

Report on a Survey of Changes in Total Annual Expenditures for Florida Counties Before and After Purchase of Touch Screens. A Comparison of Total Annual Expenditures for Touch Screens and Optical Scanners.

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PURPOSE

This project was undertaken to study the changes in total expenditures by Florida's 68 Supervisor of Elections offices before and after electronic touchscreen voting was instituted and to compare the effect of the type voting system on costs.

BACKGROUND

Florida mandated that all counties replace punch cards and other systems with either electronic optical scanners or touchscreen voting machines prior to the 2002 elections. The purchase costs for the new voting equipment was reimbursed to the Supervisor of Elections' office by the county's commissioners so that the machine purchasing expenditures were never included in the Supervisor of Election's annual expenditures. Counties that already owned optical scanners before 2001 did not have to change systems. There were 12 counties that responded completely to this survey that did not need to change their voting machines since they were already using optical scanners

METHOD

We requested data from the 68 counties in Florida (see enclosed copy of request letter). Despite the fact that 50 counties responded, we were limited to analyzing the data of 32 counties because the other counties could not provide full data on the number of registered voters and /or total expenditures for the years selected.

To compare changes in the costs for each county for touchscreens versus optical scanners, total annual expenditures from the immediate pre- touchscreen period (2000 and 2001) were compared with the post- touch screen data (2003 and 2004). These four years were used in order to include in each period one presidential election year and one with no federal elections. Data from 2002 was excluded because in 2002 all but 12 of the 32 counties changed their voting systems which probably engendered special expenditures for education, training, special handling and storage. Also many counties did not include 1999 data so we could not compare three years pre- to three years post-touch screen purchase.

ANALYSIS

A comparison of the difference in expenditures per 1000 voters of the 11 counties with touchscreen systems versus those 21 counties with optical scanning systems for the 2003/2004 period could not be meaningful for the following reasons:

1) County size had a large effect on the cost, Chart 1 shows a scatter plot of the 2003/2004 data for each county's costs per thousand voters versus the number of registered voters. Note that the small counties had higher costs per 1000 voters than the larger counties. Virtually all the small counties were optical scanners and all of the very large counties were touchscreen. This implies some minimum costs for all counties independent of size of voting population.

2) There are also many unknown expenditure variables in county to county data such as what functions are included in each county's annual expenditures, counties use different accounting protocols, some show debt service as an expense and the uncertainty as to what special services any county provides. These variables makes conclusions regarding total expected annual cost differences between optical scan ownership and touchscreen ownership difficult and uncertain.

The final analysis looked at the changes for each county in expenditures per 1000 registered voters from the pre touch screen period to the post period . We elected to use the average of 2003 and 2004 expenditures per 1000 registered voters divided by the average of the 2000 and 2001 expenditures per 1000 registered voters to determine the percentage change for each county. We then took the average of the percentage change for each of the 11 touchscreen counties and compared these to the average of the percentage change for each of the 21 optical scan counties. The statistical analysis showed that touchscreen counties had an average increase of 57.4% in per-capita cost versus a value of 16.9% as the average of per-capita increase among counties with optical scanners. The difference between these two averages is 40.4% (57.3% minus 16.9%). This indicates a 40.4% higher increase in expenses for touchscreen counties than for optical scanner counties. This is significant at a 95% confidence level. Chart 2 is a scatter plot of the percent change of the expenditures in each county per 1000 registered voters before and after purchase of touchscreens.

CONCLUSION

The annual increase for optical scanner cost may be due partly to inflation and partly to special demands by the State. One Supervisor of Elections stated that since 2002 the State mandated special things every year. For example prior to 2002, he programmed his own machines; after 2002 every year the State required that the county buy new software from the manufacturer to program their optical scanners.

The results from this study show that a county's buying touchscreens will increase their annual expenditures by 57.3%. Owning optical scanners should increase their expected annual costs 16.9%. Optical scanners have the further advantage of providing a voter verified paper ballot that can be used to audit the machine's data and for any needed independent recount. To match this auditing advantage of optical scanners, the present touch screen systems would require the county to purchase and maintain a large number of printers, an additional set of costs that would significantly increase the county's annual expenses.

One factor that may explain why having touchscreens cost so much more than optical scanners is because the county has to own and maintain so many more machines. We estimate that one optical scanner can count handle six voter's votes a minute (or 360 per hour) as they are cast but because it takes a voter at least three minutes to vote with touchscreens, it would take 20 touchscreens to perform per hour as well as optical scanners. In order not to have huge waiting lines on election day, most counties buy 10 touchscreens per precinct. Thus while one optical scanner adequately serves a precinct, the precinct needs approximately ten times as many touchscreens in order not to have huge lines of voters waiting to vote.

CHART 1
Expenditures per 1000 Registered Voters of Elections in Florida Counties, 2003/2004

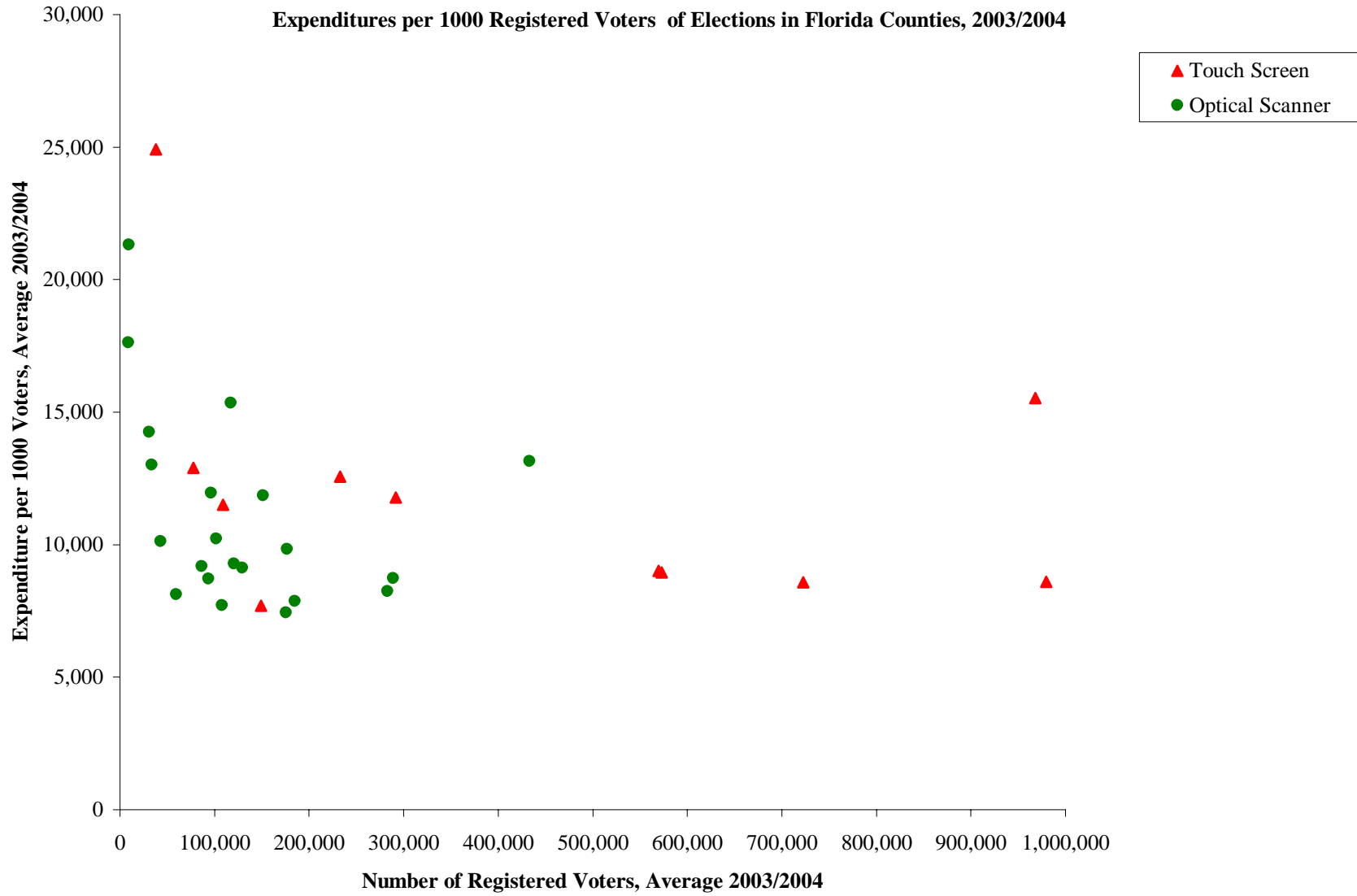
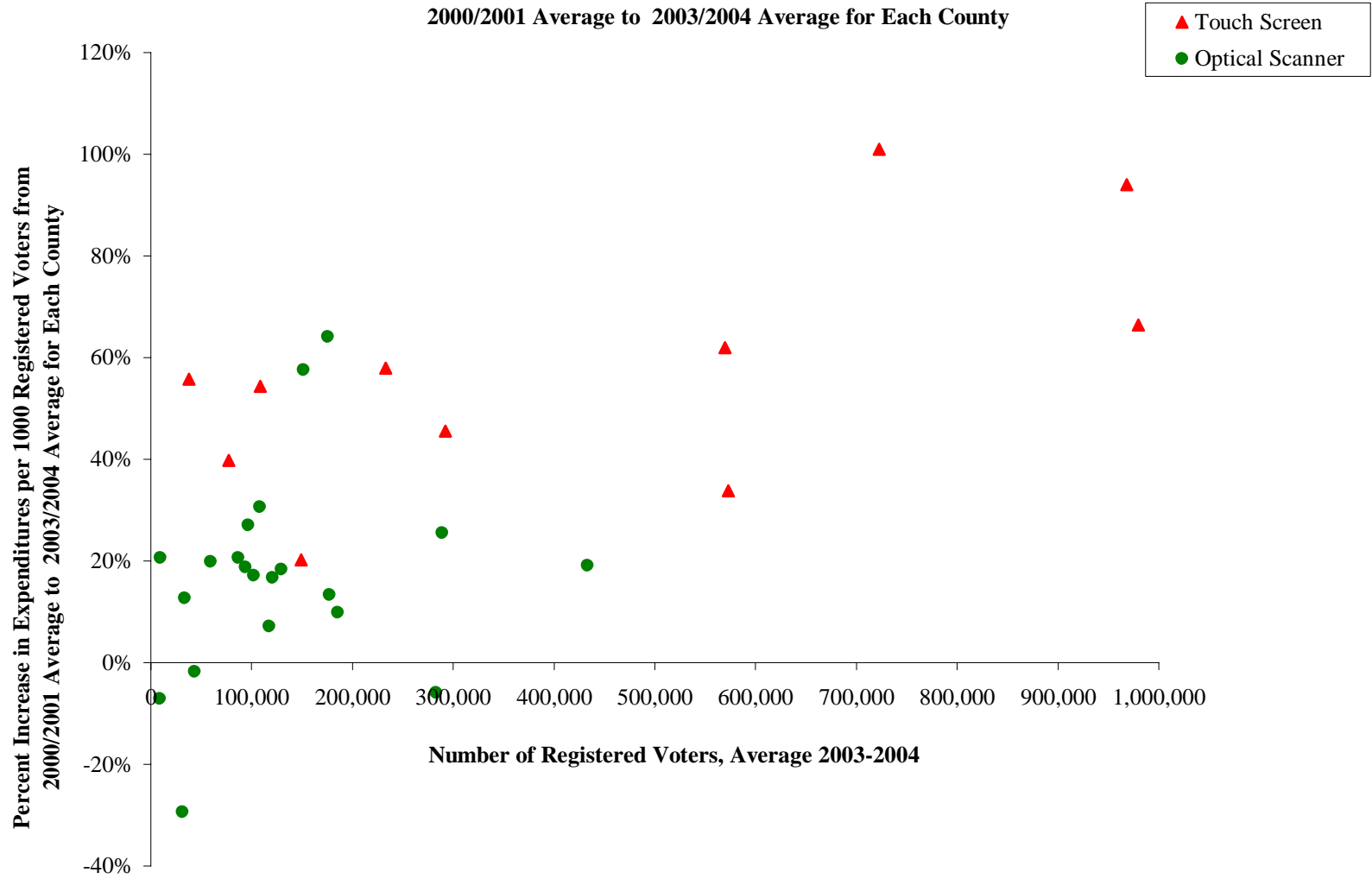


CHART 2

Change of Election Expenditures per 1000 Registered Voters in Florida Counties from 2000/2001 Average to 2003/2004 Average for Each County



	A	B	C	D	E	F	G	H	I	J	K	
1	Analnsis of Data for Florida Election Expenditures Study							Ave. Exp./1000	Section 1 Complete Data			
2					Ave. '03-'04	Ave. '03-'04	Exp. '03-'04/	voters change	Ave. '00-'01	Ave. '00-'01	Exp. '00-'01/	
3	County	1999 System	Type*	2002 System	# voters	Expenditures	1,000 Vtrs in \$	03-'04/'00-'01	# voters	Expenditures	1,000 Vtrs in \$	
4	Jefferson	Punch card	P/O	Optical scan	8,937	157,589	17,633	-7.04%	7,961	150,998	18,968	
5	Gulf	Punch card	P/O	Optical scan	9,356	199,438	21,318	20.70%	9,862	174,176	17,661	
6	Walton	Lever machines	P/O	Optical scan	30,991	441,805	14,256	-29.30%	28,814	581,029	20,165	
7	Columbia	Punch card	P/O	Optical scan	33,541	436,368	13,010	12.74%	31,674	365,506	11,540	
8	Flagler	Optical scan	O/O	Optical scan	43,118	436,713	10,128	-1.71%	34,240	352,836	10,305	
9	Highlands	punch card	P/O	Optical scan	59,247	481,839	8,133	19.88%	53,394	362,233	6,784	
10	Citrus	Optical scan	O/O	Optical scan	86,409	794,123	9,190	20.63%	80,592	613,974	7,618	
11	Bay	Optical scan	O/O	Optical scan	93,799	817,695	8,718	18.76%	95,846	703,542	7,340	
12	Clay	Optical scan	O/O	Optical scan	96,408	1,152,973	11,959	27.03%	84,361	794,214	9,415	
13	St John	Optical scan	O/O	Optical scan	101,816	1,041,702	10,231	17.19%	88,258	770,522	8,730	
14	Hernando	Punch card	P/O	Optical scan	107,772	832,271	7,723	30.69%	97,372	575,354	5,909	
15	Osceola	Punch card	P/O	Optical scan	117,108	1,798,435	15,357	7.12%	90,538	1,297,933	14,336	
16	Okaloosa	Optical scan	O/O	Optical scan	120,674	1,121,262	9,292	16.75%	113,616	904,208	7,958	
17	Alachua	Optical scan	O/O	Optical scan	129,170	1,178,672	9,125	18.38%	120,005	925,039	7,708	
18	Leon	Optical scan	O/O	Optical scan	151,506	1,796,887	11,860	57.56%	147,451	1,109,945	7,528	
19	Marion	Punch card	P/O	Optical scan	175,683	1,308,219	7,446	64.08%	146,312	664,026	4,538	
20	Escambia	Optical scan	O/O	Optical scan	176,817	1,740,157	9,842	13.36%	173,129	1,503,043	8,682	
21	Manatee	Optical scan	O/O	Optical scan	185,033	1,455,652	7,867	9.87%	159,408	1,141,420	7,160	
22	Polk	Punch card	P/O	Optical scan	283,032	2,335,256	8,251	-5.92%	244,414	2,143,605	8,770	
23	Volusia	Optical scan	O/O	Optical scan	288,805	2,525,418	8,744	25.53%	254,065	1,769,823	6,966	
24	Orange	Optical scan	O/O	Optical scan	432,945	5,692,856	13,149	19.11%	382,138	4,218,509	11,039	
25	Sumter	Punch card	P/T	Touchscreen	38,023	947,370	24,916	55.72%	32,009	512,169	16,001	
26	Indian river	Punch card	P/T	Touchscreen	77,468	999,450	12,902	39.82%	71,868	663,132	9,227	
27	Charlotte	Punch card	P/T	Touchscreen	108,821	1,251,019	11,496	54.33%	99,256	739,344	7,449	
28	Lake	Optical scan	O/T	Touchscreen	148,945	1,147,552	7,705	20.24%	134,007	858,702	6,408	
29	Sarasota	punch card	P/T	Touchscreen	233,005	2,929,420	12,572	57.97%	220,246	1,752,829	7,959	
30	Lee	Punch card	P/T	Touchscreen	291,948	3,440,887	11,786	45.53%	248,847	2,015,264	8,098	
31	Hillsborough	Punch card	P/T	Touchscreen	569,575	5,137,388	9,020	61.97%	503,939	2,806,250	5,569	
32	Pinellas	Punch card	P/T	Touchscreen	572,858	5,129,234	8,954	33.83%	570,970	3,820,141	6,691	
33	Palm Beach	Punch card	P/T	Touchscreen	722,820	6,202,863	8,581	100.97%	663,036	2,831,115	4,270	
34	Miami-Dade	Punch card	P/T	Touchscreen	968,296	15,040,000	15,532	94.00%	892,174	7,143,000	8,006	
35	Broward	Punch card	P/T	Touchscreen	979,747	8,423,192	8,597	66.45%	903,452	4,666,420	5,165	
36								Average Change in Expenditures per 1000 voters				
37								16.9%	Post 2002 Optical Scan Counties			
38								57.3%	Post 2002 Touchscreen Counties			
39		* O/O=Optical Scan before 2002 and After 2002										
39		*P/O=Punch Card before 2002 and Optical Scan after 2002										
40		*P/T=Punch Card before 2002 and Touchscreen after 2002										

Name of Supervisor of Elections
Name of County

April 5, 2005

I am working with a group that is doing a study of the election costs for different types of voting systems. I am interested in the total annual yearly expenditures for the Supervisor of Elections office and in the changes in the size of the registered voting population. I also want to know what types of voting system were used in the years 1999 through 2004. I will be delighted to share with you the results of this county by county study.

Voting Systems. Data needed:

1. What type of voting system did you use in 1999?.....
2. Did you change to an electronic system after 1999?.....If yes, then:
 - A. What type of system did you purchase?.....
 - B. Cost per machine?.....
 - C. How many machines did you buy?.....
 - D. When did you purchase them?.....
 - E. Was the cost paid by the commissioners directly or did it come out of the Supervisor of Elections' expenditures?.....
3. Number of precincts in the county.....
4. Number of registered voters in the years:
 - A. 1999 (as of September 30th).....
 - B. 2000 (as of September 30th).....
 - C. 2001 (September 30th).....
 - D. 2002 (as of September 30th).....
 - E. 2003 (as of September 30th).....
 - F. 2004 (as of September 30th).....
5. The data from the annual report of the county's independent auditors for the General Fund Schedule of Revenues, Expenditures and Changes in Fund Balance budget and Actual for the years 1999, 2000, 2001, 2001, 2003, 2004. I do not know if this is the exact title used by your auditors for their annual report to the Supervisor of Elections. The data needed from your auditor's annual report for the above listed six years is called in the report that I have from one county: "total expenditures of the general government (for supervisor of elections' office)." It is subdivided into Personal services, Operating expenditures and Capital outlay. I would be happy to pay whatever cost is entailed in Xeroxing this data. I do not need the entire yearly auditor's report, just the page with the Total expenditures for each of the above listed six years.

I look forward to hearing from you. Please let me know if there are any problems . If not, please mail the data to me at the above address. Thank you so much for helping in this research project.

	A	B	C	D	E	F	G	H	I	J	K	L	
1		TouchScreen?	CostPerVoterIncrease		REGRESSION RANGES:								
2		0	-1.71%		Y range = B2:B33								
3		0	20.63%		X range = A2:A33								
4		0	18.76%										
5		0	27.03%		SUMMARY OUTPUT FROM REGRESSION ANALYSIS								
6		0	17.19%										
7		0	16.75%		<u>Regression Statistics</u>								
8		0	18.38%		Multiple R	0.679081194							
9		0	57.56%		R Square	0.461151268							
10		0	13.36%		Adjusted R Square	0.443189644							
11		0	9.87%		Standard Error	0.214354531							
12		0	25.53%		Observations	32							
13		0	19.11%										
14		0	-7.04%		<u>ANOVA</u>								
15		0	20.70%			<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
16		0	-29.30%		Regression	1	1.179677052	1.179677052	25.67425184	1.9282E-05			
17		0	12.74%		Residual	30	1.378435944	0.045947865					
18		0	19.88%		Total	31	2.558112996						
19		0	30.69%										
20		0	7.12%		<u>Coefficients</u> <u>Standard Error</u> <u>t Stat</u> <u>P-value</u> <u>Lower 95%</u> <u>Upper 95%</u>								
21		0	64.08%		Intercept	0.169	0.047	3.618	0.001	0.074	0.265		
22		0	-5.92%		X Variable 1	0.404	0.080	5.067	0.000019	0.241	0.567		
23		1	55.72%										
24		1	39.82%		40.4% (above coefficients expressed as percentages)					24.1%	56.7%		
25		1	54.33%										
26		1	20.24%		Here 40.4% is our estimate of the extra percentage cost-per-voter increase for counties switching to TouchScreen systems.								
27		1	57.97%		The 95%-confidence interval for this estimated extra-increase has a lower bound of 24% and upper bound of 57%.								
28		1	45.53%		The low p-value (0.000019) indicates very high confidence for our finding that TouchScreen has a higher cost increase.								
29		1	61.97%										
30		1	33.83%										
31		1	100.97%										
32		1	94.00%										
33		1	66.45%										
34													
35			Average Change in Expenditures per 1000 voters										
36			16.9% Post 2002 Optical Scan Counties										
37			57.3% Post 2002 Touchscreen Counties										
38			40.4% Difference (same as "X Variable 1" Coefficient above in cell E22).										