Multivariate Methods and the Analysis of Racially Polarized Voting: Pitfalls in the Use of Social Science by the Courts

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The author discusses potential pitfalls in drawing conclusions from multivariate analysis of voting patterns as it relates to testimony offered in voting rights cases about the presence or absence of racially polarized voting. However, the methodological issues discussed are of broader relevance to deciding what statistical techniques are appropriate for descriptive as opposed to explanatory purposes.

Before a given redistricting plan will be held to dilute a given minority group's voting rights in violation of the Voting Rights Act of 1965 (as amended in 1982), federal courts have required that a showing be made that voting is polarized along racial (or ethnic) lines.[1] Until 1986, when most of the questions about how the term "racially polarized voting" was to be defined and measured were settled by the U.S. Supreme Court in the leading voting rights case of the decade (*Gingles v. Edminsten,* 590 F. Supp. 345 (1984); heard sub nom. *Thornburg v. Gingles,* 478 U.S. 30 (1986)), there were a number of important issues involving the intersection of law and social science that were confronted by federal courts facing conflicting testimony about polarized voting from social scientists testifying for opposing sides in voting rights litigation. Even after *Thornburg* some issues relating to racially polarized voting continue to be litigated. Among the issues that have been raised over the past decade are (1) claims about improper use of

[1] Most voting rights cases involve two voting blocs: whites and blacks. Voting rights cases in the Southwest often involve the voting differences between Hispanic voters and the residual set of voters, most of whom are Anglo (non-Hispanic white) voters. Hispanics, i.e., persons of Spanish heritage, customarily operationalized as those who self-identify as Spanish origin on the U.S. Census, are a protected group under the 1975 amendments to the Voting Rights Act of 1965. In some recent voting rights cases blacks and Hispanics have been treated as a combined class, and their voting behavior contrasted with that of nonminority persons: see, e.g., *Lulac v. Midland Independent School District,* 812 F.2d 1494, 1500 (5th Cir.), vacated and aff'd on other grounds, 829 F.2d 546 (1987). In other recent cases, including several in California, however, sufficient commonality in the voting choices of blacks and Hispanics has not been found to allow them to be treated as a combined group.

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statistical methodology giving rise to an ecological fallacy (cf. Robinson, 1950); (2) claims that polarization does not exist as long as white candidates supported by blacks are elected; and (3) the claim that racially polarized voting requires a showing that voting is motivated by racial animus.

The claim that racially polarized voting required a showing of racial animus was rejected by the Supreme Court when it defined polarization as simply a situation in which "black voters and white voters vote differently" (*Thornburg*, at 53 n. 21). The Court then held that racial bloc voting rose to the level of legal significance when "the white majority votes sufficiently as a bloc to enable it—in the absence of special circumstances, such as the minority candidates running unopposed—usually to defeat the minority's preferred candidate" (*Thornburg*, at 51, internal citations omitted).

The relevance of contests involving only white candidates to a showing of racial polarization has not yet been definitively resolved by the U.S. Supreme Court, but most courts have held that the inability of blacks to elect candidates of choice, *except* when those candidates are white, is evidence of an unequal opportunity to participate in the political process (see, e.g., *Citizens for a Better Gretna v. City of Gretna* (D. La. 1988), cert. denied 1990).

In *Thornburg* the Supreme Court held that reliable inferences about voting behavior could be derived from two techniques making use of aggregate-level data, namely bivariate ecological regression and homogeneous case analysis (see Loewen, 1982; Grofman, Migalski, and Noviello, 1985). These are now the standard and accepted methodologies for proving racially polarized voting, despite sometimes vigorous challenge (see, e.g., Wildgen [1990] where he repeated arguments against ecological regression that he offered unsuccessfully to a federal district court; see also rebuttal to Wildgen in Loewen [1990]. The findings of experts using ecological regression and homogeneous case analysis have only rarely been rejected by federal courts.[2] Rejection is almost unheard of when the experts using these techniques make proper use of the sort of statistical checks and safeguards described in Grofman, Migalski, and Noviello (1985) or Loewen and Grofman (1989). These techniques are now commonly used by social scientists testifying on behalf of defendants as well as by those testifying on behalf of plaintiffs. Indeed, in several recent cases (e.g., *McNeil v. City of Springfield* (D. Ill. 1987)) opposing experts have presented virtually identical calculations as to levels of racial bloc voting.

In this research note I critique the multivariate methodology that has been used by a number of social scientists testifying as experts in voting rights cases. These experts have used multivariate analyses to rebut evidence of polarized voting by a showing that the "real reasons" why blacks and

[2] In other cases, where highly homogeneous precincts were not available, federal courts have accepted analyses based on comparisons of voting behavior in the most highly minority precincts as compared to the most highly white (Anglo) precincts (see, e.g., *Gomez v. City of Watsonville*, CV-85-20319-WAI (9th Cir. July 27, 1988)).

whites voted differently had nothing to do with race, but could be accounted for in terms of factors such as differences in values among different groups of voters, differences in candidate expenditures, differences in newspaper endorsements, and differences in candidate issue positions. A number of variables are entered into a multivariate regression, along with race, and the claim is made that, unless race retained an independent explanatory role in accounting for candidate vote percentages, race is not relevant and thus voting is not "really" racially polarized.

Attempts to rebut the results of an analysis of voting patterns that shows differences in the voting behavior of minority voters and white voters by using multivariate analysis almost certainly have been legally dead since 1986;[3] however, they continue to be made by expert witnesses.[4] Even more importantly for the concerns of this research note, the multivariate approach used by social scientists testifying in voting rights cases raises important methodological issues about proper model specification to uncover effects as compared to what is appropriate in order to understand causation. The notion that, in statutory terms, bloc voting requires something beyond a pattern of differences in voting between groups was decisively rejected by Justice Brennan in his opinion in *Thornburg*. Justice Brennan (speaking for himself and three other justices) asserted that it is the "differences between the choices made by blacks and whites—not the reasons for the differences" that matter. The 1982 amendment to Section 2 of the Voting Rights Act of 1965 was explicitly designed to eliminate an intentional discrimination test and to replace it with an "effects test." This prohibition against the intent standard applied with equal force to voter intent. Whether voters were or were not racist in their motivation was, in the view of Congress, irrelevant (as well as effectively unknowable). All that mattered was that the level of bloc voting had the effect of denying minorities an equal opportunity to elect candidates of choice (Grofman, 1985; Engstrom, 1985).

Fundamental flaws exist in most multivariate approaches to bloc voting analysis used to date, because they confuse etiology with existence. The misleading nature of such analyses can be illustrated by a more detailed discussion of the pitfalls of multivariate methods as used in a specific case, *McCord v. City of Fort Lauderdale*. While this flawed methodology is no longer of legal relevance, it remains of interest for two reasons. First, its

[3]The claim that a multivariate model is needed to insure that observed differences in voting patterns are "caused" by race is found in Judge Higgenbotham's concurring opinion in *Jones v. City of Lubbock*, 727 F.2d 364 (5th Cir. 1984)—but it is an obiter dictum. Effectively, there is now a majority on the U.S. Supreme Court for the contrary view, that offered by Justice Brennan in his plurality opinion in *Thornburg*, since Justice White, in a separate opinion in that case, stated explicitly that "offering evidence that the divergent racial patterns may be *explained* in part by causes other than race cannot rebut a showing of racial bloc voting" (*Thornburg* at 2792, emphasis added).

[4]E.g., by Dr. Robert S. Miller, in his 25 August 1988 affidavit in *Chisom v. Edwards*, No. 87-3463 C.D. La., numbered para. 6, and his subsequent (1989) testimony in that case. That case is now (May 1990) on appeal.

pitfalls provide a useful illustration of the potential problems in using multivariate methods to reach causal conclusions. Second, it provides a powerful reminder of how social science testimony seemingly rooted in powerful statistical tools can mislead attorneys (and judges) not trained to find the substantive errors in the application of that methodology. In *McCord,* defendant's expert Charles Bullock offered a multivariate regression analysis that became the model for a number of subsequent attempts to rebut a showing of racially polarized voting based simply on bivariate regression results or homogeneous case analysis. The analysis offered by Bullock in *McCord* was related to his own previously published 1984 work on racial voting patterns. In the 1984 article, racial crossover was the independent variable; in *McCord,* votes received by each black or white candidate was used as the independent variable instead of votes received by the set of white or black candidates as a whole. In the 1984 article, black candidates were looked at as a class; in *McCord,* each candidate's vote total was looked at separately. In the 1984 article, only those election contests in which there was at least one black candidate were used; in *McCord,* all election contests were included, even though the overwhelming majority of them were white-versus-white contests.[5]

Bullock testified in the Fort Lauderdale case that, because the variable, "race of candidate," was not significant in explaining variance in the dependent variable (raw candidate votes) beyond what could be accounted for by other variables, this meant that race was not really a factor in accounting for voting patterns in Fort Lauderdale. Both the district and the appellate courts in *McCord* accepted this interpretation of the multivariate regression result as implying that voting in the city was not racially polarized: "When race was added to other independent variables applied to voting statistics for past city commission races, the race factor explained only .6 of one percent of the dependent variables [*sic*] of candidate success, thus leading defendant's expert and the district court to conclude that race was not a statistically significant variable" (*McCord v. City of Fort Lauderdale, Florida,* 787 F.2d 1528 at 1532 (11th Cir. 1986)). This interpretation is simply wrong. Indeed, Bullock, in being asked about his *McCord* multivariate analysis in a subsequent voting rights lawsuit in which he testified for the defendant jurisdiction (in Springfield, Illinois), has abandoned this type of analysis as methodologically unsound (*McNeil v. City of Springfield,* No. 86-2365 (C.D. Ill. Jan. 12, 1987), slip op. at p. 36, numbered para. 76). However, this recanting is not as widely known as his original misleading analysis.

The multivariate methodology used in *McCord* is misguided for four reasons. (Similar flaws are found in expert witness testimony by experts for

[5] While I find the analysis in the original article (Bullock, 1984) to be flawed, these flaws are greatly enlarged in the expert witness testimony which this article inspired.

defendant jurisdictions in *Citizens for a Better Gretna v. City of Gretna, Louisiana* (D. La. 1988), and in *Romero v. City of Pomona* (D. Cal. 1986), where experts largely copied Bullock's *McCord* methodology.)

First, if there are many more white candidates than black candidates, then race of candidate cannot possibly explain most of the variance in election success, since most of the contests are white versus white. Including the votes for white candidates in white-white contests among the data to be explained necessarily reduces the possible explanatory power of the "race of candidate" variable. In Fort Lauderdale, in the elections under investigation, there were 7 black candidates and 75 white candidates running for city commission between 1970 and 1979.

Second, the methodology used in *McCord* is virtually certain to show that there is no racially polarized voting, regardless of the actual level of racially polarized voting in a jurisdiction, because there are so many other variables collinear with race used that they almost certainly will reduce significance of race in a multivariate regression. That race, when entered as the last variable in a multivariate regression equation that contains incumbency, campaign spending, newspaper endorsements, candidate gender, and levels of voter turnout (by race) as the earlier explanatory independent variables, adds no further explanatory power, in fact, tells us nothing of interest about racial polarization in black-white contests—in Fort Lauderdale, or elsewhere. Many of the variables that are used as independent variables in this multivariate regression are surrogates for race (or at least highly correlated with it). If, for example, blacks are rarely endorsed by local newspapers, then the fact that including newspaper endorsement in a multivariate model reduces or even eliminates the effect of the race of candidate variable certainly does not imply that race was not a significant factor.

As the opinion of the dissenting circuit court judge in the 11th Circuit opinion in *McCord* pointed out, the additional factors that are commonly entered in a multivariate analysis of candidate success such as "campaign expenditures, education, income, media advertisement, religion, name recognition, position on key issues—are also closely correlated to race. It is a safe bet that blacks spend less on their campaign and on media advertisements because the overwhelming majority of their contributors are black and poor" (Judge Swygert, in *McCord v. City of Fort Lauderdale,* 787 F.2d 1528 at 1535 (11th Cir. 1986); cf. Engstrom [1985]).[6]

Similarly, if most incumbents are white, then a finding that incumbents do better than nonincumbents regardless of race of nonincumbents does not imply that race of candidate is irrelevant to outcome. When blacks become incumbents they may do well, but racially polarized voting may make it considerably less likely that black candidates will attain this status than will whites.

[6]This is exactly the point made subsequently by Justice Brennan in the plurality opinion in *Thornburg.*

Third, factors that account for the dispersion of votes among individual white candidates and/or the dispersion of votes among individual black candidates can be entirely irrelevant to the question of how well black candidates fare as a class. Consider the example shown in Table 1, where H refers to high spending, M to medium spending, and L to low levels of spending, and I refers to incumbent status.

TABLE 1

Hypothetical Election Results (in Percentage Vote Share) among Two Black Candidates (B1, B2) and Six White Candidates (W1, W2, W3, W4, W5, W6) under Conditions of Low (L), Medium (M), and High (H) Campaign Expenditure

Election	Candidates							
	B1	B2	W1	W2	W3	W4	W5	W6
1	20 (M)		80 (H, I)					
2	20 (M)		61 (H, I)	19 (M)				
3	20 (M)		36 (M, I)	24 (M)	20 (L)			
4	20 (M)		31 (M, I)	20 (M)	19 (M)	10 (L)		
5	10 (L)	10 (L)	80 (H, I)					
6	10 (L)	10 (L)	61 (H, I)	19 (M)				
7	10 (L)	10 (L)	36 (M, I)	24 (M)	20 (M)			
8	20 (M)		39 (M, I)	20 (M)	19 (M)	10 (L)		
9	20 (M)		31 (M, I)	20 (M)	19 (M)	10 (L)		
10	20 (M)		31 (M, I)	20 (M)	19 (M)	10 (L)		
11	20 (M)		31 (M, I)	20 (M)	20 (M)	9 (L)		
12	20 (M)		31 (M, I)	20 (M)	20 (M)	9 (L)		
13	20 (M)		24 (M)	16 (M)	16 (M)	16 (M)	8 (L)	
14	10 (L)	10 (L)	24 (M)	16 (M)	16 (M)	16 (M)		8 (L)

Let us posit that 20 percent of the electorate is black and voting is 100 percent racially polarized. Thus, all the votes for the black candidates come from black voters. If there is one black candidate, then he receives 20 percent of the vote. If there are two black candidates, each gets 10 percent of the vote. Let us also posit that, if there is one black candidate, he will have a medium level of campaign expenditure. Similarly, assume that, if there are two black candidates, each will have a low level of expenditure because resources in the black community are limited. Let us also assume that incumbents do better than nonincumbents regardless of comparative expenditure levels, but especially when their expenditure level is high. In the above example, we have created a situation in which voting is about as racially polarized as possible and no black candidate ever wins. What will the multivariate approach used in *McCord* claim to tell us about racial bloc voting? It will tell us (wrongly, of course) that race is irrelevant, because the bivariate correlation between vote and race of candidate is only .27 and because campaign expenditure level and incumbency status combined explain 67.7 percent of the variance ($r = .83$), while adding race of candidate to a mul-

tivariate equation with these two variables explains no additional variance. Indeed, in this multivariate equation race is statistically insignificant (t = .012; p = .99) and, thus, according to the reasoning accepted by the lower court in *McCord*, voting cannot be polarized, despite the fact that no white ever votes for a black candidate.

Fourth, if the election does not involve a head-on-head contest, but rather a vote-for-several situation (as was true in Fort Lauderdale's multimember districts where each voter was able to cast up to five votes and there were no numbered places), then the problems we have identified above are even further exacerbated. In particular, minorities may do much better in multicandidate contests because, in such contests, white voters split their votes among a number of white candidates. The fact that number of candidates is related to minority candidate success tells us nothing, however, about the magnitude of racially polarized voting. Number of candidates and minority success could well be highly correlated even if voting were completely polarized along racial lines. Indeed, in the example above, if we add number of candidates to campaign expenditure and incumbency level, we can account for 74 percent of the variance (r = .86). Moreover, there is a statistically significant bivariate correlation between number of candidates and the average vote for minority candidates. Of course, the correlation between number of candidates and the total vote for black candidates is zero. That is because the level of support for black candidates is constant in all elections. All that can change is the number of black candidates among whom votes are split.

Social science methodology has proved to be of critical importance in voting rights cases, especially in the analyses of voting patterns (Grofman, Migalski, and Noviello, 1985; Loewen and Grofman, 1989). When used with both care and common sense, regression methodology has been invaluable to courts in answering factual questions related to the legal issue of vote dilution. Nonetheless, as used so far by expert witnesses for defendants in voting rights cases, multivariate regression methods have produced misleading results about the levels of or existence of racial bloc voting patterns, and have served mainly to misuse statistics and confuse courts. There is no easy way for courts to choose among competing expert opinions except through the adversarial process. However, I believe it important that the social science methods used in courts be subject to professional scrutiny in academic forums as well. In the courtroom, in the context of a dispute about specific case facts, and in the straitjacket of a question-and-answer format, important methodological and theoretical points are all too easily lost to view. **SSQ**

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