ /\ (M-1) \\
&= (\delta-\delta^2) \cdot [\ M \cdot x_\mu - (x_\mu)^2 - \text{Var}(x)] \ /\ (M-1) \\
&= (\delta-\delta^2) \cdot [\ x_\mu \cdot (M-x_\mu) - \text{Var}(x)] \ /\ (M-1)
\end{aligned}$$

$$\begin{aligned}
\text{Var}\{E[z \mid x]\} &= E\{\ [E(z \mid x)]^2\ \} - \{\ E[E(z \mid x)]\ \}^2 \\
&= E\{[\delta x]^2\} - \{\ E[\delta x]\ \}^2 \\
&= E\{x^2\} \cdot \delta^2 - \{\ E[x]\ \}^2 \cdot \delta^2 \\
&= \text{Var}[x] \cdot \delta^2
\end{aligned}$$

Combining we obtain:

$$\begin{aligned}
\text{Var}[Z] &= (\delta \cdot M)^{-2} \cdot [(\delta-\delta^2) \cdot x_\mu \cdot (M-x_\mu) \ /\ (M-1) + [\ \delta^2 - (\delta-\delta^2)/(M-1)\ ] \cdot \text{Var}[x]] \\
&= [(\delta^{-1}-1) \cdot Z_\mu \cdot (1-Z_\mu) \ /\ (M-1)] + [\ (\delta M-1) \ /\ (\delta M-\delta)\ ] \cdot (\sigma_{X(\delta)})^2
\end{aligned}$$

Note that if $\delta = 1$, then the first term equals zero and Var[Z] = Var[X].

Claim 2: Given A2, the percentage of yes votes in a specialized election exceeds the number in a traditional election.

pf: $E[Y] = M^{-1} \cdot \sum_{i=1}^{M} x_i(1) = M^{-1} \cdot [\sum_{i.M_y} x_i(1) + \sum_{i.M_n} x_i(1)]$

$$= M^{-1} \cdot [\sum_{i.M_y} \text{full}_i + \sum_{i.M_y} (x_i(1)-\text{full}_i) + \sum_{i.M_n} | x_i(1)-\text{full}_i |]$$

$$= M^{-1} \cdot [\sum_{i.M_y} \text{full}_i - \sum_{i.M_y} r_i(1) + \sum_{i.M_n} r_i(1)]$$

Similarly:

$$E[Z] = M^{-1} \cdot [\sum_{i.M_y} \text{full}_i - \sum_{i.M_y} r_i(\delta) + \sum_{i.M_n} r_i(\delta)]$$

$$E[Z] - E[Y] = M^{-1} \cdot [\sum_{i.M_y} [r_i(1)-r_i(\delta)] - \sum_{i.M_n} [r_i(1)-r_i(\delta)]]$$

which completes the proof.

Claim 3: If $Z_\mu(1-Z_\mu) > (4N-4)^{-1}$ then a specialized election has higher outcome variance.

pf: It suffices to show:

$$(\delta^{-1}-1) \cdot Z_\mu \cdot (1-Z_\mu) / (M-1) > (\sigma_Y)^2$$

Given that $(4M)^{-1}$ is an upper bound on the right hand side, the inequality above is implied by:

$$(\delta^{-1}-1) \cdot Z_\mu \cdot (1-Z_\mu) / (M-1) > (4M)^{-1}$$

which is in turn implied by: $(\delta^{-1}-1) \cdot Z_\mu \cdot (1-Z_\mu) > 1/4$

Substituting N for δ^{-1} completes the proof.

Corollary 4.3: $0.5 < Y_\mu < Z_\mu$ then the probability of obtaining the full information outcome in a specialized election is higher than in a traditional election if

$$(Z_\mu - 0.5) \,/\, (Y_\mu - 0.5) > [\, N \cdot V_Z + o(1) \,]^{-1/2} \,/\, \sigma_Y$$

where $V = Z_\mu \cdot (1-Z_\mu) \,/\, (M-1)$ and $o(1)$ is small.

pf: It suffices to show that the inequality above implies:

$$(Z_\mu-0.5)/\sigma_Z > (Y_\mu-0.5)/\sigma_Y.$$

Or, restated, that:

$$(\sigma_Z) < [\, N \cdot V_Z + o(1) \,]^{-1/2}$$

From the definition:

$$(\sigma_Z)^2 = (\delta^{-1}-1) \cdot Z_\mu \cdot (1-Z_\mu) \,/\, (M-1) + [(\delta M-1) \,/\, (\delta M-\delta)] \cdot (\sigma_X)^2$$

Letting $V_Z = Z_\mu \cdot (1-Z_\mu) \,/\, (M-1)$. It can be shown that:

$$V_Z > (M-1) \cdot (\sigma_X)^2 \,/\, M.$$

Therefore,

$$(\sigma_Z)^2 < (\delta^{-1}-1) \cdot V_Z + V_Z + V_Z \,/\, (\delta M)$$

The last term in the numerator on the r.h.s. is an order of magnitude smaller than the other terms and is abbreviated as $o(1)$, yielding.

$$(\sigma_Z)^2 < N \cdot V_Z/(M-1) + o(1)$$

which completes the proof.

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