Appendix A

Due to slight imbalances in the matched treatment and control groups, we conduct a post-match ordinary least squares regression analysis with the following form:

$$Y = \beta_0 + \beta_1 \times [Treatment] + \beta_k \times X_k + \varepsilon, \tag{5}$$

where Y = the change in percent of the city council that is White, Treatment is a vector of 0s and 1s (0 indicating control and 1 indicating treatment), and X_k a matrix of control variables.

Table A1 estimates the treatment effect – shifting from at-large to district-based elections – on minority city council representation, with covariate controls. Tables A2 estimates a model with "year switched" fixed-effects. Table A3 estimates a model with a covariate for number of city council seats.

Table A1: Effect of CVRA on Percent White Change in City Council

	% White Change
Treatment	−0.117**
	(0.049)
% Black	−0.013
	(0.008)
% Asian	0.006
	(0.005)
% Hispanic	0.0004
	(0.003)
% Democratic	−0.005
	(0.011)
% Republican	−0.003
	(0.011)
Immigration Public Opinion	1.668
	(1.024)
Racial Resentment Public Opinion	−0.668
	(1.100)
Percent Latino Change	0.487
	(0.330)
% BA or Higher	−0.004
	(0.005)
Median Income	−0.00000
	(0.00000)
Median Age	0.010
	(0.011)
City Size	0.043
	(0.030)
Constant	−0.670
	(1.065)
N	60
R-squared	0.328
Adj. R-squared	0.139

***p < .01; **p < .05; *p < .1

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Table A2: Effect of CVRA on Percent White Change in City Council (Treatment Election Fixed Effect)

	% White Change
Treatment	−0.117**
	(0.051)
% Black	−0.013
	(0.009)
% Asian	0.006
	(0.005)
% Hispanic	0.0002
	(0.003)
% Democratic	−0.006
	(0.012)
% Republican	−0.005
	(0.012)
Immigration Public Opinion	1.608
	(1.143)
Racial Resentment Public Opinion	−0.588
	(1.200)
Percent Latino Change	0.486
	(0.367)
% BA or Higher	−0.003
	(0.006)
Median Income	−0.00000
	(0.00000)
Median Age	0.010
	(0.012)
City Size	0.040
	(0.034)
Treatment Election = 2014	−0.023
	(0.170)
Treatment Election = 2016	−0.032
	(0.167)
Treatment Election = 2017	−0.085
	(0.242)
Treatment Election = 2018	−0.024
	(0.156)
Constant	−0.562
	(1.212)
N	60
R-squared	0.331
Adj. R-squared	0.060

***p < .01; **p < .05; *p < .1

Table A3: Effect of CVRA on Percent White Change in City Council (Number of Seats on Council)

	% White Change
Treatment	−0.126**
	(0.049)
% Black	−0.015*
	(0.008)
% Asian	0.008*
	(0.005)
% Hispanic	−0.001
	(0.003)
% Democratic	−0.002
	(0.011)
% Republican	−0.002
	(0.010)
Immigration Public Opinion	1.288
	(1.041)
Racial Resentment Public Opinion	−0.415
	(1.098)
Percent Latino Change	0.528
	(0.326)
% BA or Higher	−0.002
	(0.005)
Median Income	−0.00000
	(0.00000)
Median Age	0.009
	(0.011)
City Size	0.046
	(0.030)
Number of Seats	−0.075
	(0.049)
Constant	−0.270
	(1.083)
N	60
R-squared	0.361
Adj. R-squared	0.162

***p < .01; **p < .05; *p < .1

Appendix B

H-Index Scale Measure of Segregation

We did not include a segregation measure in our initial match because city-level segregation proves less reliable with smaller cities. For instance, fully eight of our treated cities had fewer than five Census tracts. Further, 209 of the 476 cities in our city-level dataset have fewer than five Census tracts. By excluding all of these cities from the initial match we would be biasing our match and therefore interpretation of results in favor of larger cities.

Nonetheless, to begin to assess whether segregation effects our outcome measure, we calculated a measure of segregation for each city in our treatment and control that had five or more Census tracts, post-match. The treated cities excluded from this analysis are: Yucaipa, Wildomar, Sanger, Patterson, Los Banos, King City, East Vale, and Dixon. The control cities excluded from this analysis are: Wheatland, Waterford, Tulelake, Taft, Shafter, Orange Cove, Newman, McFarland, Grand Terrace, and Fowler.

The measure of segregation used is called the H-index, originally developed by Henri Theil. This is an important measure to take into account because highly segregated cities may result in greater minority representation post switch due to an ability to generate majority-minority districts.

The H-index measures how much racial diversity in each city neighborhood varies relative to the total city. For each city in California with five or more Census tracts (roughly 40-45,000 people), we collected tract-level data on racial characteristics. These data were then fed into the following algorithm using the HTheil function in R (Tivadar 2014). The resulting output is a city-level diversity/segregation index for White/non-White measure of segregation (to match our outcome variable), which we then add on to our original city-level data. We also include White (Anglo)/Hispanic. The equation below represents the H-Index:

$$H = \sum_{n=1}^{N} \frac{P_n}{P_c} \left(\frac{E_c - E_n}{E_c} \right),$$

(6)

where P is the population of neighborhood n or city c, and E is the entropy of said neighborhood or city. Theil's entropy score is thus defined:

$$E = \sum_{r=1}^{R} (\pi_r) ln \frac{1}{\pi_r},$$

(7)

where π_r is the population proportion of each racial group r within a geographical unit.

The H-index ranges from 0-1 where 0 equals very diverse (neighborhoods look like the city as a whole) and 1 very segregated (neighborhoods are completely racially homogeneous). Our matched treatment and control White/non-White H-index ranges from 0.0094 - 0.1616, $\mu = 0.072$, $sd = 0.0396$, whereas the Anglo/Hispanic H-index ranges from 0.0132 - 0.2149 ($mu = 0.092$, $sd = 0.05$).

Analysis including H-Index

With these data, we regressed all original independent variables, plus the new segregation measure onto change in city council treatment.[23] We employ both White/non-White and Anglo/Hispanic in separate models. In these segregation-augmented models (Columns 1 and 3 in Table B1), we find that our treatment covariate is negative and statistically significant, whereas our segregation measure (H-Theil) is not statistically significant. These results further confirm the original presented results that the CVRA produced a statistically and substantively significant increase in minority representation on local city councils – even when taking segregation into account.

Further, we specified two models – presented in Columns 2 and 4 – that interact segregation by treatment, to test the hypothesis that city council minority representation is more likely to occur in highly segregated cities that switch from at-large to single member district. The lack of statistical significance on the product terms in both models suggest that city-level segregation on its own may play a limited role in the redistricting process. While this is worthy of further research, it may be that even when more segregated cities change, those who are charged with drawing districts are able to do so in a way that potentially cracks highly segregated areas.

Table B1: Effect of CVRA on Percent White Change in City Council (Segregation Index)

| | | | % White Change | |
| | H-Index Base | H-Index Int. | H-Index Hispanic Base | H-Index Hispanic Int. |
	Model 1	Model 2	Model 3	Model 4
Treatment	−0.193***	−0.126	−0.193***	−0.105
	(0.069)	(0.137)	(0.068)	(0.134)
% Black	−0.003	−0.002	−0.003	−0.0001
	(0.010)	(0.010)	(0.010)	(0.011)
% Asian	0.008	0.008	0.008	0.008
	(0.006)	(0.006)	(0.006)	(0.006)
% Hispanic	0.004	0.004	0.004	0.004
	(0.004)	(0.004)	(0.004)	(0.004)
% Democratic	−0.027	−0.027	−0.027	−0.028
	(0.017)	(0.018)	(0.017)	(0.017)
% Republican	−0.020	−0.020	−0.020	−0.021
	(0.016)	(0.016)	(0.016)	(0.016)
Immigration Public Opinion	3.141**	2.883*	3.124**	2.861*
	(1.433)	(1.521)	(1.426)	(1.478)
Racial Resentment Public Opinion	−2.107	−2.043	−2.062	−2.095
	(1.598)	(1.622)	(1.599)	(1.612)
Percent Latino Change	0.578	0.549	0.592	0.561
	(0.465)	(0.474)	(0.467)	(0.473)
% BA or Higher	0.003	0.003	0.003	0.004
	(0.007)	(0.007)	(0.007)	(0.007)
Median Income	−0.00001	−0.00001	−0.00001	−0.00001*
	(0.00000)	(0.00000)	(0.00000)	(0.00000)
Median Age	0.015	0.015	0.014	0.016
	(0.013)	(0.014)	(0.013)	(0.013)
City Size	0.057	0.060	0.056	0.062
	(0.039)	(0.040)	(0.039)	(0.040)
H-Theil White-Non-White Index	0.290	0.899		
	(0.829)	(1.360)		
Treatment X H-Theil White-Non-White Index		−1.010		
		(1.773)		
H-Theil White/Anglo-Hispanic Index			0.240	0.725
			(0.622)	(0.892)
Treatment X H-Theil White/Anglo-Hispanic Index				−0.983
				(1.288)
Constant	0.354	0.397	0.344	0.443
	(1.595)	(1.617)	(1.594)	(1.612)
N	42	42	42	42
R-squared	0.517	0.523	0.518	0.528
Adj. R-squared	0.267	0.248	0.268	0.256

***p < .01; **p < .05; *p < .1

Appendix C

Table C1: Difference in difference parallel trends assumption testing changes in percent white on city council in two pre-treatment time periods. (Robust clustered standard errors).

| | Pct. White Change T-1 to Pre | Pct. White Change T-2 to T-1 |
	Model 1	Model 2
Treatment	0.062	0.053
	(0.065)	(0.068)
Time	−0.007	0.007
	(0.015)	(0.026)
Treatment X Time	−0.023	0.009
	(0.025)	(0.036)
Constant	0.760***	0.753***
	(0.048)	(0.055)
N	119	118
R-squared	0.011	0.013
Adj. R-squared	−0.015	−0.013
Chi-square (df = 3)	1.278	1.520

***p < .01; **p < .05; *p < .1

Table C2: Predicting treatment from observable covariates.

	% White Change
% Black	−0.073
	(0.092)
% Asian	0.028
	(0.055)
% Hispanic	0.001
	(0.033)
% Democratic	−0.064
	(0.128)
% Republican	−0.075
	(0.123)
Immigration Public Opinion	−11.820
	(12.107)
Racial Resentment Public Opinion	17.954
	(12.973)
Percent Latino Change	2.242
	(3.778)
% BA or Higher	−0.0002
	(0.061)
Median Income	−0.00002
	(0.00003)
Median Age	−0.019
	(0.121)
City Size	0.284
	(0.349)
Constant	5.044
	(12.317)
N	60
Log Likelihood	−38.687
AIC	103.374

***p < .01; **p < .05; *p < .1

Appendix D

In deciding which cities to target with letters, our research found that lawyers weigh the presence of racially polarized voting (RPV) in deciding whether to threaten a city with a lawsuit. Given the data constraints regarding the statistical analysis of RPV, it is not possible to estimate racially polarized voting for every single treatment and control city in our data – thus we did not include estimates of city RPV in our initial match.

However, to begin to test this potential confounder, we subset our data to cities that, along with their match, have more than n=40 precincts,[24] and estimate RPV using ecological inference techniques available in the R package, eiCompare (Barreto et al. 2019; Collingwood et al. 2016). From the California statewide database,[25] we gathered precinct-level candidate vote data, and cross-walked this with racial demographic data at the block level from the 2010 U.S. Census.

To estimate the presence of RPV, we focus on the 2012 presidential election, which featured a Black versus White candidate – a Black candidate with broad minority support at the national level.[26] Focusing on the Obama-Romney 2012 election is practical and relatively comparable across cities. The alternative is gathering city-level election data that may feature non-comparable candidates across cities, making ecological inference cross-treatment group more challenging to interpret. Due to statistical limitations, and the fact that Latinos are the largest minority group in each of our cities, we focus on Latino vs. non-Latino in estimating the presence of RPV, where non-Latino is primarily comprised of White voters.

Our goal is to assess whether RPV exists in both treatment and control cities. If, for instance, RPV exists in treatment cities but not control, our treatment effect estimates may be a result of Latinos in control cities simply continuing to prefer White candidates (or White-backed). Here, we seek to rule out this possible confounder.

Table D1 presents mean RPV estimates across the treatment and control cities analyzed. The table shows the presence of RPV in both city groups. Cities in the treatment group reveal clear racially polarized voting, with Latinos favoring Obama 78% to 22%, a difference of 56%. Non-Latinos (White) in the treatment favor Romney 76% - 24% – a difference of 52%. In the control, the numbers are similar, with Latinos favoring Obama 77%-23%, a difference of 54%. Non-Latinos (Whites) favor Romney 65% - 35%, a difference of 30%. While RPV appears a bit higher in treatment cities, analysts would conclude clear RPV in both treatment and control cities.

Other facts, such as demographic considerations, that lawyers used to determine city selection were either controlled for in the match or addressed elsewhere. One fact mentioned by Kevin Shenkman's office was the diversity of the city council at the time. We performed a t-test to compare the percent of White members on the city council during the treatment year. This proved statistically insignificant (p=0.595), with the control having an average of 0.75 percent and the treatment an average of 0.79.

Table D1: Racially Polarized Voting (RPV) means between treatment and control cities with cities (and their match) over population size n=40 precincts

	Treatment		Control
	Non Latino	Latino	Non Latino
Latino Obama			23.63
	78.12	34.93	76.93

 Rom