The Spatial and Demographic Determinants of Racial Threat

Online Appendix

1. Different Approaches to Measuring Segregation

Social scientists have created a number of empirical metrics that evaluate the extent that demographic groups are segregated from one another. These metrics are most often used to measure the level of racially based residential segregation within a geographic unit. The Dissimilarity Index (***D***) is the most well known and most widely applied measure of segregation. The Dissimilarity Index measures the level of segregation in a geographic unit by first measuring how the distribution of two groups varies across smaller constituent units (e.g. wards within a city) and then assesses how much the observed distribution of groups departs from an even distribution where each group is proportionally represented in each unit (Massey and Denton 1993, 20). There is much that can be said for Dissimilarity Index, it is easy to calculate and interpret; the formula produces a measure of segregation that ranges from zero to one, with one being complete segregation and zero being complete evenness. The formula used to compute the ***D*** statistic is shown below:

$$D = \frac{1}{2}\sum_{i=1}^{n}\left|\frac{b_i}{B} - \frac{w_i}{W}\right|$$

Where,

B represents the total number of African Americans in the precinct;

b_i represents the number of African Americans in all of the constituent census blocks;

W represents the total number of whites in the precinct;

and w_i represents the white population in the constituent census blocks.

The interpretation of the ***D*** statistic is straightforward; the number is the percentage of one group (group ***B*** in our notation) that would need to move in order for the distribution of the two groups to be uniform across the constituent units. For instance, if a city composed of whites and African Americans had a ***D*** value of .9 (a value that indicates extreme levels of segregation), the substantive interpretation is that 90 percent of African Americans would need to relocate in order to make the racial distribution of African Americans uniform across the constituent geographic units.

However, there are some potential problems with the Dissimilarity Index (and the similar Gini coefficient of segregation) when applying the measure in instances with small samples of group members. One problem stems from integer constraint. In a precinct that made up of 20 blocks but only contains 10 African Americans, evenness is not possible because each block would need to contain one-half of an African American (Carrington and Troske 1997, 402)**.** Secondly, the smaller the population of African Americans within a unit, the more the distribution of individuals across blocks is subject to unevenness as result of the random allocation of individuals. According to Carrington and Troske, "In samples with small units and small minority shares, random allocation implies substantial unevenness, and hence substantial segregation, as measured by conventional indexes. In contrast, random allocation generates little unevenness in large units and large minority shares (1997, 402)." The end result of integer constraint and the effect of randomness in small geographic units with small minority populations are high ***D*** values. However, these high ***D*** values are an artifact of measurement opposed to a reflection of substantive geographic division between whites and blacks—hence there is a mismatch between measurement and the concept of theoretical interest.

We face the problem of measuring segregation in small units directly; we are attempting to measure segregation within a precinct. As we show in *Figure A1*, the size of the population of whites and blacks in each precinct is limited by the bimodal distribution of whites and blacks across precincts; most precincts are predominately white or black. This means that there is often a very small sample of the non-majority racial group within each precinct. We have developed an alternative measure of within precinct segregation in an effort to overcome the limitations posed by other measures.

(Figure A1 Here)

We utilize the population variance of the constituent blocks to measure segregation within the precincts. The equation is depicted below:

$$Variance = \frac{1}{n}\sum_{i=l}^{n} w_i(x_i - \bar{x})^2$$

Where,

n is the number of census blocks in the precinct;

w is the block ***i***'s proportion of the precinct's population;

x is block ***i***'s proportion of blacks (or whites);

and $\bar{\mathbf{x}}$ is the precinct's proportion of blacks.

Using the population variance as a measure of segregation effectively turns the question from "what percentage of African Americans would have to move to create evenness across the constituent units" to "how similar are the constituent units to one another?"

Possible values range from 0 (complete evenness) to .25 (total segregation). Evenness can be conceived of in two ways. Precincts that are composed of census blocks that are all black or all white have a variance of zero, meaning all the constituent blocks are of equal composition. Likewise, if a voting district is composed of two blocks of equal population, both of which are

half black and half white (complete evenness), the variance will be zero. The biggest difference between our measure and the ***D*** statistic is how the measures quantify segregation in units with small minority populations. For example, lets assume there is a precinct that is composed of 10 constituent blocks and ten individuals live in each block. Furthermore, lets also assume that 99 of these 100 individuals are white and 1 is black. The **D** value for this block is extremely high, .9. Complete evenness can only be achieved with .1 African American in each block, which is obviously not a meaningful number. Our estimate of segregation for this district is very low, .00091. We argue that our measure better captures the underlying concept because our measure discounts any instances where the black (or white) population is too small to be informative. Additionally, our measure is capable of capturing substantively important amounts of segregation. If a voting district were composed of two blocks of equal population, one 10% white and another 90% white, the variance would be .16 and we would consider this to be a highly segregated voting precinct.

As *Figure A2* makes clear, precincts are small units and the majority of precincts have a very small total number of African Americans residing in them. The small number of African Americans in each precinct makes an alternative measure of segregation necessary, and we feel that the measure that we utilize in this paper effectively deals with this potentially confounding issue. However, given the much larger sample size, it is possible to effectively use the Dissimilarity Index to measure segregation on the parish level. In *Table 1A* we replicate our analysis from *Table 2* in the main document, only we utilize the Dissimilarity Index (opposed to the population variance) to measure segregation on the parish level. The substantive conclusions that we can draw from these models are the same as the conclusions we can draw from models presented in the main body of the paper.

(Figure A2 and Table A1 Here)

2. Using ArcGIS to Construct Precinct Level Variables out of Block Level Census Data.

In order to control for precinct level economic variables on community level electoral preferences that are separate from racial attitudes, we need account for white and African American income on the precinct level. One major development that allows us to introduce these variables into the analysis is the use of the ESRI ArcGIS software package. This mapping software allows us to examine more refined geographic areas with greater ease than previous scholars. Block group level data on income, education, and age were retrieved from the 2000 and 2010 US Census. ArcGIS software allowed us to create demographic values voting districts on these variables. By overlaying census block level data and voting precincts we get accurate measurements of precinct level income levels which is useful for separating neighborhood level class interests from neighborhood level racial interests. Aggregating block group data into voting districts is problematic; as the former is larger enough that it may not be fully contained within one voting district. Our method overestimated the number of individuals belonging to each age or income bracket by thirty to fifty percent. This means that individuals are being counted more than once due to their block group of residence lying within two voting districts. We use proportion of individuals in each bracket in our analyses, so the overestimation itself is not the problem, but the incorrect proportion of individuals in the group. Type II error is therefore introduced into our analysis, as demographic differences between districts are smoothed out, making each look more like its neighbors. We are comfortable tolerating this problem, because there seems to be no clear solution. The ultimate effect is that the relationship we seek to uncover will be harder to find.

Works Cited

Carrington, W.J. & Troske, K.R. 1997. On Measuring Segregation in Samples with Small Units. *Journal of Business & Economic Statistics*, 15(4): 402-409.

Massey, D. & Denton, N. 1993. *American Apartheid: Segregation and the Making of the Underclass*. Harvard University Press: Cambridge, MA.

Table A1: HLM Models Regressing White Turnout on Precinct Level Racial Composition and Segregation using the Dissimilarity Index to Measure Parish Level Segregation

EQUATION	*VARIABLES*	*2000 –- Interactive*	*2004 – Interactive*	*2008 – Interactive*
White Turnout	Precinct % AA	-0.060***	-0.044**	-0.24***
		(0.020)	(0.018)	(0.022)
	Intra-Precinct Segregation	-0.17**	-0.0044	-0.094
		(0.081)	(0.075)	(0.082)
	Adjoining Precinct % AA	0.061***	0.024*	0.039***
		(0.014)	(0.013)	(0.012)
	Republican Two Party Vote % (Precinct)	0.28***	0.27***	0.064***
		(0.024)	(0.023)	(0.024)
	Median White Income (Precinct)	0.0026***	0.0026***	0.00023
		(0.00041)	(0.00039)	(0.00021)
	Latitude	-0.021***	-0.015***	-0.000061
		(0.0044)	(0.0043)	(0.0053)
	Median White Age (Precinct)	0.0060***	0.0029***	0.0069***
		(0.00094)	(0.00090)	(0.00084)
	% With HS Diploma (Precinct)	0.083***	0.12***	0.20***
		(0.024)	(0.022)	(0.020)
	New Orleans Parish	-0.081**	-0.090***	-0.20***
		(0.032)	(0.033)	(0.043)
	Precinct % AA* Inter-Precinct Segregation	1.42***	1.16***	1.58***
		(0.18)	(0.17)	(0.17)
	Parish % AA	0.60***	0.42***	0.039
		(0.19)	(0.16)	(0.23)
	Parish Segregation (***D***)	0.13	0.051	-0.30**
		(0.11)	(0.096)	(0.15)
	Parish % AA * Parish Segregation (***D***)	-0.70**	-0.43*	0.34
		(0.30)	(0.25)	(0.37)
	Constant	0.65***	0.70***	0.37*
		(0.14)	(0.15)	(0.20)
	Observations	2,929	3,298	3,382
	Number of groups	52	61	64

Figure A1: The Distribution of the African American Population Across Precincts

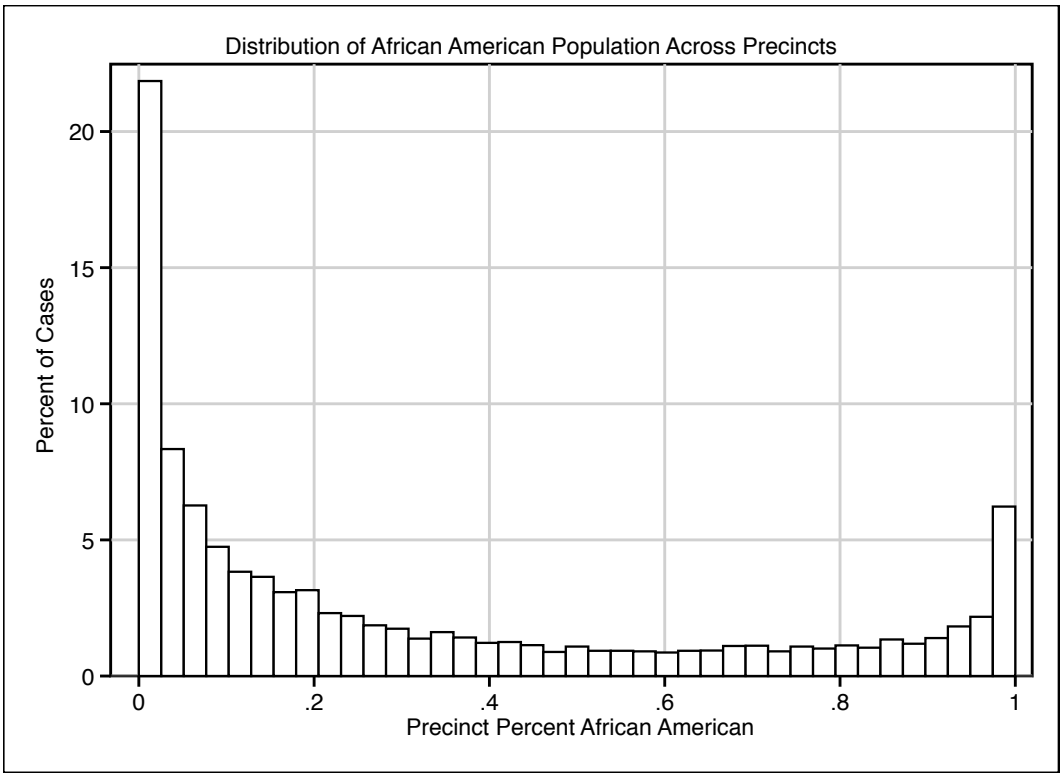

Figure A2: The Total Number of African Americans Across Precincts