

Who Really Voted for Obama in 2008 and 2012?

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The authors use simple bilinear regression on statewide exit poll data to gauge the popularity of President Barack Obama in election years 2008 and 2012 among voters in four age groups (18 to 29 year-olds; 30 to 44 year-olds; 45 to 64 year-olds; and voters 65 or older) and three income groups (under \$50,000; \$50,000 to \$100,000; and voters earning more than \$100,000). While there was little change in his popularity among voters in all age groups, Obama's popularity with the poorest group of voters (earning less than \$50,000) took a noticeable hit in 2012.

Keywords: Regression; t-tests; presidential elections

Did President Barack Obama's popularity among different age and income groups change between 2008 and 2012? Exit poll data on four different age groups (18 to 29 years of age; 30 to 44; 45 to 64; and 65 and over) as well as three different categories of family income (under \$50,000; between \$50,000 and \$99,999; and \$100,000 or more) were collected from Obama voters in both election years (www.cnn.com/ELECTION/2008/results/polls.main and www.cnn.com/election/2012/results/race/president#exit_polls). The purpose of this paper is to show how simple bilinear regression on these exit poll data in conjunction with the actual percentage of each state's Obama voters can be used to highlight Obama's relative attractiveness across age and income groups in the 2008 and 2012 presidential elections.

Methodology

Tables 1 and 2 show the results of statewide exit polls in 31 states in 2008 and for the same states in 2012.¹ Figure 1 shows a scatterplot of the actual percentage of Obama votes versus the percentage of Obama voters between 18 and 29 years of age, in both election years.

Each point represents a state whose actual percentage of Obama voters can be read along the vertical axis and percentage of Obama voters between 18 and 29 years of age (based on exit polls) can be read along the horizontal axis.² What is the relationship between Obama's actual percentage of the total vote [*Obama(actual)*] and his support among voters under 30 years of age [*Obama(18-29)*], on average?

The estimated regression equation that summarizes this relationship would be given by:

$$(1) \quad Obama(actual) = b_0 + b_1 Obama(18-29)$$

If, in all states, the percentage of Obama voters (18 to 29 years of age) were equal to the actual percentage of all voters who cast their ballots for Obama, then all points (in either panel of Figure 1) would fall on a 45-degree line, given by:

$$(2) \quad Obama(actual) = Obama(18-29)$$

The regression equation and the 45-degree line intersect at a single point, where *Obama(actual)* is equal to *Obama(18-29)*, hereafter called the critical point x^* ,³ where

$$(3) \quad x^* = \frac{b_0}{1 - b_1} .$$

If x^* is, say, equal to 21.1 (as it is for 18-to-29 year-olds in the 2008 election), then the regression analysis predicts that, on average, in states where Obama received 21.1 percent or more of the state's total vote, he was more popular with 18-to-29 year-olds than he was with the state's general population. In fact, Barack Obama received no less than (Alabama's) 50 percent of the vote in any state in 2008 (see Table 1), a result that underscores his strong popularity among voters under 30 years of age.⁴

Table 1: President Barack Obama’s Support in 2008 (percentage of vote)

State	Overall Popular Vote (percent)	Exit Poll Results						
		Age (years)				Income (thousands of dollars)		
		18-29	30-44	45-64	≥ 65	< 50	50-100	> 100
Alabama	39	50	41	36	22	48	36	24
Arizona	45	52	46	42	43	51	40	45
California	61	76	59	60	48	66	61	57
Colorado	54	.	53	56	44	57	51	56
Connecticut	61	79	61	53	.	72	60	55
Florida	51	61	49	52	45	62	44	44
Illinois	62	71	66	54	55	74	55	54
Indiana	50	63	47	49	37	56	46	45
Iowa	54	61	48	54	49	61	50	46
Kansas	42	51	37	44	34	48	39	37
Maine	58	67	59	58	45	62	55	55
Maryland	62	70	65	55	.	69	63	55
Massachusetts	62	78	57	59	.	74	63	50
Michigan	57	68	56	52	53	61	56	47
Minnesota	54	65	49	51	55	59	53	49
Mississippi	43	56	46	40	.	59	26	24
Missouri	49	59	49	47	43	57	44	46
Montana	47	61	36	47	45	56	41	42
Nevada	55	67	60	51	42	64	54	49
New Hampshire	54	61	51	56	56	59	53	56
New Jersey	57	67	59	55	47	67	55	52
New Mexico	57	71	52	54	53	65	52	53
New York	63	76	61	59	55	73	61	56
North Carolina	50	74	48	43	43	57	43	44
Ohio	52	61	51	53	44	59	52	42
Oregon	57	.	61	55	56	59	55	61
Pennsylvania	55	65	51	55	49	62	52	52
Vermont	68	81	60	68	69	70	67	66
Virginia	53	60	51	51	46	62	52	46
Washington	58	.	56	58	51	64	56	54
Wisconsin	56	64	54	57	50	65	52	48

Source: www.cnn.com/ELECTION/2008/results/polls.main

Table 2: President Barack Obama’s Support in 2012 (percentage of vote)

State	Overall Popular Vote (percent)	Exit Poll Results						
		Age (years)				Income (thousands of dollars)		
		18-29	30-44	45-64	≥ 65	< 50	50-100	> 100
Alabama	38	48	44	35	31	45	30	30
Arizona	44	63	37	38	29	47	41	43
California	60	71	60	53	48	64	59	52
Colorado	51	.	50	51	42	60	50	46
Connecticut	58	66	55	58	54	73	54	53
Florida	50	66	52	48	41	59	44	43
Illinois	57	68	57	54	57	72	57	44
Indiana	44	46	48	44	34	54	42	34
Iowa	52	56	52	52	50	59	50	45
Kansas	38	41	39	36	38	43	42	25
Maine	56	63	56	57	55	59	54	57
Maryland	62	70	64	56	64	79	61	51
Massachusetts	61	73	56	59	56	70	58	54
Michigan	54	63	56	51	48	62	49	48
Minnesota	53	63	50	49	52	59	50	46
Mississippi	44	55	44	45	22	54	30	23
Missouri	44	58	42	44	33	52	39	38
Montana	42	46	38	43	40	45	39	40
Nevada	52	68	54	49	44	68	47	37
New Hampshire	52	62	48	49	55	60	51	47
New Jersey	58	63	59	60	48	63	55	61
New Mexico	53	64	49	49	53	59	49	42
New York	62	72	61	61	59	74	60	51
North Carolina	48	67	51	47	35	55	45	44
Ohio	51	63	51	47	44	59	47	40
Oregon	54	.	51	52	53	59	45	64
Pennsylvania	52	63	55	48	43	67	41	45
Vermont	67	72	74	68	51	68	68	67
Virginia	51	61	54	46	46	60	46	47
Washington	56	66	60	50	51	64	49	59
Wisconsin	53	60	51	51	48	62	49	39

Source: www.cnn.com/election/2012/results/race/president

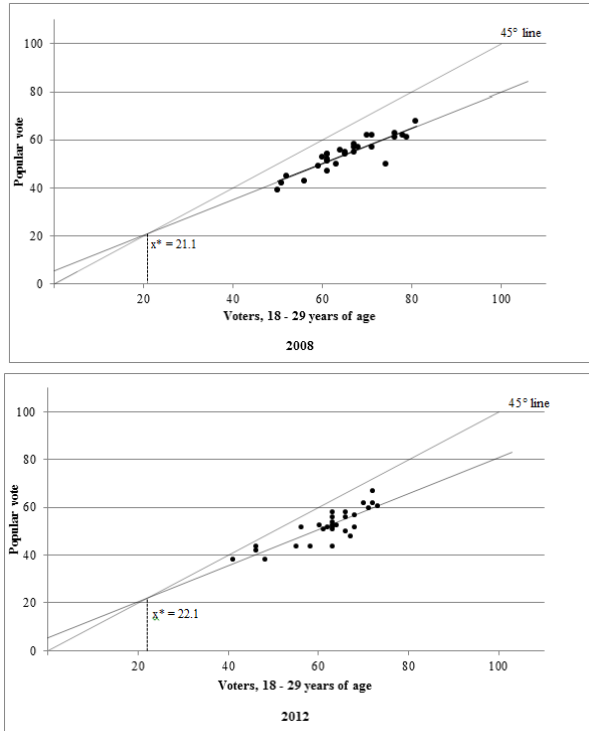


Figure 1: Exit poll results, voters 18 to 29 years of age, by election year

Results

Table 3 summarizes the regression results for all four demographic and three income groups in both 2008 and 2012. Scatterplots appear in Figures 1 through 7. The last column of Table 3 gives the critical points of intersection between the regression line and a 45-degree line.⁵ Obama was most popular with 18-to-29 year-olds and voters with incomes under \$50,000. The critical value of only 4.5 in the last column of Table 3 for Obama voters in 2008 with incomes under \$50,000 shows how very popular he was with the poorest voters. Obama was least popular with voters over 44 years of age and voters with family incomes of at least \$50,000 in both election years. Among voters 65 years of age or older, he was more popular than the general electorate (i.e., his actual vote percentage exceeded 64.7 percent in 2008 and 61.0 percent in 2012) in just one state in 2008 (Vermont) and one state in 2012 (Maryland). Among voters from families earning more than \$100,000 a year, he was more popular than the general electorate (i.e., his actual vote percentage exceeded 64.4 percent in 2008 and 60.2 percent in 2012) in just one state in 2008 (Vermont) and in only three states in 2012 (New Jersey, Oregon and Vermont).

The most interesting result in Table 3 is the much higher critical point for 2012 voters from families with incomes under \$50,000 ($x^* = 31.1$ in 2012 compared with $x^* = 4.5$ in 2008). The precipitous drop in Obama's popularity among the poorest voters might reflect their dissatisfaction with first term policies that failed to insulate them from the worst effects of the Great Recession. The poor were no better off in 2012 than they were when President Obama took office in 2008.⁶ And, judging from poverty rates in the years leading up to the 2012 election, the poorest voters were much worse off.⁷

Table 3: Summary of Regression Results, 2008 and 2012

Variable	Constant (b_0)	Slope (b_1)	R ²	Critical Point, x*
2008				
Age (years)				
<i>18-29</i>	5.4087 (1.10) ¹	0.7442 (9.99) ²	0.797	21.1
<i>30-44</i>	13.3854 (3.12)	0.7755 (9.66)	0.763	59.6
<i>45-64</i>	6.3946 (1.53)	0.9161 (11.55)	0.822	76.2
<i>≥ 65</i>	24.7951 (6.58)	0.6165 (7.87)	0.713	64.7
Income (thousands of dollars)				
<i>< 50</i>	0.5825 (0.11)	0.8696 (10.61)	0.795	4.5
<i>50-100</i>	18.1900 (7.59)	0.7071 (15.31)	0.890	62.1
<i>> 100</i>	23.3200 (6.85)	0.6378 (9.28)	0.748	64.4
2012				
Age (years)				
<i>18-29</i>	5.4520 (0.97)	0.7534 (8.38)	0.722	22.1
<i>30-44</i>	9.7547 (2.68)	0.8125 (11.78)	0.827	52.0
<i>45-64</i>	6.3705 (2.09)	0.9158 (15.20)	0.885	75.7
<i>≥ 65</i>	25.2054 (6.87)	0.5868 (7.51)	0.660	61.0
Income (thousands of dollars)				
<i>< 50</i>	8.8108 (2.08)	0.7171 (10.36)	0.787	31.1
<i>50-100</i>	15.5743 (5.16)	0.7556 (12.30)	0.839	63.7
<i>> 100</i>	26.9096 (7.70)	0.5532 (7.40)	0.654	60.2

¹Numbers in parentheses are t-values.

²All slope coefficients are significant at better than the 0.001 level.

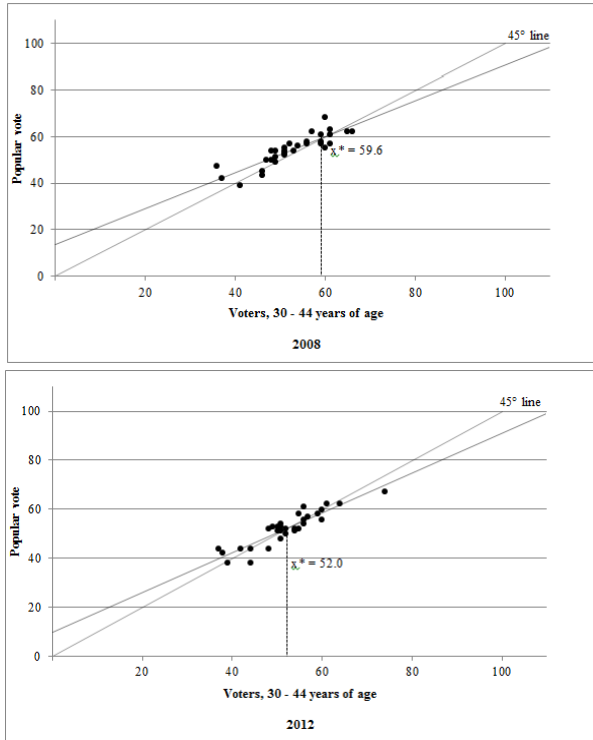


Figure 2: Exit poll results, voters 30 to 44 years of age, by election year

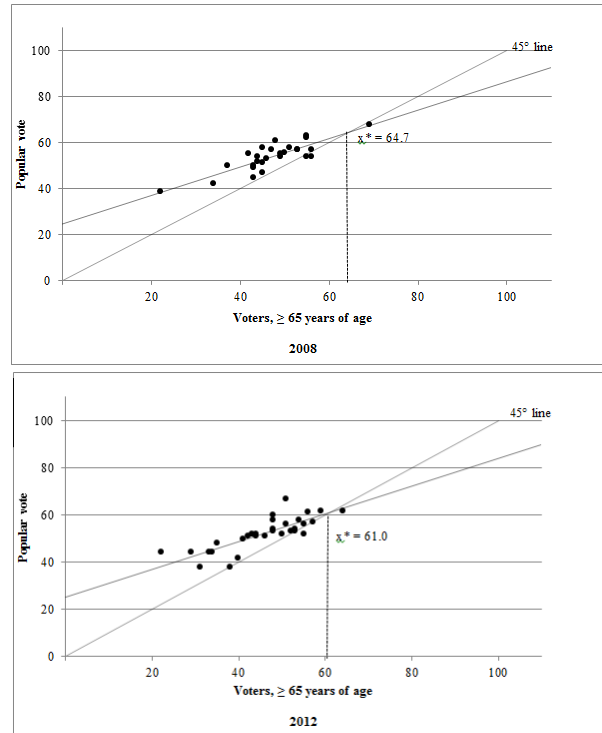


Figure 4: Exit poll results, voters 65 years of age and older, by election year

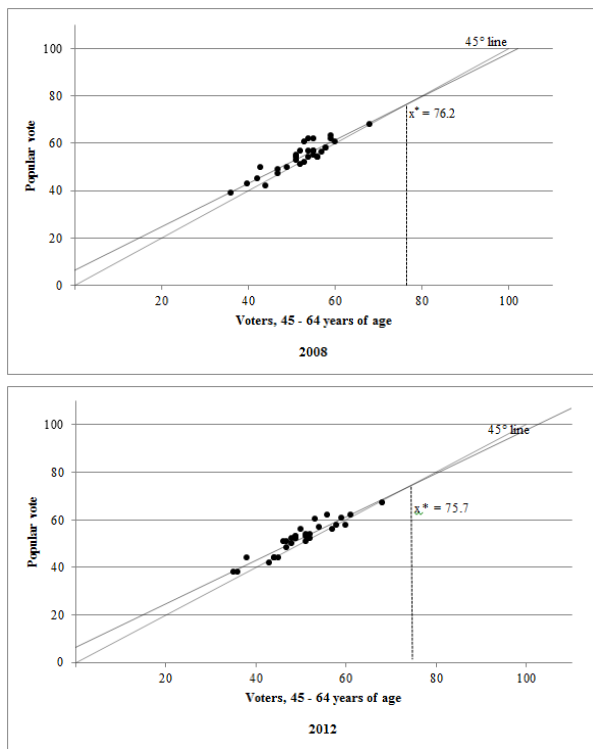


Figure 3: Exit poll results, voters 45 to 64 years of age, by election year

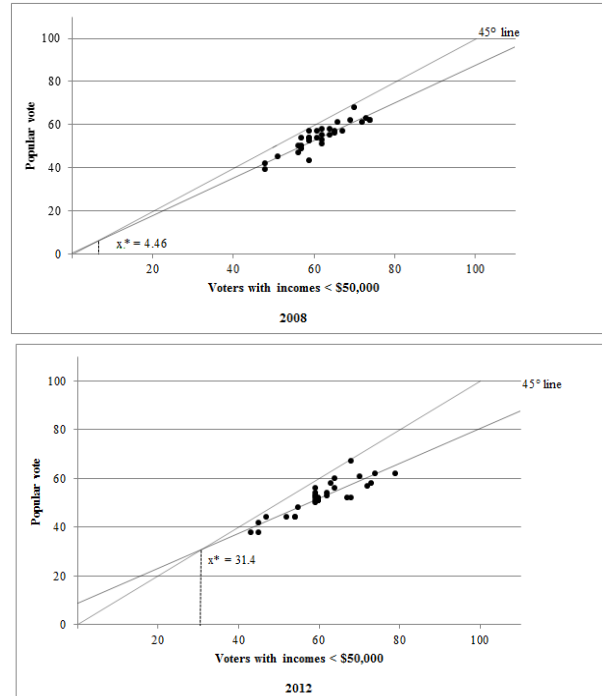


Figure 5: Exit poll results, voters with incomes less than \$50,000, by election year

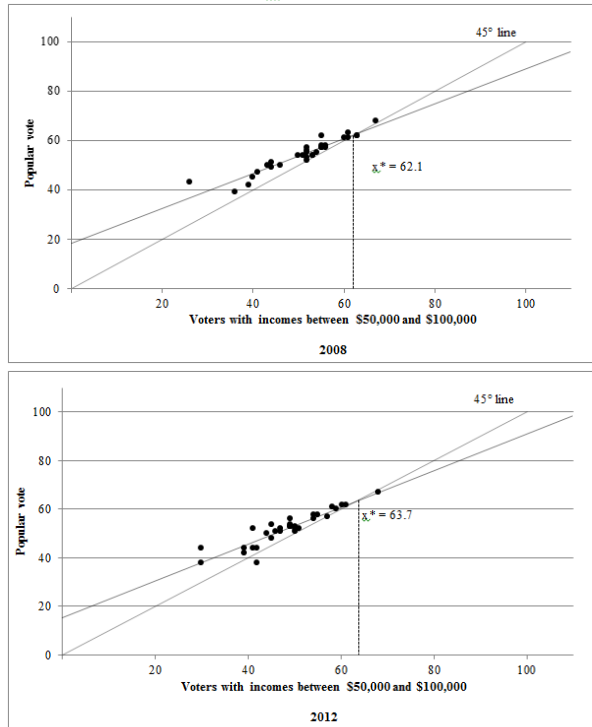


Figure 6: Exit poll results, voters with incomes between \$50,000 and \$100,000, by election year

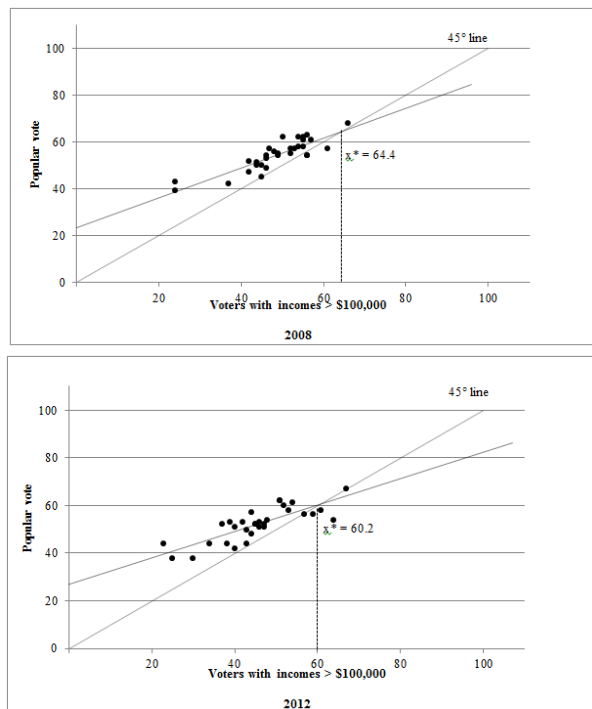


Figure 7: Exit poll results, voters with incomes greater than \$100,000, by election year

Concluding Remarks

Regression analysis on election exit poll data can be used to gauge a candidate's relative popularity among different demographic and socioeconomic groups.

In 2008, the youngest and poorest voters played a decisive role in electing the first-ever African-American U.S. President. For voters over 44 years of age and voters from families earning more than \$50,000, Obama's support was no greater than (and, in some instances, substantially less than) his support from all voters. And, in 2012, although Obama enjoyed continued strong support from the youngest group of voters, his popularity among the poorest voters clearly had waned.

References

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Footnotes

1. In 2012, CNN did not (unlike four years earlier) report the detailed results of a statewide exit poll in each of the 50 states. Edison Research, the exclusive provider of the National Election Exit Polls to major U.S. television news networks, including CNN, conducted a detailed statewide exit poll (by age group and income group) in just 31 of the states in 2012. These same 31 states are examined in this paper four years earlier.
2. In 2008, CNN did not report the breakdown between Obama and John McCain, his Republican opponent, for 18-29 year-olds in the states of Colorado, Oregon and Washington. (In 2012, there was again no exit poll data on 18-29 year-olds in the states of Colorado and Oregon.) There were observations on all 31 states for 30-44 and 45-64 year-olds. Among voters 65 years of age and over there were missing observations in 2008 on Obama for Connecticut, Maryland, Massachusetts and Mississippi, but no missing observations for this age group in 2012. Insofar as the three income groups were concerned, the exit poll data on Obama voters was complete for all 31 states both years.
3. Setting equation (1) equal to equation (2) and solving for *Obama(18-29)*, that is, the point of intersection between the regression line and the 45-degree line yields a critical value for *Obama(18-29)* equal to $\frac{b_0}{1-b_1}$, hereafter x^* . An analysis of all 50 states in 2008 appears in Chong et al. (2009).
4. Figure 1 shows that in all 28 states, Obama's percentage of the vote among those under 30 years of age exceeded his percentage of the actual vote among all voters, that is, all observations lie below the 45-degree line.
5. A series of paired *t*-tests across the 31 states between Obama's actual percentage of the state's total vote and the state's corresponding Obama support in 2008 [2012] for each of the four age groups was significant for 18-29 year-olds ($p < .001$ [$p < .001$], in Obama's favor); significant for 30-44 year-olds in 2008, but not significant in 2012 ($p = .028$ in John McCain's favor [$p = .957$]); significant for 45-64 year-olds ($p < .001$, in McCain's favor [$p < .001$, in Mitt Romney's favor]); and significant for voters 65 years of age or older ($p < .001$, again in McCain's favor [$p < .001$, again in Romney's favor]). All three paired *t*-tests involving income groups were statistically significant ($p < .001$ [$p < .001$]), with only the poorest income group (i.e., families earning less than \$50,000) favoring Obama in 2008 and again in 2012.
6. According to the U.S. Census Bureau (2013), the poverty rates in the four years prior to the 2012 election were 13.2 percent (2008), 14.3 percent (2009), 15.3 percent (2010), and 15.9 percent (2011).
7. A paired *t*-test involving all three income groups between 2008 and 2012 showed that Obama lost support among voters in the poorest income group ($p = .047$), as well as among voters with incomes \$50,000 to \$100,000 ($p < .001$) and voters with incomes greater than \$100,000 ($p < .01$).