ECONOMIC RESEARCH REPORTS

DOES APPROVAL VOTING ELECT THE LOWEST COMMON DENOMINATOR?

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R.R. #87-45 December 1987

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ABSTRACT

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Under approval voting (AV), candidates may win not because they are the first choices of many voters but rather because they are lower-ranked choices who are still acceptable and thereby garner approval votes. To test whether such lowest common denominators are commonly elected, AV ballot data from ten recent elections of The Institute of Management Sciences (TIMS) and the American Statistical Association (ASA) were examined. In the three TIMS elections and six of the seven ASA elections, the winners were "AV-dominant"--they won at least as many votes as losers both from voters who approved of relatively few candidates ("narrow" voters) and voters who approved of relatively many candidates ("wide" voters). Even in the one ASA election in which the winner was not AV-dominant, this person won principally because of overwhelming support from narrow voters, suggesting that AV tends not to elect bland candidates who benefit simply from the lukewarm support of wide voters.

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1. Introduction

Approval voting (AV) is a voting system in which voters can vote for as many candidates as they wish in a multicandidate election--one with more than two candidates (Brams and Fishburn, 1983). Like plurality voting (PV), in which voters are restricted to casting just one vote, the candidate (or candidates) with the most votes wins, with each candidate appproved of receiving one full vote.

The salient difference between AV and PV in multicandidate elections is that voters, by indicating that they approve of more than one candidate under AV, can help more than one to get elected. This feature of AV tends to prevent a relatively extreme candidate, who may be the favorite of a plurality of the electorate but is anathema to the majority, from winning. Whereas under PV an extremist can win if two or more moderate candidates split the centrist vote, under AV centrist voters can prevent the extremist's election by voting for more than one moderate. Insofar as the moderate candidates share the votes of their centrist supporters, then one will be elected--and the proverbial will of the majority will be expressed.

One fear that has been expressed about the use of AV is that while it may help elect candidates more broadly representative than PV, these candidates could turn out to be rather bland and uninspiring. They may win simply because they offend the fewest voters, not because they excite the passions of many. In this paper we shall test this hypothesis with AV

voting returns from two recent sets of elections, showing that the fear of electing a lowest common denominator is generally unfounded.

2. Approval Voting and Compromise Candidates

Social choice theory, in which the usual starting point is information about individual preferences, does not offer guidelines for distinguishing between exciting and unexciting candidates. Given information about voter preferences, however, one certainly can draw a rough distinction, say, between the case in which the winner is ranked both high and low (by different sets of voters, of course), and that in which the winner is the medium choice of most voters. In the latter case, presumably, the winner would be a compromise candidate--at least minimally acceptable to most voters but not one to arouse passionate responses either for or against.

It is difficult to say whether, in principle, a compromise candidate is a better or worse social choice than a more extreme candidate who is the darling of some voters but the bane of others. In practice, fortunately, this dichotomous choice seems rarely to arise, as data from ten recent elections will demonstrate. These data include AV ballots for each voter; in three of the elections, we also have PV ballots and information on voter preferences--that is, voter rankings of the candidates. In the other seven elections, however, we are not able to distinguish, within the subsets of approved and nonapproved candidates on each ballot, who is preferred to whom.

Nonetheless, the AV data allow one to distinguish not only preferred from nonpreferred subsets of candidates but also to infer something about the intensity of voter preferences, depending on how many candidates the

voter approved of on his or her ballot. As several scholars have demonstrated (for references, see Brams and Fishburn, 1983, ch. 5), rational voters tend to vote for just one or a very few candidates when they rate their favorites much superior to the other candidates, given all candidates are considered viable contenders. On the other hand, they spread their approval votes more widely across candidates when they do not perceive major differences among them, or intensely dislike only a few.

The ballot data we shall analyze come from the elections of two different professional societies that have recently experimented with AV. One is The Institute of Management Sciences (TIMS), which has about 6,000 members. In 1985 TIMS asked its members to submit experimental AV ballots, along with the (then) official PV ballots, in elections for three different offices. On the basis of the results of this experiment, which we shall say more about later, TIMS adopted AV in 1987 as its official election procedure.

We shall also analyze AV ballot data from seven small internal elections of the American Statistical Association (ASA), a society with about 15,000 members. The numbers of voters in these elections, which were used to elect council governors, editors to the ASA Board, and a member of an executive committee, ranged from five to twenty ASA officeholders. These elections were designed to gain some experience with AV before recommending it for ASA-wide elections, which has now been done. It is expected that the ASA will adopt AV for all elections, beginning in 1988.

As we shall next show, the AV ballot data from both TIMS and the ASA elections point to one conclusion: the dilemma posed earlier between choosing a bland, minimally acceptable candidate and an exciting, controversial candidate does not seem to occur in practice. At least in the ten elections we have studied, in which voters were well informed about AV and mathematically sophisticated, the winners under AV were candidates who were generally popular among all voters, however many candidates they voted for in the different elections. (Later we distinguish between "narrow" and "wide" voters; winners supported by both kinds are "AV-dominant.")

Thus, a divergence between forceful minority candidates (supported by narrow voters) and wishy-washy majority candidates (supported by wide voters) may well be an infrequent event: AV winners tend to be strong among all classes of voters. By contrast, the preference data we have for the three TIMS elections indicate that PV may elect minority candidates, who do not command support among all classes, in an uncomfortably large number of instances.

3. TIMS Elections

The test of AV was announced in February 1985, and in May 1985 all TIMS members received both an official PV ballot and an experimental AV ballot. Of the 1,851 members returning the PV ballot, 85 percent also returned the AV ballot, and 82 percent provided at least some rankings of the candidates (asked on the experimental AV ballot) in three multicandidate races (Little and Fishburn, 1986; Fishburn and Little, 1987).

This is considered an excellent response rate for such an experiment. Moreover, a careful analysis by Fishburn and Little (1987) of PV voters who

did and did not participate in the experiment reveals there to be no significant differences in their voting under PV, strongly suggesting that the 85 percent sample of AV respondents is probably representative of the entire voting electorate for purposes of comparing PV and AV in these elections.

Our main interest, however, is not in comparing PV and AV but rather in analyzing patterns of voting under AV. For this purpose, we restrict our analysis to AV voters who approved of at least one but not all the candidates in each TIMS race. The strategy of voting for all candidates, of course, has no effect on the outcome; it presumably indicates general approval of the entire slate or simply ignorance or indifference. Relatively small proportions of the electorate chose this strategy in each election.

To preserve anonymity, TIMS elections are identified as T1, T2, and T3. T1 and T2 were 3-candidate races, with 1,428 and 1,140 members, respectively, casting either one or two votes to elect a single winner. T3 was a 5-candidate race, in which 1,246 voters cast between one and four votes to elect two winners.

In Table 1 we have indicated the numbers of votes that each of the three candidates (A, B, and C) received from two types of voters--those who cast exactly one vote and those who cast exactly two votes--in T1 and T2. The percentages indicate the proportion of support each candidate received from 1-voters and 2-voters, summing to 100 across the rows for each election. Thus, for example, candidate A in T1 got 36 percent of his votes from 1-voters and the remaining 64 percent from 2-voters.

We have given a similar breakdown of votes, indicating from what types of voters they were received, for T3 in Table 2. To provide greater comparability with T1 and T2, we also include in this table the aggregated figures of voting for 1 or 2 candidates on the one hand, and of voting for 3 or 4 candidates on the other.

Note that the contributions to the candidates' AV totals in the 3-4 case for T3 are all at least 50 percent, as was true of those voting for exactly 2 candidates in T1 and T2. More specifically, the mean percentages of votes received from 2-voters in T1 and T2 (62 percent), and 3-voters and 4-voters in T3 (56 percent), suggest that voting for 1 (2) candidates in 1-winner elections is roughly equivalent to voting for 1 or 2 (3 or 4) candidates in 2-winner elections (at least with fields of three and five candidates, respectively). That is, there is in both cases a roughly 2-to-3 breakdown in approval votes received from voters who voted for "few" versus "many" candidates.

To be more precise, define the strategy of voting for 1 candidate in a 1-winner election, and 1 or 2 candidates in a 2-winner election, as narrow; and the strategy of voting for 2 candidates in a 1-winner election, and 3 or 4 candidates in a 2-winner election, as wide. Narrow voters may be thought of as more selective with respect to favorites, wide voters with respect to nonfavorites.

We regard each kind of voter as discriminating (though in some elections it may be simply name recognition that is the basis of their discriminations). The crucial difference between the two types of voters lies in the fact that narrow voters substantially favor--or recognize--a few

candidates over the rest, whereas wide voters substantially disfavor a few candidates over the rest (and so place more candidates in their approved category to distinguish them from the few they definitely dislike).

Define a winner to be AV-dominant if he or she receives at least as many votes as every loser from both narrow and wide voters. By this indicator of support for a winner, the winners in T1 (A), T2 (A), and T3 (A and B) are all AV-dominant. Indeed, A and B have even a greater claim to victory in T3: each receives more votes than C, D, or E from all types of voters--1-voters, 2-voters, 3-voters, and 4-voters.

In other words, none of the winners in the three TIMS elections won simply because he or she benefitted disproportionally from the support of one type of voter. In particular, it was not wide voters who pushed one candidate over the top. Had this been the case, it could be argued that such a winner garnered more votes solely by being a kind of lowest common denominator, tolerable to many and the first choice of few. But in all three TIMS elections, winners had greater appeal than losers across all types of voters.

The preference data collected on the TIMS candidates indicate that AV selected the so-called Condorcet candidates in all three contests: each of the winners could defeat, or at least tie, all the losers in separate pairwise contests. By comparison, PV actually chose one nonCondorcet candidate (D in T3), which underscores the well-known vulnerability of PV to the election of nonCondorcet candidates (for a review of empirical evidence and theoretical arguments, see Merrill, 1988).

In addition, PV selected B in T1, who, remarkably, would have tied A in a pairwise contest. Hence, both A and B are Condorcet candidates, because each can defeat C, though B narrowly defeated A under PV and therefore won the official contest.

Yet A beat B handily under AV, because he received considerably more support from those C voters who cast two approval votes (68 percent). Evidently, then, B, the PV winner, was a weaker candidate than A, the AV winner. Thus, as in T3, PV probably erred in T1 in selecting a minority candidate. The fact that such candidates won in two of the three TIMS contests seems to have been decisive in TIMS's selection of AV as its official election procedure.

4. ASA Elections

Without either PV results or preference information, we cannot compare directly AV to PV, or any other election procedures, in the seven ASA elections (Potthoff, 1987). Moreover, because the electorates in these internal elections are small, and three elections (out of seven) involved ties or were decided by only one vote, we perhaps cannot attribute as much significance to these results as the results in the TIMS races. On the other hand, there are more elections, and the electorates vary, so the consistency of the support we shall show exists for winners in the ASA races seems as strikng as in the TIMS races.

The number of candidates who received at least one vote in the ASA elections, which we shall identify as S1 through S7, varies from three to ten. In Table 3, the usual breakdown of votes by different types of voters is shown for S1 and S2, with aggregated figures for narrow and wide voters

chosen so that the majority of votes, but not necessarily voters, come from wide voters. Note in S2 that because there are no 2-voters, voting for 1, or 1 or 2, candidates both define narrow voters.

These are two of the three ASA contests in which one additional vote could make a tie (for B in S1) or break a tie (between B and C in S2). In S1, the winner, C, is AV-dominant, as are the tied winners, B and C, in S2.

The winners in S3 (A) and S4 (B), which are shown in Table 4, are also AV-dominant. In S4, which is only a three-candidate contest, the vast majority of the voters (86 percent) are 1-voters, which makes this one of two ASA contests in which the votes of wide voters are not a majority (25 percent in this case).

There are six candidates in S5, as shown in Table 5, and again the top vote-getter (D) is AV-dominant. This is the only ASA contest in which two winners were elected, and the two second-place candidates (B and E), who tie with four votes each, are both AV-dominant (vis-à-vis the losers, not with respect to the first-place winner, D). Recall that the AV-dominance of winners is defined with respect to losers, not other winners.

S6 (Table 6) has only one 2-voter, with the nine 1-voters dividing among five candidates. Nevertheless, E is the decisive winner and AV-dominant.

Finally, consider S7 (Table 7), which, like S5, is a large eletion (10 candidates). However, unlike all the other ASA elections, the winner, G, is not AV-dominant. We shall come back to this case shortly.

In summary, in six ASA elections, the winner--or winners in the case of S2 (tie) and S5 (two members elected; tie for second place)--is AV-dominant. Even more compelling is the fact that, except in S5, the winner(s) were AV-dominant across all types of voters. In S7, wherein the winner (G) got less support from wide voters than some other candidates, this loss is more than compensated for by G's overwhelming narrow support, which is instrumental in giving G 50 percent more approval votes than the two second-place candidates.

5. Conclusions

The fact that winners in nine of the ten TIMS and ASA elections are AV-dominant surprised us. But should it? After all, one would expect that winners would do better than losers across different types of voters.

A little reflection, however, shows that this need not be the case. Paradoxically, a candidate may lose among every possible class of voters--that is, be AV-dominated--and still be the AV winner. For example, A might be the victor over C among narrow voters, and B might be the victor over C among wide voters. But C could emerge as the AV winner if A did badly among wide voters, B did badly among narrow voters, but C was a close second among both types.

No winners in the TIMS and ASA elections were AV-dominated. On the contrary, the AV-dominance of the winners was complete, with the exception of S7. Yet in this election two-thirds of the winner's AV support came from 1-voters. Because such support is generally more heartfelt and intense than wide support, it seems highly unlikely that, even in S7, the winner was a weak compromise choice. Indeed, three-quarters of all 1-

voters in S7 supported this person, which is six times more 1-voter support than any other candidate received.

Altogether, the AV results strongly suggest that lowest-common-denominator winners, who may have wide but only lukewarm support, are probably not a common occurrence. At least no such candidate showed up in the ten elections studied here, but we shall investigate this question further in elections of other professional societies (e.g., the Mathematical Association of America) that have adopted AV.

TABLE 1

APPROVAL VOTES IN T1 AND T2

	T1			T2		
Candidates	Narrow 1-Voters	Wide 2-Voters	Total	Narrow 1-Voters	Wide 2-Voters	Total
A	350 (36.2%)	617 (63.8%)	976* (100%)	273 (45.0%)	334 (55.0%)	607* (100%)
B	290 (34.6%)	547 (65.4%)	837 (100%)	248 (44.9%)	304 (55.1%)	552 (100%)
C	66 (19.1%)	280 (80.9%)	346 (100%)	199 (50.1%)	198 (49.9%)	397 (100%)
Total Votes	706	1444	2150	720	836	1556
No. of Voters	706	722	1428	720	418	1138

*Winner

TABLE 2

APPROVAL VOTES IN T3

Candidates	1-Voter	2-Voters	3-Voters	4-Voters	Narrow (1 or 2)	Wide (3 or 4)	Total
A	18 (2.1%)	372 (44.1%)	386 (45.7%)	68 (8.1%)	390 (46.2%)	454 (53.8%)	844* (100%)
B	11 (1.7%)	272 (43.0%)	287 (45.3%)	63 (10.0%)	283 (44.7%)	350 (55.3%)	633* (100%)
C	7 (1.2%)	244 (41.9%)	272 (46.7%)	60 (10.3%)	251 (43.1%)	332 (55.9%)	583 (100%)
D	9 (1.6%)	252 (43.5%)	273 (47.2%)	45 (7.8%)	261 (45.1%)	318 (54.8%)	579 (100%)
E	6 (1.4%)	150 (35.4%)	216 (50.9%)	52 (12.3%)	156 (36.8%)	268 (63.2%)	424 (100%)
Total Votes	51	1290	1434	288	1341	1722	3063
No. of Voters	51	645	478	72	696	550	1246

*Winner

TABLE 3

APPROVAL VOTES IN S1 AND S2

	S1						S2						
	n-Voters			Nar.	Wide		n-Voters				Nar.	Wide	
Candidates	1	2	3	(1)	(2/3)	Total	1	2	3	4	(1/2)	(3/4)	Total
A	1	0	0	1	0	1	0	0	0	1	0	1	1
B	1	0	1	1	1	2	1	0	2	1	1	3	4*
C	1	1	1	1	2	3*	1	0	2	1	1	3	4*
D	0	1	0	0	1	1	0	0	1	0	0	1	1
E	0	0	1	0	1	1	0	0	2	0	0	2	2
F	-	-	-	-	-	-	0	0	2	1	0	3	3
Total	3	2	3	3	5	8	2	0	9	4	2	13	15
No. of Voters	3	1	1	3	2	5	2	0	3	1	2	4	6

*Winner; because there was a tie in S2, one of the two top vote-getters was randomly selected.

TABLE 4

APPROVAL VOTES IN S3 AND S4

	S3						S4		
	n-Voters			Narrow	Wide		Narrow	Wide	
Candidates	1	2	3	(1)	(2/3)	Total	(1)	(2)	Total
A	2	1	1	2	2	4*	2	2	4
B	1	0	1	1	1	2	6	2	8*
C	1	0	1	1	1	2	4	0	4
D	0	1	0	0	1	1	-	-	-
Total Votes	4	2	3	4	5	9	12	4	16
No. of Voters	4	1	1	4	2	6	12	2	14

*Winner

TABLE 5

APPROVAL VOTES IN S5

Candidates	n-Voters 1	2	3	4	5	Narrow (1/2)	Wide (3/4/5)	Total
A	0	1	0	1	1	1	2	3
B	0	1	1	1	1	1	3	4*
C	0	0	2	0	1	0	3	3
D	3	1	2	0	1	4	3	7*
E	0	1	1	1	1	1	3	4*
F	0	0	0	1	0	0	1	1
Total Votes	3	4	6	4	5	7	15	22
No. of Voters	3	2	2	1	1	5	4	9

*Winner; because there was a tie for second place, one of the two second-place candidates was randomly selected to fill the second seat in this two-winner election.

TABLE 6

APPROVAL VOTES IN S6

Candidates	Narrow 1-Voters	Wide 2-Voters	Total
A	2	0	2
B	1	0	1
C	0	1	1
D	1	0	1
E	4	1	5*
Total Votes	8	2	10
No. of Voters	8	1	9

*Winner

TABLE 7

APPROVAL VOTES IN S7

Candidates	n-Voters 1	2	3	4	Narrow (1/2)	Wide (3/4)	Total
A	0	0	1	2	0	3	3
B	1	3	1	1	4	2	6
C	0	1	1	0	1	1	2
D	0	0	1	4	0	5	5
E	1	1	2	2	2	4	6
F	0	0	0	2	0	2	2
G	6	1	2	0	7	2	9*
H	0	0	1	1	0	2	2
I	0	0	1	2	0	3	3
J	0	2	2	2	2	4	6
Total Votes	8	8	12	16	16	28	44
No. of Voters	8	4	4	4	12	8	20

*Winner

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ACKNOWLEDGMENT

We thank Richard F. Potthoff for valuable comments on an earlier draft of this paper.