

Los Angeles County was among the five counties with the highest residual vote rates for the four propositions on the March 2004 ballot, and LA's InkaVote system had the highest residual vote rate for the 25 largest California counties in which more than 58,000 ballots were cast. (These counties accounted for over 90% of the total ballots). In fact, the residual vote rate for Los Angeles County was at least one to one and one-half percentage points higher for all four propositions than the residual vote rate for every other one of the 25 largest counties. Moreover, the Los Angeles County residual vote rate was three to three and one-half percentage points higher on every proposition than the average residual vote rate for the other 24 of the 25 largest California counties.

In addition, throughout the state, not only InkaVote, but other optical scan and punch card based systems (that is, systems with a paper trail) performed less well on average based upon the residual vote standard than electronic systems. Indeed, Direct Record Electronic systems had the lowest average residual vote rates of all types of systems and were less liable to extremely high residual vote rates even though many of these systems were in large counties with very diverse populations (e.g., Alameda, Orange, Riverside, San Bernardino, San Diego, Santa Clara).

Los Angeles County was one of seven counties that changed from Votomatic style punch cards in October 2003 to new systems in March 2004. The six other counties that changed from Votomatic-style punch card systems to new systems improved by about three percentage points in top-of-the-ticket races to drop below the statewide residual vote rate average of 4.2% on Proposition 57 in March 2004. For example, the three counties that changed from Votomatic style punch cards to electronic systems (San Diego, Santa Clara, and Solano) improved by 2.9 percentage points to an average residual vote rate of 3.1%. Los Angeles County with its InkaVote system improved by about two percentage points to a residual 6.8% but remained substantially above the statewide average of 4.2% on Proposition 57.

Although the current debate about voting systems is focused upon security concerns, these data show that accuracy should also be a major concern of those working to improve voting systems. Moreover, a single-minded concern with security could lead to systems which fail to record significant numbers of votes.

Results for Los Angeles County – The first five columns of Table 1 present residual vote rates for different counties and groups of counties for the five statewide races on the March 2, 2004 ballot. The raw data upon which these calculations are based are from the official Statement of the Vote on the web page of the California Secretary of State except for the data from Los Angeles which come from Los Angeles County web pages.² The residual vote is defined as the difference between the number of ballots and the number of votes cast in a race. The residual vote rate is that difference divided by the number of ballots.

² For example, the total number of ballots is reported (12:42 PST, May 9, 2004) on: <http://rrcc.co.la.ca.us/elect/04031213/rr1213pp.html-ssi>

The residual vote rate includes both intentional undervoting or overvoting and unintentional undervoting or overvoting. Overvoting – whether intentional or not – is typically small.

Intentional undervoting occurs when a voter decides not to vote in a race. *Intentional* overvoting occurs when a voter marks more than one candidate for a race or more than one alternative for a proposition. Evidence from surveys and other sources shows that the number of intentional residual votes – the sum of intentional undervoting and intentional overvoting – is typically small for “top-of-the-ticket” measures.

Unintentional undervoting or overvoting occurs when a voting system fails to correctly record or count a vote made by a voter. With unintentional undervoting or overvoting, the voter intended to cast a proper vote, but the voting system failed to record that vote or failed to count that vote.

Because residual vote rates include both intentional and unintentional undervoting and overvoting, it is important to use residual vote rates only to make comparisons of voting system performance across counties for the same statewide races. It is also useful to focus on top-of-the-ticket races in which intentional overvoting or undervoting is probably small. By following these steps, we control for the fact that different races or propositions may elicit different levels of intentional undervoting or overvoting because they are intrinsically more or less engaging to the voters. Additional control is possible by comparing counties that are similar in those characteristics that might affect undervoting or overvoting such as socio-demographic characteristics and party registration. Furthermore, the analyst should typically focus on differences that are substantively and statistically large.

In the March 2, 2004 primary, it seems reasonable to suppose that Proposition 57 was the top of the ticket because of all the attention paid to it and the large advertising campaign devoted to it. Indeed, Proposition 57 had the lowest average residual vote rate across the state (see the first row of Table 1), and it had the lowest residual vote rate of all statewide races in 32 of the 58 California counties.

On Proposition 57, the average residual vote rate in California was 4.2% (see the first row in Table 1).³ Los Angeles County had a residual vote rate of 6.8% (see the second row in Table 1). Only Mariposa, San Benito, and Imperial Counties with fewer than 18,000 ballots cast had larger residual vote rates (7.8%, 8.0% and 11.2% respectively). Statistical theory suggests that smaller counties will have a greater variability in their

³ These residual vote rates are for precinct voting, early voting, and absentee voting. Absentee voting was approximately one-third of the statewide vote. These three types of voting sometimes involve three different voting technologies, but in our discussion of residual vote rates for counties by voting system type, we refer to the technology used in precinct polling places. Ideally, we would break down residual votes by these three types of voting, but the data are not on the Secretary of State’s web page and many counties do not post these data separately on their web pages. Because the bulk of the vote is in the precincts for most counties, this seems like a fair first approximation.

residual vote rates, and the data bear this out.⁴ Los Angeles County had the largest residual vote rate among the 38 counties with 17,200 or more ballots cast. (These 38 counties account for over 97% of the total ballots).

Moreover, the results for Propositions 55, 56, and 58 are very similar. For all four propositions, Los Angeles County is among the five counties with the highest residual vote rates (see the third row of Table 1). And as shown in row five of the Table, Los Angeles County was 3.1 percentage points to 3.7 percentage points above the residual vote rate for the rest of the state which is reported in row four.

Among the 25 large California counties in which more than 58,000 ballots were cast, Los Angeles County had the highest residual vote rate on all four propositions. (These counties accounted for over 90% of the total ballots). In fact, the residual vote rate for Los Angeles County was at least one to one and one-half percentage points higher for all these propositions than the residual vote rate for every other one of the 25 largest counties. And the Los Angeles County residual vote rate was three to three and one-half percentage points higher on every proposition than the average residual vote rate for the other 24 of the 25 largest California counties.

The story is slightly different for the Presidential primary. In this case, because the Republican primary was basically uncontested (with George W. Bush as the candidate) and because the Democratic primary occurred after the rivals of the eventual nominee, John Kerry, had already conceded the nomination to him, it seems likely that some people who came to the polls decided not to vote in the primary. And others, of course, were precluded from doing so because of the primary rules. In fact, the average residual vote rate for the primaries in California outside Los Angeles was 18.6% and the highest residual vote rate for a county was 23.4%, although Los Angeles County still had a residual vote rate of 20.2% which was about 1.6% above the rest of the state. This difference is less than for the propositions, but it is explained by the fact that the residual vote rates vary with the partisan make-up of the county because Republican voters were less likely to vote in the presidential primary than Democratic voters and because those not registered with any party could only vote in the Democratic primary if they declared a desire to do so. The fact that Los Angeles is a highly Democratic county worked against the factors that otherwise produced a higher residual vote rate in Los Angeles for the propositions.

These residual vote rate results for Los Angeles County in March 2004 are somewhat better than in the October, 2003 election when LA still used Votomatic style punch cards. The last column of Table 1 indicates the results for the top-of-the-ticket question in the October, 2003 election which was the question about whether or not Gray Davis should

⁴ The theoretical argument is that in smaller counties with fewer precincts, a bit of bad luck in a few precincts in the operation of voting systems can lead to high residual vote rates. Or good luck in all of them can lead to low residual vote rates. In a larger county, the large number of precincts averages out the luck. Empirically, the standard deviation in residual vote rates is (a measure of variability) in the twenty counties with the smallest number of ballots cast was about 2.4 percentage points while the variability in the twenty counties with the largest number of ballots cast was only 1.1 percentage points.

be recalled as governor of California. In that election, the statewide residual vote rate for this question was 4.6%, slightly higher than the 4.2% residual vote rate for the March 2004 top-of-the-ticket question (Proposition 57). In October, 2003, LA County's residual vote rate on the recall question was 6.6 percentage points higher than the average residual vote rate for the rest of the state (see row five in Table 1), but in March 2004 LA County's residual vote rate was 3.3 percentage points higher on Proposition 57 than the average for the rest of the state.

A final way to get a sense of what happened in Los Angeles is to compare Los Angeles County with other counties that changed from Votomatic style punch cards in October 2003 to new systems in 2004. For the six of these counties other than Los Angeles, residual vote rates went from an average of 6.6% which was above the statewide mean on the Recall Question in October 2003 to 3.5% which was below the statewide mean on Proposition 57 in March 2004. Thus, whereas those counties other than Los Angeles that changed from punch cards to new systems improved their performance by about three percentage points to get below the statewide residual vote rate average of 4.2% on Proposition 57, Los Angeles County improved its residual vote rate by about two percentage points to a residual vote rate of 6.8% but this figure is substantially above the statewide average of 4.2%.

Comparative Performance of Systems – The bottom part of the table (rows six through nine) presents the comparative performance of voting systems in March 2004 using a standard division of voting systems into punch cards (the Datavote counties—there are no more Votomatic style punch card counties), optical scan with central count, optical scan with precinct count, and Direct Record Electronic (DRE). These data show that the electronic systems performed the best. Moreover, the DRE's were very consistent in their performance. The highest residual vote rates for a DRE county for the four propositions were in Alameda County (4.0%, 4.7%, 4.1% and 4.8% for Propositions 55, 56, 57, and 58), but these rates were still very low compared to those for other systems. About half the Datavote counties did worse than this on each Proposition. That is, about half the Datavote counties had a higher residual vote rate than the DRE county with the highest residual vote rate. Similarly, about one-third of the precinct count optical scan counties did worse than Alameda, and about one-fifth of the central count optical scan counties did worse. Even though the DRE's tend to be in large counties with very diverse populations (e.g., Alameda, Orange, Riverside, San Bernardino, San Diego, Santa Clara), they perform better on average, and they are less liable to extremely high residual vote rates.

The results from the 2003 Recall election are similar (see last column of Table 1 and rows six through ten). In that election, the recall question was the top-of-the-ticket question. The residual vote rate was lowest for the four counties using electronic systems (1.4%), somewhat higher for the counties using Datavote (2.0%), central count optical scan (2.4%), or precinct count optical scan (2.7%), and enormously higher for those counties using Votomatic style punch cards (7.7%).

These results are confirmed if standard statistical controls are used to control for the composition of counties such as their average educational level, percentage of minorities, poverty percentage, and other factors. For example, a regression of the residual vote rate for Proposition 57 in March 2004 on education level, percentage of minorities, poverty percentage, and dummy variables for electronic and optical scan systems (with Datavote as the baseline system) indicates that the electronic systems have a 1.9 percentage points lower residual vote rate than the Datavote systems and a 1.1 percentage point lower residual vote rate than the optical scan systems. The details are as follows: The coefficient for the electronic systems is -1.922 with a standard error of .593 for a t-statistic of -3.24 and the coefficient for the optical scan systems is -1.088 with a standard error of .501 for a t-statistic of -2.17. These t-statistics indicate that both the electronic and the optical scan systems have a significantly lower residual vote percentage than the Datavote system (using the .05 level of significance as the standard). The difference between electronic and optical scan systems is not statistically significant at the .05 level, but it is at the .10 level. Regressions for the other propositions lead to similar results. Furthermore, these regression results are all robust with respect to different specifications.

A final useful comparison is to look at counties that changed systems between 2003 and 2004. The three counties that changed from Votomatic style punch cards to electronic systems (San Diego, Santa Clara, and Solano) improved by 2.9 percentage points to an average residual vote rate of 3.1% on Proposition 57 that was well below the state average.

**Table 1 – Residual Vote Rates for Different Groups of Counties
for the Five Statewide Races on March 2, 2004**

STATEWIDE & LOS ANGELES COUNTY	Prop. 55	Prop. 56	Prop. 57	Prop. 58	Pres. Primary	2003 Recall Question
1. Statewide Residual Vote rate	4.7% (4.1%) [58]	4.7% (4.2%) [58]	4.2% (3.8%) [58]	4.6% (4.2%) [58]	18.9% (18.6%) [58]	4.6% (3.2%) [58]
2. Los Angeles County	7.6%	7.3%	6.8%	7.1%	20.2%	8.9%
3. Five Counties with Largest Residual Vote Rate	9.3% 8.2% 7.6% (LA) 6.1% 6.1%	10.7% 8.3% 7.8% 7.3% (LA) 7.1%	11.2% 8.0% 7.8% 6.8% (LA) 6.2%	11.0% 8.7% 8.3% 7.3% 7.1% (LA)	23.4% 23.0% 22.8% 22.4% 21.7%	10.3% 8.9% (LA) 8.4% 8.3% 7.4%
4. Statewide Average Residual Vote Rate w/o LA	3.9% (4.0%) [57]	4.1% (4.1%) [57]	3.5% (3.7%) [57]	4.0% (4.1%) [57]	18.6% (18.6%) [57]	3.3% (3.1%) [57]
5. Residual Rate Difference: LA – State Average w/o LA	3.7% (3.6%)	3.2% (3.2%)	3.3% (3.1%)	3.1% (3.0%)	1.6% (1.6%)	6.6% (6.8%)
COMPARATIVE ANALYSIS						
6. Residual Rate Datavote Counties	3.9% (4.6%) [13]	4.0% (5.0%) [13]	3.7% (4.8%) [13]	5.0% (5.2%) [13]	19.6% (19.8%) [13]	2.0% (1.5%) [13]
7. Residual Rate Precinct Count Optical Scan Counties	4.6% (4.3%) [18]	4.7% (4.5%) [18]	4.1% (3.9%) [18]	4.8% (4.4%) [18]	18.3% (19.1%) [18]	2.7% (3.4%) [21]
8. Residual Rate Central Count Optical Scan Counties	6.1% (3.9%) [13]	5.9% (3.8%) [13]	5.3% (3.3%) [13]	5.7% (3.9%) [13]	19.8% (18.4%) [13]	2.4% (3.1%) [13]
9. Residual Rate for Direct Record Electronic Counties	3.7% (3.4%) [14]	3.8% (3.4%) [14]	3.3% (3.0%) [14]	3.6% (3.2%) [14]	18.3% (17.1%) [14]	1.4% (1.6%) [4]
10. Residual Rate Votomatic-style Punchcards	XXX	XXX	XXX	XXX	XXX	7.7% (6.9%) [7]

Note: All averages are weighted by the number of ballots in each county except those in parentheses which are averages of counties which treat all counties equally. Note that both calculations tell a similar story. The number of counties in each category is in brackets.

Source of Data: All results, except Los Angeles, are computed from the Statement of Vote on the California Secretary of State's web page. The Los Angeles Results are computed from the County of Los Angeles web pages because the official California Statement of the Vote as of May 9th appears to contain errors in the total number of ballots and in the computation of residual votes.