Clashes Involving National Popular Vote, Hare ("RCV"), Maine, Alaska

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ABSTRACT   Apparently unnoticed by its advocates, a prominent effort to improve the troubled US presidential-election system—the National Popular Vote Interstate Compact (NPVIC)—is on a collision course with another effort at electoral change—"ranked-choice voting" (RCV, known previously by less ambiguous names). The NPVIC is a clever device intended, without constitutional amendment, to elect as president the nationwide popular-vote winner (i.e., the plurality-vote winner) rather than the electoral-vote winner. Election results in 2000, 2016, and 2020 enhanced its support. However, the (constitutional) ability of even one state to replace its plurality voting with another voting system causes the popular-vote total posited for the NPVIC to be undefined, thereby rendering the NPVIC unusable. Maine and Alaska recently switched from plurality voting to RCV for presidential elections. Consequently, tangled results and turmoil could occur with the NPVIC. To improve presidential elections, replacing plurality voting with other systems appears to be more sensible than pursuing the NPVIC.

In the 2000 US presidential election, George W. Bush was elected president by winning more electoral votes than Albert Gore despite losing to him, albeit narrowly, in the nationwide popular vote. Hillary Clinton had a popular-vote margin of almost 3 million votes over Donald Trump in the 2016 presidential race but still lost to him in the Electoral College. In 2020, Trump lost the popular vote by an even greater margin than in 2016; but Joe Biden won in the Electoral College—although only barely—after eking out close victories in several pivotal states.

In view of this close call in 2020, together with the disagreement between electoral-vote and popular-vote winner in 2000 and in 2016, one can expect a continuation—maybe even an expansion—of previous efforts to cut back the influence of the Electoral College and give more weight to the popular vote in deciding presidential election winners. If the role of the Electoral College is to be diminished, the most straightforward way to do so would be through constitutional amendment. However, that approach is fraught with obstacles, so much so that proponents of change largely eschew it as unlikely to be successful. Hence the emergence, about 15 years ago, of the proposed National Popular Vote Interstate Compact (NPVIC), a creative scheme that seemingly would be able to bypass the Electoral College and decide a presidential election based on the nationwide popular vote, without amending the Constitution.

Under the NPVIC (Koza et al. 2013; Richie and Levien 2013), once enough states have joined the compact so that they have sufficient total electoral votes to elect a president (currently 270), each state in the compact is obliged to cast its electoral votes for the national popular-vote winner (even if another candidate wins the state). The theme of this critique is to contend that that winner can be mathematically undefined, thereby potentially causing the NPVIC scheme—despite any merits it may possess otherwise—to be not only inexecutable but also capable of creating chaos. What is mathematically undefined is, necessarily, also legally undefined; in turn, this legal ambiguity is what ultimately seals the fate of the NPVIC proposal.

CURRENT STATUS OF THE NPVIC

As of early 2021, 15 states and the District of Columbia had joined the NPVIC. Not surprisingly in view of recent electoral history, their political leanings are heavily toward the Democratic Party. Their electoral votes currently total 196, or 74 short of the required 270; however, the number 196 could change slightly as a result of the 2020 US Census.

The most recent activity concerning the status of the NPVIC occurred in Colorado. In 2019, that state had joined the NPVIC through a bill passed by the legislature and signed by the governor.

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However, opponents then forced a referendum on the NPVIC law (possible in Colorado). In the November 2020 election, this veto referendum went to Colorado voters, who approved the NPVIC by the narrow margin of 52.3% to 47.7%. In general, Democratic leaders and counties supported the NPVIC and Republicans opposed it.

The possibility for a state to use a voting system other than plurality voting constitutes a lethal quagmire for the NPVIC.

Many works have been written both attacking and defending the Electoral College, with the attacks perhaps outnumbering the defenses. We make no attempt to recount those works here. Although Koza et al. (2013) are highly critical of the Electoral College in their massive publication on the NPVIC, they largely cover the main arguments and the main writings not only against the NPVIC but also for it.

THE NPVIC RELIES ON PLURALITY VOTING

The NPVIC has a fatal defect. The difficulty stems from Article II, Section 1, Paragraph 2, of the US Constitution, which allows each state to decide how to choose its Electors. That provision not only allows any state to join the NPVIC (provided that the NPVIC is constitutional, as its proponents assume; see Koza et al. 2013, section 9.1) but correspondingly also allows any state to use a voting method other than plurality voting in a presidential election.

Thus, for its November 2020 presidential voting, the State of Maine replaced plurality voting with the (single-winner version of the) Hare system, a method whose ballots direct voters to rank the candidates. The system is known also as the alternative vote, or instant-runoff voting, or IRV, or ranked-choice voting, or RCV. (It would seem that these last two terms could apply equally well to other systems that use ranked ballots, such as Borda, Condorcet methods, and Coombs—which explains why RCV is enclosed in quotation marks in the title of this article.) The Hare system successively eliminates whoever has the fewest first-place votes and redistributes that candidate's ballots as first-place votes to the highest-ranked non-eliminated candidate (if any) on each of those ballots. The Hare system's final round comes when a candidate has a majority of the first-place votes on the remaining ballots.

Since long before starting to use the Hare system, Maine has had a system for determining its electoral votes in presidential elections that is unlike that of any other state except Nebraska. Maine gives two electoral votes to the statewide winner and bestows one electoral vote on the winner in each of its two congressional districts. Thus, for the November 2020 presidential contest in Maine, Hare was applicable not only once but three times. In the 2020 tally, Biden received more than 50% of the first-place votes statewide. Each district race also had more than 50% going to one candidate: Biden in the first district and Trump in the second. As a result, no second round under the Hare system was needed in any of the three contests.

In addition to Maine, Alaska is set to use the Hare system in its November 2024 presidential voting. In November 2020, Alaska voters approved its use for future presidential (and other) elections. The margin in favor of the Hare system was 50.5% to 49.5%—even tighter than the Colorado margin in favor of the NPVIC.

This study maintains that the possibility for a state to use a voting system other than plurality voting constitutes a lethal quagmire for the NPVIC. The claim would still hold even if Maine and Alaska had not replaced plurality voting with the Hare system for presidential elections—and would still hold if they were to revert to plurality voting—because any state could switch away from plurality voting at any time. Moreover, it also would still hold if a state were to replace its plurality voting not with Hare but with another system. The reason for the predicament is that the language in the NPVIC text does not cover electoral systems other than plurality voting. The national popular vote total, required for the use of the NPVIC, is undefined (and thus effectively nonexistent) unless *every* state uses plurality voting for its presidential elections. The problem becomes more evident upon study of Examples 1 and 2 presented in the next section.

HARE VOTING CLASHES WITH THE NPVIC IN MAINE

The following two examples show how the NPVIC would be incompatible with the Hare system in Maine. They apply regardless of whether Maine is a nonmember (as is the case now) or member of the compact because the compact uses the votes from across the entire country. The quandaries that affect Maine would apply also to Alaska, except that there can be extra anomalies with Maine because of how the fragmentation of its electoral votes (described previously) interacts with the Hare system.

The two examples admittedly are extreme cases but were constructed in that way for emphasis. They may be unrealistic in the following three respects:

1. For simplicity, Maine ballots are marked in only a few of the many ways that a voter can cast a ranked ballot (including leaving some candidates unranked).
2. The examples show substantial support for candidates from more than just two dominant parties. However, future elections could see increased backing from additional parties. In fact, the influence of candidates beyond two in Maine contributed to the Hare system's proponents pushing for its adoption there.
3. In Example 2, vote differences between districts are quite large.

Concerns such as these three may affect the scale but not the potentiality of the types of problems that the two examples portray.

Example 1

Five candidates (the same number as in Maine's 2020 presidential election) are on Maine's presidential ballot: V, W, X, Y, and Z. More precisely, these are five *slates*, each consisting of a presidential and a vice-presidential candidate. This example looks mainly at the statewide picture and supposes that exactly half of the voters who mark a given ranking are in each district. Therefore, the results in each district are basically the same as those statewide.

Table 1 shows how the Hare system successively eliminates Y, W, and V, leaving X as the winner over Z. Slate X wins all four of Maine's electoral votes (if Maine is a nonmember of the NPVIC) but has received only 52,000, or 6½%, of Maine's 802,000 total first-place Hare votes.

Now comes the crucial question: For purposes of the NPVIC, how would the votes for the five slates in Maine be tallied? Section III-1 of the NPVIC text refers merely to the determination of "the number of votes for each presidential slate in each State..." as a prelude to "add[ing] such votes together [across states] to produce a 'national popular vote total' for each presidential slate"; Section III-2 specifies "the presidential slate with the largest national popular vote total as the 'national popular vote winner'" (Koza et al. 2013, 259; see also 262–69). However, there is no definition of "number of votes" or of what a "vote" is. It seems to be assumed implicitly that all votes are by plurality voting, with no recognition that voting could be using the Hare system—or, for that matter, approval voting, a Condorcet method, Borda, Coombs, or any other voting system that a state could choose.

However, the *certificate of ascertainment* required by Title 3, Section 6, of the United States Code is apparently what governs the number of "popular votes" to be tallied for each slate in each state for NPVIC purposes (Koza et al. 2013, 266–67). For the 2020 presidential election in Maine, its certificate of ascertainment (State of Maine 2020) shows the number of votes for each of the five slates—both in each district and for the state total across the two districts—to be the same as the *number of first-place Hare votes.*

(A subsequent discussion notes that knowledge of how Maine's votes are tallied for NPVIC purposes could affect how Maine voters vote, but we ignore that point for the present.)

In Maine in 2000, there was (as already noted) only one round under the Hare system for each of the three Hare tabulations. In such a case, it might seem reasonable to use the statewide totals of first-place Hare votes for each slate as the "number of votes" to be counted for Maine in the calculations of the NPVIC "national popular vote total" for the slate. However, even if that were

deemed acceptable when there is only one round, it can be totally unreasonable if there is more than one, as in Example 1.

In this case, slate X, which wins all four of Maine's electoral votes (if Maine is a nonmember of the NPVIC), would be awarded only 52,000 of the state's first-place Hare votes that would be included in the "national popular vote total," whereas slate Z would receive 400,000. Suppose, for example, that nationwide outside of Maine, slates X and Z have the two highest totals of popular votes with X ahead of Z by 300,000. Then, with the addition of Maine's (first-round) first-place Hare votes, Z would become the presidential vote winner by 48,000. Maine's votes thus would convert X from winner to loser despite the fact that X wins all four of Maine's electoral votes.

Example 2

In this example, the Maine presidential ballot has four slates: E, F, G, and H. Table 2 shows the Hare results for each district and for the state as a whole. The Hare winners are E in the first district, F in the second district, and G in the whole state. The respective numbers of electoral votes for E, F, and G (if Maine is outside of the NPVIC) therefore are 1, 1, and 2. Statewide across both districts, however, H has the highest total of first-place votes. If "popular votes" for Maine are tallied based on the (first-round) first-place Hare votes, then—among the four slates—H would provide the largest contribution to the "national popular vote total" but the smallest contribution (i.e., zero) to the electoral votes.

Consider a severe but instructive scenario for Example 2 that is possible albeit not likely. Suppose that, nationwide except for Maine, slates E, F, and G have popular vote totals that are close to one another and also are each between 50,000 and 100,000 votes ahead of H. With popular votes for Maine taken as the first-place Hare votes (table 2), Maine gives slates E, F, G, and H popular votes of 164, 166, 170, and 300 (in thousands), respectively. Thus, the Maine results catapult H from fourth rank in total number of votes to top rank and presidential victory—despite the fact that H

Table 1
Details for Example 1, Showing Statewide Vote

Ballot Ranking of Slates	Number of Ballots (Thousands)	Round or Transfer	Total Updated Votes (Thousands) for Slate					Total
			V	W	X	Y	Z	
Z, Y, X, W, V	400							
V, W, X, Y, Z	200							
W, X, V, Y, Z	100							
X, Y, W, V, Z	52							
Y, X, Z, W, V	50							
Total	802							
		Round 1	200	100	52	50	400	802
		Transfer from Y			+50	−50		
		Round 2	200	100	102		400	802
		Transfer from W		−100	+100			
		Round 3	200		202		400	802
		Transfer from V	−200		+200			
		Round 4			*402		400	802

Notes: *Hare winner. It is assumed that each Maine district has half of the ballots with each ballot ranking.

Table 2
Details for Example 2

Ballot Ranking of Slates	Number of Ballots (Thousands)		
	District 1	District 2	State Total
E, G, F, H	130	34	164
F, G, E, H	35	131	166
G, F, E, H	85	85	170
H, F, G, E	150	150	300
Totals	400	400	800

District	Round or Transfer	Total Updated Votes (Thousands) for Slate				
		E	F	G	H	Total
1	Round 1	130	35	85	150	400
	Transfer from F		−35	+35		
	Round 2	130		120	150	400
	Transfer from G	+120		−120		
	Round 3	*250			150	400
2	Round 1	34	131	85	150	400
	Transfer from E	−34		+34		
	Round 2		131	119	150	400
	Transfer from G		+119	−119		
	Round 3		*250		150	400
State Totals	Round 1	164	166	170	**300	800
	Transfer from E	−164		+164		
	Round 2		166	334	300	800
	Transfer from F		−166	+166		
	Round 3			*500	300	800

Notes: *Hare winner. **Most statewide first-ranked votes.

is the only one of the four slates not to receive any electoral votes from Maine.

One can imagine that the Hare results under the NPVIC in either Example 1 or Example 2 could generate controversy and disruption far worse than what occurred in Florida after the

unappealing) option would be to designate the first-place Hare votes from the *last* round for the NPVIC, but then all but two slates would receive zero votes.

APPROVAL VOTING

Fargo, the largest city in North Dakota, voted in November 2018 by a margin of 63.5% to 36.5% to use approval voting (Brams and Fishburn 2007) in local elections. The first actual use of approval voting in Fargo came in its June 2020 elections. By a margin of 68.1% to 31.9%, voters in the November 2020 election in St. Louis, the second largest city in Missouri, adopted a form of approval voting for future municipal elections. Thus, it is not inconceivable that North Dakota or Missouri or another state could decide to use approval voting for presidential elections. How would that affect the NPVIC?

Approval voting allows a voter to vote for more than one of the slates. Like the Hare system, it receives no direction from the NPVIC text for calculating the NPVIC votes. Also as with the Hare system, more than one way to do this calculation exists (Potthoff 2019, table 6), although the options may be more palatable than those for Hare. Perhaps the best option is simply to multiply the approval votes for each slate by a fraction so chosen that the results for the slates will sum to the number of voters, thereby avoiding a disparity between number of votes and number of voters.

COULD THE NPVIC BE SALVAGED?

One can ask whether the NPVIC could be salvaged by revising it. That would require tackling the following three obstacles. Even if the first is surmountable, the second and third may not be:

1. Presumably, all legislatures that passed the NPVIC would have to take further action to cover revisions.
2. Myriad voting systems for choosing presidential electors (perhaps even including systems not yet invented) are possible for a state to adopt if it jettisons plurality voting. Recognizing all of them somehow in an NPVIC revision thus would be a formidable undertaking, likely involving a mathematical and legal jumble.
3. A revision would need to provide befitting means for a system to get the vote values for the NPVIC. These means would have to be resistant to a claim that they would, in effect, partially override and undermine a state's chosen presidential voting system. Suppose, for example, that the NPVIC votes under the

One can imagine that the Hare results under the NPVIC in either Example 1 or Example 2 could generate controversy and disruption far worse than what occurred in Florida after the 2000 presidential election.

2000 presidential election. Although we acknowledged previously that (to accentuate our analysis) Examples 1 and 2 portray extreme situations, cases that are less extreme also could create havoc.

The NPVIC provides no direction for how to handle the Hare system. Using first-round first-place Hare votes to enter into the NPVIC national totals is not the only possibility. Another (also

Hare system (in Maine) were defined (despite the problems noted previously) to be the first-round first-place votes. Then only the first-place votes would affect the national winner. Knowing this, some Maine voters might cast their votes as they would under plurality voting rather than Hare, perhaps casting a different first-place vote and/or marking only one choice instead of ranking two or more.

AN UNRECOGNIZED SHORTCOMING

It seems surprising that NPVIC supporters apparently have been oblivious to the threat to the NPVIC that arises from non-plurality systems—although perhaps they have been lulled by the fact that (in recent times) nothing but plurality voting was used for presidential elections before 2020. However, what is more surprising is that NPVIC opponents have not seized on this same threat to bolster their case. They have forgone a virtually ironclad argument

2. It can be possible for voters to transform their favorite candidate from loser to winner by ranking that candidate lower than first, rather than first (i.e., monotonicity failure).
3. It can be possible for voters to bring about an election result more to their liking by refraining from voting rather than by voting (i.e., no-show paradox).
4. In a recount, small changes among minor candidates can have a profound effect on the outcome.

Although the Electoral College is not a flawless institution, changing it fundamentally without a constitutional amendment may not be doable. Less-sweeping ways to alter the presidential-election mechanism are possible.

against the NPVIC in favor of ones that appear controversial and are not as easy to defend.

The dilemma concerning the NPVIC was pointed out previously by Potthoff (2019) in a paper that also provides further discussion of the NPVIC. However, what was at that time only a theoretical possibility (i.e., a state switching away from plurality voting) is now a reality: both Maine and Alaska now specify the Hare system for their presidential voting.

ARE THERE OTHER REMEDIES?

Although the Electoral College is not a flawless institution, changing it fundamentally without a constitutional amendment may not be doable. Less-sweeping ways to alter the presidential-election mechanism are possible. They are discussed here but only briefly. Like the NPVIC, they would involve action at the state level, but they can, for example, enhance centrism and reduce polarization even though they could not have as broad effects as a constitutional amendment.

How much are current problems with US presidential elections, including unhealthy polarization, caused by the Electoral College and how much by plurality voting (within states)? There is nothing sacred about a plurality voting system. It has serious flaws. It can encourage problematic strategic voting (by discouraging "wasted" votes). It can elect a Condorcet loser (i.e., a candidate who would lose to each rival head-to-head), as in a three-candidate race in which the candidate with the most plurality votes (but not a majority) is the last choice of supporters of the other two. It may be feasible to replace plurality voting on a state-by-state basis.

Easier ballot access, both for candidates of the two major parties who are defeated in presidential primaries and for candidates of other parties and independent candidates, could be a plus. More candidates who are centrist could result.

If a state replaces plurality voting with another system, is Hare the best replacement? Although the Hare system is intended to curtail the disadvantages of plurality voting, it has several drawbacks (Fishburn and Brams 1983; Potthoff 2013, section 11), including the following:

1. The Hare system can fail to elect a Condorcet winner (i.e., a candidate who could defeat each rival head-to-head), as in a three-candidate race with no majority winner in which the candidate with the fewest first-place votes is a centrist who is the second choice of supporters of the other two.

5. A practical problem is that the Hare winner generally cannot be determined through a simple summing of numbers across precincts.
6. Some ranked systems other than Hare may more easily accommodate (and enable aggregation of) ballots that allow voters to rank candidate(s) both at the top and at the bottom but leave others unranked. For example, consider a voter who may revere candidate V and despise candidate Z but not know enough to assign ranks among candidates W, X, and Y in the middle.

Would approval voting or a Condorcet method (i.e., one that is intended to elect a Condorcet winner) be a better replacement than the Hare system? Condorcet methods would have none of the six disadvantages above. Approval voting escapes disadvantages 2 through 5, may largely (although not completely) avoid disadvantage 1, and has the advantage of simplicity.

A Condorcet system would require a completion method, to be applied if no Condorcet winner emerges. Possible completion methods include Borda (Black 1958, 66), Hare (Green-Armytage, Tideman, and Cosman 2016), and approval voting (Nurmi 1987, 176; Potthoff 2013).

SUMMARY

The NPVIC language does not recognize that a state may use an electoral system other than plurality voting to choose its presidential electors. As a result, the national vote totals required for implementing the NPVIC may be undefined and therefore indeterminable.

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