Voting Machines and Electoral Results in Florida: The Statistical Evidence

By Global Research
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Region: USA
In-depth Report: Election Fraud in America

Editor's note

we bring to the attention of our readers, the incisive analysis of Kathy Dopp, who carefully analyzed the Florida election results, the day after. Also included are further statistical analyses of Elizabeth Liddle and Josh Mitteldorf.

PART I

Surprising Pattern of Florida's Election Results

by Kathy Dopp

Wednesday November 3, 2004

Look at the Percent Change columns.
Notice how the percents vary much more widely in the Op-Scan counties versus the Touchscreen counties.
Explanation, Sources, and Graphical Plots are Below the Chart
Voting Machine Type by County 2004

New! Cross-party voting in Florida seems to depend on the local voting technology

While the heavily scrutinized touch-screen voting machines seemed to produce results in which the registered Democrat/Republican ratios largely matched the Kerry/Bush vote, in Florida's counties using optically scanned paper ballots the results seem to contain anomalies. Mathematicians are interested in investigating the November 2004 election because if exit polls from various states use the same scientific methodology, then the likelihood of election results being significantly different than exit polls results in half a dozen swing states is very very low. By the 2006 election, we need by county exit polls to do a better analysis.

Note: This is a scientific study. Small op-scan counties must be excluded for valid analysis. This relationship with voting machines is statistically significant. No conclusions as to the causes of the pattern can be drawn at this time. I am putting my ideas for a complete study out to statisticians and programmers to be able to fully analyze 2004 election results beginning with Florida, so that we can develop and test the efficacy of a system to put in place by 2006 to pinpoint counties or even precincts which warrant recounts.

Please Subscribe to our mail list for updates and to learn how you can help this project. With your help, we can put measures in place by 2006 to find patterns allowing us to pinpoint possible election rigging/hacking/innocent-errors by the day after the election, so that

candidates will immediately know if precincts or counties need to be recounted prior to conceding.

E-Touch Voting

(%Regist)*(TotalVotes)

(Actual-Exp)/(Exp)

COUNTY
vendor
REGISTERED VOTERS
ACTUAL RESULTS
EXPECTED_VOTES
PERCENT CHANGE

%REP
%DEM
TOT_REG
REP
DEM
TOT_VOTES
REP
DEM
REP
DEM

Broward
ES&S
26.8%
50.5%
1,058,069
236,794
441,733
686,715
184,152
346,565
28.6%
27.5%

Charlotte
ES&S

44.9%
31.9%
113,808
44,402
34,227
79,730
35,806
25,435
24.0%
34.6%

Collier
ES&S
53.1%
24.4%
168,673
82,493
43,277
126,916
67,388
30,912
22.4%
40.0%

Hillsborough
Sequoia
35.1%
41.7%
621,201
241,630
210,892
455,970
159,843
190,023
51.2%
11.0%

Indian River
Sequoia
51.3%
30.0%
81,643
36,744
23,850
61,087
31,325
18,343
17.3%
30.0%

Lake

ES&S
47.4%
34.3%
161,269
73,971
47,963
123,269
58,388
42,237
26.7%
13.6%

Lee
ES&S
47.5%
29.7%
304,937
114,153
76,874
193,326
91,895
57,513
24.2%
33.7%

Martin
ES&S
52.5%
27.5%
98,857
41,303
30,149
72,334
37,953
19,905
8.8%
51.5%

Miami-Dade
ES&S
34.8%
42.8%
1,058,801
326,362
383,032
713,022
248,045
305,486
31.6%
25.4%

Nassau
ES&S
49.1%
36.8%
41,353
23,726
8,543
32,656
16,031
12,017
48.0%
-28.9%

Palm Beach
Sequoia
32.0%
45.1%
729,575
174,233
275,030
452,061
144,679
204,000
20.4%
34.8%

Pasco
ES&S
40.1%
37.3%
265,974
103,195
84,729
190,861
76,531
71,237
34.8%
18.9%

Pinellas
Sequoia
39.2%
37.8%
590,989
222,630
222,103
448,875
175,947
169,789
26.5%

30.8%

Sarasota
ES&S
47.9%
31.2%
240,592
104,446
88,225
195,183
93,552
60,833
11.6%
45.0%

Sumter
ES&S
43.5%
40.8%
40,523
19,794
11,583
31,835
13,851
13,004
42.9%
-10.9%

5,576,264
1,845,876
1,982,210
3,863,840
1,435,385
1,567,297

Op-Scan Precinct

(%Regist)*(TotalVotes)

(Actual-Exp)/(Exp)

COUNTY
vendor
REGISTERED VOTERS
ACTUAL RESULTS
EXPECTED_VOTES
PERCENT CHANGE

%REP
%DEM
TOT_REG
REP
DEM
TOT_VOTES
REP
DEM
REP
DEM

Alachua
Diebold
27.8%
50.5%
142,358
47,615
62,348
111,022
30,887
56,111
54.2%
11.1%

Baker
Sequoia
24.3%
69.3%
12,887
7,738
2,180
9,955
2,415
6,895
220.4%
-68.4%

Bay
ES&S
44.2%
39.2%
101,315

53,305
21,034
74,890
33,079
29,351
61.1%
-28.3%

Bradford
ES&S
28.3%
61.4%
14,721
7,553
3,244
10,851
3,072
6,663
145.8%
-51.3%

Brevard
Diebold
44.8%
36.5%
338,195
152,838
110,153
265,075
118,772
96,860
28.7%
13.7%

Calhoun
Diebold
11.9%
82.4%
8,350
3,780
2,116
5,961
709
4,911
433.2%
-56.9%

Citrus
Diebold
41.5%
38.9%

90,780
39,496
29,271
69,457
28,809
27,039
37.1%
8.3%

Clay
ES&S
56.5%
25.6%
106,464
61,813
18,887
81,144
45,877
20,794
34.7%
-9.2%

Columbia
Diebold
31.3%
56.5%
34,282
16,753
8,029
24,984
7,825
14,119
114.1%
-43.1%

DeSoto
Diebold
25.4%
59.3%
14,901
5,510
3,910
9,493
2,413
5,630
128.4%
-30.6%

Dixie
Diebold
15.0%

77.5%
9,676
4,433
1,959
6,440
968
4,988
358.1%
-60.7%

Duval
Diebold
36.9%
46.2%
515,202
218,476
157,624
378,330
139,605
174,965
56.5%
-9.9%

Escambia
ES&S
43.8%
40.7%
189,833
93,311
48,207
142,895
62,602
58,149
49.1%
-17.1%

Flagler
Diebold
40.7%
38.1%
47,068
19,624
18,563
38,455
15,669
14,657
25.2%
26.6%

Franklin
ES&S

15.9%
77.3%
7,620
3,472
2,400
5,930
943
4,586
268.1%
-47.7%

Gadsden
ES&S
11.2%
82.9%
26,884
6,236
14,610
20,948
2,347
17,361
165.7%
-15.8%

Gilchrist
Diebold
30.4%
58.6%
9,035
4,930
2,015
7,007
2,133
4,106
131.2%
-50.9%

Glades
Diebold
24.8%
64.8%
5,963
1,983
1,434
3,434
852
2,227
132.8%
-35.6%

Gulf
ES&S
26.6%
67.1%
9,627
4,797
2,398
7,259
1,928
4,874
148.8%
-50.8%

Hamilton
ES&S
14.9%
78.9%
7,645
2,786
2,252
5,065
755
3,994
268.9%
-43.6%

Hardee
Diebold
26.7%
63.8%
10,399
5,047
2,147
7,245
1,936
4,619
160.7%
-53.5%

Hendry
ES&S
30.8%
56.5%
17,144
5,756
3,960
9,774
3,010
5,523
91.3%

-28.3%

Hernando
Diebold
41.3%
38.8%
109,656
40,137
35,006
75,832
31,303
29,428
28.2%
19.0%

Highlands
ES&S
44.5%
39.8%
60,176
20,475
12,986
33,687
14,976
13,401
36.7%
-3.1%

Holmes
ES&S
21.3%
72.7%
10,982
6,410
1,810
8,298
1,771
6,036
261.9%
-70.0%

Jackson
ES&S
22.0%
71.5%
27,138
12,092
7,529
19,750
4,339
14,127

178.7%
-46.7%

Jefferson
Diebold
20.7%
72.3%
9,300
3,298
4,134
7,477
1,551
5,408
112.7%
-23.6%

Lafayette
ES&S
13.2%
82.8%
4,309
2,460
845
3,325
440
2,755
459.3%
-69.3%

Leon
Diebold
26.6%
57.1%
171,182
47,902
79,591
128,316
34,165
73,214
40.2%
8.7%

Levy
Diebold
27.6%
59.7%
22,617
10,408
6,073
16,649
4,594

9,940
126.5%
-38.9%

Liberty
ES&S
7.9%
88.3%
4,075
1,927
1,070
3,021
237
2,667
712.3%
-59.9%

Madison
Diebold
14.9%
79.5%
11,371
4,195
4,048
8,306
1,238
6,605
238.8%
-38.7%

Manatee
Diebold
44.3%
33.0%
191,635
81,237
61,193
143,469
63,489
47,394
28.0%
29.1%

Marion
ES&S
43.2%
39.7%
184,257
81,235
57,225
139,581

60,279
55,427
34.8%
3.2%

Monroe
Diebold
38.7%
36.1%
51,377
19,457
19,646
39,517
15,286
14,278
27.3%
37.6%

Okaloosa
Diebold
57.2%
24.7%
127,455
69,320
19,276
89,288
51,059
22,085
35.8%
-12.7%

Okeechobee
Diebold
29.7%
58.5%
18,627
6,975
5,150
12,184
3,622
7,124
92.6%
-27.7%

Orange
ES&S
35.1%
40.2%
531,774
191,389
192,030

385,547
135,299
154,938
41.5%
23.9%

Osceola
Diebold
32.8%
40.2%
129,487
32,812
30,295
63,440
20,804
25,508
57.7%
18.8%

Polk
Diebold
39.0%
42.6%
295,742
123,457
85,923
210,642
82,059
89,651
50.4%
-4.2%

Putnam
Diebold
28.1%
57.7%
45,344
18,303
12,407
30,960
8,690
17,878
110.6%
-30.6%

Santa Rosa
ES&S
55.9%
28.1%
96,359
51,952

14,635
67,175
37,543
18,880
38.4%
-22.5%

Seminole
Diebold
44.6%
32.3%
241,230
107,913
76,802
185,762
82,869
60,037
30.2%
27.9%

St.Johns
Diebold
53.3%
28.3%
109,635
58,802
26,215
85,699
45,678
24,272
28.7%
8.0%

St.Lucie
Diebold
36.6%
41.4%
137,951
38,919
43,367
82,798
30,272
34,288
28.6%
26.5%

Suwannee
ES&S
26.8%
63.6%
21,930

11,145
4,513
15,785
4,236
10,035
163.1%
-55.0%

Taylor
Diebold
18.9%
75.6%
11,481
5,466
3,049
8,580
1,622
6,486
237.1%
-53.0%

Union
ES&S
18.3%
75.5%
7,063
3,396
1,251
4,675
855
3,529
297.4%
-64.5%

Volusia
Diebold
35.9%
40.8%
309,930
100,209
106,853
208,410
74,891
85,000
33.8%
25.7%

Wakulla
Diebold
24.2%
66.9%

15,396
6,777
4,896
11,763
2,850
7,864
137.8%
-37.7%

Walton
Diebold
50.1%
36.8%
32,777
17,526
6,205
23,939
11,987
8,802
46.2%
-29.5%

Washington
Diebold
25.4%
67.0%
14,421
7,367
2,911
10,363
2,634
6,947
179.6%
-58.1%

4,725,026
1,950,213
1,445,675
3,419,852
1,337,242
1,432,425

Note: Election Results were taken on Nov 3, when the Florida vote was 98.6% in and the Voter Registration Numbers are from 10-04.

Explanation of What these numbers are, and how they were calculated:

PERCENT CHANGE for DEM, for example, = (Actual DEM Vote – Expected DEM Vote) / (Expected DEM Vote)

This is a simple *percent change* measure taught in highschool mathematics.

EXPECTED_VOTES REP = the percentage of registered REP * the total number of voters who voted in each county on Tuesday.

EXPECTED votes would normally vary from the ACTUAL votes due to increased voter turnout by one party, Independents voting REP or DEM or other factors. What seems very odd in these numbers is that the increase in ACTUAL votes from EXPECTED votes has a striking pattern of being so much higher for REPs than that for DEMs in counties using optical scan voting machines, even when smaller counties are excluded from the analysis.

http://enight.dos.state.fl.us/ and http://election.dos.state.fl.us/voterreg/index.shtml for registered voters by county and election results by county
http://vevo.verifiedvoting.org/verifier/ for voting machine type by county

Statistical Analysis and Visual Charts of the Data

Graphical Plots of FL 2004 Data
Simple pictures of counties by voting machine type – Op Scan- Precinct Counties and Touchscreen Counties
Statistical Significance FL 2004 & Graph
Pearson's Correlations FL 2004
Interesting but Not Rigorous because the data was plotted using counties with smaller population.

Criticisms of Our Work & Our Responses

An analyses of our data http://synapse.princeton.edu/~sam/royle_florida.html which neglected to remove smaller counties from the study before doing the analyses and so is not a valid critique of our analyses but is interesting. Here is another critique of our analyses by Poli Scientists and explanations of why these Cornell interpretations aren't suported by the data by Elizbeth Liddle and Marc Sapir and Kathy Dopp .

Other Election Results by County:

Florida Presidential 2000
Pennsylvania Presidential 2004

An open source election and vote-counting system with voter verifiable paper ballot and two independently-programmed, always-reconciled ballot counting system that needs your support.

Voters nationally voted along party lines by about 90% and Florida exit polls favored Kerry. Interesting manipulations have been done to the exit polls after the election to change their results. Further study is needed of other numerical by county measures for Florida and other states' election results and races. This site was mentioned in a http://www.house.gov/judiciary_democrats/gaoinvestvote2004ltr11504.pdf letter from three congressmen to the GAO urging an investigation.

And an interesting look at this data from Florida.

Truthout and Thom Hartman of CommonDreams is covering us. http://www.truthout.org/docs_04/110804Z.shtml

PART 2

2004 Presidential Florida By County By Voting Machine Type Election Analysis

by Elizabeth Liddle

This analysis is derived from the above tables presented by Kathy Dopp this Florida Election Data.

Op-scan machines tended to be used in counties with small numbers of registered voters, while very largest counties tended to used E-touch, so that the entire two groups of counties (E-touch and Op-scan users in Florida) cannot be validly compared, as county-size itself might account for the data. However, for the 26 mid-sized counties with between 80,000 and 500,000 registered voters, the type of machine used was not significantly related to the number of registered voters in the county. Eight of these counties used E-touch machines, and 18 used Op-scan machines. There was no significant difference between these two groups of counties in either their numbers of registered voters or their proportion of registered Republicans to registered Democrats. Neither covariate was a significant predictor of change. However, "machine used" was very significant ($p<.01$), with Op scan favoring repubs.

An analysis of variance (ANOVA) conducted on the percent change for each party ([Actual vote minus expected vote]/expected vote) in each county, with "machine type" as a predictive factor, indicated that machine type was a significant predictor of percent change in voting. Counties using E-touch machines showed significantly positive percent changes in vote for both Republican and Democrat candidates, with greater mean percent changes for the Democrat. However counties using Op-scan machines showed significant positive percent change only for the Republican candidate, the mean change for the Democrat being insignificantly greater than zero.

Caveats: The number of counties is small, and the groups unequal in size; this means that the probability of the results occurring by chance may be somewhat greater than quoted. It is also possible that a county's choice of machine or voting pattern may be influenced by a third factor that also influenced voter behaviour. The magnitude of the apparent effect of voting machine type on voter behaviour nonetheless would seem to warrant investigation.

PART 3

Cross-party voting in Florida seems to depend on the local voting technology

by Josh Mitteldorf

The day after the election, Kathy Dopp noticed a pattern in Florida's voting that seemed to relate to the type of voting machine used in each county (see data above). Nationwide, exit polls showed that 90% of party-registered voters tend to vote for the party to which they are registered. In Florida '04, counties that used electronic touch-screen voting showed a shift from this expectation toward Kerry; but among counties that used opti-scan paper ballots, there was a shift toward Bush.

One suggested explanation for this pattern was that it was small counties that haven't yet made the switch to electronic technologies, and in these areas "Dixiecrats" tend to register Democrat for local elections, but vote Republican in national elections. To test this hypothesis, Elizabeth Liddle refined Dopp's study, eliminating the smallest counties, all of which used the opti-scan technology, and also the largest counties, which tended to use the touch-screen machines. There remained 26 mid-size counties, 8 of which use touch-screen and 18 use opti-scan. Within this group, there is no significant relationship between county size and voting technology.

A significant, unexplained relationship remained between voting technology and party shift. In the graph, opti-scan counties are represented by blue markers and touch-screen counties by red markers. County size is plotted horizontally, and party shift is the vertical axis. Upward displacement represents unexpected votes for Bush, and downward displacement is unexpected votes for Kerry. It is easy to see that the opti-scan counties shifted toward Bush, while touch-screen counties show a smaller shift toward Kerry.

On this map, just the 26 mid-size counties are shown in color. Red means opti-scan and blue means touch-screen. The opti-scan counties tended to be more in the north of the state. Still, the effect can be observed in mixed areas like the Southeast. On the right of the map, near the bottom, Red St Lucie County is sandwiched between Martin and Indian River Counties, both Blue. St Lucie County shifted to Bush, while Martin and Indian River shifted to Kerry.

Technical description of the analysis

The registration percentage was defined as R/(R+D), such that independent and third-party registrants were not part of the measure. Similarly, voting percentage was defined as Bush/(Bush+Kerry). Party shift was defined as the difference between Republican voting percentage and Republican registration percentage.

In touch-screen counties, mean party shift was -2.9% in the D direction, with a standard deviation of 3.5% (z=2.3, n=8). In opti-scan counties, mean party shift was +6.0% in the R direction, with a standard deviation of 4.9% (z=5.2, n=18).

Analysis of Variance was performed on party shift as a dependent variable, with county size and voting machine type as the two independent variables. There was no significant relationship between county size and party shift (p=0.6), but the relationship between voting technology and party shift was highly significant (p=0.00026).

Corresponding analysis for results of the 2000 election showed a similar pattern, though less pronounced.

Touch-screen: mean party shift was -6.1% stdev=3.8%, (z=4.5, n=18)

Opti-scan: mean party shift was +4.0% stdev=7.4%, (z=2.3, n=18)

ANOVA: significant relationship between '04 voting technology and '00 party shift (p=0.0023) but not county size and party shift (p=0.4).

Note that the same counties were analyzed with the same division, based on '04 voting

technology, even though that technology was not in place in most of these counties in 2000.