Preferences that Matter: Inequality, Redistribution and Voting

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Abstract

While a significant literature in political economy has recently focused on the relationship between inequality and redistribution preferences, it is unclear that these preferences have any influence over political behavior. In this paper we argue that redistribution preferences are indeed a most significant determinant of voting. We will show that voting for the Democratic Party by the rich is highly dependent on state inequality levels. The rich in more unequal states are more supportive of redistribution than the rich in more equal states. We contend that it is precisely these redistribution preferences that make them more likely to vote for the Democratic Party. Our analysis goes beyond previous research by explicitly studying this preference mechanism in a potential-outcomes framework. We disentangle the direct and indirect effects of inequality to obtain estimates of inequality's effect on voting through preferences.

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I. INTRODUCTION

Many observers would agree that an individual's income affects her political behavior. In political science there is an influential literature on how pocketbook issues (Downs 1957; Key 1966; Fiorina 1981) and class (Lipset 1983; Evans 1999; Brooks and Manza 1997), both strongly related to relative income, influence voting choice. Inequality and redistribution in America have seen a resurgence in academic interest in recent times. Bartels (2009) has shown the spectacular increase in inequality over the past 35 years to be the product of policy choices in a political system dominated by partisanship and particularly receptive to the preferences of the wealthy. Hacker and Pierson (2011) coincide not only in the appreciation of the attention that policy-makers pay to the rich but also about the fact that politics is the main factor behind inequality ("American politics did it").

This paper's analysis addresses one of the implications of most arguments about the importance of economic circumstances to political outcomes. If income matters to individual political behavior, it seems reasonable to assume that it does so through its influence on redistribution preferences. These redistribution preferences may (or may not) then be reflected on party positions and, eventually, government policy. In the US, rising inequality has become a visible feature of the economy (e.g., Levy and Murnane 1992; Gottschalk 1997; Piketty and Saez 2003) as well as of mainstream political debates. At the same time, as observed by Gelman et al. (2008), affluent people in some states are much more likely to vote for the Democratic party than in other states (while for the poor, this difference is much less pronounced).

While a voluminous political economy literature has emerged on the influence of income and inequality on preferences, we know much less about whether these preferences do in fact affect political behavior at all. Most political economy arguments start from the assumption that an individual's position in the income distribution determines her preferences for redistribution. The most popular version of this approach is the theoretical model proposed by Romer (1975) and developed by Meltzer and Richard (1981). And there is some evidence supporting the argument that relative income (whether an individual is rich or poor) influences preferences for redistribution. In the US American data, a relative income effect is found in, among others, Gilens (2005), McCarty, Poole, and Rosenthal (2008), and Page and Jacobs (2009). Do these preferences translate into political behavior?

As we will show below, the support of the rich for the Democratic party is highly dependent on local levels of inequality. In states where inequality is high, the rich are more likely to vote Democrat. Why would this be the case? We argue below that redistribution preferences are an important part of the story. Our arguments add to those prevalent in the literature in at least three important ways. First, most political economy models link individual income (and sometimes individual preferences) to policy outcomes. The central assumed political mechanism is the relationship between preferences and voting. This paper's contribution is to specify explicitly the theoretical mechanisms that determine preferences and party choice, and to test them empirically. Second, much of the debate about the lack of redistributive policies in the US has centered around the perception that second-dimension issues are disproportionately important to the poor. Perhaps the most well-known example of this is the contention that cultural, religious and social values outweigh economic concerns for the American working class in some states (see Frank 2004 and, more recently, Hersh and Nall 2015). The implication of these arguments is that the solution to the (lack of) redistribution puzzle in the US concerns demand. We show in this paper that this may not be the case. We find the poor to be uniformly in favor of redistribution and, in agreement with Gelman et al. (2008), therefore uniformly more likely to vote Democrat. Third, while a number of important contributions to our understanding of partisanship (McCarty, Poole, and Rosenthal 2008) and voting (Gelman et al. 2008) focus on the role of state wealth (are rich and poor states different?), we emphasize the importance of state-level inequality. We argue that individual-level relative income captures individuals' material self-interest and use state-level macro inequality as a measure of concerns unrelated to the pocketbook. We provide theoretical reasons (and empirical evidence) why we need to pay attention to inequality if we want to understand the determinants of voting.

II. ARGUMENT

Our theoretical argument proceeds in two stages. First, we detail the influence of redistribution preferences on voting choices. We argue that those who are supportive of redistribution will be more likely to vote for the Democratic Party. Second, we address the formation of preferences for redistribution, proposing that macro-levels of inequality will matter most to the rich. We argue that higher levels of macro inequality will make the affluent more likely to support redistribution and therefore more likely to vote Democrat.

In the first stage of our argument, we argue for the relevance of redistribution preferences to voting. Our starting point here is the assumption that economic factors affect individual preferences and voting behavior. We therefore follow a well-established literature on the relationship between income and political behavior. As mentioned above, most political economy arguments start from the assumption that an individual's position in the income distribution determines her preferences for redistribution (see Romer 1975 and Meltzer and Richard 1981). The literatures on economic voting and class voting are based on similar arguments. Like authors in the economic voting tradition (e.g., Duch and Stevenson 2008), our argument posits that there is a relationship between an individual's economic interests and her likelihood to vote for a particular party. Class voting analyses (e.g., Evans and de Graaf 2013 and Evans 1999) emphasize the effects of socio-economic cleavages on political preferences, but their focus on occupational factors is largely compatible with our arguments. Our approach is also related to a recent literature that emphasizes risks and skills as determinants of preferences. While this literature associates unemployment vulnerability with skill profiles (e.g, Cusack, Iversen, and Rehm 2006), we highlight the importance of redistribution preferences (regardless of skills).

Like the traditional economic voting literature (Downs 1957) we conceive of voters as instrumental rational actors. Individuals will vote following a comparison of what they gain or lose from the policies proposed by each party. In the words of Duch and Stevenson, we assume that "voters rationally derive expected utilities for competing political parties and that these determine their vote choice" (2008: 9). As in the pioneering work of Kramer (1971) and Fair (1978), we consider that economic well-being (and therefore income) is a significant factor affecting a voter's utility function.

A substantial literature debates the issue of how exactly economic considerations enter into the voter's utility function. Two main approaches can be distinguished, one emphasizing *sanctioning* and the other focusing on *selection* (here, we follow the analysis provided in Duch and Stevenson 2008). The *sanctioning model* is characterized by the consideration that voters are narrowly retrospective and mostly motivated by punishing or rewarding incumbents (see the classic works of Kramer 1971, Key 1966 and Fiorina 1981). Focusing on moral hazard, i.e., the risk of rent-seeking by incumbents if not punished for bad economic outcomes, Barro (1973) and Ferejohn (1986) also belong within this tradition. The *selection/competency model* argues that voters gather more information to assess the likely economic outcomes associated with competing political alternatives. Downs (1957) and Stigler (1973) are classical examples of this approach but we would argue that this is also the understanding of voting underlying Meltzer and Richard (1981) and subsequent political economy treatments of redistribution and voting (Persson and Tabellini 2000). While the sanctioning model has dominated the economic voting literature, it is clear that our argument implies a selection logic. We propose that individuals who are in favor of redistribution will identify the Democratic Party as more likely to promote equality and therefore be more likely to vote for it.

While the intuition explained above is pretty straightforward, it has not received enough attention in the existing American literature. In fact, we agree with McCarty et al. when they argue that:

> "Although much recent work in comparative political economy has sought to link inequality to political conflict and back to economic policy, few of these insights have been applied to American politics. (...) Perhaps one reason for the dearth of interest is that income or wealth has not been seen as a reliable predictor of political beliefs and partisanship in the mass public, especially in comparison to other cleavages, such as race and region, or in comparison to other democracies" (McCarty, Poole, and Rosenthal 2008: 73).

Two clear illustrations of this are major recent works on partisan identification and voting by Green, Palmquist, and Schickler (2004) and Lewis-Beck (2009). Both analyses underplay the importance of income (and, even more so, of its connection to redistribution preferences). To the extent that income and redistribution preferences are considered in this literature, it is through the prism of "class voting."[3] But this

[3] Lewis-Beck (2009) finds class to have become less significant a determinant of voting in presidential elections, while Manza and Brooks (1999) find the class cleavage to be stable from 1952 to 1996. In a more recent contribution, Hersh and Nall (2015) find income-based voting to be less important than racial context.

approach is quite distinct from the political economy arguments that we present in this paper.

The approach most similar to ours is that of McCarty, Poole, and Rosenthal (2008),[4] and their finding that voting in presidential elections is increasingly linked to income is compatible with our arguments. But the equilibrium in most political economy models (including McCarty, Poole, and Rosenthal 2008) is achieved by individuals deriving their preferences over optimal fiscal policy based on their income position, which are then "aggregated into an economywide policy via the collective choice mechanism in place" (Drazen 2000: 312). Thus the two central concepts are citizens' redistribution preferences (or ideal points) and vote choices (the collective choice mechanism). The traditional mode of empirical analysis has then been to relate income to economy-wide outcomes, such as spending (see, e.g., the summaries of empirical research in Persson and Tabellini 2000 and Mueller 2003). This, however, simply assumes that our central argument – the relationship between preferences and voting – is indeed the mechanism at work. This paper's contribution is to specify explicitly the theoretical mechanisms that determine preferences and party choice, and to test them empirically.

Thus, the second stage of our argument involves the relationship between macro-levels of inequality and redistribution preferences. As in the Meltzer-Richard model, our argument implies that a rise in inequality that increases the distance between an individual's income and the mean will change her distribution preferences. More importantly, our argument also implies that the current pocketbook consequences of inequality are fully contained in the individual income distance changes produced by this inequality shift. In other words, the tax and transfer consequences of inequality are picked up by individual income changes.

Macro levels of inequality, however, can indirectly affect the individual utility function implicit in the previous paragraph. Following Alesina and Giuliano (2011), we can think about this utility function as one in which individuals care not only

[4]But see also Brooks and Brady (1999), who argue that income shapes voting behavior indirectly (by affecting evaluations of social welfare and government size).

about their current tax and transfers but also about some macro measure of income distribution.[5]

There are several reasons why macro levels of inequality can affect the redistribution preferences of the rich, but not those of the poor. Perhaps most clearly related to this paper's argument, Rueda and Stegmueller (Forthcoming) argue in a recent contribution that macro inequality promotes economic externalities. They propose that the poor have shorter-term motivations than the rich.[6] They conclude that the relative importance of receiving benefits is greater for the poor than the relative importance of paying taxes is for the rich. Longer time horizons and lower stakes (in relation to current tax and transfer considerations) mean that the negative externalities of inequality will be more important to the rich.[7] In this argument, relative income is still negatively correlated with redistribution preferences, but the rich in high-inequality states become more likely to support redistribution than the rich in low-inequality states.[8]

The hypotheses that emerge from this paper's arguments are summarized in Figure 1. Because of negative economic externalities (and possibly other-regarding motivations), we expect inequality to make the rich more likely to support redistribution and therefore more likely to vote Democrat. Since we argue that voting for the Democratic Party is partly determined by redistribution preferences, and since redistribution

[5]As suggested by Alesina and Giuliano (2011), different individuals may be affected by different kinds of inequality. For simplicity, in this paper we focus on the Gini coefficient, which is the most commonly used measure of inequality in the political economy literature.

[6]This has been explored in the economics and sociology literature. In economics, the poor have been argued to be more constrained in their investment decisions than the rich (explaining the lower likelihood by the poor to invest in long-term objectives like increasing human capital or saving for retirement). See, for example, Lawrance (1991) or Dynan, Skinner, and Zeldes (2004). Complementarily, sociological research has illustrated that lower social class (itself closely related to low income) leads to shorter time horizons (see, for example, O'Rand and Ellis 1974).

[7]McCarty, Poole, and Rosenthal (2008) (like Gelman et al. (2008)) emphasize the relative wealth of a state as a macro explanatory variable. We focus on macro levels of inequality and find the rich to be affected by it very differently from the poor (even when controlling for state wealth).

[8]An alternative theoretical approach with similar observable implications focuses on the role of other-regarding motivations. There are different ways to think about altruism, from the "reference-dependent inequity aversion" preferences proposed by Fehr and Schmidt (1999) to the "fairness" preferences in Alesina and Angeletos (2005). Dimick, Rueda, and Stegmueller (2014) argue argue that altruism towards the poor by the rich is more significant when macro inequality is high (they show that altruism becomes a "luxury good," the demand for it increases as income increases when inequality is high).

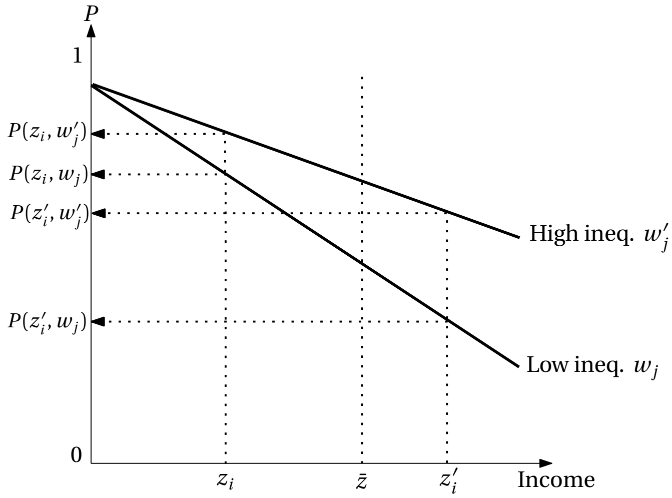

Figure 1: Macro-Inequality and Democratic vote

preferences converge regardless of the macro-level of inequality as income declines, we expect the voting behavior of the poor to be similar whether macro inequality is high or low. Thus, the probability of voting Democrat for an individual with low income z_i in a low-inequality state w_j, denoted $P(z_i, w_j)$, and in a high-inequality state $P(z_i, w'_j)$ do not differ by much. In contrast, we expect the likelihood to vote Democrat of a rich individual in a low-inequality state $P(z'_i, w_j)$ to differ starkly from that of a rich individual in a high-inequality state $P(z'_i, w'_j)$.

To make transparent how we think about these questions conceptually, it is useful to use the framework of potential outcomes to study explicitly our hypothesized causal mechanism (Imai et al. 2011; VanderWeele and Vansteelandt 2009).[9] Start with a scenario where individual i $(i = 1, \ldots, N)$ receives some level of income, z_i and lives in a state with a level of inequality, w_j. Our individual prefers a certain level of redistribution, which is a function of her income and the level of inequality, which we write as $R_i(z_i, w_j | x_{1i})$. Possibly confounding variables are denoted by x_{1i}. At an election, she casts her vote in part based on her redistribution preferences and on a number of other factors shaped by inequality, as well as (again) a number of possible confounders, x_{2i}. We write this vote function as $V_i(z_i, w_j, R_i(z_i, w_j | x_{1i}) | x_{2i})$.

[9]For a recent example of using the causal mechanism framework to explicate mechanisms in an observational study, see Becher and Donnelly (2013).

Note that inequality appears twice: as a factor changing preferences (which in turn shape vote choice) and as a factor shaping vote choice (via possibly infinitely many other possible channels).

To analyze the role of inequality, denote a counterfactual shift in inequality, w_j'. Holding everything else constant, we get the *total* effect of inequality on vote choice by (we omit possible confounders for clarity):

$$TE \equiv V_i(z_i, w_j, R_i(z_i, w_j)) - V_i(z_i, w_j', R_i(z_i, w_j')) \tag{1}$$

This is the expected (counterfactual) difference in the probability of voting Democrat as a result of changing inequality. This difference results from the combination of the systematic effects of changing preferences and other factors, which are not relevant to our argument.

To understand *how* inequality shapes the Democratic vote *via* preferences it is not enough to look at disparate sets of regression coefficients (of, say, inequality on preferences, and preferences on voting). Rather, we need to explicitly test our hypothesized mechanism (Robins 2003). Thus, we calculate the indirect effect:

$$IE \equiv V_i(z_i, w_j, R_i(z_i, w_j)) - V_i(z_i, w_j, R_i(z_i, w_j')). \tag{2}$$

This is the effect a change in inequality has on vote choice via redistribution preferences *only*. By fixing inequality and only changing preferences, we isolate our preference mechanism and eliminate the impact of competing mechanisms (Imai et al. 2011: 769). In other words, it is a strict statistical expression of our hypothesized inequality–preference nexus *net* of alternative explanations (such as, for example, second dimension concerns). The remaining effect of inequality on vote choice via all mechanisms other than preferences is captured by the direct effect:

$$DE \equiv V_i(z_i, w_j, R_i(z_i, w_j)) - V_i(z_i, w_j', R_i(z_i, w_j)). \tag{3}$$

The previous discussion lays out the causal counterfactual logic of our argument and is independent of the specific statistical model used to estimate it.[10] We describe

[10]General nonparametric identification results for this structure are discussed in Imai, Keele, and Yamamoto (2010). In our empirical application (as in any analysis having to rely on observational

our statistical model in Section V. Let us emphasize again that this setup provides a strict test of our hypotheses. We test if inequality and income systematically shape Democratic vote via redistribution preferences while allowing for (possibly infinitely many) other channels by which inequality and income could be linked to vote choice.

Out of the multitude of channels linking inequality and voting, however, we must specifically contend with two additional factors when explaining the determinants of Democratic voting in the US: values and the South. Regarding values, an important literature posits that, in some states, the poor are diverted from the pursuit of their material self-interest. Perhaps the most well-known example of these arguments is the contention that second-dimension issues (particularly cultural and social ones) outweigh economic ones for the American working class. Frank 2004, and the critique in Bartels 2006, are good illustrations of this debate, but so is the emphasis on cosmopolitanism as a determinant of vote in Gelman et al. (2008).While not denying that moral and cultural issues are important to voting Democrat in the US, we emphasize the importance of redistribution preferences. McCarty et al. find that income is an extraordinarily good predictor of partisanship and voting even among conservative Christians (2008: 100-101). In the same vein, we will show below that the interaction between income, macro inequality and redistribution preferences are a powerful predictor of voting even when controlling for the influence of other channels of influence (such as values).

Regarding regional differences, the historically dramatic shift of voters in the South from the Democratic Party to the Republican Party has been well documented. The general contours of partisanship in the South have been analyzed before. Starting in the 1960s, non-African Americans in the South switched from being Democratic to being Republican (see McCarty, Poole, and Rosenthal 2008 and Green, Palmquist, and Schickler 2004). The connection between race and Southern politics has been the subject of analysis for a long time (see, for example, Key 1949). While we introduce race as an individual covariate below, the existence of *racial institutional orders* (King and Smith 2011) necessitates the exploration of regional patterns in the South that

data) a number of conditions have to be met in order for inferences to be credible. We study these using sensitivity analyses in appendix F.

may not be similar to those in the rest of the states in our analysis. We do this in the sections below.[11]

III. DATA

We use data from the General Social Survey (GSS) covering nine presidential elections between 1976 and 2008. We limit our population to those who are of working age (18-65), not currently in full-time education and who casted a vote in a presidential election. This yields 10,218 observations. After removing individuals with missing values on covariates we are left with 9,073 individuals.[12]

Our vote choice variable is based on a retrospective statement from each GSS respondent for which party he or she voted in the last presidential election. We create a simple indicator variable equal to 1 if a vote was cast for the Democrats and 0 if the Republican party was chosen. Respondents who abstained or chose a third candidate (such as Anderson in 1980 or Perot in 1992/96) are not included in the sample, to allow us to make meaningful "two-party choice" comparisons.[13]

To capture redistribution preferences we use a commonly used measure (e.g., Alesina and Angeletos 2005), available over time in the GSS. It presents respondents with the following statement: "the government should reduce income differences between the rich and the poor, perhaps by raising the taxes of wealthy families or by giving income assistance to the poor." Answers are recorded on a seven-point scale, with labeled endpoints "1=should" and "7=should not", which we reverse for ease of interpretation. Table 1 shows the distribution of responses in our sample. Immediately apparent is the breadth of preferences held by the American public. Opposition and support for redistribution are almost evenly distributed in the population.

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[11] For a recent contribution to this debate, see Hersh and Nall 2015 who, using geocoded registration records and precinct returns find the correlation between income and partisanship to be strong in heavily black areas of the Old South and other areas with a history of racialized poverty, but weaker elsewhere, including in urbanized areas of the South.

[12] We also removed individuals for which we observe neither vote choice nor preferences. Due to the complexity of the model used, we opted not to use multiple imputation for missing covariates. Missing values on *dependent* variables will be imputed within the model (assuming an ignorable or MAR missingness process).

[13] In further work we will incorporate a full model for abstention. Note, however, that a proper unified model of turnout and party choice is a lot more complex than simply including abstention as another "party" (see, e.g., Adams, Dow, and Merrill 2006).

Table 1: Redistribution preferences

Should government reduce income difference between rich and poor?						
No 1	2	3	4	5	6	Yes 7
14.8	10.3	14.2	17.7	16.5	10.8	15.7

Note: Entries are percentages per category.

We measure state-level inequality via the Gini index (Cowell 2000). We use data from Frank (2009) who calculates Gini measures following Cowell and Mehta (1982) based on data on the number of returns and adjusted gross income by the IRS. A central problem in assessing inequality is that the very rich are underrepresented in standard surveys. Furthermore, in order to protect respondents' anonymity, incomes are usually top-coded. Thus, the extent of inequality tends to be underestimated when calculated from sample surveys. Matters are improved when inequality is calculated from administrative records. Atkinson, Piketty, and Saez (2011) provide an extended discussion on the validity and advantages of tax-return based calculations.

We measure income distance as the distance between a respondent's household income and the national mean income in each year. The GSS captures income by asking respondents to place their total net household income into a number of income bands. These are transformed into midpoints (see Hout 2004 for details). We impute the top-coded income category value by assuming that the upper tail of the income distribution follows a Pareto distribution (e.g., Kopczuk, Saez, and Song 2010). Finally, to allow meaningful comparison over time, incomes are converted to constant dollars (with base year 2000). The distribution of income distances used in our analysis is summarized in Figure A.1 in the appendix.

To control for state-specific changes in economic conditions, we use yearly state-level unemployment rates. We calculate them by averaging the Bureau of Labor Statistics' LA series of state monthly unemployment rates (Bureau of Labor Statistics 1992).[14] As further individual-level characteristics we include a respondent's age, gender, education (years of schooling), an African-American indicator variable, and

[14]In our robustness tests, we also control for state wealth measured as state gross domestic product and average state income

a "non-white" summary indicator. Respondents' labor market status is captured by indicator variables for currently being self-employed, unemployed, or in part-time employment. Finally we include an indicator of respondents living in urban areas, defined as cities with at least 50,000 inhabitants. Table B.1 in the appendix shows descriptive statistics for our central variables.

IV. STATE VARIATION IN INEQUALITY, PREFERENCES AND VOTING

We have argued above that rich individuals who live in unequal areas will be more likely to support redistribution and, therefore, to vote Democrat. The first stage of our argument involves the relationship between relative income and voting. As Gelman et al. (2008) have noted, affluent people in some states are much more likely to vote for the Democratic Party than in other states (while for the poor, this difference is much less pronounced). Figure 2 presents data on the average percentage of Democratic vote among the poor and the rich in presidential elections from 1976 to 2008. The poor are defined as those \$32,590 below the national income mean, the rich are those \$26,953 above the mean (these correspond to the 90th and 10th percentiles in the national income distribution). The figure confirms the general findings in Gelman et al. (2008), the poor are generally highly likely to vote Democrat. The states in the upper panel are uniformly dark. There are a couple of exceptions (Montana and Maine) where the percentage of Democratic voters among the poor is unusually low (around 20%). But the rest of states have uniformly high levels of Democratic vote (in 36 states, it is higher than 50%; in 30 states, it is higher than 60%).

Voting Democrat among the rich, however, exhibits a much higher state variance. There are states with very low percentages (below 20): Kentucky, Oklahoma and Mississippi. There are states with low percentages (between 20 and 30): Idaho, Montana, Georgia, New Hampshire, Ohio, Delaware and Texas. There are a number of states with percentages of Democratic votes between 30 and 40: Arizona, Kansas, Indiana, North Carolina, Tennessee, Vermont, Maine, South Carolina, Florida, Missouri and Virginia. There are then 20 states with percentages of Democratic vote between

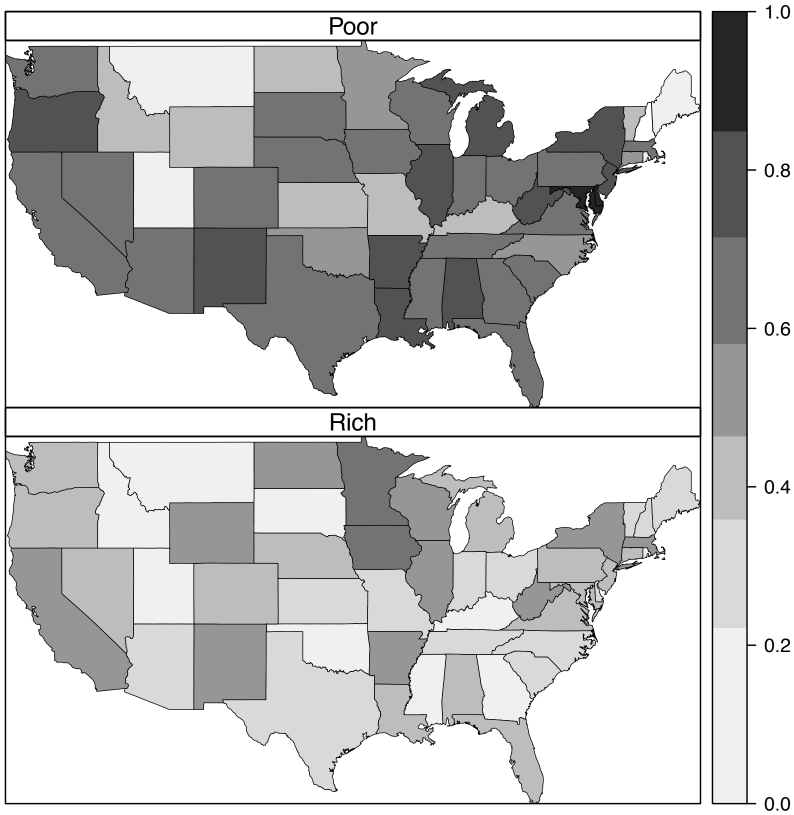

Figure 2: Democratic vote, presidential elections 1976-2008

40 and 50 and 5 states where these percentages are higher than 50: Massachusetts, Minnesota, Iowa and DC.[15]

The more systematic analysis to be developed below will help explain the voting patterns shown in Figure 2. An initial illustration of the explanatory variable emphasized in the first stage of our argument is offered in Figure 3, which displays state inequality (our Gini index calculated with data from Frank (2009)). It shows inequality to be highest in New York, Massachusetts, Connecticut, Florida, Texas and California. The most equal states are Nevada, Idaho, Indiana, West Virginia, and Washington. More importantly, the figure shows a general correlation between inequality and the likelihood of voting Democrat among the rich shown in Figure 2. States with high levels of inequality (the darker color in Figure 3) tend to contain

[15]It is important to mention that these are averages over time, not reflecting the temporal variation that will be captured by the analysis in the following sections.

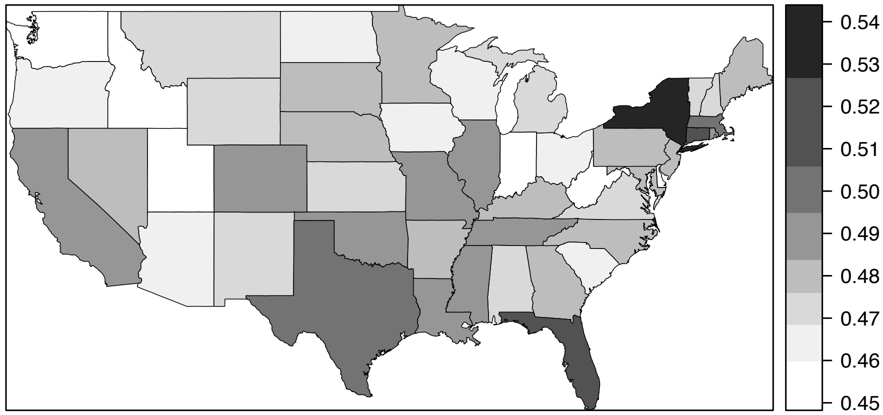

Figure 3: Average inequality (Gini) by state, 1974-2008

the highest levels of Democratic support among the rich in Figure 2. This is the case in New York, California and Massachusetts. States with low levels of inequality (the lighter color in Figure 3) tend to contain low levels of support for the Democratic Party among the rich. Utah and Idaho are good examples.

Figure 4 addresses the second element of our argument: the existence of state variation in support for redistribution among the rich and the poor. Once again the poor are defined as those $32,590 below the national income mean, and the rich are those $26,953 above the mean. The figure captures the average level of support (i.e., the mean of the 7-point scale) for redistribution in each of the states in the sample.

Figure 4 suggests the existence of a general relative-income effect. While the poor's average state support for redistribution is 4.6, the average for the rich is 3.4. The figure shows a remarkable amount of state variation. The lowest support for redistribution among the rich (2.5 on the 7-point scale) can be found in South Dakota, while the highest support among the rich (4.6) is in Hawaii. For the poor, the highest support for redistribution (5.4) is again in Hawaii while the lowest support (2.5) is to be found in Utah. By looking at the two panels side by side, we can see that the support for redistribution of the poor is almost always higher than that of the rich. This point is brought home in Figure 5. It presents the differences in redistribution preferences between poor and rich. There are only three states where this difference is negative (i.e., where the rich are more pro-redistribution than the poor): Utah, Montana and

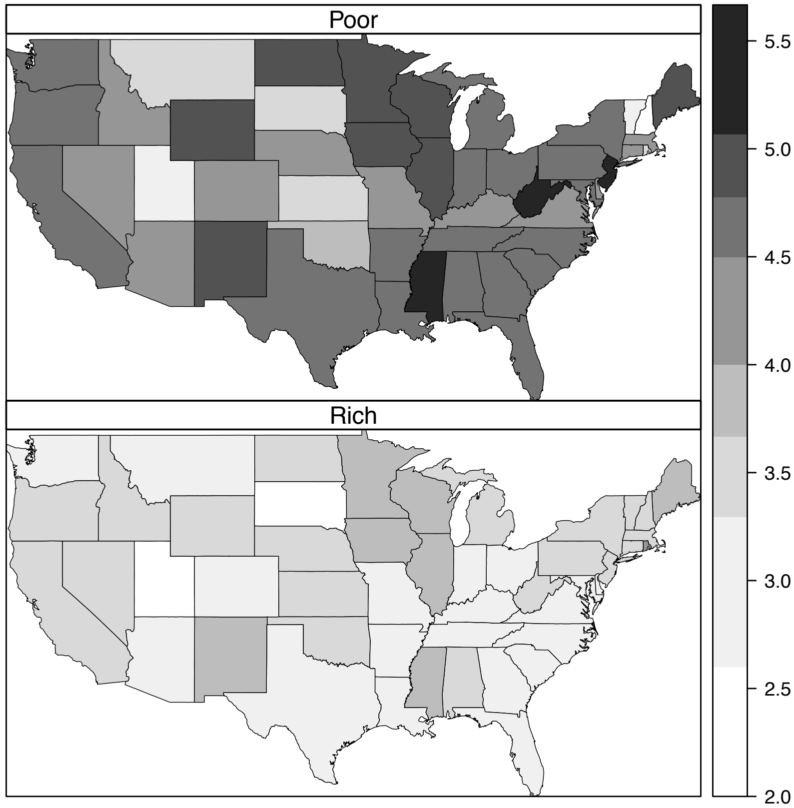

Figure 4: Redistribution preferences among poor and rich

Rhode Island.[16] The rest of the sample is characterized by levels of redistribution support that are higher among the poor than among the rich. The states where these differences are the greatest are Tennessee, West Virginia and Arkansas.

Using again Figure 3, we can see a general correlation between inequality and the difference in redistribution preferences shown in Figure 5. States with high levels of inequality (the darker color in Figure 3) tend to exhibit greater differences in the redistributive preferences of rich and poor (the darker color in Figure 5). This is the case in Texas, California and Florida. States with low levels of inequality (the lighter color in Figure 3) tend to exhibit smaller differences in the redistributive preferences of rich and poor (the lighter color in Figure 5). This is the case in Utah, Kansas,

[16]These cases are exceptional, but in different ways. In Utah, as noted above, the poor are unusually against redistribution (the lowest average in the sample). In Montana and Rhode Island, the rich are unusually supportive of redistribution.

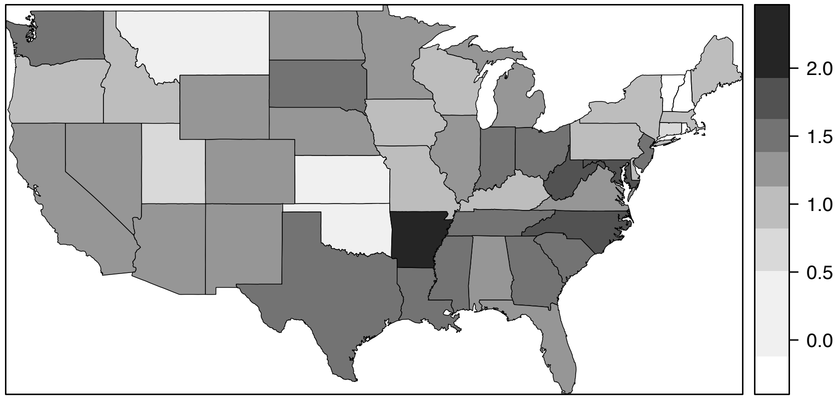

Figure 5: Difference in redistribution preferences between poor and rich

Vermont and New Hampshire. In this preliminary illustration, there are of course also exceptions (Washington is a very equal state with high preference differences between rich and poor, for example). In the following pages, we will analyze more systematically the determinants of the patterns shown in Figure 5.

V. MODEL

Our statistical analysis uses repeated cross-sections, i.e., we have surveys repeated at several points in time. Our lowest unit of analysis is the individual, while the unit for inequality is the state. Given obvious and persistent state differences, and the difficulty in measuring all state characteristics, our statistical strategy is to control for state-specific effects and exploit temporal variation by using a *within*-states design. Thus, we model individuals' preferences and voting choices when faced with changing levels of state inequality, holding other state-level characteristics constant.

Vote choice and preference variables Our first dependent variable is an individual's decision to vote for a Democratic candidate. More precisely, let y_{1ijt} represent observed vote choice of individual i ($i = 1, \ldots, n_{jt}$) in state j ($j = 1, \ldots, J$) at time point (year) t ($t = 1, \ldots, T$). In a decision theoretic formulation, an individual will vote for one candidate if the utility derived from that choice exceeds that of the alternative. In our two-party setting, we simply observe $y_{1ijt} = \mathbf{1}(y^*_{1ijt} > 0)$.[17] Our measure of

[17] $\mathbf{1}$ is an indicator function, which evaluates to 1 if its argument is true.

preferences is the 7-category survey item, y_{2ijt}. For simplicity, we treat this variable as continuous.[18]

Model In this paper we want to make two points. The first one is simply that inequality matters more to the voting behavior of the rich than that of the poor. In other words, we expect to observe a positive interaction effect between income distance and income state-level inequality. Our second point is that these voting patterns can be (partly) explained by the fact that the preferences of rich voters in high inequality states are systematically different. We argue that the rich are more likely to support redistribution (or be less opposed to it) as income inequality rises.

To test our first point we model vote choice as a function of income distance, z_{ijt}, state-level inequality in year t, w_{jt}, and their interaction, $w_{jt}z_{ijt}$. Their effect is captured by the three-vector $\boldsymbol{\beta}$:

$$y^*_{1ijt} = x'_{ijt}\boldsymbol{\alpha}_1 + \boldsymbol{\beta}(w_{jt} + z_{ijt} + w_{jt}z_{ijt}) + \xi_j + \epsilon_{1ijt} \tag{4}$$

We include a vector of both individual and state controls, x_{ijt}, with associated coefficients $\boldsymbol{\alpha}_1$, as well as unobserved state effects, ξ_j (we describe their specification in more detail below).

To explicitly test our second point, we need to model the role of income distance and inequality in shaping preferences and how preferences themselves influence vote choice. Thus we jointly estimate the following two equations:

$$y^*_{1ijt} = x'_{ijt}\boldsymbol{\alpha}_1 + \lambda y_{2ijt} + \boldsymbol{\beta}(w_{jt} + z_{ijt} + w_{jt}z_{ijt}) + \xi_j + \epsilon_{1ijt} \tag{5}$$

$$y_{2ijt} = x'_{ijt}\boldsymbol{\alpha}_2 + \boldsymbol{\gamma}(w_{jt} + z_{ijt} + w_{jt}z_{ijt}) + \zeta_j + \epsilon_{2ijt} \tag{6}$$

The effect of endogenous preferences, y_{2ijt}, on vote choice is captured by λ. Our main covariates of interest are (again) an individual's income distance, z_{ijt}, state-level inequality at a specific time-point, w_{jt}, and their interaction, $w_{jt}z_{ijt}$. Their effect is captured by the two three-element vectors of parameters $\boldsymbol{\beta}$ and $\boldsymbol{\gamma}$. The latter shows how preferences are shaped by income and inequality, while the former now shows the remaining effect of income and inequality on vote choice not due to preferences.

[18]Using a more complex latent variable model does not make a substantive difference to our results.

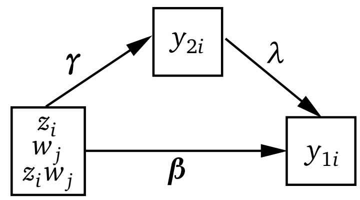

Figure 6: Illustration of joint model of preferences and vote choice

The basic structure of our model is illustrated in Figure 6 (see also Imai et al. 2011 Figure 1a.). It shows how preferences are introduced as an intermediary variable between income and inequality (we omit covariates for clarity). This setup will allow us to distinguish the effects of income and inequality that are channeled via preferences (i.e. via the γ and λ paths) from those due to other channels (general ideology, second-dimension concerns, etc: the β paths). With estimates from our joint preference and vote model in hand, we can calculate the direct and indirect (counterfactual) effects specified in equations (2) and (3). Appendix C shows how these are derived from our model estimates.

Our statistical model includes a vector of both individual and state controls, x_{ijt}, with associated coefficients $\boldsymbol{\alpha}_1$ and $\boldsymbol{\alpha}_2$. To capture unobserved state confounders, our model contains state-specific effects in both vote (ξ_j) and preference (ζ_j) equations. In other words, we allow unobserved state factors to affect preferences and vote choice differently. Both ξ_j and ζ_j, are specified as arising from a normal distribution with zero mean and estimated variances σ^2_ξ and σ^2_ζ, respectively.[19] Finally, the last element in the model are residuals, ϵ_1, ϵ_2, which are both zero-mean normally distributed. While the variance of ϵ_2 is freely estimated, the variance of ϵ_1 is fixed to one to identify the probit equation.[20]

Estimation We implement our model in a Bayesian framework. Besides enabling us to jointly estimate our voting and preference equations, this is also preferable from

[19]In classical parlance, those are "random effects". However, in a Bayesian framework all parameters are random, i.e. have to be assigned a prior distribution. The difference between "fixed" and "random" effects is then simply that the latter have an added hierarchical element, their common variance distribution (described below). See Rendon (2012) for an extended discussion.

[20]We specify ϵ_1, ϵ_2 as uncorrelated (conditional on all covariates, preferences, and state random effects). A model with correlated residuals (using a parameter expanded inverse Wishart covariance prior, with scale matrix $\boldsymbol{I}_2$ and 3 df.) yields a residual covariance of -0.006.

a more philosophical standpoint. US states are not a random sample, but comprise the whole population. In that context classical maximum likelihood standard errors are not particularly meaningful (Jackman 2009: xxxii). In contrast, the Bayesian inferential framework considers 'standard errors' (or posterior standard deviations to be exact) to be a measure of uncertainty and is thus applicable in our case. Jackman (2009) and Gill (2008) provide further discussion of the advantage of Bayesian methods. To complete the Bayesian specification we assign vague or uninformative prior distributions to all model parameters.[21]

VI. RESULTS

Income, inequality and vote choice Table 2 shows a set of estimated $\boldsymbol{\beta}$ coefficients for income distance, inequality, and their interaction from equation (4). As our analysis is Bayesian we do not just obtain point estimates, we also recover for each parameter its full posterior distribution (reflecting its estimation uncertainty). This distribution is summarized in Table 2 by providing posterior means and standard deviations, as well as Bayesian 95% highest posterior density regions, which can be understood as the Bayesian analogue to the classical confidence interval. While we provide more intuitive quantities of interest below, Table 2 provides a first test of our first argument. After controlling for a number of individual and state characteristics, we find clear main effects of individual income distance and state inequality on the propensity to vote Democratic. More importantly, we also find our hypothesized interaction: the general effect of income on Democratic vote choice is negative, but richer individuals in states that are more unequal are systematically more likely to support the Democratic party.

In order to assess the interaction between income and inequality, Figure 7 shows the predicted probabilities of casting a Democratic vote by income distance in high and low inequality states. We define high and low inequality states as the 10th and 90th percentiles of the distribution of Gini coefficients in our sample. Two conclusions

[21] More explicitly, we set them to be *a priori* distributed mean zero with a large variance of 10 to reflect our prior ignorance over their true value, i.e. $\beta, \gamma \sim N(0, 10)$. The same vague prior distribution is used for the effect of preferences on vote choice: $\lambda \sim N(0, 10)$. We have two free state variances in our model for which we use vague inverse Gamma priors (Spiegelhalter et al. 1997), $\sigma^2_\zeta, \sigma^2_\xi \sim IG(0.001, 0.001)$.

Table 2: Income, inequality and Democratic vote choice. Posterior means, standard deviations, and 95% highest posterior density regions

	Mean	SD	95% HPDR	
Income distance	−0.292	0.023	−0.336	−0.247
Inequality	0.147	0.028	0.092	0.202
Income×inequality	0.151	0.044	0.066	0.238
State random effect				
Var(ξ)	0.070	0.015	0.042	0.099

Note: Based on 10,000 MCMC samples from equation (4). Included controls are: age, education, female, black, other non-white, self-employed, part-time employed, unemployed, living in large city, union membership, and state percentage of non-white, state unemployment rate.

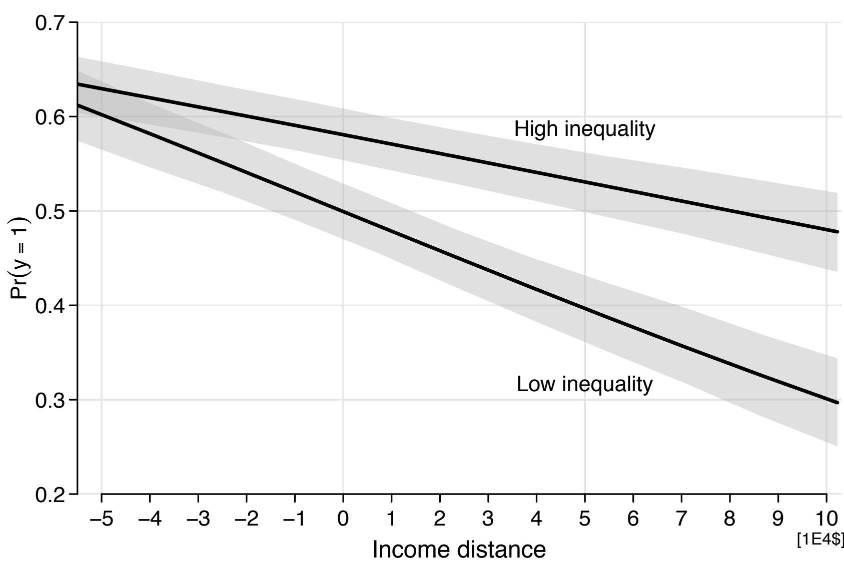

Figure 7: Predicted probability of Democratic vote as function of income and inequality. Posterior means and 95% intervals.

are evident. First, the “Meltzer-Richard” prediction is confirmed – the further above from the mean of the income distribution and individual is, the less likely he or she is to vote Democrat. However, this relationship is strongly moderated by inequality. In states with high levels of inequality the negative effect of income distance is markedly less pronounced. An affluent individual \$50,000 above the national mean in a low inequality state (like Maine in 1988, which is close to the 10th percentile) will have a 40% probability of voting Democrat. In a high inequality state (like California in 2005, which is close to the 90th percentile), an individual in exactly the same position in the income distribution would have more than a 50% probability or, in other words, would be at least as likely to vote Democrat as Republican.

The role of preferences The second part of our argument stresses that the strong interrelationship between income and inequality affecting vote choice can be explained by individual redistribution preferences. To test this proposition we estimated our joint model of preferences and vote choice, eqs. (5) and (6). Table 3 shows summaries of the posterior parameter distributions for this model. We only display our main parameters, a full table is available in appendix table D.2.

To start at the top, we find unequivocal support of the argument that redistribution preferences determine vote choice. Individuals who hold more pro-redistribution preferences are more likely to support the Democratic party. This relationship is highly statistically significant as evidenced by the small posterior uncertainty interval. In order to gain a more intuitive understanding of the role of preferences, we calculate the change in the predicted probabilities of Democratic vote choice when preferences change (holding everything else constant). Moving one category up from the population average of redistribution preferences increases the probability of voting Democrat by 4.7 ± 0.1 percentage points.

Returning to the upper panel of Table 3 we find that including preferences explains a sizable portion of the effect of income on preferences. By comparing the estimates in Table 3 to those we presented in Table 2, we can see that the remaining effect of income on voting (i.e., the income effect not explained by preferences) is reduced by more than 40%. The same is true for the interaction between inequality and income distance.

We argued that redistribution preferences are shaped systematically by income and inequality. While rich individuals generally oppose redistribution, we proposed that

Table 3: Joint model of vote choice and redistribution preferences. Posterior means, standard deviations, and 95% intervals.

	Mean	SD	95% HPDR	
(A) Index equation for Democratic vote choice				
Redistribution preferences	0.178	0.007	0.164	0.193
Income distance	−0.170	0.024	−0.218	−0.124
Inequality	0.174	0.029	0.118	0.232
Income×inequality	0.112	0.046	0.020	0.199
(B) Equation for redistribution preferences				
Income distance	−0.737	0.040	−0.819	−0.661
Inequality	−0.099	0.045	−0.189	−0.014
Income×inequality	0.262	0.075	0.116	0.408
Random state effects				
Var(ξ)	0.071	0.015	0.041	0.100
Var(ζ)	0.033	0.013	0.011	0.058

Note: Based on 10,000 MCMC samples from jointly estimated equations (5) and (6). Included controls (full estimates in appendix) are: age, education, female, black, other non-white, self-employed, part-time employed, unemployed, living in large city, union membership, state percentage of non-whites, and state unemployment rate.

the rich in high inequality states would be far less opposed to redistributive policies. This expectation is tested in the lower panel of Table 3, which shows the posterior summary of equation (3). We find that – as expected – higher-income individuals prefer less redistribution. However, in high inequality states their opposition becomes significantly less pronounced (in both the statistical and substantive sense). To visualize how inequality moderates the role of income distance, we calculate expected values of redistribution preferences for rich and poor individuals. As in previous sections, we define poor and rich as those who are at the 10th and 90th percentiles of the national income distribution. We then calculate the difference in expected preferences between rich and poor. Repeating this calculation over a range of Gini values allows us to visualize how state inequality changes the effect of income on preferences.

The results shown in Figure 8 illustrate the importance of including inequality in explanations of income and voting. At low levels of inequality, say at a Gini coefficient

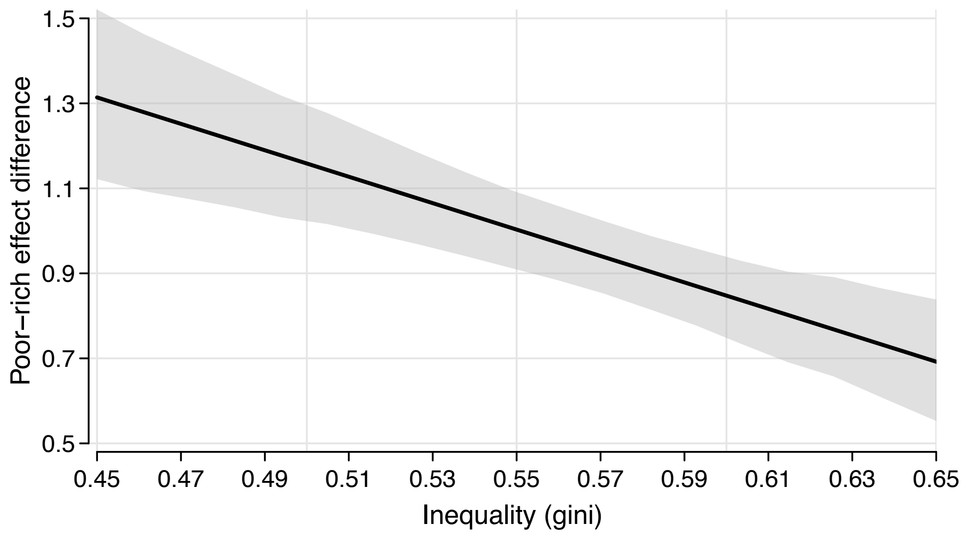

Figure 8: Difference between Poor and Rich in redistribution preferences at different levels of inequality. Differences in expected values and 95% intervals.

of 0.51 (e.g., Maine in 1988), one sees a marked difference in preference between Rich and Poor of more than 1.1 points (on a seven point scale). At high levels of inequality, for example in states with a Gini coefficient of 0.62 (California in 2005), the Rich-Poor difference decreased markedly to less than 0.8 points. The width of our 95% interval once more makes clear that this difference is statistically reliable.

Indirect effects of income and inequality via preferences So far we have described the role of inequality and income in shaping preferences and how preferences shape Democratic vote choice. However, to unequivocally demonstrate the relevance of preferences in linking income and inequality to voting we need to perform a stricter test.

There are numerous channels through which income and inequality might shape vote choices. Clearly, the aim of this paper is not to specify them all, but to concentrate on a specific one: an individual's redistribution preferences. To test whether preferences are a significant channel we calculate the indirect effect of income, inequality, and our income inequality interaction on vote choice. By indirect we mean an estimate of the path of income, inequality (etc.) on preferences and subsequently on vote choice, as defined in equation (2). In other words, we test the relevance of the full hypothesized path (income → preferences → vote choice) net of all other possible channels.

Results of these tests are displayed in Table 4, which displays indirect and direct effects (cf. equations (3) and (2)).[22] We find that income distance significantly shapes vote choice *via* redistribution preferences: the confidence bounds around our estimates of the full path (from income to preferences to vote choice) do not include zero. The same result holds for state level inequality.[23] Most importantly, we find that our hypothesized moderating effect of inequality significantly shapes vote choice *through preferences*. While the effects of rising income and inequality on voting (through preferences) are negative, a combined unit increase in inequality and income increases the probability of voting for Democrats by more than one percentage point (holding all else equal). Note that this is the effect *only* due to preferences. A lot of other (unspecified) mechanisms additionally operate to shape vote choice.

To gain an understanding of the quantitative role preferences play in the income–inequality–vote nexus, we calculate the percentage of the total effect that is due to preferences (indirect effects) and due to all other channels. Table 4 shows results of these calculation in columns labeled "%". Our results once more underscore the importance of preferences for redistribution. Preferences *alone* make up one third of the total effect of the interaction between inequality and income distance. We also confirm the, by now clear, result that income distance matters for vote choices mainly through its effect on preferences. Preferences *alone* explain half of the total effect of income on vote choice.

VII. ROBUSTNESS TESTS

Before moving to our conclusion we describe a number of robustness and specification tests (we currently display only a subset). Our first (and strictest) robustness check is a change in estimation strategy from "random effects" to "fixed effects". In a Bayesian framework this means that instead of specifying state-specific constants as arising from common normal distributions, we include state-specific constants with direct priors. Results from this model are shown under specification (1) in Table 5. Note

[22]A full table is available in appendix table D.3.
[23]The significance of the direct effects is, on the other hand, much more limited.

Table 4: Indirect (via preferences) and direct effects of inequality and income on vote choice. Posterior means and standard deviations of effect estimates, percentages of total effect

	Indirect effect			Direct effect		
	Est.	SD	%	Est	SD	%
Income distance	−4.177	0.262	46	−4.938	−6.467	54
Inequality	−0.417	0.190	9	4.403	3.049	91
Income×inequality[a]	1.137	0.331	31	2.895	0.707	69

Note: Other variables not shown. Calculated via 10,000 simulated values from posterior parameter distribution. Indirect effect following equation (2); direct effect following equation (3); taking into account that the outcome variable is binary. Calculated values are probability differences.
[a] Calculated with main effect (moderator) at mean

that our use of state-specific effects (both fixed and random) implies that state-level confounders that are time-constant are ruled out as alternative explanations. Thus, in the following paragraphs we mostly focus on either alternative individual-level factors or explanations that involve time-varying state-level variables.

Specification (2) shows that our main results are also obtained in a minimal model without additional covariates. To check if differences in state wealth influence our estimated relationships, as emphasized by (McCarty, Poole, and Rosenthal 2008) and (Gelman et al. 2008), we include state gross domestic product (from the Bureau of Economic Analysis) and average state income (calculated from March CPS files) in specifications (3) and (4).

Moving on to individual level checks, an important literature on the political economy of redistribution preferences has shown the importance of risk. Possessing specific skills increases demand for social protection (Iversen and Soskice 2001). Specification (5) includes a measure of general and specific skills following Fleckenstein, Saunders, and Seeleib-Kaiser (2011). A related argument stresses the role of occupational unemployment risk (Cusack, Iversen, and Rehm 2006; Rehm 2011). In specification (6) we include the occupational unemployment rate (on the level of DOT occupations).[24]

Regarding more "social" rival explanations, Iversen and Soskice (2015) argue that political information is differently available to individuals, and that this influences their voting. We suspect that this important factor is orthogonal to our income-inequality

[24] We are indebted to Philipp Rehm for providing us with his data.

nexus. Specification (7) provides a test, where we include estimated levels of political discussion derived from the ANES (the GSS does not provide a political discussion or political information measure over time). We estimate average discussion levels for 24 age×education×gender groups in each ANES year and match this information back to GSS respondents[25] We also include indicators for a respondent's social class (e.g., Evans and de Graaf 2013) in specification (8). Religion (e.g., De La O and Rodden 2008; Stegmueller 2013) is covered by both church attendance and denomination indicators in specification (9). We also include a respondent's ideology and party identification. While we argue that more clearly defined measures of preferences (such as ours) should be preferred over catch-all concepts, we nonetheless estimate specifications (10) which includes ideology as a straightforward left-right self placement (on a 7-pt scale) available in the GSS and (11) which includes indicator variables for respondents identifying as Democrat or Republican (with independents as reference group).[26]

Another concern we need to address is the influence of segregation. Racial segregation, or the sorting of similar individuals into distinct neighborhoods, might be an important confounder. While our models capture the time-constant effects of state-level variables, *changes* in patters of racial segregation could be responsive for our observed changes in voting patters. To address this issue we calculate two sets of segregation indices from Census data on ca. 65,000 neighborhoods (census tracts). In robustness test (12a) we use the level of neighborhood segregation in each state over time. For robustness test (12b) we first calculate neighborhood segregation for each city with more than 10,000 inhabitants and then aggregate these obtained segregation measures to the state level. We use what is arguably the most popular segregation measure: the index of dissimilarity, which expresses the share of a racial group which would have to move in order to produce an even racial distribution in a neighborhood. In order to save space, we provide a much more detailed discussion in appendix E.

Our robustness results (we present indirect effect estimates for income×inequality) show that our core findings are unaffected by these specification changes. Most

[25] Some missing year-cells in the ANES are imputed using a tobit equation.

[26] We create these indicators from the standard political party affiliation question by combining "strong" and "not very strong" Democrats and Republicans in their respective indicator variables. Independents (including those leaning towards a party) are the reference group.

Table 5: Robustness checks. Indirect effect estimates of inequality×income. Posterior means, and standard deviations.

Specification		Mean	SD
(1)	Fixed state effects	1.769	0.521
(2)	No Controls	1.295	0.393
(3)	State GDP	1.103	0.325
(4)	State avg. income	1.138	0.330
(5)	Specific skills	1.012	0.319
(6)	Occupational unemployment	1.142	0.328
(7)	Political discussion	1.151	0.333
(8)	Social class	1.207	0.336
(9)	Religion	1.012	0.319
(10)	Ideology	0.866	0.282
(11)	Party identification	0.742	0.332
(12a)	Segregation (state)	1.132	0.470
(12b)	Segregation (local)	1.260	0.507

Note: Based on 10,000 MCMC samples from jointly estimated model equations (5) and (6). Displayed are indirect effects calculated following equation (2).

noteworthy is probably the fact that a fixed-effects estimation strategy (i.e., without shrinkage estimation) produces a larger total indirect effect estimate. Many alternative explanations seem to operate in addition to our income-inequality nexus, not replace it. The only exception is the inclusion of ideology, which (as expected) reduces the impact of preferences on Democratic vote choice. However, even there we find a clear effect of preferences and of the income-inequality interaction.

A. The South

Finally we turn to a different kind of robustness test: how the exceptionalism of the South affects our results. While our models include idiosyncratic state effects and thus allow for systematic (level) differences between states, we did not explicitly explore whether income and inequality have different effects in parts of the country. The exceptionalism of the political South has been stressed repeatedly, from Key (1949) to arguments about late democratization in the South by González and King (2004).

This raises two questions: Do we still find our proposed effects when excluding the South from our analysis? And how does the relationship look like in the South?

To address them, we estimate a series of models exploring the different roles that income and inequality play in Southern states. We split our sample into Non-Southern states and the 'political South' (Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia and West Virginia). Not only does this allow us to study the question of effect heterogeneity in the South, it also provides a test of whether the results presented above still hold in a smaller sample (without the South). Figure 9 plots predicted probabilities derived from these models. Panel (A) shows the effect of income on the probability of voting Democrat, holding all else (including inequality) constant, while panel (B) plots the effect of income conditional on levels of inequality.

The results of this analysis are quite unequivocal. With respect to the role of income, we find no systematic difference between Southern and non-Southern states. In both, the further removed an individual is from the mean income earner, the less likely she is to vote Democrat.[27] Figure 9 also reveals that the exceptionalism of the South lies in the effect of inequality. While the point estimates reveal a similar (but weaker) pattern in the South, the smaller sample makes the difference in support for redistribution by the rich statistically insignificant. The rich in states with higher levels of inequality in the South (again keeping in mind the smaller sample) are not significantly more likely to support redistribution than the rich in states with lower levels of inequality in the South. Finally, it should be noted that the left figure of panel (B) clearly shows that in our smaller sample of Non-Southern states we still replicate the hypothesized income-inequality interaction found for the full sample in Figure 7.

VIII. CONCLUSION

We will conclude by noting that, in some ways, this paper presents a somewhat unintuitive result: the rich are more supportive of redistribution in those states where inequality is highest. One might ask why we do find more inequality in precisely the places where the rich are more supportive of redistribution. We think this is an

[27] Our estimate for this effect in the South is less precise, since we now have a much smaller sample at our disposal.

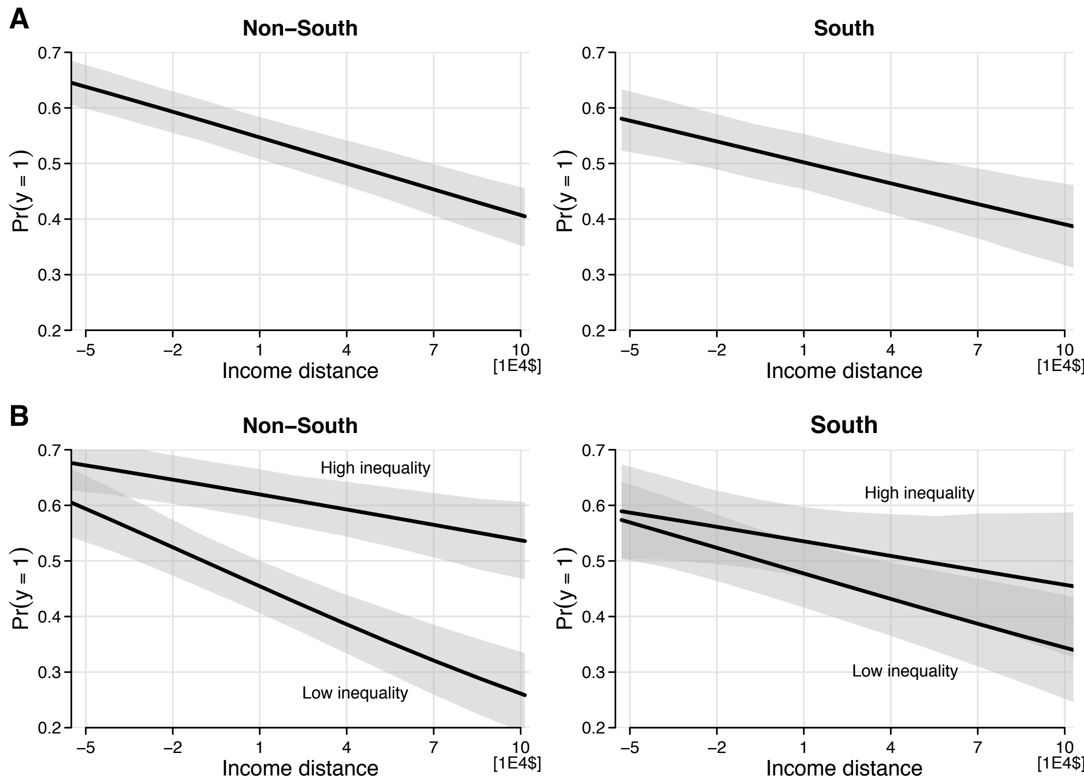

Figure 9: Democratic Vote as function of income and inequality in (Non-)Southern states. Panel (A) shows the effect of income, panel (B) shows effects of income conditional on levels of inequality.

important question in need of a significant amount of further research. As McCarty and Pontusson (2009) note, models of the political economy of redistribution involve two separate propositions: there is a "demand" side, concerning the redistribution preferences of voters, and a "supply" side, concerning the aggregation of these preferences and the provision of policy. In this paper we have focused on the first proposition and ignored the second.

In the introduction to our theoretical claims about the relationship between income and political behavior, we declared that, as in the traditional economic voting literature (Downs 1957), we conceive of voters as instrumental rational actors. The starting point for our argument, common to most political economy approaches to voting, is that individuals will vote after comparing the expected utilities they would derive from the policies promoted by competing political parties. As we have shown above,

Table 6: Illustration of inequality–income effects in the 2008 presidential election. Change in democratic vote margins resulting from a one-point increase or decrease in state-level inequality.

	Full sample		Without South	
Gini change:	increase	decrease	increase	decrease
Change in Democratic vote margin	4.65 (1.19)	−4.58 (1.19)	4.89 (1.23)	−4.80 (1.23)

Note: Entries are percentage points with standard errors in parentheses. We calculate these percentages by keeping all respondents' observables at their observed values and only change Gini coefficients. Changes are relative to the existing level of inequality in each state.

the affluent in high-inequality states want more redistribution and, consequently, are more likely to vote Democrat. The persistence of inequality implies no irrationality on the part of the affluent. It simply reflects the fact that other (exogenous) factors affect inequality outcomes. Given the policy proposals of the two parties during the period we analyzed, it is reasonable for affluent individuals concerned about inequality to expect Democratic candidates to promote more redistribution.

It is perhaps also appropriate to return to the main thrust of the paper in these final remarks, and to re-emphasize the substantive effects we have identified in our analysis. We have argued that redistribution preferences matter to voting in significant ways and that they are responsible for an important portion of the effects of the interaction between income and inequality. In Figure 7, we provided the predicted probabilities of voting Democrat in high and low inequality states and showed that affluent individuals in states with low levels of inequality had a much lower probability of supporting the Democratic Party than individuals with the same income in high-inequality states. It is germane to question how electorally relevant the differences depicted in Figure 7 are. To address this question, we turn to Table 6. The table explores the effects of the relative income–macro inequality relationship on voting, and uses the 2008 presidential election as an illustration.

The table shows the predicted electoral effects of a one-point change in the levels of state inequality observed in 2008. What would have been the consequences in the 2008 presidential election, we ask, of this kind of change in macro inequality given the observed characteristics of the individuals in the survey? We simulate both a one-point increase in the existing state-specific Ginis and a one-point decrease. The table shows that a general one-point increase in state inequality would significantly increase the Democratic vote margin[28] by more than 4 and half percentage points. By making the affluent less likely to vote Democrat, a one-point decrease in macro inequality (again keeping constant the characteristics of our respondents) would decrease the Democratic margin by more than 4 and half percentage points. To illustrate the substantive importance of these electoral outcomes, let us remind the reader that in the 2008 presidential election electoral margins under 7.6% were produced in 50% of states. In 10% of states, the elections produced margins under 2.3%. It is clear then that the effects identified in our paper are potentially momentous.

[28]We define the Democratic vote margin here as the absolute value of the difference between the Democratic vote share and 50.

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Appendix to "Preferences that Matter: Inequality, Redistribution and Voting"

A. Income distance by state

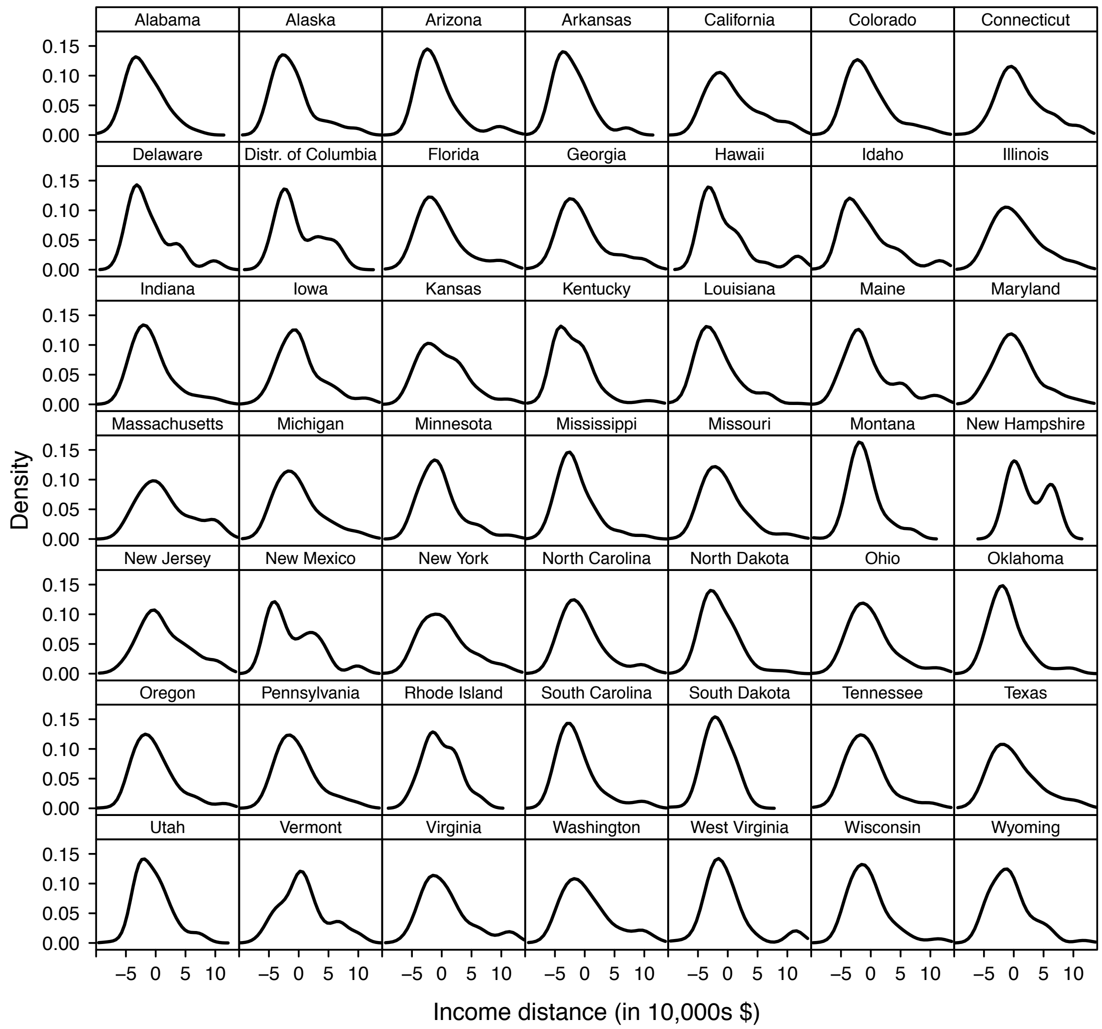

Figure A.1: Distribution of income distance by state. Kernel density estimates (Gaussian kernel, evaluated on 100 point grid).

B. Descriptive statistics

Table B.1: Descriptive statistics. Means and standard deviations for continuous variables, percentages for dichotomous variables

	Mean	SD
Income distance [10,000$]	0.047	3.945
Inequality (gini)	0.564	0.055
Age [10 years]	4.315	1.189
Education [years]	13.966	2.791
State unemployment rate	5.995	1.739
Female	55.6%	
Self-employed	11.8%	
Part-time employed	10.7%	
Unemployed	5.7%	
Black	15.1%	
Other non-white	4.0%	
Urban area	30.9%	
Union member	10.4%	

C. Calculation of direct and indirect effects

This section describes how we calculate direct and total indirect effects (Robins 2003) of equations (3) and (2) from our model estimates obtained from equations (5) and (6).[1] Write our model in simplified form with one covariate of interest (treatment), x_i, a mediating variable (preferences), m_i, and confounders, c_i. We estimate the following system of equations:

$$\text{probit}(y_i) = \beta_0 + \beta_1 x_i + \lambda m_i + \beta_2 c_i \tag{C.1}$$

$$m_i = \gamma_0 + \gamma_1 x_i + \gamma_2 c_i + \epsilon_{2i}. \tag{C.2}$$

with

$$\epsilon_{2i} \sim N(0, \sigma^2_{\epsilon_2}) \tag{C.3}$$

Since our dependent variable is binary, probit(y_i) is the probability of obtaining a positive response (voting Democrat), defined as

$$P(Y_i = 1|m, x, c) = \int_{-\infty}^{\text{probit}(y_i)} f(z; 0, 1)\partial z = \Phi(\text{probit}(y_i)) \tag{C.4}$$

where $f(z; 0, 1)$ is the standard normal density, and Φ is the CDF of the standard normal distribution.

Take the general expression used in the formulas for direct and indirect effects (eq. (3) and (2)), $E(Y(x, M(x'))|C = c)$. As these quantities are not expressed conditional

[1] Imai, Keele, and Tingley (2010); Imai, Keele, and Yamamoto (2010); Imai et al. (2011) call these average causal mediated effects for the treated and average direct effects for the control, while Pearl (2001) calls them total natural indirect effects and pure natural direct effects. See Imai, Keele, and Tingley 2010 and Muthen and Asparouhov 2014 for an extended discussion on their computation.

on M, we need to integrate over M:[2]

$$E(Y(x,M(x'))|C=c) = \int_{-\infty}^{\infty} E(Y|C=c,X=x,M=m) \times f(M|C=c,X=x')\partial M \tag{C.5}$$

$$= \int_{-\infty}^{\infty}\int_{-\infty}^{\text{probit}(y_i)} f(z;0,1)\partial z \times f(M;\gamma_0+\gamma_1 x'+\gamma_2 c,\sigma^2_{\epsilon_2})\partial M \tag{C.6}$$

$$= \int_{-\infty}^{\text{probit}(x,x')} f(z;0,1)\partial z. \tag{C.7}$$

Here, probit(x,x') is given by:

$$\text{probit}(x,x') = [\beta_0+\beta_1 x+\beta_2 c+\lambda(\gamma_0+\gamma_1 x'+\gamma_2 c)]/\sqrt{var(x)} \tag{C.8}$$

where the variance $var(x)$ is given by

$$var(x) = \lambda^2\sigma^2_{\epsilon_2}+1. \tag{C.9}$$

Indirect effect Denote two values of a treatment by x and x' (e.g., low vs. high inequality). The indirect effect (eq. 2) is :

$$E[(Y(x',M(x'))-Y(x',M(x))|C] = \tag{C.10}$$

$$\int_{-\infty}^{\infty} E[Y|C=c,X=x',M=m] \times f(M|C=c,X=x')\partial M \tag{C.11}$$

$$-\int_{-\infty}^{\infty} E[Y|C=c,X=x',M=m] \times f(M|C=c,X=x)\partial M. \tag{C.12}$$

Expressed in terms of equation C.4 the indirect effect is calculated as (see also Imai, Keele, and Tingley 2010, appendix F):

$$\Phi(\text{probit}(x',x')) - \Phi(\text{probit}(x',x)) \tag{C.13}$$

[2]The last equality is obtained by variable transformation and a change of order of integration (see the appendix of Muthen (1979: 810) for a proof.)

Direct effect The direct effect (eq. 3) is

$$E[Y(x',M(x)) - Y(x,M(x))|C] = \tag{C.14}$$

$$\int_{-\infty}^{\infty} (E[Y|C=c,X=x',M=m] - E[Y|C=c,X=x,M=m]) \times f(M|C=c,X=x)\partial M. \tag{C.15}$$

Expressed in terms of equation C.4 it is calculated as:

$$\Phi(\text{probit}(x',x)) - \Phi(\text{probit}(x,x)). \tag{C.16}$$

Substantive interpretation of these quantities rests on a number of assumptions. We discuss these and conduct sensitivity analyses (Imai, Keele, and Tingley 2010; Imai, Keele, and Yamamoto 2010) in Section F below.

D. Full table of estimates

Table D.1: Democratic vote choice as function of income and inequality. Full table. Posterior means, standard deviations and HPD intervals.

	Mean	SD	95% HPDR	
Income distance	−0.292	0.023	−0.336	−0.247
Inequality	0.147	0.028	0.092	0.202
Income×inequality	0.151	0.044	0.066	0.238
Age	0.001	0.021	−0.041	0.041
Education	0.085	0.022	0.043	0.129
Female	0.179	0.021	0.139	0.220
Black	1.460	0.038	1.383	1.534
Other non-white	0.507	0.052	0.407	0.608
Self-employed	−0.051	0.031	−0.115	0.009
Part-time empl.	0.011	0.033	−0.053	0.075
Unemployed	0.160	0.045	0.076	0.253
Urban	0.259	0.023	0.213	0.303
Union member	0.275	0.034	0.207	0.341
State non-white	0.013	0.041	−0.069	0.094
State unemployment	0.142	0.026	0.088	0.191
State random effect				
Var(ξ)	0.070	0.015	0.042	0.099

Note: Based on 10,000 MCMC samples

Table D.2: Democratic vote choice as function of income, inequality, and redistribution preferences. Full table. Posterior means, standard deviations and HPD intervals.

	Mean	SD	95% HPDR	
(A) Index equation for Democratic vote choice				
Redistribution preferences	0.178	0.007	0.164	0.193
Income distance	−0.170	0.024	−0.218	−0.124
Inequality	0.174	0.029	0.118	0.232
Income×inequality	0.112	0.046	0.020	0.199
Age	0.000	0.022	−0.043	0.042
Education	0.132	0.023	0.085	0.175
Female	0.115	0.022	0.073	0.157
Black	1.382	0.040	1.304	1.460
Other non-white	0.433	0.055	0.325	0.539
Self-employed	−0.007	0.033	−0.072	0.060
Part-time empl.	0.030	0.034	−0.037	0.096
Unemployed	0.153	0.047	0.063	0.247
Urban	0.259	0.024	0.211	0.306
Union member	0.239	0.035	0.170	0.308
State non-white	0.005	0.043	−0.079	0.088
State unemployment	0.148	0.027	0.093	0.200
(B) Equation for redistribution preferences				
Income distance	−0.737	0.040	−0.819	−0.661
Inequality	−0.099	0.045	−0.189	−0.014
Income×inequality	0.262	0.075	0.116	0.408
Age	−0.001	0.038	−0.073	0.075
Education	−0.239	0.040	−0.318	−0.163
Female	0.384	0.037	0.309	0.453
Black	0.778	0.057	0.663	0.888
Other non-white	0.589	0.095	0.399	0.766
Self-employed	−0.284	0.057	−0.395	−0.172
Part-time empl.	−0.084	0.059	−0.202	0.030
Unemployed	0.045	0.082	−0.112	0.209
Urban	0.072	0.041	−0.012	0.150
Union member	0.277	0.052	0.173	0.377
State non-white	−0.029	0.052	−0.131	0.072
State unemployment	0.018	0.043	−0.066	0.103
Random state effects				
Var(ξ)	0.071	0.015	0.041	0.100
Var(ζ)	0.033	0.013	0.011	0.058

Note: Based on 10,000 MCMC samples.

Table D.3: Indirect (via preferences) and direct effects of inequality and income on vote choice. Full table. Posterior means and standard deviations of effect estimates, percentages of total effect.

	Indirect (TIE)			Direct (DE)		
	Est	SD	%	Est	SD	%
Income distance	−4.177	0.262	46	−4.938	−6.467	54
Inequality	−0.417	0.190	9	4.403	3.049	91
Income*inequality	1.137	0.331	31	2.895	0.707	69
Age	−0.003	0.183	1	−0.017	0.591	2
Education	−1.059	0.181	24	3.406	0.576	76
Female	1.643	0.169	36	2.988	0.562	64
Black	0.479	0.063	2	19.169	0.989	98
Other non-white	1.767	0.315	15	9.747	1.077	85
Self-employed	−1.411	0.289	69	−0.198	0.915	7
Part-time employed	−0.400	0.283	32	0.807	0.909	45
Unemployed	0.190	0.351	5	3.896	1.138	92
Urban	0.276	0.158	4	6.343	0.575	96
Union member	1.062	0.203	15	5.880	0.820	85
State non-white share	−0.141	0.252	15	0.110	1.161	6
State unempl. rate	0.077	0.184	2	3.788	0.661	96

Note: Based on 10,000 MCMC samples. Calculated following equations (2) and (3); cf. appendix C.

E. Segregation

We measure segregation using the widely used index of dissimilarity (White 1986; Massey, Rothwell, and Domina 2009).[3] We focus on segregation between African Americans and Whites. While this simplifies our measure, ignoring growing Asian and Hispanic populations means that our measure *overestimates* the degree of segregation. Thus we checked that using a broader dissimilarity measure including Whites, African Americans, Asians, and Hispanics did not produce substantively different results.

The index of dissimilarity expresses the extent to which African Americans and Whites are spread evenly among census tracts in a geographic unit, where "evenly" is defined relative to the racial composition of the geographic unit. It expresses the percent of one group who would have to move in order to achieve an evenly distributed residential pattern (that is where every census tract is representative of the racial composition of the geographic unit). Thus its possible values range from 0 to 1. Let b_i be the population of African Americans in census tract i, while w_i is the population of whites. Let B be the total African American population and W the total population of whites. Then the index of dissimilarity is given by

$$D = 1/2 \sum_i (b_i/B - w_i/W) \tag{E.1}$$

We produce two sets of segregation indices. The state is our primary contextual unit (which we can match directly to GSS data). Therefore, our first measure simply calculates segregation indices at the state level. However, which "spatial lens" one uses influences the resulting picture of segregation. For example, Massey and Hajnal (1995) show that over time the locus of racial segregation shifted from the macro level (states and counties) down to the micro level (municipalities and neighborhoods). Thus, we also use dissimilarity calculated at the city level, which we then aggregate into a state measure. We detail both measures below.

[3]The dissimilarity index belongs to the group of evenness measures, which describe how far the distribution of (racial) groups deviates from an equal equidistributed setting. Massey, Rothwell, and Domina (2009) list five dimensions of segregation (see also Massey and Denton 1988), noting that the group of evenness and isolation indices are the ones that are the most relevant at higher geographic levels (Massey, Rothwell, and Domina 2009: 76). Thus we focus on the index of dissimilarity. We have repeated our robustness check with a measure of exposure, which belongs to the group of isolation indices, and find similar results.

State- and city-level segregation All calculations are based on the ca. 65,000 census tracts. Our first, state-level, measure of segregation is produced by calculating equation (E.1) for each state.[4] Using census tracts as areal unit of measurement means employing data from the decennial census conducted in 1980, 1990, 2000 and 2010. Thus we have state-level segregation measures at four evenly spaced time points. We fill in intermediate years using linear interpolation.[5]

Our second, city-level, measure of segregation is calculated in two steps. We use dissimilarity indices calculated for 4,411 American cities with populations over 10,000 provided by the American Communities Project.[6] We then aggregate these 4,411 indices to the state level. The number of cities included in this calculation varies starkly between states. The average number of cities per state is 71, ranging from less than 10 in Vermont, Alaska, and North Dakota to over 250 in Texas, Florida, and California. As before, we linearly interpolate inter-census years, in order to have a continuous time series of segregation.

Figure E.1 shows the resulting two sets of state-level estimates of segregation from 1976 to 2010. Panel (A) shows state-level dissimilarity, while panel (B) shows city-level dissimilarity aggregated to the state level. We group states by census regions and add region-specific linear trend lines. Figure E.1 shows a secular decline in the majority of states, with the exception of Maine, New Hampshire, and Vermont, which show a more erratic pattern. Note that measures based on aggregated city-level data show lower levels of segregation (see the different scaling of the y-axis) but display similar or even stronger trends.

F. Sensitivity analysis

In addition to the usual assumptions of basic regression models, decomposing direct and indirect effects requires additional assumptions. These are clearly laid out in Imai et al. (2010; see also Sobel 2008). Intuitively, the following assumptions

[4] In 2010 the average number of census tracts per state was 1,423. We note the valid criticism that census tracts are essentially arbitrary administrative units. However, opting for more detailed spatial resolution (while at the same time maintaining comparability over time) is beyond the scope of this paper.

[5] Note that "filling in" intermediate years will underestimate the standard errors of the segregation effect, making it a stricter test of our argument.

[6] See `http://www.s4.brown.edu/us2010`.

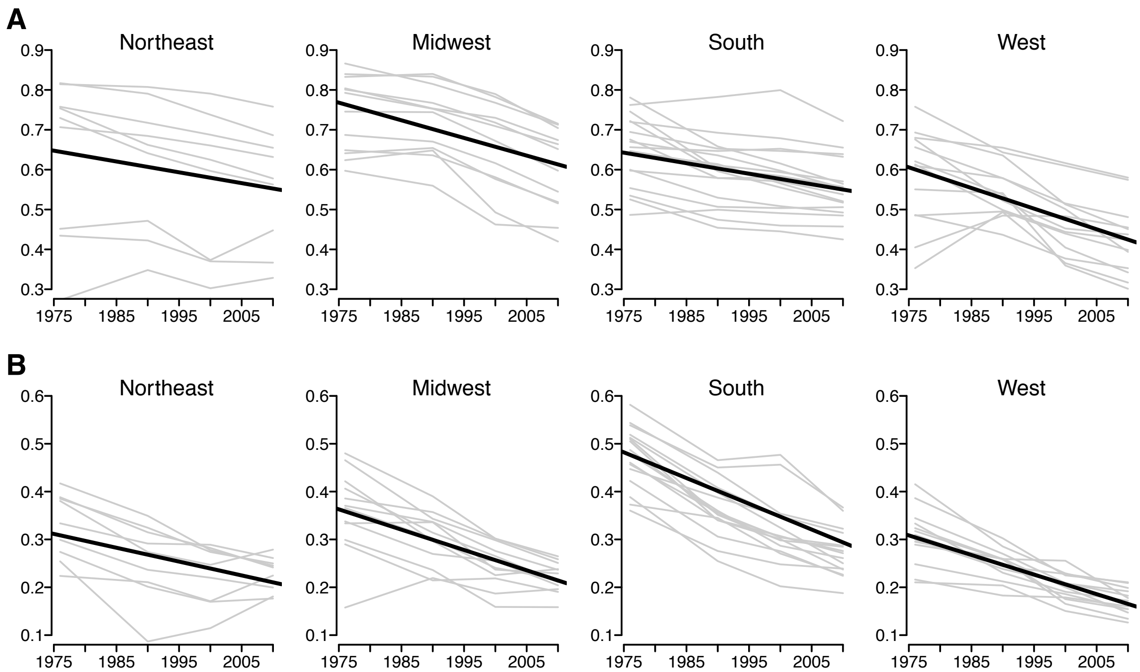

Figure E.1: Dissimilarity index in US states by census region, 1976-2010. Panel (A) shows state-level segregation, panel (B) shows city-level segregation aggregated to the state level. Bold lines show linear fit.

are needed: (i) no omitted confounding of the treatment-outcome relationship, (ii) no omitted confounding of the mediator-outcome relationship, (iii) no omitted treatment-mediator confounding, and (iv) no mediator-outcome confounder affected by the treatment. These assumptions are often violated, even in randomized studies (Green, Ha, and Bullock 2010). With observational data these are highly likely to be violated. The most problematic issue is omitted variables that affect both the intermediate variable *and* the outcome. Assume that an omitted variable U influences both preferences and vote choice. While we include a number of controls to reduce the likelihood of substantial omitted confounders, their existence can of course not be ruled out with the data available to us. By not including U in our model a correlation, ρ, between residuals in the preference and vote equation is generated. The direction and size of that correlation cannot be estimated (as including it renders the model unidentified). Thus Imai, Keele, and Tingley (2010); Imai, Keele, and Yamamoto (2010) and VanderWeele (2010) propose sensitivity analyses to study the impact omitted mediator-outcome confounders have on the resulting estimates. Following their approach, we conduct two sets of sensitivity analyses. In the first one we calculate mediated effect estimates at different levels of ρ. Results are shown in Figure F.1.

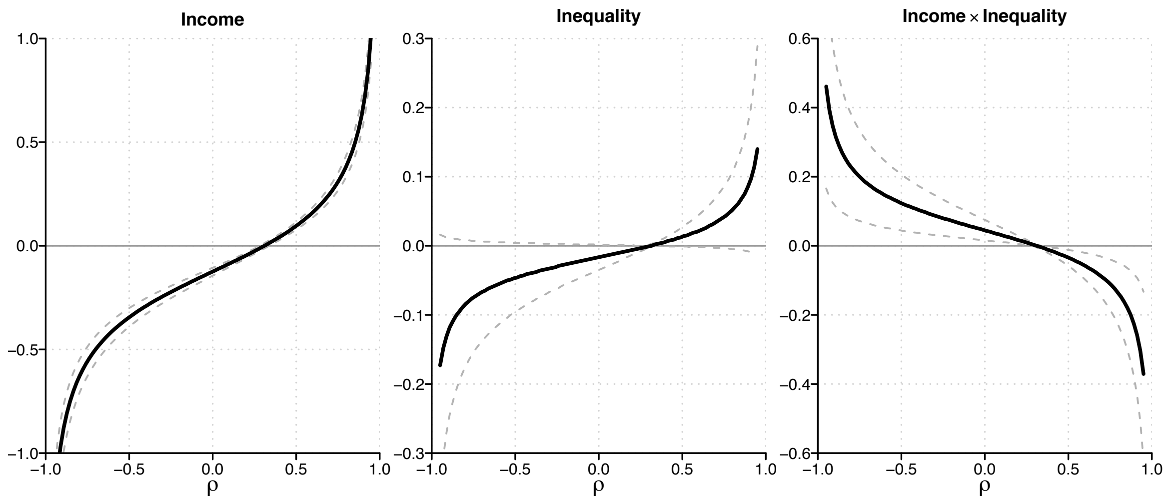

Figure F.1: Sensitivity analysis. Indirect effects at different levels of ρ

In our second sensitivity analysis, we average over a large number of possible mediator outcome correlation levels to calculate resulting estimates and bounds. More explicitly, we evaluate our indirect effect estimates over a 100 point grid spanning $\rho = (-r, \ldots, r)$, where the limit r is chosen to represent sensible levels of possible correlations. We use 5,000 Monte Carlo samples (obtained from the posterior distribution of each parameter) to account for estimation uncertainty. We create a point estimate taking into account all possible levels of ρ by simply calculating the mean of all simulations. Furthermore, we create "bounds" by calculating the 10th and 90th empirical quantile of the distribution of estimates. Table F.1 shows the result of this sensitivity analysis.

We find that (as expected) high levels of simulated correlation between preferences and vote choice can have detrimental effects, to the extent that signs flip at high correlation values. More precisely, our conclusions about the sign of effects hold up to ρ values of about 0.45. This is under the assumption that the mediator outcome correlation caused by the unobserved confounder(s) is positive. If it is negative we obtain results confirming the sign of our results and find effects of greater size. This suggests our second sensitivity analysis, which produces effect bounds by averaging over a range of ρ values. The overall picture (cf. table F.1) suggest that when unobservables produce correlations in the range of −0.5 to 0.5 our core results are clearly confirmed. If we allow for the full range of possible correlations we find much smaller effect sizes (which then simply results from the fact that our model would miss much that matters for voting). However, we still do find the systematic pattern that income effects are smaller in more unequal states.

Table F.1: Sensitivity analysis. Average indirect effect estimates and bounds. Simulations over a range of possible preference vote choice correlations.

	$\rho = (-0.5, \ldots, 0.5)$	$\rho = (-0.9, \ldots, 0.9)$
Income	−2.565	−1.390
	[−2.890 : −2.247]	[−1.624 : −1.160]
Inequality	−0.237	−0.058
	[−0.441 : −0.038]	[−0.119 : −0.006]
Income×Inequality	0.674	0.175
	[0.310 : 1.046]	[0.054 : 0.311]

Note: Calculated from 5000 draws from posterior parameter distribution at ρ-range evaluated over 100 point grid.

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