

DECLARATION OF HENRY E. BRADY

I, HENRY E. BRADY, hereby declare as follows:

1. I submit this declaration in support of the plaintiffs' motion to require the Secretary of State to postpone the October 7, 2003 recall election, on the ground that the use of the punchcard machines in this election would have a disproportionate negative impact on voters in counties that use these machines and on minority voters.

2. I was asked by Plaintiffs' counsel Mark Rosenbaum and Daniel Tokaji to review the impact of voting technology on the October 7, 2003 recall election, especially the continued use of punchcard technology for vote recording and counting instead of the newer systems required as of March 1, 2004 by the May 9, 2002 consent decree between Common Cause, et al. and Bill Jones, California Secretary of State.

3. Section I, below, sets forth my qualifications. Section II provides a summary of my opinions. Section III addresses the disparate impact on minority voters resulting from the use of punchcard voting systems in six California counties.

I. EXPERT QUALIFICATIONS

4. I am currently Robson Professor of Political Science and Public Policy at the University of California, Berkeley where I regularly teach courses in advanced statistical methods, voting behavior, and elections at the graduate level. I am also Director of the University's Survey Research Center and of UC DATA (University of California Data Archive and Technical Assistance) where I regularly design studies of voting and political participation. I have taught at MIT, Harvard University, and the University of Chicago. Among my three books, three monographs, and over 50 articles and reports, there are major studies of political participation (*Voice and Equality*, Harvard University Press), voting (*Letting the People Decide*, Stanford University Press), and voting technology (*Counting all the Votes*, Survey Research Center and Institute for Governmental Studies).

5. I have a 1980 Ph.D. in Economics and Political Science from the Massachusetts Institute of Technology where I specialized in public finance, urban economics, American politics, public policy, and econometrics which is the statistical analysis of economic data.

6. I am a past president of the Political Methodology Group (PMG) of the American Political Science Association, Vice-President of the Midwest Political Science Association, and a member of the Council of the Association for Public Policy and Management. I am co-chair of the 2003 annual meeting of the American Political Science

Association. I have served on the editorial boards of the *American Political Science Review*, the *American Journal of Political Science*, *Evaluation Research*, *Political Analysis*, and I am associate editor of *Perspectives on Politics*. I am a member of the Advisory Board to the Directorate for Social, Behavioral, and Economic Sciences of the National Science Foundation. I was recently elected a Fellow of the American Academy of Arts and Sciences.

II. SUMMARY OF OPINIONS

7. One of the primary goals of election administration is the conduct of elections in a fair and equitable manner that maximizes participation.¹ The October 7, 2003 California recall election presents formidable challenges to fairness, equity, and participation. It is an exceptional election that is not part of the usual electoral schedule in California. Furthermore, the announcement of the election came on July 24th – just eleven weeks before the election – giving election officials very little time to deal with the logistics of a state-wide election. Among other problems, election officials face difficulties finding voting locations, designing a ballot that will accommodate the many candidates expected to run, and implementing adequate vote counting systems. In this declaration, I focus on the consequences that flow from using punchcard voting systems.

8. Four types of voting systems are used in California: pre-scored punchcards, Datavotes, optical scan systems, and touch screens.

(a) Pre-scored punchcards (Votomatic and Pollstar systems in California) use cards similar to computer cards to record the vote. These cards are pre-scored with columns of small, perforated rectangles, known as chads. The names of the candidates are not on these cards. Voters insert this card into a slot in the voting device, and then they use a stylus punch device to punch-out the chads on the punchcards to indicate their preferred selection.

(b) Datavote machines use a stapler-like tool that creates a hole in ballots. In contrast to pre-scored punch card machines like Votomatic and Pollstar, the names of candidates appear on the medium where punches are made. Although the Datavote system makes punches, it operates in a much different way than Votomatic or Pollstar systems, and in the following discussion the term “punchcards” refers only to Votomatic and Pollstar systems; it does not refer to Datavote systems.

¹ Other goals include ensuring voter privacy, minimizing the cost of elections, and maximizing the speed at which votes are counted.

(c) Optical scan systems function in a way similar to standardized tests. Next to each choice is either a small circle or an arrow with a gap. The voter must darken the bubble next to the preferred candidate or measure, or draw a straight line connecting the two parts of the arrow. The ballot is then placed in a box and, once ballots are collected, counted using an optical scanner. Some versions of the technology permit the voter to scan the ballot at the polling place to make certain that he or she voted as intended. These are called “precinct-count” optical scan systems. Those which do not allow counts to be made in precincts are called “central-count” optical scan systems.

(d) Touch screen voting machines (also known as direct recording electronic devices or DREs) resemble ATM machines in appearance. Upon entering the booth, the voter touches the name of the candidate or the ballot measure on a screen to register his or her preference. Typically, the voter may review the entire ballot to check the votes cast. It is not possible to vote twice, or “overvote,” for the same office or measure. The computer tallies the votes and sends them to a central location.

9. In the October 7, 2003 statewide recall election, punchcard voting technology will be used in at least six counties (Los Angeles, Mendocino, Sacramento, San Diego, Santa Clara, and Solano) which comprised 44 percent of the 2000 vote in California. The use of punchcards will significantly increase the rate of residual votes (i.e., invalid ballots) as compared to other technologies. Comparing punchcard counties versus non-punchcard counties in California in 2000 (Figure 1) demonstrates that the residual vote rate is 1.34 percent higher in punchcard counties. Comparing the residual vote rates in counties that used punchcards in 1996 but moved to new systems in 2000 (Fresno, Marin, and San Francisco) indicates that residual votes declined by an average of 1.59 percent. The probability that these results happened by chance is less than one in a billion. Thus, counties using punchcards have, on average, a residual vote rate about one and one-half percentage points higher than those using other systems.

10. Punchcard voting systems also discriminate against minorities for two reasons. First, the six punchcard counties have a larger percentage of minorities (46%) than non-punchcard counties (32%). Second, punchcard systems lead to especially high residual vote rates among minorities. When punchcard systems are used, minorities have much higher residual vote rates than non-minorities, but when other voting systems replace punchcards, minorities have residual vote rates much closer to other groups. In those counties that moved from punchcards to other systems between 1996 and 2000, the difference in residual vote rates between zero percent minority Census tracts and 100 percent minority Census tracts was reduced by one to three percent for an average reduction

of 1.90 percent; thus bringing minority residual vote rates much closer to non-minority residual vote rates. The probability that these results occurred by chance is less than one in a billion.

11. Similarly for those counties that used punchcards in 2000, the residual vote rate for 100 percent minority tracts was about 4 percent while the residual vote rate for zero percent minority tracts was only about 1.3 percent. Hence, 100 percent minority tracts had a residual vote rate 2.7 percentage points higher than zero percent minority tracts when punchcards were used. For those counties that used non-punchcard systems in 2000, the residual vote rate for 100 percent minority tracts was about 0.5 percent and the residual vote rate for zero percent minority tracts was about 2 percent. Thus, 100 percent minority tracts had a residual vote rate only 1.5 percentage points higher. The racial gap was thus decreased by 1.2 percent by moving away from punchcards.

12. These data and data from other studies support the conclusion that moving away from punchcards will reduce overall residual voting by one to three percentage points with a best estimate of about 1.5 percentage points, and it will reduce the especially high residual vote rates among minorities compared to non-minorities by one to two percentage points.

13. Furthermore, there is no evidence that that the widely publicized concerns with punchcards resulting from the difficulties in the 2000 presidential election have led to an improvement in their performance. The eight counties that used punchcards in the 2002 Gubernatorial race had a residual vote rate of 4.04 which was worse than the 3.72 percent in those counties in the 1998 Gubernatorial race. But the four counties that changed from punchcards in 1998 to new systems in 2002 decreased their residual votes by 0.88 percent even though the residual vote rate increased for the rest of the state. Compared to the rest of the state, these new systems recorded at least one percentage point more votes.

14. In an election that may be close, as the October 7 election is shaping up to be, these impacts are significant enough to make the difference between whether the first recall question is approved and/or who receives the highest number of votes on the second recall question.

III. COUNTING VOTES FAIRLY AND EQUITABLY

A. Punchcards in California

15. In the 2000 Presidential election in California, nine California counties used either Pollstar or Votomatic voting systems (called “punchcard systems” in the following discussion) for recording and tabulating votes. The counties which used punchcard systems were

Alameda, Los Angeles, Mendocino, Sacramento, San Bernardino, San Diego, Santa Clara, Shasta, and Solano.

16. As a result of the difficulties in Florida, punchcards have come under substantial scrutiny across the United States. In California, the result was an October 12, 2001 stipulation and order and a May 9, 2002 consent decree which had the effect of decertifying Votomatic and Pollstar punchcard systems by March 1, 2004.

17. The consent decree was based upon abundant evidence that punchcard systems lead to higher rates of residual votes consisting of the sum of undervotes (cases where there is no vote for a race) and overvotes (cases where there is more than one mark for a single choice). In addition, punchcard systems lead to disproportionately high levels of undervotes and overvotes among minorities and those with low education.

B. Punchcards Perform Poorly Compared to Other Systems

18. Figure 1 shows the higher level of residual (or invalid) votes for each kind of system in use in California in 2000.² For those voters using punchcard systems, the residual vote rate was 2.23 percent. No other system had a higher average residual vote rate than 0.89 percent, a difference of 1.34 percentage points, meaning that punchcard systems failed to count 1.34 percentage points more votes than these other systems. In short, counties using punchcards performed significantly worse than those using other systems.

19. Figure 2 demonstrates that this poor performance was the result of using punchcards and not other characteristics of the punchcard counties. Figure 2 shows the impact of moving from a Votomatic punchcard system in Fresno county in 1996 to a Global Accu-Vote ES 2000 system (a precinct-count optical scan system) in 2000. The figure displays how the residual vote (i.e., ballots not counted on the grounds they were improperly marked) in the presidential elections of 1996 and 2000 (measured along the vertical axis) changes with the percent minorities (measured along the horizontal axis) in Census tracts in Fresno county. The solid line and solid circles represent data for 1996. The dashed line and empty triangles represent data for 2000. (The lines are estimated using

² “Punchcards” are Votomatic and Pollstar punchcard systems. Optical scan systems use forms like standardized tests. “Central optical” scan systems count votes in a central location; “precinct optical” scan systems count votes in the precinct. “DRE” stands for Direct Record Electronic systems like ATMs. “Datavote” systems use cards with the names of candidates on the cards.

ordinary least squares, a standard and accepted method for summarizing data of this sort.)

20. Note that the solid line is substantially above the dashed line, and it has a greater slope. The fact that the solid line for 1996 is everywhere above the dashed line for 2000 demonstrates that the Votomatic punchcard system used in Fresno in 1996 led to substantially more residual votes than the optical scan system. Indeed, the average difference of 2.65 percentage points implies that 2.65 percent of the votes were simply not recorded by the punchcard system.

21. The steep upward slope of the solid line means that the percentage of residual votes for punchcard systems increases dramatically as tracts become more heavily minority. Residual votes increase from less than 3 percent in tracts with virtually no minorities to about 6 percent in tracts with nearly 100 percent minorities. The much smaller slope for the dashed line indicates that the optical scan system has similar percentages of residual votes for all tracts, whether or not minorities live within them. Thus, there is strong evidence that punchcard systems discriminate against minorities.

22. These results are highly statistically significant. For each one of the 128 tracts in Figure 2 except one tract, the residual votes (or invalid votes) for 1996 in that tract are substantially above those for 2000. (The only exception is a very small tract with fewer than ten votes and with zero invalid votes in both years.) Clearly, residual votes were higher in Fresno when a punchcard system was used, and clearly residual votes increased at a much higher rate with percent minority when punchcards were used.

23. A standard statistical test of the difference in the performance between the two systems can be based upon the assumption that if there were no difference, then residual votes for one tract in 1996 might sometimes be above those for 2000, but residual votes would just as likely be below those for 2000. That is, there would be no consistent evidence that punchcards performed worse than the replacement system. If there were no difference, the chance that the residual votes would be higher in 2000 would be one-half, exactly like the probability of getting heads on a coin flip. Instead, with the one exception described above, for every Census tract the residual vote rate for 1996 when a punchcard system was used is above the residual vote rate for the same tract in 2000. If each Census tract is thought of as an independent test of the impact of the new system, then the probability of this happening if there is no significant impact of the system is the same as the probability of getting 127 consecutive heads in the flip of a coin, namely $1/2$ to the 127th power or approximately one chance in 10^{38} or one chance in 100,000,000,000,000,000,000,000,000,000,000,000,000,000,000.

24. In addition, we can test whether the precinct optical scan system used in Fresno County reduced the number of residual votes for minority voters by using regression analysis which is a standard statistical method for analyzing data like those in Figure 2. There are two ways to do this. One way is to consider the slopes of each line in Figure 2. The slope of the line for 1996 is .0413, meaning that for each 10 percent increase in minority population in a tract, the residual vote rate increases by .413 percent. For a change from 0 percent minority to 100 percent minority the residual vote rate increases by 4.13 percent. The slope of the second line for 2000 is .0086 (with a standard error of .0012) meaning that for each 10 percent increase in minority population in a tract, the residual vote rate increases by only .086 percent. Thus the change to precinct optical scan significantly reduces the relationship between percent minority and residual votes because the slope goes from .0413 to .0086 for a reduction of .0327. Another more direct test (which also allows for a test of statistical significance) is to take the difference between the residual vote in 2000 and 1996 for each tract and to regress it on minority percentage. If the change in systems reduced the racial disparity, then the coefficient should be significantly negative because the relationship between the residual vote rate and minority percentage should decline. The coefficient is -.0327 percent which indicates that for each 10 percent increase in minority population in a tract, the residual vote percentage went down by .327 percent with the change from punchcards to precinct optical scan. And the difference between tracts with 0 percent minority and those with 100 percent minority is -3.27 percent. The standard error is .0027 which indicates that the reduction is very highly statistically significant with a t-statistic of 12.1.³ In short, the likelihood that this reduction occurred by chance is less than one in a trillion.

25. Two other punchcard counties changed to new systems in 2000. Marin and San Francisco changed to precinct optical scan systems. Similar results are obtained for these two counties. The overall reduction in residual vote rate is 1.19 percent and the reduction in the slope

³ This t-statistic indicates that the reduction is statistically significant far, far beyond the standard .05 level of significance. Indeed, all of the t-statistics that I report in this declaration are beyond the value of 3.37 required for a .001 level of significance. A .001 level of significance means, roughly speaking, that if there is, in fact, no relationship, then the observed data will occur less than once in a thousand times. That is, if something is significant at the .001 level then we would observe what we do by chance (when there is no relationship) only about one in a thousand times.

on percent minority is -.0114 with a standard error of .002 (and a t-statistic of 5.8 indicating that the chance that this reduction occurred by chance is less than one in a billion.) Thus, the change away from punchcards in these counties reduced the difference in residual vote rate between tracts with zero percent minority and 100 percent minority percent minority by 1.14 percentage points.

26. In short, the change away from punchcards between 1996 and 2000 in three California counties – Fresno, Marin, and San Francisco – reduced the overall residual vote rate in these counties by about one to 2.5 percentage points for an average of 1.59 percentage points, and it reduced the difference in residual vote rates between 100 percent minority and 0 percent minority Census tracts by one to over 3 percentage points for an average of 1.90 percentage points.

27. Similar results have also been found for counties in other states and for nationwide data. See Justin Buchler, Matthew Jarvis, and John McNulty, “Punch Card Technology and the Racial Gap in Residual Votes,” unpublished paper, University of California, Berkeley; Henry E. Brady, Justin Buchler, Matt Jarvis, and John McNulty, *Counting all the Votes*, September 2001, Survey Research Center and Institute for Governmental Relations; Michael Tomz and Robert P. Van Houweling, 2003, “How Does Voting Equipment Affect the Racial Gap in Voided Ballots?” *American Journal of Political Science*, 47: 46-60.

28. Professors Michael Tomz of Stanford University and Robert P. Van Houweling of the University of Michigan summarize their results as follows in their abstract (cited here in its entirety):

“An accumulating body of research suggests that African Americans cast invalid ballots at higher rates than whites. Our analysis of a unique precinct level dataset from South Carolina and Louisiana shows that the black-white gap in voided ballots depends crucially on the voting equipment people use. In areas with punchcards or optically scanned ballots, the black-white gap ranged from four to six percentage points. Lever and electronic machines, which prohibit overvoting and make undervoting more transparent and correctible, cut the discrepancy by a factor of ten. Judging from exit polls and opinion surveys, much of the remaining difference could be due to intentional undervoting, which African Americans profess to practice at a slightly higher rate than whites. In any case, the use of appropriate voting technologies can virtually eliminate the black-white disparity in invalid ballots.” (Page 46.)

29. Thus, Tomz and Van Houweling argue that: (a) there are racial disparities in residual votes and (b) better voting technologies can solve the problem.

30. They do, however, find that optical scan systems in South Carolina did not perform very well. In the body of their paper they say: “We find that, unlike centrally counted optical ballots and punch cards, DRE and lever machines nearly eliminate the racial gap in voided ballots (page 46).” The key phrase in this quotation is “centrally counted optical ballots.” Almost all (10 of the 13) optical scan systems in the Tomz and Van Houweling study employed central counting where the ballots are sent to a central location for counting. Precinct-count optical scan systems, on the other hand, count ballots within the precinct, and they can be used to inform voters about overvotes and/or undervotes. There is evidence that precinct-count optical scan systems do better than central-count optical scan systems, and nationwide, precinct-count optical scan systems are replacing central count optical scan systems. In the Tomz and Houweling study, the optical scan systems (of which 10 of 13 were central count systems) averaged 5.6 percent invalid votes and punch cards averaged 5.3 percent invalid votes – essentially equal values given the small number of counties studied.

31. In California, however, it appears that central count optical scan systems do well. Figure 1 shows that central-count optical scan systems (used in 11 counties in 2000 in California) do just as well as other systems. (If the simple average of residual votes for counties with the same system is computed, instead of the more appropriate average weighted by the number of voters in each county as in Figure 1, then central count optical scan systems with an average residual vote rate of 1.16% do slightly worse than precinct count optical scan systems with a residual vote rate 0.97%.) In national studies (e.g., the Cal-Tech/MIT Voting Project. 2001. *Voting: What Is, What Could Be*, Pasadena and Cambridge and Henry E. Brady, Justin Buchler, Matt Jarvis, and John McNulty, *Counting All the Votes: The Performance of Voting Technology in the United States*, September 2001) in which both kinds of optical scan systems have been lumped together, optical scan does much better than punchcards. In summary, the poor performance of optical scan systems in the Tomz and Houweling study appears to be the result of the predominance of central count optical scan systems and the result of especially bad performance by those systems in the one state examined in the study, South Carolina, that used them. Furthermore, there is no comparable evidence for difficulties with central count optical scan in California.

C. Punchcards Performed Badly in Counties Using Them in 2000

32. Figure 3 presents evidence for the possibility of a racial bias in the use of punchcards in Los Angeles County in 1996 and 2000. The average residual vote in Los Angeles County for these years is

3.79% and 2.70% respectively. The slopes of the lines which plot percent residual vote versus percent minority are .0374 (t-statistic of 22.8) for 1996 and .0273 (t-statistic of 37.9) for 2000. These data show that punchcards appear to significantly increase residual votes by minority voters. For 1996, going from zero to 100 percent minority Census tracts increases the residual vote rate by 3.74 percentage points; for 2000, the same change increases the residual vote rate by 2.73 percentage points.

33. Figure 4 presents data for all counties that used punchcards in 2000 except Los Angeles (because data for Los Angeles is in Figure 3). These eight counties were Alameda, Mendocino, Sacramento, San Bernardino, San Diego, Santa Clara, Shasta, and Solano. Their performance for 1996 (when they also used punchcards) is also displayed. The average residual vote rate for these counties in 1996 was 2.21% and it was 1.82% in 2000. Once again, there is a strong indication that there is a significantly higher residual vote rate for minorities. The slope is .0273 for 1996 (with a t-statistic of 28.0) and .0149 for 2000 (with a t-statistic of 20.8). These data show that punchcards appear to significantly increase residual votes by minority voters. For 1996, going from zero to 100 percent minority Census tracts increases the residual vote rate by 2.73 percentage points in these seven counties; for 2000, the same change increases the residual vote rate by 1.49 percentage points.

34. Figures 3-4 show that for the nine counties that used punchcards in 2000 (six of which intend to use punchcards in October 7, 2003), the residual vote rate increased significantly from Census tracts with no minorities to those composed entirely of minorities. The increase in residual vote rates is highest in Los Angeles (several percentage points).

D. Other Systems Do Better than Punchcards

35. The strong relationship between residual vote rate and residual votes in punchcard counties is especially worrisome because it can be remedied. Figure 2 and the discussion in paragraphs 19-25 (summarized in paragraph 26) demonstrate that for three counties (Fresno, Marin, and San Francisco) with substantial relationships between residual votes and percent minorities in Census tracts in 1996, the replacement of punchcards with other systems substantially reduced this relationship between residual votes and minority voters. Thus, the replacement of punchcards with other systems substantially reduced racial biases. It also lowered the overall level of residual votes.

36. Similarly, moving from a punchcard county in 2000 to a non-punchcard county significantly reduces the disparity in residual vote rates between minorities and others. Figure 5 plots the presidential residual vote for 2000 versus percent minority for counties using punchcards and counties using all other systems. The fit lines tell the story – there is a

greater residual vote rate for punchcard counties and the slope of the line is significantly greater for punchcard counties meaning that punchcards discriminate against minorities. Thus, for punchcard counties the residual vote rate for 100 percent minority tracts was about 4 percent while the residual vote rate for zero percent minority tracts was only about 1.3 percent – implying a racial disparity of 2.7 percentage points because 100 percent minority tracts had a residual vote rate 2.7 percentage points higher than zero percent minority tracts when punchcards were used. For those counties that used non-punchcard systems in 2000, the residual vote rate for 100 percent minority tracts was about 0.5 percent and the residual vote rate for zero percent minority tracts was about 2 percent. Thus, 100 percent minority tracts had a residual vote rate only 1.5 percentage points higher than zero percent minority Census tracts. The racial gap was thus decreased by 1.2 percentage points by moving away from punchcards.

37. In summary, there is ample evidence that moving away from punchcards to other voting systems reduces residual votes rates overall, and it reduces the discriminatory impact of using punchcards. Moving away from punchcards will reduce overall residual voting by one to three percentage points with a best estimate of about 1.5 percentage points. It will also reduce the especially high residual vote rates among minorities compared to non-minorities by about one to two percentage points.

E. Punchcards in the October 7, 2003 Recall Election

38. In 2002, Alameda County moved to an electronic voting system, but eight counties still used punchcards in the November, 2002 election. I have checked with voting officials in all eight California counties that used punchcards in the November 2002 elections. Six of them intend to use punchcards in the October 7, 2003 election. These six are Los Angeles, Mendocino, Sacramento, San Diego, Santa Clara, and Solano. One, San Bernardino, is 98 percent certain to use an optical scan system if a commercial printer can be found to print the optical scan ballot. And one other, Shasta, intends to use touch screen system for election-day voting. The six counties that intend to use punchcards comprised 44 percent of the total votes in the 2000 presidential election.

39. The use of punchcards in these six counties in the October 7, 2003 election will mean that there will be a high residual vote rate in them. It also means that minorities will be discriminated against for two reasons. First, they will be discriminated against because of where they live. These six counties have 9 percent African Americans, 11 percent Asian Americans, and 27 percent Latinos compared to non-punchcard counties that have only 5 percent African Americans, 8 percent Asian Americans, and 19 percent Latinos. Even if punchcards affected all groups

equally, minorities would be disadvantaged by being disproportionately concentrated in punchcard counties with high residual vote rates compared to non-punchcard counties. But punchcards do not affect all groups equally. Hence, the second way that minorities will be discriminated against is that minorities have much higher residual vote rates than non-minorities in punchcard counties .

40. One of the reasons punchcards perform so poorly is that the “computer card” on which votes are recorded only has pre-scored punches and numbers – no names of candidates are visible on the punchcard. As a result, voters cannot easily check their work as on an Datavote and optical scan ballots which put names of candidates next to the marks that are made on the ballot or in electronic systems in which names are next to “buttons.” Furthermore, whereas optical scan systems with in-precinct counting and direct record electronic systems can actually check ballots for overvotes and undervotes before they are submitted by the voter, punchcard systems used in California do not allow for this.

41. Checking overvotes will be especially important in the October 7, 2003 election. As of 4:30 pm on August 10, 2003, the Secretary of State’s web page (http://www.ss.ca.gov/elections/recall_cand.htm) indicated that 193 candidates had filed of which 89 had complete applications and 104 were still under review. Thus, there is every indication that there will be over 100 candidates and perhaps almost 200. This large number of candidates presents serious problems for a punchcard system. It is worth remembering that the infamous and confusing Florida “Butterfly Ballot” was designed with the intent of reducing the possibility of overvotes on a punchcard system by getting all ten of the presidential candidates in Florida on two facing pages of a punchcard voting device. Duval County, Florida experienced significant numbers of overvotes on a punchcard system when it used multiple pages to list presidential candidates. Punchcard systems can only deal with this many candidates by having a “booklet” with multiple pages listing the candidates with perhaps ten candidates per page. It will be very easy for voters to get confused and to think that they must mark each page or to simply accidentally mark more than one candidate. The result will be the nullification of that person’s vote because of an overvote. It will be hard for voters to check whether they have made multiple marks, and there will be no systematic checking as with in-precinct optical scan or DRE systems.

42. In summary, punchcard systems significantly increase the residual vote rate (by one to three percentage points). They discriminate against minorities by increasing their residual vote rate by one to two percentage points. And they are especially prone to overvoting which is likely to be a significant problem in the October 7, 2003 election.

43. Specifically, the significant relationship between residual votes and percent minority in Census tracts found for punchcard counties in California is significantly reduced in non-punchcard counties (Figure 5), and it is reduced when punchcards in a county are replaced by another system (Figure 2).

44. These impacts are especially worrisome in a close election, either on the first recall question or the second recall question. Punchcards “throw-away” about 1.5 percent of the vote. If we project from the 2000 experience for the six counties using punchcards in 2003, then 44 percent of the vote will be in punchcard counties. Turnout in the Gubernatorial election of 2002 was 7,738,821 which was 51 percent of registered voters. The last statewide special election (in 1993) had a turnout 36 percent. It seems likely that turnout for this election will be higher, say 40 percent. Then 40 percent of those 15,303,469 people registered in the Nov. 2002 election will vote leading to a turnout of approximately 6,000,000. Of these 44% will be in punchcard counties; that is 2,640,000. In these counties, punchcards will throw away about 1.5% of these votes that would not be lost with other systems. Hence, they will throw away about 40,000 votes. These votes will be heavily concentrated in minority areas. If the winning candidate gets 20 percent of the vote and the next highest vote getter gets 19.33 percent, then the difference will be two-thirds of one percent of 6,000,000 which is 40,000. Thus, thrown away punchcard votes could account for the difference.

45. With so many candidates, the chance of a close election (a “tie”) is increased because there are so many ways that ties could occur among those candidates with the highest number of votes. When only two candidates run, there is only one way for a tie to occur (when each gets 50 percent); but when many candidates run, there are many ways that ties can occur. Hence, the likelihood of a close election is much higher in the October 7, 2003 recall election than in a normal statewide election.

F. Punchcard Performance Has Not Improved Since 2000

46. Based upon the extraordinary attention paid to the problems with punchcards in the 2000 Florida election, it might be thought that punchcard performance would have improved through a combination of voter awareness and increased diligence by election officials. Table 1 shows that this is not so in California. The Table compares residual vote rates in the 1998 Gubernatorial race (Davis versus Lungren) and Senatorial race (Boxer versus Fong) and the 2002 Gubernatorial race (Davis versus

Simon).⁴ The table compares three kinds of counties. One group is the eight counties that used punchcards in both 1998 and 2002 (namely Los Angeles, Mendocino, Sacramento, San Bernardino, San Diego, Santa Clara, Shasta, and Solano). The second group is composed of the four counties that changed from punchcards to other systems (Alameda, Fresno, Marin, and San Francisco). The third group is the non-punchcard counties in the state that did not use punchcards in 1998 or in 2002. The entries in the first three columns are residual vote rates. The last two columns indicate the number of counties in each group and the fraction of the 2000 vote coming from those counties.

47. The most direct comparison in Table 1 is between the Gubernatorial residual vote in the eight punchcard counties in 1998 and 2002. The eight counties that used punchcards in the 2002 Gubernatorial race had a residual vote rate of 4.04 which was worse than the 3.72 percent in those counties in the 1998 Gubernatorial race. Rather than improving, punchcard performance got worse from 1998 to 2002. But the four counties that changed from punchcards in 1998 to new systems in 2002 decreased their residual vote rate from 3.25 percent to 2.37 percent even though the residual vote rate increased for the eight punchcard counties (by .32 percentage points) and for the rest of the state (by 1.48 percentage points). Thus, those counties that changed from punchcards to other systems bucked the statewide trend toward a higher residual vote rate by lowering their residual vote rates. The same result holds when the 1998 Senatorial residual vote rates are compared with the 2002 Gubernatorial residual vote rates, or when the 2002 punchcard residual vote rate (4.04 percent) is compared with the average (2.81 percent)⁵ for all other, non-punchcard, counties in 2002. In both cases, those counties using punchcards have much higher residual vote rates than those counties using other systems.

⁴ It does not make sense to compare presidential residual vote rates from 2000 with residual vote rates for statewide offices such as Governor or Senator because off-year (non-presidential) elections typically involve lower turnout and many other differences from presidential elections.

⁵ The residual vote rate figure for non-punchcard counties in 2002 is the average of 2.37 percent for those counties that changed from punchcards to other systems between 1998 and 2002 and 2.93 percent for those counties that did not use punchcards in either 1998 or 2002. The average must be weighted by the percent of the vote in each set of counties. The result is 2.81 percent.

48. Thus, punchcards have not improved since 2000. In fact, there is evidence that punchcards are performing worse in California. Moreover, there is additional evidence from comparing the 1998 and 2002 elections that other systems perform much better than punchcards.

G. Benefits of Moving the Recall Election to March, 2004

49. Moving the recall election to March, 2004 will make it possible for all counties to implement new systems to replace punchcards. These new systems will reduce residual votes overall and racial disparities in residual votes. For example, compare Los Angeles County with nearby Riverside County. Los Angeles used punchcards from 1998 through 2002 and intends to use them in the October, 2003 election. Riverside County has used optical scan systems from 1998 to the present. Los Angeles County had residual vote rates of 4.04 percent in the 1998 Gubernatorial race, 2.70 percent in the 2000 presidential race, and 4.39 percent in the 2002 Gubernatorial race. Riverside County had residual vote rates of 1.20 percent in the 1998 Gubernatorial, 0.87 percent in the 2000 presidential, and 2.35 percent in the 2002 Gubernatorial – figures two to three percentage points lower than Los Angeles. The data presented throughout this declaration suggest that at least a one and one-half percentage point improvement in Los Angeles is attainable, and this comparison with Riverside County suggests that an even greater improvement may be possible.

50. Moving the recall will also make it possible for all counties to staff precincts equal to what they usually have in statewide elections instead of reducing the number of precincts, as some have done, because of the short time that they have to get organized for the October 7, 2003 election. For example, Los Angeles County is planning to have about 1800 precincts instead of the more than 4900 that they had in the November, 2002 statewide election. By having more precincts and by having the usual number, a March 2004 election will avoid the disruption to those who are used to voting in a particular precinct and the extra travel time associated with going to a location farther away when precincts are consolidated.

I declare under penalty of perjury that the foregoing is true and correct, and if called upon to do so, I could and would so testify. Executed this ___ day of August, 2003, at _____, California.

Henry E. Brady

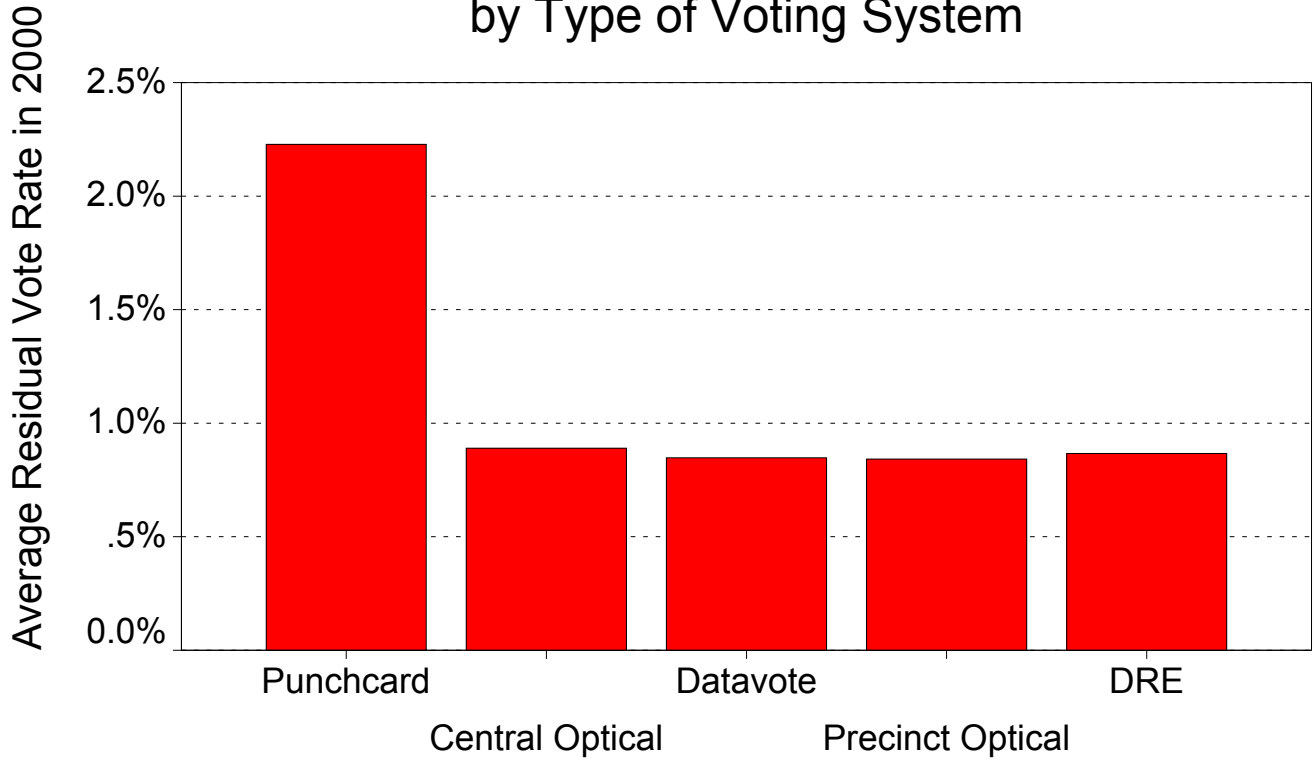
**Table 1: Residual Vote Rates for 1998 and 2002 Statewide Elections by
Type of Voting System Used in the Counties**

Description of Voting System used in the Counties	Residual Vote Rates			Counties and Voters	
	1998		2002	# of Counties	% of 2002 Vote
	Governor	Senator	Governor		
PUNCHCARD Punchcard in 1998 and in 2002	3.72%	4.16%	4.04%	8	47%
CHANGERS Punchcard in 1998 but not in 2002	3.25%	3.85%	2.37%	4	11%
NON-PUNCHCARD Non-punchcard systems in 1998 and 2002	1.45%	2.75%	2.93%	46	42%
Statewide Totals	2.74%	3.55%	3.39%	58	100%

Figure 1

Residual Vote Rate in 2000 in California

by Type of Voting System



Counties weighted by total votes

Figure 2

Presidential Residual Vote in 1996 and 2000 by
Percent Minorities in Census Tract in Fresno

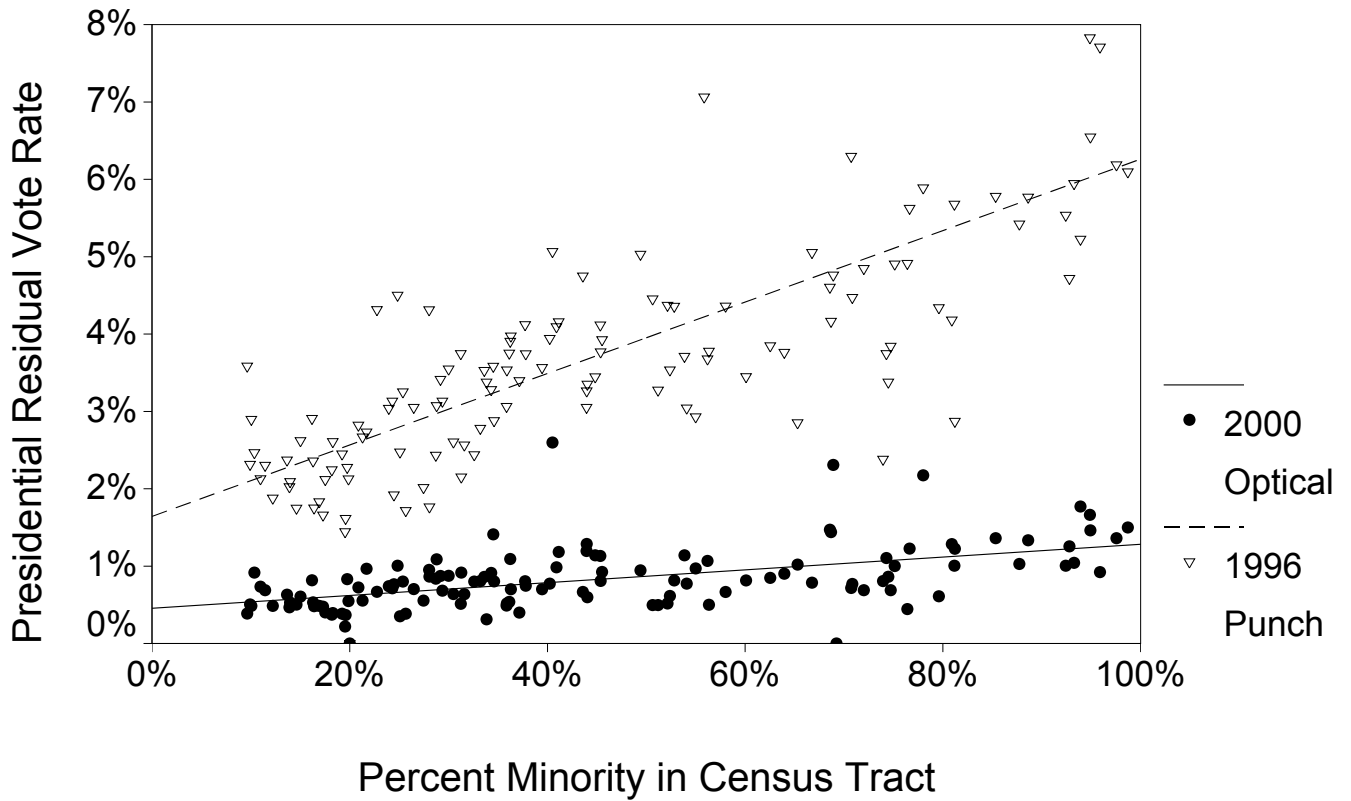


Figure 3

Residual Vote Rate in Los Angeles

by Percent Minority in Census Tract

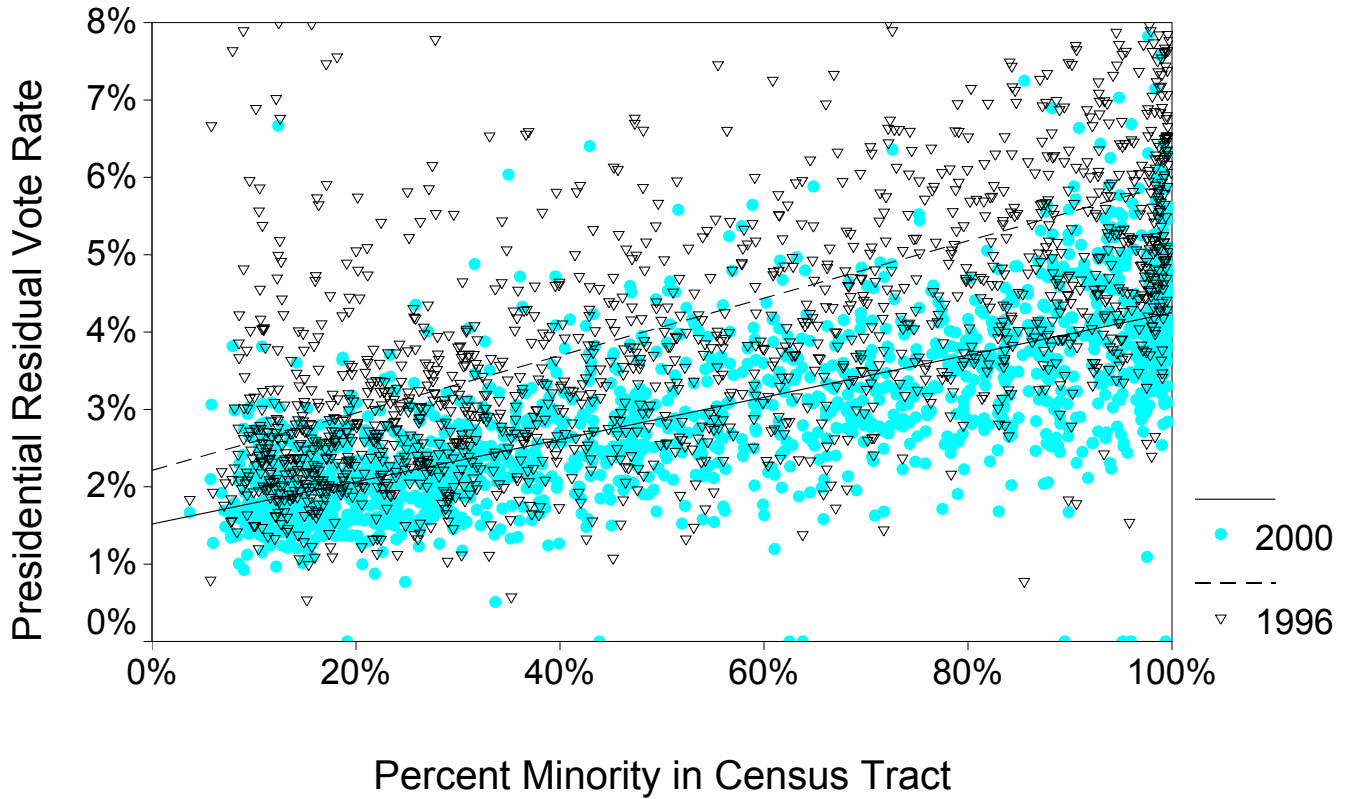


Figure 4

All 2000 Punchcard Counties

Except Los Angeles

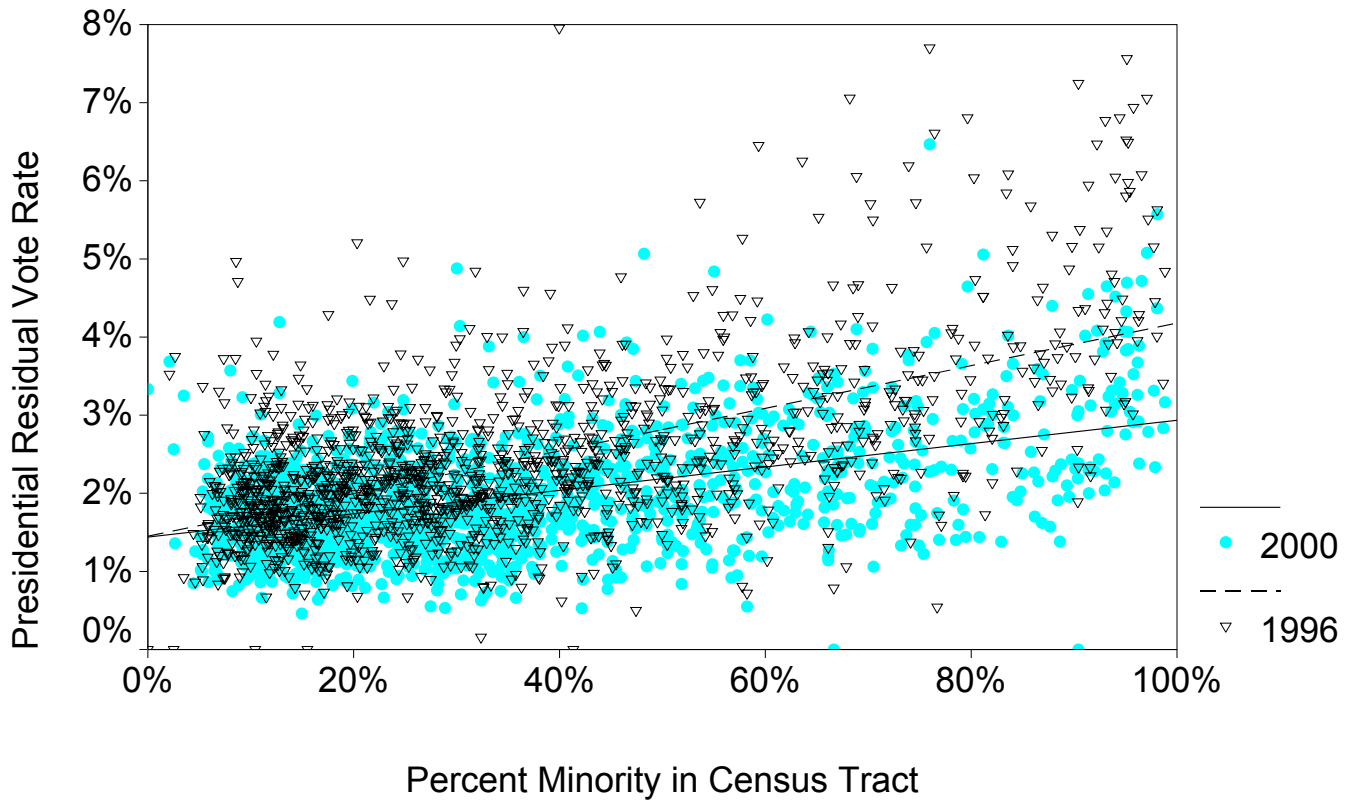


Figure 5

Punchcard Counties versus All Other in 2000

