

## Observations on the Close Minnesota Senate Election

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Draft date: November 6, 2008

The margin between incumbent Norm Coleman and challenger Al Franken in the Minnesota U.S. Senate race has been reduced to 336 votes and a recount is likely.<sup>1</sup> The question on everyone's mind is how likely would it be for a recount to overturn the results of the election?

The most likely source of an additional 337 votes for Franken is among the 25,000–40,000 ballots (of over 2.9 million) that didn't record a vote for any of the senatorial candidates. What is the likelihood of that happening? We won't know until the recount happens, but there is at least one pattern in "ballot roll-off" that paints an optimistic picture for Franken.

First, some background. The data being analyzed here are from the Minnesota Secretary of State's web site (<http://electionresults.sos.state.mn.us/20081104/>). On the site is a downloadable file recording the election returns for all state races, including Senate and President. The site doesn't yet have the precinct-by-precinct turnout, which would be necessary to compute the "residual vote rate,"<sup>2</sup> which would be the most accurate measure of the number of blank and over-voted ballots in the Senate race. Presumably those will be posted in the next few days.

The data set reports 2,910,128 votes cast for one of the presidential candidates (including write-ins) and 2,885,274 for one of the senatorial candidates (including write-ins). This works out to a statewide "roll-off" of 24,854 between the presidential and senatorial races. ("Roll-off" is a commonly-used measure in political science to gauge the number of voters who voted in the race at the "top of the ticket," but choose not to vote in a race "down-ballot.") This roll-off number is an under-estimate of the total number of residual votes in the senatorial race because we don't know how many residual votes there were in the presidential election — these should be added to the roll-off total to produce the number of residual votes in the Senate election. The residual vote rate for Minnesota in 2004 was 0.5%, so we can guess that there were approximately 15,000 additional voters who don't show up on the presidential candidate total. Therefore, the residual vote number in the Senate race is probably something like 40,000 votes.

Unfortunately, because we don't have the turnout figures yet, we cannot say where the full 40,000 residual votes in the senatorial race occurred, only the 25,000 votes that failed to be cast for the Senate by voters who cast a ballot in the presidential race.

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<sup>1</sup>[http://www.startribune.com/politics/state/34024274.html?elr=KArksLckD8EQDUoaEyqyP4O:DW3ckUiD3aPc:\\_Yyc:aULPQL7PQLanchO7DiUX](http://www.startribune.com/politics/state/34024274.html?elr=KArksLckD8EQDUoaEyqyP4O:DW3ckUiD3aPc:_Yyc:aULPQL7PQLanchO7DiUX), accessed at November 6, 2008 (8:46pm).

<sup>2</sup>A "residual vote" is a ballot that either shows no vote for a candidate in a particular race (and under-vote) or multiple votes in a particular race (an over-vote). The most common cause for under-voting is abstaining; the most common cause for over-voting is writing-in the name of the candidate one has previously voted for in the regular way.

Table 1 reports the number of presidential votes cast in each county, along with the senatorial roll-off rate.

[Table 1 about here]

Figure 1 graphs the roll-off rate in each precinct against the number of presidential votes in each precinct. The red horizontal line is the average for the state, at 0.85%. Note that as the precinct size gets bigger, the spread around the statewide average shrinks. Large precincts don't have higher (or lower) drop-offs — the correlation between the two is a paltry .10. However, notice that there are a few outliers along the way — precincts with significantly higher drop-off rates than other precincts of similar size. These outliers are indicated with the oval in the figure. These precincts are small enough, and the drop-off rates small enough, that it is unlikely that these precincts alone could provide enough votes for a significant shift in the overall vote margin. Still, these dozen-or-so precincts would seem ripe for further audit.

**Figure 1. Drop-off in senatorial race against votes cast for president at the precinct level.**

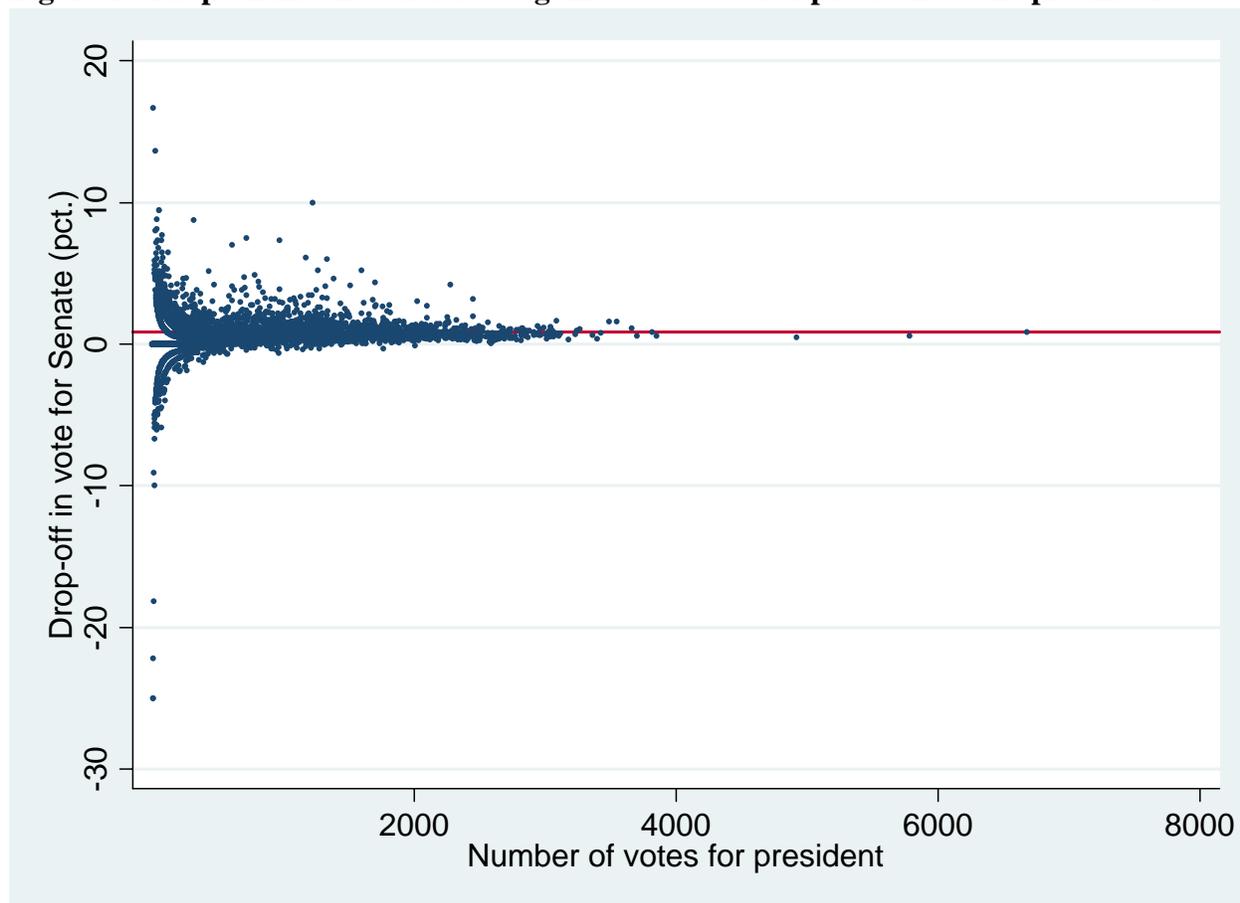
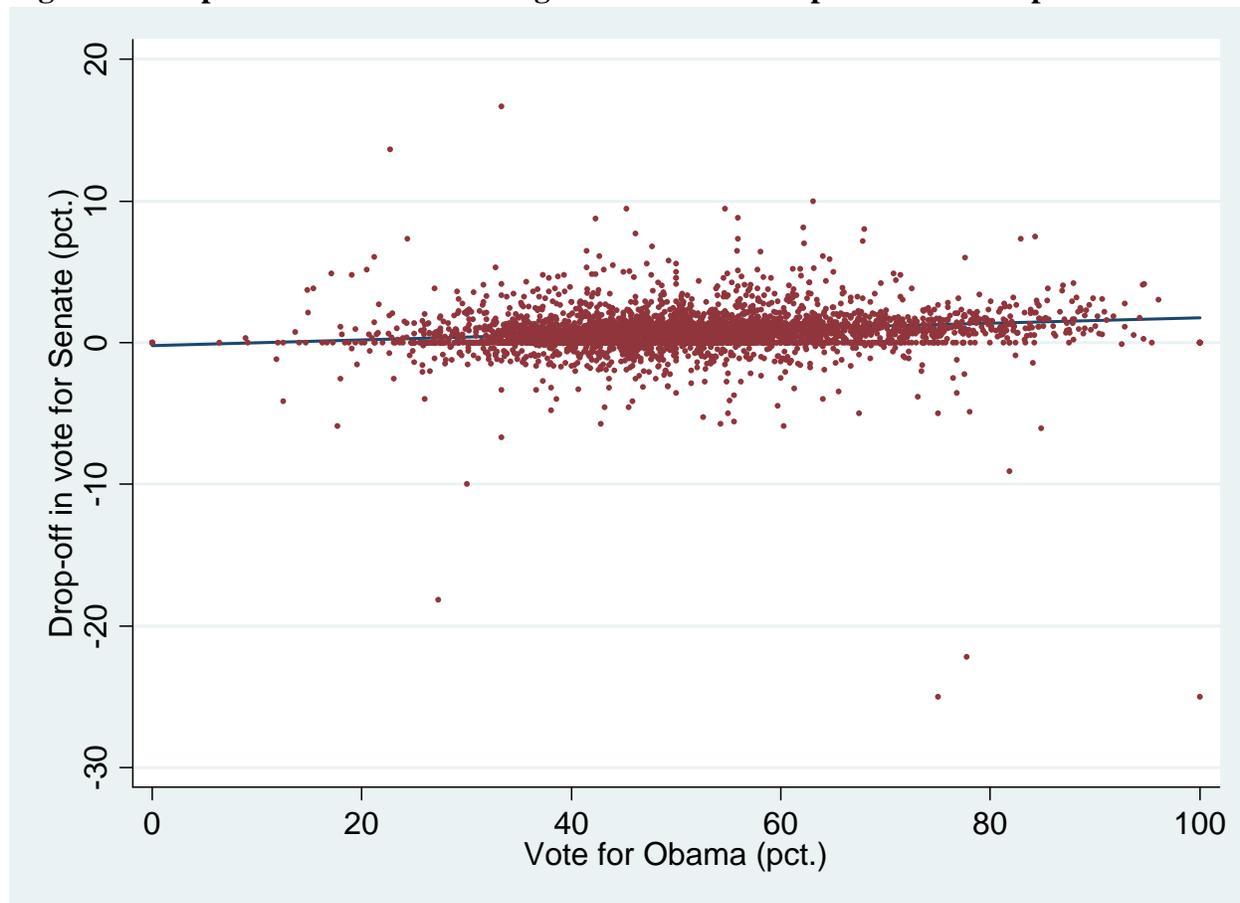


Figure 2 graphs the roll-off rate in each precinct against the percentage of the vote for Obama. Here, there *is* a positive relationship between the Obama vote and the roll-off rate. The red line in the graph is the linear-regression least-squares fit (weighting each precinct by the number of votes cast for president). The predicted values of the regression line across the range of observations is substantial. The regression line predicts, for instance, that in a precinct that gave only 10% of the vote to Obama, the average drop-off rate would be zero (-0.031%, to be precise). At an Obama vote of 90%, the average drop-off rate would be 1.58%.<sup>3</sup>

**Figure 2. Drop-off in senatorial race against votes cast for president at the precinct level.**



<sup>3</sup>The regression is as follows:

roll-off rate =  $-0.23 + .020 \cdot \text{Obama pct.}$ ,  $r^2 = .11$ ,  $N = 4,119$ . (The standard errors for the coefficients are 0.049 for the constant and 0.00088 for the Obama vote). A fixed effects regression, using the county as the fixed effect, finds that there is significant variability across counties, but the coefficient on the Obama vote remains virtually unchanged. This assures us that this effect is not due to the Obama vote being concentrated in a few counties that may have had high roll-off rates for other reasons.

Do Democratic areas always tend to produce more drop-off or residual votes than Republican areas? Results from 2000 suggest the answer is no. A similar analysis of data from that election, which has total turnout, so that we can calculate the residual vote rate for both Senate and Presidential races, as well as the drop-off, reveals the following:

1. A statistically significant *negative* relationship between the residual vote rate for a precinct and the percentage of the vote cast for the Democratic presidential nominee, Al Gore.
2. *No* relationship between the residual vote rate for President and the vote for Gore.
3. A significantly negative relationship between the drop-off rate, from president to Senate, and the percentage of the vote cast for Gore.

In other words, in 2000, the last time a Senate race appeared on the ballot in Minnesota in a presidential year, Democratic areas had lower residual votes for Senate.

If, in the end, it happens that the drop-off rate is a good proxy for the residual vote rate in the Minnesota senatorial election, then the higher rate of over- and under-voting in Democratic areas of Minnesota could be due to (at least) two phenomena. First, Democrats may have mis-marked their ballots at a higher rate than Republicans, in which case relatively more votes for Franken will be found in the recount than votes for Coleman. Second, Democrats may have just chosen to abstain from the race at a higher rate than Republicans, in which case a recount should, on net, favor neither candidate. As they say, time will tell.

Table 1. Roll-off in Minnesota senatorial election

County	Votes cast for president	Roll-off	County	Votes cast for president	Roll-off
Aitkin	9,418	0.6%	Martin	10,754	0.8%
Anoka	182,226	0.7%	Mcleod	19,029	0.3%
Becker	16,965	0.9%	Meeker	12,544	0.3%
Beltrami	22,236	1.1%	Mille Lacs	13,545	0.7%
Benton	19,337	0.7%	Morrison	16,742	0.4%
Big Stone	2,990	0.5%	Mower	19,187	0.9%
Blue Earth	35,070	1.0%	Murray	4,813	0.4%
Brown	13,617	0.5%	Nicollet	18,245	0.9%
Carlton	18,449	0.6%	Nobles	8,813	1.1%
Carver	49,685	0.7%	Norman	3,434	0.7%
Cass	16,307	0.6%	Olmsted	76,469	1.4%
Chippewa	6,352	0.5%	Otter Tail	32,687	0.6%
Chisago	29,303	0.5%	Pennington	6,822	1.3%
Clay	29,259	1.4%	Pine	14,383	0.3%
Clearwater	4,261	1.2%	Pipestone	4,799	1.3%
Cook	3,348	0.7%	Polk	15,333	1.3%
Cottonwood	6,036	0.4%	Pope	6,535	0.2%
Crow Wing	35,164	0.7%	Ramsey	277,384	1.2%
Dakota	225,448	0.7%	Red Lake	2,190	1.5%
Dodge	10,213	0.9%	Redwood	7,806	0.7%
Douglas	20,917	0.6%	Renville	8,135	0.3%
Faribault	8,153	0.6%	Rice	31,799	1.2%
Fillmore	11,234	0.9%	Rock	4,972	1.6%
Freeborn	17,280	1.0%	Roseau	7,698	0.8%
Goodhue	25,795	0.5%	Saint Louis	118,705	0.7%
Grant	3,605	0.2%	Scott	67,136	0.7%
Hennepin	663,674	1.0%	Sherburne	44,996	0.7%
Houston	10,883	1.9%	Sibley	7,729	0.3%
Hubbard	11,639	0.5%	Stearns	78,756	0.9%
Isanti	20,054	0.6%	Steele	19,656	0.5%
Itasca	24,396	0.6%	Stevens	5,633	0.4%
Jackson	5,623	0.0%	Swift	5,244	0.4%
Kanabec	8,498	0.5%	Todd	12,258	0.8%
Kandiyohi	21,892	0.5%	Traverse	2,033	0.6%
Kittson	2,568	0.7%	Wabasha	11,893	0.6%
Koochiching	6,802	1.1%	Wadena	7,168	0.3%
Lac Qui Parle	4,193	0.6%	Waseca	9,889	0.3%
Lake	6,969	1.0%	Washington	137,064	0.7%
Lake Of The Woods	2,313	2.2%	Watsonwan	5,258	0.4%
Le Sueur	15,009	0.2%	Wilkin	3,414	1.1%
Lincoln	3,126	0.5%	Winona	27,934	2.5%
Lyon	12,708	0.7%	Wright	65,578	0.6%
Mahnomen	2,343	0.9%	Yellow Medicine	5,569	0.2%
Marshall	4,739	0.7%	Statewide	2,910,128	0.9%