Investigating Racial & Partisan Disparities in Access to Polling Places across the South and Midwest

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1 Introduction

Our Democracy cannot function if voters cannot make their voices heard. Voters cannot make their voices heard without ready access to a polling place. Thus, if certain voters are being targeted and stripped of access, our democracy will feel the effects. Unfortunately, this country has had a troubled relationship with suffrage in the past, with certain states utilizing discriminatory laws to block access to the voting booth for minorities and other groups. Out of this past has come certain legislation, like the Voting Rights Act, mean to protect voters and make sure that their voices are heard. This legislation, and our system of running elections, is meant to give equal opportunity to all in casting their votes.

Hypotheses & Data

Is every voter given the same opportunity though? Or do certain groups still face discrimination when polling places are allocated? Given recent court decisions like *Shelby County v. Holder* and the intensely partisan environment we live in, this paper hypothesizes that racial biases and partisan biases exist across states that reduce access to polling places specifically for non-white populations and more Democratic-leaning areas. Furthermore, these biases are expected to be a nationwide issue, independent of regional differences. Demographic data from the Census Bureau's American Community Survey, data on polling place locations in 15 states in the South

and Midwest, and the 2016 Presidential Election results are all pulled together to answer these questions.

Summary of Results

Overall, the results indicate that there is not a relationship between race and polling place access, nor between partisanship and access, across the 15 states examined. Certain factors, like increasing population density, are associated with decreased access to polling places. However, it is clear that disparities in access to polling places do exist in several states even if not all of them, and that these disparities may have a racial or partisan dimension. Some disparities even generalize to a regional level. Thus, while discriminatory polling place allocation is not a nationwide issue, this does not mean that further investigation is not needed in certain states.

2 Theory & Previous Literature

Voting as Costly

Voting is an essential function of democracy, and ideally every citizen would be able to vote easily. However, certain barriers may discourage or prevent voting. Costs associated with travel, registering to vote, waiting in line, etc. (Downs, 1957), all create a barrier for some voters. Studies conducted in different parts of the country have found that differences in the distance to polling places can affect turnout (Haspel & Knotts, 2005), as well as the consolidation of polling places (Brady & McNulty, 2011). The methods used by these studies to measure access vary, from examining distance to polling places for individual voters, to looking at the consolidation of polling places in a geographic area. Overall, these studies seem to indicate that access to a polling place can affect turnout. If access to polling places truly does have an impact on voters decisions to turnout, then policy choices that restrict access are quite problematic.

Concerns over Discrimination

This exact concern is common in the popular press, especially since the 2013 Supreme Court decision *Shelby County vs Holder*. This decision removed the requirement of preclearance from states and jurisdictions seeking to make changes to voting and redistricting. The requirement was a core part of the Voting Rights Act meant to protect minorities from electoral discrimination. Organizations like Pew and news media organizations have sounded the alarm on voter suppression, especially targeting minorities, in the wake of polling place closures and other changes since *Shelby* (Vasilogambros, 2018; Nichols, 2018). With all these concerns in mind, political scientists have grown increasingly interested in investigating these claims.

Past Findings on Disparities in Access & Discrimination

Results, unfortunately, are mixed, and a variety of methods have been used to investigate these questions. A nationwide analysis of the 2016 election using cellphone location data around polling places found that, "residents of entirely-black neighborhoods waited 29% longer to vote and were 74% more likely to spend more than 30 minutes at their polling place" (Haggag et al., 2019). Furthermore, an analysis of the different travel times for voters in a midwestern county found that the dominant party often had shorter travel times (Joslyn et al., 2020). However, not every study has found these effects. An analysis of polling place location changes in North Carolina across the 2008, 2012, and 2016 presidential elections did not find evidence that election officials were allocating polling places in a partisan manner, even after the *Shelby* decision (Shepherd et al., 2021). Altogether, it seems there are some indications of disparities between access among racial or partisan groups, but these results are not conclusive.

Contributions of this Paper

This paper seeks to attempt to bridge that gap in understanding, while attempting a larger scale analysis with new methods. The scale of the paper is across over one thousand counties in 15 different states located in the South and Midwest. This builds on much of the previous literature, which focuses on one state or even one county. This broader scale will produce results more generalizable to the country as a whole, or at least the regions studied, instead of focusing on particular counties that may or may not be representative. The question of access will be operationalized through polling places per ten thousand voting age residents, examining the number of polling places divided by the voting age population in a county, and multiplied by 10,000 for ease of interpretation. While looking at population and number of polling places is not a completely unique method, it stands in contrast to travel-time or wait time methods offered by other analyses, and may offer new insights.

Theory and Intention

If the theory holds that less access to polling places can hurt turnout, then any discrimination due to partisanship or race would be all the more concerning. Thus, this paper will examine the effects of race and partisanship as independent variables on access to polling places. To ensure the true relationship is being examined, economic conditions, population density, educational attainment, and the state a county is in will also be controlled for.

3 Data

Polling Place Data

First is polling place data collected by The Center for Public Integrity, across several states and elections. I focus on polling places for the 2018 midterm election, from Delaware, Georgia, Illinois, Iowa, Louisiana, Minnesota, Nebraska, North Carolina, North Dakota, Ohio, Oklahoma,

South Carolina, South Dakota, West Virginia, and Wisconsin. The polling place data includes the county, name, and address for each polling place. For the purposes of this paper, polling places are aggregated by county. In addition, some county names were adjusted to fit census standards and merge data, such as Dewitt County, IL being adjusted to "De Witt County, IL".

American Community Survey Demographic Data

The second data source is the 5-year American Community Survey, with estimates of several demographic features constructed by the census using data collected from 2014-2018. Specifically, the DP05 (Demographic & Housing Estimates), DP02 (Selected Social Characteristics), and DP03 (Selected Economic Characteristics) tables were used, in addition to population density data from Social Explorer, an interface for accessing census data. These separate data tables were merged in R, and then cut down to approximately 40 potential variables of interest. This provides a county-level snapshot of population, racial demographics, educational attainment, economic indicators, and other factors across the country.

2016 Presidential Election Results

Finally, county-level election results from the 2016 Presidential Election, kindly provided by Dr. Stephen Pettigrew from the University of Pennsylvania (Pettigrew, 2016), provide a measure of partisanship at the county level. From these results, a measure of partisanship was created for each county using the democratic two-party vote share, expressed as a decimal. This measure, Partisan Lean, is calculated by multiplying the vote share by 100 and subtracting 50, with a partisan lean of 0 representing an evenly split county. Positive values represent a trend towards the Democratic party and negative values a trend towards the Republican party. These results were then merged with the polling place and census data.

New Variables

Finally, a few additional variables were created from the data. Counties were sorted into regional categories based on the Census designation for regions, with counties in Delaware, Georgia, Louisiana, North Carolina, Oklahoma, South Carolina, or West Virginia being labeled as "South" and counties in Illinois, Iowa, Minnesota, Nebraska, North Dakota, Ohio, South Dakota, or Wisconsin being labeled as "Midwest". In addition, the polling places per capita variable was created by dividing the estimate of voting age population in a county from the American Community Survey by the number of polling places in the county.

Description of Variables & Descriptive Statistics

Below is a table of descriptive statistics for the major variables being used. All variables are at the county level and include: Polling Places per 10k Voting Age People, the dependent variable; Partisan lean, an independent variable for partisanship; % White, an independent variable for race; Unemployment Rate, to control for economic conditions; % Bachelor's Degree or Higher, to control for educational attainment; and Population Density, to control for urbanicity.

Fig 1: Descriptive Statistics for Independent and Dependent Variables (n = 1163)

Statistic	Mean	Median	Pctl(25)	Pctl(75)	St. Dev.	Min	Max
Polling Places per 10k Voting Age People (D)	13.897	10.967	6.614	17.461	11.440	0.392	116.175
Partisan Lean (I)	-17.309	-19.243	-27.452	-9.583	14.064	-44.9	41.220
% White (I)	82.304	90.400	72.300	95.800	17.861	5.000	100.000
Unemployment Rate (C)	5.376	5.000	3.300	6.850	2.940	0.000	26.400
% Bachelor's Degree or Higher (C)	20.728	19.400	15.200	24.000	7.904	5.400	57.600
Population Density[1] (C)	141.224	42.922	18.263	103.702	366.670	0.491	5,528.124

[1] Population density is quite right-skewed, as seen in this table. Thus it will be logged before being included in regressions.

The following two tables provide information about another important control: the state a county is in. Region is not used as a control due to autocorrelation with state, but is used later to examine potential interactions with region and the independent variables.

Fig 2: Counties per State

State	
DE	3
GA	159
IA	99
IL	102
LA	64
MN	87
NC	100
ND	52
NE	93
OH	88
OK	77
SC	46
SD	66
WI	72
WV	55

Fig 3: Average Polling Places per 10k Voting Age Residents

State (S – South, MW – Midwest)	
DE (S)	5.97
GA (S)	5.25
IA (MW)	9.68
IL (MW)	16.08
LA (S)	16.48
MN (MW)	26.44
NC (S)	5.08
ND (MW)	22.91
NE (MW)	15.44
OH (MW)	11.00
OK (S)	12.13
SC (S)	7.97
SD (MW)	21.98
WI (MW)	23.78
WV (S)	14.36

4 Hypotheses and Empirical Tests

With all of this data together, the hypotheses are as follows:

- H1: Polling places per capita will rise as the percentage of the county that is white rises, independent of partisan lean.
- H2: Polling places per capita will fall as the partisan lean of a county towards Democrats rises, independent of race.
- H3: The relationship between the percentage white and polling places per capita is consistent between regions.
- H4: The relationship between the partisan lean and polling places per capita is consistent between regions.

Hypothesis 1

For H1, the null hypothesis is no change in polling places per capita as the percentage white changes. To test this hypothesis, a fixed effects model is fit using the plm function, with counties being grouped by state in order to control for state. Polling places per 10k is the dependent variable and % White the independent, controlling for partisan lean (the other independent variable), logged population density, the percent unemployed in the county, and the percent with a bachelor's degree or higher. The null hypothesis can be rejected with a statistically significant relationship at a significance level of 0.1 or lower.

Hypothesis 2

For H2, the null hypothesis is no change in polling places per capita as the partisan lean changes. To test this hypothesis, a fixed effects model is also fit, again grouping counties by state in order to control for state. Polling places per 10k is the dependent variable and Partisan Lean the independent, controlling for % White (the other independent variable), logged population density, the percent unemployed in the county, and the percent with a bachelor's degree or higher. The null hypothesis can be rejected with a statistically significant relationship at a significance level of 0.1 or lower.

Hypothesis 3

For H3, the null hypothesis is that there is a statistically significant interaction term between % white and region. To test this hypothesis, I will run a regression of polling places per thousand voting age people on % white and region, including an interaction term. The null hypothesis can be rejected if the interaction term is statistically significant at a level higher than 0.1.

Hypothesis 4

For H4, the null hypothesis is that there is a statistically significant interaction term between partisan lean and region. This hypothesis is tested with a regression of polling places per 10k voting age people on partisan lean and region, including an interaction term. The null hypothesis can be rejected if the interaction term is statistically significant at a level higher than 0.1.

5 Results

H1 & H2

Initial Regressions

Figure 5, below, shows the correlations between the % White and the Partisan Lean of a county and that county's number of polling places per ten thousand voting-age residents.

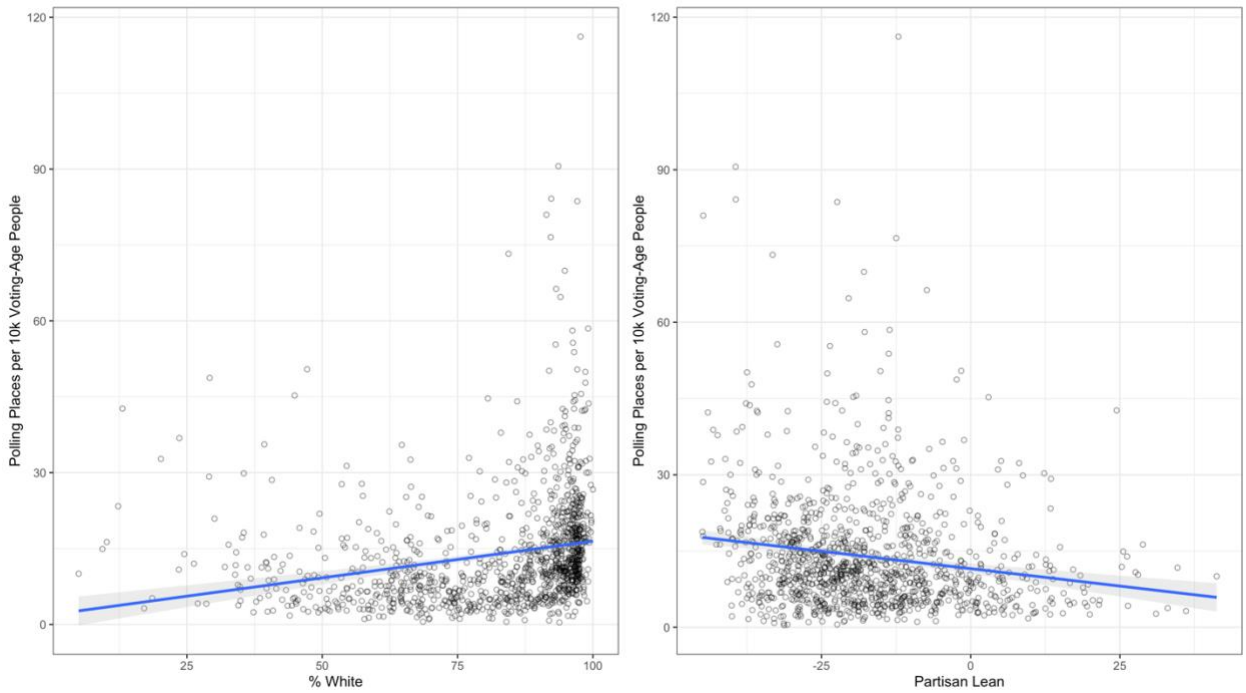


Figure 4

These two graphs do seem to indicate a relationship for both variables. An increase in the number of white residents in a county seems to be correlated with an increase in the polling

places per 10k people. On the other hand, an increase in the partisan lean of a county seems to be correlated with a decrease in the polling places per 10k people. The two very simple regressions below also bear this out:

Figure 5	*Dependent variable:*	
	Polling Places per 10k Voting-Age Residents	
	(1)	(2)
% White	0.145***	
	p = 0.000	
Partisan Lean		-0.137***
		p = 0.000
Constant	1.955	11.528***
	p = 0.206	p = 0.000
Observations	1,163	1,163
R^2	0.051	0.028
Adjusted R^2	0.051	0.027
Residual Std. Error (df = 1161)	11.147	11.281
F Statistic (df = 1; 1161)	62.809***	33.826***
Note:		*p**p***p<0.01

Initial Analysis & Adding Controls

Both % White and Partisan Lean both have a statistically significant relationship with the number of Polling Places per 10k Residents. As in the graphs, the relationship is positive for % White, and negative for Partisan Lean. The following fixed-effects models add in the controls: logged population density, state, unemployment rate, and the % with a bachelor's degree or higher. Two will be created: one regressing the Polling Places per 10k, and the other the Normalized Polling Places per 10k. This second regression will allow us to interpret effect sizes through the coefficients.

The effects of each state will not be reported, as they are the index for the fixed effects model. Any effect that controlling for them has on other variables will be reported in the model.

Figure 6	*Dependent variable:*	
	Polling Places per 10k Voting-Age Residents	Normalized Polling Places per 10k (Effect Size)
	(1)	(2)
% White	-0.021	-0.002
	p = 0.512	p = 0.512
Partisan Lean	0.012	0.001
	p = 0.739	p = 0.739
Logged Population Density	-5.065***	-0.443***
	p = 0.000	p = 0.000
Unemployment Rate	0.054	0.005
	p = 0.643	p = 0.643
% Bachelor's Degree or Higher	0.137***	0.012***
	p = 0.001	p = 0.001
Observations	1,163	1,163
R^2	0.324	0.324
Adjusted R^2	0.313	0.313
F Statistic (df = 5; 1143)	109.796***	109.796***
Note:		*p**p***p<0.01

Significance and Relationships in the Fixed Effect Model

After adding in the controls, the relationship between % White and Polling places per 10k is no longer statistically significant, and it has both weakened considerably and changed direction. Similarly, partisan lean is no longer a significant predictor, and its relationship has weakened and changed direction as well. Looking to the controls, Unemployment is also not significant. However, both population density and % with a Bachelor's degree or higher are statistically

significant predictors, with a negative and positive relationship respectively. Relationships aside, how can the coefficients and effect sizes be interpreted?

Effect Sizes: Independent Variables

The two independent variables, partisanship and race, are no longer statistically significant, as aforementioned. Furthermore, their effects are now quite weak, with effect sizes of 0.001 and -0.002 respectively. Effect sizes refer to the number of standard deviations produced by a one unit change in a variable. Generally, an effect size of |0.25| is considered modest, |0.5| large, and so on up to |1|. Thus, the effect sizes of 0.001 and 0.002 are very small, and mean that for partisanship to have a modest effect there would have to be an approximately 250%-point shift in partisan lean, which is impossible. Race is not much better, requiring a 125%-point change of the white population to have a modest effect.

Effect Sizes: Significant Controls

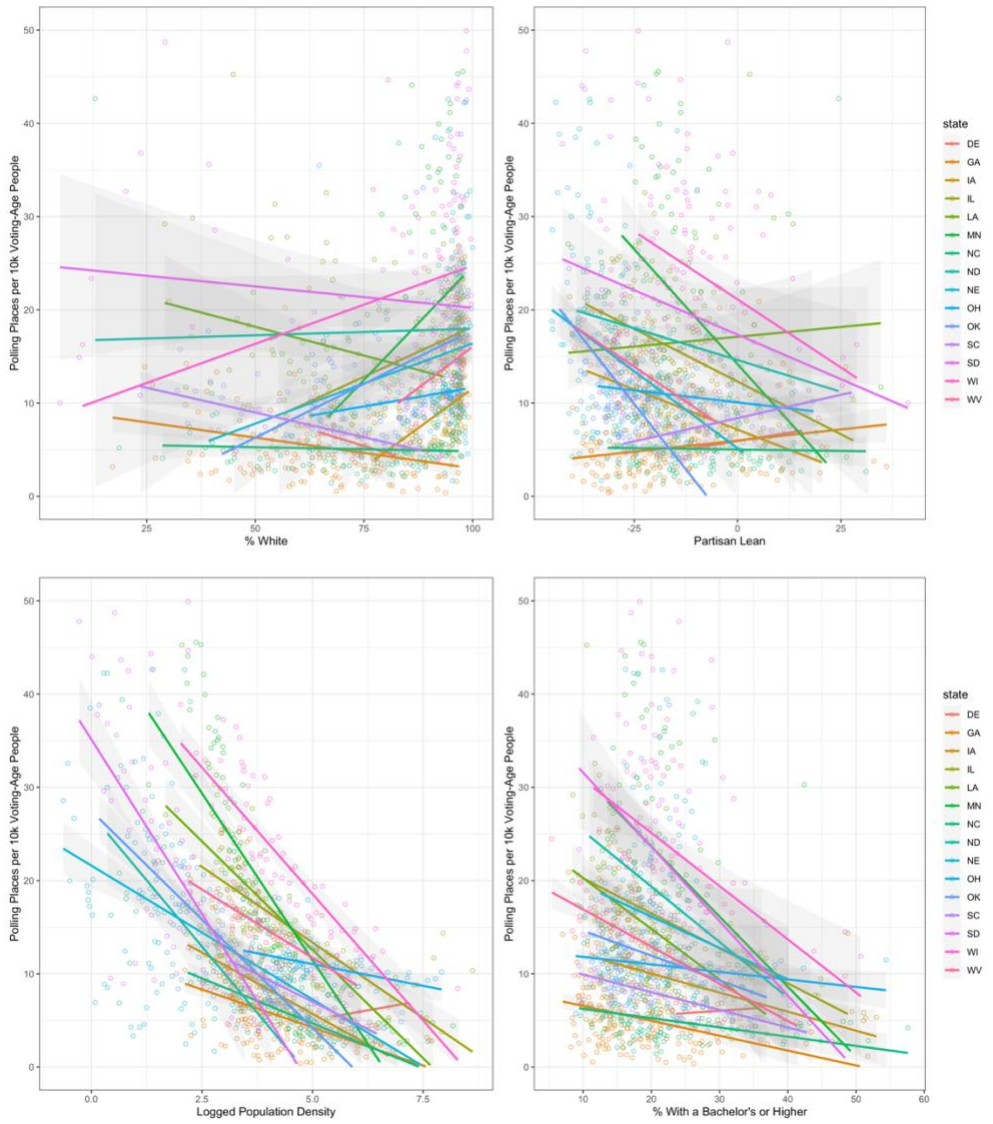
Clearly, the independent variables have lost their predictive power after controls. However, population density has a significant effect. A 1% increase in population density is associated with a decrease of 0.05 polling places per 10k residents[2], with an effect size of -0.004. This is a relatively small effect, requiring population density to change by approximately 60% to produce a significant effect size of 0.25. The percent with a bachelor's degree or higher also turned out to be a significant predictor. A 1%-point increase in people with a bachelor's degree or higher results in 0.137 additional polling places per 10k people, with an effect size of 0.012. This is a considerably weaker effect than population density: an approximately 20%-point increase in people with a bachelor's or higher would be required to produce a modest effect, or a shift in almost three standard deviations for the bachelor's variable.

[2] Important catch on my part, that the coefficient of log-transformed independent variables should be interpreted as coefficient / 100.

Evaluating the Hypotheses

With all of this in mind, the null hypothesis cannot be rejected for H1 or H2 because there is not a statistically significant relationship, and effect sizes are very small. However, some controls are statistically significant, namely population density and educational attainment, with more significant effect sizes. Figure 7 shows how controlling state through the fixed effect models muddles the relationship between the independent variables and polling place access, but not for population density or educational attainment.

Figure 7



H3 & H4

Initial Graphs & Regression

Before, the correlation plots of % White and Partisan Lean suggested there might be a relationship. Separating the counties by region in these plots already suggests a different relationship may exist than first appeared.

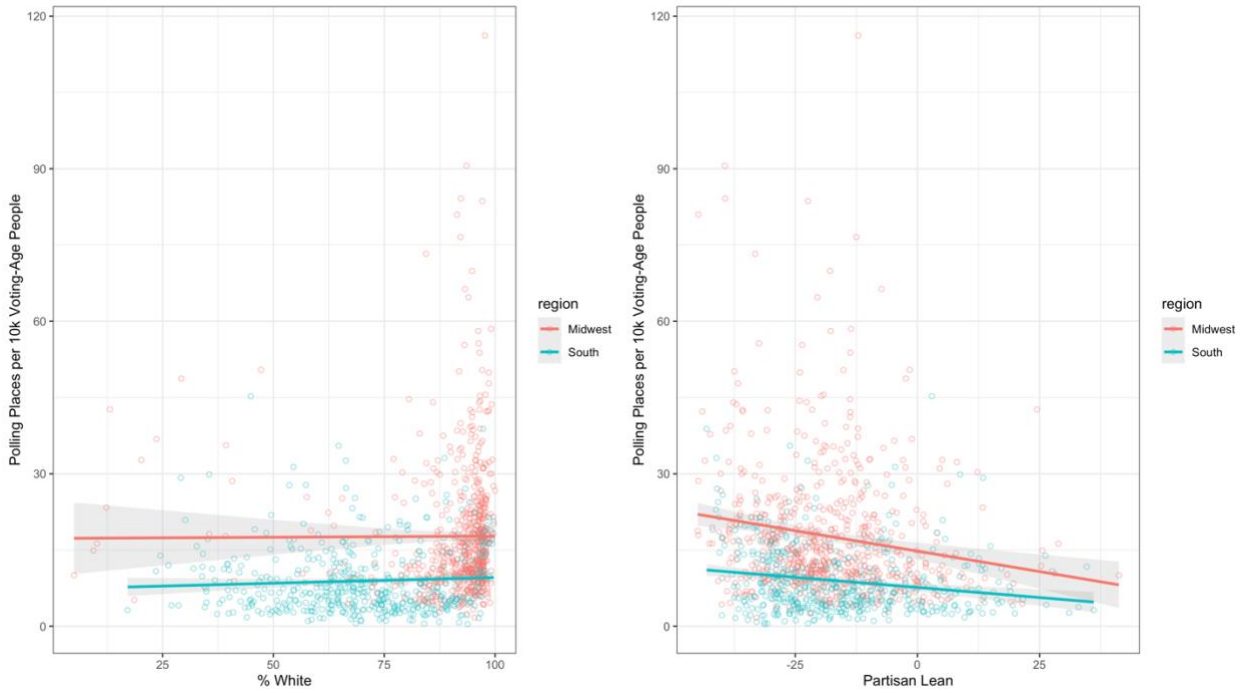


Figure 8

The relationship between % White and polling places levels out, revealing instead the wide disparity in the distribution of race between the Midwest and the South. The south is far more diverse than the Midwest, and once this is accounted for the relationship between race and polling places disappears. The negative relationship between partisan lean and polling places remains. However, it does seem that the two lines have different slopes, suggesting that there could be an interaction between the variables of partisan lean and region. Let us see what the

regressions, with Polling places regressed on region and the interaction terms between region and % White and Partisan Lean, have to say.

Figure 9	*Dependent variable:*	
	Polling Places per 10k Voting-Age Residents	
	(1)	(2)
% White	0.004	
	p = 0.898	
Partisan Lean		-0.161***
		p = 0.00000
South	-9.946***	-7.144***
	p = 0.007	p = 0.000
South and % White	0.018	
	p = 0.675	
South and Partisan Lean		0.081*
		p = 0.064
Constant	17.289***	14.785***
	p = 0.00000	p = 0.000
Observations	1,163	1,163
R^2	0.144	0.167
Adjusted R^2	0.142	0.165
Residual Std. Error (df = 1159)	10.596	10.452
F Statistic (df = 3; 1159)	65.120***	77.672***
Note:		*p**p***p<0.01

Significance in the Interaction Model

With the first model, both % White and the interaction between it and region are not even nearly statistically significant. Region, however, is, with Southern counties having almost ten fewer polling places per 10k on average. In the second model, partisan lean and region are both significant. It does seem as if there is a statistically significant interaction between partisan lean and region. In the intercept condition, where the region is Midwest, that relationship sees every

percentage point increase in partisan lean result in a decrease of 0.16 polling places per 10k people. In the South, however, the effect of partisan lean is weaker, at only -0.08 polling places per percentage point increase in partisan lean. Being in the south has its own statistically significant effect of -7.1 polling places per 10k.

Evaluating the Hypotheses

With those results, the null hypothesis for H3 can be rejected, as the interaction term between % White and Region is not statistically significant. However, the null hypothesis for H4 cannot be rejected, as there is in fact a statistically significant interaction between partisan lean and region.

6 Discussion

Summary of Results

All in all, it seems that partisanship and race do not have significant effects on access to polling places, once the state, educational attainment, population density, and other variables are controlled for. In particular, controlling for state seems to remove the relationship between race or partisanship and access to polling places. At first glance, this goes against many of the fears that many carry about partisan or racially-motivated voter suppression. The effects, after all, are not there. Instead, it seems that urban discrimination may be the biggest concern, followed perhaps by less educated counties.

Surprising Findings & Future Directions

However, it may just as well be the case that looking across states in this way obscures important disparities between the states. The finding that different states have such different average polling places per 10K (Figure 3) is cause for concern in of itself. Furthermore, figure 7 shows that race and partisanship seem to have very different relationships between states: these differences are concerning and worth investigating. The finding such wide disparities in racial

diversity between the South and Midwest, as well as the significance of region as a predictor in the interactions also indicate that regional disparities may well exist and be worth investigating. In particular, the different effects of partisanship in different regions of the country need further research.

Limitations

That said, this paper does have important limitations. For one, only Midwestern and Southern states were examined due to a lack of data and resources. Thus, the data analyzed provides an incomplete picture of the United States as a whole. Secondly, while states were accounted for using fixed effects, specific kinds of state level policies, such as voter ID laws or different requirements for the number of polling places in a county, could have effects that were not properly included. More data on these policies may be useful. The way in which the research questions were operationalized may have also had an effect. Previous studies looking at the allocation of polling places have also found little to no effect from partisanship (Shepherd et al., 2021). Meanwhile, studies that operationalize access to polling places in terms of the distance voters travel (Joslyn et al., 2020), or in terms of time spent at polling places waiting (Haggag et al., 2019), have found significant effects of partisanship and racial demographics respectively on access. Furthermore, attempting to examine multiple states together may muddle results, especially if such wide disparities do exist at the state level. Instead, multiple state-level analyses could be compared, without trying to find effects that are constant across states.

7 Conclusion

All things considered, there is still a great deal of research to be done in this area. Different ways of studying access yield different results, as do looking at different geographic scales. This paper's results contribute as much to our understanding of how different choices in research

design affect polling place access as much as they contribute to our understanding of the effect of partisan ship, race, or other factors. Regardless, even if it is because of regional differences, population density, or state-level policies, it is clear that access to polling places is not equal for every citizen of these United States. Thus, further research is required to understand these disparities. Comparing travel distances for voters between multiple counties or states is a promising next step for future research, as well as continuing to examine racial or partisan discrimination at different scales, across states, and in different parts of the country.

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