Report on a Survey of Changes in Total Annual Expenditures for Florida Counties Before and After Purchase of Touch Screens and 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 67 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 non-electronic voting systems with either optical scanners or touch screen voting machines prior to the 2002 elections. The purchase costs for the new voting equipment were 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 13 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 67 counties in Florida (see enclosed copy of request letter). Despite the fact that 50 counties responded, we were limited to analyzing the data of 33 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 13 of the 33 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 22 counties with optical scanning systems for the 2003/2004 period could not be meaningful for the following reasons:

1) County size had an 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. The counties with less than 40,000 registered voters had higher costs per 1000 voters than the larger counties. This unusually high average annual expenditure 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, some counties use different accounting

protocols, some show debt service as an expense. These and uncertainties as to what special services a county includes make it difficult to make conclusions regarding total expected annual cost differences between optical scan ownership and touchscreen ownership. Therefore the final analysis looks at the changes for each county in expenditures per 1000 registered voters from the pre touch screen period to the post period .

We used 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 22 optical scan counties. The statistical analysis showed that touchscreen counties had an average increase of 57.3% in per-capita cost versus a value of 16.7% as the average of per-capita increase among counties with optical scanners. The difference between these two averages is 40.6% (57.3% minus 16.7%). This indicates a 40.6% 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 the state mandated that every county use only electronic voting machines. A comparison of the expenditure changes for counties with optical scan in both periods (O/O) to those that bought them in 2002 (P/O) shows 6.9% higher increase for O/O counties than the P/O counties showing no savings by not changing..

CONCLUSION

The annual increase for optical scanner cost may be due partly to inflation and partly to special demands by the State.

The results from this study show that a county's buying touchscreens can increase their annual expenditures of the order of 57.3% and a county buying optical scanners can increase their expenditures of the order of 16.7%. 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 at least 18 touchscreens to perform per hour as well as optical scanners. In order not to have huge waiting lines on Election Day, most counties buy at least 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 **Page 3**

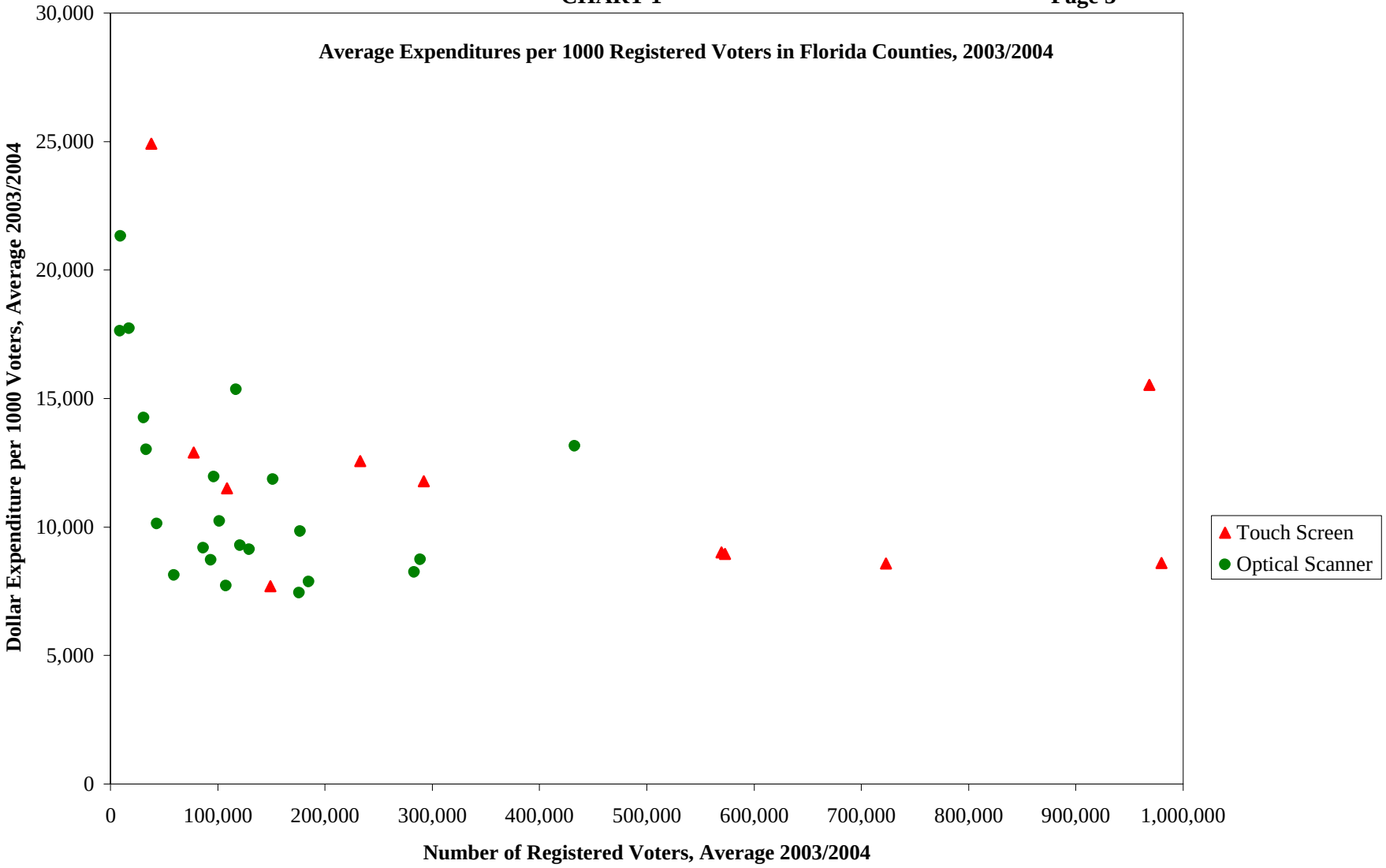
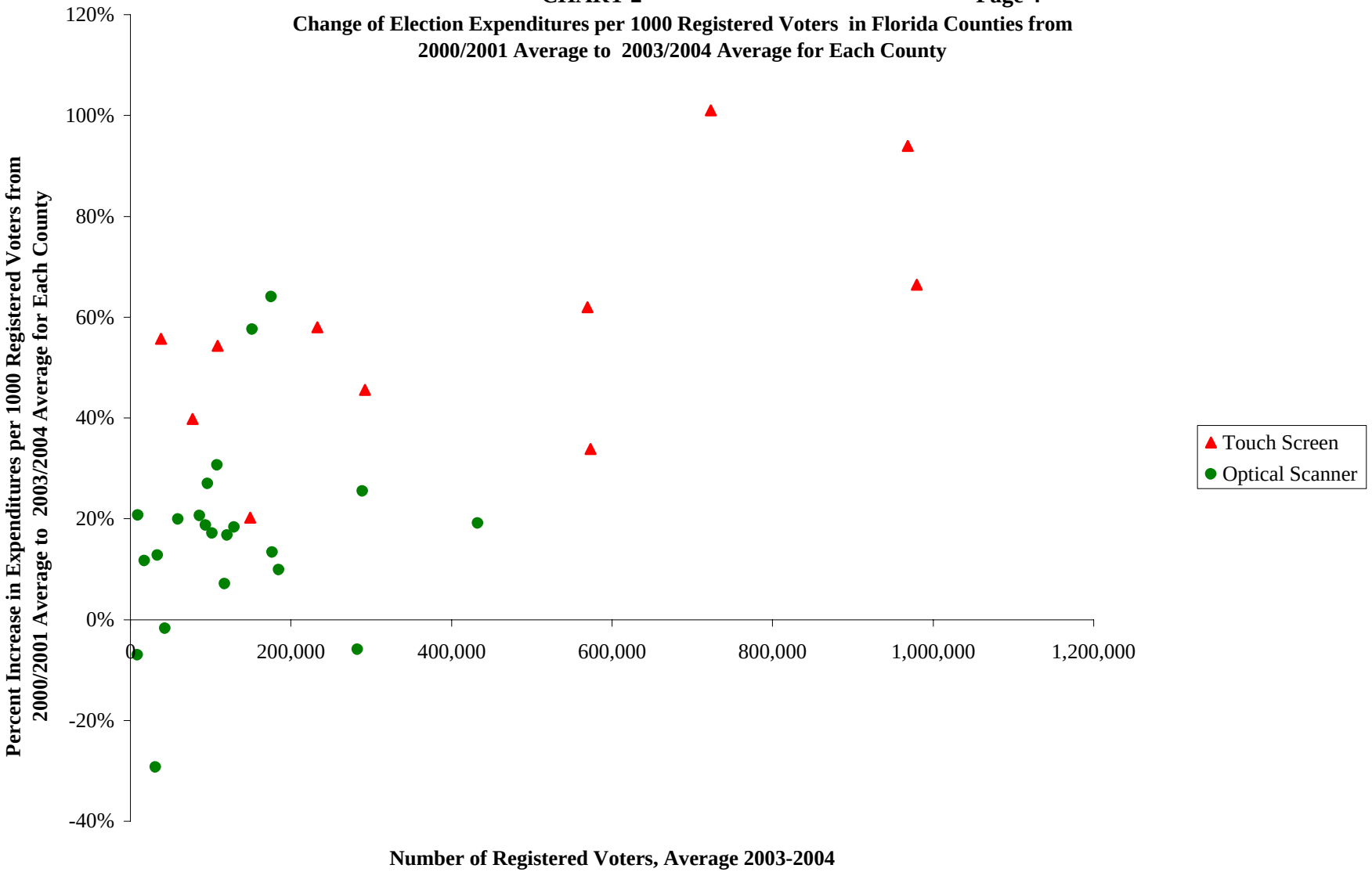


CHART 2 **Page 4**

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	**Analysis 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	Okeechobee	Optical Scan	O/O	Optical Scan	17,591	311,783	17,725	11.65%	17,128	271,892	15,875
5	Flagler	Optical scan	O/O	Optical scan	43,118	436,713	10,128	-1.71%	34,240	352,836	10,305
6	Citrus	Optical scan	O/O	Optical scan	86,409	794,123	9,190	20.63%	80,592	613,974	7,618
7	Bay	Optical scan	O/O	Optical scan	93,799	817,695	8,718	18.76%	95,846	703,542	7,340
8	Clay	Optical scan	O/O	Optical scan	96,408	1,152,973	11,959	27.03%	84,361	794,214	9,415
9	St John	Optical scan	O/O	Optical scan	101,816	1,041,702	10,231	17.19%	88,258	770,522	8,730
10	Okaloosa	Optical scan	O/O	Optical scan	120,674	1,121,262	9,292	16.75%	113,616	904,208	7,958
11	Alachua	Optical scan	O/O	Optical scan	129,170	1,178,672	9,125	18.38%	120,005	925,039	7,708
12	Leon	Optical scan	O/O	Optical scan	151,506	1,796,887	11,860	57.56%	147,451	1,109,945	7,528
13	Escambia	Optical scan	O/O	Optical scan	176,817	1,740,157	9,842	13.36%	173,129	1,503,043	8,682
14	Manatee	Optical scan	O/O	Optical scan	185,033	1,455,652	7,867	9.87%	159,408	1,141,420	7,160
15	Volusia	Optical scan	O/O	Optical scan	288,805	2,525,418	8,744	25.53%	254,065	1,769,823	6,966
16	Orange	Optical scan	O/O	Optical scan	432,945	5,692,856	13,149	19.11%	382,138	4,218,509	11,039
17	Jefferson	Punch card	P/O	Optical scan	8,937	157,589	17,633	-7.04%	7,961	150,998	18,968
18	Gulf	Punch card	P/O	Optical scan	9,356	199,438	21,318	20.70%	9,862	174,176	17,661
19	Walton	Lever machines	P/O	Optical scan	30,991	441,805	14,256	-29.30%	28,814	581,029	20,165
20	Columbia	Punch card	P/O	Optical scan	33,541	436,368	13,010	12.74%	31,674	365,506	11,540
21	Highlands	punch card	P/O	Optical scan	59,247	481,839	8,133	19.88%	53,394	362,233	6,784
22	Hernando	Punch card	P/O	Optical scan	107,772	832,271	7,723	30.69%	97,372	575,354	5,909
23	Osceola	Punch card	P/O	Optical scan	117,108	1,798,435	15,357	7.12%	90,538	1,297,933	14,336
24	Marion	Punch card	P/O	Optical scan	175,683	1,308,219	7,446	64.08%	146,312	664,026	4,538
25	Polk	Punch card	P/O	Optical scan	283,032	2,335,256	8,251	-5.92%	244,414	2,143,605	8,770
26	Lake	Optical scan	O/T	Touchscreen	148,945	1,147,552	7,705	20.24%	134,007	858,702	6,408
27	Sumter	Punch card	P/T	Touchscreen	38,023	947,370	24,916	55.72%	32,009	512,169	16,001
28	Indian river	Punch card	P/T	Touchscreen	77,468	999,450	12,902	39.82%	71,868	663,132	9,227
29	Charlotte	Punch card	P/T	Touchscreen	108,821	1,251,019	11,496	54.33%	99,256	739,344	7,449
30	Sarasota	Punch card	P/T	Touchscreen	233,005	2,929,420	12,572	57.97%	220,246	1,752,829	7,959
31	Lee	Punch card	P/T	Touchscreen	291,948	3,440,887	11,786	45.53%	248,847	2,015,264	8,098
32	Hillsborough	Punch card	P/T	Touchscreen	569,575	5,137,388	9,020	61.97%	503,939	2,806,250	5,569
33	Pinellas	Punch card	P/T	Touchscreen	572,858	5,129,234	8,954	33.83%	570,970	3,820,141	6,691
34	Palm Beach	Punch card	P/T	Touchscreen	722,820	6,202,863	8,581	100.97%	663,036	2,831,115	4,270
35	Miami-Dade	Punch card	P/T	Touchscreen	968,296	15,040,000	15,532	94.00%	892,174	7,143,000	8,006
36	Broward	Punch card	P/T	Touchscreen	979,747	8,423,192	8,597	66.45%	903,452	4,666,420	5,165
37								**Average Change in Exp. per 1000 voters**			
38								**16.7%**	**Post 2002 Opt. Scan Counties All**		
39		* O/O=Optical Scan before 2002 and After 2002						**57.3%**	**Post 2002 Touchscreen Counties**		
40		*P/O=Punch Card before 2002 and Optical Scan after 2002						**19.5%**	**Post 2002 Opt.Scan Counties O/O**		
41		*P/T=Punch Card before 2002 and Touchscreen after 2002						**12.6%**	**Post 2002 Opt. Scan Counties P/O**		
43											
44											Page 5

LETTER SENT TO EACH SUPERVISOR OF ELECTIONS IN EACH FLORIDA COUNTY

Name of Supervisor of Elections April 5, 2005
Name of County

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' budget .....
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.

Statistics 1

TouchScreen?	CostPerVoterIncrease
0	11.65%
0	-1.71%
0	20.63%
0	18.76%
0	27.03%
0	17.19%
0	16.75%
0	18.38%
0	57.56%
0	13.36%
0	9.87%
0	25.53%
0	19.11%
0	-7.04%
0	20.70%
0	-29.30%
0	12.74%
0	19.88%
0	30.69%
0	7.12%
0	64.08%
0	-5.92%
1	55.72%
1	39.82%
1	54.33%
1	20.24%
1	57.97%
1	45.53%
1	61.97%
1	33.83%
1	100.97%
1	94.00%
1	66.45%

REGRESSION RANGES:

Y range = C2:C34
X range = B2:B34

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.683761516
R Square	0.46752981
Adjusted R Square	0.450353352
Standard Error	0.211071619
Observations	33

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	1.212649759	1.212649759	27.21922163	1.152E-05
Residual	31	1.38108808	0.044551228		
Total	32	2.593737839			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	0.167	0.045	3.708	0.000817	0.075	0.259
X Variable 1	0.407	0.078	5.217	0.000012	0.248	0.566

40.7% (above coefficients expressed as percentages) 24.8% 56.6%

Here 40.7% is our estimate of the extra percentage cost-per-voter increase for counties switching to touchscreen systems.
The 95%-confidence interval for this estimated extra-increase has a lower bound of 25% and upper bound of 57%.
The low p-value (0.000012) indicates very high confidence for our finding that TouchScreen has a higher cost increase.

Average Change in Expenditures per 1000 voter

16.68% Post 2002 Optical Scan Counties
57.35% Post 2002 Touchscreen Counties
40.66% Difference (same as "X Variable 1" Coefficient above in cell E22).