VOTING PATTERNS AND THE DRUG EPIDEMIC

TWO SLOW-MOVING STORIES

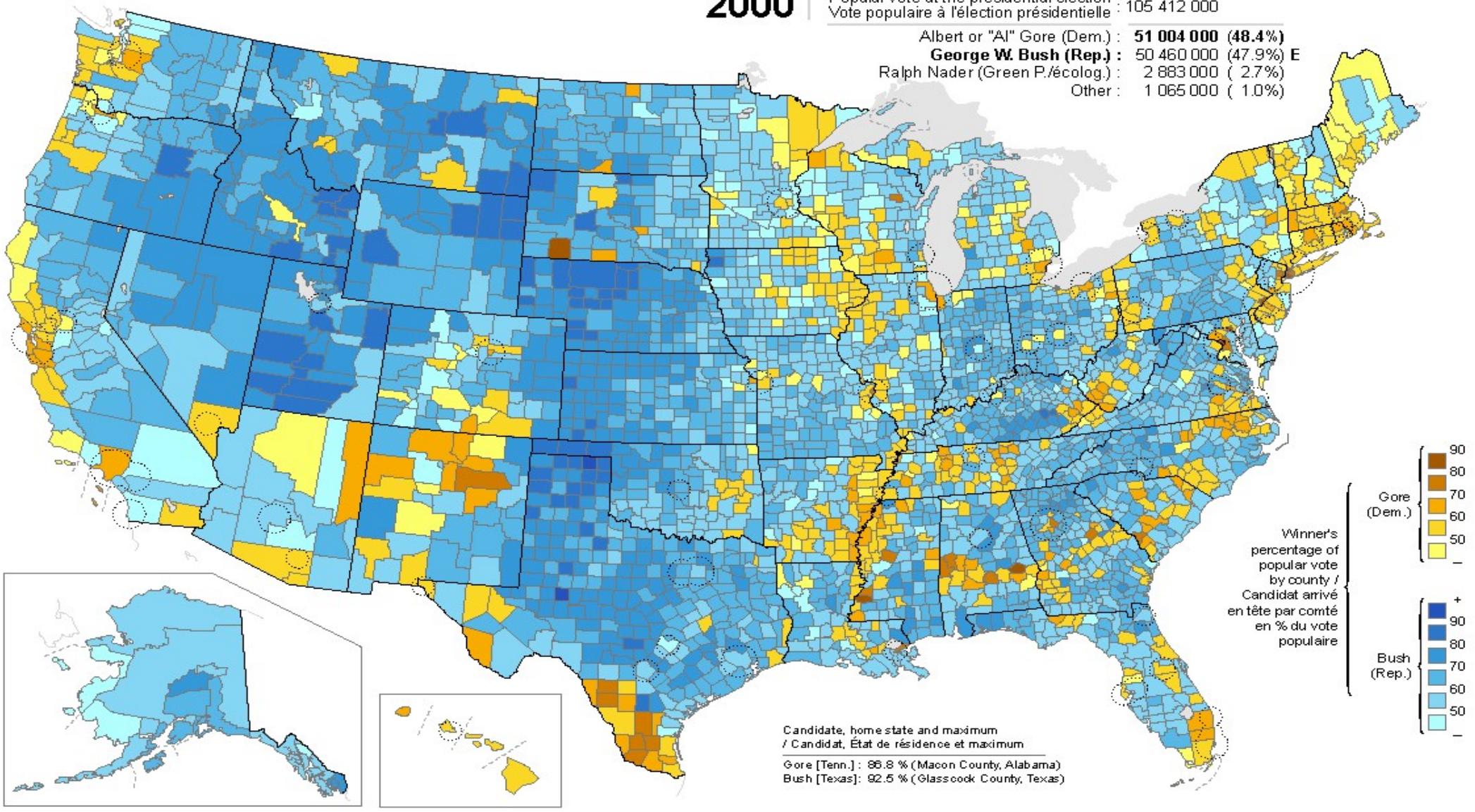
- Educational and regional polarization
  - Twenty years ago, the less-educated and more rural white voters were more likely to vote Democratic than those who were more educated and suburban.
  - In recent elections, the pattern has been completely inverted.
  - In 2000, the Republicans had an 11% advantage among white college-graduates in party identification, versus a 6% advantage among white non-college graduates.
  - In 2020, they had a 13% deficit among white college graduates and a 25% advantage among non-college graduates.
  - https://news.gallup.com/poll/248525/non-college-whites-affinity-gop-trump.aspx

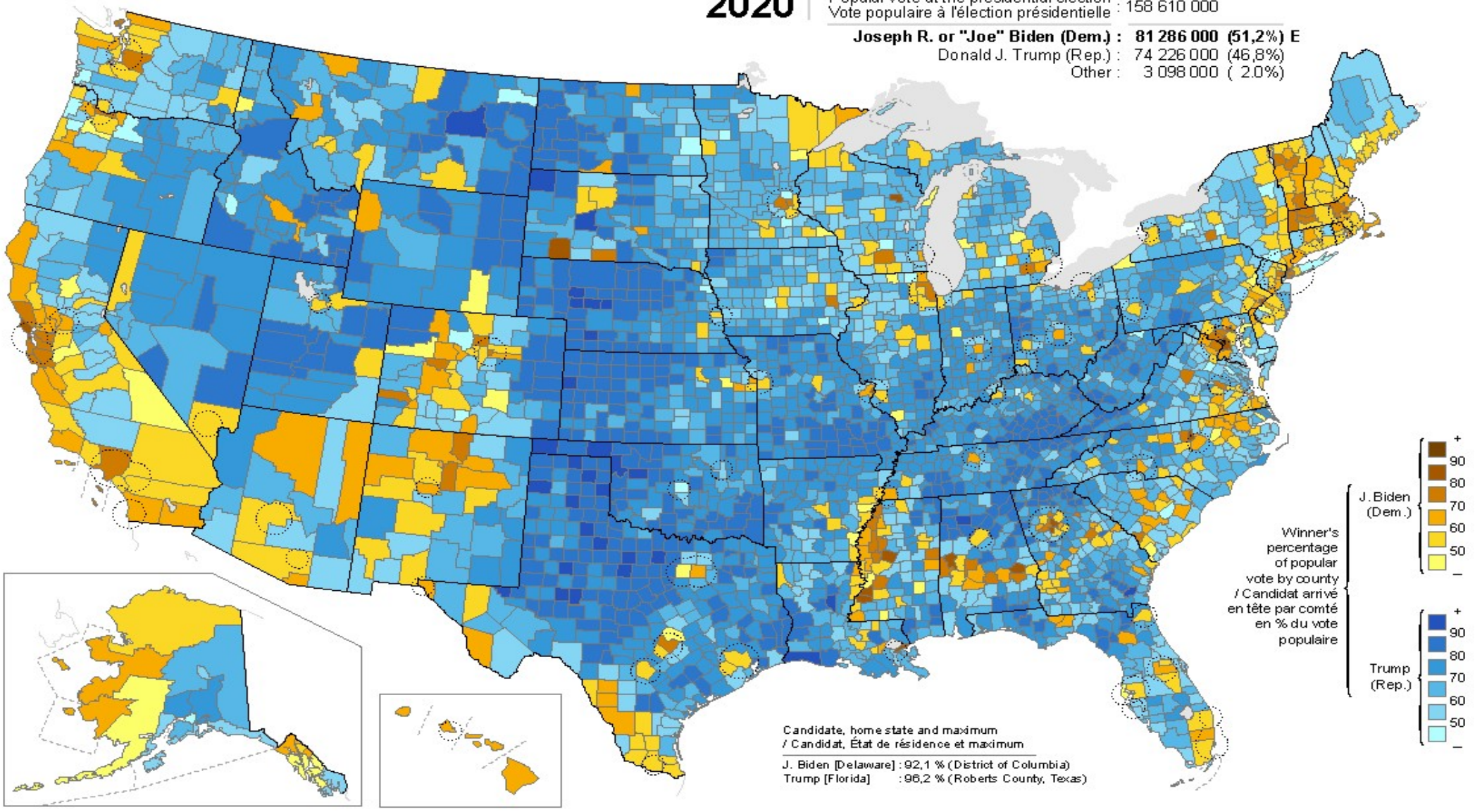
REGIONAL REALIGNMENT RURAL VS. SUBURBAN

The following two charts are taken from:

http://geoelections.free.fr/USA/elec_comtes/2000.htm

http://geoelections.free.fr/USA/elec_comtes/2020.htm

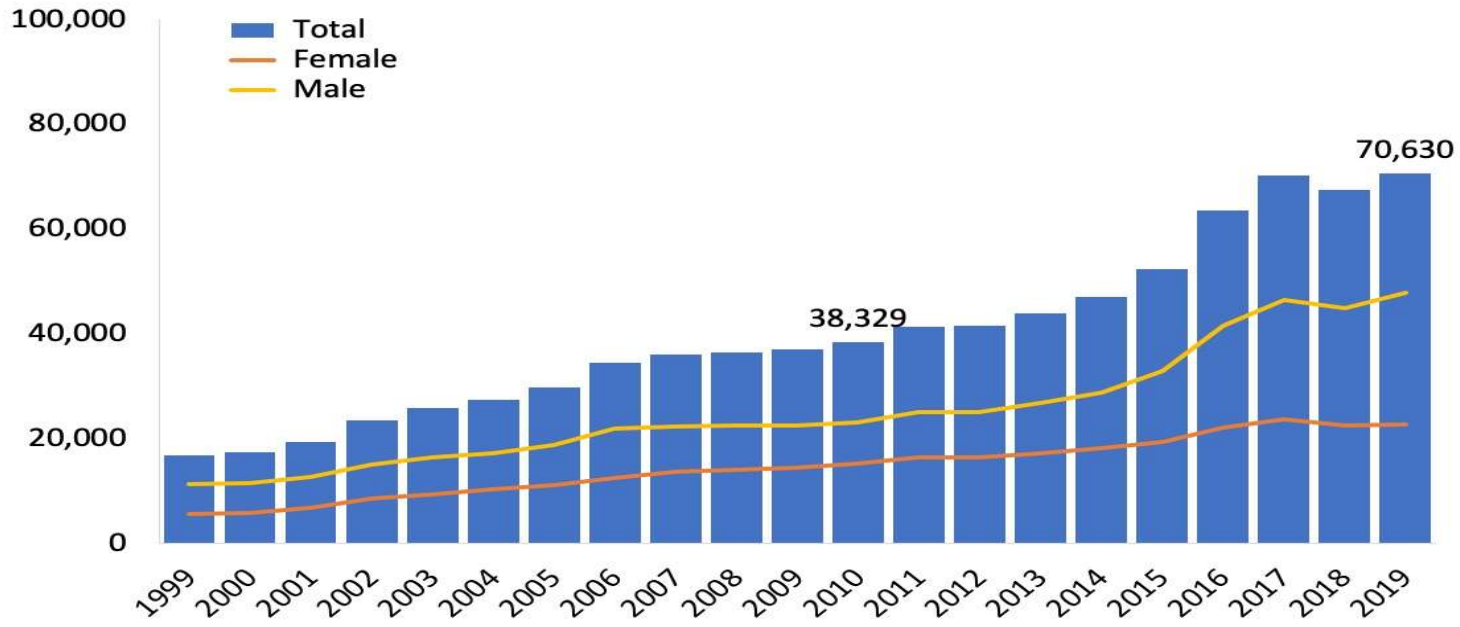

2000
Popular vote at the presidential election
Vote populaire à l'élection présidentielle : 105 412 000
Albert or "Al" Gore (Dem.) : 51 004 000 (48.4%)
George W. Bush (Rep.) : 50 460 000 (47.9%) E
Ralph Nader (Green P./ecolog.) : 2 883 000 (2.7%)
Other : 1 065 000 (1.0%)
Winner's percentage of popular vote by county / Candidat arrivé en tête par comté en % du vote populaire
Gore (Dem.)
90
80
70
60
50
–
Bush (Rep.)
+
90
80
70
60
50
–
Candidate, home state and maximum
/ Candidat, État de résidence et maximum
Gore [Tenn.] : 86.8 % (Macon County, Alabama)
Bush [Texas]: 92.5 % (Glasscock County, Texas)


2020
Popular vote at the presidential election
Vote populaire à l'élection présidentielle : 158 610 000
Joseph R. or "Joe" Biden (Dem.) : 81 286 000 (51,2%) E
Donald J. Trump (Rep.) : 74 226 000 (46,8%)
Other : 3 098 000 (2.0%)
Winner's percentage of popular vote by county / Candidat arrivé en tête par comté en % du vote populaire
J. Biden (Dem.)
Trump (Rep.)
+
90
80
70
60
50
–
Candidate, home state and maximum
/ Candidat, État de résidence et maximum
J. Biden [Delaware] : 92,1 % (District of Columbia)
Trump [Florida] : 96,2 % (Roberts County, Texas)

THE OPIOID CRISIS – A SLOW-MOVING TRAGEDY

- Another event that has been slowly taking place throughout the country is the tragic increase in the use of opiates and the related rise in overdose deaths.
  - The number of drug-overdose deaths in 2000 was around 20,000.
  - In the most recent 12-month period, the number exceeded 100,000

Figure 1. National Drug-Involved Overdose Deaths*
Number Among All Ages, by Gender, 1999-2019



*Includes deaths with underlying causes of unintentional drug poisoning (X40–X44), suicide drug poisoning (X60–X64), homicide drug poisoning (X85), or drug poisoning of undetermined intent (Y10–Y14), as coded in the International Classification of Diseases, 10th Revision.
Source: Centers for Disease Control and Prevention, National Center for Health Statistics. Multiple Cause of Death 1999-2019 on CDC WONDER Online Database, released 12/2020.

https://www.drugabuse.gov/drug-topics/trends-statistics/overdose-death-rates

QUESTION:
IS THERE ANY CORRELATION?

- Some have opined that there is some relationship between these phenomena.
  - Some arguing that the drug crisis has made people blame government assistance for – in their view – enabling people's addictions.
  - Others argue that loss of employment opportunities has caused both a rise in addictions and in anti-immigration, anti-trade sentiment.

WHAT DO THE DATA SAY?

DATA SOURCES

- https://electionlab.mit.edu/data
  - Contains results for presidential elections by county.

- https://data.cdc.gov/NCHS/NCHS-Drug-Poisoning-Mortality-by-County-United-Sta/pbkm-d27e
  - Contains estimated drug overdose death counts by county for the years 1999-2015

ELECTION DATA

year	state	state_po	county_name	county_fips	office	candidate	party	candidate votes	totalvotes	version	mode
2000	ALABAMA	AL	AUTAUGA	1001	PRESIDENT	AL GORE	DEMOCRAT	4942	17208	20191203	TOTAL
2000	ALABAMA	AL	AUTAUGA	1001	PRESIDENT	GEORGE W. BUSH	REPUBLICAN	11993	17208	20191203	TOTAL
2000	ALABAMA	AL	AUTAUGA	1001	PRESIDENT	RALPH NADER	GREEN	160	17208	20191203	TOTAL
2000	ALABAMA	AL	AUTAUGA	1001	PRESIDENT	OTHER	OTHER	113	17208	20191203	TOTAL
2000	ALABAMA	AL	BALDWIN	1003	PRESIDENT	AL GORE	DEMOCRAT	13997	56480	20191203	TOTAL
2000	ALABAMA	AL	BALDWIN	1003	PRESIDENT	GEORGE W. BUSH	REPUBLICAN	40872	56480	20191203	TOTAL
2000	ALABAMA	AL	BALDWIN	1003	PRESIDENT	RALPH NADER	GREEN	1033	56480	20191203	TOTAL
2000	ALABAMA	AL	BALDWIN	1003	PRESIDENT	OTHER	OTHER	578	56480	20191203	TOTAL

REFINED DATA

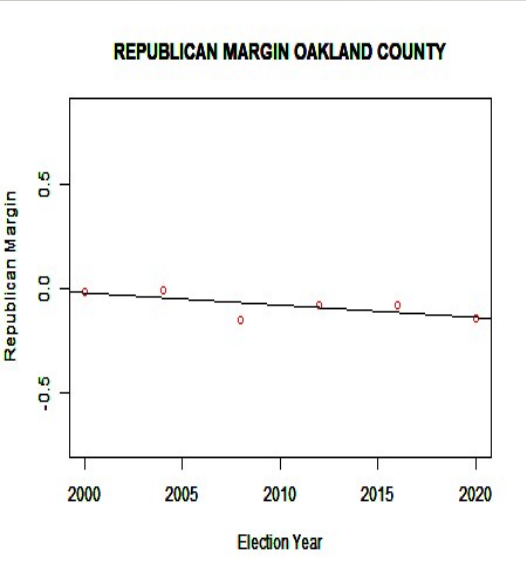
- Kept only data for the two major parties
- Consolidated all years by county
- Calculated the two-party vote margin

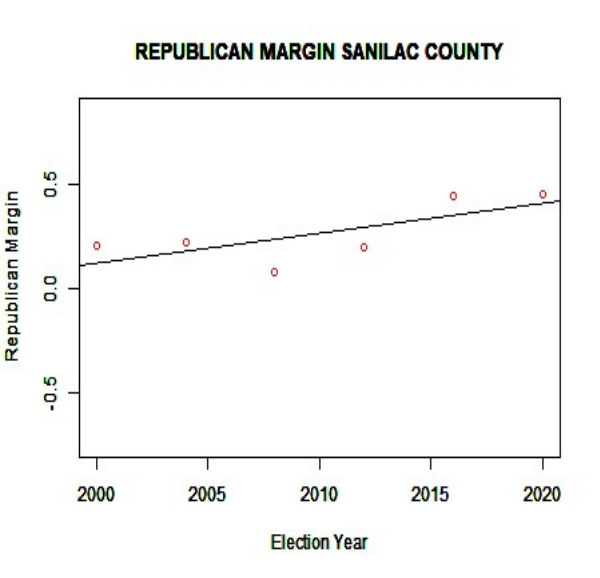
	county_fips	state_po	county_name	2000	2004	2008	2012	2016	2020
1	10001	DE	KENT	0.026758	0.137664	-0.09809	-0.04938	0.048795	-0.04071
2	10003	DE	NEW CASTLE	-0.22983	-0.21993	-0.40621	-0.34067	-0.29496	-0.37085
3	10005	DE	SUSSEX	0.073634	0.21743	0.085775	0.13026	0.219587	0.112468
4	1001	AL	AUTAUGA	0.409751	0.519795	0.478406	0.460304	0.489969	0.444184
5	1003	AL	BALDWIN	0.475832	0.539123	0.514476	0.557688	0.571601	0.537623
6	1005	AL	BARBOUR	-0.00885	0.099007	0.014531	-0.03145	0.055688	0.076631
7	1007	AL	BIBB	0.22011	0.445132	0.458468	0.466746	0.551536	0.57728
8	1009	AL	BLOUNT	0.427864	0.625372	0.695059	0.74094	0.80909	0.800022
9	1011	AL	BULLOCK	-0.40008	-0.36379	-0.48384	-0.528	-0.50743	-0.49859
10	1013	AL	BUTLER	0.066769	0.186074	0.133587	0.075084	0.134563	0.157357
11	1015	AL	CALHOUN	0.167699	0.325554	0.32521	0.319238	0.409974	0.390032
12	1017	AL	CHAMBERS	0.035575	0.17457	0.084782	0.051673	0.148129	0.156242
13	1019	AL	CHEROKEE	0.083983	0.318599	0.512263	0.549545	0.690021	0.728315

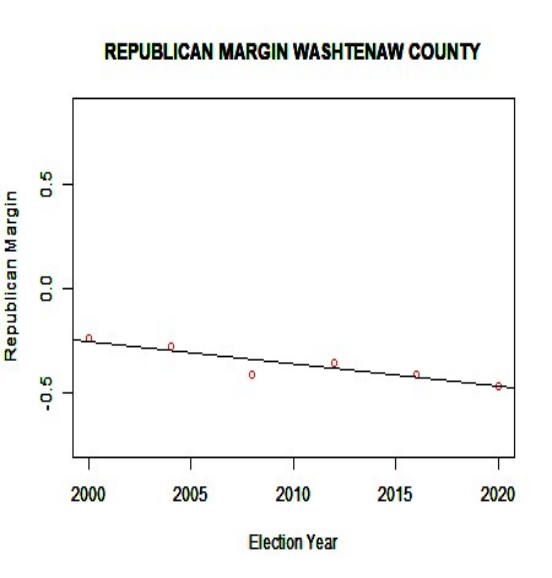
REGRESSION – TWO PARTY VOTE BY YEAR

- Elections are very "noisy".
- Many things affect people's vote.
- We're looking for the general trend.
- We used regression to find that.

Examples of Regression – Republican Margin by Year





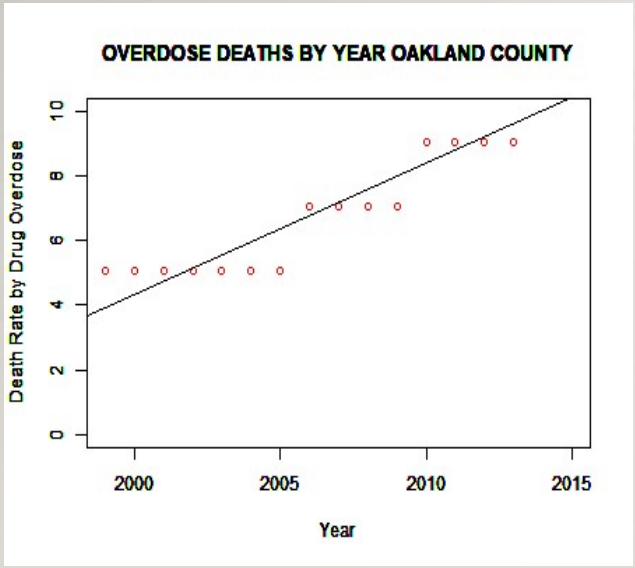


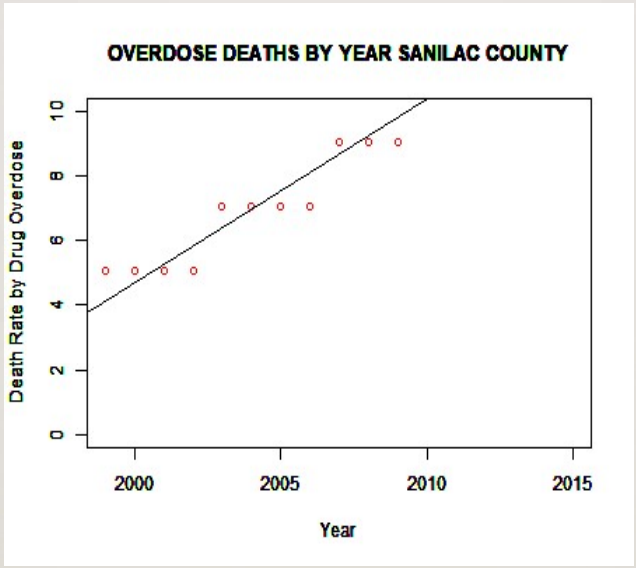
The y-axis represents the Republican margin (Republican votes – Democratic votes) divided by total votes.

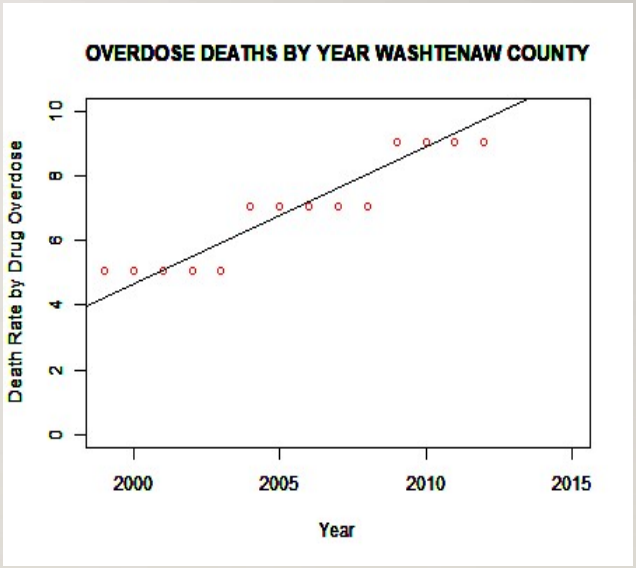
OVERDOSE DEATH DATA

FIPS	Year	State	ST	FIPS State	County	Population	Estimated Age-adjusted Death Rate, 16 Categories (in ranges)
8014	2012	Colorado	CO	8	Broomfield County, CO	58949	12.1-14
41069	2013	Oregon	OR	41	Wheeler County, OR	1390	14.1-16
9011	2015	Connecticut	CT	9	New London County, CT	271863	18.1-20
36117	2012	New York	NY	36	Wayne County, NY	93017	4.1-6
48263	2015	Texas	TX	48	Kent County, TX	764	4.1-6
4012	2013	Arizona	AZ	4	La Paz County, AZ	20377	>30
26073	2011	Michigan	MI	26	Isabella County, MI	70656	8.1-10
5011	2006	Arkansas	AR	5	Bradley County, AR	11778	2.1-4
27113	2012	Minnesota	MN	27	Pennington County, MN	14094	10.1-12
13291	2014	Georgia	GA	13	Union County, GA	21952	18.1-20
13295	2011	Georgia	GA	13	Walker County, GA	68617	14.1-16

OVERDOSE DEATH DATA- SAMPLE PLOTS AND REGRESSION LINES



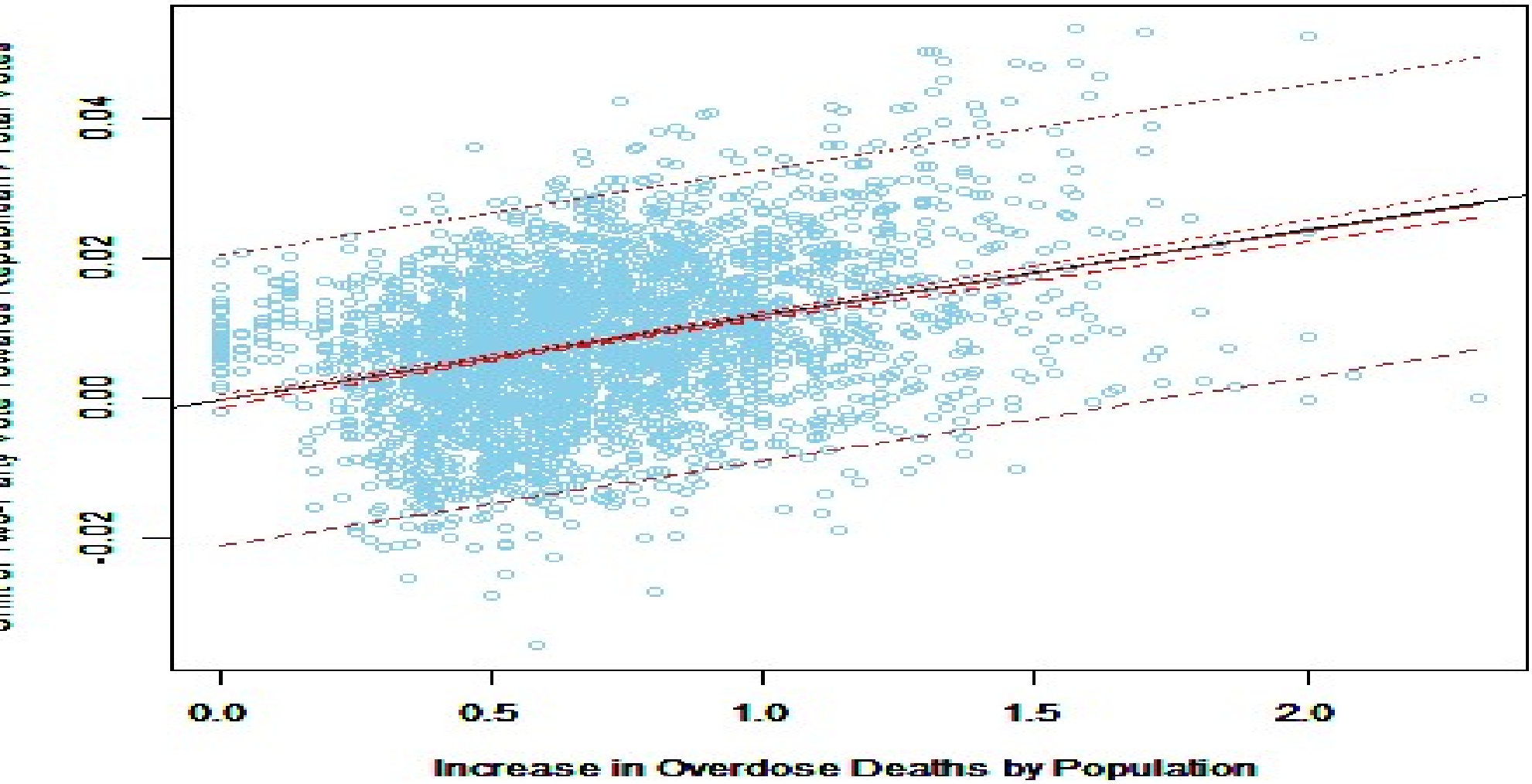


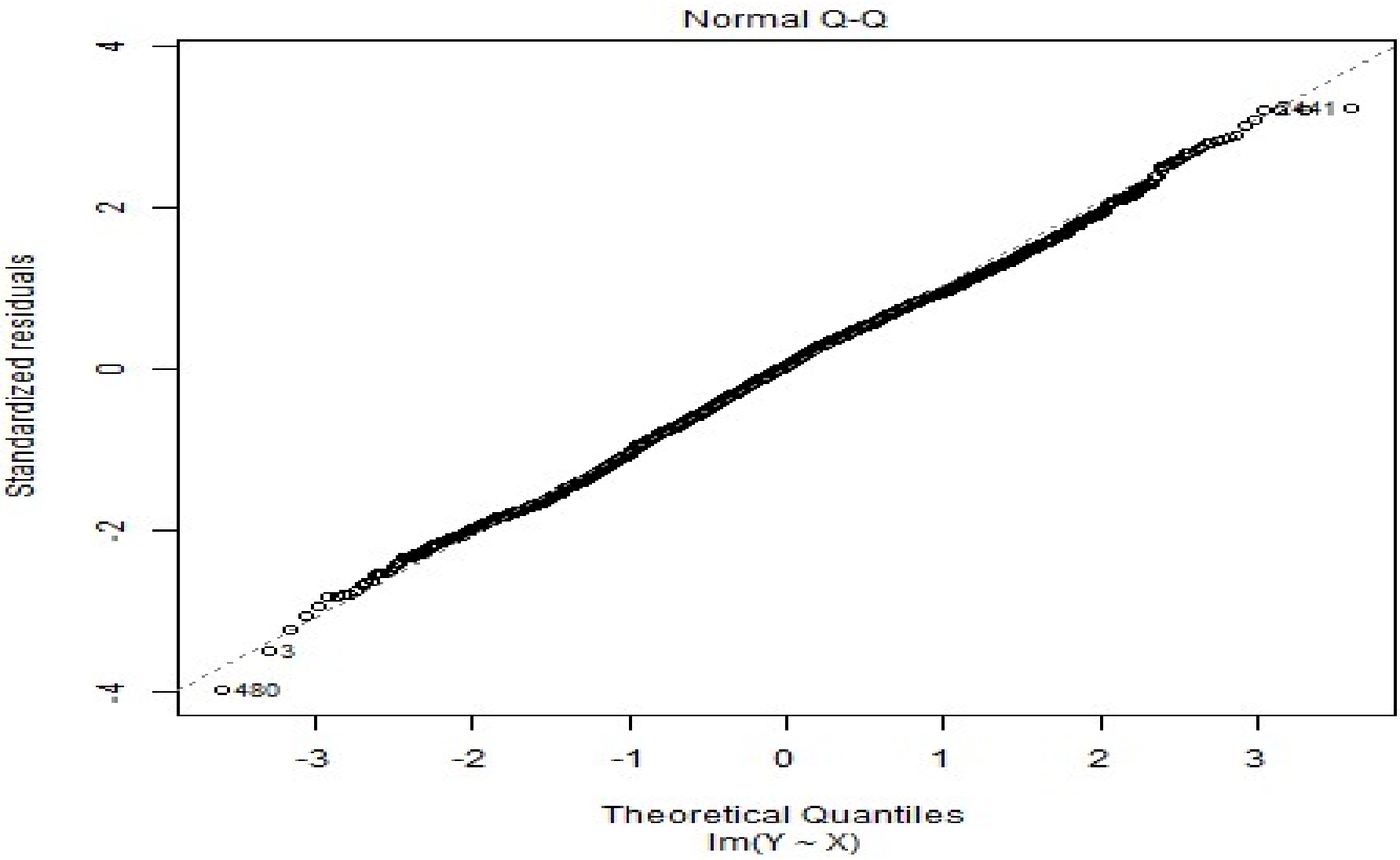


GRAPHING THE CORRELATION

- Combine both data using county FIPS code (every county has a unique numeric code)
- Regress the rate of vote shift toward Republicans on the rate of increase in overdose deaths.

RESULTS


-0.02
0.00
0.02
0.04
0.0
0.5
1.0
1.5
2.0
Increase in Overdose Deaths by Population


Normal Q-Q
Standardized residuals
4
2
0
-2
-4
-3
-2
-1
0
1
2
3
Theoretical Quantiles
lm(Y ~ X)
480
3

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function | Addins | Project: (None)

project.Rmd | summary.Rmd* | Homework 4.Rmd | OD | Untitled1* | ODtest

Knit on Save | Knit | Run

```
Warning in predict.lm(LM, int = "p") :
  predictions on current data refer to _future_ responses

null device
          1
null device
          1
```

123

124 ```{r echo=FALSE}
125 summary(LM)
126
127 ```

```
Call:
lm(formula = Y ~ X)

Residuals:
      Min        1Q    Median        3Q       Max
-0.042295 -0.007293  0.000461  0.007458  0.034360

Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept) -0.0003993  0.0004628  -0.863    0.388
X            0.0121981  0.0006084  20.049   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.01065 on 3071 degrees of freedom
Multiple R-squared:  0.1157,    Adjusted R-squared:  0.1155
F-statistic:   402 on 1 and 3071 DF,  p-value: < 2.2e-16
```

15:1 | Chunk 2 | R Markdown

Console

Environment | History | Connections | Tutorial

Import Dataset | 966 MiB | List

R | Global Environment

PI	num [1:3073, 1:3] -0.000399 -0.000399 -0.000399 …
Pres	63747 obs. of 7 variables
$ year	: int 2012 2012 2012 2016 2016 2016 2020 2020 2020 …
$ county_fips	: int 48301 48301 48301 48301 48301 48301 48301 483…
$ party	: chr "DEMOCRAT" "OTHER" "REPUBLICAN" "DEMOCRAT" ...
$ county_name	: chr "LOVING" "LOVING" "LOVING" "LOVING" ...
$ state_po	: chr "TX" "TX" "TX" "TX" ...
$ totalvotes	: int 64 64 64 65 65 65 66 66 66 66 ...
$ candidatevotes	: int 9 1 54 4 3 58 4 0 2 0 ...
Pres2000	3152 obs. of 5 variables
$ county_fips	: int 10001 10003 10005 1001 1003 1005 1007 1009 1011 …
$ year	: int 2000 2000 2000 2000 2000 2000 2000 2000 2000 200…
$ state_po	: chr "DE" "DE" "DE" "AL" ...
$ county_name	: chr "KENT" "NEW CASTLE" "SUSSEX" "AUTAUGA" ...
$ Rmargin	: int 1291 -48952 4881 7051 26875 -92 1563 7690 -1962 …
Pres2004	3154 obs. of 5 variables
Pres2008	3154 obs. of 5 variables
Pres2012	3154 obs. of 5 variables
Pres2016	3153 obs. of 5 variables
Pres2020	3153 obs. of 5 variables
$ county_fips	: int 10001 10003 10005 1001 1003 1005 1007 1009 1011 …
$ year	: int 2020 2020 2020 2020 2020 2020 2020 2020 2020 202…
$ state_po	: chr "DE" "DE" "DE" "AL" ...
$ county_name	: chr "KENT" "NEW CASTLE" "SUSSEX" "AUTAUGA" ...
$ Rmargin	: int -3543 -106670 14548 12335 58966 806 5539 22071 -…
Pres2Party	41812 obs. of 12 variables
$ year	: int 2000 2000 2000 2000 2000 2000 2000 2000 2000 …
$ state	: chr "ALABAMA" "ALABAMA" "ALABAMA" "ALABAMA" ...
$ state_po	: chr "AL" "AL" "AL" "AL" ...

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CONCLUSION

- A strong correlation seems to exist.
- Correlation does not equal causation
- Is one causing the other, or are they both caused by something else?