The Impact of Majority-Minority Districts on Congressional Elections

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Abstract

We utilize the Cox and Katz (1998, 2002) bargaining model of the redistricting process and data from the 1972-2000 House elections to answer two questions: first, does the creation of majority-minority districts increase the likelihood that minority candidates will be elected in those districts? Second, does the creation of majority-minority districts also generate pro-Republican gerrymanders? We demonstrate that after controlling for the proportion of minorities in a state, as the proportion of majority-minority districts increases, the proportion of minorities elected to the House increases as well, regardless of which party controls the redistricting process. This result is consistent with previous research. To test the hypothesis that majority-minority districting has "perverse-effects," the seats-votes curves are estimated for each election, allowing for the partisan or bipartisan control of the redistricting process and the presence of majority-minority mandates. We demonstrate that there is no significant difference in the level of partisan bias observed under redistricting plans with majority-minority districts and those without majority-minority districts. The claim that majority-minority districting has "perverse-effects" is not supported by the data.

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1 Introduction

In 1994 the Democrats lost control of the House of Representatives for the first time in 40 years. A question, then, is whether changes in the electoral environment led to the Republican victory. Pursuant to the Voting Rights Act of 1965 and related legislation, majority-minority districts (MMDs) were created in an attempt to increase descriptive representation of minorities. It has been argued that this increased number of MMDs created pro-Republican gerrymanders; this is the so-called "peverse-effects" claim. For instance, after the 1980 round of redistricting, there were 27 majority-minority districts, whereas in 1992, there were 56. There were 30 minority representatives in 1982 (5 from non-MMDs), and 55 in 1992 (4 from non-MMDs). The number of MMDs increased, and the number of minorities elected to Congress went up as well. However, there was also a significant seat swing to the Republicans in Congress at the same time. In the House, the Republicans gained 52 seats in 1994, giving them a 230-204 majority. In the Senate, the Republicans gained 8 seats, giving them a 53-47 majority. We know that racial redistricting can at best provide only a partial answer to the Republican gains as there is no way redistricting caused the seat swings in the Senate.

The nature of single-member districts is such that a minority group may not be able to elect a candidate of its choice without a large concentration of minority voters in a particular district. Since majority-minority districts concentrate minority votes within a single district, it follows that MMDs may increase the election of minority candidates in those districts. In fact, there is a general agreement in the literature that as the proportion of minorities in a district increases, the likelihood that a minority candidate will be elected to Congress increases as well (Grofman, et al. 1992, Swain 1993, Lublin 1997). The casual evidence presented above supports the claim that majority-minority districts increase descriptive representation of minorities, but further investigation is necessary.

Does the creation of majority-minority districts generate pro-Republican gerrymanders? It has been argued that while MMDs appear to increase descriptive representation for minorities, the overall effect of majority-minority districting may be to decrease substantive representation of minorities. Majority-minority districting involves packing large numbers of minorities into a small number of districts. Because minorities traditionally vote Democratic, this has the potential "perverse-effect" of decreasing the Democratic influence in the remaining districts, and in turn, making them safer for Republicans. It is possible, then, that although the intention behind majority-minority districting might be to increase opportunities for minorities to be elected to office, in practice majority-minority districting might be decreasing policy representation for a large fraction of minorities.

Most of the work on the perverse-effects claim was conducted soon after the Republican takeover in 1994. Because there was not yet much data available, many of the studies relied on rather strong assumptions in their models. For example, counterfactuals are often posed to ask what would have happened in the election if MMDs were not present. The estimates of the number of Democratic seats that were lost due to redistricting vary greatly. For example, some have argued that MMDs have not positively affected Republicans (Engstrom

1995), while others estimate that the Democrats lost as many as four seats in 1992 and two more in 1994 (Bullock 1995), or seven seats in 1992 and four more in 1994 (Lublin 1997).

This paper makes two contributions to the previous literature on this topic. Because the impact of a redistricting plan is not typically felt in the first election under the plan, we use data from the 1972-2000 congressional elections, allowing us to analyze the impact of each redistricting plan over several election cycles. Second, an econometric model that arises from the Cox and Katz (1998, 2002) bargaining model of the redistricting process is used to predict how the introduction of majority-minority districting into the redistricting process will affect the translation of votes into seats in Congress. The large amount of data, combined with the model of the redistricting process, allows us to conduct a controlled comparison of redistricting plans with MMDs and those without MMDs. Not surprisingly, the data indicate that there is a positive increase in descriptive representation of minorities when majority-minority districts are present in the redistricting plan. This is consistent with the previous research. We show further that there is no evidence to support the "perverse-effects" claim. Redistricting plans with MMDs do not exhibit a pro-Republican bias more than plans without MMDs.

The paper proceeds as follows. In Section 2, we first discuss types of gerrymanders and the perverse-effects claim in more detail. We then extend the Cox and Katz (1998, 2002) model of congressional redistricting to include mandates for majority-minority districting. In section 3, we present the data and discuss the estimation techniques. We then demonstrate that although the presence of majority-minority districts increases descriptive representation of minorities, the claim that this is at the expense of substantive representation is not supported by the data. Section 5 concludes.

2 A Congressional Redistricting Model

In this section we discuss the redistricting process in more detail. We then present the formal model of congressional redistricting by Cox and Katz (1998, 2000) and extend the model to incorporate the constraint imposed on the redistricting process by majority-minority mandates. The model motivates the econometric specification we use to estimate the impact of MMDs.

2.1 Types of Gerrymanders

There are three types of gerrymanders discussed in the literature: partisan, incumbent-protecting, and "racial gerrymanders". Redistricting plans that are drawn to maximize the seats of the party in control of redistricting are known as partisan gerrymanders. If there is not a party in control of the state legislature, then a bipartisan group may choose to draw the district lines to the benefit of the current officeholders. This is known as the incumbent-protecting gerrymander.

Of course, even if one party controls the state legislature, incumbent-protecting gerrymanders can still arise. Typically partisan gerrymanders involve taking party supporters from districts the party already holds and placing them in districts the party wants to obtain. The hope is that the incumbent's chances for re-election will only marginally decrease, while the chances of claiming an adjacent district will increase substantially. One problem is that incumbents might not view the changes in their re-election prospects as minimal.

The third type of gerrymander is the "racial gerrymander,"[1] which is the manipulation of district lines to either benefit or harm a particular racial group. Many of the majority-minority districts in our data were created because of a constraint imposed or threatened by the Department of Justice to enforce Section 2 of the Voting Rights Act. These districts were generated with the hope of increasing the opportunity for minorities to elect candidates of their choice. Given that many minority groups traditionally vote Democratic and majority-minority districting often involves packing large numbers of minority voters into a small number of districts, redistricting plans with MMDs have the potential to look like a pro-Republican gerrymander.

The three types of gerrymanders differ by the goals of those in charge of drawing the district line. During the redistricting process, there are often several actors with divergent interests involved, such as partisans, incumbents, and the courts. We would like to see how these players interact to arrive at a final redistricting plan. Cox and Katz (1998, 2002) model the bargaining that occurs when strategic parties must choose a redistricting plan. Although the literal output of the redistricting plan is a set of lines and boundaries mapping out the congressional districts in the state, the politicians involved only care about the allocation of the seats at stake. One feature of the Cox and Katz model is that it allows us to abstract away from the actual line drawing and focus on the political characteristics of the redistricting process. In the model, the party (or parties) in control of redistricting select a set of parameters that capture the way votes will translate into seats, with the goal of maximizing their expected seat share. In the case of a bipartisan legislature, the two parties must bargain with one another while trying to achieve their separate goals. The redistricting plan is then a set of lines that implements the set of parameters selected by the redistricters.

What happens when the parties in charge of redistricting are faced with a federal mandate to create majority-minority districts? Shotts (2001) develops a model of optimal gerrymandering under the constraint of a majority-minority mandate when control of the legislature is unified partisan. He compares the party's optimal strategy choice and the electoral outcomes resulting in the model, both with and without the imposition of the majority-minority constraint. Our approach is similar. We introduce majority-minority mandates into the Cox and Katz model, by allowing the mandates to act as a constraint on the actors' strategy sets, under partisan and bipartisan control of the legislature.[2] The impact of the mandates is then

[1] Although our focus is on gerrymanders that are drawn pursuant to the Voting Rights Act to benefit a particular minority group, racial gerrymandering has been used to hinder minority voting rights. For a detailed discussion of the legal history of minority voting rights, please see Kousser (1999).

[2] There are several choices when deciding how to model optimal partisan gerrymandering. In particular, see Shotts (2001) and Owen and Grofman (1988). We focus on the Cox and Katz model because it leads

determined by comparing the outcomes that arise from the bargaining process under the constrained and unconstrained models.

2.2 An Outline of the Redistricting Model

The basic elements of the Cox and Katz (1998, 2002) model are enumerated here. In a given state, there are two parties - Republicans and Democrats. The parties are assumed to prefer more seats to fewer and to be risk averse. There are two main features that affect the way votes are translated into seats - partisan bias and responsiveness. The redistricting process is thought of as having two steps - a strategic choice about the levels of partisan bias and responsiveness the plan will exhibit, and a set of lines that implement these levels. The drawing of the lines is ignored here; the focus is on the choice of bias and responsiveness levels. Partisan bias is the difference between the Democrats' expected seat share under an average vote share of 0.5, and a seat share of 0.5 under an average vote share of 0.5, while responsiveness is a measure of how much seat shares change as the vote share changes (Cox and Katz 1998, 2002). Informally, partisan bias is the bonus in seats the party winning the most votes receives, whereas responsiveness determines whether one party receives more favorable "terms of trade" in the translation of votes into seats. The strategy choice for each party is the level of bias and responsiveness it would ideally like the redistricting plan to have. The parties bargain with one another in an attempt to implement their bias and responsiveness goals.

One way to think about bias and responsiveness is to consider the different strategies for drawing a redistricting plan. When the party in charge of redistricting seeks to draw district lines to increase partisan bias in their favor, they want to "pack" as many of the other party's supporters into as few districts as possible - creating many winning districts for the "in-charge" party and few inefficiently safe districts for the other party. If the "in-charge" party believes it will garner a majority of the votes in the state, a strategy might be to generate districts that are similar in composition to the state as a whole, creating more marginal districts and increasing the responsiveness of the system. Under this strategy, whichever party gets the most votes overall will win all of the seats.

The relative bargaining strength of the two parties depends on the partisan control of the state government and the type of reversionary plan in place. Partisan control is defined as unified Democratic, divided, or unified Republican based on the composition of the state legislature and the party of the governor, taking into account the state laws concerning gubernatorial vetoes and legislative overrides. The reversionary plan is a legally defined default that goes into effect if the governor and the state legislature can not agree upon a new plan.[3] Cox and Katz (1998,2002) were interested in how the court's decision in *Wesberry v. Sanders* (376 U.S. 1) changed the reversionary outcome of the redistricting process and consequently, the bargaining

directly to a testable empirical formulation.

[3]For a complete discussion of reversionary plans and their impact on the bargaining process, please see Cox and Katz, 2002, p.24-27.

outcome. For our purposes, we take the reversionary outcome as given, and focus on how a mandate to create majority-minority districts affects the bargaining outcome.

2.3 The Formal Setup

The seat share that a given party wins, $s(v;\lambda,\rho)$, is written as a function of the level of partisan bias, denoted λ, and responsiveness, denoted ρ, as well as the average vote share that the party wins, v. (Cox and Katz 1998, 2002). The parameters (λ,ρ) are assumed to affect the translation of votes to seats according to the following formula:[4]

$$\left(\frac{s}{1-s}\right) = e^{\lambda}\left(\frac{v}{1-v}\right)^{\rho} \tag{1}$$

Partisan bias can be interpreted as a percentage difference between the curve, given λ, ρ, and v_o, a fixed value of v, and the curve, given $\lambda = 0$, ρ, and v_o.[5] Responsiveness of the plan is judged relative to $\rho = 1$. That is, when $\rho = 1$ both parties receive seat shares equal to their vote shares, while when $\rho < 1$, the corresponding seat share is greater (less) than the vote share of the party winning the smaller (larger) share of the votes. To better understand the relationship between the parameters (λ,ρ) and the seats-votes curve, see Figures 1 and 2.

In Figure 1, two curves are drawn: $s(v;0,1)$ and $s(v;0,3)$. Since λ is set to zero for both, we can see how a change in responsiveness from 1 to 3 affects the translation of votes into seats. When responsiveness is 1, we are in the benchmark case where seat share is equal to vote share for both parties. When responsiveness is 3, the party receiving 40% of the votes receives only 20% of the seats, while the party receiving 60% of the votes garners 80% of the seats.

In Figure 2, the curves represented are $s(v;0,1)$ and $s(v;-1.5,1)$. When the bias-responsiveness pair is $(0,1)$, we are in the "fair" case where 50% of the votes translates into 50% of the seats. A λ value of -0.5 on the other hand, translates to a partisan bias of approximately -0.12, using the formula above. This means that the party winning 50% of the votes only receives 38% of the seats.

In order for a party to choose the desired levels of bias and responsiveness for the redistricting plan, the party must have some idea about the future seat shares it expects to receive. In their model, Cox and Katz

[4]This is a generalization of the classic "cube law" of Kendall and Stuart (1950).

[5]Following King 1989a,

$$\%Bias(v=v_o) = 100[E(s|v_o,\lambda,\rho) - E(s|v_o,\lambda=0,\rho)] = 100\left\{\left[1+e^{(-\lambda)}\left(\frac{1-v_o}{v_o}\right)\right]^{-1} - \left[1+\left(\frac{1-v_o}{v_o}\right)\right]^{-1}\right\}$$

Letting $v_o = 0.5$ the percent bias in the seats-votes curve is given by:

$$\%Bias(v_o=0.5) = 100\left[(1+e^{(-\lambda)})^{-1} - 0.5\right]$$

(1998, 2002) assume that parties' beliefs about the vote shares for each party are given by a cumulative probability distribution F, where $F(v)$ represents the probability that the stronger party receives a vote share less than or equal to v. The stronger party is the party that is expected to receive the larger share of the votes. The model is then a partisan bargaining model where the two state parties are the ones in charge of redistricting. Each party seeks to maximize its expected utility of its seat share subject to the various constraints on the set of feasible redistricting plans, and each party is assumed to be risk averse (Cox and Katz, 1998, 2002).

Letting a positive value of λ represent a bias in favor of the stronger party, it is clear that the strong party favors bias while the weak party dislikes bias. The strong party also favors responsiveness whereas the weak party does not. How much a party likes bias relative to responsiveness is dependent upon the expected vote shares of the two parties. For example, the more confident the strong party is that it will garner the larger part of the vote share, the more willing the strong party is to give up bias in favor of more responsiveness. In their model, each party faces a trade-off between the level of bias and the level of responsiveness it can attain in a given districting plan (Cox and Katz, 1998, 2002).

2.4 Incorporating Majority-Minority Districts

When control of the state legislature is unified partisan, then this trade-off between bias and responsiveness is one constraint the "in-charge" party faces in choosing its optimal districting plan. When there is divided control of the legislature, the two parties must bargain with one another to select the final plan from the set of feasible plans. If we include a mandate to create majority-minority districts into the model, then we can think of it as another constraint on the set of feasible plans.

The Cox and Katz (1998, 2002) model has two actors: a strong party and a weak party that redistrict a given state. Let $v_j (j = 1, \ldots, J)$ denote the vote share of the strong party in the jth district in the state and $v = \frac{1}{J}\sum_j v_j$ be the party's average vote share. Positive values of $x = \mathtt{ln}(\frac{v}{1-v})$ indicate an average vote share majority for the strong party, whereas negative values indicate average vote share majorities for the weak party. The strong party wants to select ρ and λ to maximize $\mathrm{E}[u(s(x;\rho,\lambda))]$, where $s(x;\rho,\lambda)$, the strong party's seat share given x, can be derived from Equation 1 as

$$s(v;\rho,\lambda) = \frac{\mathtt{exp}[\rho x]}{\mathtt{exp}[-\lambda] + \mathtt{exp}[\rho x]}.$$

The strong party's maximization problem can be expressed as

$$\max_{(\rho,\lambda)\in A} \int_{-\infty}^{\infty} u\left[\frac{\mathtt{exp}[\rho x]}{\mathtt{exp}[-\lambda] + \mathtt{exp}[\rho x]}\right] f(x)dx$$

(where f represents the density governing x), whereas the weak party wants to select ρ and λ to maximize $\mathrm{E}[w(1 - s(x))]$. In the Cox and Katz model, the feasibility constraints are introduced through restrictions on the form of the constraint set A.

We can think about the problem of majority-minority constraints in terms of the lines that are drawn for a given plan. For concreteness, consider a unified Democratic legislature that is the strong party in terms of vote share ($f(v) > 0.5$). The optimal plan for the Democrats is a redistricting plan where every district is a microcosm of the state. Under such a plan, the Democrats expect to win all of the seats. Suppose the legislature must create at least some mandated level of MMDs. The optimal constrained plan will necessarily contain higher bias and lower responsiveness levels than the optimal unconstrained plan in this case. It is clear that the Democrats might be forced to choose a suboptimal plan, in terms of expected seat share, under the mandates. If the perverse-effects claim is true, then we conjecture that the majority-minority constraint is binding for Democratic plans. In a different model, Shotts (2001) finds that it is Republicans that are harmed (weakly) by the introduction of majority-minority mandates. For example, take a unified Republican legislature with $f(v) > 0.5$. The "microcosm strategy" is also the optimal strategy in this case. If the Republicans succeed in generating a redistricting plan that contains no Democratic districts, then a mandate to create MMDs could harm the Republicans. Formally, the mandate constrains the feasible set of (λ, ρ) from which the redistricting party selects the optimal (λ^*, ρ^*) that maximize expected utility of seat shares. Since bias is zero-sum, we know that the constrained maximizer must differ, at least weakly, from the solution to the unconstrained maximization problem.

The majority-minority constraint would enter the party's maximization problem in two ways: first, by placing an upper bound on the level of responsiveness the plan can exhibit, $\rho \leq \bar{\rho}^{\texttt{MMD}}$, and second, by placing a lower bound on the level of democratic bias the plan can exhibit, $\lambda \geq \underline{\lambda}^{\texttt{MMD}}$. The strong party now wants to select ρ and λ in order to maximize $\mathrm{E}[u(s(x;\rho,\lambda))]$ subject to $(\rho,\lambda) \in \mathcal{D} = A \bigcap \{(\rho,\lambda) : \bar{\rho}^{\texttt{MMD}} - \rho \geq 0$; $\lambda - \underline{\lambda}^{\texttt{MMD}} \geq 0\}$. This can be solved by forming the Lagrangean and applying the Kuhn-Tucker theorem. Then, the Lagrangean, $L(\rho, \lambda, \mu)$, can be written as

$$L(\rho,\lambda,\mu) = \int_{-\infty}^{\infty} u\left[\frac{\texttt{exp}[\rho x]}{\texttt{exp}[-\lambda] + \texttt{exp}[\rho x]}\right] f(x)dx + \mu_1(\bar{\rho}^{\texttt{MMD}} - \rho) + \mu_2(\lambda - \underline{\lambda}^{\texttt{MMD}}),$$

where μ_1 and μ_2 are Lagrange multipliers.

By the Kuhn-Tucker theorem, the solution(s) to the maximization problem will solve the following set of equations:

$$\frac{\partial L}{\partial \rho}(\rho, \lambda, \mu) = 0, \quad \frac{\partial L}{\partial \lambda}(\rho, \lambda, \mu) = 0,$$
$$\frac{\partial L}{\partial \mu_i}(\rho, \lambda, \mu) \geq 0, \quad \mu_i \geq 0, \quad \mu_i \frac{\partial L}{\partial \mu_i}(\rho, \lambda, \mu) = 0, \; i = 1, 2.$$

Let $M_{\texttt{MMD}} = \{(\rho, \lambda, \mu) : (\rho, \lambda, \mu)$ is a critical point of L and $(\rho, \lambda) \in A\}$ denote the set of all critical points of L for which $(\rho, \lambda) \in A$. To examine the impact of of the majority-minority constraint, we compare the set $\{(\rho, \lambda) :$ there is μ such that $(\rho, \lambda) \in M\}$, the set of solutions to the constrained maximization problem, to , the set of solutions to the unconstrained maximization problem, $\{(\rho, \lambda) : (\rho, \lambda) \; = \max_{(\rho,\lambda)\in A} \; E[u(s(x; \rho, \lambda))]\}$.

Empirically, this comparison is done by estimating $\hat{\rho}$ and $\hat{\lambda}$ for plans with MMDs and for plans without MMDs, and testing for significant differences between the parameters. If the constraint binds, the estimated parameters from constrained plans will differ statistically from the estimated parameters from unconstrained plans. To do this, we estimate the seats-votes curves for the elections in our data set and then compare the estimated bias and responsiveness levels for elections held under redistricting plans with MMDs and those without MMDs, taking into account the party (or parties) that controlled the redistricting process. Not only can we use seats-votes curves to see how the changes in the partisan breakdown of the state due to redistricting affect elections, but we can also examine how changes in the racial breakdown of the state affect elections. For example, we might want to compare elections held under a redistricting plan where minorities are spread out across districts to those held under a plan with MMDs. To measure the impact MMDs have on descriptive representation of minorities, we estimate the seats-votes curve for minority voters and candidates for each election, comparing the parameter estimates for constrained and unconstrained redistricting plans.

3 The Econometric Model and Data

3.1 The Econometric Model

Consider Equation 1 for the Seats-Votes Curve given above. We would like to estimate the parameters λ and ρ from the observed data, but the equation is deterministic and cannot be used in its current form for estimation. Following Cox and Katz (1998, 2002; see also King and Browning 1987 and King 1989), a stochastic model is assumed. Then the expected portion of seats in a state i in election t going to the Democrats is given by Equation 1 as:

$$E[s_{i,t}] = \left[1 + e^{\lambda}\left(\frac{v_{i,t}}{1 - v_{i,t}}\right)^{\rho}\right]^{-1} = \left[1 + \texttt{exp}\left(-\lambda - \rho \; \texttt{ln}\left(\frac{v_{i,t}}{1 - v_{i,t}}\right)\right)\right]^{-1} \tag{2}$$

If it is assumed that the probability that a Democrat wins the district is independently and identically distributed, then the process could be modeled with a binomial distribution, and a standard grouped logit model could be estimated with maximum likelihood or two-step minimum chi-square methods (Cox and Katz, 1998, 2002; King and Browning 1987). Cox and Katz (1998, 2002) point out that there is probably heterogeneity in the model, beyond that captured by the logistic of the vote shares, and correlation in the election probabilities across districts. To deal with this heterogeneity, an extended beta-binomial distribution is used. This model assumes that the probability (from a binomial model) that a Democrat wins the district varies according to a beta distribution.[6] Let $S_{i,t}$ be the number of seats the Democrats win in state i in election t and let N_i be the total number of districts in state i. The extended beta-binomial distribution is then:

$$f(s_{i,t}|\pi_i,\gamma) = \frac{N_i!}{S_{i,t}!(N_i - S_{i,t})!} \frac{\prod_{j=0}^{S_{i,t}-1}(\pi_i + \gamma j) \prod_{j=0}^{N_i - S_{i,t}-1}(1 - \pi_i + \gamma j)}{\prod_{j=0}^{N_i-1}(1+\gamma j)} \tag{3}$$

Following Cox and Katz (2002), the convention is adopted that if any of the constituent products in Equation 3 are negative then the term is set equal to 1. The parameter π_i denotes the average probability that a given district in state i is won by the Democrats.

$$\pi_i = \frac{E[S_{i,t}]}{N_i} = E[s_{i,t}]$$

Thus the systematic variation in the underlying probability can be modeled by Equation 2. The correlation across districts is captured in the parameter γ. Note that if $\gamma = 0$, Equation 3 becomes the binomial probability distribution function. $\gamma > 0$ denotes positive correlation between districts, while $\gamma < 0$ denotes negative correlation between districts.

The log likelihood is derived assuming independence across states (Cox and Katz, 2002). Ignoring terms that do not depend on the parameters, the contribution of each state i is then:

$$L_i(\pi_i, \gamma | S_{i,t}, N_i) \propto \sum_{j=0}^{S_{i,t}-1} (\pi_i + \gamma j) + \sum_{j=0}^{N_i - S_{i,t}-1} (1 - \pi_i + \gamma j) - \sum_{j=0}^{N_i-1} (1+\gamma j) \tag{4}$$

Substituting Equation 2 in for π_i gives us $L_i(\lambda, \rho, \gamma | S_{i,t}, N_i, v_{i,t})$. The likelihood for the entire sample is found by summing L_i across states. In the estimation in this paper, λ and ρ are allowed to vary across plan types, but a common γ is assumed. Once the estimation is complete, estimates of responsiveness can be read directly from the results. To calculate the partisan bias, the estimated λ values need to be transformed using the equation found in footnote 6 above. Maximum Likelihood Estimation is invariant to reparameterization, so this is a consistent estimate of the partisan bias. In order to calculate the standard errors, however, the Delta method is used (Cox and Katz 2002; Greene 2003, pp. 913-914).

3.2 Data

The following analysis is based upon data from the 1972-2000 congressional elections. The unit of analysis is a (state, year) pair, focusing on the House elections in a particular state in a particular year. Following

[6] For a complete derivation of the extended beta-binomial distribution, please see King 1989b, pp. 45-48.

the bargaining model of Cox and Katz (1998, 2002), for each observation the current redistricting plan is classified as "Republican," "Bipartisan," or "Democratic." The classification is determined by the partisan composition of the state legislature at the time of the redistricting, as well as the partisanship of the governor, taking into account the state laws concerning gubernatorial vetoes and legislative overrides.

Of the 655 observations, there are 42 cases that we exclude from our analysis. Nebraska is excluded because elections are non-partisan and there is a unicameral state legislature. Minnesota elections were non-partisan from 1972-1980, and they are excluded from the sample. Washington from 1992-2000 was excluded because an independent commission was in charge of drawing the redistricting plan, and at present there are not sufficient numbers to run the analysis including this extra category.[7]

In addition to the data on redistricting plans, Democratic vote share in each House election is averaged across the districts in each state. The number of majority-minority districts in each state is calculated from the Decennial Census of Population. In this data minority-majority districts are considered to be those districts with 50% or more of voting age population composed of blacks and Latinos.[8] The number of majority-minority districts in a given state ranges from 0 to 9, with the largest number in New York, Texas, and California.

The frequency of elections under each plan type, for states with MMDs and for states without, can be found in Table 1. The numbers of majority-minority districts across the census years are given in Table 2. Table 3 summarizes the data on black and minority congressional seats and majority-minority districts.

4 Estimating the Impact of Majority-Minority Districts

4.1 Evaluating the Perverse-Effects Claim

An empirical seats-votes curve can be traced out by plotting the average Democratic vote share against the Democratic seat share for each (state, year) pair. In Figure 3, the empirical seats-votes curve is plotted for those elections held under plans with MMDs and those held under plans without MMDs. If the perverse-effects claim were true, then we would expect to see a rightward shift in the seats-votes curve for those observations with MMDs, indicating a negative, or pro-Republican, bias. But this outcome is not displayed by the data.

For more precise estimates of the effect majority-minority mandates have on redistricting plans, we estimate values of ρ and λ using the extended beta-binomial likelihood function. Because the optimal redistricting plan differs by the plan type – unified Republican, unified Democratic, or Bipartisan – a different

[7]In addition, TN 1976, ME 1984, MT 1984, and OH 1986 were excluded from the analysis because several conflicting sources were found on the redistrictings in these years.

[8]The analysis is also performed using black majority districts and Latino majority districts. We present these results only where they differ from the analysis on the pooled districts.

seats-votes curve is estimated for each case. The model predicts that majority-minority mandates will constrain the set of feasible (ρ, λ), but it is not immediately clear how the constraint will enter the equation for the seats-votes curve. It may simply be that the presence of MMDs constrains the optimal districting plan, or it may be that the number of MMDs in a state matters as well. A mandate to create two MMDs in a state with three districts is likely to be a greater constraint on the feasible set of plans than a mandate to create two MMDs in a state with fifty districts. The estimation presented in this section focuses on the fraction of districts in each plan that are majority-minority.[9]

Figure 4 indicates the transformed estimates of Democratic bias and 95% confidence intervals. The vertical line in the center represents zero bias. Looking at the estimates of Democratic bias, the first thing to notice is that in general, there is not a significant difference between the estimate of bias for the observations with majority-minority districts and those without majority-minority districts, for all plan types. If the perverse-effects claim is true, once we control for the minority population in a state, partisan bias in favor of Democrats decreases as the proportion of majority-minority districts created in a state increases. Although the MMD constraint produces a negative (pro-Republican) shift in bias for Republican plans, the difference is not significant. For both Bipartisan and Democratic plans, the majority-minority constraint translates to a positive (pro-Democratic), but not significant, shift in bias. This finding is directly contrary to the claim that the presence of MMDs generates a significant pro-Republican bias in the redistricting plan.

Figure 5 is a graph depicting the 95% confidence intervals around the point estimates of ρ. The vertical line at 1 represents the benchmark case of $\rho = 1$. The estimates of responsiveness are lower for all plans facing majority-minority mandates than those without majority-minority districts. This result is not surprising given that Democratic responsiveness is increased by redistricting plans which generate districts that are microcosms of the state - the opposite of the packing that occurs under majority-minority districting.

The levels of bias and responsiveness were also estimated distinguishing black majority districts from Latino majority districts. The pattern of the results follows that of estimates using the combined majority-minority districts, with the exception of the bias estimates under unified Democratic plans. The effect of Latino majority districts on Democratic plans is to increase bias. Figure 6 demonstrates that the direction of the black majority districts effect on Democratic plans is negative, but not significant. The direction of the impact of black majority districts on Democratic plans is the most promising evidence to support the perverse-effects claim, but the difference between the estimates of bias is not statistically significant.

It has been suggested that the perverse-effects of majority-minority districts on elections in the 1990s are dampened by the earlier observations in the data. One might suspect that the 1990 redistricting cycle was more strongly influenced by majority-minority mandates and the threat of court interference because of the decisions put forth in cases such as *Thornburg v. Gingles* (1986). To allow for this possibility, a

[9] To test the robustness of these findings, the estimation was conducted using both an indicator for the presence of MMDs and the number of MMDs in a state. The results do not differ significantly and are available from the authors.

time trend was introduced into the model. If the 1990s were truly "different" than the earlier periods, one would expect to see a change in the impact of the majority-minority constraint across time. Figures 7 and 8 present the estimates of Democratic bias and responsiveness, partitioning the elections by decades. The impact of the majority-minority constraint on bias estimates is relatively constant over times for each plan type. Although the impact is still not significant, majority-minority districts do appear to have a larger effect on responsiveness of the partisan plans in the 1990s than in the earlier years.[10]

4.2 Estimating the Impact of MMDs on Minority Representation

Turning to the relationship between minority population and minority seats, Figures 9-11 are histograms of districts with minority representatives and without, in each election year, by the proportion of voting age minorities in the district. These figures illustrate the claim that the racial composition of the district matters in the election of minorities to Congress.

To address the question of whether descriptive representation increases through the use of majority-minority districting plans, the seats-votes curve was estimated in terms of the minority seats in the House for a state in a given year, and the average minority voting age population share in the state. Figure 12 plots the transformed estimates of bias and the 95% confidence intervals around the point estimates. Figure 13 plots the point estimates and 95% confidence intervals for the estimates of ρ for each plan type.

The transformed λ values are below zero for the partisan plans without MMDs and do not increase significantly for the plans with MMDs. Bipartisan plans appear to be negatively affected by the introduction of a majority-minority constraint, although the effect is not significant. It is possible that these counterintuitive results are driven by a few outliers in the data. The estimates of responsiveness are strictly larger under majority-minority mandates for both partisan plan types. This result may be interpreted as a positive normative result if it is the aim of majority-minority districting to increase the responsiveness of the system to minority voters in terms of descriptive representation.

[10]One might also think that redistricting plans in the southern states are differently affected by majority minority constraints than non-southern states. To test this hypothesis, levels of partisan bias and responsiveness were estimated for states in "the South" (Alabama, Arkansas, Georgia, Florida, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Texas and Virginia) and for states in "the Deep South" (Alabama, Georgia, Louisiana, Mississippi and South Carolina). The pattern of the results is similar to that of the non-southern states. There is not a significant difference in responsiveness levels between plans with MMDs and those without MMDs. Partisan bias differs significantly for Democratic plans, but the presence of MMDs generates a positive shift in Democratic bias– the opposite of the perverse-effects hypothesis. One might also suspect that a time trend exists within the southern states, but unfortunately adding the additional constraint of time trend to the small sample of southern states renders estimation impossible. The results are available from the authors upon request.

The impact of MMDs on the minority seats-votes curve can be seen more clearly in an empirical seats-votes curve, Figure 14. With the exception of a few outliers, the elections held under plans without MMDs are concentrated along the zero seat share line, whereas the seats-votes curve with MMDs is shifted upward toward the 45 degree line. Once we control for the proportion of minorities in the state, as the proportion of majority-minority districts increases, the proportion of minorites elected to the House increases as well. For both the transformed λ and responsiveness estimates, the impact of MMDs on bipartisan plans is opposite that of partisan plans. Figure 15 is an empirical seats-votes curve for the bipartisan plans. The discrepancy arises because the data for elections under plans without MMDs are concentrated along a line at zero seat share with four outliers just above the 45 degree line.

5 Discussion

The political aim of majority-minority mandates is to create opportunities for minorities to elect candidates of their choice within single member districts. One of the first considerations of the impact of majority-minority districts on congressional elections, then, is whether the mandates are successful in increasing the election of minority representatives to Congress. Focusing on descriptive representation, we examine the effect of majority-minority mandates on the translation of the average proportion of minority voters in the state's congressional districts into the proportion of minority representatives in the state's congressional delegation. The evidence shows that the presence of MMDs in a state substantially increases the election of minority members to Congress. Both the raw data and the estimates for the seats-votes curves, excluding outliers, suggest that MMDs shift the translation of votes into seats in favor of minority representatives. The pattern is similar for both black-majority and Latino-majority districts.

Although majority-minority districts appears to achieve the goal of increasing descriptive representation of minorities, proponents of the "perverse-effects" claim argue that this gain within a district comes at the expense of overall partisan representation across districts in a state. The evidence presented suggests that this trade-off is not present. The translation of votes into seats does not look substantially different in elections held under plans facing majority-minority mandates than under plans without MMDs. Claims about the "perverse-effects" of majority-minority districting appear to be unfounded.

There are a few interesting extensions to the current research. The 2000 redistricting cycle has been excluded up to the present because the 2000 redistrictings were not in effect until the 2002 elections, and the effects of a plan on elections cannot be completely judged without several observations under that plan (i.e., several election cycles under each plan). An interesting issue that was not examined in this paper is the impact independent commissions have on the redistricting process. At present, there are seven states with independent commissions that are in charge of drawing district lines. The only state that had these commissions prior to 2000 was Washington, however, so the data used in this paper are insufficient to perform a complete analysis. With the 2004 congressional elections now complete, the most recent rounds of redistricting could be added to the analysis to try and gain an understanding of the impact of independent redistricting commissions on electoral patterns in those states.

6 Appendix

6.1 Figures

Figure 1: Example of a Seats - Votes Curve ($\lambda = 0$)

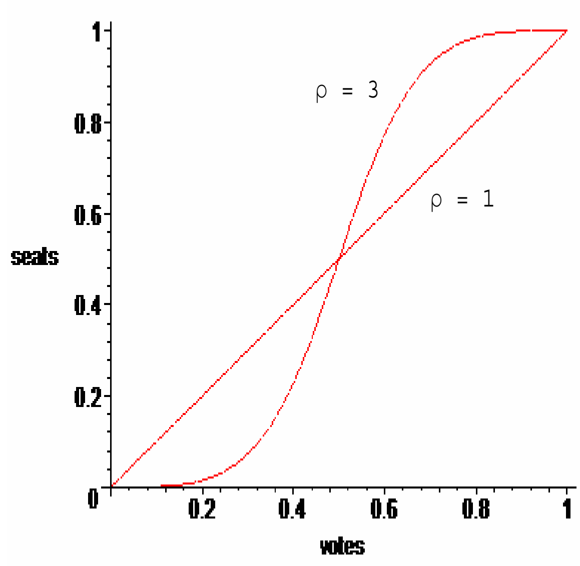


Figure 2: Example of a Seats - Votes Curve ($\rho = 1$)

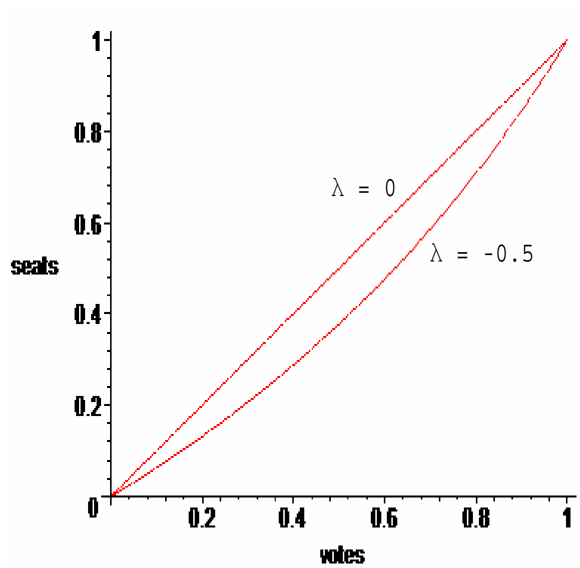


Figure 3: Democratic Seats - Democratic Votes Curves

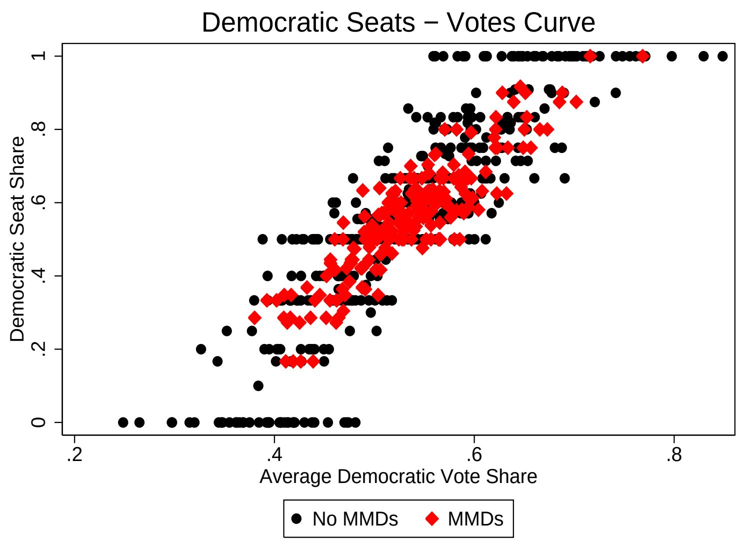


Figure 4: Plot of Democratic Bias Estimates

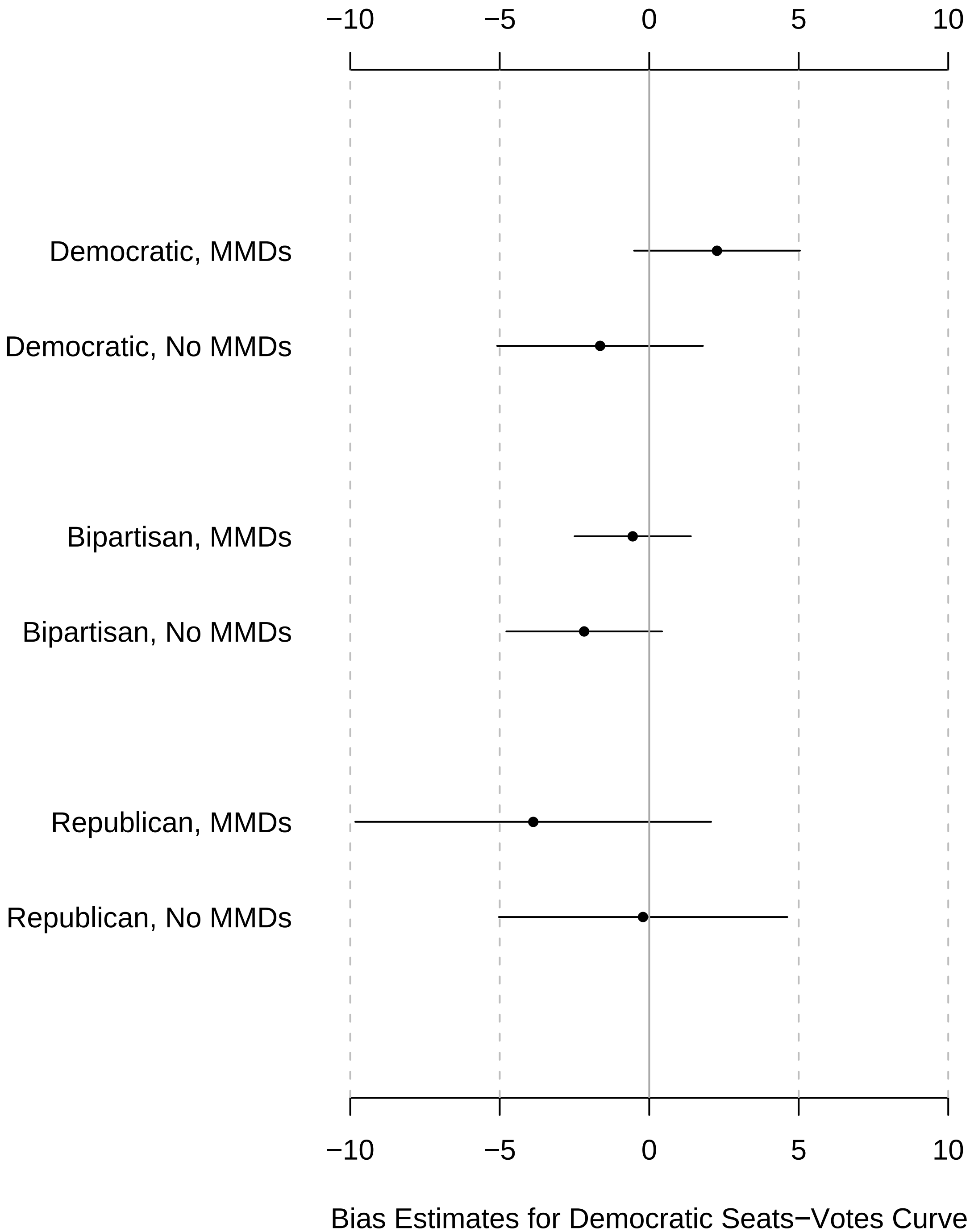


Figure 5: Plot of Democratic Responsiveness Estimates

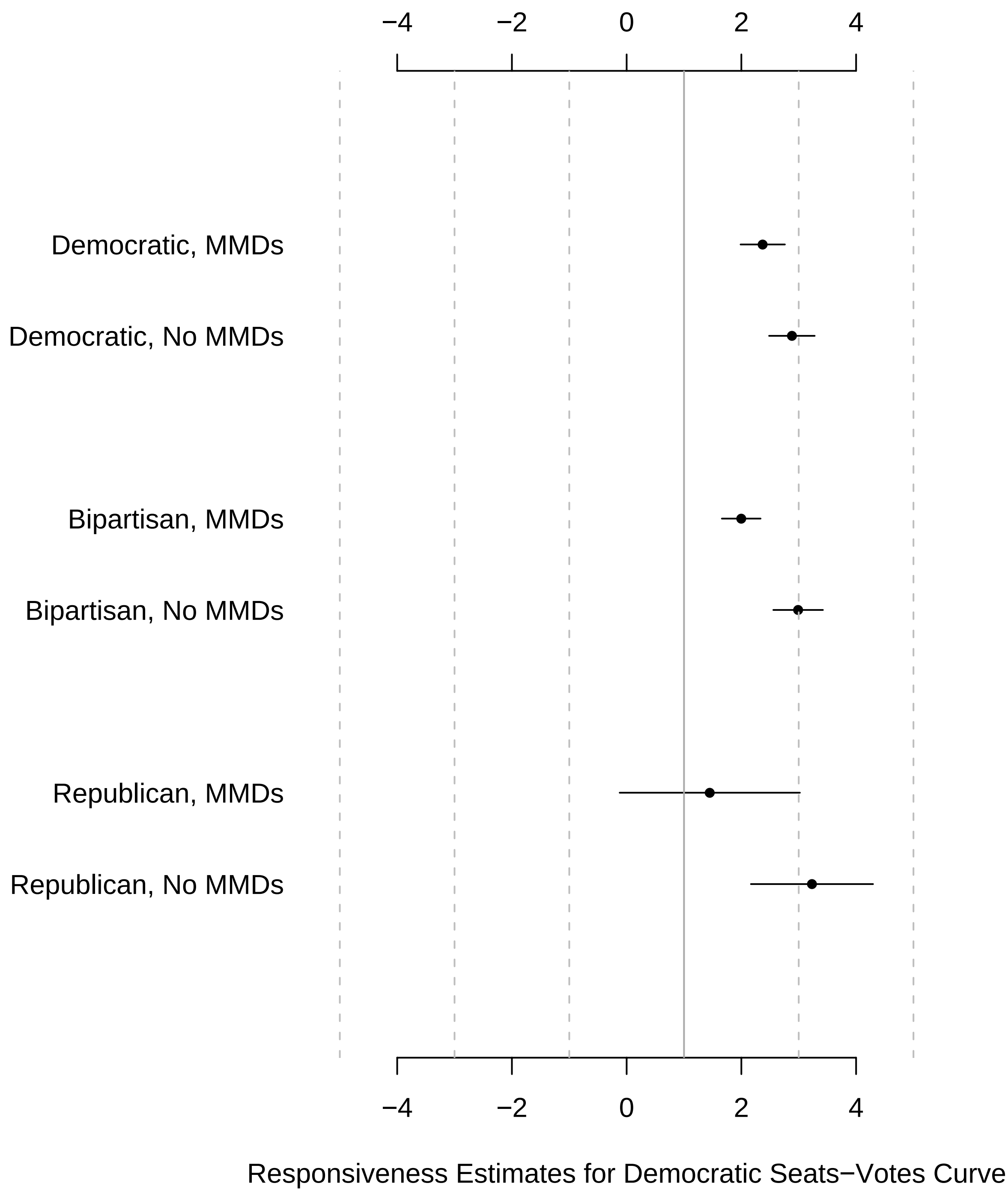


Figure 6: Plot of Democratic Bias Estimates Using Black Majority Districts

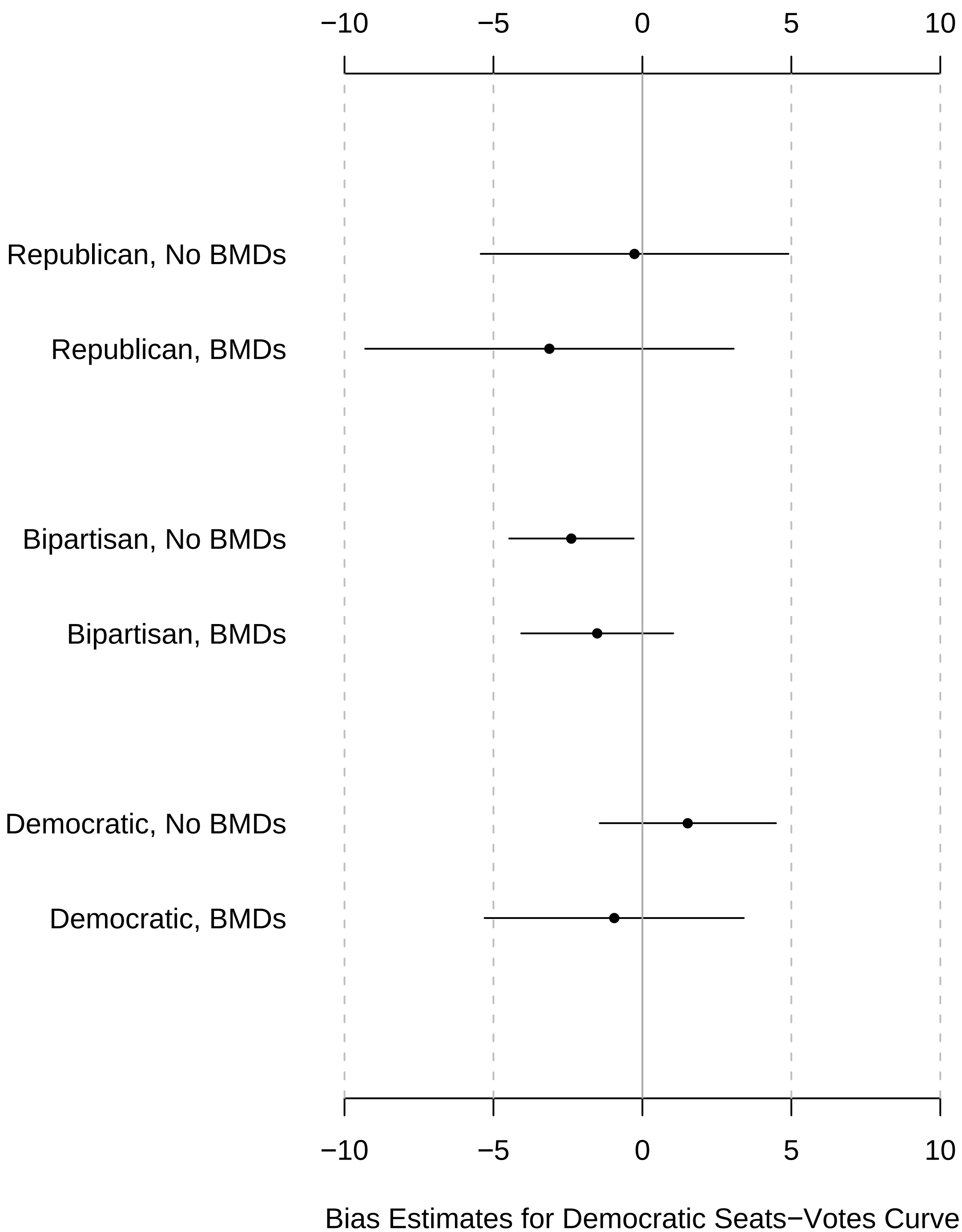


Figure 7: Plot of Democratic Bias Estimates Using Time Trend

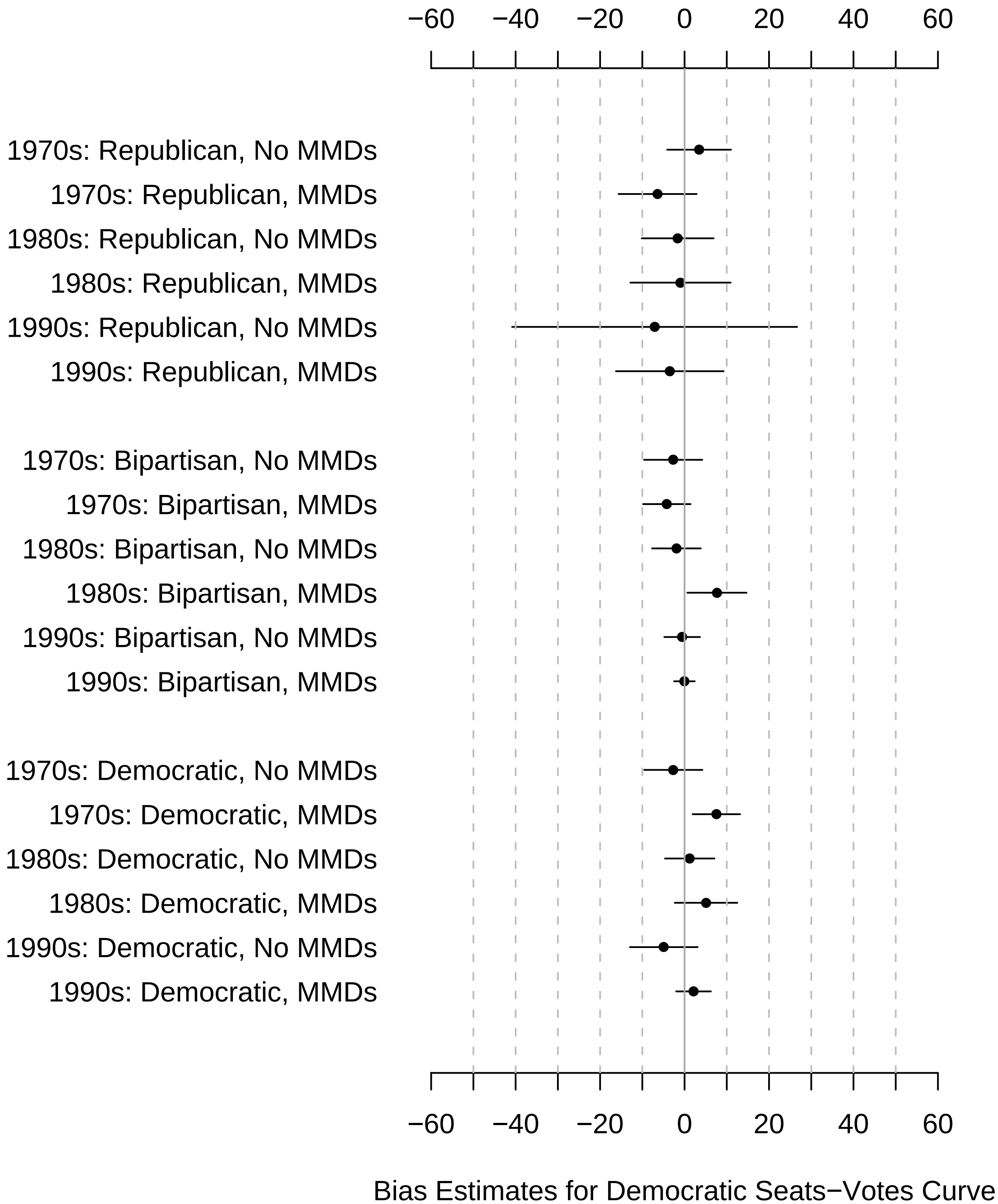


Figure 8: Plot of Democratic Responsiveness Estimates Using Time Trend

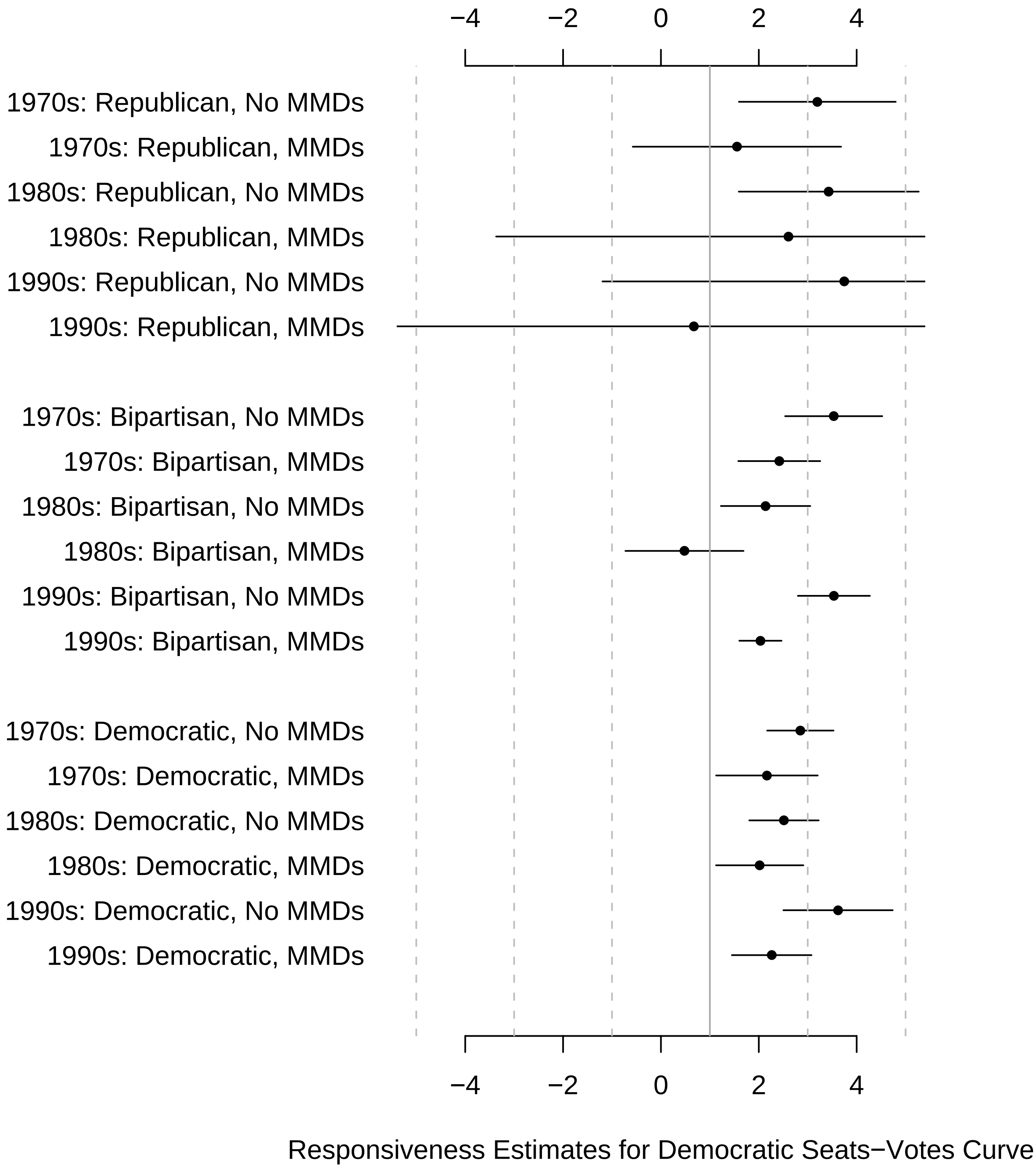


Figure 9: Minority Representative Elected by Proportion of District Minority

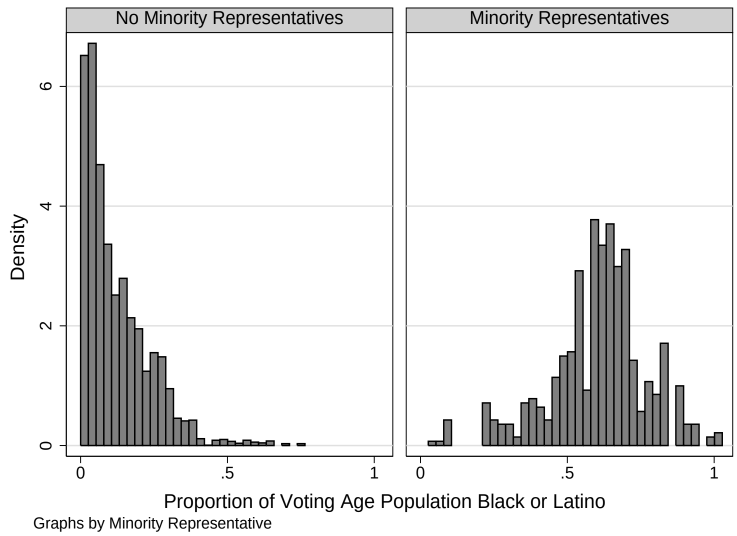


Figure 10: Black Representative Elected by Proportion of District Black

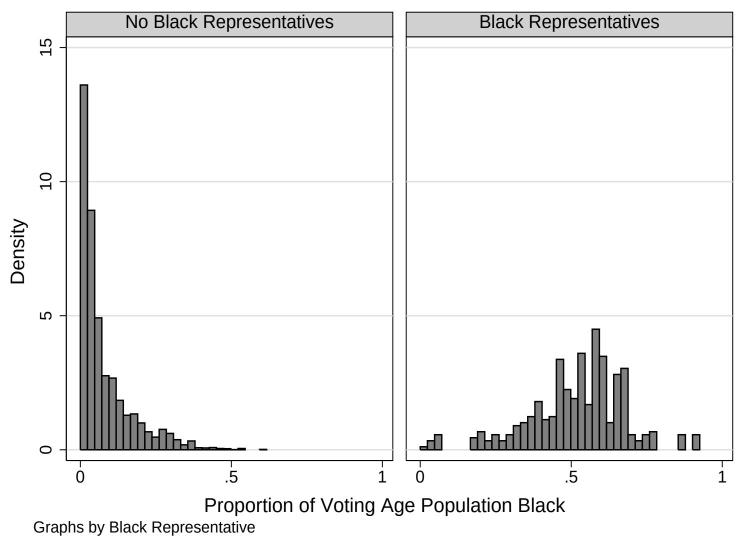


Figure 11: Latino Representative Elected by Proportion of District Latino

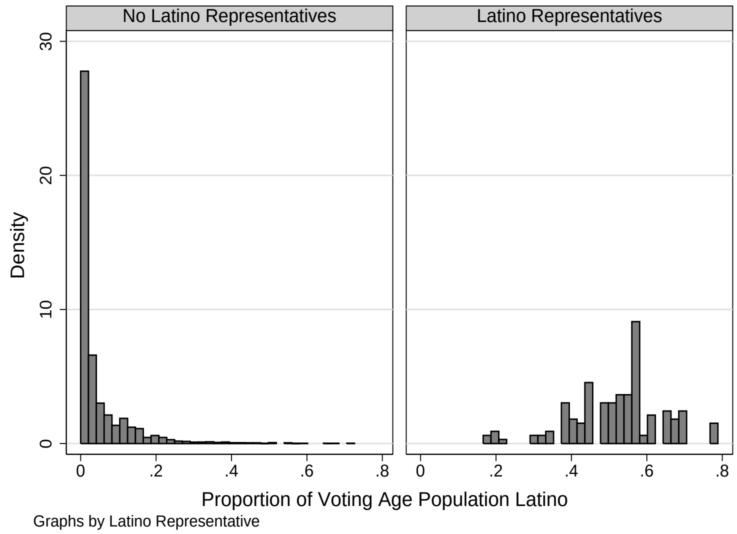


Figure 12: Plot of Bias Estimates for Minority Seats-Votes Curves

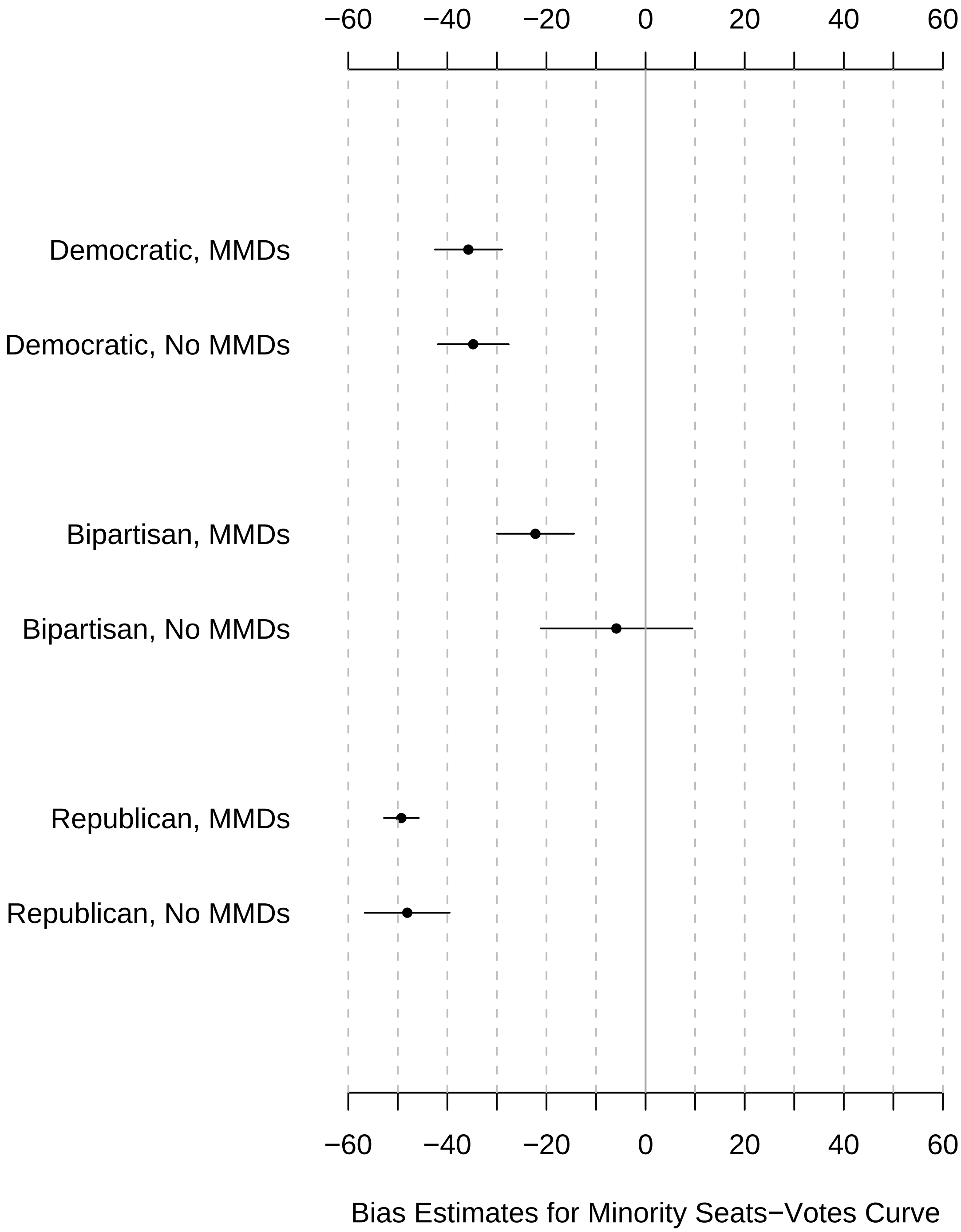


Figure 13: Plot of Responsiveness Estimates for Minority Seats-Votes Curves

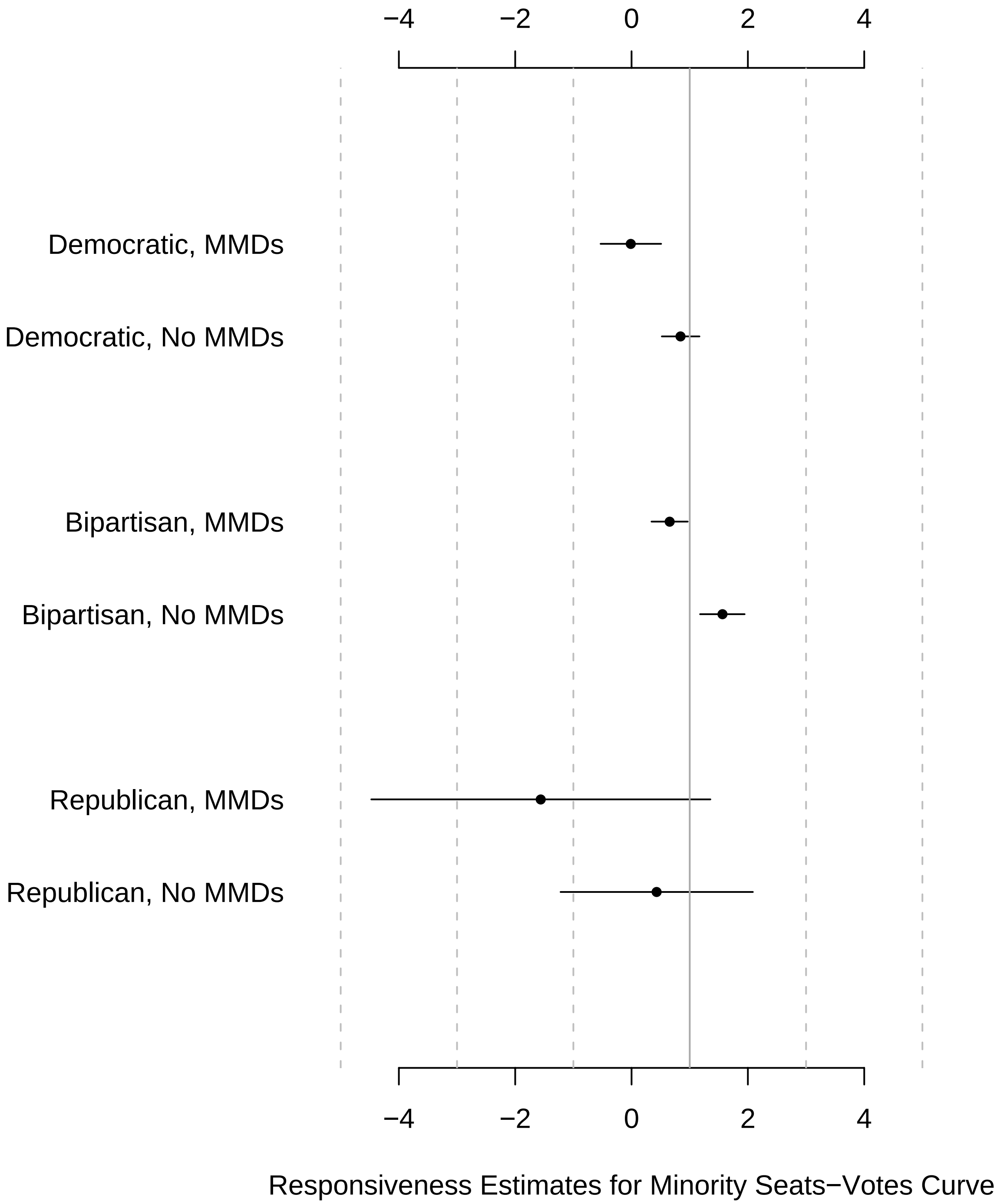


Figure 14: Empirical Minority Seats-Votes Curve

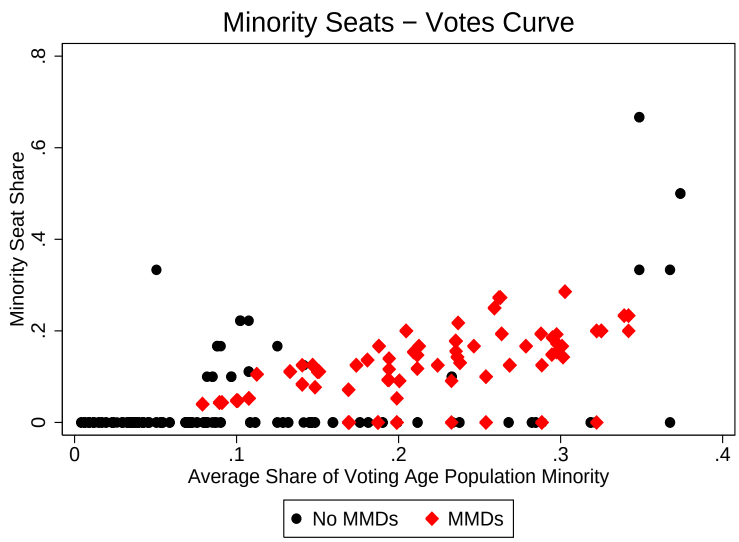
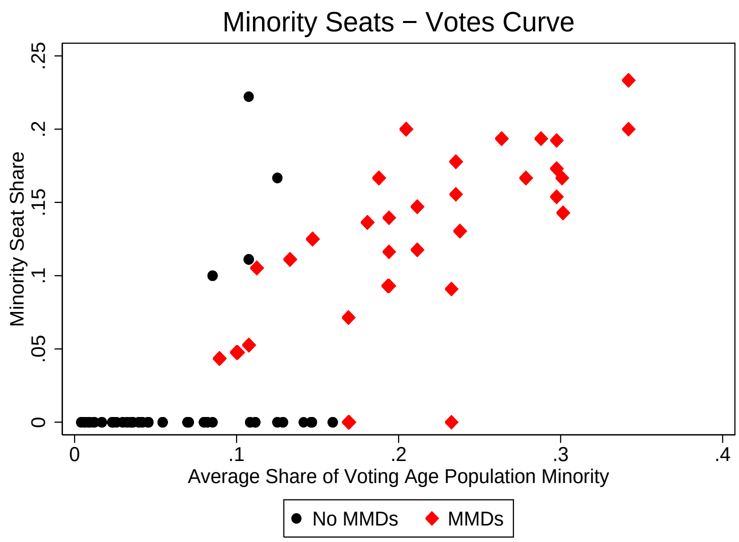


Figure 15: Empirical Minority Seats-Votes Curve for Bipartisan Plans only



6.2 Tables

Table 1. Frequency of Elections Under Each Plan Type

	Frequency of Elections		
Plan Type	MMDs	No MMDs	Total
Republican	16	62	78
Bipartisan	93	161	254
Democratic	93	188	281
Total	202	411	613

Table 2. Number of Majority-Minority Districts in the U.S., 1972-2000

Year	Black and Latino	Black	Latino
1972	16	8	2
1982	27	12	6
1992	56	27	9
2000	51	21	14

Table 3. Number of Minority Representatives in the U.S., 1972-2000

	Black Representatives		Latino Representatives		Total	
Year	MMDs	No MMDs	MMDs	No MMDs	MMDs	No MMDs
1972	9	6	2	3	17	3
1982	12	8	7	3	25	5
1992	29	9	14	3	51	4
2000	25	12	14	2	48	4

Table 4: Untransformed Estimates of λ and ρ from Democratic Seats-Votes Curve Estimation

	Using Fraction of Districts Majority-Minority				Using Fraction of Districts Majority-Black			
	λ		ρ		λ		ρ	
Plan Type	No MMDs	MMDs	No MMDs	MMDs	No BMDs	BMDs	No BMDs	BMDs
Republican	-0.008	-0.156	3.231	1.449	-0.012	-0.125	3.220	1.325
	(0.32)	(0.35)	(0.74)	(0.90)	(0.33)	(0.36)	(0.75)	(0.93)
Bipartisan	-0.087	-0.022	2.989	1.997	-0.095	-0.061	2.643	1.803
	(0.23)	(0.20)	(0.47)	(0.42)	(0.21)	(0.23)	(0.43)	(0.46)
Democratic	-0.066	0.091	2.881	2.373	0.061	-0.038	2.649	2.312
	(0.27)	(0.24)	(0.45)	(0.45)	(0.25)	(0.30)	(0.42)	(0.55)

Table 5: Untransformed Estimates of λ and ρ from Democratic Seats-Votes Curve Estimation

Using Fraction of Districts Majority-Minority and a Time Trend				
	λ		ρ	
Plan Type	No MMDs	MMDs	No MMDs	MMDs
Republican				
1970's	0.138	-0.257	3.196	1.553
	(0.40)	(0.44)	(0.91)	(1.05)
1980's	-0.065	-0.038	3.429	2.609
	(0.42)	(0.49)	(0.97)	(1.76)
1990's	-0.286	-0.140	3.747	1.561
	(0.84)	(0.51)	(1.60)	(1.40)
Bipartisan				
1970's	-0.108	-0.168	3.531	2.418
	(0.38)	(0.34)	(0.72)	(0.66)
1980's	-0.077	0.309	2.139	0.481
	(0.34)	(0.34)	(0.69)	(0.79)
1990's	-0.023	-0.001	3.535	2.034
	(0.38)	(0.30)	(0.62)	(0.47)
Democratic				
1970's	-0.107	0.304	2.849	2.166
	(0.40)	(0.52)	(0.59)	(0.73)
1980's	0.049	0.204	2.515	2.019
	(0.35)	(0.39)	(0.60)	(0.68)
1990's	-0.198	0.085	3.620	2.264
	(0.41)	(0.29)	(0.76)	(0.65)

Table 6: Untransformed Estimates of λ and ρ from Minority Seats-Votes Curve Estimation

	Using Fraction of Districts Majority-Minority				Using Fraction of Districts Majority-Black			
	λ		ρ		λ		ρ	
Plan Type	No MMDs	MMDs	No MMDs	MMDs	No BMDs	BMDs	No BMDs	BMDs
Republican	-3.95	-4.92	0.433	-1.559	-0.90	-0.514	1.108	1.027
	(1.54)	(1.59)	(0.92)	(1.23)	(1.40)	(1.73)	(0.83)	(1.20)
Bipartisan	-0.236	-0.955	1.561	0.654	0.0322	-0.761	1.135	0.687
	(0.57)	(0.45)	(0.44)	(0.40)	(0.72)	(0.67)	(0.46)	(0.48)
Democratic	-1.716	-1.794	0.844	-0.012	-3.215	-2.298	0.013	-0.283
	(0.53)	(0.53)	(0.41)	(0.52)	(0.57)	(0.67)	(0.39)	(0.60)

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