The Likely Consequences of Internet Voting for Political Representation

R. Michael Alvarez

Jonathan Nagler

THE LIKELY CONSEQUENCES OF INTERNET VOTING FOR POLITICAL REPRESENTATION

R. Michael Alvarez* and Jonathan Nagler**

I. INTERNET VOTING AND POLITICAL REPRESENTATION

The introduction of new and improved communication technologies has always influenced the conduct of political campaigns and elections. Early in the twentieth century, the advent of widespread radio communication gave politicians the ability to reach into the living rooms of American citizens.[1] In the 1950s and thereafter, television dramatically changed the marketing of political candidates and their electoral strategies; televised events like the Kennedy-Nixon presidential election debate, the airing of Johnson's "Daisy" advertisement in the 1964 election, and most recently the infamous Bush "Willie Horton" advertisement, all have been seen as having a pivotal impact on presidential elections.[2]

Most recently the rapid rise of the Internet and the World Wide Web has begun to impact the conduct of political campaigns and elections. It is now quite common for political candidates, even candidates for state and local offices, to have their own sites on the World Wide Web. Candidates such as Jesse Ventura and John

McCain employed their Internet sites for interactive contact with voters and contributors in recent elections.[3] The mass media now covers political events such as the 2000 party conventions using the Internet, with downloadable distribution of media reports and political speeches in both text and multimedia formats.

One other obvious political use of the Internet and the World Wide Web is for the conduct of elections. Given widespread penetration of the Internet throughout American society, the relative ease with which balloting could be conducted on the Internet, and the potential cost-savings of "elections-on-the-net," there has been much discussion of electronic balloting across the nation. There are a number of private companies that provide electronic balloting technologies for non-political balloting such as union elections and proxy voting for mutual fund companies.[4] To date, only one major political election has been conducted on the Internet—the 2000 Democratic Presidential Primary in Arizona, an Internet election that we will discuss much more fully later in this paper.[5] Other states, most notably California, have carefully studied the potential of Internet elections.[6]

One of the most important political and legal issues surrounding the debates about electronic balloting fundamentally concerns what political scientists call "political representation."[7] A critical political question about electronic balloting is whether it will have an impact on political representation, broadly defined. A critical legal question about electronic balloting is whether it will violate the Voting Rights

---

3. *See* Rebecca Fairley Raney, *Former Wrestler's Campaign Got a Boost from the Internet*, N.Y. TIMES, Nov. 6, 1998, at B10; Christy True, *Presidential Candidates Cast for Votes in Cyberspace*, SEATTLE TIMES, Feb. 27, 2000, at C1.

4. *See, e.g.,* Gary Chapman, *Casting a Vote of Caution on Online Voting*, L.A. TIMES, Mar. 20, 2000, at C3.

5. *See* Ben White, *Online Balloting: A Question of Fairness; Justice Department Challenges Arizona's Use of Voting by Computer in Primary*, WASH. POST, Mar. 19, 2000, at A9.

6. *See generally* BILL JONES, CAL. INTERNET VOTING TASK FORCE, A REPORT ON THE FEASIBILITY OF INTERNET VOTING: JANUARY 2000 (finding that an appropriate balance between security, ease of use, and accessibility must be met before Internet voting can be implemented).

7. *See* HANNAH FENICHEL PITKIN, THE CONCEPT OF REPRESENTATION 1 (1967).

Act,[8] which is a narrowly defined way to look at political representation by focusing only on minority voting rights. The purpose of our research reported in this paper is to shed some light on both the political and legal aspects of electronic balloting.

The general principle of representation is quite intuitive. If we consider a hypothetical group of citizens, and a hypothetical legislature producing public policies, most intuitive definitions of representation require that there be some correspondence between preferences over policies by the citizens and the policy outputs of the legislature. Typically speaking, political scientists would see an electoral or political system as strongly representative when there is a close correlation between the preferences of the citizenry and the legislative outputs; likewise, a system which does not produce a close correspondence between citizen preferences and policy outputs would be seen as poorly representative. Hanna Pitkin described several types of representation.[9] The concepts useful to us here are those of "descriptive representation" and "substantive representation."[10] Regarding the first concept, we say that a polity meets the goal of descriptive representation if the policy makers resemble the citizens on politically relevant characteristics.[11] What exactly qualifies as a politically relevant dimension may be subject to some debate. But in the United States most people would agree that age, income, ethnicity, and gender are politically relevant characteristics.[12] Thus, any change in the law which increased the participation of one age, income, ethnic, or gender group relative to another group would alter the state of descriptive representation. A polity would meet the goal of the second concept, substantive representation, if the policy makers had preferences similar to the preferences of the citizens. Of course in the case of Internet voting we cannot yet look directly at the fit between policy makers and citizens, as there have not yet

---

8. Voting Rights Act of 1965, 42 U.S.C. § 1973(a) (1994).

9. *See* PITKIN, *supra* note 7, at 1.

10. *See id.* at 60-62.

11. *See id.* at 114-15. Pitkin uses the term "acting for" to indicate substantive representation.

12. *See, e.g.,* Jan E. Leighley & Jonathan Nagler, *Socioeconomic Class Bias in Turnout, 1964-1988: The Voters Remain the Same,* 86 AM. POL. SCI. REV. 725 (1992).

been enough elections conducted using Internet voting to allow for such an analysis.[13]

Rather we will assess the representativeness of Internet voting by comparing the set of citizens currently voting to those who would be voting if Internet voting were implemented. If we observe sharp differences, either descriptively or substantively, between these two sets of voters, we will see that as evidence of a change in representation caused by Internet voting.[14]

It is easily demonstrated that election laws and balloting procedures have direct and measurable influences on political representation. For instance, election or ballot laws that restrict political participation to only certain demographic groups and exclude others, such as laws that restricted women or African Americans from having the right to vote, remove certain demographic groups from the political process and thereby do not allow their preferences to be expressed in elections.[15] To the extent to which excluded demographic groups have distinctly different preferences about public policy outcomes, relative to demographic groups which are not excluded from the electoral process, political representation suffers as elected

---

13. For example, an ideal situation would be for us to observe a state in which elected legislators used polling place voting for a decade, then shifted exclusively to Internet voting for a decade. We could then observe the nature of the electorate under polling place and Internet voting, as well as the descriptive attributes and policy-making behavior of the elected representatives in that state. For example, if we observed that the electorate changed after the imposition of Internet voting, shifting to a higher income, higher educational attainment, and less racially diverse set of voters, we could trace how the change in the electorate influenced the behavior of elected representatives. Such a natural experiment has not yet been undertaken; we do not have the data to undertake such a study.

14. Of course, we are assuming that the types of voters who participate determine the types of policy makers who are elected. Thus if we observe an electorate which is skewed in certain demographic attributes, we are assuming that such an electorate would elect similarly skewed representatives.

15. *See* ANNA L. HARVEY, VOTES WITHOUT LEVERAGE: WOMEN IN AMERICAN ELECTORAL POLITICS, 1920-1970 (1998) (examining the effects of laws prohibiting the participation of women); V.O. KEY, JR., SOUTHERN POLITICS IN STATE AND NATION (1949) (analyzing the evolution of suffrage restrictions); J. MORGAN KOUSSER, COLORBLIND INJUSTICE: MINORITY VOTING RIGHTS AND THE UNDOING OF THE SECOND RECONSTRUCTION (1999) (examining past voter discrimination against African Americans).

representatives have little incentive to elicit or to follow the prefer-
ences of the excluded groups.

When it comes to electronic elections, therefore, a very impor-
tant question is whether the demographic differences we observe
between those with Internet access and those without (commonly re-
ferred to as the "digital divide") may make electronic elections less
representative than traditional in-person precinct balloting or vote-
by-mail. In this Article we examine this question directly, beginning
with a discussion of the set of electoral reforms we regard as closest
to Internet voting. There have been many other legal changes in the
last twenty years to lower the barriers to voting and registration. In
particular, the liberalization of absentee balloting and the advent of
vote-by-mail elections have made it easier for people to vote. And
barriers to registration have continued to fall, culminating with the
National Voter Registration Act (hereinafter "NVRA" or "Motor
Voter"), the most famous provision of which guarantees that citizens
will be given the chance to register to vote whenever they renew
their driver's licenses.[16] We view Internet voting as another way to
lower the barriers to voting. The distinction between Internet voting
and the above-named reforms is that Internet voting has the greatest
potential to impart an even stronger upper-class bias to the electorate
than exists today.

There is no disagreement that the voters in the United States are
wealthier, more educated, and more often white than the citizenry as
a whole.[17] Whether there has been a change over time in this class-
bias of the electorate is a matter of debate.[18] However, while the
primary provision of the NVRA does help people who have at least
enough income to apply for a drivers license, it does not discriminate
between people driving Hyundais and people driving BMWs.[19]
Internet voting offers the greatest assistance to people who have
Internet access from home. As we will show below, this means that
Internet voting has the potential to offer more assistance to

---

16. *See* 42 U.S.C. § 1973gg-3(a)-(c) (1994).

17. *See* Leighley & Nagler, *supra* note 11, at 728.

18. *See id.* at 734; Walter Dean Burnham, *The Turnout Problem, in*
ELECTIONS AMERICAN STYLE 97, 125 (A. James Reichley ed., 1987).

19. *See* 42 U.S.C. § 1973gg.

those who are white and of higher incomes than to blacks and those with lower incomes.

After we review the existing academic literature on NVRA and vote-by-mail elections, we turn more directly to the Internet and electronic elections. First we look carefully at the "digital divide" in the United States using recent survey data. Then we examine the sole existing electoral experiment with Internet voting: the 2000 Arizona Democratic Presidential Primary. Subsequently, we consider the possible constituencies for Internet voting, using polling data from California. We conclude with a summary of our results and our inferences regarding the representational consequences of Internet voting.

II. REGISTRATION, TURNOUT, AND REPRESENTATION

Voting in the United States is a two-part act. Persons must first register to vote, and then actually vote. The first hurdle, registration, eliminates a sizable portion of the electorate. The low registration rate in the United States is the most compelling explanation for the low turnout in the United States relative to most industrial democracies.[20] In 1996, only 65.9% of the voting age population in the United States even *claimed* to be registered to vote (Census Bureau, Current Population Reports).[21] In the most influential modern work on voter turnout, Wolfinger and Rosenstone focused on reforming registration laws as the most effective way to increase the turnout rate in the United States.[22] The key provision that they cite is the requirement that citizens must register in advance of the election.[23] Various estimates suggest that if all states allowed for same-day

---

20. *See, e.g.,* Robert S. Erikson, *Why Do People Vote? Because They Are Registered,* 9 AM. POL. Q. 259 (1981) (speculating that the act of registering heavily influences voting).

21. *See* Lynn M. Casper & Lorreta E. Brass, *Current Population Reports: Voting and Registration in the Election of November 1996, in* U.S. CENSUS BUREAU 2 tbl.2 (July 1998), *available at* http://www.census.gov/ prod/3/ 98pubs/p20-504.pelf; Bill Jones, *Statement of Vote: Primary Election, in* U.S. CENSUS CURRENT POPULATION REPORTS 20-466 (1998).

22. *See* RAYMOND E. WOLFINGER & STEVEN J. ROSENSTONE, WHO VOTES? 61-88 (1980). Their findings were confirmed and extended in Leighley & Nagler, *supra* note 11.

23. *See* WOLFINGER & ROSENSTONE, *supra* note 22, at 61.

registration, turnout would increase by between five and ten percent. Furthermore, Wolfinger and Rosenstone argued that registration hurdles had a larger deterrent effect on the poorly educated than the well educated.[24] The argument was that voters with lower levels of education would be less able to overcome the bureaucratic hurdles imposed by early registration requirements.[25] Regardless of whether or not one accepts Wolfinger and Rosenstone's contention that registration barriers prove the greatest hurdle for the least educated, one theory holds that *any* reform which increases turnout is likely to help the representation of people with lower socio-economic status. The argument is that since more poor people are "at risk" of not voting than rich people are, reforms that increase voting will increase voting more among the poor. Consider a case where 50% of poor people vote and 90% of rich people vote. Then any reform to increase turnout can increase the turnout rate among rich people by at most 10%. But because of the larger pool of non-voting poor, even if the reform only affects one out of five of poor persons not voting, that will lead to an increase in the turnout rate of 10% among poor people. Notice that this logic unravels if the reform being contemplated is one that would explicitly help rich people. This is the potential problem with Internet voting. If the reform is one that will act only on people in the high end of the socio-economic scale, those with home computers and ISP subscriptions, then the reform will not have the representation-increasing property.

This leads us to the first empirical question at hand: Have the reforms enacted over the past several decades making it easier to vote led to any increase in the representation of the electorate? Or, have poor people or rich people been more likely to take advantage of these reforms? There are two behavioral hypotheses underlying the two possibilities. First, it is possible that it is only rich people who want to vote. If this were the case, then making it easier to vote would only increase the turnout rate of rich people. If poor people simply did not want to vote, then we could literally hand them ballots

---

24. *See id.* at 79.
25. *See id.*; Jonathan Nagler, *The Effect of Registration Laws and Education on U.S. Voter Turnout*, 85 AM. POL. SCI. REV. 1393, 1395-1403 (1991); Jonathan Nagler, *Scobit: An Alternative Estimator to Logit and Probit*, 38 AM. J. POL. SCI. 230, 230-55 (1994).

affixed with postage, give them a pen to mark the ballots, provide them with information on the candidates, and they might still toss the ballots in the trash. Second, the Wolfinger and Rosenstone hypothesis could be correct and poor people may want to vote just as much as rich people, but they simply have trouble with the registration requirements and other hurdles imposed by the state. If this were the case then changes in election procedures that make it easier to vote could raise the voting rate of poor people and close the gap in voting rates between rich and poor.

To test these alternative views of the impact of registration reforms on the representativeness of the electorate, we can examine the impact of the National Voter Registration Act, absentee balloting, and vote-by-mail elections.

A.   Results of Reforms: Motor Voter and Vote-by-Mail

The National Voter Registration Act of 1993 stipulated that each state would "include a voter registration application form for elections for Federal office" as part of the application for a driver's license.[26] The states were given leeway as to whether this would be a single form or multiple forms. And states were also required to allow for mail-in registration and agency-based registration. These provisions were only required for states without same-day registration. However, as only North Dakota, Maine, Minnesota, and Wisconsin had same-day registration, the impact of the Act was widespread. As with most forms of election laws, prior to the enactment of the NVRA there was considerable variation across the states,[27] as well as variation in the speed of implementation of the law.

In one of the earliest and more rigorous pieces examining the effect of the NVRA, Stephen Knack analyzed state level election data from 1976 through 1992 to examine the impact of voluntary state implementation of NVRA provisions predating actual passage of NVRA.[28] Knack followed Crocker's previous (1990) analysis[29] in

---

26. 42 U.S.C. § 1973gg (1994).

27. *See generally* Stephen Knack, *Does "Motor Voter" Work? Evidence From State-Level Data*, 57 J. POL. 796 (1995) (detailing the effects of NVRA).

28. *See id.*

29. *See* ROYCE CROCKER, VOTER REGISTRATION AND TURNOUT IN STATES WITH MAIL AND MOTOR-VOTER REGISTRATION SYSTEMS 3 (1990).

distinguishing "active" programs from "passive" programs, and also adds the following distinction to mail-in programs.[30] Motor voter states are defined as having active programs if there is a provision on the driver's license application form asking applicants if they wish to register to vote, or if an employee of the Department of Motor Vehicles is required by statute to ask them if they wish to do so.[31] States are defined as having passive programs if neither of these provisions is met.[32] States with passive programs then make voter-registration forms available at motor vehicle offices, but applicants need to seek them out.[33] The NVRA explicitly requires what is categorized here as an active program. Knack defines mail-in programs as active if they require neither notarization nor witnessing.[34] Again, this is consistent with the NVRA which explicitly forbade states from adding such provisions to mail-in registration forms.[35] Knack estimates that the cumulative impact of the motor voter provisions when adopted across all states would be an increase in registration of 10%, and an increase in turnout in presidential elections of less than 3%.[36] Notice that these estimates support the view that people do not register because they do not want to vote. According to Knack's estimates, only 30% of the new registrants would be voters.[37] This is less than half the turnout rate of current registrants.

While his focus is not on the provisions of the NVRA, Benjamin Highton provides another look at the impact of registration changes.[38] Highton compares reported turnout in states with same-day registration to reported turnout in other states *and* to the turnout of all other *registered voters*.[39] Highton notes several important

---

30. *See* Knack, *supra* note 27, at 800.
31. *See id.*
32. *See id.*
33. *See id.*
34. *See id.*
35. *See id.*
36. *See id.* at 806 tbl.3.
37. *See id.* at 802. This really is not Knack's estimate; it is a figure he cites from the District of Columbia.
38. *See* Benjamin Highton, *Easy Registration and Voter Turnout*, 59 J. POL. 565 (1997).
39. Highton uses the Census Bureau's 1980 and 1992 Current Population Survey as his data source. Thus, the figures he provides are self-reported rates for both registration and voting.

facts.[40]   First, turnout in the same-day registration states is signifi-
cantly lower than turnout of registered voters in other states (77%
versus 90%).[41]   This suggests that there is some self-selection to
registration. If registration functioned purely as a barrier to turnout,
then the turnout of those in same-day registration would be the same
as the turnout of registered voters in other states. That turnout in
same-day registration states is lower suggests that registration acts as
a screen as well as a barrier; those who have registered in other states
are the people who are interested in being voters.

Highton also notes that the gap in turnout between poorly edu-
cated and well-educated persons is lower in same-day registration
states than for poorly educated and well-educated persons in other
states.[42] For instance, 59% of persons with some high school educa-
tion voted in same-day registration states, compared to the 93% of
persons with a college degree who voted in same-day registration
states, for a gap of 34%.[43] In states without same-day registration the
comparable numbers are 49% and 86%, for a gap of 37%.[44] Thus,
same-day registration seems to lower the turnout gap, leading to a
more representative electorate. Also, this suggest that removing the
chore of registration will help poorly educated voters more than well-
educated voters.

If Highton's data is examined, however, it can be seen that these
results truly reflect the overall higher levels of turnout in the same-
day registration states. The question can thus be asked: Who is
more likely to take advantage of same-day registration, poorly edu-
cated or well-educated persons? In Table 1, we reproduce one sec-
tion of Highton's Table 1,[45] giving the voting rate of the three rele-
vant groups, categorized by level of education: persons in same-day
registration states; eligible voters in other states; and registered vot-
ers in other states. In addition, we compute the hypothetical turnout
rate for non-voters in each education group as if they were passively
registered. For instance, in the first row we see that turnout of

---

40. *See id.* at 569 tbl.1.
41. *See id.*
42. *See id.* at 570.
43. *See id.* at 569 tbl.1.
44. *See id.*
45. *See id.*

eligible voters with zero to eight years of education in the "Other States" was 49%, whereas, turnout of the same education bracket in the same-day registration states was 63%.

TABLE 1: TURNOUT BY REGISTRATION:
SAME-DAY REGISTRATION STATES AND OTHERS[46]

Education	Same Day Registration on States[a]	Other States		
		Eligible Voters[a]	Registered Voters[a]	Hypothetical Rate[b]
0-8 Years	63	49	81	27 ~(14/51)
9-11 Years	59	49	84	20 ~(10/51)
12 Years	75	63	90	32 ~(12/37)
Some College	83	75	92	48 ~(12/25)
College Degree	93	86	96	64 ~(9/14)
Advanced Degree	93	90	96	30 ~(3/10)

[a]Cell entries are the reported turnout of each group.

[b]Cell entries in the last column give the hypothetical turnout rate in each education group of those who had been non-voters in states requiring advance registration.

Based on these numbers, it can be inferred that of the 51% of the eligible voters who did *not* vote in the "Other States," 14% of them (63% - 49%) would have voted had those not registered been passively registered through no action of their own. Thus, the turnout

---

46. *See id.* (entitled, "Turnout By Registration Context and Demographic Characteristics" and using data from 1980 and 1992 Current Population Surveys). Alvarez and Nagler modify the Highton table by adding a fourth column containing computations.

rate of this group of non-voters were they all registered would be 27% (or 14/51). Thus what this table tells us is extremely important. Whereas 64% of college educated non-voters would become voters with zero-cost registration, only 32% of high school educated non-voters would become voters with zero-cost registration. In a nutshell, this is the reformer's dilemma as they try to achieve greater representation. If voting is made easier, it is those who already tend to vote who will take advantage of the easier voting. However, we can also see the arithmetic that tends towards greater representation as we facilitate voting. While the *rate* at which persons take advantage of the easier voting is higher among the better educated, because the pool of uneducated *non-voters* is so much larger, the effect of the reform is still to narrow the turnout gap between the education groups. However, that narrowing is significantly less than that for which many reformers would have hoped.

B.   Voting by Mail

The change in the rules for absentee balloting in many states is another reform that has reduced the costs of voting. In many states, including California, voters may vote by absentee ballot on demand: No reason is necessary to request an absentee ballot. The proportion of votes cast as absentee ballots in the 1998 statewide primary election in California was over 25%.[47] In theory, this lowers the cost of voting as the voter does not need to make a trip to a polling place on a specific day. Oliver examined the choice voters made as to how to cast their votes using the 1992 Current Population Survey.[48] He used a multivariate model where the dependent variable was the decision to vote absentee or cast a polling place ballot. He found that the higher a respondent's income, the more likely he or she was to cast an absentee ballot rather than a polling place ballot.[49] This is further evidence that it is those already more likely to vote who are more likely to take advantage of reforms that lower the cost of voting. This result is also consistent with the view that one reason why registration is more difficult for those with low levels of education is

---

47. *See* Jones, *supra* note 21, at iv.
48. *See* Eric J. Oliver, *The Effects of Eligibility Restrictions and Party Activity on Absentee Voting and Overall Turnout*, 40 AM. J. POL. SCI. 498 (1996).
49. *See id.* at 505 tbl.2.

that such people are less accustomed to using the mail for such things as paying bills.

Moving beyond absentee balloting, some elections are held where voting by mail is the *only* way voters can cast ballots. Such elections are the closest approximation we are aware of to Internet voting. Oregon is the state with the most experience with vote by mail (VBM) elections.[50] Oregon has been using vote by mail in local elections since 1981. In 1987, the state extended vote by mail to include all special elections.[51] And in 1998, an initiative extended vote by mail to all biennial primary and general elections. The motivation of state officials to adopt vote by mail is similar to motivations to adopt Internet voting. First, voters like it. Second, such elections cost less to run.

No doubt the 2000 presidential election, the first presidential race held as a vote by mail election, will yield fascinating data. But there has already been one high profile federal race in Oregon held using vote by mail. There was a special election in January 1996 to fill Bob Packwood's seat. Priscilla L. Southwell conducted a random digit dial telephone survey of Oregon voters at the time of the election.[52] She split respondents into three groups. "Traditional Voters" were defined as those who voted in 1992 and 1996, and claimed that they usually voted. "Vote by Mail" voters were those who did *not* vote in 1992, but did vote in the 1996 election under the vote by mail rules; or claimed that they had problems getting to the polls in the past.[53] Finally, "Registered Nonvoters" were simply those respondents who were registered voters but did not vote in the 1996 vote by mail election. Looking at the demographic characteristics of each of the three groups Southwell found that Vote by Mail voters are slightly different than Traditional Voters: They are more likely to be hourly workers rather than salaried workers, for instance.[54] But the much clearer difference was between both the Traditional Voters and Vote by Mail voters and the third group: the Registered Nonvoters.

---

50. *See* Priscilla L. Southwell & Justin Burchett, *Survey of Vote-by-Mail Senate Election in the State of Oregon*, 30 POL. SCI. & POL. 53, 53-57 (1997).
51. *See id.* at 53.
52. *See id.* at 57.
53. *See id.*
54. *See id.* at 56.

The Registered Nonvoters were clearly a group apart in their demographic characteristics and in their attitudes (such as how little they cared about the election and how little attention they paid to politics). Southwell concluded that vote by mail elections would not change representation very much, that such elections would in fact pick up the "cream of the crop" of non-voters.[55]

Thus, our review of the literature of the two most important recent reforms attempting to lower the costs of voting—the "Motor Voter" legislation and experiments with voting by mail—produce conclusions about Internet voting which are pessimistic. Neither of these reforms has produced massive increases in voter registration or turnout, nor have they led to vastly improved political representation. The results of these election law reforms, in contrast to the goals of their proponents, have been much more modest. That significant reform led to modest changes in registration and turnout suggests that we should expect the same types of outcomes, at best, from reforms such as Internet voting. But in the next two sections of this paper we produce additional evidence which casts doubt on whether even modest increases in voter turnout and political representation might be expected from Internet voting, largely because of the so-called "digital divide" in American society.

III. THE DIGITAL DIVIDE AND POLITICAL REPRESENTATION

Unfortunately, the term digital divide is poorly defined and often misused. It has come to represent any measured difference between the Internet-connected population and the general population at large.[56] Also, the general discussion of the digital divide has tended to focus on comparing the population of Internet users versus the general population. But for the purposes of examining representation and voting we might want to compare the population of Internet users to the population of politically active persons or the population of frequent voters.

To better delineate the digital divide in America we turn to a unique telephone poll conducted by CBS News in January 1999—the

---

55. *See id.* at 57.
56. *See* U.S. DEP'T OF COMMERCE, FALLING THROUGH THE NET: TOWARDS DIGITAL INCLUSION 2 (2000).

"CBS News, CBS Marketwatch.com Internet Poll." This telephone poll was conducted from January 27 to February 2, 1999, during which a sample of 1782 telephone respondents were asked a number of questions about their Internet use, their perceptions of the Internet, and a set of background demographic and political questions.[57]

For our purposes, we are interested in a number of different possible digital divides, namely, the differences between (1) the population of American adults; (2) the Internet-using population; (3) the politically active population; and (4) the Internet-using, politically active population. To study these differences, we provide in Tables 2 and 3 the survey marginals computed for each of these relevant populations.[58] In Table 2 we give the marginals for gender, marital status, region of residence, education, and age; in Table 3 we provide marginals for partisanship, race, Hispanic identity, political ideology, and whether the respondent was politically active, computer-connected, and Internet-capable. By comparing across the columns in the tables we visualize the digital divide.

TABLE 2: THE DIGITAL DIVIDE, 1999
PART 1

Variable	Population			
	American Adults	Politically Active	Internet Users	Internet Political
Gender				
Men	45.8	44.9	51.5	51.3
Women	54.2	55.1	48.5	48.7
Marital Status				
Married	57.0	62.2	61.1	68.3

57. *See* CBS NEWS, CBS NEWS INTERNET POLL, *at* http://www. CBS.Marketwatch.com (Jan. 1999) [hereinafter CBS NEWS SURVEY].

58. To categorize a survey respondent as politically active or not, we computed a variable based on whether or not a respondent was a registered voter and whether they participated in the 1996 presidential election. Those who were both registered and participated in the 1996 presidential election were classified as politically active; those who were either not registered or were registered but did not participate in the 1996 presidential election were classified as non-participatory.

Variable	Population			
	American Adults	Politically Active	Internet Users	Internet Political
Widowed	8.3	9.7	2.2	2.1
Divorced	13.9	13.1	13.9	12.9
Separated	2.0	1.6	1.4	1.5
Never Married	18.8	13.5	21.5	15.3
Region				
North E	20.3	19.9	19.6	18.3
North C	26.5	28.0	24.3	25.4
South	34.9	33.8	33.2	33.1
West	18.2	18.3	22.8	23.2
Education				
No High School	7.3	5.2	2.3	1.6
High School	34.0	29.1	21.6	17.3
Some College	26.4	27.7	30.0	29.3
College	18.8	22.0	26.0	28.6
Post-Grad	13.5	16.1	20.5	23.3
Age				
18-29	17.2	9.7	21.6	13.3
30-39	20.6	20.0	25.3	26.2
40-49	22.7	25.4	25.2	29.4
50-59	16.0	17.8	16.9	19.1
60-69	10.3	11.8	5.8	7.1
70+	13.2	15.5	5.1	4.8

TABLE 3: THE DIGITAL DIVIDE, 1999
PART 2

Variable	Population			
	American Adults	Politically Active	Internet Users	Internet Political
Partisanship				
Republican	31.2	32.5	33.8	35.2
Democratic	37.0	38.5	33.7	34.2
Independent	31.7	29.0	32.5	30.5
Race				
White	85.7	87.2	88.0	89.4
Black	8.6	8.2	4.8	4.4
Asian	1.4	0.7	2.0	1.0
Other	4.4	3.9	5.3	5.2
Hispanic				
Hispanic	4.7	3.6	5.3	4.9
Not	95.3	96.4	94.7	95.1
Ideology				
Liberal	21.2	20.1	22.7	21.2
Moderate	41.2	41.2	42.9	42.3
Conservative	37.7	38.6	34.4	36.6
Computer Access				
Yes	74.4 ·	76.0		
No	25.7	24.0		
Internet Access				
Yes	49.2	52.2		
No	50.8	47.8		

Beginning in Table 2, we break down the digital divide by gen-der, marital status, region, education, and race. The CBS News poll was comprised of a majority of women (54.2% women and 45.8% men). The percentages of men and women in the politically-active population (the second column of Table 2) are almost identical to those of the adult population. But notice that when we turn to the

Internet user population, a slight majority of that population is male (51.5%), which is also true of the Internet-using, politically-active population in the fourth column.

Next, as to marital status, the adult population is mainly married (57.0%), with a minority that is single and never married (18.8%), divorced (13.9%), widowed (8.3%), or separated (2.0%). The main differences between the adult and politically-active populations are that the latter has about 5% more adults who are married, most of the difference coming from the fact that the politically-active population has also about 5% fewer single but never married adults. But the Internet-user population is distinct from the adult and politically-active population: The Internet user population is made up of more single and never married adults (21.5%) and many fewer widowed adults. The politically-active and Internet-using population, furthermore, has a high concentration of married adults (68.3%), and many fewer widowed adults than the adult or politically-active populations.

In terms of region of residence, the CBS News survey consisted of a plurality of adults from the South (34.9%), followed by the North Central states (26.5%), the North Eastern states (20.3%), and last, the West (18.2%).[59] The politically-active population is almost identical in terms of regional representation to the adult population. But the Internet-user population is almost 5% more concentrated in the West, a result which is similar when we turn to the Internet-using, politically-active population.

A plurality of American adults in the CBS News sample received a high school degree (34%), followed by some college education (26.4%), college degree (18.8%), post-graduate education (13.5%), and lastly, 7.3% have no high school education at all. The politically-active population has higher levels of educational attainment. Note that there is an almost 2% higher rate of the population with some college background, 4% higher rate in the college educated population, and almost 3% higher rate in the post-graduate education population. This skewness in the level of educational attainment continues as we shift to the Internet user population, as 30% of Internet users have some college education, 26% have a college degree, and almost 21% have post-graduate education. The

---

59. *See* CBS NEWS SURVEY, *supra* note 57.

Internet-using, politically-active population has an even greater edu-
cational skewedness, with almost 29% having a college degree and
23% having a post-graduate education. To emphasize the educa-
tional skewedness to the politically-active, Internet-using population,
note that the politically-active, Internet-using population has 17%
fewer adults with only a high school education, but has 10% more
adults with a college education and 10% more with a post-graduate
education.

The last set of rows in Table 2 focus on the age distributions of
each population. The adult population is concentrated in the thirty to
thirty-nine (20.6%) and forty to forty-nine (22.7%) age groups, with
17.2% of adults in the eighteen to twenty-nine group, 16.0% in the
fifty to fifty-nine age group, 10.3% in the sixty to sixty-nine age
group, and 13.2% in the seventy and over group. The politically-
active population is decidedly older than the American adult popula-
tion, with only 9.7% in the eighteen to twenty-nine age group in the
politically-active population, but with more in the forty to forty-nine
age group (25.4%) and more in the seventy and older group (15.5%).
On the other hand, the Internet user population has a strong skewness
to the younger age groups, as 21.6% of the Internet-using population
is in the eighteen to twenty-nine group, 25.3% is in the thirty to
thirty-nine age group, 25.5% is in the forty to forty-nine age group.
This skewness towards the younger groups persists when we look at
the politically-active, Internet-using population, which is primarily
concentrated in the thirty to thirty-nine age group (26.2%) and the
forty to forty-nine age group (29.4%). Notice that while the young-
est American adults are slightly less represented in the Internet-
using, politically-active population than in the overall American
adult population, the former population is very much concentrated in
the thirty to thirty-nine and forty to forty-nine age groups.

In Table 3 we continue our examination of the digital divide by
looking at partisanship, race, Hispanic identity, and ideology.
Thirty-seven percent of American adults state they are Democrats,
31.7% claim to be Independents, and 31.2% say they are Republi-
cans in the CBS News 1999 survey data.[60] The politically-active
population is somewhat more partisan, as the level of independents

---

60. *See id.*

drops to 29%, with slight increases in Democratic and Republican identification. Internet users are somewhat less partisan than either the adult or politically-active population, with 32.5% of the Internet-using population claiming independence; also, Internet-users are equally split between the Democratic and Republican parties. Interestingly, when we turn to the last column, we see that the Internet-using, politically active population is slightly more Republican than Democratic (35.2% to 34.2%), and a little less independent than the Internet users population (30.5%).

The CBS News survey provided two different measures of race and ethnicity. Eighty-five and seven tenths percent of the adult population in the survey is white, followed by 8.6% black, 4.4% other, and 1.4% Asian. The politically-active population is about 2% more white than the adult population. But the Internet-using, and the Internet-using politically-active populations, are both more strongly white (88.0% and 89.4%, respectively), with most of the increase coming at the expense of blacks, which drop to 4.8% and 4.4%, respectively. Hispanic identification, interestingly, shows little differences across the four populations, primarily because all four populations are virtually exclusively non-Hispanic.

Ideology is the next item we examine. Most American adults call themselves moderate (41.2%), or conservative (37.7%), with only 21.2% saying they are liberal. The politically-active population is virtually identical to the adult population in ideological identification. When we turn to the Internet-using population, they are slightly more liberal (22.7%) and moderate (42.9%), but less conservative. But in the final column, we see that the politically-active and Internet-using population is ideologically similar to the adult or politically-active populations.

Last, to provide an overall sense for the digital divide, we provide in Table 3 the breakdown of the extent of computer and Internet access for the adult and politically-active populations. Note that 74.4% of the adult population has computer access, and that slightly higher rates of politically-active adults have access to a computer (76%). But the adult population is almost evenly divided as to whether they have Internet access, as 49.2% said they had Internet access in 1999 and 50.8% said they did not. Slightly higher rates

of the politically-active have access to the Internet, as 52.2% said they had Internet access.

What can we conclude after our examination of the digital divide? First, it is clear that roughly half of the adult or politically active populations do not have Internet access; thus, roughly half of the adult or politically active populations would have difficulty accessing the Internet for electronic balloting purposes. Of course, two things could help resolve this problem—the continuing expansion of Internet access throughout America and the fact that electronic balloting places can be established for individuals who do not have regular Internet access.

What do we know about the likely users of electronic balloting, i.e., the politically-active, Internet-using population, relative to the adult population from this analysis? They are more likely to be male, to be married, to have high educational attainment, to be younger, but not in the very young group, eighteen to twenty-nine, and to be slightly more Republican and white.[61] These differences suggest that electronic balloting is most likely to be accessible to certain segments of the adult population, and that some of these differences raise serious legal concerns about electronic balloting. As the likely audience for electronic balloting is skewed towards whites and away from blacks, we believe that electronic balloting will face serious voting rights challenges in the near future. Additionally, electronic balloting might face political challenges from other likely impacted groups—women, the elderly, and those with lower levels of educational attainment. Thus as long as these digital divides exist in America, we believe that caution is in order regarding the implementation of electronic balloting.

IV. THE ARIZONA DEMOCRATIC PRIMARY

A recent and extensive use of the Internet for voting occurred this spring in Arizona.[62] In what technically was a private election,

---

61. *See* U.S. DEP'T OF COMMERCE, *supra* note 56.

62. *See* Frederick I. Solop, Digital Democracy Comes of Age in Arizona: Participation and Politics in the First Binding Internet Election (prepared for presentation at the American Political Science Association national conference, Washington, D.C., Aug. 31-Sept. 3, 2000) (unpublished manuscript, on file with the Northern Arizona University Department of Political Science), *avail-*

contracted and conducted by the Arizona state Democratic party to select delegates for the Democratic National Convention, registered Democratic voters were given four different ways to cast ballots: through remote Internet voting during the four days before the Saturday, March 11, 2000 primary; through traditional vote-by-mail absentee voting; through in-precinct paper ballots; or by in-precinct electronic balloting.[63] Thus the 2000 Internet election in Arizona provides a very important datum from which to assess the potential political consequences of Internet voting.

However, the 2000 Democratic primary in Arizona was experimental in another way, as Arizona has not had much experience with presidential primaries for either party. In 1996, the Arizona Republican party held the first real primary in the state, largely at the initiative of John McCain, who worked to get an Arizona Republican primary in late February to help the candidacy of Phil Gramm.[64] Arizona Democrats also wanted to run a February primary in 1996, but national Democratic party rules forbade such an early primary and the Democratic party had to settle with a small-scale, party-run preference vote at only a very limited number of polling locations. As Cook notes: "turnout for the Democratic event has been comparatively light. The last competitive contest in 1992 drew barely 35,000 voters—slightly more than the 10 percent of the turnout for the Republican presidential primary in 1996."[65]

The Arizona Democratic Internet voting experiment in 2000 occurred at a time in the Democratic nomination contest when the outcome had been decided; after the round of primaries, on March 7, 2000, it became quite clear that Al Gore would win the Democratic nomination.[66] While an important statewide experiment with Internet voting, the Arizona Democratic primary was held after the real race was over; and thus many voters may have stayed away from the polls.

---

able at http://pro.harvard.edu/papers/036/ 03015SolopFrede.pdf.

   63. *See id.*

   64. *See* RHODES COOK, UNITED STATES PRESIDENTIAL PRIMARY ELECTIONS 1968-1996: A HANDBOOK OF ELECTION STATISTICS 60 (2000).

   65. *Id.*

   66. *See A Day for Front Runners*, L.A. TIMES, Mar. 8, 2000, at B6 ("There is no question now that Gore will become the [Democratic] nominee in Los Angeles in August.").

Even so, the Arizona Democratic primary Internet voting process was relatively straightforward. Registered Democratic voters in Arizona received personal identification numbers (PIN's) in the mail in February and March. These PIN numbers were generated by the company hired by the Arizona Democratic party to conduct the Internet election, Election.com.[67] Voters who wanted to cast ballots over the Internet were allowed to do so beginning at 12:01 a.m. on Tuesday, March 7 through midnight on Friday, March 10.[68] During this period, voters needed to log on to one of two web sites run by the Democratic party and Election.com; the log-in process required that the voter accept the election rules, enter a PIN, and then answer two personal questions.[69] The PIN and the two personal questions were matched against voter registration records, and once verified, a ballot would appear on the voter's computer screen. The voter then would click on their choice of candidate, click YES to confirm their choice, and receive electronic confirmation of the ballot.[70]

The remote Internet voting was closed on Friday, March 10. On Saturday, March 11, voting was allowed in-person at 124 polling places established by the Democratic party. Most of the 124 polling places had electronic voting machines, as well as traditional paper ballots. PIN numbers were used on primary election day (March 11) to insure that a voter did not cast more than one ballot.[71]

Thus, the Arizona Democratic Presidential Primary in 2000 gives us an important way to examine the representational implications of Internet voting. The Arizona Democratic party has provided data from their presidential primary which details the number of ballots cast using each type of electoral participation: remote Internet voting, absentee vote-by-mail, electronic voting in the polling place, and traditional paper-based balloting in polling places. This data is provided for each of the fifteen Arizona counties, which we have merged with voter registration data from the Arizona Secretary

---

67. *See* Solop, *supra* note 62, at 4-5.
68. *See id.*
69. *See id.*; *see also* Ariz. Democrats Making History, *Arizona Democratic Presidential Primary: Casting a Vote* (on file with Loyola of Los Angeles Law Review).
70. *See* Solop, *supra* note 62, at 4-5.
71. *See id.*

of State and with data on county economic and demographic profiles from the Arizona Department of Commerce.

We report the percentages of votes cast in the 2000 Arizona Democratic primary in Table 4. Overall, 35,768 or 41% of the ballots were cast using remote Internet voting. This was closely followed by traditional vote-by-mail, which constituted almost 32,747 or 38% of the ballots cast in this election. Together, remote Internet or absentee voting accounted for 79% of the votes cast in this election. Most of the remaining ballots were cast in precincts using paper ballots (16%) or electronic voting machines in polling places (5%).

TABLE 4: BALLOT CHOICES, 2000 ARIZONA DEMOCRATIC PRIMARY[72]

County	Percentage of Votes Cast Per Ballot Type			
	Internet	Mail	Polling Electronic	Polling Paper
Apache	27.03	26.78	28.16	18.02
Cochise	42.20	33.16	6.03	18.61
Coconino	49.85	25.76	11.43	12.95
Gila	32.22	35.55	5.62	26.61
Graham	28.76	27.68	8.37	35.19
Greenlee	36.36	36.36	1.65	25.62
La Paz	26.79	58.04	0.45	14.73
Maricopa	43.02	40.64	3.97	12.37
Mohave	39.32	10.09	7.65	42.93
Navajo	28.62	32.67	7.33	31.38
Pima	42.03	32.98	2.84	22.15
Pinal	34.19	38.98	2.01	24.82
Santa Cruz	27.41	34.86	5.25	32.49
Yavapai	37.01	40.10	5.78	17.10
Yuma	33.12	51.77	3.36	11.75
State	**41.16**	**37.68**	**4.80**	**16.36**

72. *See* Ariz. Democrats, *Paper Ballots vs. Internet Votes, at* http://www.azdem.org/breakdown.html (Jan. 11, 2001); Ariz. Dep't of Commerce, *Arizona Demographics: Population by County, at* http://www.azcommerce.com/datapages/demograp.html (last modified Dec. 8, 2000) [hereinafter *Arizona Demographics*].

However, there was significant variation across the fifteen counties in the use of Internet balloting. In Coconino County (north-central Arizona, including Flagstaff), almost 50% of the ballots were cast using remote Internet voting; in three other counties, i.e., Cochise (southeastern Arizona), Maricopa (south-central Arizona, including Phoenix), and Pima (southern Arizona, including Tucson), Internet voting rates were 40% or higher. On the other end of the distribution were five counties with Internet voting rates just greater than 25% (Apache, Graham, La Paz, Navajo, and Santa Cruz counties).

Though many ballots were cast using the Internet in the 2000 Arizona Democratic Presidential Primary, turnout in this election was quite low.[73] Statewide turnout (the number of ballots cast as a percentage of registered Democratic voters) was only 10.59%, as we show in Table 5. Unfortunately, as we noted earlier,[74] the Democratic presidential race was already decided by the time Arizona's Democrats were able to vote, which no doubt depressed turnout in this particular election. Even with this fact in mind, turnout in this presidential primary was much lower in Arizona than in previous statewide primaries in 1998, 1996, and 1994, which averaged 23.94%.[75]

---

73. *See* COOK, *supra* note 64.

74. *See id.*; *see also supra* note 65 and accompanying text.

75. *See* COOK, *supra* note 64, at 60. As we noted above, the Arizona Democratic Party before 2000 did not conduct a true statewide presidential primary, so it is impossible to make comparisons to earlier Democratic presidential primaries. The statewide primaries involve state and local partisan primaries, as well as various ballot measures, which provide many stimuli to attract voters to the polls. On the other hand, presidential races are very salient and are often accompanied by much media attention, which fuel voter interest and participation. In the end, the previous statewide primary turnout data provide a solid indication of the general propensity of Arizona voters to participate in primary elections.

TABLE 5: TURNOUT IN ARIZONA 2000, COMPARED TO
PREVIOUS PRIMARIES[76]

County	Turnout of Registered Voters in Democratic Primaries				
	2000 Turnout	1998 Turnout	1996 Turnout	1994 Turnout	1994-98 Average
Apache	2.97	24.32	34.30	35.01	31.21
Cochise	8.64	27.78	33.70	38.14	33.21
Coconino	5.56	12.01	23.08	20.57	18.55
Gila	8.73	33.23	42.40	44.75	40.13
Graham	4.99	24.70	52.95	39.09	38.91
Greenlee	2.91	48.20	58.41	43.57	50.06
La Paz	6.08	14.05	32.62	28.66	25.11
Maricopa	13.33	10.54	14.03	29.89	18.15
Mohave	7.37	20.65	21.91	29.95	24.17
Navajo	4.47	19.46	29.05	34.97	27.83
Pima	9.41	15.96	26.15	29.83	23.98
Pinal	7.38	29.03	33.93	38.29	33.75
Santa Cruz	6.05	22.24	48.19	44.97	38.47
Yavapai	14.14	15.82	15.97	36.48	22.76
Yuma	7.06	23.57	28.71	26.64	26.31
State	10.59	19.66	23.57	28.58	23.94

Again, we see significant county-by-county variation in turnout in the 2000 Arizona Democratic Primary. Two counties, i.e., Yavapai (north-central Arizona, including Prescott) and Maricopa, had turnouts in the 13% to 14% range in the 2000 Democratic Primary, but two other counties had virtually no voter turnout at all (Apache [northeast Arizona] and Greenlee [eastern Arizona]). Most of the remaining Arizona counties saw voter participation in the 5% to 9% range in this election. Thus, we see significant variance in voter participation in the 2000 Democratic Presidential Primary.

76. *See id.*

Significantly, when we contrast the 2000 Democratic turnout with the turnout from recent previous statewide primaries at the county level, we see that there is a negative correlation; that is, counties which had low 2000 voter participation had higher 1994, 1996, or 1998 participation rates.[77] We can see this in Table 5 when we examine counties at either extreme: Yavapai County had 14% participation in 2000, but 23% participation in statewide primaries from 1994-1998; Greenlee County had 2.91% participation in 2000, but 50% participation in the 1994-1998 statewide primaries. Thus the evidence is clear and systematic, showing that turnout in the 2000 Arizona Democratic Presidential Primary was high in historically lower turnout counties but low in historically high turnout counties.

Our interest in turnout regarding the Arizona 2000 Democratic Presidential Primary goes to the heart of what we view as the central, narrow legal question about the use of Internet voting: Does Internet voting have a negative impact on minority voting rights?[78] To present a more tightly focused analysis regarding this narrow legal question, we compare turnout of white and non-white citizens/voters in the 1998 statewide Democratic Primary in Arizona to the 2000 turnout in the Democratic Presidential Primary.

As we noted earlier, since the Democratic Party in Arizona had never previously conducted a true statewide presidential primary prior to 2000, it is impossible to produce a comparison to turnout in earlier Democratic presidential primaries. Instead, we observe the turnout in statewide primaries as indications of the underlying propensity of Arizona Democrats to participate in primary elections. As we demonstrated above, there is a relatively high degree of consistency in Democratic turnout across the recent statewide primary elections in Arizona. The problem, of course, is that Democratic turnout rates for whites and non-whites are not collected nor reported in Arizona. This means that we must use the known Democratic

---

77. The correlation coefficients are -.45 (2000 and 1998), -.65 (2000 and 1996), -.12 (2000 and 1994), and -.51 (2000 and the 1994-1998 average).

78. We are focusing in this analysis only on the voting rights question regarding non-Native American minority voters in Arizona. It could also be the case that the voting rights of Native Americans in Arizona's Internet voting primary could be impacted, but we do not examine that question here. The categories of white and non-white voters, as we use them, are exclusive of Native Americans.

turnout rates for 1998 and 2000, as well as known estimates of the racial composition of Arizona counties to estimate the white and non-white Democratic turnout rates in each Arizona county for each election.[79] This is probably familiar to readers as the common "ecological inference" problem—using geographically aggregated data to produce estimates of individual-level behavior. We use a recently developed method to estimate the white and non-white Democratic turnout rates, a method that produces ecological estimates with reasonable statistical properties under a set of reasonable assumptions.[80]

Our ecological estimates of white and non-white Democratic turnout in each of Arizona's counties in 1998 and 2000 is given in Table 6. The three left columns give the estimates of white Democratic turnout, while the three right columns give the estimates of non-white Democratic turnout.

TABLE 6: RACE AND TURNOUT, 1998 AND 2000
ARIZONA DEMOCRATIC PRIMARIES

County	White Democratic Turnout			Non-White Democratic Turnout		
	1998	2000	Change	1998	2000	Change
Apache	16.42	2.38	-14.04	50.62	4.93	-45.69
Cochise	16.49	10.67	-5.82	47.03	5.19	-41.84
Coconino	9.39	5.70	-3.69	19.79	5.13	-14.66
Gila	22.51	9.74	-12.77	69.81	5.27	-64.54
Graham	15.91	4.97	-10.94	42.82	5.03	-37.79
Greenlee	23.52	1.45	-22.07	77.88	4.68	-73.20
La Paz	11.34	6.28	-5.06	30.26	4.90	-25.36
Maricopa	8.29	15.11	6.82	21.01	5.06	-15.95
Mohave	18.33	7.54	-10.79	51.72	5.15	-46.57
Navajo	14.14	4.32	-9.82	35.15	4.94	-30.21

79. *See* Betsey Bayless, *Elections*, *at* http://www.sosaz.com/ election/ (last visited Feb. 12, 2000). For economic and demographic data provided by the Arizona Department of Commerce, see *Arizona Demographics*, *supra* note 72.

80. *See* GARY KING, A SOLUTION TO THE ECOLOGICAL INFERENCE PROBLEM: RECONSTRUCTING INDIVIDUAL BEHAVIOR FROM AGGREGATE DATA 91-122 (1997).

County	White Democratic Turnout			Non-White Democratic Turnout		
	1998	2000	Change	1998	2000	Change
Pima	12.62	11.26	-1.36	23.53	5.24	-18.29
Pinal	18.13	8.70	-9.43	47.95	5.09	-42.86
Santa Cruz	15.74	10.08	-5.66	23.95	4.99	-18.96
Yavapai	13.67	14.92	1.25	40.44	5.09	-35.35
Yuma	14.28	8.77	-5.51	34.75	5.01	-29.74
Averages			-7.26			-36.07

Not surprisingly, as noted above, turnout was low in the 2000 Democratic Primary, as observed in Table 6, where turnout fell between 1998 and 2000 for both whites and non-whites. However, the legally and politically significant fact is that the *average rate of decrease for non-white turnout was five times greater than the average rate of decrease for white turnout.* Secondly, notice that in two Arizona counties—Maricopa and Yavapai Counties—white turnout actually increased in the 2000 Democratic Presidential Primary from the levels in 1998. Contrast this with the fact that *non-white turnout declined between 1998 and 2000 in every Arizona county.* We see the evidence in Table 6 as an indication that non-white voting rights might have been seriously impacted in 2000 by the introduction of Internet voting. However, the data we have presented so far from the 2000 Arizona Democratic Presidential Primary in 2000 in Tables 5 and 6 tells us little about the implications of Internet voting for political representation. In order to shed some light on this important question, we turn to multivariate analysis.[81]

Our multivariate analysis focuses on one dependent variable, measured at the county level: the proportion of ballots cast in each county using the remote Internet option, out of all ballots cast in the county. Of course, two caveats must be raised about this

---

81. Multivariate analysis uses several descriptive variables in a statistical model to explain the variation in a dependent or response variable. Importantly, multivariate analysis allows the researcher to examine the impact of one descriptive variable on the dependent variable, holding all other descriptive variables constant. *See* EDWARD R. TRUFLE, DATA ANALYSIS FOR POLITICS AND POLICY 2-5 (1974).

multivariate analysis. First, we are sharply limited in our analysis by the fact that we have only fifteen observations, which curtails our ability to include many independent variables on the right-hand side of each analysis. Second, we are conducting an analysis at an aggregated level, thus our results might be subject to various ecological inference critiques.[82]

With those caveats in mind, we have one last complication to discuss regarding this analysis. Our dependent variable is a proportion, namely, the proportion of voters who cast an Internet vote. The appropriate econometric technique for analyzing proportions data of this sort is grouped logit.[83] The grouped logit technique is very similar to the more familiar logit, probit, or logistic regression techniques for binary choice data. In fact, one simple intuitive way to think about grouped logit is as a method which uses the proportions data to estimate something like an individual-level model where the dependent variable is a binary choice and the independent variables are attributes of the decision-maker.[84]

In this grouped logit analysis, we test whether or not the 2000 Democratic Presidential Primary in Arizona adversely impacted voters who do not have ready access to the Internet; those members of American society who are on the wrong side of the digital divide.[85] The important demographic groups we analyze are women, the elderly, the non-white, the unemployed, and residents of rural areas. We have tested whether members of these various groups were more or less likely to use Internet voting in the 2000 Arizona Democratic Presidential Primary.

While all of these groups are on the wrong side of the digital divide, one group is of particular legal importance—the non-white residents of Arizona. This particular legal concern revolves around the possibility that Internet voting systems might be challenged under Section 2 of the 1964 Voting Rights Act, which "prohibited any

---

82. *See* KING, *supra* note 80, at 158-96. For example, aggregation bias might plague our ability to use the aggregated data to make inferences about individuals. However, our sample is so limited that we do not believe that using alternative ecological inference techniques is possible.

83. *See* WILLIAM H. GREENE, ECONOMETRIC ANALYSIS 834-35 (4th ed. 2000).

84. *See* Appendix *infra*.

85. *See* discussion *supra* Part III.

'voting qualification or prerequisite to voting, or standard, practice, or procedure' that denied or abridged the right to vote on the basis of race or color."[86]   Thus we will focus particular attention on non-whites and Internet voting in the 2000 Arizona Democratic Presidential Primary.

Our specification of the grouped logit model is straightforward. As discussed above, the model we use has as a dependent variable the proportion of Democratic ballots cast in 2000 that were cast using the Internet. This is measured at the county level. The right-hand side variables are also measured in proportions. We include the proportion of the county that is female, the proportion of the county that is elderly (over 65 years of age), and the proportion of the county that is non-white. We also include the county unemployment rate, and the proportion of the population of the county which resides in an urban area.

We begin our presentation of these grouped logit results with Table 7, which gives the maximum-likelihood grouped logit estimates and their associated standard errors. Estimates which are marked with an asterisk ("*") are ones which are statistically significant at the $p = .05$ level or better. In this table, we also provide estimates of the marginal effects of each independent variable on a hypothetical voter.[87]

---

86. KOUSSER, *supra* note 15, at 55 (quoting Voting Rights Act of 1965, 42 U.S.C. § 1973(a) (1994)).

87. Readers versed in the political methodology literature will be familiar with these marginal effect estimates, which are commonly called "first differences." Essentially we start with a hypothetical individual, in this case a voter who lives in an urbanized area, is white, male, non-elderly and employed. We compute the probability that this voter would cast an Internet ballot, relative to the other ballot options (which we estimate to be .73). We then alter one characteristic at a time, each time computing the new probability; for example, we next change this hypothetical voter to be female, and compute the probability that she would cast an Internet ballot (which we estimate to be .30). In the table, we then report the difference between the baseline probability and the probability for each "new" voter.

TABLE 7: GROUPED LOGIT ANALYSES,
ARIZONA DEMOCRATIC PRIMARY

Variable	Choice of Internet Vote	
	Logit Estimates	Marginal Impact
Constant	.25	
	.71	
Female	-1.76	.43
	1.49	
Elderly	-1.71*	.42
	.33	
Non-White	-.37*	.08
	.11	
Unemployed	-1.07*	.40
	.24	
Urban Resident	.75*	.17
	.07	

Note: Entries in left column are grouped logit maximum likeli-hood estimates, followed by their associated standard errors. An asterisk (*) indicates a coefficient significant at the $p = .05$ level. Entries in right column are estimates of marginal impacts of each independent variable for a hypothetical voter, changing the particular variable from high to low while holding the other variable constant.

In the first column of Table 7 we present results for Internet voting rates. In this analysis, four of the five demographic variables have statistically significant effects; the coefficient for females, while negative, cannot be statistically differentiated from zero. The other coefficients, however, do provide important tests of our hy-potheses about Internet voting. *Ceteris paribus*, the elderly, the non-white, and the unemployed all were statistically less likely to engage in Internet voting. Additionally, those who lived in rural areas were less likely to engage in Internet voting. Thus we have clear evidence that those citizens on the wrong side of the digital divide were

less likely to engage in Internet voting than were those citizens on the right side of the divide.

Next, we turn to the strength of each of these demographic effects within these grouped logit models. To do this, we transform our results into hypothetical estimate probabilities for each type of voter, relative to some hypothetical baseline voter (urban resident, non-elderly, white, employed, and male). These are reported in the final column of Table 7. We see that the estimated magnitude of each demographic voter attribute clusters into two groups: gender, age, and employment status on the one hand, each of which has a relatively strong impact on the propensity to use the Internet as a voting option; and race and urbanization on the other hand, both of which have weaker but statistically significant impacts on the likelihood that a hypothetical Arizona Democratic voter would use the Internet to vote in this primary election.

Thus, the results in Table 7 demonstrate clearly that those people on the wrong side of the digital divide—women, the elderly, the non-white, the unemployed, and rural residents—were less likely to use the Internet to vote in the 2000 Arizona Democratic Presidential Primary. These findings have two implications for the basic themes of this paper. First, regarding the narrow legal question of the impact of Internet voting on minority voting rights, we again see evidence which makes us pessimistic about how Internet voting should be viewed in the context of the Voting Rights Act: non-white voters did not vote on the Internet as often as whites, so the Internet voting option seems unlikely to improve the voting rights of minorities. Instead, Internet voting seems likely to weaken the voting rights of minorities, as in this particular case minority turnout dropped substantially more than did white turnout.

Second, regarding the broader political representation question, we observe that as long as the digital divide exists in American society, those behind the digital divide will not see enhanced political representation as a result of Internet voting.[88] Some low propensity voters, like non-whites or the unemployed, might see further reductions in the quality and strength of their political representation as a result of the introduction of widespread Internet voting. Some low

---

88. *See* U.S. DEP'T OF COMMERCE, *supra* note 56, at 16.

propensity voters, in particular the younger generations of voters, might see enhanced political representation with the introduction of Internet voting as this might make younger voters more likely to participate in politics. Thus, if Internet voting were widely used in American politics, it would change the character of political representation, with some specific groups behind the digital divide (minorities, the unemployed, and the elderly) losing further political power while other groups (especially the young and those in urban areas) might see increased political power.

V. THE POLITICS OF INTERNET VOTING

Despite the digital divide, and the possible problems it presents for Internet voting discussed in the last two sections of this paper, is the public ready to support widespread Internet voting? If not, is there an identifiable constituency which backs Internet voting? On these questions, there has been little systematic research, and virtually no easily obtainable data. Instead, in this section we report on the few survey studies which have been conducted regarding public support for Internet voting.

Some polls have been conducted nationally on preferences for or against Internet voting.[89] For example, in July, 1999, ABC News conducted a national telephone poll in which 42% of the adult respondents stated that they would be willing to vote over the Internet if such a balloting process could be made secure.[90] Support, however, was much greater for younger adults, as 61% of those aged eighteen to thirty-four said they would be willing to participate in Internet elections.[91] Much of the reluctance of these survey respondents to back Internet voting seems to arise from their uncertainty about the security of the process: 26% stated that the Internet elections "could be made secure from fraud anytime in the near future," while 69% said that making Internet elections secure would take "many years" or that it would "never happen."[92] Even younger

---

89. *See* Gary Langer, *Virtual Voting: Poll Finds Most Oppose Online Ballots*, ABCNEWS.com, July 21, 2000, *at* http://abcnews.go.com/sections/politics/ DailyNews/poll990721.html.
90. *See id.*
91. *See id.*
92. *Id.*

voters remain to be convinced of the security of Internet voting, as 60% of the eighteen to thirty-four year olds said that making Internet elections secure would take "many years."[93]

In recent telephone interviews in Arizona, Solop found that 56% of Arizona adults thought that Internet voting should be included as an option in all future statewide elections in Arizona.[94] Solop also found the same sort of age gap in preferences for and against Internet voting in Arizona that ABC News identified in 1999; 61% of voters age eighteen to twenty-nine favored including Internet voting as an option in Arizona statewide elections, while only 47% of those over sixty years of age favored such a plan.[95] Support for Internet voting also rose in Solop's study with educational attainment and income.[96]

The issue of Internet voting was also studied in California. In December, 1999, the Public Policy Institute of California (hereinafter "PPIC") Statewide Survey found that California adults were deeply divided over whether they favored or opposed a system that would allow Californians to vote in elections over the Internet.[97] Forty-seven percent of those polled favored such a system, 48% opposed it, and only 5% had no opinion.[98] We provide details of the PPIC survey on Internet voting in California in Table 8.

---

93. *Id.*
94. *See* Solop, *supra* note 62, at 13.
95. *See id.*
96. *See id.*
97. *See* MARK BALDASSARE, PUBLIC POLICY INSTITUTE OF CALIFORNIA STATEWIDE SURVEY: CALIFORNIANS AND THEIR GOVERNMENT 31 (1999).
98. *See id.*

TABLE 8: INTERNET VOTING IN CALIFORNIA[99]

	Partisanship						
	All Adults	Democrats	Republicans	Other	Not Registered	Lati-nos	Internet Users
Internet Voting							
Favor	47	50	40	52	53	50	54
Oppose	48	45	56	44	41	45	37
Don't Know	5	5	4	4	6	6	9
Ballot Type							
Ballot Box	46	47	49	45	39	47	41
Absentee	23	23	26	19	21	23	*
Internet	30	29	24	36	37	27	40
Don't Know	1	1·	1	0	3	3	*

*Note: Results from the December, 1999, Public Policy Institute of California Statewide Survey.

The preferences for and against Internet voting in the 1999 PPIC poll in California differ in important ways across citizens. There is a clear partisan division in California over Internet voting, with 50% of Democrats and 52% of those registered in some way other than with the two major parties supporting Internet voting; and 56% of Republicans opposing Internet voting.[100] Importantly, a majority of survey respondents who are not registered (53%) state they favor

---

99. *See id.* The PPIC report did not break down the responses of the remaining 19%, but it is likely that most if not all of these Internet users preferred the absentee ballot.
100. *See id.*

Internet voting.[101]   Also, Latino respondents slightly favored Internet voting (50% in support, 45% in opposition, 5% no opinion).[102]

The PPIC survey also included another question about Internet voting: "If you had the choice, would you prefer to vote in elections at the ballot box, by absentee mail ballot, or over the Internet?"[103] As we present in Table 8, when given this menu of ballot choices (similar to the Arizona menu), 30% of respondents said they would use the Internet.   Forty-six percent would use the traditional ballot box means of voting, while 23% would vote by mail.   The menu of ballot choices, broken down by party registration, shows that Internet voting has the strongest support among Californians who are not registered with the two major parties (36% would pick Internet voting from the menu) and with those not registered at all (37% would pick Internet voting).   Latinos in California are not very different from the rest of the sample of adults, as 27% would pick the Internet. Perhaps not surprisingly, Internet users are almost as likely to say they would use the Internet to vote as they would be to use the traditional ballot box to cast their ballots.[104]

Thus, Internet voting appears to currently enjoy some support, both nationally and in at least two important states involved in the Internet voting revolution.   However, Internet voting seems only able to muster bare majority support at present, implying that this political reform may not necessarily be wildly supported in the future.   In comparison, two recent political reforms on the ballot in California, Propositions 208 (campaign finance reform in the 1996 general election) and 198 (primary election reform in the 1996 primary election) both achieved roughly 60% support or better when they passed, despite facing significant opposition.[105]   As Internet voting is only able to achieve 45% to 50% support in public opinion polls in a time where there has not been a concerted effort to oppose Internet voting

---

101. *See id.*
102. *See id.*
103. *Id.*
104. *See id.*
105. *See* 1996 GENERAL ELECTION RETURNS FOR BALLOT PROPOSITIONS, *available at* http://Vote96.ss.ca.gov/Vote96/html/vote/prop/page.961218083 528.html (last visited Jan. 26, 2001); 1996 PRIMARY ELECTION: BALLOT PROPOSITIONS, *available at* http://Primary96.ss.ca.gov/e/returns/prop/page. 960504080000.html (last visited Feb. 12, 2001).

makes us pessimistic about contemporary public support for Internet voting.

VI. CONCLUSION

We believe that based on the evidence we have presented, Internet voting is likely to exacerbate the current problem of class-bias in American elections if it is introduced any time in the near future. We have shown that previous reforms to ease voting or registration have tended to be taken advantage of by those of higher socio-economic status.[106] Similarly, based on the current digital divide, Internet voting is a reform ripe to be taken advantage of by those with higher socio-economic status. Adopting a system of voting whereby people of sufficient means can vote from the convenience of their homes using a technology they find routine and regularly use for everything from checking stock price quotations to examining movie schedules to doing mail-order shopping, while people of lesser means must brave the uncertain weather of early November to find a local polling place hardly seems like an election reform likely to lead to fairer or more representative elections. While there is a tendency to view increased participation as a good thing, if that increased participation occurs primarily among those who are already over-represented at the polling place, then increased participation can be a bad thing.

As Internet penetration increases in the United States, Internet voting will become a more viable alternative. As the penetration rate rises, the potential for Internet voting to raise the turnout rates of the huge number of non-voting people lower on the socio-economic scale could outweigh the greater individual propensity for people on the higher end of the scale to take advantage of it. But right now, Internet voting would be the equivalent of "motor voter: for luxury car drivers only."

---

106. *See* ELECTION SUMMARY REPORT, *available at* http://Vote98.ss.ca.gov/Misc/Summary.html (last visited Feb. 12, 2001); 1998 PRIMARY ELECTION SUMMARY OF THE "STATEMENT OF THE VOTE", *available at* http://Primary98.ss.ca.gov/Final/SOV_Summary.html (last visited Feb. 12, 2001).

APPENDIX

The log-likelihood function for the binary choice model is $\log L \sum_{i=1}^{N} (y_i \log F(x_i\beta) + (1 - y_i) \log[1 - (x_i\beta)])$ where F is either the normal or logistic distribution. The grouped logit log-likelihood function is very similar: $\log L = \sum_{i=1}^{N} N_i (P_i \log(x_i\beta) + (1 - P_i) \log[1 - F(x_i\beta)])$ where again F is the logistic function, n_i is the number of individuals in the population, and P_i is the proportion of the n_i individuals who respond with $y_i = 1$.