NBER WORKING PAPER SERIES

MINORITY UNDERREPRESENTATION IN U.S. CITIES

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Working Paper 29738
http://www.nber.org/papers/w29738

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
February 2022

We would like to thank Matilde Bombardini, Ernesto Dal Bó, Anubhav Jha, Andy Little, Giulia Lo Forte, Adlai Newson, Juan Felipe Riaño-Rodriguez and members of the Berkeley Political Economy Research Lab for many comments and useful suggestions. The views expressed herein are those of the authors and do not necessarily reflect the views of the National Bureau of Economic Research.

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NBER Working Paper No. 29738
February 2022
JEL No. P16,P48

ABSTRACT

This paper investigates the patterns of Minority representation and voter registration in U.S. municipal governments. For the period 1981-2020, we report substantial levels of strategic underrepresentation of African American, Asian, and Latino voters in U.S. local politics. Disproportionality in the representation and in voter registration rates of Minority groups are widespread, but stronger when racial or ethnic minorities are electorally pivotal. Underrepresentation is determined by the combination of several endogenous institutional features, starting from systematic disparity in voter registration, strategic selection of electoral rules, city's form of government, council size, and pay of elected members of the council. We provide causal evidence of the strategic use of local political institutions in reducing electoral representation of minorities based on the U.S. Supreme Court narrow decision of Shelby County v. Holder (2013), which deemed unconstitutional Voting Rights Act (VRA) Section 4(b), removing federal preclearance requirements for a specific subset of U.S. jurisdictions.

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1 Introduction

Fifty six years after the Voting Rights Act (VRA) of 1965, the question of equal representation and equal access to the electoral franchise for minorities in the United States is still debated. To some, the discussion appears decoupled from empirical fundamentals. For example, in the Shelby County v. Holder (2013) landmark ruling, a majority of Supreme Court justices "*asserted that the federal oversight of elections was no longer necessary in nine states, mostly in the South, because of strides made in advancing voting rights since passage of the 1965 law.*"[1] Others disagree. "*A plethora of reasons remain to justify aggressively monitoring voting practices under [VRA's] current provisions*", according to Lewis (2005).

Evidence of disproportionality in descriptive representation is available.[2] Non-White racial or ethnic minorities account for approximately 40% of the U.S. population, while only 23% of the 117th Congress members belong to an ethnic minority. The National Conference of State Legislatures (NCSL, 2021) reports an average gap of -13.48 percentage points between percent non-White representatives in state legislatures in 2020 and percent non-White of state population in 2019. Certain groups stand out. In 2018, Latino elected officials represented 1.2% of the total of national and local elected officials, while Latinos make up 18.1% of the U.S. population.[3]

While much of this debate is motivated by gaps in representation in U.S. national politics, this paper's goal is to provide a comprehensive analysis of the statistical evidence of strategic Minority underrepresentation and underregistration at the local level. The paper focuses first on within municipality variation over time in a panel data setting and then presents causal inference results stemming from Shelby County v. Holder (2013), which exploit the geographic variation in the lifting of the VRA coverage resulting from this Supreme Court ruling. In particular, the analysis of Shelby County v. Holder (2013) sheds light on the mechanisms behind our findings.

Our focus on local politics is motivated by four main considerations. First, as Hajnal (2009) discusses (p.42), "*local elections are fairly sharply divided by race and ethnicity*" and "*there is a considerable gap between the vote of the White electorate on the one hand and the vote of the African American, Latino, and Asian American electorate on the other*". Hence, city govern-

[1] "House Passes Voting Rights Bill Despite Near Unanimous Republican Opposition" The New York Times, Dec. 6, 2019.

[2] With the term descriptive representation we mean here the mapping between certain measurable demographic characteristics of the voting age population and the characteristics of their corresponding elected representatives. Substantive representation – the supply of policies demanded by certain demographic subpopulations – is an issue only partially addressed in this work and only insomuch as policy catering to the interests of ethnic subpopulations correlates with our measures of descriptive representation. Empirical evidence in support of this association is provided in Lowande et al. (2019); Broockman (2013); Griffin (2014); Wallace (2014), among others.

[3] "Latinos make up only 1% of all local and federal elected officials, and that's a big problem" U.S. Today, Jan. 6, 2020.

ments represent a rich environment to study the political economy of race.[4] As municipal politics is also largely nonpartisan, there is limited risk of party-specific confounders (Ferreira and Gyourko, 2009). Second, the fact that local governments often represent an entry point in political careers aimed at higher office highlights that impediments to local representation may reverberate at higher levels of government (Frendreis et al., 1990; Shah, 2014). Third, in the U.S. local governments are key suppliers of public goods (education, policing, public infrastructure, etc.) affecting the median voter (Coate and Knight, 2011; Trounstine et al., 2020). This implies that welfare consequences associated with our findings could be large. Fourth, the vast amount of city demographic variation – the U.S. counts 90,000 local governments (Trounstine, 2010; Warshaw, 2019; Trounstine et al., 2020) and our sample covers 7,687 cities over the 1981-2020 period – allows us to explore vast institutional heterogeneity across observations, which is unfeasible at the national level, and provides suitable levels of statistical power (Trebbi et al., 2008; Trounstine et al., 2020).

This work begins by studying the relationship between Minority shares of the voting age population and the share of Minority city council members from the perspective of descriptive representation.[5] Using data on municipalities from eight quinquennial International City/County Management Association (ICMA) surveys,[6] spanning from 1981 to 2018, combined with U.S. Census data from Manson et al. (2021), we document a sizable representation gap of minorities in city councils in terms of difference between the Minority population share and the share of council members belonging to a racial or ethnic Minority. On average non-White minorities are collectively underrepresented by approximately 8.4 percentage points in the sample. The results extends to the African American, Asian, and Latino minorities considered separately.

Not only underrepresentation is a pervasive feature of U.S. municipal politics, but it is stronger in those cities where minorities may have a higher chance of being electorally pivotal: where non-White minorities are close to constituting a majority of the voting age population. More precisely, the representation gap is sharply nonlinear, with underrepresentation being the highest when minorities account for 55% to 60% of the total voting age population. From the specificity of the shape of these nonlinearities one can begin to draw additional inference on the strategic nature of the underrepresentation.

In a second contribution of the paper, we trace an institutional anatomy of underrepresentation.

[4] In the paper, the terms municipality, city, town, and alike are used interchangeably to indicate a general-purpose subcounty local government.

[5] In the remainder of the paper we will use the terms population and voting age population interchangeably, but with the understanding that our empirical analysis will only focus on voting age population in order to account for differential fertility and age profiles of different ethnic groups. The focus on voting age population to minimize mismeasurement is also an important novel feature of our empirical analysis relative to much of the literature.

[6] Available at https://icma.org/.

We look at whether the choices of city political features appear systematically designed to limit Minority representation and at which level of Minority shares of the voting age population.[7]

U.S. cities typically select electoral rules among a limited set of alternatives. At-Large (i.e. city-wide) multi-member elections are common, while other cities allocate council seats to geographic subdivisions in single-member districts races (SMD), or via a mix of SMD and At-Large. A substantial literature in political economy and political science has shown that, for cities with geographically segregated ethnic groups, SMD electoral rules play a crucial role in fostering Minority representation (Davidson and Korbel, 1981; Davidson, 1994; Sass and Pittman, 2000; Trounstine and Valdini, 2008; Marschall et al., 2010; Abott and Magazinnik, 2020), as White majorities are better able to exclude Minority candidates from being elected when they control a city-wide majority of votes (thus diluting the weight of areas with a concentration of Minority voters). In our data we confirm that the estimated maximum underrepresentation is higher in At-Large systems by 6 to 10 percentage points.

To assess the strategic use of electoral rules in U.S. cities one can apply the theoretical framework of Trebbi et al. (2008), which focuses on African American representation around the passage of the VRA. They show how At-Large and SMDs systems are alternatively used to limit the political influence of minorities as a function of their relative size. When minorities are small, At-Large system are better at diluting the vote of minorities. As minorities grow and approach 50% of the population, SMDs prevent them from potentially electing the whole council, as it might be the case under an At-Large rule. Consistently with this framework, we find that electoral rules are endogenously chosen to maximize minorities' underrepresentation. At-Large systems are more likely to be used in municipalities in which minorities are approximately 25% of the population, large enough to potentially win in a SMD, but not enough to threaten the White majority in At-Large elections, and less and less likely to be chosen as the Minority population grows.

Besides electoral rules, city form of government, council size, and monetary retribution for council members also display patterns consistent with underrepresentation of minorities at points of the distribution where minorities can be electorally pivotal.

In a third contribution of our analysis, we present evidence of nonlinearities in Minority voter registration rates using proprietary information collected by Aristotle, a nonpartisan technology and voter information firm based in Washington DC. We show that Minority voters' underregistration rates are at their highest at levels of Minority population shares between 45% and 50%, similarly to what observed for underrepresentation. Minority voter registration rates have the largest gap relative to White voter registration rates between 20% and 30% of the population

[7]Electoral laws and city council procedures are frequently endogenously chosen to effectively achieve the goals of incumbents. For a discussion of the general issue of strategically chosen political institutions see Aghion et al. (2004) and Acemoglu and Robinson (2006).

(where ethnic minorities would have a chance at being represented via SMD elections). These patterns have implications not just for voter registration for local elections, but translate in underregistration for voting in national elections as well.[8]

In order to establish the causal mechanism behind the observed Minority underrepresentation and underregistration patterns, a fourth contribution of this paper is to exploit a recent ruling of the U.S. Supreme Court, limiting a crucial provision of the VRA. According to Section 5 of the VRA, certain jurisdictions, identified according to the coverage formula contained in Section 4(b), were required to obtain federal preclearance on any proposed changes to their voting procedures. These covered jurisdiction, characterized as having exhibited "entrenched racial discrimination in voting" before 1965, had to prove that the proposed changes had no discriminatory purpose, nor deleterious effects with respect to racial, ethnic, or language minorities before implementing any changes. Following the Shelby County v. Holder (2013) U.S. Supreme Court case, the coverage formula was ruled unconstitutional, with previously covered jurisdictions effectively no longer requiring federal approval in order to implement electoral changes. This allows us to perform a comparison of covered and uncovered municipalities, before and after the 2013 landmark decision.

Our results confirm, in both covered and non-covered municipalities, a non-linear relationship between minorities underrepresentation and population shares before and after Shelby County v. Holder (2013), but with a crucial difference. Before the ruling, non-covered municipalities display higher Minority underrepresentation compared to covered ones. After the ruling, the two groups of municipalities converge to similar levels of underrepresentation for ethnic minorities. In essence, the results indicate that the VRA coverage was an imperfect, but effective tool in limiting the representation gap in cities requiring federal preclearance. Lifting the coverage systematically decreased representation of minorities in the councils of previously covered municipalities. All effects are statistically precise and robust to either using the entire contiguous U.S. sample or restricting the analysis to areas in a neighborhood of 200 or 100 miles on either side of the boundary of previously covered jurisdictions.

We then show that removing the VRA coverage affected patterns of voter registration of minorities vis-à-vis Whites. Municipalities that saw preclearance conditions lifted after 2013 display relatively less registration of Minority voters than Whites over time relative to non covered municipalities, again suggesting that differential obstacles to voter registration for Minority groups manifest once VRA protections are removed. Existing anecdotal evidence[9] describes renovated

[8]Indeed, work on the effects of Minority enfranchisement has shown access to the electoral franchise to be highly consequential at the federal level. For instance, Husted and Kenny (1997); Cascio and Washington (2014) present evidence of the policy consequences for minorities stemming from the VRA's re-enfranchisement of large swaths of the African American electorate.

[9]See, for instance, https://www.brennancenter.org/our-work/research-reports/election-2016-restrictive-voting-laws-numbers, https://www.washingtonpost.com/news/the-fix/wp/2014/07/07/how-has-voting-changed-since-shelby-county-v-holder/, and https://www.theatlantic.com/politics/archive/2018/07/how-shelby-county-broke-

efforts to introduce previously blocked electoral reforms affecting voters registration and polling station shut downs following the Shelby County v. Holder (2013) ruling.[10]

In summary, the paper presents three main sets of findings consistent with a strategic interpretation of the mechanisms behind Minority underrepresentation: First, the peculiarity of the shape of Minority underrepresentation and underregistration as a function of voting age population shares, which is maximal at a point where Minority voters are close to being able to shift the political outcome of an election – that is, where electoral incentives of an incumbent group to handicap the opposition are the strongest. Second, evidence of the strategic selection of certain voting procedures that matches established patterns of Minority disenfranchisement around the VRA (Trebbi et al., 2008). Third, the specific response in the aftermath of Shelby County v. Holder (2013) and the effects of the removal of protections for Minority voter blocs in areas with a proven past of Minority disenfranchisement.

In terms of related literature, the role of VRA for minorities representation has been the object of interest in a number of studies. At the local level, Shah et al. (2013) explore the representation of African American minorities in city councils from 1981 to 2006, showing the positive effect of the VRA for Minority representation throughout the entire period. At the national level, Schuit and Rogowski (2017) study the attitudes towards civil rights legislation of Congress members elected by covered jurisdictions. Their results suggest that the representatives of covered jurisdiction are more supportive of civil rights proposals, in particular in districts where African American voters account for a larger fraction of the electorate. Ang (2019) recently examines the long-run effects of the VRA and how it increased voter turnout at the state level thanks to the increased participation of minorities. Such participation substantially affected political competition (Besley et al., 2010) and public goods provision (Cascio and Washington, 2014). Finally, Feder and Miller (2020) find a significant increase in registered voter purges following Shelby County v. Holder (2013) and in those counties previously covered by the VRA. Looking at the consequences of minorities representation, the work of Facchini et al. (2020) shows how the VRA and the enfranchisement of African American voters helped lowering the arrest rates for minorities, especially when combined with elected, rather than nominated, chief police officers. Alesina et al. (1999) link ethnic diversity in local governments with the provision of public goods offering cross-sectional evidence from U.S. cities, highlighting a negative relationship. Relatedly, Beach and Jones (2017) use a regression discontinuity design applied to close municipal elections in California, they show that more ethnically

america/564707/. For its economic consequences also see Aneja and Avenancio-León (2019).

[10]Notably, new attempts to introduce potentially discriminatory legislation have been made by both previously covered and non-covered jurisdictions. If also non-covered jurisdictions perceived the Shelby County v. Holder (2013) ruling as a signal of a more permissive approach towards discriminatory electoral reforms, then the findings on the effects of Shelby County v. Holder (2013) on covered municipalities compared to non-covered ones should be interpreted as underestimates due attenuation bias.

diverse city councils provide less public goods, and suggest that this might be due to increased hurdles in the legislative bargaining process in more diverse councils, and overall lower levels of agreement.

The evidence on the recent tightening of state ID laws is less settled. As way of example, Cantoni and Pons (2021) find no effect of strict ID laws on registration or turnout by race, nor any effect of ID laws on voter fraud or on curbing perception of electoral fraud, while Hajnal et al. (2017) and others present opposing results. Part of the problem in reconciling some of these results may stem from the "almost surgical precision" of how certain institutional features are applied.[11] These voting procedures may not have detectable average effects, but can be fine tuned to precise local subconstituencies. The evidence in this article supports this intuition.

The rest of the paper proceeds as follows. Section 2 describes the data on U.S. municipalities and voter registration. Section 3 presents the evidence on systematic strategic underrepresentation of racial and ethnic minorities in U.S. cities. Section 4 lays out the institutional features that contribute to underrepresentation. Section 5 explores the role of Minority voters' underregistration and shifts the attention from a purely local political analysis to one that has bearing on national elections. Section 6 reports causal inference originating from Shelby County v. Holder (2013) and assesses magnitudes in this context. Section 7 concludes.

2 Data

The analysis is based on three main data sources, combining institutional information on U.S. municipalities with detailed demographic and voter registration data at the municipal level.

The institutional data on forms of government, electoral rules, and council composition of U.S. municipalities are based on the Municipal Form of Government surveys managed by ICMA. The waves included are 1981, 1986, 1991, 1996, 2001, 2006, 2011, and 2018. For reference, the 2018 edition of the survey was submitted to 12,761 municipalities, and returned by 4,109, with a response rate of 32.2%. The surveys are representative of the universe of U.S. municipalities with a population of 2,500 and over. The resulting dataset is therefore restricted to municipalities above this threshold located in the continuous U.S., for a final panel of 29,974 observations, from 7,687 unique local governments, each included on average 3.9 periods. The main variables of interest

[11] For instance, in 2016 in discussing a voter-I.D. law in North Carolina that an appeals court found the law could "target African-Americans with almost surgical precision". The appeals court noted that the North Carolina Legislature "requested data on the use, by race, of a number of voting practices" and then based on the data "enacted legislation that restricted voting and registration in five different ways, all of which disproportionately affected African Americans." See https://pdfserver.amlaw.com/nlj/7-29-16%204th%20Circuit%20NAACP%20v%20NC.pdf. Last accessed November 2021.

recovered from this source are summarized in Table 1.

The top panel reports the summary statistics for the ethnic and racial breakdown of council members. From the ICMA surveys, it is possible to recover the fraction of Hispanic or Latino, Asian or Pacific Islander, Black or African American, and White (not of Hispanic origins) councilors. For notational purposes and with no intention of diminishing the importance of any race or ethnicity, these fractions are coded as Latino, Asian, African American, and White respectively.[12] Finally, a collective Minority fraction is defined as the reciprocal of White. Throughout the paper, the term Minority is used to refer to the latter measure, and instead the term minorities is used to refer to the collection of individuals belonging to one of the non-White races or ethnicities listed above.

The institutional details of U.S. municipalities are complemented by a corresponding set of sociodemographic data at the municipal level, based on the decennial U.S. Census data from Manson et al. (2021). The linkage between ICMA and census data is made through the Federal Information Processing System (FIPS) place classification available in both sources.[13] Because the census data are only available by decade, we interpolate the census data when necessary and match each survey-year to census measures from the year before. That is, for instance, the 2001 survey is matched with the 2000 census data, the 2006 survey is matched with 2005 interpolated data, and so on. The second panel of Table 1 summarizes the data on the ethnic and racial composition of the population at the municipal level. In parallel to the information on council composition, the population fractions are reported for Hispanic or Latino, Asian or Pacific Islander (not of Hispanic origins), Black or African American (not of Hispanic origins), and White (not of Hispanic origins). Similarly to the council measures, an aggregate Minority population fraction is computed as the reciprocal of White (not of Hispanic origins). Because of the classification used by the U.S. Census, the distinction between ethnicity and race is particularly relevant. In the rest of the paper, the Asian, African American, and White measures refer to people not of Hispanic or Latino origins. The population measures are computed with respect to the voting age population only[14], that is 18 years of age or older. The use of voting age populations is particularly relevant in order to account for the different age distributions between minorities, traditionally younger and thus less likely to be eligible to vote, and White.

Combining these two sources, in the third panel we report the summary statistics for under-representation in local governments, measured as the difference between the Minority population share and the share of members belonging to an ethnic Minority.

[12] In an earlier version of this paper, the terms Black and African American have been used interchangeably and may still be in some parts of this draft.

[13] Federal Information Processing Standard classification for places, including municipalities such as cities, towns, villages, and townships. For a detailed description of the FIPS classification, see https://www.census.gov/programs-surveys/geography/guidance/geo-identifiers.html and https://nhgis.org/documentation/gis-data/place-points.

[14] An analysis using total population is available upon request and confirms what reported in the paper.

The following two panels summarize the institutional features of interest of U.S. municipalities. The variable Mayor-Council is an indicator for municipalities adopting a Mayor-Council form of government, with both a Mayor and a council elected directly, as opposed to a Council-Manager system in which voters elect the councilors, which in turn appoint an administrative manager. U.S. municipalities also differ in terms of the electoral rules through which voters elect their council members, either through At-Large or SMD elections, or a combination of the two. At-Large reports the fraction of council members elected via a city-wide system. The remaining two variables of the first panel are Council-size, which simply reports the number seats in a city council, and the indicator VRA covered for municipalities subject to the preclearance requirements of Section 5 of the VRA, at the time of the landmark ruling of the U.S. Supreme Court in the case of Shelby County v. Holder (2013).

The data on the VRA coverage are collected directly from the U.S. Department on Justice.[15] Covered jurisdictions are required to request and receive federal approval before implementing any change to their electoral systems, and are explicitly required to prove that the proposed changes are not designed to, or result in, discriminating voters on the basis of their race or language. For a detailed discussion of the Section 5 of the VRA and the Shelby County v. Holder (2013) ruling, see Section 6.1.

Additional institutional variables considered include a partisanship indicator for local elections in which the political party affiliation of candidates appear on the ballot, the fee (in $) to run for office, the number of voters represented by a council member, whether the council is elected in staggered elections, and finally the term length of council members (in years) and an indicator for municipalities with term limits.

Finally, the bottom panel reports a number of variables, all at the municipal level, used as controls in the empirical analyses. In addition to the population and voting age population measures, it includes the U.S. Census data on the fraction of population which is over 65 years of age and older, the fractions of rural and foreign populations, and the median household income.[16]

The voter registration data is based on the proprietary Voter Lists Online (VLO) database of Aristotle, a nonpartisan technology and voter information firm based in Washington DC. They maintain data on the live universe of registered voters in the U.S.

Using information on the registration date we can recover, for each municipality, a count of registered voters at any point in time, conditional on being registered today. We collect data on registered voters by the end of each year from 2007 to 2020. We can also distinguish the counts by race or ethnicity, either provided on the official voters lists or inferred by Aristotle. The sample

[15] https://www.justice.gov/crt/jurisdictions-previously-covered-section-5, last accessed November 2021.

[16] Deflated using Consumer Price Index data from the Bureau of Labor Statistics, using the year 2000 as reference. LBS CPI series, all items, U.S. city average, annual averages. See https://data.bls.gov/cgi-bin/surveymost?cu.

covers the universe of municipalities in the contiguous U.S. and with population 2,500 and over based on the 2010 and 2020 U.S. Census.[17]

Table 2 reports the summary statistics at the municipality level for a set of 2020 registration variables. The top panel describes the composition of registered voters in terms of race or ethnicity. Voters to which Aristotle does not assign an inferred race or ethnicity are imputed to one using the observed distributions. The second panel reports the breakdown of voting age populations by race or ethnicity, while the third panel summarizes underregistration for each group, given by the difference between the voting age population share of a Minority and its share of registered voters.

The fourth panel shows the registration rates for each race or ethnicity, as well as for the total population. The registration rate is defined simply as the fraction of voters who register relative to their corresponding voting age populations, that is how many voting age individuals of a given race or ethnicity are also registered to vote. The bottom panel is identical to Table 1 and includes a set of sociodemographic variables used as controls, namely the total and voting age population, the fractions of over 65, rural, and foreign populations, as well as the median household income.

3 Patterns of Minority underrepresentation

We begin our analysis by studying (nonparametrically and parametrically) the relationship between Minority council members share and the share of minorities in the voting age population. Throughout, with the term underrepresentation we will refer to the difference between the fraction of the Minority voting age population and the fraction of elected Minority council members. Formally, for a given municipality m at time t, underrepresentation is defined as:

$$u_{mt} = p_{mt} - c_{mt}$$

where p is the Minority share of the voting age population and c is the Minority share of the council members. A higher value of underrepresentation u corresponds to a larger disproportionality between population size and council representation.

Figure 1 plots a binned scatter of Minority voters' representation in city councils and the size of minorities in the voting age population for our sample. The bins are computed by averaging the fraction of Minority council members for each percentile of Minority population. The plotted line represents a nonparametric LOWESS smoothing fit of the underlying municipality-level observations. The figure also includes the 45 degree line for reference, to represent perfect proportionality between Minority council representation and population, as a normative benchmark.

[17] The sample also excludes North Dakota municipalities, given the high number of registered voters not included in any of the explicit races or ethnicities.

Figure 1 displays a strongly non-linear relationship between Minority representation and relative voting age population size in a city. Minorities are invariably underrepresented throughout the whole range of p, constantly below the 45 degree line, but not monotonically so. The largest representation gap (the distance between the nonparametric fit and the 45 degree line) peaks approximately in cities between 55% and 60% Minority voting age population share. Similar relationships are also present, in varying degrees, for each Minority group individually: Latino, African American, and Asian, as reported in Appendix Figure A.2. This is important, as it underlines that a common mechanism may drive this set of empirical regularities across different parts of the country.[18] This is also consistent, for example, with White voters having stronger incentives to coalesce politically and to strategically manipulate voting procedures at the point where they are at the highest risk of losing control of their local government.[19] This interpretation of the data is consistent with historical asymmetries in access to local institutions and administrations in U.S. city politics by White local majorities,[20] but needs additional corroboration, which we offer below.

Table 3 complements the nonparametric evidence above with a parametric analysis controlling for fixed municipality-specific and time-specific confounders. Our preferred specification looks at Minority underrepresentation as a quadratic function of its relative population size:

$$u_{mt} = \beta_0 + \beta_1 p_{mt} + \beta_2 p_{mt}^2 + \delta_m + \delta_t + \mathbf{x}'_{mt}\alpha + \varepsilon_{mt}, \tag{1}$$

where δ_m and δ_t are the municipality and year fixed effects, and $\mathbf{x}_{mt}$ is a vector of time varying controls, including log-population, log-median household income, and the fractions of rural, foreign, and over 65 population. Importantly, specification (1) exclusively employs as identifying variation the one stemming from within-municipality changes, so it is conservative.

Given the quadratic specification in (1) and the set of estimates $\hat{\beta}_0$, $\hat{\beta}_1$, and $\hat{\beta}_2$, the estimated *max* and *argmax* of Minority underrepresentation with respect to the Minority population fraction p are given by:

$$\text{max} = \hat{\beta}_0 - \frac{\hat{\beta}_1^2}{4\hat{\beta}_2}; \quad \text{argmax} = -\frac{\hat{\beta}_1}{2\hat{\beta}_2}, \tag{2}$$

In the specification (1) with fixed effects, the constant term is computed and can be interpreted as the sample mean of the estimated fixed effects. Note that the estimates for the municipality

[18] In the sample, the population shares of the different minorities tend to be little or negatively correlated. Considering municipalities with an overall Minority share above the median (0.09), Latinos and African Americans are correlated by -0.27. Those with Minority share above the average (0.17) , Latinos and African Americans are correlated by -0.43. This is consistent with the geographic sorting of African Americans in the South and Latinos in the West, by far the two most relevant minorities, and supports our measure of choice of Minority voters as non-White minorities.

[19] For evidence, see Trebbi et al. (2008) and Amy (2002).

[20] See Alesina and Glaeser (2004).

fixed effects are unbiased, but not necessarily consistent unless $T \to +\infty$, where T is the total number of periods observed for each municipality. In the specifications with controls, the constant term used to compute the *max* in (2) also includes $\bar{\mathbf{x}}'\hat{\alpha}$, where $\bar{\mathbf{x}}$ are sample means of the control variables.

Column (1) in Table 3 corresponds to a baseline model without fixed effects or controls, which is progressively augmented in columns (2)-(4) to include year fixed effects, municipality fixed effects, and both. Column (5) adds time varying controls.

All specifications show a clear nonmonotonic concave relationship between Minority underrepresentation and the Minority population share, which confirms the nonparametric relationship suggested by the graphical analysis above. All coefficients are strongly statistically significant.

In terms of location, the *argmax* estimates suggest that the representation gap for ethnic minorities is at the highest when its relative population size is approximately between 55% to 61%, with corresponding *max* estimates ranging from 21 to 36 percentage points. Again, these results establish that the minorities are most underrepresented when they approach an electoral majority of the voting age population – close to the point where they could gain control of the majority of the city council.

In Appendix A we show that these results hold for Latino, Asian, and African American underrepresentation considered separately (see Tables A.1, A.2, and A.3). The *argmax* estimates are also relatively consistent with the previous results, ranging from 40% to 55%, depending on the race or ethnicity considered. In synthesis, a similar representation gap affects all the minorities considered, not just African Americans or Latinos.

Finally, to support the external validity of our city-level findings in Figure 1, Figure A.3 reports evidence of the state-level mapping between state Minority share of the population in 2019 and state legislatures' share of Minority representatives in 2020, based on data from NCSL (2021). Using a LOWESS fit, Figure A.3 shows in state legislatures a nonlinear pattern of underrepresentation similar to what observed in city councils. In the remainder of this study we will limit ourselves to Minority representation in cities for parsimony, but with the caveat that higher levels of government may be exhibit similar patterns.

4 An anatomy of underrepresentation

In order to support a claim that the nonmonotonic pattern of underrepresentation presented in the previous section is strategic, one should be able to produce evidence of a systematic manipulation of voting procedures targeted at increasing the representation of White voting blocs at the expense of Minority groups. This section presents a first set of facts in this direction, finding that At-Large elections, Council-Manager form of government, smaller city council size, unpaid council positions

are all tools correlating with Minority underrepresentation. For the case of At-Large elections in particular, we can also show that the patterns of selection match those of Trebbi et al. (2008), which describes how electoral rules were used around the passage of the VRA as tools for strategically reducing the electoral weight of African American voters after they were reinfranchised by the Act.

4.1 Electoral rules

U.S. cities differ in terms of electoral rules through which voters elect their most important local representative body, the city council. In 2018 about 65% of municipalities sampled by ICMA relied entirely on At-Large electoral systems. In At-Large elections all councilors run in a single multi-member district (the city). In most cases, voters cast as many ballots as seats to be filled, thus allowing a simple majority of voters to elect the entire council. In this sense, At-Large is a bloc voting system differing significantly from a proportional representation rule. Single-member district or SMD resembles instead more closely first-past-the-post single member elections. In 2018, 20% of municipalities divided their geographic jurisdiction in several non-overlapping electoral districts or wards, each electing one member of the city council by plurality. The remaining 15% of cities adopt a mix of the two systems, with a certain number of members elected At-Large and the rest by SMDs.

In our sample, about 14% of cities change their electoral rule over a period of five years on average (8% not in combination with a change in number of seats) and the average number of seats in the council is 6.2.

Figure 2 explores underrepresentation nonparametrically, differentiating between municipalities adopting an At-Large rule from those using SMD. The bins for municipalities electing at least 50% of their council seats via SMD elections are represented by darker $\times$ markers, while the lighter circles indicate averages for municipalities electing a majority of seats At-Large. The lines represent the LOWESS smoothing fit for each electoral system separately. Consistently with the large literature on U.S. city representation cited in the Introduction, SMD municipalities display a smaller representation gap, compared to At-Large systems. Geographic partitioning in SMD allows segregated minorities to express Minority candidates from their districts. At-Large systems with their high premia for city-wide majorities, instead dilute the representation of minorities. The dilution effect of At-Large systems is, however, nonlinear and evident in particular around a Minority population share of 30% to 40%. Furthermore, despite showing a smaller underrepresentation gap, SMDs municipalities still display a considerable amount of disproportionality, and a similarly non-linear relationship converging closer to proportionality only for very high or very

low Minority shares.

In terms of parametric estimates, the baseline specification in (1) can be modified to include electoral rule differences. Let us denote $AL_{mt} = I\,(m \text{ At-Large council at } t)$, where $I\,(\cdot)$ is an indicator function taking value 1 for municipalities electing the majority of their council members via At-Large elections at t, and 0 otherwise. By including its interactions with a Minority population fraction and its squared value, we obtain the modified specification:

$$\begin{aligned} u_{mt} \quad = \beta_0 + \quad & \beta_1 p_{mt} + \beta_2 p_{mt}^2 + \gamma_0 AL_{mt} + \gamma_1 \left(AL_{mt} \times p_{mt}\right) + \\ & + \gamma_2 \left(AL_{mt} \times p_{mt}^2\right) + \delta_m + \delta_t + \mathbf{x}'_{mt}\alpha + \varepsilon_{mt}. \end{aligned} \tag{3}$$

Given the added interaction terms, the *max* and *argmax* parametric estimates of the underrepresentation curve can be differentiated between At-Large and SMDs systems as follows:

$$\begin{aligned} \max_{SMD} &= \hat{\beta}_0 - \frac{\hat{\beta}_1^2}{4\hat{\beta}_2}; \\ \operatorname{argmax}_{SMD} &= -\frac{\hat{\beta}_1}{2\hat{\beta}_2}; \\ \max_{AL} &= \hat{\beta}_0 + \hat{\gamma_0} - \frac{\left(\hat{\beta}_1 + \hat{\gamma_1}\right)^2}{4\left(\hat{\beta}_2 + \hat{\gamma_2}\right)}; \\ \operatorname{argmax}_{AL} &= -\frac{\left(\hat{\beta}_1 + \hat{\gamma_1}\right)}{2\left(\hat{\beta}_2 + \hat{\gamma_2}\right)}; \end{aligned}$$

where the constant term $\hat{\beta}_0$ term includes the sample mean of the estimated fixed effects and $\bar{\mathbf{x}}'\hat{\alpha}$ and where $\bar{\mathbf{x}}$ are sample means of the control variables.

The estimates of (3) are reported in Table 4. Column (1) reports the estimates of the model without fixed effects and controls. Columns (2) and (3) add year fixed effects and municipality fixed effects, respectively. Column (4) includes both fixed effects. Finally, column (5) is based on the full specification with both the fixed effects and controls.

Taking into account the added interaction terms, the first two coefficients are those corresponding to SMD systems. Throughout all specifications, these coefficients display a strong concave relationship between Minority underrepresentation and population. The relationship is highly statistically significant. At the same time, both interaction coefficients are statistically different from zero, suggesting a difference in the relationship between Minority underrepresentation and population in At-Large systems compared to SMDs, as shown visually in Figure 2. The location estimates of the *argmax* for the two systems are similar across specifications, with SMDs showing

somewhat higher *argmax* estimates consistent with the constraining effects of this system for high Minority shares and the relatively better performance at low shares.[21] The *max* estimates indicate a maximum underrepresentation between 6 and 10 percentage points higher in predominantly At-Large municipalities than in SMDs. All *max* estimates are statistically different between the two electoral rules at standard significance levels, while the differences between the *argmax* are not (or weakly) statistically significant, depending on the specification.

Overall, the analysis suggests that the representation gap is both present and highly non-linear under the two electoral systems. While SMDs systems appear to have some beneficial effect for Minority representation, in line with most of the existing literature, they are not resolutive of underrepresentation.[22]

Regarding the endogeneity of the electoral rule, Trebbi et al. (2008) show how, as a response to the massive enfranchisement of the African American electorate in the aftermath of the VRA of 1965, White majorities in the South selectively changed municipal electoral rules to maintain political control of their jurisdictions. The authors describe how the incentives to employ At-Large bloc voting increase as the Minority group fraction to the population increase, because the dilution At-Large affords is useful to prevent minorities from electing representatives to the council. At the same time, there are strong strategic incentives to decrease the At-Large fraction as the African American population approaches the critical 50% threshold, due to the risk for the White majority of losing control of the council.

Table 5 shows that the same forces are at play in our broader sample and are relevant to understanding underrepresentation of all Minority groups, not just African Americans. In this table the original baseline regression model of (1) is adapted using as dependent variable the fraction of council seats elected At-Large, while keeping the fractions of Minority population and its squared value as main explanatory variables. Due to the inclusion of municipality fixed effects, these preferred specifications are identified by the relationship between within-city changes in ethnic composition and changes in electoral rules. In columns (1)-(2) of Table 5 we explore the entire sample, while in columns (3)-(4) we focus only on those municipalities with shares of Whites in the voting age population above 50% (the subsample in which it is most plausible that Whites are selecting the electoral rule).

All columns display a strong concave relationship between the At-Large fraction of seats and the relative Minority population size, with an *argmax* consistently between 23% to 29%. The

[21] This is due to "packing", occurring when a large Minority population is concentrated in a few districts.

[22] Looking at ethnic groups separately, the differences between the two systems are particularly strong for the African American minority, with above 10 percentage points gap between the two estimated maximum underrepresentation (with At-Large being higher). The Asian estimates show no statistically significant difference between the two systems, while the results for the Latino minority lie somewhat in between the two, with an estimated maximum representation gap of 4 percentage points higher under At-Large rules (see Tables A.4, A.5, and A.6).

strategic deployment of SMDs closer to the 50% threshold is particularly consistent with both the theory and with the *argmax* estimates placing the highest underrepresentation levels at around 50% to 60% Minority population shares even under SMD. The patterns of selection of electoral rules in presence of changes in the ethnic composition of the municipalities in our broad sample match the same established patterns of African American underrepresentation around the passage of the VRA in Trebbi et al. (2008), pointing to similar forces being at play for the Latino and Asian, as well as African American population.

4.2 Form of government, council size, paid council members

In the previous section we have focused on electoral rules. This subsection explores form of government, council size and whether council members are paid for their service.

U.S. municipalities can be broadly divided in two main forms of government. Cities can adopt a so-called Mayor-Council system, in which voters elect both the council members and a mayor directly. In these, the mayor holds significant administrative autonomy over the council, which operates as the deliberative body. Alternatively, cities can adopt a Council-Manager structure, in which the constituents only elect the council, which in turn nominates a professional manager to carry out day-to-day administrative duties.[23] This second approach attributes considerable more power to the council members, while limiting the independence of the manager role.

Using the same approach of Table 4 and progressively saturating the specifications with more restrictive sets of fixed effects, Table 6 shows that cities with Council-Manager form of government have statistically significantly higher levels of underrepresentation of minorities – their *max* estimates being 0.8 to 5.3 percentage points higher than for Mayor-Council cities. A possible explanation is that in Council-Manager municipalities the role and political value of each council seat is bigger, thus providing stronger incentives to retain control of council seats.

Similar deleterious effects to the representation of minorities are also found in comparing cities with smaller councils (thus limiting access to small blocs of voters) and cities with unpaid council members (thus increasing the opportunity cost of serving on the council). The results are reported in Table 7 and Table 8. Cities with council size below the median have between 1.4 and 5.4 percentage points higher underrepresentation of minorities at their *max* relative to cities above median. Cities with unpaid council members have between 1.1 and 3.8 percentage points higher underrepresentation of minorities at their *max* relative to cities with paid members.[24]

[23] ICMA, the source of the surveys used in part of this paper, is the professional association of U.S. city managers.

[24] In Appendix A we also discuss a set of other institutional features, such as term limits, number of voters per seat, and staggered electoral terms for the council, which do not appear to systematically associate with higher levels of underrepresentation.

4.3 Turnout

This section briefly addresses the issue of endogenous voter turnout by race. Given the absence of reliable ethnic group level turnout data for city elections, this subsection simply presents a discussion of the possible role of voter turnout in our results.

A potential confounding driver of Minority underepresentation may be the differential propensity of voters in different ethnic groups to strategically show up at the polling booth. Indeed, the differential voter turnout by ethnic group is an issue that has found active discussion in the literature (Fraga, 2016, 2018), albeit mostly for national level elections. As long as differential patterns of turnout (for example White voters being more prone than Minority voters to turn out) are constant across municipal demographic composition, this is not a concern affecting directly the evidence in Figures 1 and A.2 (nor in our main parametric regressions). It would take simply the form of a downward parallel shift of the parabolic curve in Figure 1.

While part of the political science literature underscores how "*Whites tend both to be more conservative and to be politically mobilized where Minority populations comprise a considerable size – around 40% of the district*" (Griffin and Newman 2007 p.1034, and Lublin, 2021),[25] the nonlinearities presented in Sections 3 and 4 can not entirely originate from differential levels of mobilization at the local level – a form of ethnic backlash in local politics. To affect the shape of the nonlinear patterns of underrepresentation that we report, differential turnout should be higher for Whites around the 50-50 percent split between Whites and Minority voters than, say, in more ethnically lopsided cities with a 80-20 White majority or a 20-80 White minority. This is where standard predictors of voter turnout have difficulties in matching the moments in the data. While it is known that election closeness (around a 50-50 ethnic split) is a strong predictor of turnout,[26] it is unclear why this effect should be stronger for Whites than Minorities when also Minorities are closer to becoming electorally pivotal.

Furthermore, to completely explain all variation, the endogenous propensity to turnout of Whites should also respond to the institutional features presented in Sections 4.1 and 4.2, matching those precise patterns with a similar mechanism. It is not clear then, following Figure 2, how Minority turnout could also be higher under SMD than At-Large. The reason is that SMD tends to reduce the closeness of district level elections, as typically Minority groups are geographically segregated and packed, facing less competition from White candidates within their wards (Trebbi et al., 2008).

Other drivers of voter mobilization (Geys, 2006), such as low stakes (suppressing turnout) and smaller populations (increasing the likelihood of being pivotal and therefore the incentives to turn out), also appear ambiguously correlated with White and Minority mobilization rates. As these

[25] See also Washington (2006) and Ang (2019) for evidence of ethnic backlash.
[26] See Geys (2006) for a comprehensive discussion.

factors should affect all groups symmetrically, they do not seem to offer a clear interpretative key to our findings.

5 Underregistration

This section discusses differential voter registration levels by ethnic group as a potential driver of Minority underrepresentaion. The information on voter registration is based on the VLO data from Aristotle (2021). The original data includes the live universe of registered voters in the U.S.

Using information on the registration date, we recover a count of registered voters at any point in time, conditional on being registered in June 2021, at the time of collection. For each municipality m, we count the number of voters who were registered at time t, and define R_{mt} as the number of voters in municipality m whose registration date is before or equal to time t, in other words voters who were registered at time t. In general, t will be the end of a given calendar year, namely December 31, from 2007 to 2020, except for the count at the time of Shelby County v. Holder (2013) on June 25, 2013. We distinguish counts of registered voters by ethnicity, either provided on the voters lists or inferred by Aristotle (2021), depending on the state or county. Overall, the final sample covers the universe of municipalities in the contiguous U.S. and population above or equal to 2,500 based on the U.S. Census.

We focus the analysis to the 2020 cross-section and drop the t subscript for ease of notation, as the most accurate and recent data on population comes from 2020. We construct three main dependent variables of interest. First, similarly to what we did for council underrepresentation, we define Minority underregistration as:

$$ur_m = p_m^M - r_m^M \tag{4}$$

where p_m^M is the Minority voting age population share in municipality m, and r_m^M is the Minority share of registered voters. The second main dependent variable measures the registration rate of Minority voters, that is the share of Minority voters who are registered. For each municipality m, let R_m^M be the absolute number of Minority voters who are registered, and P_m^M the Minority voting age population, then the Minority registration rate is:

$$rr_m^M = \frac{R_m^M}{P_m^M}. \tag{5}$$

The third variable of interest is then the registration rate gap between White and Minority

voters, measured by:

$$rg_m = \frac{R_m^W}{P_m^W} - \frac{R_m^M}{P_m^M}, \tag{6}$$

where R_m^W and P_m^W are the number of registered White voters and the White population in municipality m.

Figure 3 shows that a non-linear relationship between Minority share of the voting age population and underregistration of Minority voters of the city holds similarly to what observed for Minority underrepresentation in Figure 1, suggesting the two associations may be related.

We can confirm this intuition using a parametric approach by estimating the quadratic specification:

$$y_m = \beta_0 + \beta_1 p_m + \beta_2 p_m^2 + \delta_{s(m)} + \mathbf{x}_m'\alpha + \varepsilon_m, \tag{7}$$

where y_m is one of the three dependent variables of interest, $\delta_{s(m)}$ is a state fixed effect for state $s(m)$ of municipality m, $\mathbf{x}_m$ is a vector of controls, including the log-population, the log-median household income, and the fractions of rural, foreign, and over 65 population.

Table 9 reports the estimates of (7) for the Minority underregistration measure from (4). The results show a strong, significant concave relationship between Minority population share and Minority share of registered voters, much in line with our results for underrepresentation in Section 3. The estimated maximum underregistration gap is about 20 percentage points. The location of the *argmax* is consistently estimated between 46-49% Minority population shares, close the estimated *argmax* for underrepresentation. This indicates that minorities exhibit the widest gap between their share of registered voters and their share of the voting age population right at the point where they could shift the control of the city council.

In terms of Minority voter registration, Figure 4 reports a non-linear relationship with Minority registration rates, as defined in (5). The lowest registration rates for minorities occur where minorities constitute 15-20% of the voting age population in the city. The White-Minority registration gap has also a similar shape, with a White-minority voter registration gap, as defined in (6), being maximum where minorities constitute 15-25% of the voting age population in the city. This is reported in Figure 5.

6 Causal inference: Shelby County

6.1 Background on Shelby County v. Holder

The general provision of the VRA of 1965 broadly prohibits the implementation of any voting device that would result in the disenfranchisement of any Minority. The provision is intentionally

quite generic and since 1982 it has been amended by Congress to focus specifically on the resulting discriminatory effects of any voting practice, regardless of the original intent. Because its general provision is relatively vague, the VRA contains a number of special provisions that prescribe additional limitations and protections of the voting rights of minorities. Section 4(b) of the VRA contains the so-called coverage formula used to determine which jurisdictions are subject to the special provisions. Originally, were considered covered those jurisdictions that in 1964 were employing any device restricting voting and in which less than half the eligible voters were registered to vote in the 1964 Presidential election, or less than half the eligible voters voted in that election. The VRA coverage was later amended to include those jurisdiction that met the same two requirements in 1968 and 1972. Section 5 of the VRA, requires that all jurisdictions identified by the coverage formula in Section 4(b) must receive a federal approval, known as preclearance, before implementing any change to their voting procedures. By change, the section refers to any major or minor change. The jurisdiction proposing the change is required to prove that said change does not have discriminatory purpose nor effects with respect to race or language minorities. Over time, a number of U.S. Supreme Court ruling have established that the discriminatory effects must be evaluated with respect to the existing conditions. That is, in order to obtain preclearance, the proposed change should not worsen the existing disenfranchisement.

On top of limiting ex-ante the introduction of discriminatory practices, Section 5 of the VRA is also crucial in providing legal ground to private plaintiffs to sue a jurisdiction that failed to obtain federal approval. In 2013, the U.S. Supreme Court took a crucial stand on the constitutionality of Section 4(b) of the VRA, in relation to the case of Shelby County v. Holder (2013). The Court upheld the special provisions of Section 5 as constitutional, but at the same time ruled the coverage formula based on 1964 conditions unconstitutional. Without the formula, effectively no jurisdiction is any longer subject to the special provisions and the preclearance requirement until Congress establishes a new formula.

6.2 Shelby effects on underrepresentation

The purpose of this section is to exploit the Shelby County v. Holder (2013) ruling to establish a causal link between strategic disenfranchisement and the underrepresentation of minorities, comparing municipalities that were covered by the VRA formula to municipalities never covered by the VRA (referred to as covered and non-covered) before and after the Court ruling (referred

to as pre and post periods).[27] The aim is to compare both the shape of the relationship as well as the extent of the Minority underrepresentation and underregistration. Relative to standard difference-in-differences estimators, here we are focusing on differences in nonlinear relationships.

To this goal, let $VRA_m = I(m \text{ covered})$ be an indicator variable if municipality m was covered by the VRA before Shelby County v. Holder (2013). Let $POST_t = I(t > 2013)$ be an indicator variable for post Shelby County v. Holder (2013) observations. The specification that allows us to parametrically recover the patterns of underrepresentation is:

$$\begin{aligned} u_{mt} &= \beta_0 + \beta_1 p_{mt} + \beta_2 p_{mt}^2 + \\ &+\gamma_0 VRA_m + \gamma_1 (VRA_m \times p_{mt}) + \gamma_2 (VRA_m \times p_{mt}^2) + \\ &+\delta_0 POST_t + \delta_1 (POST_t \times p_{mt}) + \delta_1 (POST_t \times p_{mt}^2) + \\ &+\eta_0 (VRA_m \times POST_t) + \eta_1 (VRA_m \times POST_t \times p_{mt}) + \\ &+\eta_2 (VRA_m \times POST_t \times p_{mt}^2) + \varepsilon_{mt}. \end{aligned} \tag{8}$$

Given estimates of (8) and letting $g(m,t)$ summarize the four groups of pre and post, covered and non-covered municipalities, we can derive the estimates for the parameters of the quadratic formula:

$$\begin{aligned} \hat{c}_{g(m,t)} &= \hat{\beta}_0 + \hat{\gamma}_0 VRA_{g(m,t)} + \hat{\delta}_0 POST_{g(m,t)} + \hat{\eta}_0 (VRA_{g(m,t)} \times POST_{g(m,t)}), \\ \hat{b}_{g(m,t)} &= \hat{\beta}_1 + \hat{\gamma}_1 VRA_{g(m,t)} + \hat{\delta}_1 POST_{g(m,t)} + \hat{\eta}_1 (VRA_{g(m,t)} \times POST_{g(m,t)}), \\ \hat{a}_{g(m,t)} &= \hat{\beta}_2 + \hat{\gamma}_2 VRA_{g(m,t)} + \hat{\delta}_2 POST_{g(m,t)} + \hat{\eta}_2 (VRA_{g(m,t)} \times POST_{g(m,t)}). \end{aligned} \tag{9}$$

The estimated *max* and *argmax* for a given set of estimates in (9) are given by:

$$\begin{aligned} \max_{g(m,t)} &= \hat{c}_{g(m,t)} - \frac{\hat{b}_{g(m,t)}^2}{4\hat{a}_{g(m,t)}}; \\ \operatorname{argmax}_{g(m,t)} &= -\frac{\hat{b}_{g(m,t)}}{2\hat{a}_{g(m,t)}}. \end{aligned}$$

Finally, we can then assess the effect of Shelby on Minority underrepresentation as:

$$\text{Shelby} = \left(\max_{VRA,POST} - \max_{VRA,PRE}\right) - \left(\max_{NONVRA,POST} - \max_{NONVRA,PRE}\right). \tag{10}$$

Table 10 collects the estimated parameters for covered and non-covered municipalities, for the

[27] A complete list of jurisdictions covered by the VRA at the time of Shelby County v. Holder (2013) can be found here: https://www.justice.gov/crt/jurisdictions-previously-covered-section-5. Last accessed November 2021.

pre and post periods. The columns and estimates correspond to that of Appendix Table A.12 and are based on the main specification in (8) and the linear combinations in (9). In columns (3) and (4), the controls enter linearly in the constant term, taking one common average of the underlying variables. In columns (5) and (6) the controls' averages are taken separately for covered and non-covered, pre and post.

The parameters confirm a strong and significant non-linear relationship between underrepresentation and population shares, for all groups and periods. From (10), we can measure the effect of Shelby by comparing the estimated *max* levels of underrepresentation between groups and periods. The second panel of Table 6 shows the estimated *max* for all groups, as well as the effect of Shelby. The ruling had a strong and significant effect on underrepresentation, with an increase of approximately 7 percentage points in previously covered municipalities.

Given the quadratic specification, it is easier to compare the four groups graphically. Figure 6 plots the estimated curves in Table 10, dividing by pre and post periods. Before the ruling of Shelby County v. Holder (2013), non-covered municipalities had significantly higher underrepresentation for almost all levels of Minority population. Following Shelby County v. Holder (2013), the covered and non-covered municipalities become virtually indistinguishable, with a convergence to uncovered municipality levels. Essentially, once previously covered municipalities become free to adopt whatever changes in their voting procedures, the underrepresentation of minorities converges to the same level of those municipalities that were never constrained in their voting procedures to begin with. This result shows that the VRA preclearance formula was an effective tool in limiting Minority underrepresentation more than fifty years after its first implementation.[28]

Finally, to add further support to the analysis, we investigate possible pre-trends comparing covered and non-covered municipalities by year. To do so, the specification (8) is modified to include yearly fixed effects and interactions as follows. Let $Y1981_t = I(t = 1981)$ be an indicator for observations in year $t = 1981$, and so on for all the remaining years in the sample: 1986, 1991, 1996, 2001, 2006, 2011, and 2018. Then, the yearly specification is given by:

$$\begin{aligned} u_{mt} \quad = \quad & \sum_{T=\{1981,\ldots,2018\}} YT_t \left[\beta_{0,T} + \beta_{1,T} p_{mt} + \beta_{2,T} p_{mt}^2 + \right. \\ & \left. + \gamma_{0,T} VRA_m + \gamma_{1,T}(VRA_m \times p_{mt}) + \gamma_{2,T}(VRA_m \times p_{mt}^2)\right] + \varepsilon_{mt}. \end{aligned} \tag{11}$$

Figure 7 displays the Shelby effect coefficients based on (10) and estimates of (11) taking 2011 as reference period. For all the years before Shelby County v. Holder (2013), the non-covered

[28] This seems to support the intuition in the dissent to the ruling by Justice Ruth Bader Ginsburg: "*throwing out preclearance when it has worked and is continuing to work to stop discriminatory changes is like throwing away your umbrella in a rainstorm because you are not getting wet.*" See https://www.documentcloud.org/documents/717244-supreme-court-decision-in-shelby-county-v-holder.html#document/p32 last accessed on November 2021.

and covered municipalities display no clear pre-trend and Shelby effects are never statistically significant at standard levels until after the ruling.

As a robustness check of our analysis, we also restrict our regressions to a more contained set of control municipalities. Rather than taking the collection of all VRA non-covered municipalities in the country as control units, we focus on a more comparable sample of covered and non-covered observations based on areas in a neighborhood of 200 or 100 miles from the boundary of any VRA covered jurisdiction. More specifically, we only use municipalities falling geographically within a narrow 200 miles (or 100 miles) bandwidth around all VRA covered state and counties' boundaries. This exercise has the advantage of creating a more comparable set of control observations in the estimation, both in terms of observable and unobservable characteristics of control and treated units.

Reassuringly, both for case of the 200 miles in Table A.13 and the 100 miles analysis in Table A.14, the estimated parameters for covered and non-covered municipalities, for the pre and post periods, align consistently with the results of Figure 6 and Table 10. All our main findings in terms of effects of VRA removal on underrepresentation appear robust to different bandwidth and our difference-in-differences results are not to likely driven by confounding dynamics within parts of the country not comparable to VRA covered areas.

6.3 Shelby effects on underregistration

In parallel to the analysis above, we conclude this section by investigating the effects of Shelby County v. Holder (2013) decision on patterns of Minority underregistration. This subsection confirms patterns of differential increases in Minority underrepresentation relative to White population once the VRA Section 5 protections are removed in 2013.

The methodology that we adopt in this section is as follows. As in the discussion above, let R^M_{mt} be the number of Minority registered voters in municipality m at time t, that is with registration date prior or equal to t, and similarly R^W_{mt} for White voters. We normalize both variables relative to the same measure in 2007, the first year in our registration data sample from Aristotle (2021), in order to focus on within municipality-ethnic group variation. We then consider the difference between Minority and White,[29] namely:

$$dr_{mt} = \frac{R^M_{mt}}{R^M_{m07}} - \frac{R^W_{mt}}{R^W_{m07}}. \tag{12}$$

[29]The variables are trimmed to avoid outliers. That is, the observations of any municipality for which the ratios of Minority or White in (12) are above the 99th percentile, for any of the sample years, are excluded. In addition, the observations of any municipality for which the difference between Minority and White in (12) is below the 0.1th or above the 99.9th percentile, for any of the sample years, are excluded.

Again similarly to before, let $VRA_m = I(m \text{ covered})$ be an indicator for municipality m being covered by the VRA before Shelby County v. Holder (2013), and $YT_t = I(t = T)$ an indicator for year T, where $T = 2008, ..., 2020$. Year 2012 is set as the period relative to which coefficients are normalized. The empirical specification is:

$$dr_{mt} = \delta_m + \delta_t + \sum_{\substack{T=2008 \\ T \neq 2012}}^{T=2020} \beta_T \times VRA_m \times YT_t + \sum_{T=2008}^{T=2020} \mathbf{x}'_{mt} \boldsymbol{\alpha}_T \times YT_t + \varepsilon_{mt},$$

where δ_m and δ_t are municipality and year fixed effects, and $\mathbf{x}_{mt}$ is a set of demographic controls designed to flexibly control for trends, including the ratios of Minority, White, and voting age population relative to 2007, namely:

$$\frac{P^M_{mt}}{P^M_{m07}}, \qquad \frac{P^W_{mt}}{P^W_{m07}}, \qquad \frac{P^{VAP}_{mt}}{P^{VAP}_{m07}},$$

where P^M_{mt} is the Minority population in municipality m in year t, and similarly for White (W) and voting age (VAP). The yearly population measures are obtained by linearly interpolating the 2000, 2010, and 2020 U.S. Census data.

Figure 8 presents our results. Within the same figure we report both results with standard errors clustered at the county and at the State level (with generally wider, but still precise 95% confidence intervals with State-level clustering). All four panels in the figure control for demographic trends in Minority, White, and voting age population.

In our preferred specification, panel (a) of Figure 8 shows a clear differential gap in the registration rates of Minority voters compared to White voters, both relative to 2007, in the previously VRA covered areas after Shelby County v. Holder (2013). Magnitudes indicate an almost 40 percentage points lower registration gap of Minorities compared to Whites in 2020 in covered municipalities than non-covered ones, with respect to the same difference in 2012.[30] The effect exhibits a lag, realistically due to the time necessary to implement changes to voting procedures, and it is particularly strong after the 2016 presidential election, the first after Shelby County v. Holder (2013).

In panels (b) and (d) we perform a sample split between above and below median Minority voting age population shares calculated in 2010 using the same methodology as for panels (a) and (c). By confining to the subsamples, we are able to see that the differential lower registration of Minority voters relative to White voters is clearly driven by previously VRA covered areas

[30] More precisely, a coefficient of 0.4 is telling that that difference Minority-White registration ratios (both constructed relative to 2007 to control for size and fixed city propensity of groups to register) is 0.4 lower, meaning less positive or more negative, in covered municipalities than in non-covered municipalities, than the difference Minority-White registration rates was in 2012.

with a high percentage of Minority voters before Shelby County v. Holder (2013). These are exactly those localities where the incentives to repress Minority voters are higher due to their likely electoral importance. Magnitudes indicate an almost 50 percentage point lower registration gap of Minorities compared to Whites in 2020 relative to 2012 for covered municipalities above the median in terms of share of Minority voters. Instead, for municipalities below the median in terms of share of Minority voters, there is virtually no difference in terms of Minority compared to White registration ratio between covered and non-covered municipalities after VRA coverage is removed. If anything, in this subsample previously covered municipalities seem to perform somewhat better.

As in the case of underrepresentation, the results are robust to using samples restricted to 200 and 100 miles within the VRA border, presented in Figures A.4 and A.5 respectively.

7 Conclusion

This paper studies empirically the issue of systematic Minority underrepresentation and Minority underregistration in municipal governments in the United States for the period 1981-2018. Using a comprehensive panel of U.S. municipalities, we provide statistical evidence that both underrepresentation and underregistration relative to overall voting age population Minority shares are widespread phenomena that are particularly strong where racial or ethnic minorities are more likely to be electorally pivotal, pointing to a strategic origin of such patterns. We show that these patterns are common to Latino, African American, and Asian voters alike. Both Minority voters' underregistration and selected features of the city institutional structure (electoral rule, form of government, council size, whether council members are paid) contribute the extent of these patterns.

A difference-in-differences estimator, based on variation induced by Shelby County v. Holder (2013) Court's decision of eliminating Section 4(b)'s formula to determine preclearance coverage under the VRA of 1965, provides causal evidence of the ability of local governments of adjusting municipal institutional features to limit the political competition and representation of Minority voters. In the five years following the removal of preclearance conditions requiring Washington's approval for institutional changes that weakened Minority representation in covered jurisdictions, municipalities which were no longer covered revert to levels of underrepresentation similar to previously noncovered municipalities, eroding post-1965 gains. Similar patterns are present in terms of lower registration of Minority voters. Again, we show that these results are driven by municipalities where minorities are electorally more relevant. As in our main analysis, the response to Shelby County v. Holder (2013) points to patterns of underrepresentation consistent with strategic manipulation of voting procedures.

Within the context of this paper, one of our contributions is to show the degree of precision with respect to electoral conditions with which voting procedures detrimental to representation of minorities are applied. Future research should further investigate the conditional use of changes in voting procedures at other levels of the U.S. government. This will complement the necessarily partial picture that we could provide in this article.

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Tables and Figures

Table 1: Summary Statistics

	Mean	Std. Dev.	Min.	Max.	Obs.
Council Composition (frac.):					
Latino	0.025	0.111	0.000	1.000	27,686
Asian	0.003	0.030	0.000	1.000	27,686
African American	0.051	0.128	0.000	1.000	27,686
Minority	0.087	0.180	0.000	1.000	27,686
White	0.913	0.180	0.000	1.000	27,686
Voting Age Population (frac.):					
Latino	0.069	0.130	0.000	0.985	29,940
Asian	0.019	0.040	0.000	0.693	27,884
African American	0.070	0.127	0.000	0.982	29,847
Minority	0.171	0.191	0.000	1.000	29,855
White	0.829	0.191	0.000	1.000	29,931
Underrepresentation:					
Latino	0.043	0.086	-0.996	0.833	27,656
Asian	0.015	0.038	-0.991	0.505	25,688
African American	0.020	0.079	-1.000	0.971	27,569
Minority	0.084	0.136	-0.991	0.990	27,576
Main Institutional Features:					
Mayor-Council	0.433	0.495	0.000	1.000	26,802
Council Size	6.230	2.009	2.000	50.000	29,381
At-Large (frac.)	0.716	0.413	0.000	1.000	28,199
Paid Council Members	0.879	0.326	0.000	1.000	29,035
VRA covered	0.171	0.377	0.000	1.000	29,957
Additional Institutional Features:					
Partisanship	0.262	0.440	0.000	1.000	28,954
Running Fees	22.923	105.453	0.000	5,000.000	15,904
Voters per Councilor (thousands)	2.662	5.566	0.181	180.901	29,347
Staggered Terms	0.807	0.395	0.000	1.000	29,046
Term Length	3.390	0.904	1.167	8.000	28,584
Term Limits	0.092	0.289	0.000	1.000	16,692
Sociodemographics:					
Population	24,117.542	85,414.602	2,313	7,071,639	29,940
Voting Age Population	18,043.860	63,780.398	1,472	5,306,172	29,940
Over 65 (frac.)	0.144	0.058	0.001	0.708	29,922
Rural (frac.)	0.075	0.206	0.000	1.000	29,621
Foreign (frac.)	0.064	0.078	0.000	0.706	29,902
Median Household Income	42,358.913	19,242.365	4,563.352	200,001.000	29,922

Table 2: Summary Statistics - Registration (2020)

	Mean	Std. Dev.	Min.	Max.	Obs.
Shares of Registered Voters (frac.):					
Latino	0.087	0.162	0.000	0.979	6,436
Asian	0.021	0.046	0.000	0.672	6,436
African American	0.079	0.173	0.000	0.987	6,436
Minority	0.187	0.231	0.005	0.989	6,436
White	0.813	0.231	0.011	0.995	6,436
Voting Age Population (frac.):					
Latino	0.130	0.171	0.001	0.985	6,436
Asian	0.036	0.064	0.000	0.719	6,436
African American	0.104	0.162	0.000	0.971	6,436
Minority	0.313	0.232	0.024	0.995	6,436
White	0.687	0.232	0.005	0.976	6,436
Underregistration:					
Latino	0.044	0.048	-0.293	0.465	6,436
Asian	0.015	0.025	-0.155	0.221	6,436
African American	0.025	0.063	-0.453	0.508	6,436
Minority	0.126	0.089	-0.235	0.635	6,436
Registration Rates:					
Latino	0.390	0.192	0.000	1.000	6,436
Asian	0.485	0.237	0.000	1.000	6,436
African American	0.475	0.330	0.000	1.000	6,436
Minority	0.347	0.197	0.008	1.000	6,436
White	0.873	0.133	0.024	1.000	6,436
Total	0.751	0.130	0.285	1.000	6,436
Sociodemographics:					
Population	30,086.356	147,209.615	2,502	8,804,190	6,436
Voting Age Population	23,413.266	117,290.619	1,733	7,064,048	6,436
Over 65* (frac.)	0.145	0.055	0.010	0.795	6,436
Rural* (frac.)	0.055	0.155	0.000	1.000	6,436
Foreign* (frac.)	0.087	0.099	0.000	0.970	6,436
Median Household Income*	42,416.786	20,508.293	11,578.660	197,427.141	6,436

All summary statistics based on 2020 registration and U.S. Census data. Variables denoted by * are based on 2010 U.S. Census data.

Figure 1: Minority Underrepresentation

Solid line represents a LOWESS smoothing of the underlying municipality-level data. Markers represent population bins averages.

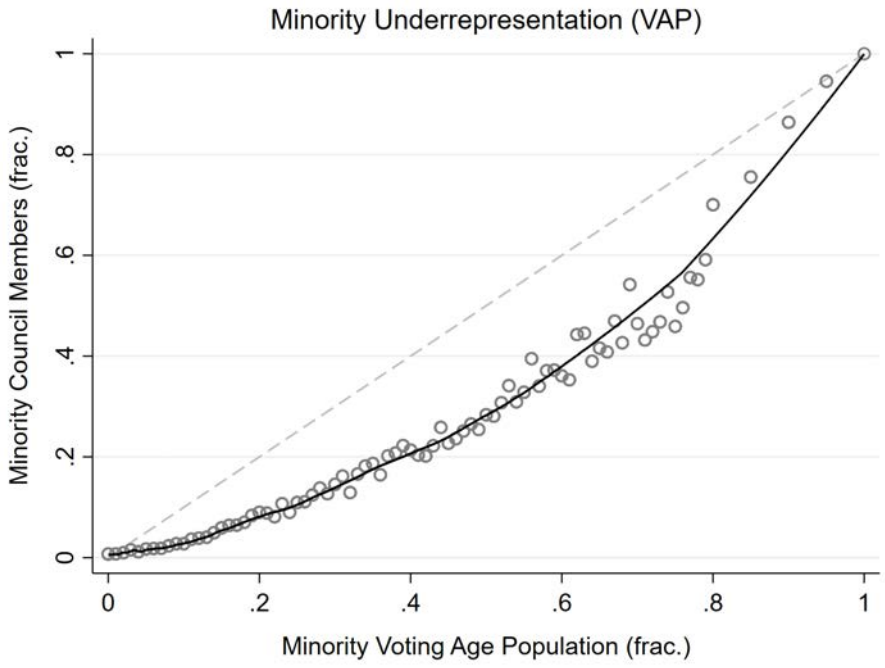


Table 3: Minority Underrepresentation

	(1) Minority Underrep.	(2) Minority Underrep.	(3) Minority Underrep.	(4) Minority Underrep.	(5) Minority Underrep.
Minority	0.801***	0.776***	1.238***	1.493***	1.384***
	(0.018)	(0.018)	(0.029)	(0.042)	(0.048)
Minority^2	-0.727***	-0.706***	-1.060***	-1.222***	-1.195***
	(0.030)	(0.030)	(0.049)	(0.054)	(0.055)
max	0.216***	0.211***	0.303***	0.364***	0.326***
	(0.004)	(0.004)	(0.006)	(0.009)	(0.012)
argmax	0.551***	0.550***	0.584***	0.611***	0.579***
	(0.013)	(0.013)	(0.016)	(0.015)	(0.016)
Population	VAP	VAP	VAP	VAP	VAP
Year FE	-	X	-	X	X
Municipality FE	-	-	X	X	X
Controls	-	-	-	-	X
Obs.	27,576	27,576	26,205	26,205	26,065
Municipalities	7,472	7,472	6,101	6,101	6,084
Cluster level	Municipality	Municipality	Municipality	Municipality	Municipality
Adjusted R^2	0.260	0.266	0.493	0.500	0.500

Cluster robust standard errors in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The dependent variable in all specifications is Minority underrepresentation, computed as the difference between the fraction of Minority population and the fraction of Minority council members. The main independent variables are the fraction of Minority population and its squared value. Population measures based on voting age population. The controls include the log-population, the log-median household income, and the fractions of rural, foreign, and over 65 population. For *max* and *argmax*, the standard errors in parentheses are asymptotic. Given a quadratic formula $y = ax^2 + bx + c$, the *max* is computed as $c - \frac{b^2}{4a}$, while the *argmax* is computed as $-\frac{b}{2a}$.

Figure 2: Minority Underrepresentation by Electoral Rule

Solid lines represent LOWESS smoothings of the underlying municipality-level data. Markers represent population bins averages.

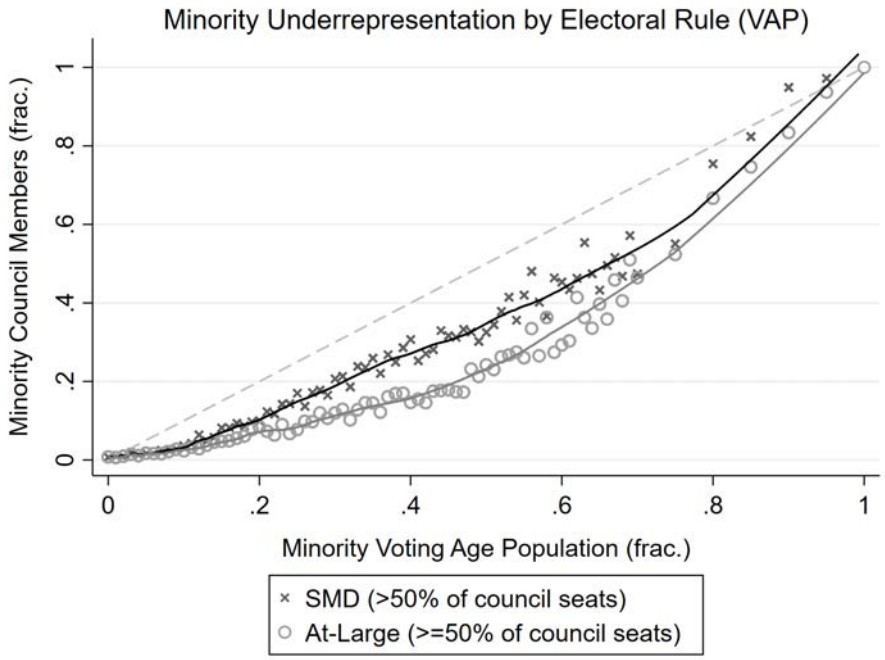


Table 4: Minority Underrepresentation by Electoral Rule

	(1) Minority Underrep.	(2) Minority Underrep.	(3) Minority Underrep.	(4) Minority Underrep.	(5) Minority Underrep.
Minority	0.543***	0.519***	0.990***	1.219***	1.124***
	(0.028)	(0.028)	(0.041)	(0.051)	(0.056)
Minority^2	-0.495***	-0.478***	-0.765***	-0.914***	-0.892***
	(0.046)	(0.045)	(0.066)	(0.068)	(0.068)
At-Large	-0.017***	-0.016***	-0.008	-0.009*	-0.008
	(0.002)	(0.002)	(0.005)	(0.005)	(0.005)
At-Large × Minority	0.427***	0.424***	0.373***	0.353***	0.345***
	(0.035)	(0.035)	(0.046)	(0.045)	(0.045)
At-Large × Minority^2	-0.386***	-0.377***	-0.388***	-0.378***	-0.376***
	(0.057)	(0.056)	(0.072)	(0.071)	(0.072)
max (SMD)	0.153***	0.148***	0.265***	0.324***	0.287***
	(0.005)	(0.005)	(0.011)	(0.014)	(0.015)
max (At-Large)	0.255***	0.250***	0.340***	0.387***	0.351***
	(0.005)	(0.005)	(0.008)	(0.009)	(0.012)
argmax (SMD)	0.548***	0.543***	0.647***	0.667***	0.630***
	(0.027)	(0.027)	(0.034)	(0.029)	(0.029)
argmax (At-Large)	0.551***	0.551***	0.591***	0.609***	0.579***
	(0.013)	(0.013)	(0.018)	(0.016)	(0.018)
Test *max* (p-value)	0.000	0.000	0.000	0.000	0.000
Test *argmax* (p-value)	0.937	0.769	0.074	0.032	0.050
Population	VAP	VAP	VAP	VAP	VAP
Year FE	-	X	-	X	X
Municipality FE	-	-	X	X	X
Controls	-	-	-	-	X
Obs.	26,419	26,419	25,022	25,022	24,885
Municipalities	7,401	7,401	6,004	6,004	5,987
Cluster level	Municipality	Municipality	Municipality	Municipality	Municipality
Adjusted R^2	0.293	0.299	0.506	0.511	0.511

Cluster robust standard errors in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The dependent variable in all specifications is Minority underrepresentation, computed as the difference between the fraction of Minority population and the fraction of Minority council members. The main independent variables are the fraction of Minority population and its squared value. Population measures based on voting age population. At-Large is an indicator for municipalities in which at least 50% of council seats are elected using an At-Large electoral rule. The controls include the log-population, the log-median household income, and the fractions of rural, foreign, and over 65 population. For *max* and *argmax*, the standard errors in parentheses are asymptotic. Given a quadratic formula $y = ax^2 + bx + c$, the *max* is computed as $c - \frac{b^2}{4a}$, while the *argmax* is computed as $-\frac{b}{2a}$.

Table 5: Endogenous Choice of Electoral Rule

	(1) At-Large (frac.)	(2) At-Large (frac.)	(3) At-Large (frac.)	(4) At-Large (frac.)
Minority	0.298***	0.231***	0.811***	0.777***
	(0.076)	(0.086)	(0.119)	(0.132)
Minority^2	-0.510***	-0.484***	-1.693***	-1.686***
	(0.083)	(0.084)	(0.201)	(0.201)
argmax	0.293***	0.239***	0.240***	0.230***
	(0.042)	(0.062)	(0.015)	(0.022)
Population	VAP	VAP	VAP	VAP
Sample	Full	Full	$\leq 50\%$	$\leq 50\%$
Year FE	X	X	X	X
Municipality FE	X	X	X	X
Controls	-	X	-	X
Obs.	26,714	26,557	24,457	24,314
Municipalities	6,151	6,130	5,756	5,736
Cluster level	Municipality	Municipality	Municipality	Municipality
Adjusted R^2	0.766	0.766	0.773	0.773

Cluster robust standard errors in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Columns (1) to (3) use the full sample, columns (4) to (6) are restricted to municipalities with Minority voting age population fraction less or equal to 50%. The dependent variable in all specifications is the share of council seats elected At-Large. The main independent variables are the fraction of Minority population and its squared value. Population measures based on voting age population. The controls include the log-population, the log-median household income, and the fractions of rural, foreign, and over 65 population. For *argmax*, the standard errors in parentheses are asymptotic. Given a quadratic formula $y = ax^2 + bx + c$, the *argmax* is computed as $-\frac{b}{2a}$.

Table 6: Mayor-Council v. Council-Manager

	(1) Minority Underrep.	(2) Minority Underrep.	(3) Minority Underrep.	(4) Minority Underrep.	(5) Minority Underrep.
Minority	0.835***	0.811***	1.249***	1.493***	1.385***
	(0.026)	(0.026)	(0.037)	(0.047)	(0.053)
Minority^2	-0.720***	-0.701***	-1.054***	-1.200***	-1.180***
	(0.041)	(0.041)	(0.059)	(0.063)	(0.064)
Mayor-Council	0.005**	0.006**	0.003	-0.004	-0.004
	(0.002)	(0.002)	(0.004)	(0.004)	(0.004)
Mayor-Council × Minority	-0.114***	-0.118***	-0.012	0.022	0.022
	(0.035)	(0.035)	(0.041)	(0.040)	(0.040)
Mayor-Council × Minority^2	0.015	0.021	-0.042	-0.074	-0.067
	(0.054)	(0.054)	(0.060)	(0.059)	(0.059)
max (Council-Manager)	0.235***	0.230***	0.306***	0.368***	0.328***
	(0.006)	(0.006)	(0.007)	(0.010)	(0.012)
max (Mayor-Council)	0.182***	0.178***	0.289***	0.351***	0.315***
	(0.006)	(0.006)	(0.008)	(0.010)	(0.013)
argmax (Council-Manager)	0.580***	0.579***	0.593***	0.622***	0.587***
	(0.019)	(0.019)	(0.019)	(0.018)	(0.018)
argmax (Mayor-Council)	0.511***	0.510***	0.565***	0.595***	0.565***
	(0.015)	(0.015)	(0.018)	(0.016)	(0.018)
Test *max* (p-value)	0.000	0.000	0.039	0.044	0.110
Test *argmax* (p-value)	0.002	0.003	0.096	0.080	0.120
Population	VAP	VAP	VAP	VAP	VAP
Year FE	-	X	-	X	X
Municipality FE	-	-	X	X	X
Controls	-	-	-	-	X
Obs.	24,855	24,855	23,658	23,658	23,553
Municipalities	6,783	6,783	5,586	5,586	5,574
Cluster level	Municipality	Municipality	Municipality	Municipality	Municipality
Adjusted R^2	0.261	0.267	0.493	0.499	0.500

Cluster robust standard errors in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The dependent variable in all specifications is Minority underrepresentation, computed as the difference between the fraction of Minority population and the fraction of Minority council members. *Mayor-council* is an indicator for municipalities adopting that systems as opposed to a council-manager form. The main independent variables are the fraction of Minority population and its squared value, and their interactions. Population measures based on voting age population. The controls are the log-population, the log-median household income, and the fractions of rural, foreign, and over 65 population. For *max* and *argmax*, the standard errors in parentheses are asymptotic. Given a quadratic formula $y = ax^2 + bx + c$, the *max* is computed as $c - \frac{b^2}{4a}$, while the *argmax* is computed as $-\frac{b}{2a}$.

Table 7: Council Size

	(1) Minority Underrep.	(2) Minority Underrep.	(3) Minority Underrep.	(4) Minority Underrep.	(5) Minority Underrep.
Minority	0.887***	0.870***	1.309***	1.543***	1.437***
	(0.027)	(0.027)	(0.046)	(0.055)	(0.059)
Minority^2	-0.782***	-0.767***	-1.134***	-1.272***	-1.258***
	(0.042)	(0.042)	(0.071)	(0.075)	(0.076)
Council size (CS)	0.005**	0.007***	-0.002	-0.002	-0.004
	(0.002)	(0.002)	(0.006)	(0.006)	(0.006)
CS × Minority	-0.131***	-0.145***	-0.121**	-0.093*	-0.105**
	(0.036)	(0.035)	(0.053)	(0.052)	(0.052)
CS × Minority^2	0.041	0.056	0.139	0.099	0.128
	(0.057)	(0.057)	(0.085)	(0.084)	(0.084)
max (CS below median)	0.244***	0.240***	0.320***	0.378***	0.338***
	(0.006)	(0.006)	(0.009)	(0.011)	(0.014)
max (CS above median)	0.190***	0.185***	0.294***	0.355***	0.316***
	(0.005)	(0.005)	(0.009)	(0.011)	(0.013)
argmax (CS below median)	0.567***	0.567***	0.578***	0.607***	0.571***
	(0.017)	(0.017)	(0.020)	(0.019)	(0.020)
argmax (CS above median)	0.511***	0.509***	0.597***	0.618***	0.589***
	(0.015)	(0.015)	(0.022)	(0.020)	(0.020)
Test *max* (p-value)	0.000	0.000	0.043	0.092	0.069
Test *argmax* (p-value)	0.011	0.010	0.462	0.650	0.428
Population	VAP	VAP	VAP	VAP	VAP
Year FE	-	X	-	X	X
Municipality FE	-	-	X	X	X
Controls	-	-	-	-	X
Obs.	27,576	27,576	26,205	26,205	26,065
Municipalities	7,472	7,472	6,101	6,101	6,084
Cluster level	Municipality	Municipality	Municipality	Municipality	Municipality
Adjusted R^2	0.268	0.275	0.494	0.500	0.501

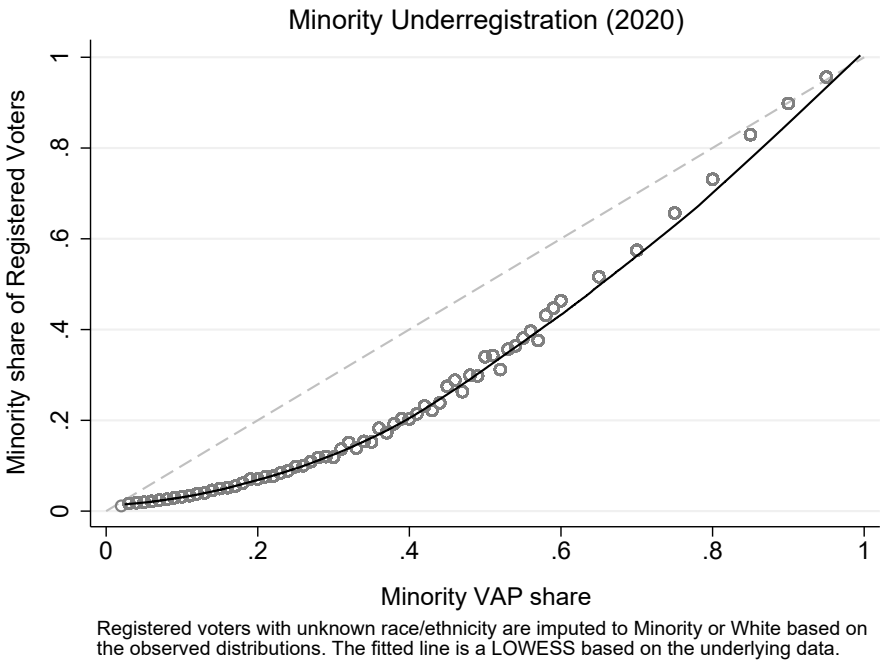
Cluster robust standard errors in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The dependent variable in all specifications is Minority underrepresentation, computed as the difference between the fraction of Minority population and the fraction of Minority council members. *Council size* is an indicator for municipalities with council size above or equal the median. The main independent variables are the fraction of Minority population and its squared value, and their interactions. Population measures based on voting age population. The controls are the log-population, the log-median household income, and the fractions of rural, foreign, and over 65 population. For *max* and *argmax*, the standard errors in parentheses are asymptotic. Given a quadratic formula $y = ax^2 + bx + c$, the *max* is computed as $c - \frac{b^2}{4a}$, while the *argmax* is computed as $-\frac{b}{2a}$.

Table 8: Paid Council Members

	(1) Minority Underrep.	(2) Minority Underrep.	(3) Minority Underrep.	(4) Minority Underrep.	(5) Minority Underrep.
Minority	0.914***	0.883***	1.210***	1.467***	1.355***
	(0.050)	(0.050)	(0.055)	(0.063)	(0.066)
Minority^2	-0.843***	-0.817***	-0.939***	-1.106***	-1.077***
	(0.079)	(0.078)	(0.081)	(0.085)	(0.084)
Paid council members	0.009**	0.009**	0.004	0.002	0.001
	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)
Paid × Minority	-0.126**	-0.118**	0.037	0.032	0.030
	(0.052)	(0.052)	(0.055)	(0.055)	(0.055)
Paid × Minority^2	0.129	0.123	-0.147*	-0.140*	-0.143*
	(0.083)	(0.082)	(0.079)	(0.080)	(0.079)
max (not Paid)	0.234***	0.228***	0.327***	0.394***	0.352***
	(0.011)	(0.011)	(0.015)	(0.017)	(0.018)
max (Paid)	0.213***	0.209***	0.300***	0.359***	0.320***
	(0.004)	(0.004)	(0.006)	(0.009)	(0.012)
argmax (not Paid)	0.542***	0.541***	0.645***	0.663***	0.629***
	(0.028)	(0.029)	(0.033)	(0.029)	(0.029)
argmax (Paid)	0.552***	0.551***	0.574***	0.602***	0.568***
	(0.014)	(0.014)	(0.016)	(0.015)	(0.016)
Test *max* (p-value)	0.059	0.091	0.047	0.021	0.018
Test *argmax* (p-value)	0.743	0.729	0.017	0.022	0.014
Population	VAP	VAP	VAP	VAP	VAP
Year FE	-	X	-	X	X
Municipality FE	-	-	X	X	X
Controls	-	-	-	-	X
Obs.	27,077	27,077	25,704	25,704	25,564
Municipalities	7,436	7,436	6,063	6,063	6,046
Cluster level	Municipality	Municipality	Municipality	Municipality	Municipality
Adjusted R^2	0.261	0.267	0.494	0.500	0.501

Cluster robust standard errors in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The dependent variable in all specifications is Minority underrepresentation, computed as the difference between the fraction of Minority population and the fraction of Minority council members. *Paid* is an indicator for municipalities with paid council members. The main independent variables are the fraction of Minority population and its squared value, and their interactions. Population measures based on voting age population. The controls are the log-population, the log-median household income, and the fractions of rural, foreign, and over 65 population. For *max* and *argmax*, the standard errors in parentheses are asymptotic. Given a quadratic formula $y = ax^2 + bx + c$, the *max* is computed as $c - \frac{b^2}{4a}$, while the *argmax* is computed as $-\frac{b}{2a}$.

Figure 3: Minority Underregistration



Registered voters with unknown race/ethnicity are imputed to Minority or White based on the observed distributions. The fitted line is a LOWESS based on the underlying data.

Table 9: Minority Underregistration

	(1) Minority Underreg.	(2) Minority Underreg.	(3) Minority Underreg.
Minority	0.831***	0.957***	0.901***
	(0.014)	(0.015)	(0.019)
Minority^2	-0.870***	-0.971***	-0.963***
	(0.015)	(0.015)	(0.017)
max	0.196***	0.209***	0.201***
	(0.002)	(0.002)	(0.002)
argmax	0.477***	0.493***	0.468***
	(0.003)	(0.003)	(0.005)
Population	VAP	VAP	VAP
Year	2020	2020	2020
State FE	-	X	X
Controls	-	-	X
Obs.	6,436	6,435	6,435
Adjusted R^2	0.359	0.586	0.597

Robust standard errors in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Registered voters with unknown race/ethnicity are imputed to Minority or White based on the observed distributions. The dependent variable in all specifications is Minority underregistration, computed as the difference between the fraction of Minority population and the Minority fraction of registered voters. The main independent variables are the fraction of Minority population and its squared value. Population measures based on voting age population. When included, the controls are the log-population, the log-median household income, and the fractions of rural, foreign, and over 65 population. For *max* and *argmax*, the standard errors in parentheses are asymptotic. Given a quadratic formula $y = ax^2 + bx + c$, the *max* is computed as $c - \frac{b^2}{4a}$, while the *argmax* is computed as $-\frac{b}{2a}$.

Figure 4: Minority Registration Rate

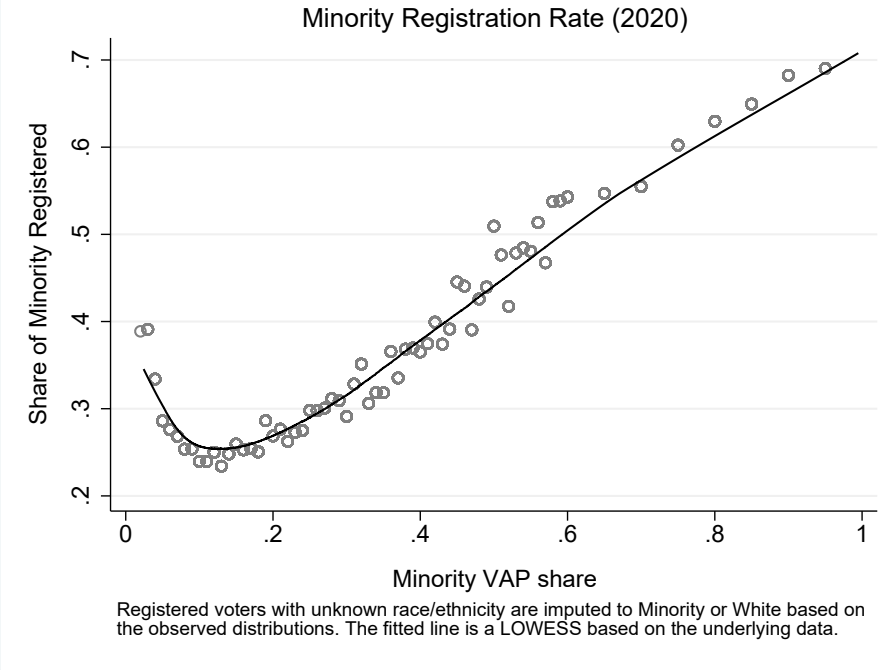


Figure 5: Minority Registration Gap

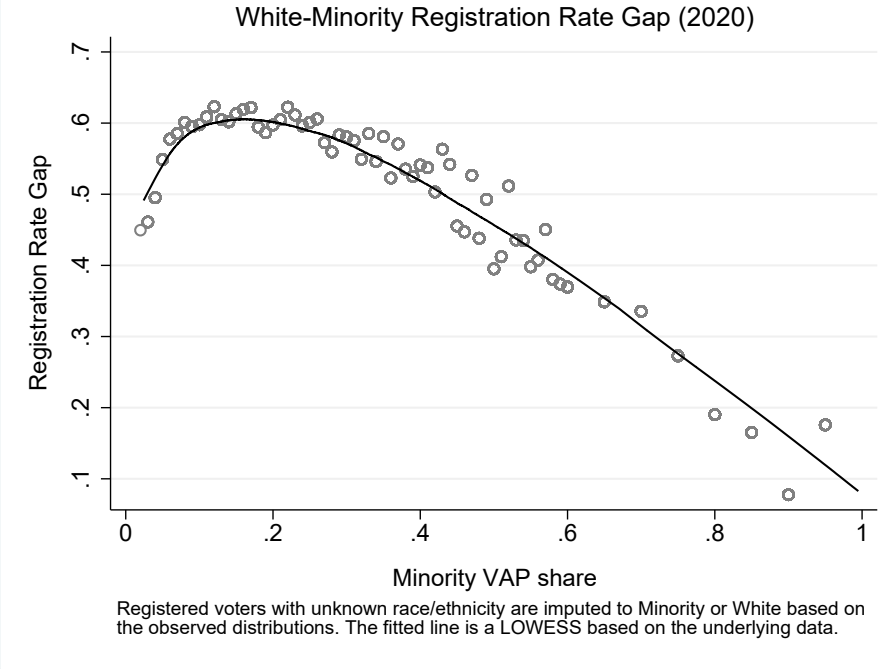
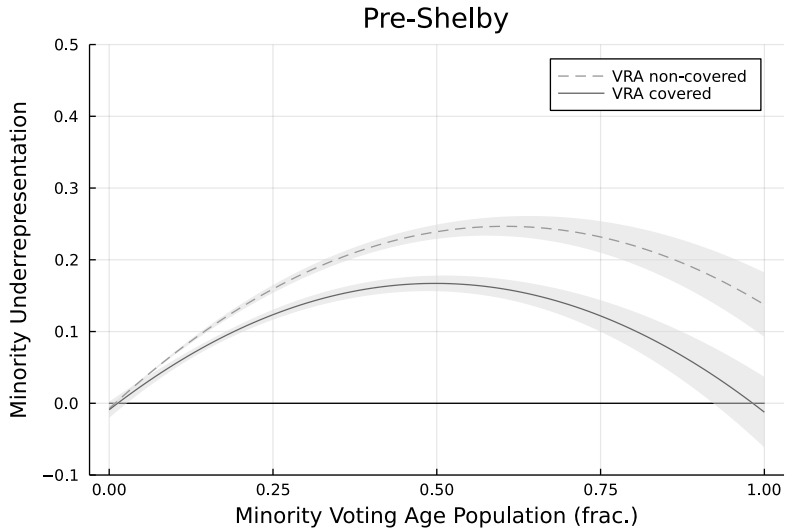


Table 10: Minority Underrepresentation Pre/Post Shelby (2013)

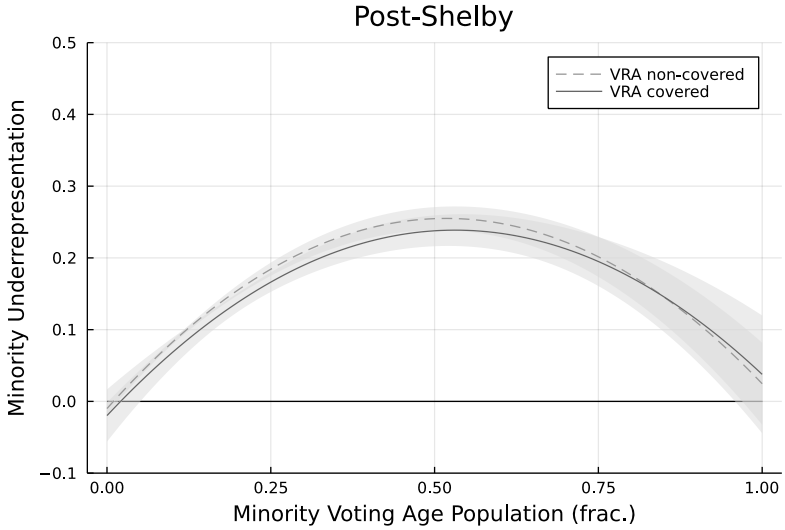
	(1) Minority Underrep.	(2) Minority Underrep.	(3) Minority Underrep.	(4) Minority Underrep.	(5) Minority Underrep.	(6) Minority Underrep.
Pre, VRA non-covered						
constant	-0.007***	-0.007**	0.010***	0.010**	0.010***	0.010**
	(0.001)	(0.004)	(0.002)	(0.004)	(0.002)	(0.004)
Minority	0.841***	0.841***	0.724***	0.724***	0.724***	0.724***
	(0.023)	(0.070)	(0.026)	(0.054)	(0.026)	(0.054)
Minority^2	-0.696***	-0.696***	-0.740***	-0.740***	-0.740***	-0.740***
	(0.039)	(0.061)	(0.038)	(0.046)	(0.038)	(0.046)
Pre, VRA covered						
constant	-0.009	-0.009	-0.004	-0.004	-0.009	-0.009
	(0.006)	(0.007)	(0.006)	(0.007)	(0.006)	(0.007)
Minority	0.708***	0.708***	0.791***	0.791***	0.791***	0.791***
	(0.042)	(0.116)	(0.042)	(0.092)	(0.042)	(0.092)
Minority^2	-0.711***	-0.711***	-0.893***	-0.893***	-0.893***	-0.893***
	(0.056)	(0.162)	(0.057)	(0.136)	(0.057)	(0.136)
Post, VRA non-covered						
constant	-0.010**	-0.010**	0.016***	0.016**	0.025***	0.025***
	(0.004)	(0.004)	(0.006)	(0.008)	(0.006)	(0.008)
Minority	1.024***	1.024***	0.861***	0.861***	0.861***	0.861***
	(0.048)	(0.048)	(0.054)	(0.071)	(0.054)	(0.071)
Minority^2	-0.990***	-0.990***	-1.006***	-1.006***	-1.006***	-1.006***
	(0.063)	(0.049)	(0.068)	(0.076)	(0.068)	(0.076)
Post, VRA covered						
constant	-0.020	-0.020	-0.013	-0.013	0.005	0.005
	(0.019)	(0.027)	(0.020)	(0.023)	(0.020)	(0.024)
Minority	0.973***	0.973***	0.960***	0.960***	0.960***	0.960***
	(0.109)	(0.190)	(0.113)	(0.163)	(0.113)	(0.163)
Minority^2	-0.915***	-0.915***	-0.991***	-0.991***	-0.991***	-0.991***
	(0.123)	(0.171)	(0.127)	(0.160)	(0.127)	(0.160)
Max (Pre, VRA non-covered)	0.247***	0.247***	0.187***	0.187***	0.187***	0.187***
	(0.007)	(0.030)	(0.006)	(0.015)	(0.006)	(0.015)
Max (Pre, VRA covered)	0.167***	0.167***	0.171***	0.171***	0.166***	0.166***
	(0.006)	(0.014)	(0.005)	(0.010)	(0.005)	(0.010)
Max (Post, VRA non-covered)	0.255***	0.255***	0.200***	0.200***	0.210***	0.210***
	(0.008)	(0.012)	(0.008)	(0.011)	(0.008)	(0.011)
Max (Post, VRA covered)	0.239***	0.239***	0.220***	0.220***	0.237***	0.237***
	(0.011)	(0.027)	(0.011)	(0.019)	(0.011)	(0.018)
Shelby	0.063***	0.063**	0.035***	0.035**	0.048***	0.048***
	(0.015)	(0.028)	(0.013)	(0.017)	(0.013)	(0.017)
Population	VAP	VAP	VAP	VAP	VAP	VAP
Sample	Full	Full	Full	Full	Full	Full
Controls	-	-	X	X	X (split)	X (split)
Obs.	27,562	27,562	27,274	27,274	27,274	27,274
Clusters	7,470	49	7,305	49	7,305	49
Cluster level	Municipality	State	Municipality	State	Municipality	State

Cluster robust standard errors in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The dependent variable in all specifications is Minority underrepresentation, computed as the difference between the fraction of Minority population and the fraction of Minority council members. We report the estimates for municipalities *covered/non-covered* by the VRA at the time of Shelby, and for *pre/post* Shelby periods. See Table A.12 for the underlying estimates. The controls are the log-population, the log-median household income, and the fractions of rural, foreign, and over 65 population. For *max* and *shelby*, the standard errors in parentheses are asymptotic. Given a quadratic formula $y = ax^2 + bx + c$, the *max* is computed as $c - \frac{b^2}{4a}$, while the *shelby* is a diff-in-diffs estimate based on the *max*.

Figure 6: Minority Underrepresentation Pre/Post Shelby (2013)



(a) Pre Shelby (2013)



(b) Post Shelby (2013)

Figure 7: Pre-trend analysis of Shelby (2013) effect of Minority Underrepresentation

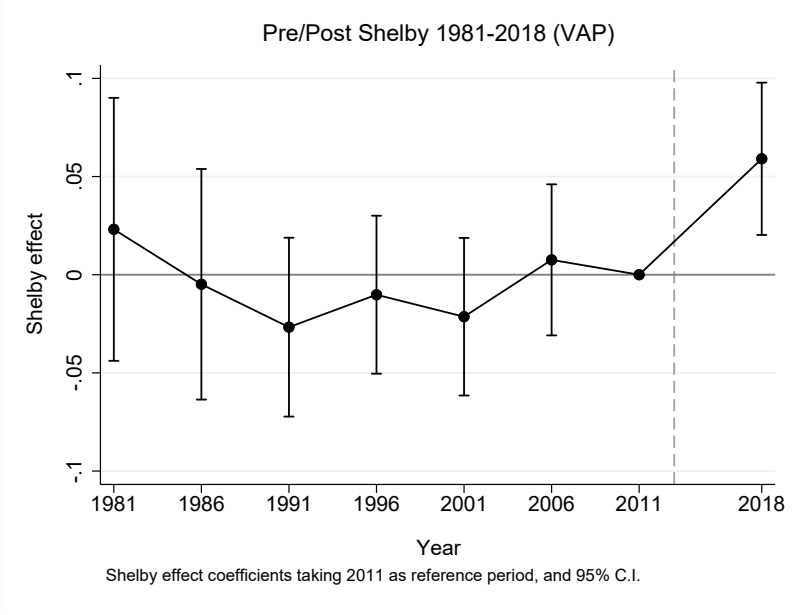
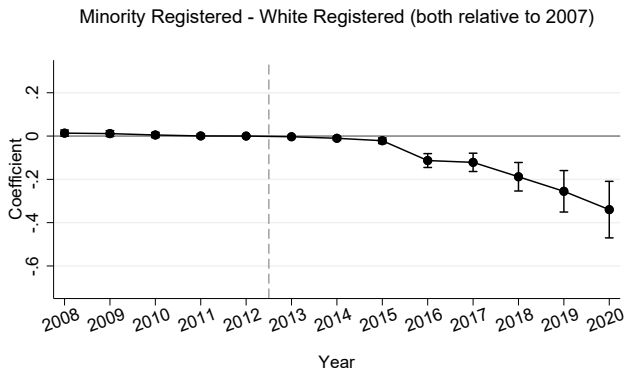


Figure 8: Registration and Shelby (2013)

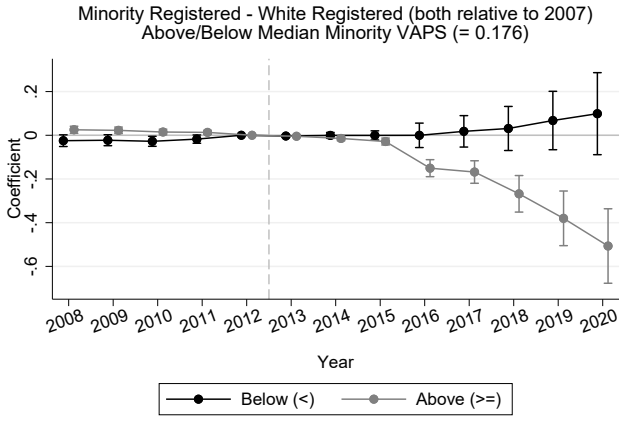
Controlling for demographic trends in Minority, White, and voting age population (relative to 2007)

(a)



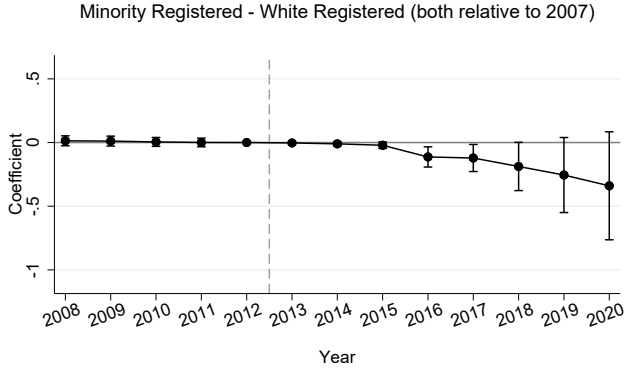
Standard errors clustered at County level. Shelby effect coefficients taking 2012 as reference period, and 95% C.I. Demographic trends for Minority, White, and voting age populations (relative to 2007) interacted by year indicators as controls.

(b)



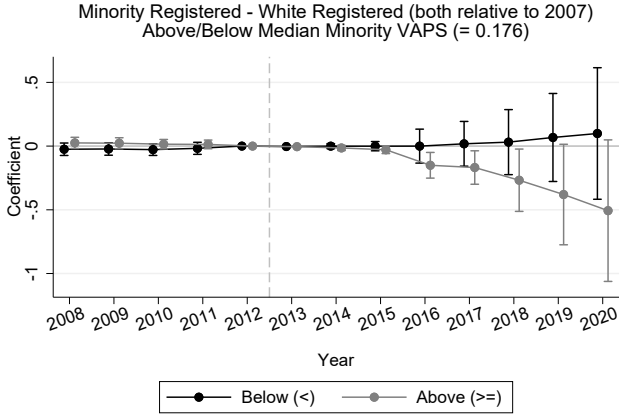
Standard errors clustered at County level. Shelby effect coefficients taking 2012 as reference period, and 95% C.I. Demographic trends for Minority, White, and voting age populations (relative to 2007) interacted by year indicators as controls.

(c)



Standard errors clustered at State level. Shelby effect coefficients taking 2012 as reference period, and 95% C.I. Demographic trends for Minority, White, and voting age populations (relative to 2007) interacted by year indicators as controls.

(d)



Standard errors clustered at State level. Shelby effect coefficients taking 2012 as reference period, and 95% C.I. Demographic trends for Minority, White, and voting age populations (relative to 2007) interacted by year indicators as controls.

Online appendix - Not for publication

A Data appendix and additional results

Figure A.1: Minority Underrepresentation (parametric, based on column 1 of Table 3)

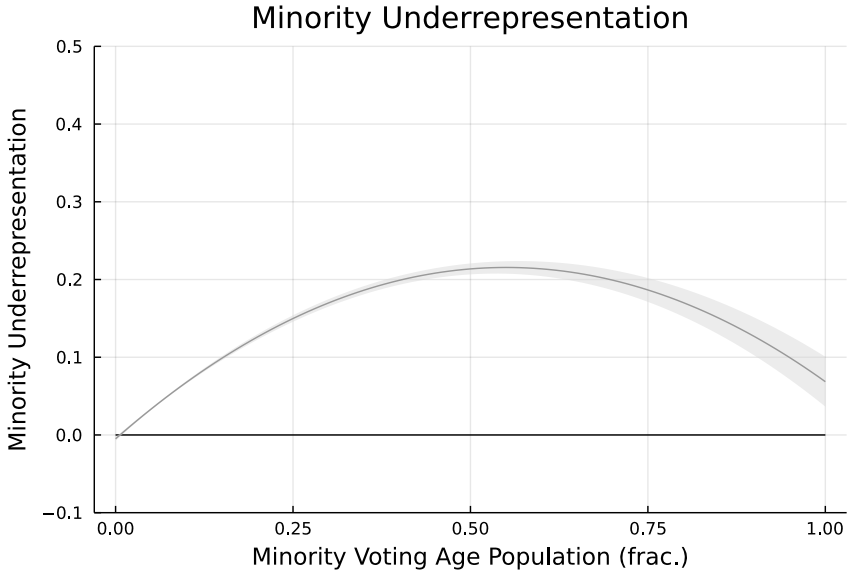
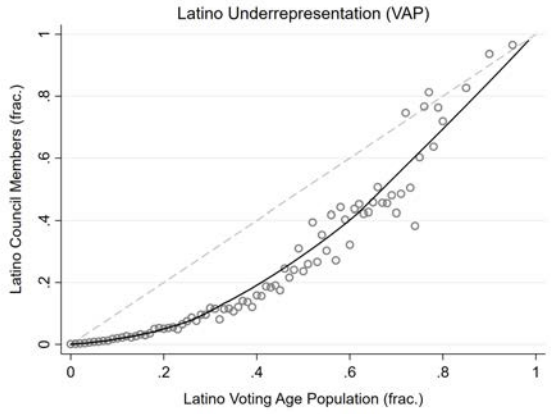
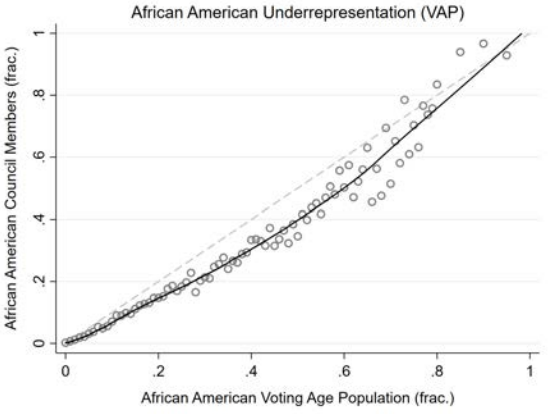


Figure A.2: Underrepresentation by Race/Ethnicity

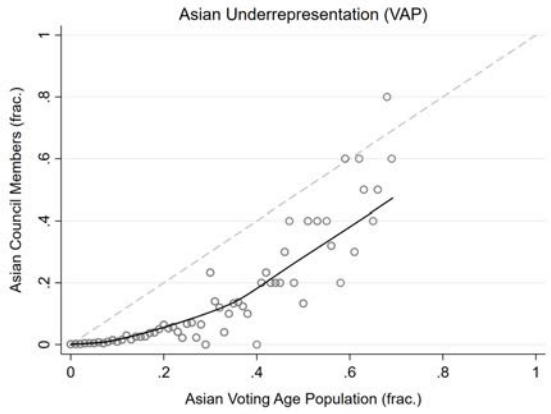
Solid lines represent LOWESS smoothings of the underlying municipality-level data. Markers represent population bins averages.



(a) Latino Underrepresentation



(b) African American Underrepresentation



(c) Asian Underrepresentation

Table A.1: Latino Underrepresentation

	(1) Latino Underrep.	(2) Latino Underrep.	(3) Latino Underrep.	(4) Latino Underrep.	(5) Latino Underrep.
Latino	1.001***	0.997***	1.127***	1.236***	1.262***
	(0.020)	(0.020)	(0.035)	(0.047)	(0.056)
Latino^2	-1.057***	-1.053***	-1.049***	-1.137***	-1.141***
	(0.036)	(0.036)	(0.085)	(0.093)	(0.093)
max	0.235***	0.234***	0.291***	0.319***	0.330***
	(0.006)	(0.006)	(0.011)	(0.011)	(0.017)
argmax	0.473***	0.474***	0.537***	0.544***	0.553***
	(0.011)	(0.011)	(0.030)	(0.028)	(0.029)
Population	VAP	VAP	VAP	VAP	VAP
Year FE	-	X	-	X	X
Municipality FE	-	-	X	X	X
Controls	-	-	-	-	X
Obs.	27,656	27,656	26,282	26,282	26,142
Municipalities	7,479	7,479	6,105	6,105	6,088
Cluster level	Municipality	Municipality	Municipality	Municipality	Municipality
Adjusted R^2	0.476	0.477	0.639	0.641	0.641

Cluster robust standard errors in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The dependent variable in all specifications is Latino underrepresentation, computed as the difference between the fraction of Latino population and the fraction of Latino council members. The main independent variables are the fraction of Latino population and its squared value. Population measures based on voting age population. The controls include the log-population, the log-median household income, and the fractions of rural, foreign, and over 65 population. For *max* and *argmax*, the standard errors in parentheses are asymptotic. Given a quadratic formula $y = ax^2 + bx + c$, the *max* is computed as $c - \frac{b^2}{4a}$, while the *argmax* is computed as $-\frac{b}{2a}$.

Table A.2: African American Underrepresentation

	(1) African American Underrep.	(2) African American Underrep.	(3) African American Underrep.	(4) African American Underrep.	(5) African American Underrep.
African American	0.395***	0.397***	1.071***	1.239***	1.283***
	(0.021)	(0.021)	(0.052)	(0.056)	(0.057)
African American^2	-0.393***	-0.393***	-1.407***	-1.535***	-1.567***
	(0.041)	(0.041)	(0.095)	(0.094)	(0.095)
max	0.100***	0.100***	0.178***	0.214***	0.225***
	(0.005)	(0.005)	(0.010)	(0.011)	(0.012)
argmax	0.503***	0.505***	0.381***	0.404***	0.409***
	(0.031)	(0.031)	(0.015)	(0.015)	(0.015)
Population	VAP	VAP	VAP	VAP	VAP
Year FE	-	X	-	X	X
Municipality FE	-	-	X	X	X
Controls	-	-	-	-	X
Obs.	27,569	27,569	26,182	26,182	26,042
Municipalities	7,479	7,479	6,092	6,092	6,075
Cluster level	Municipality	Municipality	Municipality	Municipality	Municipality
Adjusted R^2	0.120	0.124	0.418	0.429	0.432

Cluster robust standard errors in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The dependent variable in all specifications is African American underrepresentation, computed as the difference between the fraction of African American population and the fraction of African American council members. The main independent variables are the fraction of African American population and its squared value. Population measures based on voting age population. The controls include the log-population, the log-median household income, and the fractions of rural, foreign, and over 65 population. For *max* and *argmax*, the standard errors in parentheses are asymptotic. Given a quadratic formula $y = ax^2 + bx + c$, the *max* is computed as $c - \frac{b^2}{4a}$, while the *argmax* is computed as $-\frac{b}{2a}$.

Table A.3: Asian Underrepresentation

	(1) Asian Underrep.	(2) Asian Underrep.	(3) Asian Underrep.	(4) Asian Underrep.	(5) Asian Underrep.
Asian	1.014***	1.010***	1.079***	1.108***	1.096***
	(0.028)	(0.030)	(0.033)	(0.041)	(0.045)
Asian^2	-1.140***	-1.133***	-1.205***	-1.249***	-1.243***
	(0.092)	(0.094)	(0.099)	(0.106)	(0.110)
max	0.224***	0.224***	0.239***	0.243***	0.239***
	(0.013)	(0.013)	(0.014)	(0.014)	(0.014)
argmax	0.445***	0.446***	0.448***	0.443***	0.441***
	(0.029)	(0.029)	(0.029)	(0.028)	(0.028)
Population	VAP	VAP	VAP	VAP	VAP
Year FE	-	X	-	X	X
Municipality FE	-	-	X	X	X
Controls	-	-	-	-	X
Obs.	25,688	25,688	24,160	24,160	24,013
Municipalities	7,396	7,396	5,868	5,868	5,843
Cluster level	Municipality	Municipality	Municipality	Municipality	Municipality
Adjusted R^2	0.540	0.540	0.620	0.620	0.619

Cluster robust standard errors in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The dependent variable in all specifications is Asian underrepresentation, computed as the difference between the fraction of Asian population and the fraction of Asian council members. The main independent variables are the fraction of Asian population and its squared value. Population measures based on voting age population. The controls include the log-population, the log-median household income, and the fractions of rural, foreign, and over 65 population. For *max* and *argmax*, the standard errors in parentheses are asymptotic. Given a quadratic formula $y = ax^2 + bx + c$, the *max* is computed as $c - \frac{b^2}{4a}$, while the *argmax* is computed as $-\frac{b}{2a}$.

Figure A.3: Minority Underrepresentation in State Legislatures (2020)

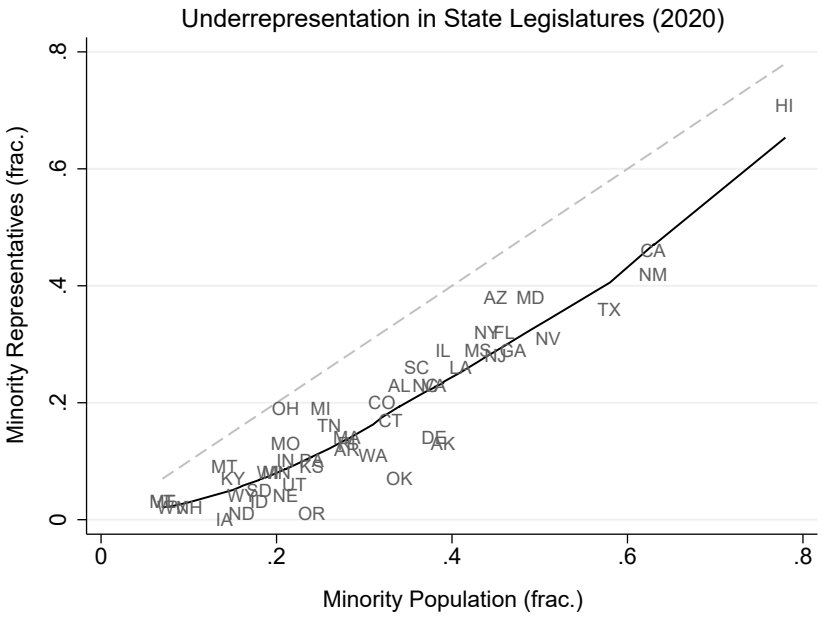


Table A.4: Latino Underrepresentation by Electoral Rule

	(1) Latino Underrep.	(2) Latino Underrep.	(3) Latino Underrep.	(4) Latino Underrep.	(5) Latino Underrep.
Latino	0.907***	0.902***	1.002***	1.107***	1.145***
	(0.035)	(0.036)	(0.043)	(0.053)	(0.061)
Latino^2	-0.973***	-0.966***	-0.876***	-0.962***	-0.978***
	(0.071)	(0.071)	(0.098)	(0.103)	(0.105)
At-Large	-0.004***	-0.004***	-0.002	-0.005***	-0.005***
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
At-Large × Latino	0.141***	0.143***	0.191***	0.193***	0.187***
	(0.042)	(0.042)	(0.047)	(0.047)	(0.048)
At-Large × Latino^2	-0.130	-0.132*	-0.217**	-0.218**	-0.206**
	(0.080)	(0.080)	(0.097)	(0.096)	(0.096)
max (SMD)	0.212***	0.211***	0.275***	0.304***	0.318***
	(0.009)	(0.009)	(0.016)	(0.016)	(0.021)
max (At-Large)	0.245***	0.244***	0.312***	0.339***	0.353***
	(0.007)	(0.007)	(0.014)	(0.014)	(0.019)
argmax (SMD)	0.466***	0.466***	0.572***	0.576***	0.586***
	(0.022)	(0.022)	(0.045)	(0.040)	(0.042)
argmax (At-Large)	0.475***	0.475***	0.546***	0.551***	0.563***
	(0.012)	(0.012)	(0.034)	(0.032)	(0.034)
Test *max* (p-value)	0.002	0.002	0.024	0.033	0.040
Test *argmax* (p-value)	0.716	0.711	0.501	0.486	0.523
Population	VAP	VAP	VAP	VAP	VAP
Year FE	-	X	-	X	X
Municipality FE	-	-	X	X	X
Controls	-	-	-	-	X
Obs.	26,498	26,498	25,100	25,100	24,963
Municipalities	7,407	7,407	6,009	6,009	5,992
Cluster level	Municipality	Municipality	Municipality	Municipality	Municipality
Adjusted R^2	0.483	0.484	0.643	0.645	0.645

Cluster robust standard errors in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The dependent variable in all specifications is Latino underrepresentation, computed as the difference between the fraction of Latino population and the fraction of Latino council members. The main independent variables are the fraction of Latino population and its squared value. Population measures based on voting age population. At-Large is an indicator for municipalities in which at least 50% of council seats are elected using an At-Large electoral rule. The controls include the log-population, the log-median household income, and the fractions of rural, foreign, and over 65 population. For *max* and *argmax*, the standard errors in parentheses are asymptotic. Given a quadratic formula $y = ax^2 + bx + c$, the *max* is computed as $c - \frac{b^2}{4a}$, while the *argmax* is computed as $-\frac{b}{2a}$.

Table A.5: African American Underrepresentation by Electoral Rule

	(1) African American Underrep.	(2) African American Underrep.	(3) African American Underrep.	(4) African American Underrep.	(5) African American Underrep.
African American	0.215***	0.220***	0.707***	0.840***	0.885***
	(0.029)	(0.029)	(0.064)	(0.067)	(0.067)
African American^2	-0.198***	-0.203***	-0.938***	-1.043***	-1.085***
	(0.054)	(0.054)	(0.112)	(0.112)	(0.113)
At-Large	-0.001	-0.001	-0.004*	-0.007***	-0.008***
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
At-Large × African American	0.340***	0.334***	0.561***	0.551***	0.549***
	(0.040)	(0.040)	(0.053)	(0.052)	(0.053)
At-Large × African American^2	-0.341***	-0.334***	-0.569***	-0.572***	-0.562***
	(0.076)	(0.076)	(0.110)	(0.107)	(0.109)
max (SMD)	0.058***	0.059***	0.110***	0.141***	0.150***
	(0.007)	(0.007)	(0.010)	(0.012)	(0.012)
max (At-Large)	0.142***	0.141***	0.239***	0.264***	0.274***
	(0.008)	(0.008)	(0.011)	(0.012)	(0.012)
argmax (SMD)	0.541***	0.541***	0.377***	0.403***	0.408***
	(0.087)	(0.085)	(0.023)	(0.023)	(0.023)
argmax (At-Large)	0.515***	0.516***	0.421***	0.431***	0.435***
	(0.035)	(0.036)	(0.019)	(0.018)	(0.018)
Test *max* (p-value)	0.000	0.000	0.000	0.000	0.000
Test *argmax* (p-value)	0.773	0.779	0.030	0.149	0.165
Population	VAP	VAP	VAP	VAP	VAP
Year FE	-	X	-	X	X
Municipality FE	-	-	X	X	X
Controls	-	-	-	-	X
Obs.	26,413	26,413	25,001	25,001	24,864
Municipalities	7,406	7,406	5,994	5,994	5,977
Cluster level	Municipality	Municipality	Municipality	Municipality	Municipality
Adjusted R^2	0.150	0.152	0.454	0.460	0.463

Cluster robust standard errors in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The dependent variable in all specifications is African American underrepresentation, computed as the difference between the fraction of African American population and the fraction of African American council members. The main independent variables are the fraction of African American population and its squared value. Population measures based on voting age population. At-Large is an indicator for municipalities in which at least 50% of council seats are elected using an At-Large electoral rule. The controls include the log-population, the log-median household income, and the fractions of rural, foreign, and over 65 population. For *max* and *argmax*, the standard errors in parentheses are asymptotic. Given a quadratic formula $y = ax^2 + bx + c$, the *max* is computed as $c - \frac{b^2}{4a}$, while the *argmax* is computed as $-\frac{b}{2a}$.

Table A.6: Asian Underrepresentation by Electoral Rule

	(1) Asian Underrep.	(2) Asian Underrep.	(3) Asian Underrep.	(4) Asian Underrep.	(5) Asian Underrep.
Asian	0.950***	0.941***	1.009***	1.054***	1.022***
	(0.041)	(0.043)	(0.057)	(0.064)	(0.077)
Asian^2	-0.728***	-0.699***	-0.918***	-1.052***	-0.898*
	(0.262)	(0.267)	(0.348)	(0.353)	(0.474)
At-Large	-0.001	-0.001	-0.001	-0.001	-0.002*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
At-Large × Asian	0.070	0.075	0.084	0.065	0.082
	(0.053)	(0.053)	(0.066)	(0.065)	(0.075)
At-Large × Asian^2	-0.434	-0.456	-0.323	-0.228	-0.374
	(0.282)	(0.284)	(0.362)	(0.358)	(0.473)
max (SMD)	0.310***	0.316***	0.275***	0.262***	0.289**
	(0.094)	(0.101)	(0.081)	(0.065)	(0.118)
max (At-Large)	0.222***	0.222***	0.238***	0.241***	0.237***
	(0.014)	(0.014)	(0.014)	(0.014)	(0.015)
argmax (SMD)	0.653***	0.673***	0.550***	0.501***	0.569**
	(0.215)	(0.235)	(0.183)	(0.144)	(0.264)
argmax (At-Large)	0.439***	0.440***	0.440***	0.437***	0.434***
	(0.031)	(0.031)	(0.030)	(0.029)	(0.029)
Test *max* (p-value)	0.357	0.359	0.645	0.751	0.656
Test *argmax* (p-value)	0.325	0.324	0.554	0.659	0.608
Population	VAP	VAP	VAP	VAP	VAP
Year FE	-	X	-	X	X
Municipality FE	-	-	X	X	X
Controls	-	-	-	-	X
Obs.	24,587	24,587	23,011	23,011	22,873
Municipalities	7,313	7,313	5,737	5,737	5,716
Cluster level	Municipality	Municipality	Municipality	Municipality	Municipality
Adjusted R^2	0.539	0.540	0.617	0.618	0.616

Cluster robust standard errors in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The dependent variable in all specifications is Asian underrepresentation, computed as the difference between the fraction of Asian population and the fraction of Asian council members. The main independent variables are the fraction of Asian population and its squared value. Population measures based on voting age population. At-Large is an indicator for municipalities in which at least 50% of council seats are elected using an At-Large electoral rule. The controls include the log-population, the log-median household income, and the fractions of rural, foreign, and over 65 population. For *max* and *argmax*, the standard errors in parentheses are asymptotic. Given a quadratic formula $y = ax^2 + bx + c$, the *max* is computed as $c - \frac{b^2}{4a}$, while the *argmax* is computed as $-\frac{b}{2a}$.

Table A.7: Fees to Run (above/below median)

	(1) Minority Underrep.	(2) Minority Underrep.	(3) Minority Underrep.	(4) Minority Underrep.	(5) Minority Underrep.
Minority	0.870***	0.839***	1.282***	1.496***	1.397***
	(0.024)	(0.024)	(0.045)	(0.067)	(0.077)
Minority^2	-0.820***	-0.788***	-1.006***	-1.140***	-1.108***
	(0.036)	(0.036)	(0.080)	(0.088)	(0.089)
Fees to run	0.006	0.002	-0.009	0.000	0.001
	(0.005)	(0.005)	(0.007)	(0.007)	(0.007)
Fees × Minority	-0.172***	-0.155***	0.077	0.022	0.025
	(0.049)	(0.049)	(0.071)	(0.072)	(0.072)
Fees × Minority^2	0.205***	0.181***	-0.172*	-0.112	-0.123
	(0.068)	(0.068)	(0.104)	(0.105)	(0.106)
max (Fees below median)	0.224***	0.221***	0.337***	0.388***	0.354***
	(0.005)	(0.005)	(0.013)	(0.016)	(0.021)
max (Fees above median)	0.198***	0.192***	0.312***	0.358***	0.326***
	(0.008)	(0.008)	(0.012)	(0.016)	(0.020)
argmax (Fees below median)	0.530***	0.532***	0.637***	0.656***	0.631***
	(0.013)	(0.013)	(0.032)	(0.029)	(0.031)
argmax (Fees above median)	0.568***	0.563***	0.577***	0.606***	0.578***
	(0.028)	(0.027)	(0.029)	(0.030)	(0.031)
Test *max* (p-value)	0.004	0.002	0.081	0.045	0.051
Test *argmax* (p-value)	0.196	0.283	0.043	0.084	0.060
Population	VAP	VAP	VAP	VAP	VAP
Year FE	-	X	-	X	X
Municipality FE	-	-	X	X	X
Controls	-	-	-	-	X
Obs.	14,843	14,843	12,530	12,530	12,401
Municipalities	6,652	6,652	4,339	4,339	4,307
Cluster level	Municipality	Municipality	Municipality	Municipality	Municipality
Adjusted R^2	0.248	0.254	0.531	0.534	0.535

Cluster robust standard errors in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The dependent variable in all specification is Minority underrepresentation, computed as the difference between the fraction of Minority population and the fraction of Minority council members. *Fees to run* is an indicator for municipalities with fees to run for council above or equal to the median. The main independent variables are the fraction of Minority population and its squared value, and their interactions. Population measures based on voting age population. The controls are the log-population, the log-median household income, and the fractions of rural, foreign, and over 65 population. For *max* and *argmax*, the standard errors in parentheses are asymptotic. Given a quadratic formula $y = ax^2 + bx + c$, the *max* is computed as $c - \frac{b^2}{4a}$, while the *argmax* is computed as $-\frac{b}{2a}$.

Table A.8: Staggered Terms

	(1) Minority Underrep.	(2) Minority Underrep.	(3) Minority Underrep.	(4) Minority Underrep.	(5) Minority Underrep.
Minority	0.612***	0.596***	1.208***	1.465***	1.371***
	(0.034)	(0.034)	(0.052)	(0.058)	(0.062)
Minority^2	-0.586***	-0.573***	-1.071***	-1.229***	-1.210***
	(0.051)	(0.050)	(0.081)	(0.082)	(0.083)
Staggered terms	-0.005*	-0.004*	-0.005	0.000	0.003
	(0.003)	(0.003)	(0.005)	(0.005)	(0.005)
Staggered × Minority	0.244***	0.235***	0.036	0.028	0.009
	(0.039)	(0.039)	(0.055)	(0.053)	(0.053)
Staggered × Minority^2	-0.182***	-0.172***	0.016	0.014	0.024
	(0.060)	(0.059)	(0.081)	(0.079)	(0.079)
max (non Staggered)	0.158***	0.155***	0.287***	0.346***	0.312***
	(0.007)	(0.007)	(0.011)	(0.013)	(0.015)
max (Staggered)	0.232***	0.228***	0.308***	0.368***	0.328***
	(0.005)	(0.005)	(0.007)	(0.009)	(0.013)
argmax (non Staggered)	0.523***	0.520***	0.564***	0.596***	0.566***
	(0.023)	(0.023)	(0.024)	(0.022)	(0.023)
argmax (Staggered)	0.557***	0.558***	0.590***	0.615***	0.582***
	(0.014)	(0.015)	(0.018)	(0.016)	(0.017)
Test *max* (p-value)	0.000	0.000	0.088	0.079	0.190
Test *argmax* (p-value)	0.190	0.158	0.263	0.392	0.447
Population	VAP	VAP	VAP	VAP	VAP
Year FE	-	X	-	X	X
Municipality FE	-	-	X	X	X
Controls	-	-	-	-	X
Obs.	27,193	27,193	25,806	25,806	25,669
Municipalities	7,444	7,444	6,057	6,057	6,041
Cluster level	Municipality	Municipality	Municipality	Municipality	Municipality
Adjusted R^2	0.273	0.278	0.496	0.502	0.503

Cluster robust standard errors in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The dependent variable in all specification is Minority underrepresentation, computed as the difference between the fraction of Minority population and the fraction of Minority council members. *Staggered* is an indicator for municipalities with staggered terms. The main independent variables are the fraction of Minority population and its squared value, and their interactions. Population measures based on voting age population. The controls are the log-population, the log-median household income, and the fractions of rural, foreign, and over 65 population. For *max* and *argmax*, the standard errors in parentheses are asymptotic. Given a quadratic formula $y = ax^2 + bx + c$, the *max* is computed as $c - \frac{b^2}{4a}$, while the *argmax* is computed as $-\frac{b}{2a}$.

Table A.9: Term Length (above/below median)

	(1) Minority Underrep.	(2) Minority Underrep.	(3) Minority Underrep.	(4) Minority Underrep.	(5) Minority Underrep.
Minority	0.834***	0.808***	1.185***	1.467***	1.359***
	(0.029)	(0.029)	(0.042)	(0.053)	(0.058)
Minority^2	-0.800***	-0.776***	-0.932***	-1.138***	-1.108***
	(0.052)	(0.052)	(0.073)	(0.077)	(0.078)
Term length	0.005**	0.004*	-0.000	0.008	0.009*
	(0.002)	(0.002)	(0.005)	(0.005)	(0.005)
Term × Minority	-0.051	-0.048	0.059	0.014	0.010
	(0.036)	(0.036)	(0.050)	(0.049)	(0.049)
Term × Minority^2	0.106*	0.103*	-0.144*	-0.080	-0.081
	(0.063)	(0.062)	(0.080)	(0.080)	(0.080)
max (Term below median)	0.210***	0.206***	0.318***	0.377***	0.337***
	(0.007)	(0.007)	(0.013)	(0.014)	(0.016)
max (Term above median)	0.218***	0.214***	0.301***	0.362***	0.324***
	(0.005)	(0.005)	(0.007)	(0.010)	(0.013)
argmax (Term below median)	0.521***	0.521***	0.636***	0.645***	0.613***
	(0.020)	(0.020)	(0.032)	(0.026)	(0.026)
argmax (Term above median)	0.565***	0.565***	0.578***	0.608***	0.576***
	(0.016)	(0.017)	(0.017)	(0.017)	(0.018)
Test *max* (p-value)	0.287	0.313	0.205	0.292	0.308
Test *argmax* (p-value)	0.088	0.091	0.062	0.164	0.136
Population	VAP	VAP	VAP	VAP	VAP
Year FE	-	X	-	X	X
Municipality FE	-	-	X	X	X
Controls	-	-	-	-	X
Obs.	26,750	26,750	25,334	25,334	25,203
Municipalities	7,411	7,411	5,995	5,995	5,980
Cluster level	Municipality	Municipality	Municipality	Municipality	Municipality
Adjusted R^2	0.262	0.268	0.499	0.505	0.506

Cluster robust standard errors in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The dependent variable in all specification is Minority underrepresentation, computed as the difference between the fraction of Minority population and the fraction of Minority council members. *Term length* is an indicator for municipalities with term length above or equal to the median. The main independent variables are the fraction of Minority population and its squared value, and their interactions. Population measures based on voting age population. The controls are the log-population, the log-median household income, and the fractions of rural, foreign, and over 65 population. For *max* and *argmax*, the standard errors in parentheses are asymptotic. Given a quadratic formula $y = ax^2 + bx + c$, the *max* is computed as $c - \frac{b^2}{4a}$, while the *argmax* is computed as $-\frac{b}{2a}$.

Table A.10: Term Limits

	(1) Minority Underrep.	(2) Minority Underrep.	(3) Minority Underrep.	(4) Minority Underrep.	(5) Minority Underrep.
Minority	0.826***	0.807***	1.305***	1.528***	1.444***
	(0.024)	(0.024)	(0.051)	(0.078)	(0.088)
Minority^2	-0.769***	-0.750***	-1.045***	-1.178***	-1.154***
	(0.037)	(0.037)	(0.088)	(0.097)	(0.099)
Term limits	-0.013*	-0.011	-0.007	-0.006	-0.007
	(0.008)	(0.007)	(0.011)	(0.011)	(0.011)
Limits × Minority	0.127	0.120	0.095	0.086	0.098
	(0.080)	(0.079)	(0.123)	(0.122)	(0.123)
Limits × Minority^2	-0.106	-0.104	-0.098	-0.081	-0.101
	(0.116)	(0.115)	(0.187)	(0.186)	(0.187)
max (no Term limits)	0.220***	0.217***	0.329***	0.382***	0.354***
	(0.005)	(0.005)	(0.013)	(0.017)	(0.021)
max (Term limits)	0.244***	0.240***	0.343***	0.398***	0.368***
	(0.011)	(0.011)	(0.022)	(0.026)	(0.027)
argmax (no Term limits)	0.537***	0.538***	0.624***	0.648***	0.626***
	(0.013)	(0.013)	(0.033)	(0.030)	(0.031)
argmax (Term limits)	0.545***	0.543***	0.612***	0.641***	0.614***
	(0.032)	(0.032)	(0.055)	(0.054)	(0.052)
Test *max* (p-value)	0.041	0.050	0.511	0.518	0.511
Test *argmax* (p-value)	0.820	0.887	0.823	0.881	0.815
Population	VAP	VAP	VAP	VAP	VAP
Year FE	-	X	-	X	X
Municipality FE	-	-	X	X	X
Controls	-	-	-	-	X
Obs.	15,170	15,170	12,785	12,785	12,644
Municipalities	6,762	6,762	4,377	4,377	4,343
Cluster level	Municipality	Municipality	Municipality	Municipality	Municipality
Adjusted R^2	0.242	0.248	0.542	0.545	0.544

Cluster robust standard errors in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The dependent variable in all specification is Minority underrepresentation, computed as the difference between the fraction of Minority population and the fraction of Minority council members. *Term limits* is an indicator for municipalities with term limits. The main independent variables are the fraction of Minority population and its squared value, and their interactions. Population measures based on voting age population. The controls are the log-population, the log-median household income, and the fractions of rural, foreign, and over 65 population. For *max* and *argmax*, the standard errors in parentheses are asymptotic. Given a quadratic formula $y = ax^2 + bx + c$, the *max* is computed as $c - \frac{b^2}{4a}$, while the *argmax* is computed as $-\frac{b}{2a}$.

Table A.11: Voters/Council Members (above/below median)

	(1) Minority Underrep.	(2) Minority Underrep.	(3) Minority Underrep.	(4) Minority Underrep.	(5) Minority Underrep.
Minority	0.806***	0.782***	1.191***	1.484***	1.390***
	(0.025)	(0.025)	(0.041)	(0.053)	(0.057)
Minority^2	-0.787***	-0.763***	-1.004***	-1.203***	-1.175***
	(0.043)	(0.042)	(0.070)	(0.075)	(0.075)
Voters/Council members (V/C)	-0.001	0.000	-0.005	0.007	0.002
	(0.002)	(0.002)	(0.004)	(0.004)	(0.005)
V/C × Minority	-0.006	-0.008	0.071	0.008	-0.014
	(0.036)	(0.036)	(0.050)	(0.050)	(0.051)
V/C × Minority^2	0.094	0.092	-0.085	-0.021	-0.021
	(0.059)	(0.058)	(0.081)	(0.081)	(0.081)
max (V/C below median)	0.202***	0.198***	0.297***	0.362***	0.335***
	(0.006)	(0.006)	(0.011)	(0.013)	(0.015)
max (V/C above median)	0.226***	0.221***	0.305***	0.367***	0.322***
	(0.006)	(0.006)	(0.007)	(0.010)	(0.013)
argmax (V/C below median)	0.512***	0.513***	0.593***	0.617***	0.592***
	(0.016)	(0.016)	(0.026)	(0.022)	(0.023)
argmax (V/C above median)	0.578***	0.577***	0.579***	0.610***	0.576***
	(0.019)	(0.019)	(0.018)	(0.017)	(0.018)
Test *max* (p-value)	0.002	0.003	0.550	0.744	0.330
Test *argmax* (p-value)	0.006	0.009	0.611	0.772	0.487
Population	VAP	VAP	VAP	VAP	VAP
Year FE	-	X	-	X	X
Municipality FE	-	-	X	X	X
Controls	-	-	-	-	X
Obs.	27,576	27,576	26,205	26,205	26,065
Municipalities	7,472	7,472	6,101	6,101	6,084
Cluster level	Municipality	Municipality	Municipality	Municipality	Municipality
Adjusted R^2	0.262	0.268	0.493	0.500	0.500

Cluster robust standard errors in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The dependent variable in all specification is Minority underrepresentation, computed as the difference between the fraction of Minority population and the fraction of Minority council members. *Voters/Council members* is an indicator for municipalities with voters/council members (in thousands) ratios above or equal to the median. The main independent variables are the fraction of Minority population and its squared value, and their interactions. Population measures based on voting age population. The controls are the log-population, the log-median household income, and the fractions of rural, foreign, and over 65 population. For *max* and *argmax*, the standard errors in parentheses are asymptotic. Given a quadratic formula $y = ax^2 + bx + c$, the *max* is computed as $c - \frac{b^2}{4a}$, while the *argmax* is computed as $-\frac{b}{2a}$.

Table A.12: Minority Underrepresentation Pre/Post Shelby (2013) - Estimates

	(1) Minority Underrep.	(2) Minority Underrep.	(3) Minority Underrep.	(4) Minority Underrep.
Minority	0.841***	0.841***	0.724***	0.724***
	(0.023)	(0.070)	(0.026)	(0.054)
Minority^2	-0.696***	-0.696***	-0.740***	-0.740***
	(0.039)	(0.061)	(0.038)	(0.046)
Covered	-0.002	-0.002	-0.014**	-0.014**
	(0.006)	(0.008)	(0.006)	(0.007)
Covered × Minority	-0.134***	-0.134	0.067	0.067
	(0.048)	(0.139)	(0.049)	(0.103)
Covered × Minority^2	-0.015	-0.015	-0.152**	-0.152
	(0.069)	(0.174)	(0.069)	(0.144)
Post	-0.003	-0.003	0.006	0.006
	(0.004)	(0.003)	(0.005)	(0.005)
Post × Minority	0.183***	0.183***	0.137***	0.137***
	(0.048)	(0.050)	(0.050)	(0.045)
Post × Minority^2	-0.293***	-0.293***	-0.265***	-0.265***
	(0.065)	(0.045)	(0.068)	(0.054)
Post × Covered	-0.008	-0.008	-0.014	-0.014
	(0.019)	(0.023)	(0.020)	(0.020)
Post × Covered × Minority	0.082	0.082	0.031	0.031
	(0.119)	(0.103)	(0.121)	(0.105)
Post × Covered × Minority^2	0.089	0.089	0.167	0.167*
	(0.142)	(0.081)	(0.143)	(0.097)
Population	VAP	VAP	VAP	VAP
Sample	Full	Full	Full	Full
Controls	-	-	X	X
Obs.	27,562	27,562	27,274	27,274
Clusters	7,470	49	7,305	49
Cluster level	Municipality	State	Municipality	State
Adjusted R^2	0.279	0.279	0.333	0.333

Cluster robust standard errors in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The dependent variable in all specifications is Minority underrepresentation, computed as the difference between the fraction of Minority population and the fraction of Minority council members. The main independent variables are the fraction of Minority population and its squared value, and the interaction terms. Population measures based on voting age population. *Covered* is an indicator for municipalities covered by the VRA at the time of Shelby. *Post* is an indicator for post-Shelby periods. The controls are the log-population, the log-median household income, and the fractions of rural, foreign, and over 65 population. For *max* and *shelby*, the standard errors in parentheses are asymptotic. Given a quadratic formula $y = ax^2 + bx + c$, the *max* is computed as $c - \frac{b^2}{4a}$, while the *shelby* is a diff-in-diffs estimate based on the *max*.

Table A.13: Minority Underrepresentation Pre/Post Shelby (2013) - Restricted (200 miles)

	(1) Minority Underrep.	(2) Minority Underrep.	(3) Minority Underrep.
Max (Pre, VRA non-covered)	0.246***	0.186***	0.187***
	(0.007)	(0.006)	(0.006)
Max (Pre, VRA covered)	0.169***	0.171***	0.159***
	(0.009)	(0.006)	(0.006)
Max (Post, VRA non-covered)	0.254***	0.199***	0.210***
	(0.010)	(0.009)	(0.009)
Max (Post, VRA covered)	0.229***	0.210***	0.222***
	(0.013)	(0.012)	(0.012)
Shelby	0.052***	0.026*	0.041***
	(0.018)	(0.015)	(0.015)
Population	VAP	VAP	VAP
Sample	Restricted (200 miles)	Restricted (200 miles)	Restricted (200 miles)
Controls	-	X	X (split)
Obs.	20,198	19,991	19,991
Clusters	5,571	5,439	5,439
Cluster level	Municipality	Municipality	Municipality

Asymptotic standard errors in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Estimates based on a sample restricted to municipalities within 200 miles from the VRA coverage border at the time of Shelby (2013). The controls are the log-population, the log-median household income, and the fractions of rural, foreign, and over 65 population, averaged over the entire sample. When split, the average controls are taken separately for covered and non-covered municipalities, pre and post Shelby (2013). Given a quadratic formula $y = ax^2 + bx + c$, the *max* is computed as $c - \frac{b^2}{4a}$, while the *shelby* is a diff-in-diffs estimate based on the *max*.

Table A.14: Minority Underrepresentation Pre/Post Shelby (2013) - Restricted (100 miles)

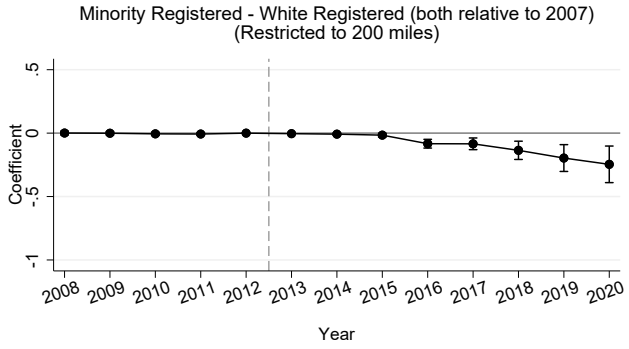
	(1) Minority Underrep.	(2) Minority Underrep.	(3) Minority Underrep.
Max (Pre, VRA non-covered)	0.234***	0.189***	0.192***
	(0.008)	(0.006)	(0.006)
Max (Pre, VRA covered)	0.192***	0.189***	0.176***
	(0.014)	(0.008)	(0.008)
Max (Post, VRA non-covered)	0.242***	0.195***	0.209***
	(0.012)	(0.012)	(0.012)
Max (Post, VRA covered)	0.251***	0.230***	0.239***
	(0.016)	(0.014)	(0.014)
Shelby	0.052**	0.034*	0.047**
	(0.022)	(0.018)	(0.018)
Population	VAP	VAP	VAP
Sample	Restricted (100 miles)	Restricted (100 miles)	Restricted (100 miles)
Controls	-	X	X (split)
Obs.	11,717	11,599	11,599
Clusters	3,174	3,104	3,104
Cluster level	Municipality	Municipality	Municipality

Asymptotic standard errors in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Estimates based on a sample restricted to municipalities within 100 miles from the VRA coverage border at the time of Shelby (2013). The controls are the log-population, the log-median household income, and the fractions of rural, foreign, and over 65 population, averaged over the entire sample. When split, the average controls are taken separately for covered and non-covered municipalities, pre and post Shelby (2013). Given a quadratic formula $y = ax^2 + bx + c$, the *max* is computed as $c - \frac{b^2}{4a}$, while the *shelby* is a diff-in-diffs estimate based on the *max*.

Figure A.4: Registration and Shelby (2013) - Restricted (200 miles)

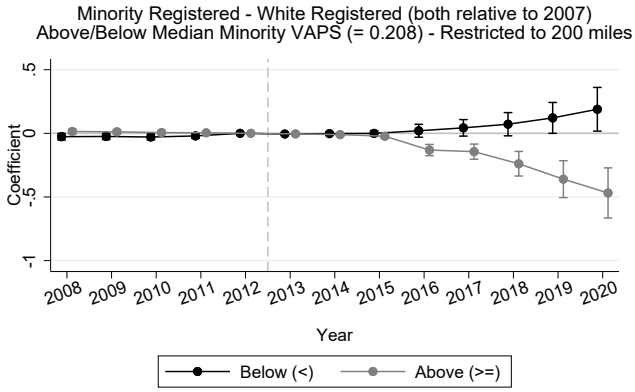
Controlling for demographic trends in Minority, White, and voting age population (relative to 2007)

(a)



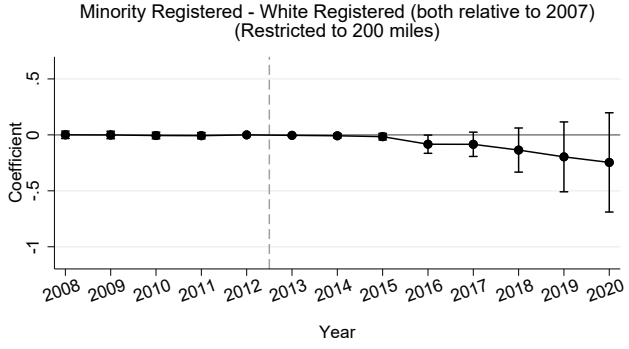
Standard errors clustered at County level. Shelby effect coefficients taking 2012 as reference period, and 95% C.I. Demographic trends for Minority, White, and voting age populations (relative to 2007) interacted by year indicators as controls. Estimates based on a sample restricted to municipalities within 200 miles from the VRA coverage border at the time of Shelby (2013).

(b)



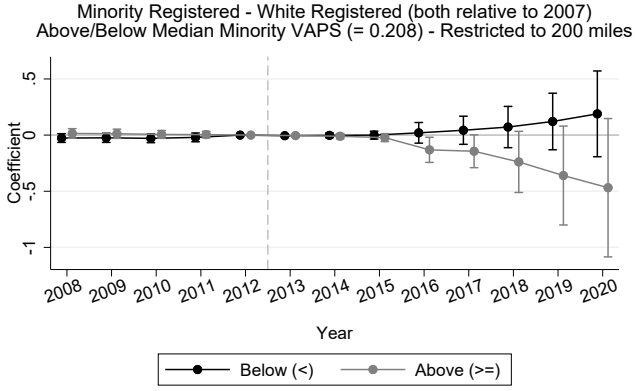
Standard errors clustered at County level. Shelby effect coefficients taking 2012 as reference period, and 95% C.I. Demographic trends for Minority, White, and voting age populations (relative to 2007) interacted by year indicators as controls. Estimates based on a sample restricted to municipalities within 200 miles from the VRA coverage border at the time of Shelby (2013).

(c)



Standard errors clustered at State level. Shelby effect coefficients taking 2012 as reference period, and 95% C.I. Demographic trends for Minority, White, and voting age populations (relative to 2007) interacted by year indicators as controls. Estimates based on a sample restricted to municipalities within 200 miles from the VRA coverage border at the time of Shelby (2013).

(d)

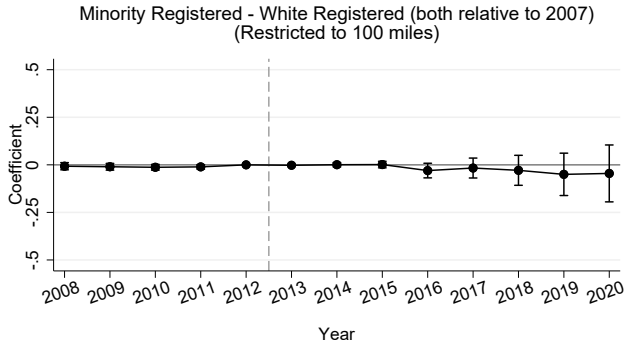


Standard errors clustered at State level. Shelby effect coefficients taking 2012 as reference period, and 95% C.I. Demographic trends for Minority, White, and voting age populations (relative to 2007) interacted by year indicators as controls. Estimates based on a sample restricted to municipalities within 200 miles from the VRA coverage border at the time of Shelby (2013).

Figure A.5: Registration and Shelby (2013) - Restricted (100 miles)

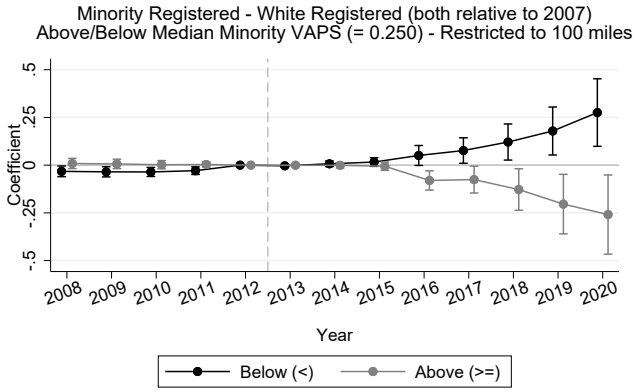
Controlling for demographic trends in Minority, White, and voting age population (relative to 2007)

(a)



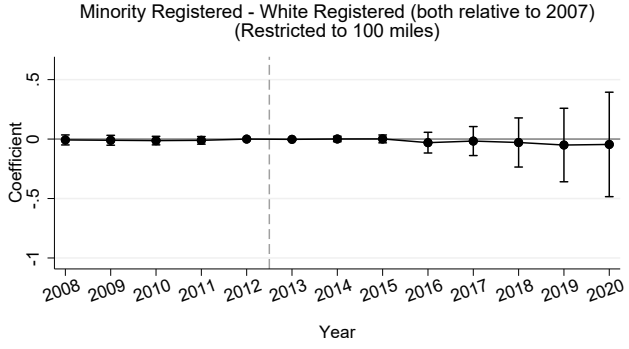
Standard errors clustered at County level. Shelby effect coefficients taking 2012 as reference period, and 95% C.I. Demographic trends for Minority, White, and voting age populations (relative to 2007) interacted by year indicators as controls. Estimates based on a sample restricted to municipalities within 100 miles from the VRA coverage border at the time of Shelby (2013).

(b)



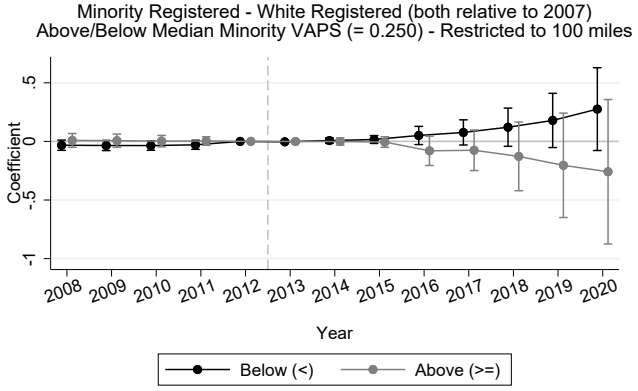
Standard errors clustered at County level. Shelby effect coefficients taking 2012 as reference period, and 95% C.I. Demographic trends for Minority, White, and voting age populations (relative to 2007) interacted by year indicators as controls. Estimates based on a sample restricted to municipalities within 100 miles from the VRA coverage border at the time of Shelby (2013).

(c)



Standard errors clustered at State level. Shelby effect coefficients taking 2012 as reference period, and 95% C.I. Demographic trends for Minority, White, and voting age populations (relative to 2007) interacted by year indicators as controls. Estimates based on a sample restricted to municipalities within 100 miles from the VRA coverage border at the time of Shelby (2013).

(d)

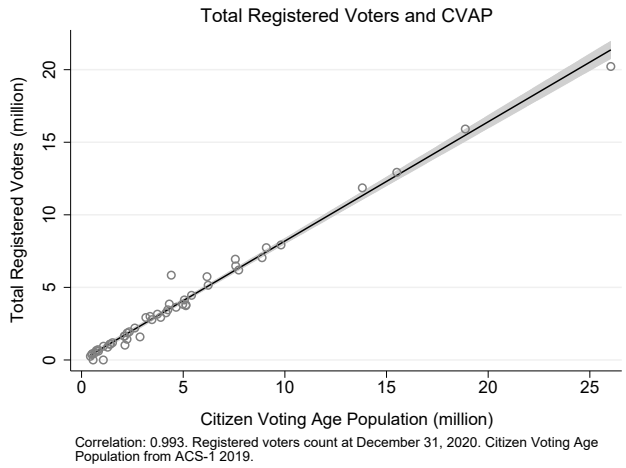


Standard errors clustered at State level. Shelby effect coefficients taking 2012 as reference period, and 95% C.I. Demographic trends for Minority, White, and voting age populations (relative to 2007) interacted by year indicators as controls. Estimates based on a sample restricted to municipalities within 100 miles from the VRA coverage border at the time of Shelby (2013).

B Validation of voter registration data

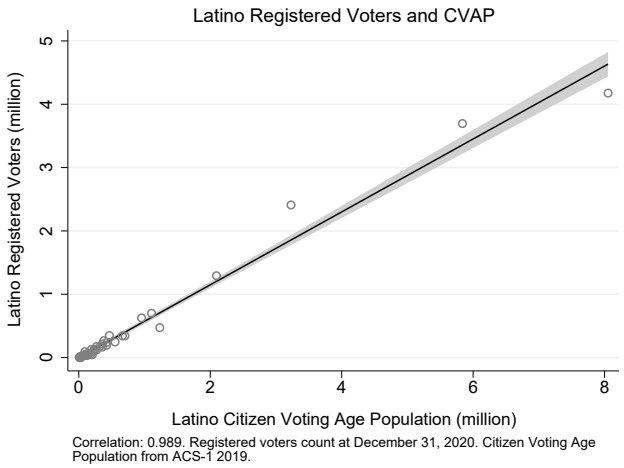
Figure B.1: Registered Voters and Citizen Voting Age Population

(a) Total



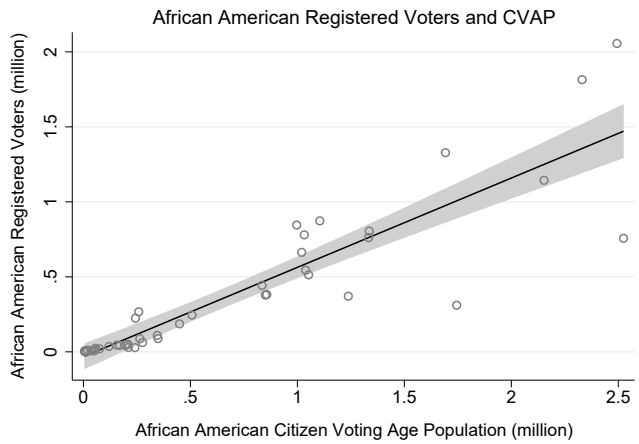
Correlation: 0.993. Registered voters count at December 31, 2020. Citizen Voting Age Population from ACS-1 2019.

(b) Latino



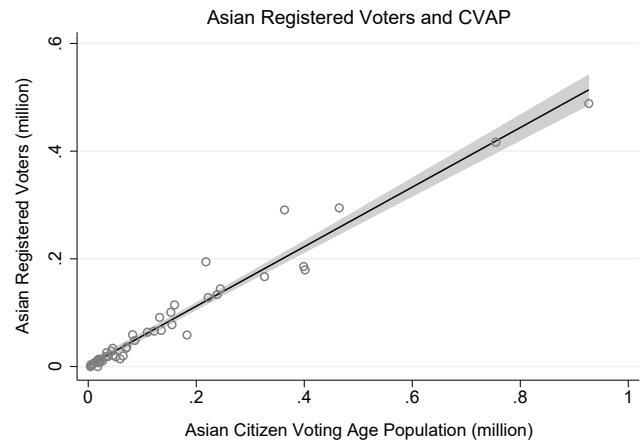
Correlation: 0.989. Registered voters count at December 31, 2020. Citizen Voting Age Population from ACS-1 2019.

(c) African American



Correlation: 0.896. Registered voters count at December 31, 2020. Citizen Voting Age Population from ACS-1 2019.

(d) Asian



Correlation: 0.983. Registered voters count at December 31, 2020. Citizen Voting Age Population from ACS-1 2019. Excluding CA for illustration purposes.

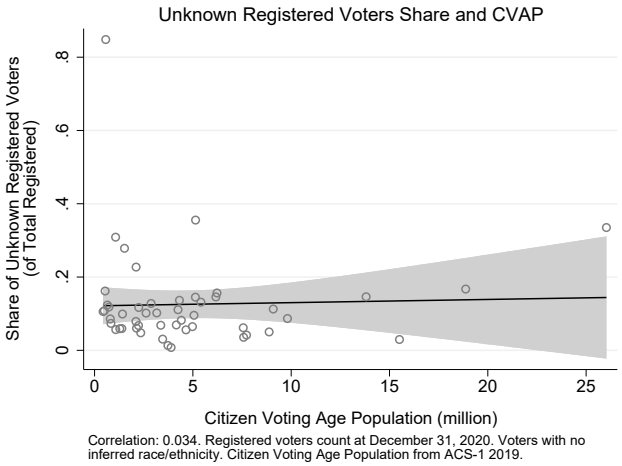
Table B.1: Registered Voters and Citizen Voting Age Population

	(1) Total Registered (mm)	(2) Latino Registered (mm)	(3) African American Registered (mm)	(4) Asian Registered (mm)
Total CVAP (mm)	0.822***			
	(0.014)			
Latino CVAP (mm)		0.576***		
		(0.012)		
African American CVAP (mm)			0.595***	
			(0.044)	
Asian CVAP (mm)				0.385***
				(0.011)
Obs.	49	49	47	48
Adjusted R^2	0.986	0.978	0.798	0.965

Standard errors in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. State-level data. Registered voters count at December 31, 2020. Citizen Voting Age Population (CVAP) from ACS-1 2019.

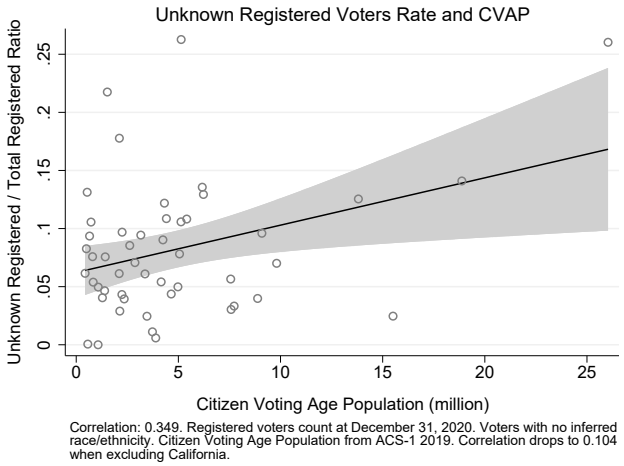
Figure B.2: Unknown Registered Voters and CVAP

(a) Unknown Share



Correlation: 0.034. Registered voters count at December 31, 2020. Voters with no inferred race/ethnicity. Citizen Voting Age Population from ACS-1 2019.

(b) Unknown Rate



Correlation: 0.349. Registered voters count at December 31, 2020. Voters with no inferred race/ethnicity. Citizen Voting Age Population from ACS-1 2019. Correlation drops to 0.104 when excluding California.

Table B.2: Registered Voters and CVAP Shares

	(1) Registered	(2) CAVP	(3) Registered (known only)	(4) CVAP (no other)
Averages across States:				
Latino	0.056	0.087	0.067	0.090
African American	0.078	0.120	0.086	0.122
Asian	0.017	0.029	0.020	0.029
White	0.723	0.741	0.827	0.764
Unknown/Other	0.126	0.022		
National level:				
Latino	0.092	0.131	0.105	0.134
African American	0.086	0.129	0.099	0.132
Asian	0.027	0.045	0.031	0.046
White	0.669	0.672	0.765	0.688
Unknown/Other	0.126	0.033		

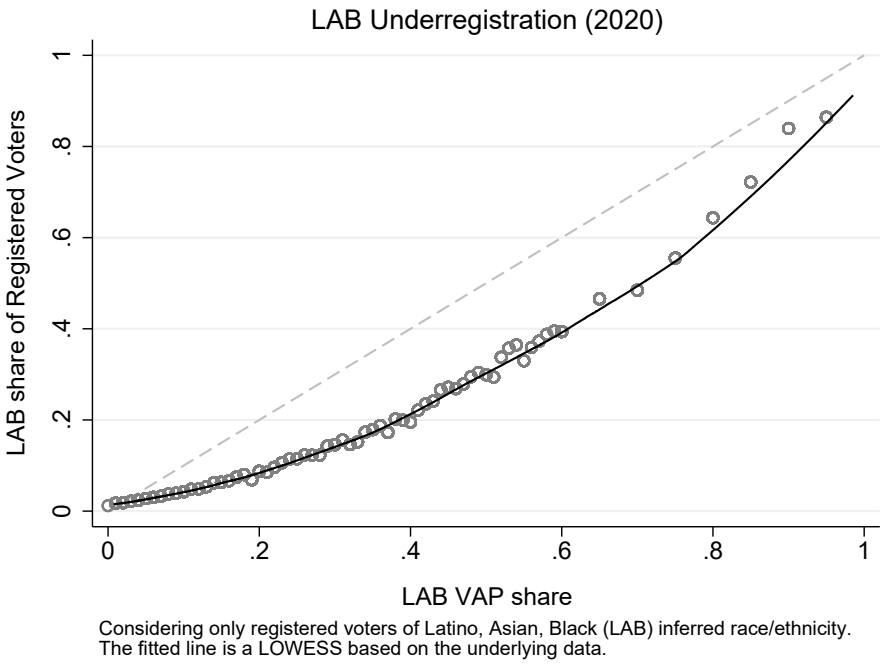
State-level data. Registered voters count at December 31, 2020. Citizen Voting Age Population (CVAP) from ACS-1 2019. For registered voters, *unknown* means with no inferred race/ethnicity information. For CVAP, *other* means a race/ethnicity other than the ones explicitly reported in the table.

Table B.3: Average Registration Rates

	(1) Latino	(2) African American	(3) Asian	(4) White
Average Registration Rate	0.472	0.445	0.529	0.771
National level	0.571	0.546	0.493	0.813

Average of *Registration Rate* as ratio of number of registered voters to citizen voting age population for a given race/ethnicity. State-level data. Registered voters count at December 31, 2020. Citizen Voting Age Population (CVAP) from ACS-1 2019.

Figure B.3: LAB Underregistration



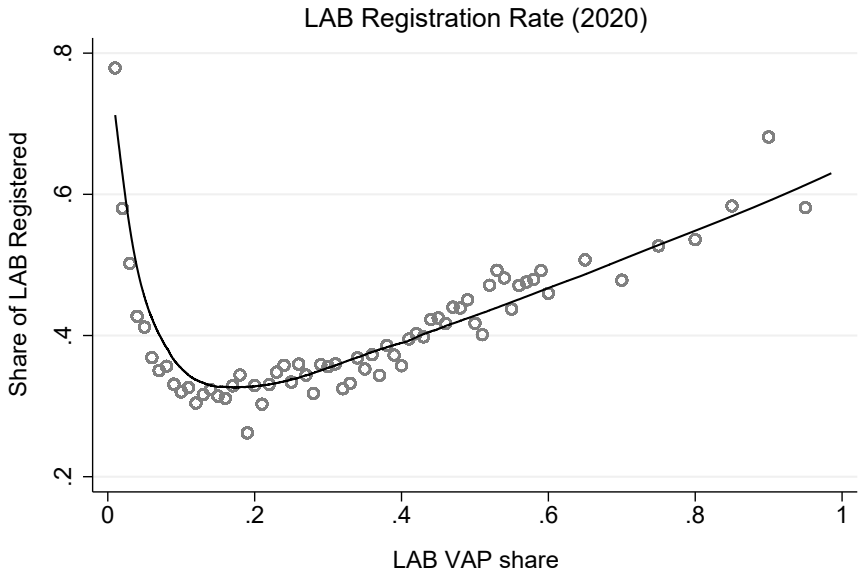
Considering only registered voters of Latino, Asian, Black (LAB) inferred race/ethnicity.
The fitted line is a LOWESS based on the underlying data.

Table B.4: LAB Underregistration

	(1) LAB Underreg.	(2) LAB Underreg.	(3) LAB Underreg.
LAB	0.778***	0.929***	0.824***
	(0.015)	(0.015)	(0.018)
LAB^2	-0.670***	-0.825***	-0.804***
	(0.021)	(0.018)	(0.019)
max	0.213***	0.228***	0.203***
	(0.003)	(0.003)	(0.003)
argmax	0.581***	0.564***	0.512***
	(0.009)	(0.006)	(0.006)
Population	VAP	VAP	VAP
Year	2020	2020	2020
State FE	-	X	X
Controls	-	-	X
Obs.	6,436	6,435	6,435
Adjusted R^2	0.430	0.680	0.711

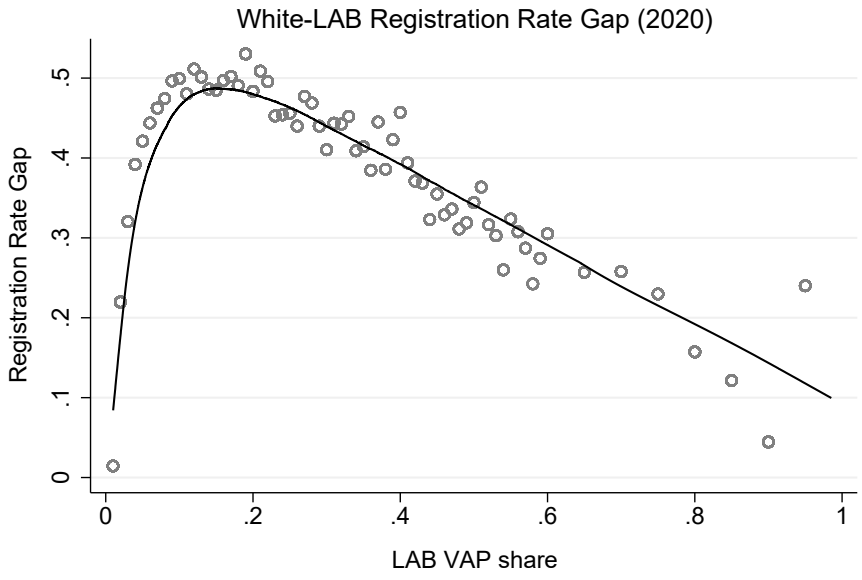
Robust standard errors in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Considering only registered voters of Latino, Asian, African American (LAB) inferred race/ethnicity. The dependent variable in all specifications is LAB underregistration, computed as the difference between the fraction of LAB population and the LAB fraction of registered voters. The main independent variables are the fraction of LAB population and its squared value. Population measures based on voting age population. When included, the controls are the log-population, the log-median household income, and the fractions of rural, foreign, and over 65 population. For *max* and *argmax*, the standard errors in parentheses are asymptotic. Given a quadratic formula $y = ax^2 + bx + c$, the *max* is computed as $c - \frac{b^2}{4a}$, while the *argmax* is computed as $-\frac{b}{2a}$.

Figure B.4: LAB Registration Rate



Sample restricted to VAP share >= 0.01. Considering only registered voters of Latino, Asian, Black (LAB) inferred race/ethnicity. The fitted line is a LOWESS based on the underlying data.

Figure B.5: LAB Registration Gap

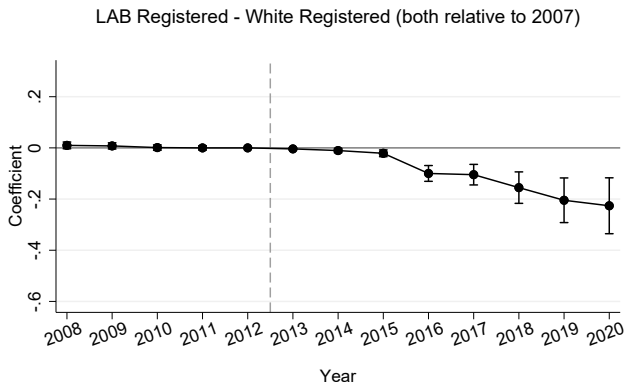


Sample restricted to VAP share >= 0.01. Considering only registered voters with inferred race/ethnicity of White, and Latino, Asian, Black (LAB). The fitted line is a LOWESS based on the underlying data.

Figure B.6: LAB Registration and Shelby (2013)

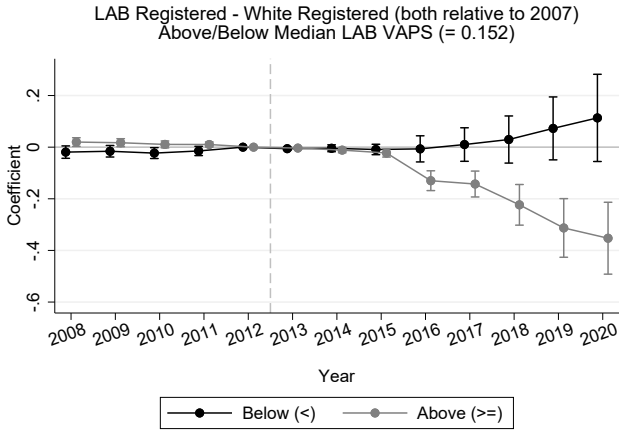
Controlling for demographic trends in LAB, White, and voting age population (relative to 2007)

(a)



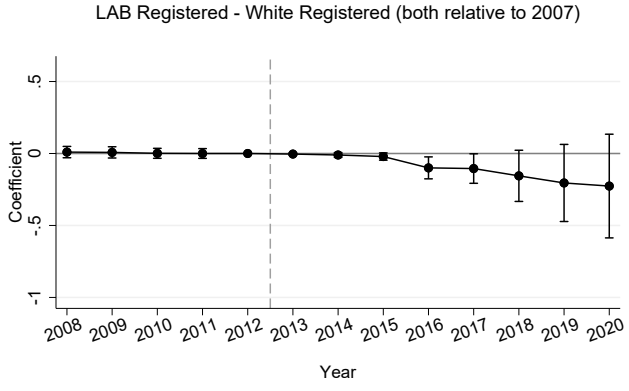
Standard errors clustered at County level. Demographic trends for LAB, White, and voting age populations (relative to 2007) interacted by year indicators as controls.

(b)



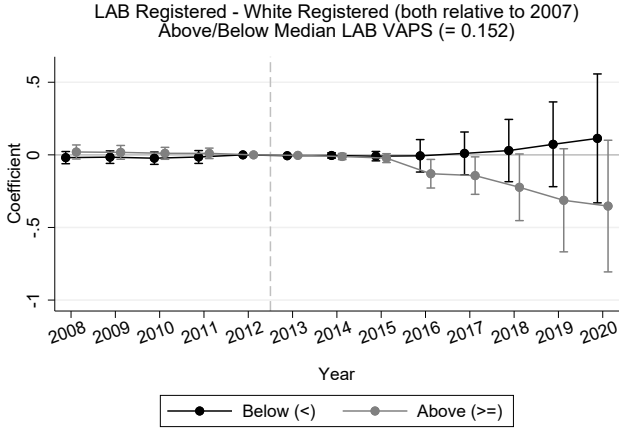
Standard errors clustered at County level. Demographic trends for LAB, White, and voting age populations (relative to 2007) interacted by year indicators as controls.

(c)



Standard errors clustered at State level. Demographic trends for LAB, White, and voting age populations (relative to 2007) interacted by year indicators as controls.

(d)



Standard errors clustered at State level. Demographic trends for LAB, White, and voting age populations (relative to 2007) interacted by year indicators as controls.