

Report in Response to
Report of Dr. Christopher Cooper

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INTERVENOR-DEFENDANTS

TRIAL EXHIBIT 99

Introduction

I have been retained by intervenor-defendants' counsel, Shanahan Law Group, PLLC in the case of Common Cause, et al. v. Lewis, et al., Case No. 18-CVS-14001 (Wake County, North Carolina). I have been asked to review the report submitted by Dr. Christopher Cooper for the plaintiffs. The document produced by Dr. Cooper describes his opinion of the political leanings of the state of North Carolina, the partisan composition of the state legislature, and discusses the connection between the partisanship and ideology of the electorate and the partisanship and voting behavior of the state legislature. In this report I outline several places in which the claims by Dr. Cooper are less certain than originally presented. In many cases, the evidence is less clear regarding the ideological composition of the electorate and how that should affect the partisan composition of the state legislature. Furthermore, I discuss the long-term trend in the North Carolina state legislature away from Democratic dominance to Republican dominance and show that these trends predate the redistricting round of 2010. Finally, I discuss how the geographic distribution of voters in the state will affect the partisanship of districts that attempt to be geographically compact or respect existing political boundaries.

In summary of the major points made below:

- The partisanship of the North Carolina state legislature has long been trending away from Democrats towards Republicans. Any changes in the composition of the legislature post-2010 are very small compared to changes in the preceding decades. This suggests that long-term trends are a larger factor, as opposed to a single round of redistricting.
- Measuring the ideological composition of the North Carolina electorate is much harder than presented in Dr. Cooper's report. Previous research on public opinion in the United States shows that partisanship and ideology are often very different concepts among the mass public. This implies that many voters, while registered with a par-

ticular party, often hold political views that are contrary to the dominant view of that party. This makes assertions of the “moderation” of the electorate difficult and often inaccurate. Furthermore, inferences about the implications of these ideological measures of the electorate for the partisan composition of the legislature are unreliable.

- At both the VTD¹ and county level, there is significant variation in the population density of districts and counties. This is the result of the unequal distribution of persons across the state (i.e. urban versus rural).
- At both the VTD and county level, there is a positive correlation between the population density of a VTD and county and the proportion of that unit’s voters who have supported Democratic candidates in past elections. Those districts that are most densely populated tend to also be the most supportive of Democratic candidates.
- The unique political geography of North Carolina leads to an “inefficient” distribution of voters registered with the Democratic Party. In other words, while there may have been more votes cast for Democratic candidates statewide in 2018, the large population, density, and relative partisan homogeneity of North Carolina’s urban areas combined with the state’s constitutional requirement that districts respect county boundaries leads to many districts with supermajoritarian support for Democratic candidates that are entirely contained in these urban areas. Furthermore, the sparsely populated but strongly Democratic counties of the northeast portion of the state lead to districts that entirely contain these counties and have large majorities in support of Democratic candidates.

¹VTDs are census-designated “voting tabulation districts” and contain small groupings of electoral precincts.

1 Historic Trends in North Carolina Legislature

Dr. Cooper notes that elections in the twenty-first century in North Carolina have been quite competitive. However, this has not always been the case. Figure 1 shows the distribution of partisanship in the state House and state Senate from the 1930s to 2019. While the early twenty-first century has seen slim majorities in both chambers, this period is a dramatic outlier from North Carolina’s overall legislative history. We see that up until the 1970s, the state legislature was nearly entirely dominated by the Democratic party. Beginning in the 1980s, the legislature began a decades-long trend away from Democratic dominance as Republicans won more and more seats. Thus, one reason for the competitiveness of the twenty-first century is that this trend away from the Democratic Party has continued to the point that over the last several elections Republicans have been winning nearly half of the seats in both chambers of the legislature.

Figure 1 also shows a dashed vertical line between 2010 and 2012 when Republicans controlled both chambers of the legislature for the first time and were responsible for redistricting after the 2010 Census. We see that after the implementation of these new districts, Republicans continued to pick up a few additional seats in the legislature in subsequent elections in the state Senate while the Republican majority size remained relatively constant in the state House. Furthermore, we see an uptick for Democrats in both chambers after the 2018 election. The most notable change in recent decades, however, predates the Republican redistricting and can be seen in the change between 2008 and 2010 when Republicans won a large number of seats and took control of both chambers of the legislature. It should be noted that this large shift in seats towards Republicans took place under maps drawn by the legislature with Democratic.² Furthermore, the post 2012 shift in seats fits well within the overall trend away from the Democratic party over the last 50 years in the state. Taken

²See https://www3.ncleg.gov/Representation/Content/Plans/PlanPage_DB_2003.asp?Plan=Session_Law_2009-78&Body=House and https://www3.ncleg.gov/Representation/Content/Plans/PlanPage_DB_2003.asp?Plan=2003_Senate_Redistricting_Plan&Body=Senate for maps and details of the districting plan used in the 2010 election.

Seats Controlled by Democrats in North Carolina Legislature

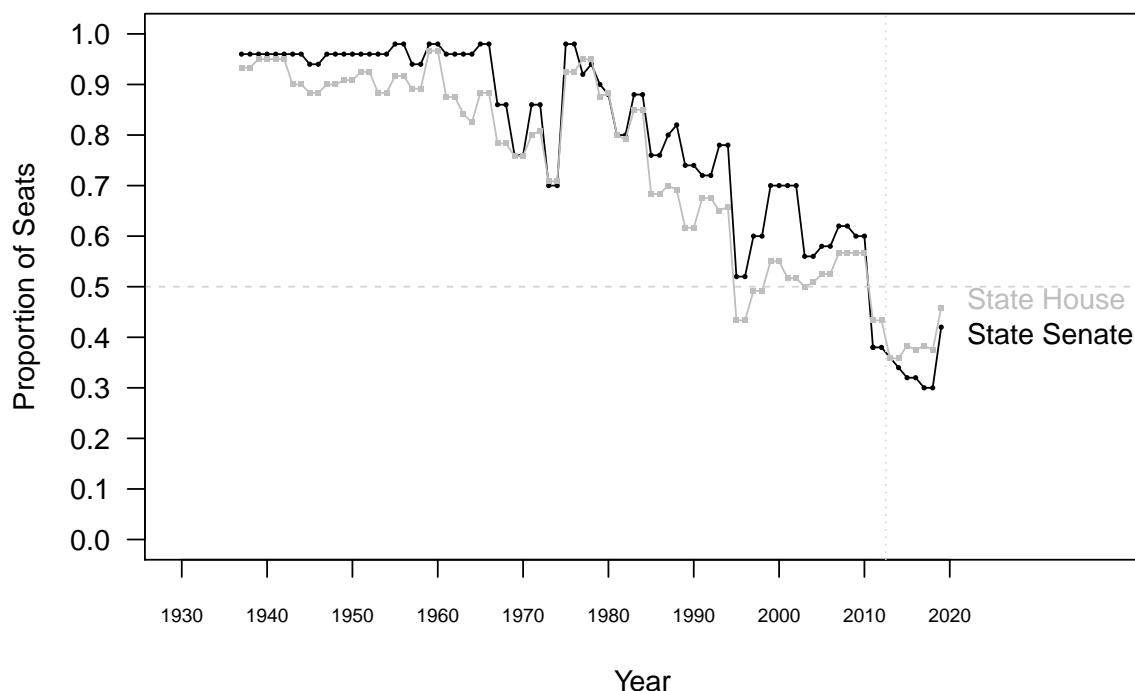


Figure 1: Historical partisan composition of NC Legislature.

Source: <https://dataverse.harvard.edu/dataset.xhtml?persistentId=hdl:1902.1/20403> and <http://www.ncsl.org/research/about-state-legislatures/partisan-composition.aspx>

together, the historical partisanship of the state makes it difficult to argue that the redistricting plan implemented by Republicans in the most recent round of redistricting has done much to affect the overall trend in the state away from the Democratic party and towards the Republican party.

2 Measuring Citizen Ideology

In his report, Dr. Cooper uses data to make the case that voters in North Carolina are politically moderate. He then looks at the partisan composition of the North Carolina legislature and the voting record of the state legislature to suggest that the moderation of the

electorate is not reflected in the partisan composition and votes of the state legislature. This analysis, however, suffers from several problems that, when considered, make it significantly more difficult to make such an assertion. These issues are grounded in several theoretical and methodological points. I will consider each of them in turn.

First, the main data used by Dr. Cooper to estimate the ideological preferences of voters in the state is a poor measure of voter ideology. The data come from Berry et al. (1998; 2010), who attempt to create a “dynamic measure of the ideology of a state’s citizens and political leaders (Berry et al. 1998, abstract).”³ The problem is that the data used to create this measure are only loosely connected to citizens’ policy views. To create their measure, the authors take weighted averages of the estimated ideology scores⁴ of legislators in Congress and assume that these legislator ideology scores can act as a valid proxy for the ideology of citizens. However, later in his report Dr. Cooper makes the case that exactly the opposite is occurring - the legislators elected by the voters are not accurately representing the policy view of their voters. For example, he says “The North Carolina General Assembly does not reflect the partisan and ideological preferences of the average North Carolinian (pg. 13).” Dr. Cooper can’t have it both ways - either legislators are faithfully representing the policy views of their voters (which is a necessary assumption for the validity of the Berry et al (1998) measure of citizen ideology) or they aren’t faithfully representing the policy views of their voters (which is what is suggested in Dr. Cooper’s report, but would further invalidate the Berry et al. (1998) measure).

Dr. Cooper does, however, point to an alternative measure of voter ideology that was developed by Tausanovitch and Warshaw (2013) that uses voter responses to survey questions on a variety of policy questions to estimate the ideological leanings of voters throughout

³See Berry, W., Ringquist, E., Fording, R., & Hanson, R., Measuring Citizen and Government Ideology in the American States, 1960-93. *American Journal of Political Science*, 42(1), 327-348, (1998); Berry, W. D., Fording, R. C., Ringquist, E. J., Hanson, R. L., & Klarner, C. E. Measuring citizen and government ideology in the US states: A re-appraisal. *State Politics & Policy Quarterly*, 10(2), 117-135, (2010).

⁴These ideology scores are based on statistical models that use either interest group ratings of legislators votes or on the actual roll call votes cast in Congress as their inputs.

the country.⁵ However, this measure of citizen ideology presents its own set of concerns, especially when being used to compare voters' ideological view on policy to the partisan composition of the state legislature.

First, methods to characterize the ideology of voters often aggregate policy questions contained in surveys in a way that creates “artificial moderation”. Broockman (2016) and Ahler and Broockman (2018) discuss this issue in recently published studies of voter preferences.⁶ Their critique of measures of policy moderation are that such measures, at their core, are averaging policy positions of voters across a variety of different policy areas. The effect this has is “ideological scales tend to capture citizens’ degree of ideological consistency across policy domains (e.g., ‘this citizen has liberal views on two-thirds of issues’) but say little about citizens’ views within domains, on issues themselves (e.g., ‘this citizen supports state-sponsored healthcare’). (Broockman 2016, pg. 182.)” In other words, when aggregating policy responses of voters in surveys, the process of aggregation masks on which issues voters have a liberal or conservative view, only telling us that on some proportion of the issues considered voters took a liberal position. Thus, measures of state-level ideology, which further aggregate the already-aggregated responses of voters only further muddy the water rather than provide clarity as to the partisan or ideological preferences of North Carolina voters. Furthermore, when a state is said to have an overall ideological score of ‘X’, it is impossible to know what exactly that implies for representation in a legislature. On which proportion of issues did voters have a liberal position? And which voters had a liberal or conservative position on each issue? An aggregate measure of state ideology cannot speak to these questions. Thus, it is also impossible to say whether a certain vote on an issue in the legislature is in line or out of step with public opinion in the state legislature’s district because these aggregate measures do not speak to individual issues and votes. A simple

⁵See Tausanovitch, C., and Warshaw, C., Measuring Constituent Policy Preferences in Congress, State Legislatures, and Cities, *The Journal of Politics* 75 (2), 330-342, (2013).

⁶See Broockman, D. E., Approaches to studying policy representation. *Legislative Studies Quarterly*, 41(1), 181-215 (2016); and Ahler, D. J., & Broockman, D. E., The delegate paradox: Why polarized politicians can represent citizens best. *The Journal of Politics*, 80(4), 1117-1133, (2018).

example from Ahler and Broockman (2018) further illustrates this point.

Table 1: Hypothetical Preferences of Voters and Votes Cast By State Legislator

Policy:	Survey Response					Roll Call Vote State Legislator
	Voter 1	Voter 2	Voter 3	Voter 4	Voter 5	
Health Care	1	1	1	0	0	1
Minimum Wage	1	1	0	0	1	1
Tax Increase	0	0	1	1	1	1
Gun Policy	1	0	0	1	1	1
Aggregated Ideology	.75	.5	.5	.5	.75	1
Aggregated State Ideology			.6			

Table 1 shows a hypothetical district with five voters and a state legislator who represents them. Imagine that voters in the state have preferences over four different issues, listed in column 1 of the table. Each voter’s preferences are shown below them with “1” being a preference for a liberal outcome on the policy and “0” being a preference for a conservative outcome on the policy. The row labeled “Aggregated Ideology” shows the average ideology of each voter, which is simply the average of the preferences of each voter over these four policies. One problem with these aggregated ideological scales, such as the Tausanovich and Warshaw measure, becomes immediately apparent. While Voters 1 and 5 have the same aggregate ideology score (.75), they differ on which issues they hold a liberal and conservative preference. The same is true of Voters 2, 3, and 4. Furthermore, the overall state ideology (.6), which is just the average of these five voters’ ideologies, indicates that the district may lean slightly to the left, but it does not indicate on which issues the district prefers a liberal or conservative policy. The final column of Table 1 shows the voting record of the hypothetical state legislator representing this district. Looking across the rows, we can see that the legislator is, in fact, voting with the majority of his district on each of the four issues. However, his overall ideology score makes him look extremely liberal, with a score of 1. Furthermore, comparing his overall ideology score to the state average of .6 gives the appearance that he is out of step with the ideology of his district, when in fact, he is perfectly in line with his district on every single issue.

This simple example illustrates why comparing aggregate ideology scores of voters and the voting records of legislators cannot reliably demonstrate whether the partisan composition of the legislature reflects the partisan preferences of the electorate. In many cases legislators who are voting exactly with their district appear to be ideologically more extreme than their district because of the issues of aggregation described above. A better approach would be to compare preferences of voters issue-by-issue and look at how each legislator voted on those issues to avoid the problems of aggregation. While the Tausanovich and Warshaw measure of ideology used by Dr. Cooper is more sophisticated than a simple average, at its most basic level, they are using policy responses of voters to create aggregate measures of ideology for districts and states, and I believe their data do not reliably support the conclusions drawn by Dr. Cooper.

It is also the case that many voters who identify with one of the two major parties do not hold all of the policy views that are traditionally associated with their party. This means that it is often incorrect to note the moderation - or ideologically mixed - views of voters and assume that their votes should therefore also be mixed across the parties. In other words, it is not out of the question that voters with a mixture of conservative and liberal policy positions might also prefer a legislature that is largely Republican (or Democratic). Decades of prior research in political science supports the idea that voters can be, and often are, simultaneously ideologically moderate, yet decidedly partisan.⁷ For example, a recent study by Mason (2018) finds that there are a number of self-identified Republicans throughout the

⁷See Converse, P. E. The nature of belief systems in mass publics (1964). *Critical Review*, 18:1-3, 1-74 (2006). This is widely seen as the foundational text on this question. The article has been cited by scholars of public opinion more than 9,000 times. Other, more recent work has affirmed the findings of Converse, who originally studied this topic in the 1960s. See for example, Kinder, D. R., & Kalmoe, N. P., *Neither liberal nor conservative: Ideological innocence in the American public*. University of Chicago Press (2017); Feldman, S., & Zaller, J., The political culture of ambivalence: Ideological responses to the welfare state, *American Journal of Political Science*, 268-307 (1992); Treier, S., & Hillygus, D. S., The nature of political ideology in the contemporary electorate, *Public Opinion Quarterly*, 73(4), 679-703 (2009); Bartels, L. M., Partisanship and Voting Behavior, 1952-1996, *American Journal of Political Science*, 44(1), 35-50 (2000); Barber, M., & Pope, J. C., Does Party Trump Ideology? Disentangling party and ideology in America. *American Political Science Review*, 113(1), 38-54 (2019); Broockman, D. E., Approaches to Studying Policy Representation, *Legislative Studies Quarterly*, 41(1), 181-215 (2016).

country who, despite being loyal Republicans, hold a number of liberal policy positions.⁸ Similarly, she finds that there are a substantial group of Democrats who, nevertheless, hold consistently conservative policy views. Furthermore, among these partisans whose issue positions are less well-aligned with their party, they nevertheless retain positive feelings towards the party they affiliate with, even though their issue positions suggest they would be better suited ideologically inside the opposite party.

The point of this is to show that comparing the ideological views of voters to the partisanship of the legislator elected from that district is an exercise fraught with complicating issues that make such comparisons much less helpful than they might first appear. This becomes even more problematic when looking at statewide measures of ideology and the overall partisan composition and voting behavior of the entire state legislature.

3 Seats-Votes Relationship in North Carolina

Dr. Cooper also discusses the partisan composition of the state legislature in his report. He notes the election of 2018 and remarks that Democrats won a majority of the votes in the state but a minority of the seats in the legislature. He says, “Specifically, Democratic candidates won 51.1% of the two-party statewide vote in 2018 state House elections, but won only 55 of 120 seats (45.8%). Democratic candidates won 51.2% of the two-party statewide vote in 2018 state Senate elections, but won only 21 of 50 seats (42%).” It is worth considering how rare this type of an outcome is in which a party wins a majority of votes statewide but only captures a minority of the votes. More generally, this refers to the votes-seats ratio, a term in political science that describes how votes cast for a particular office that contains multiple geographic districts (Congress or state legislature) are translated into seats won by that party. Since North Carolina, and the vast majority of other states in the United States, use single-member districts to elect members of Congress and state legislators,⁹ the

⁸See Mason, L., *Uncivil agreement: How politics became our identity*. University of Chicago Press (2018).

⁹A few states use a combination of single member districts and multi-member districts where several legislators are chosen from the same district.

geographic distribution of voters with different partisan preferences across the state means that the statewide margin for a party will often not exactly translate to the same proportion of seats won by that party in the legislature.

A simple hypothetical illustrates this point. Imagine a state in which all voters are either Republicans or Democrats and the overall proportion across the state is 49% Republican and 51% Democratic. If voters were distributed completely evenly across the state, and the state were divided into districts of equal size, it would actually be the case that Democrats would win 100% of the seats in this hypothetical legislature while only winning a small majority of the statewide vote. Figure 2 demonstrates this point using a simple toy example. Suppose that the state is divided into four legislative districts and that each district contains 8 precincts that are each 49% Republican and 51% Democratic. In this toy example, because voters are distributed uniformly across the state, there is no possible way to draw districts using any combination of precincts to produce a district that would elect a Republican candidate. While Figure 2 shows only three possible districting schemes, it is the case that under any districting plan in this toy example, the results will be a four person legislature entirely of Democratic office holders.

Hypothetical State - 1

District 1		District 2		District 3		District 4	
p1	p2	p3	p4	p5	p6	p7	p8
p9	p10	p11	p12	p13	p14	p15	p16
p17	p18	p19	p20	p21	p22	p23	p24
p25	p26	p27	p28	p29	p30	p31	p32
51% D Democrat Elected		51% D Democrat Elected		51% D Democrat Elected		51% D Democrat Elected	

Hypothetical State - 2

District 1	p1	p2	p3	p4	p5	p6	p7	p8	51% D Democrat Elected
District 2	p9	p10	p11	p12	p13	p14	p15	p16	51% D Democrat Elected
District 3	p17	p18	p19	p20	p21	p22	p23	p24	51% D Democrat Elected
District 4	p25	p26	p27	p28	p29	p30	p31	p32	51% D Democrat Elected

Hypothetical State - 3

District 1 51% D Democrat Elected				District 3 51% D Democrat Elected				
p1	p2	p3	p4	p5	p6	p7	p8	
p9	p10	p11	p12	p13	p14	p15	p16	District 4 51% D Democrat Elected
p17	p18	p19	p20	p21	p22	p23	p24	
p25	p26	p27	p28	p29	p30	p31	p32	
District 2 51% D Democrat Elected								

Figure 2: A Simple Example of Districting and Voter Geographic Distributions - In this simple example a hypothetical state is divided into four districts, each with eight precincts. Voters in each of the 32 precincts are divided 51/49 for Democrats and Republicans, respectively. Despite the close margin statewide, Democrats win all four districts in the state no matter the district configuration.

Of course, Figure 2 is a dramatically simplified version of reality, and voters from each party (and independents) in North Carolina are not distributed equally across the state. However, this simple example illustrates an important point, which is that the geographic distribution of voters can have a dramatic effect on the translation of votes statewide to seats in the legislature. In other words, single member districts do not guarantee proportionality in the legislature. Turning from the toy example to actual election results in North Carolina, Figure 3 plots the relationship between votes and seats for the last several decades (1970 - 2018). The horizontal axis (x-axis) shows the proportion of the vote won by Democrats statewide for state House and state Senate races in each election. The vertical axis (y-axis) shows the proportion of seats won by the Democratic party in that same election - i.e. the votes-seats ratio. Circles show the results for the state Senate and triangles show the results for the state House. The right panel of Figure 3 shows the same data but zoomed in on elections where Democrats and Republicans were near parity in the statewide vote. The diagonal line is a 45-degree line and indicates where the statewide vote share and proportion of seats in the legislature would be exactly equal. Overall, there is a strongly positive relationship, indicating that as a party wins more votes statewide they tend to also increase the number of seats they hold in the legislature. The relationship, however, is far from perfect, indicating that from election to election, those votes are distributed unequally across the state such that in some years the same number of votes statewide can lead to a different number of seats in the legislature.¹⁰

The 2018 election is marked on the right panel of Figure 3. We see that in this election, as noted by Dr. Cooper, Democrats won a majority of the votes statewide (the point is to the right of .5 on the horizontal axis) but won less than a majority of the seats in the legislature (the point is below .5 on the vertical axis). An interesting question is to see if this outcome is all that rare. In fact, as seen in the picture, it is not. We see that there

¹⁰Data for Figure 3 are from <https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/3WZFK9>, <https://dataverse.harvard.edu/dataset.xhtml?persistentId=hdl:1902.1/20403>, and <http://www.ncsl.org/research/about-state-legislatures/partisan-composition.aspx>.

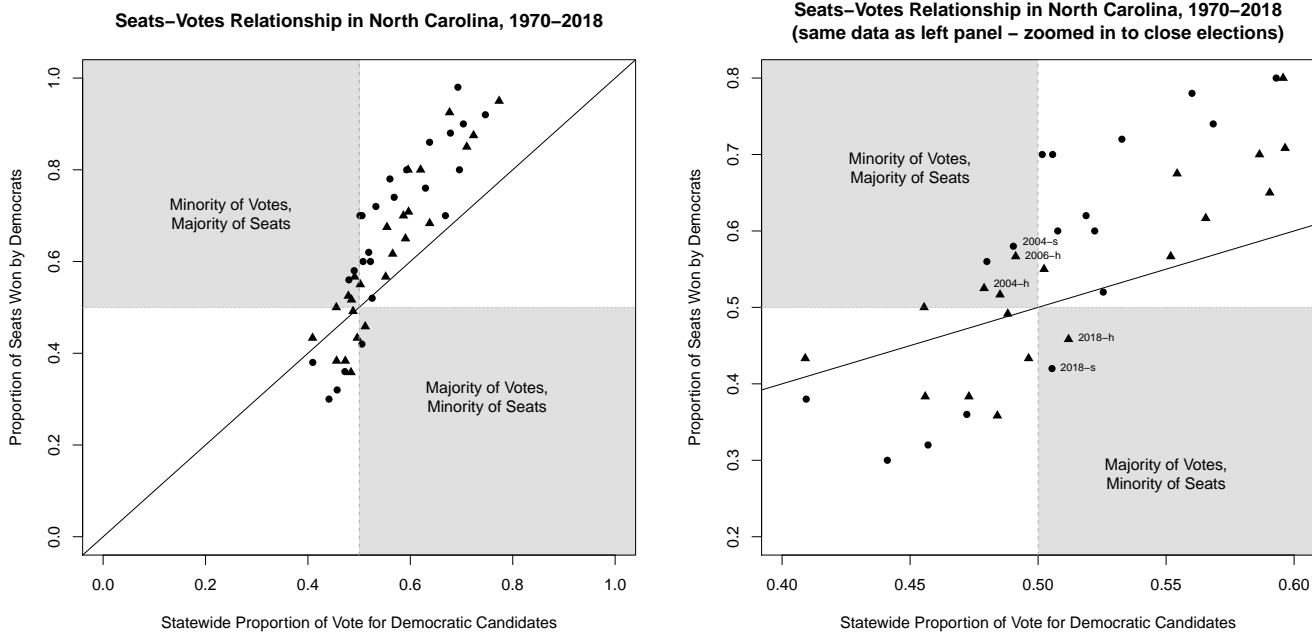


Figure 3: Statewide Vote to Legislature Seats Relationship - This figure shows the relationship between the statewide vote share for Democratic candidates in the state legislature and the proportion of seats occupied after each election by Democratic legislators. The right panel is the same as the left, just zoomed in to focus on results near the 50% margin.

are at least five other times in which a party won a majority of seats with a minority of the statewide vote (alternatively you could say the other party won a minority of the seats in the legislature despite winning a majority of the votes statewide). All five of these cases favored the Democratic Party. The most recent instances prior to the 2018 election were in the 2004 and 2006 elections (marked on the right panel of Figure 3). In 2006, Democrats (Republicans) won a majority (minority) of the seats in the state House but only won a minority (majority) of the statewide vote. A similar outcome occurred in 2004 in both the state House and Senate.¹¹ Thus, while it is not the most common outcome, 2018 is certainly not unique in the history of North Carolina in which a majority for one party in the statewide vote for state legislature did not translate to a majority of seats for that same party in the state legislature.

¹¹The complete list of instances where a party won a minority of statewide vote but a majority of the state legislature seats is 2018-h, 2018-s, 2006-h, 2004-h, 2004-s, 2002-s, 2000-h

4 Geographic Distribution of Voters in North Carolina

Scholarship in political science has noted that the spatial distribution of voters throughout a state can have an impact on the partisan outcomes of elections when a state is, by necessity, divided into a variety of legislative districts. This is largely the case because Democratic-leaning voters tend to cluster in dense, urban areas while Republican-leaning voters tend to be more equally distributed across the remainder of the state.¹² One prominent study of the topic (Chen and Rodden, 2013) finds that “Democrats are highly clustered in dense central city areas, while Republicans are scattered more evenly through the suburban, exurban, and rural periphery...Precincts in which Democrats typically form majorities tend to be more homogenous and extreme than Republican-leaning precincts. When these Democratic precincts are combined with neighboring precincts to form legislative districts, the nearest neighbors of extremely Democratic precincts are more likely to be similarly extreme than is true for Republican precincts. As a result, when districting plans are completed, Democrats tend to be inefficiently packed into homogenous districts.”¹³

While the Chen and Rodden (2013) study does not include North Carolina in their analysis, the relationship they describe is largely the case in North Carolina as well. I use a variety of different data and methods to demonstrate this. It is the case in North Carolina that Democratic voters tend to live in areas that are more densely populated than the areas of the state that tend to support Republicans. In order to show that this is the case in North Carolina, I use three different sources of data. First, I obtained GIS shapefiles of the

¹²See for example Stephanopoulos, N. O. and McGhee, E. M., Partisan Gerrymandering and the Efficiency Gap, *The University of Chicago Law Review* 82: 831-900, (2015); Chen, J. and Rodden, J., Unintentional Gerrymandering: Political Geography and Electoral Bias in Legislatures, *Quarterly Journal of Political Science* 8: 239-269, (2013); Nall, C., The Political Consequences of Spatial Policies: How Interstate Highways Facilitated Geographic Polarization, *Journal of Politics*, 77(2): 394-406, (2015); Gimple, J. and Hui, I., . Seeking politically compatible neighbors? The role of neighborhood partisan composition in residential sorting, *Political Geography* 48: 130-142 (2015); Bishop, B., *The Big Sort: Why the Clustering of Like-Minded America is Tearing Us Apart*, Houghton Mifflin Press (2008); and Jacobson, G. C., and Carson, J. L., *The Politics of Congressional Elections*, 9th ed. Lanham, MD: Rowman and Littlefield (2016).

¹³Chen, J. and Rodden, J., Unintentional Gerrymandering: Political Geography and Electoral Bias in Legislatures, *Quarterly Journal of Political Science* 8: 239-269, (2013)

North Carolina VTDs from the U.S. Census Bureau.¹⁴ I then use the statewide voter file to determine the number of registered voters who reside in each VTD in the state. Combining this data with the geographic size of the VTD, I calculate the population density of each precinct.

These VTD maps are shown below as Figure 4. It becomes immediately apparent that the most densely populated districts are those in the major metro areas of the state. Using a similar methodology, I also calculated the population density of counties in the state. Not surprisingly, the same areas of the state stand out as the most densely populated. Figure 5 contains the map of county population density.

It is also the case that the most densely populated parts of the state also tend to be the parts of the state that are most supportive of Democratic candidates. To measure this, I created a partisan index for each VTD using election data for several prior statewide partisan elections. Table 2 displays the elections used to create this index. These results are reported at the VTD level by the state and averaged across elections to provide a general sense of the proportion of the precinct that typically votes for a Democratic or Republican candidate.¹⁵ The index is calculated by taking the average of the proportion of the VTD that voted for the Democratic candidate in each of the elections shown in Table 2. A value of 1 would indicate a district that voted unanimously for every Democratic candidate across all of the races included. Similarly, a value of 0 would indicate a district that voted unanimously for every Republican candidate across the various races included in the index. The actual values of the index range from 0.09 to 0.99.

Figure 6 maps the partisan index for each of the VTDs in the state. We see that the most heavily Democratic parts of the state (those that are shaded the darkest blue) are located in the urban centers of the state. The areas with the lowest average support for Democratic candidates are some of the most rural areas of the state. This is also true if we

¹⁴Shapefiles from https://catalog.data.gov/dataset/tiger-line-shapefile-2012-2010-state-north-carolina-2-resource/d7c2988a-e957-4380-b258-1d3ea4faefd8?inner_span=True

¹⁵Data from: https://dl.ncsbe.gov/?prefix=ENRS/2016_11_08/

Table 2: Elections Used in Partisan Index

Election	Year
Governor	2012
Lt. Governor	2012
Secretary of State	2012
Senate	2014

aggregate the data to the county level rather than the VTD. Figure 7 shows this map. A simple comparison between Figures 4 and 6 (or Figures 5 and 7) shows that the most densely populated districts/counties that surround the urban centers of North Carolina are also those that are most likely to overwhelmingly support Democratic candidates, on average.

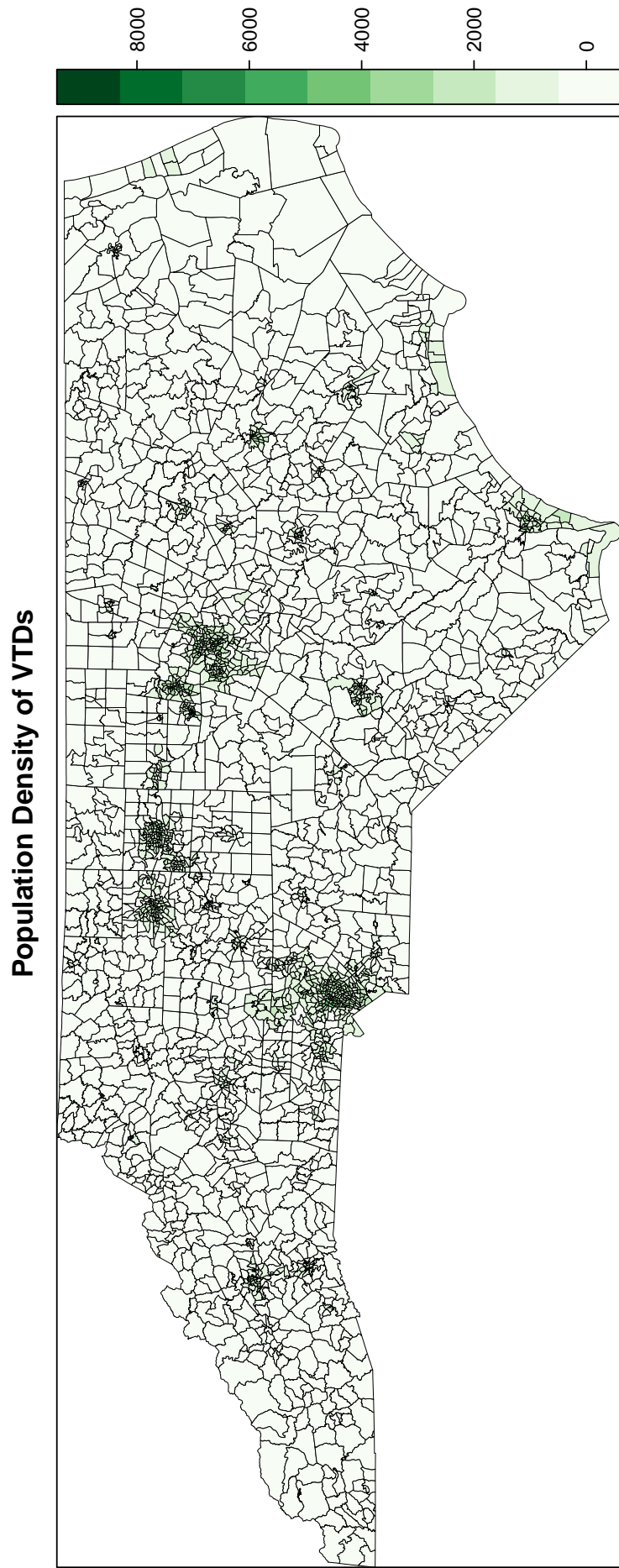


Figure 4: Population Density of VTDs in North Carolina (Persons per Square Mile)

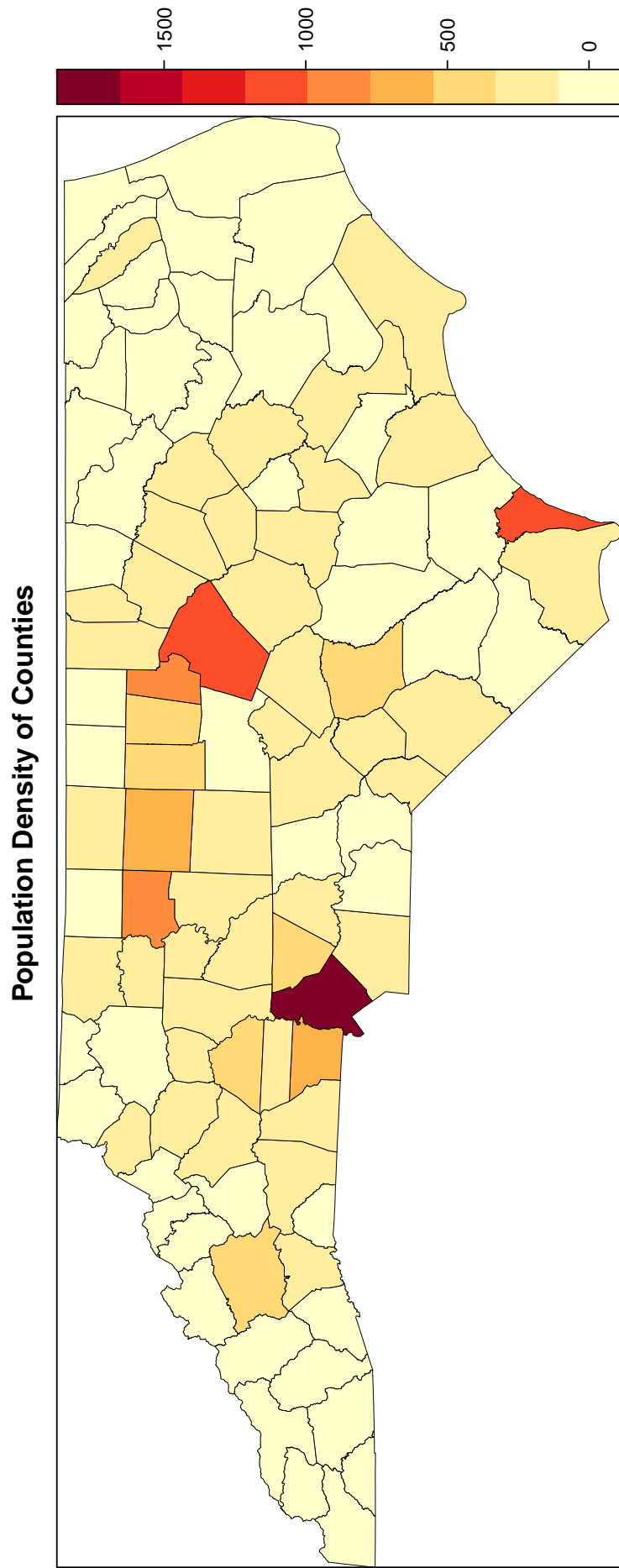


Figure 5: Population Density of Counties in North Carolina (Persons per Square Mile)

Partisan Leaning of VTDs

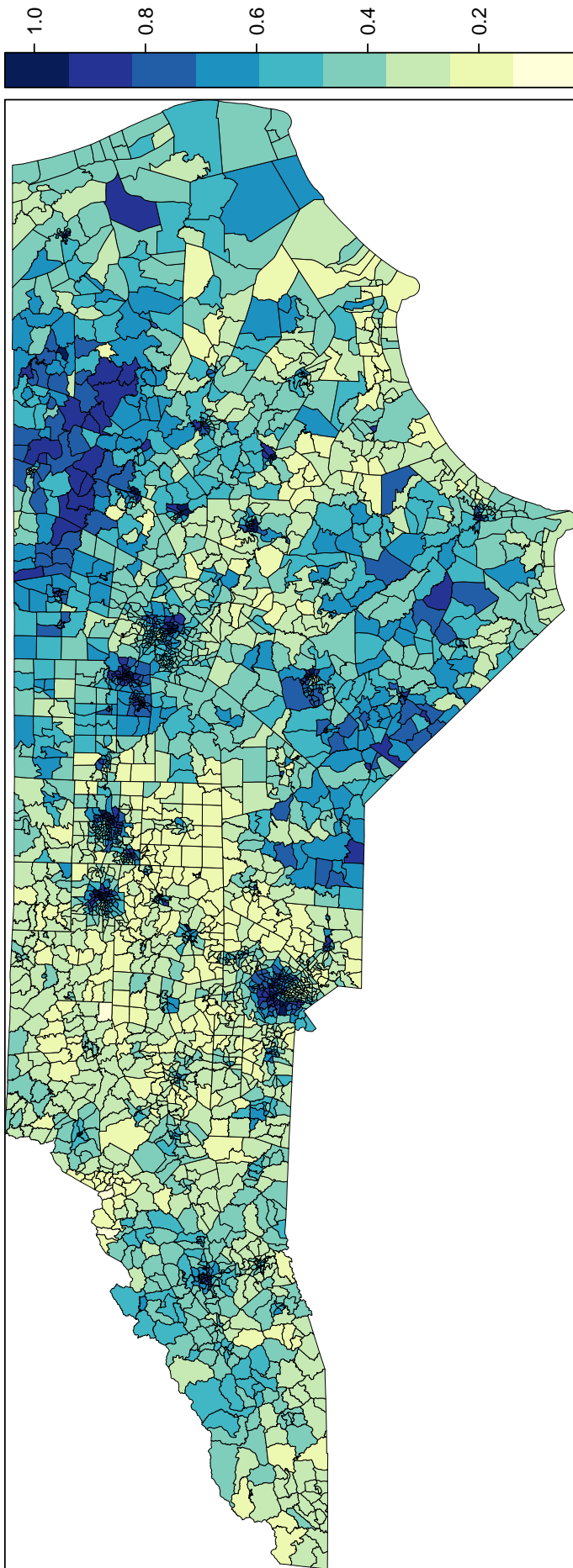


Figure 6: Partisan Lean of VTDs in North Carolina

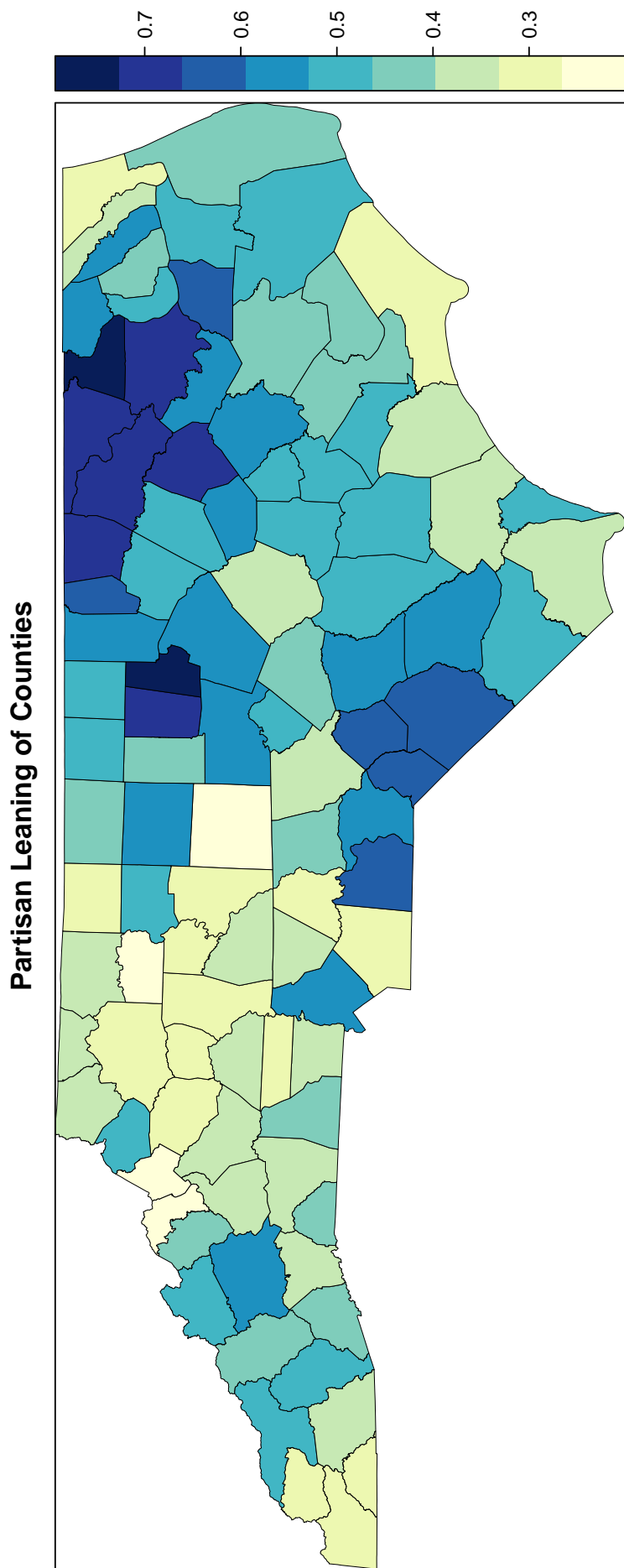


Figure 7: Partisan Lean of Counties in North Carolina

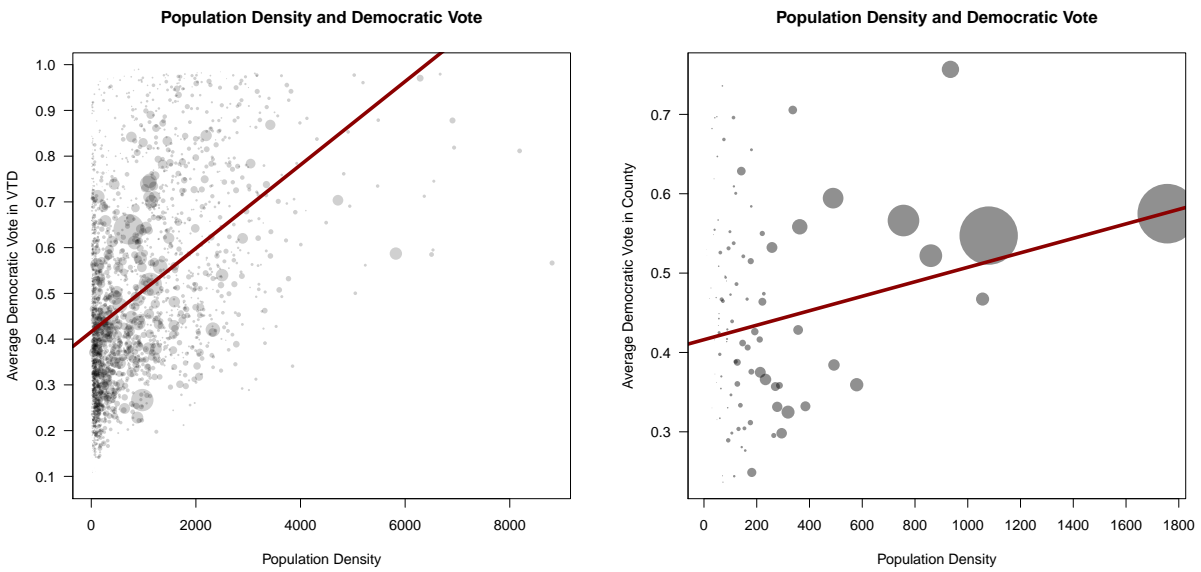


Figure 8: Relationship between Population Density and Democratic Vote - In each case there is a positive relationship between the density of the VTD/county and the support for Democratic candidates. The size of each point is proportionate to the population of that observation. The left panel shows the relationship for VTDs in the state. The right panel shows the relationship for counties in the state.

Figure 8 tests this proposition formally by plotting the population density of each VTD (left panel) or county (right panel) on the horizontal axis and the partisan index of each district/county on the vertical axis. The trend seen in each scatterplot is positive, indicating that it is indeed the case that there is a positive correlation between population density and support for Democratic candidates in the state. The line shows a regression line of best fit, which is positive in both cases and statistically significant ($p < .01$, two-tailed) for VTDs, but not for counties ($p = .16$, two-tailed), a point I return to later in this report.

The North Carolina Constitution states that counties are important pre-existing political subdivisions that must be considered in drawing legislative district maps. Specifically, where doing so is not otherwise required by law, districts should be confined to a single county or minimum grouping of contiguous counties.¹⁶ With 120 state House districts, 50 state Senate districts, and 100 counties, there will inevitably be districts that span multiple counties. Moreover, in the most populous counties there could be (and in practice are) multiple legislative districts contained entirely within a county. To illustrate this idea, I calculate the number of people who would reside in a legislative district such that each district contained an equal number of people. With an estimated overall state population¹⁷ of 10,383,620, we can calculate the current size of the ideal state House district if redistricting were to happen today¹⁸ by dividing the state's population into 120 equally sized districts: $10,383,620 / 120 = 86,530$ persons per district. Following the same logic, the ideal state Senate district would contain roughly $10,383,620 / 50 = 207,672$ persons today. As discussed earlier, while the state of North Carolina may be competitive statewide, it is highly lopsided in its most populous counties. The result of this unequal distribution of voters is that many legislative districts that are drawn to respect county boundaries are going to

¹⁶N.C. Const. art. II, §§ 3, 5; *Stephenson v. Bartlett*, 582 S.E.2d 247, 249-51 (N.C. 2003); *Dickson v. Rucho*, 781 S.E.2d 404, 9 (N.C. 2015) (judgement vacated by 137 S. Ct. 2186 on federal law grounds.)

¹⁷This number comes from the U.S. Census Bureau Population Estimates Program: <https://www.census.gov/quickfacts/nc>

¹⁸The actual number of people who live in each state legislative district will be different today because of uneven changes in population growth across the state since the current districts were drawn. As well, there is a small amount of allowable deviation in population across districts afforded by the state constitution.

be highly lopsided in their partisan lean. And because, for example, Mecklenburg County, the most populous county in the state, has enough people (1,093,901) to entirely contain nearly 13 state legislative districts, a high number of these 13 districts will favor Democratic candidates by extremely wide margins. The implication for the remaining districts outside of Mecklenburg County and the other urban counties of the state is that these districts will tend to be more Republican-leaning given that the overall state is quite competitive and a majority of the Democratic voters in the state are concentrated in the relatively few urban counties of the state.

An additional feature of North Carolina's spatial distribution of voters works to create heavily Democratic state legislative districts. Figure 7 shows that the rural counties of north eastern North Carolina are strongly Democratic.¹⁹ These counties appear to exhibit the opposite relationship that is shown in Figure 8; that is, while they are heavily Democratic they are also very rural and sparsely populated. Figure 9 below displays a county map of North Carolina showing the proportion of the county population that is African American. We see that the counties mentioned above, while very rural, are also heavily African American, and given the historically strong support for Democratic candidates among African American voters, these counties also lean strongly towards Democratic candidates.

This further works to facilitate the creation of strongly Democratic state legislative districts because each of these rural counties, and sometimes in combination with other adjacent rural counties, can form a legislative district. This is because the state constitution again emphasizes that counties be kept together when drawing district boundaries, and when grouping counties to collect a sufficient number of people, the minimum grouping of contiguous counties should be used. Because these rural counties all share the common feature of being strongly Democratic, any grouping of these counties together will further generate legislative districts with large majorities in support of Democratic candidates.

¹⁹This would include Vance, Warren, Halifax, Northampton, Hertford, Bertie, and Edgecomb counties.

Percent African American of Counties

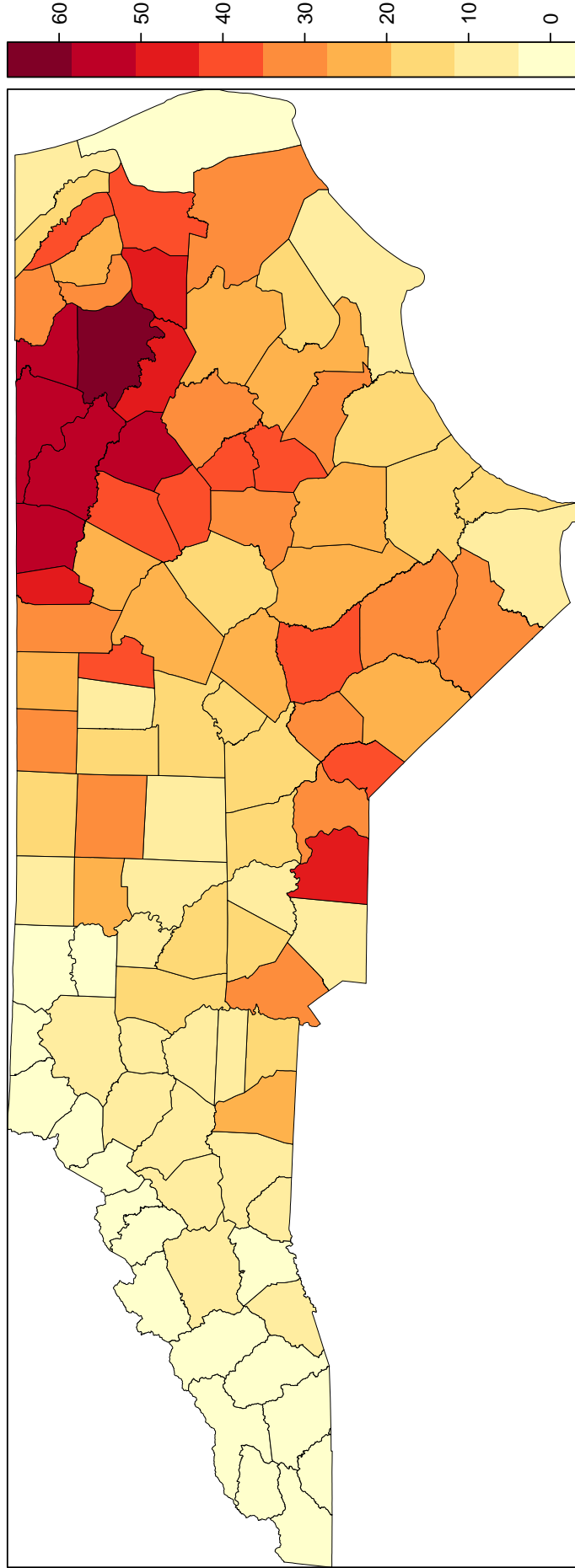


Figure 9: Proportion African American in North Carolina Counties.
Source: <https://factfinder.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t>

Earlier I noted that the relationship between population density and support for Democratic candidates was positive, but not statistically significant, when looking at the county-level data (the right panel of Figure 8). Part of the reason for the lack of statistical significance is these rural, but strongly Democratic, counties in the northeastern portion of the state. However, if we account for this by including a variable that measures the proportion of the county that is African American in a simple linear regression model, the coefficient on the relationship between population density and Democratic support in the county remains nearly the same size, but becomes statistically significant. Table 3 shows the results of this regression model.²⁰

Table 3: Regression Model of Population Density and Democratic Support

Dependent Variable: Average Democratic Vote Share	County		VTD	
Population Density of County	0.068 (0.048)	0.055* (0.028)	0.09*** (0.004)	0.06*** (0.002)
Proportion of County African American		0.006*** (0.0004)		0.69*** (0.008)
Number of Observations	100	100	2,692	2,692

Note: Linear regression model coefficients shown with standard errors below. *** $p < .001$, ** $p < .01$, * $p < .05$, two-tailed tests.

Table 4: Regression Model of Population Density and Democratic Support (weighted)

Dependent Variable: Average Democratic Vote Share	County		VTD	
Population Density of County	0.10*** (0.02)	0.06*** (0.015)	0.09*** (0.003)	0.06*** (0.002)
Proportion of County African American		0.007*** (0.0006)		0.69*** (0.009)
Number of Observations	100	100	2,692	2,692

Note: Linear regression model, weighted by county (or VTD) population size, coefficients shown with standard errors below. *** $p < .001$, ** $p < .01$, * $p < .05$, two-tailed tests.

The takeaway from the results presented above are that the distribution of voters in

²⁰When weighted by county population, or VTD population, the results are largely consistent with those shown in Table 4.

North Carolina is such that legislative districts drawn to respect county boundaries will lead to multiple heavily Democratic districts in the most urban portions of the state while also leading to a few equally Democratic districts that incorporate the entirety of rural counties in the northeast portion of the state. These results are similar to those found in prior research into districting and the geographic distribution of voters. For example, Chen and Rodden (2013) state something similar to what I have described above. Specifically, they write:

...voters are arranged in geographic space in such a way that traditional districting principles of contiguity and compactness will generate substantial electoral bias in favor of the Republican Party. This result is driven by a partisan asymmetry in voters' residential patterns: Democrats live disproportionately in dense, homogeneous neighborhoods in large cities that aggregate into landslide Democratic districts, or they are clustered in minor agglomerations that are small relative to the surrounding Republican periphery. Republicans, on the other hand, live in more sparsely populated suburban and rural neighborhoods that aggregate into districts that are geographically larger, more politically heterogeneous, and moderately Republican. (pg. 264)

While their analysis does not consider North Carolina specifically, the geographic and partisan distribution of voters in North Carolina appears to also be consistent with their findings in other states throughout the country.

5 Conclusion

In summary, the analysis provided by Dr. Cooper is less convincing regarding the effects of redistricting on representation in North Carolina and the partisan composition of the legislature. This is for a few different reasons. First, the historical trends in North Carolina show that the state has long been trending from Democratic dominance towards the Republican party in the state legislature. This trend predates and is much larger than

any changes in the partisanship of the legislature post-2010 when Republican majorities took over the redistricting process in the state. Second, the data used by Dr. Cooper to measure the ideological views of citizens in the state are poor measures of the policy views and partisan preferences of voters and mask a large amount of variation across individuals. Furthermore, as described earlier, data on policy views in the public cannot speak to the partisan preferences of voters since policy ideology and partisanship are two very distinct factors that are not always in alignment with one another among the mass public. Finally, voters in the state are unevenly distributed across the state in a number of important ways that will impact the results of any redistricting process. This geographic distribution of voters combined with the North Carolina's "whole county provision" in the state constitution mean that densely populated areas that favor Democratic candidates and the heavily Democratic counties of the northeastern portion of the state will place many Democratic-leaning voters into these legislative districts that will therefore be strongly Democratic.

APPENDIX

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CONTACT INFORMATION

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ACADEMIC APPOINTMENTS

Brigham Young University, Provo, UT

2014 - present Assistant Professor, Department of Political Science
2014 - present Faculty Scholar, Center for the Study of Elections and Democracy

EDUCATION

Princeton University Department of Politics, Princeton, NJ

Ph.D., Politics, July 2014

- Advisors: Brandice Canes-Wrone, Nolan McCarty, and Kosuke Imai
- Dissertation: “Buying Representation: the Incentives, Ideology, and Influence of Campaign Contributions on American Politics”
- 2015 Carl Albert Award for Best Dissertation, Legislative Studies Section, American Political Science Association (APSA)

M.A., Politics, December 2011

Brigham Young University, Provo, UT

B.A., International Relations - Political Economy Focus, April, 2008

- *Cum Laude*

RESEARCH INTERESTS

American politics, congressional polarization, political ideology, campaign finance, survey research

PUBLICATIONS

15. “**Issue Politicization and Interest Group Campaign Contribution Strategies**”, with Mandi Eatough
Forthcoming at *Journal of Politics*
14. “**Conservatism in the Era of Trump**”, with Jeremy Pope
Forthcoming at *Perspectives on Politics*
13. “**Legislative Constraints on Executive Unilateralism in Separation of Powers Systems**”, with Alex Bolton and Sharece Thrower
Forthcoming at *Legislative Studies Quarterly*
12. “**Electoral Competitiveness and Legislative Productivity**”, with Soren Schmidt
Forthcoming at *American Politics Research*
11. “**Does Party Trump Ideology? Disentangling Party and Ideology in America**”, with Jeremy Pope
American Political Science Review, 2019, 113 (1) 38–54

10. **“The Evolution of National Constitutions”**, with Scott Abramson
Quarterly Journal of Political Science, 2019, Vol. 14, No. 1: 89–114
9. **“Who is Ideological? Measuring Ideological Responses to Policy Questions in the American Public”**, with Jeremy Pope
The Forum: A Journal of Applied Research in Contemporary Politics, 2018, 16 (1) 97–122
8. **“Status Quo Bias in Ballot Wording”**, with David Gordon, Ryan Hill, and Joe Price
The Journal of Experimental Political Science, 2017, 4 (2) 151–160.
7. **“Ideologically Sophisticated Donors: Which Candidates Do Individual Contributors Finance?”**, with Brandice Canes-Wrone and Sharece Thrower
American Journal of Political Science, 2017, 61 (2) 271–288.
6. **“Gender Inequalities in Campaign Finance: A Regression Discontinuity Design”**, with Daniel Butler and Jessica Preece
Quarterly Journal of Political Science, 2016, Vol. 11, No. 2: 219–248.
5. **“Representing the Preferences of Donors, Partisans, and Voters in the U.S. Senate”**
Public Opinion Quarterly, 2016, 80: 225–249.
4. **“Donation Motivations: Testing Theories of Access and Ideology”**
Political Research Quarterly, 2016, 69 (1) 148–160.
3. **“Ideological Donors, Contribution Limits, and the Polarization of State Legislatures”**
Journal of Politics, 2016, 78 (1) 296–310.
2. **“Online Polls and Registration Based Sampling: A New Method for Pre-Election Polling”** with Quin Monson, Kelly Patterson and Chris Mann.
Political Analysis 2014, 22 (3) 321–335.
1. **“Causes and Consequences of Political Polarization”** In *Negotiating Agreement in Politics*. Jane Mansbridge and Cathie Jo Martin, eds., Washington, DC: American Political Science Association: 19–53. with Nolan McCarty. 2013.
 - Reprinted in *Solutions to Political Polarization in America*, Cambridge University Press. Nate Persily, eds. 2015
 - Reprinted in *Political Negotiation: A Handbook*, Brookings Institution Press. Jane Mansbridge and Cathie Jo Martin, eds. 2015

AVAILABLE
WORKING PAPERS

“Campaign Contributions and Donors’ Policy Agreement with Presidential Candidates”

with Brandice Canes-Wrone and Sharece Thrower (invited to revise and resubmit)

“A Revolution of Rights in American Founding Documents”

with Scott Abramson and Jeremy Pope (Under Review)

“Ideology as a Second Language”

with Jeremy Pope

“Ideological Disagreement and Pre-emption in Municipal Policymaking”

with Adam Dynes

“Estimating Neighborhood Effects on Turnout from Geocoded Voter Registration Records.”

with Kosuke Imai

WORKS IN
PROGRESS

“Who’s the Partisan: Are Issues or Groups More Important to Partisanship?”

with Jeremy Pope

“Super PAC contributions in Congressional Elections”

“Preferences for Representational Styles in the American Public”

with Ryan Davis and Adam Dynes

“Partisanship and Trolleyology”

with Ryan Davis

INVITED
PRESENTATIONS

“Are Mormons Breaking Up with Republicanism? The Unique Political Behavior of Mormons in the 2016 Presidential Election”

- Ivy League LDS Student Association Conference - Princeton University, November 2018, Princeton, NJ

“Issue Politicization and Access-Oriented Giving: A Theory of PAC Contribution Behavior”

- Vanderbilt University, May 2017, Nashville, TN

“Lost in Issue Space? Measuring Levels of Ideology in the American Public”

- Yale University, April 2016, New Haven, CT

“The Incentives, Ideology, and Influence of Campaign Donors in American Politics”

- University of Oklahoma, April 2016, Norman, OK

“Lost in Issue Space? Measuring Levels of Ideology in the American Public”

- University of Wisconsin - Madison, February 2016, Madison, WI

“Polarization and Campaign Contributors: Motivations, Ideology, and Policy”

- Hewlett Foundation Conference on Lobbying and Campaign Finance, October 2014, Palo Alto, CA

“Ideological Donors, Contribution Limits, and the Polarization of State Legislatures”

- Bipartisan Policy Center Meeting on Party Polarization and Campaign Finance, September 2014, Washington, DC

“Representing the Preferences of Donors, Partisans, and Voters in the U.S. Senate”

- Yale Center for the Study of American Politics Conference, May 2014, New Haven, CT

CONFERENCE
PRESENTATIONS

Washington D.C. Political Economy Conference (PECO):

- 2017 discussant

American Political Science Association (APSA) Annual Meeting:

- 2014 participant and discussant, 2015 participant, 2016 participant, 2017 participant, 2018 participant

Midwest Political Science Association (MPSA) Annual Meeting:

- 2015 participant and discussant, 2016 participant and discussant, 2018 participant

Southern Political Science Association (SPSA) Annual Meeting:

- 2015 participant and discussant, 2016 participant and discussant, 2017 participant

TEACHING
EXPERIENCE

Poli 315: Congress and the Legislative Process

- Fall 2014, Winter 2015, Fall 2015, Winter 2016, Summer 2017

Poli 328: Quantitative Analysis

- Winter 2017, Fall 2017

Poli 410: Undergraduate Research Seminar in American Politics

- Fall 2014, Winter 2015, Fall 2015, Winter 2016, Summer 2017

AWARDS AND
GRANTS

2019 BYU Mentored Environment Grant (MEG), American Ideology Project, \$30,000

2017 BYU Political Science Teacher of the Year Award

2017 BYU Mentored Environment Grant (MEG), Funding American Democracy Project, \$20,000

2016 BYU Political Science Department, Political Ideology and President Trump (with Jeremy Pope), \$7,500

2016 BYU Office of Research and Creative Activities (ORCA) Student Mentored Grant x 3

- Hayden Galloway, Jennica Peterson, Rebecca Shuel

2015 BYU Office of Research and Creative Activities (ORCA) Student Mentored Grant x 3

- Michael-Sean Covey, Hayden Galloway, Sean Stephenson

2015 BYU Student Experiential Learning Grant, American Founding Comparative Constitutions Project (with Jeremy Pope), \$9,000

2015 BYU Social Science College Research Grant, \$5,000

2014 BYU Political Science Department, 2014 Washington DC Mayoral Pre-Election Poll (with Quin Monson and Kelly Patterson), \$3,000

2014 BYU Social Science College Award, 2014 Washington DC Mayoral Pre-Election Poll (with Quin Monson and Kelly Patterson), \$3,000

2014 BYU Center for the Study of Elections and Democracy, 2014 Washington DC Mayoral Pre-Election Poll (with Quin Monson and Kelly Patterson), \$2,000

2012 Princeton Center for the Study of Democratic Politics Dissertation Improvement Grant, \$5,000

2011 Princeton Mamdouha S. Bobst Center for Peace and Justice Dissertation Research Grant, \$5,000

2011 Princeton Political Economy Research Grant, \$1,500

OTHER SCHOLARLY ACTIVITIES Expert Witness in NANCY CAROLA JACOBSON, et al., Plaintiffs, vs. LAUREL M. LEE, et al., Defendants. Case No. 4:18-cv-00262 MW-CAS

ADDITIONAL TRAINING EITM 2012 at Princeton University - Participant and Graduate Student Coordinator

COMPUTER SKILLS Statistical Programs: R, Stata, SPSS, parallel computing

Updated April 30, 2019

I, Michael Barber, am being compensated for my time in preparing this report at an hourly rate of \$400/hour. My compensation is in no way contingent on the conclusions reached as a result of my analysis.

The information and opinions contained in this report are true to the best of my knowledge, information, and belief.

A handwritten signature in black ink, appearing to read "Michael Barber". The signature is fluid and cursive, with the first name "Michael" and last name "Barber" clearly distinguishable.

Michael Barber

April 30, 2019