

Examining a Racial Turnout Gap in the Transition to Vote Centers

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We examine the location of vote centers and their association with voter turnout in Fresno County, CA, and St. Louis County, MO. Fresno County adopted vote centers in 2020 in compliance with requirements of the California Voter Choice Act, while St. Louis County implemented vote centers in 2020 without any state guidance. The tradeoff with vote centers is allowing voters to cast their ballot at any location, with a substantial decline in the number of polling places (which we observe in both counties). Based on voter file data and the geocoded locations of past and present voting locations, in each county we find that losing a nearby polling place is associated with a 1 percentage-point decline in turnout. Hosting a nearby vote center or drop box is associated with a similar boost in turnout. In St. Louis County, we also analyze whether these estimated voting location effects on turnout vary by voter race. These are important findings given the increasing number of jurisdictions considering vote centers, in response to budget pressures and the COVID-19 pandemic.

Keywords: vote centers, election administration, polling places, voter turnout

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Introduction

We examine locations and turnout at vote centers in two local jurisdictions, Fresno County, California, and St. Louis County, Missouri. At least eighteen states allow local jurisdictions to adopt vote centers, a system with fewer polling locations that allows voters to cast their ballots at any location. The COVID-19 pandemic and financial pressures have accelerated the trend toward polling place consolidation, particularly in heavily populated counties (Persily and Stewart, 2021; Manion et al., 2022), and vote centers appear to be an appealing solution.

The two cases for our study are similar in population, and both adopted vote centers in 2020, during the pandemic. However, Fresno County is engaged in more of a top-down process of implementation, while St. Louis County is more of a bottom-up case. Fresno County, like several other California counties, adopted vote centers in compliance with the state's Voter Choice Act (VCA), which includes clear requirements for voter outreach, number of voting locations and their accessibility, among other things. Meanwhile, St. Louis County was the first county in Missouri to implement vote centers, and did so without any state requirements or guidelines, as Missouri law says nothing about vote centers. Thus, St. Louis County is making decisions based on their own expertise and resources, a bottom-up approach. Our research questions focus on the impacts of polling place consolidation and vote center location on voter turnout, particularly for disparate communities.

Both jurisdictions in our study made serious efforts to distribute voting locations equitably, although the legacy of residential segregation complicates these efforts in St. Louis County. In the 2022 midterm election, we find that losing a nearby polling place is

associated with a one percentage-point decline in turnout. However, hosting a neighborhood vote center or drop box is associated with an increase in turnout. For Black voters in St. Louis County, the transition to vote centers is not as positively associated with voter turnout as for voters of other races. Different groups of voters may experience vote centers, or other election reforms, in different ways.

Background on Vote Centers

A growing body of research assesses the performance of vote centers. Some find positive voter evaluations of vote centers (Stein and Vonnahme 2014; Folz 2014; Scheele et al. 2009; Bryant et al., 2024). However, in some cases the implementation of vote centers has been flawed (Montjoy, 2008). In Harris County, Texas vote center voters reported a less positive experience, including longer lines and less helpful poll workers (Chen et al., 2021). Research in California finds that voters of color were less likely to be aware of new voting options associated with vote centers (Romero and Chami, 2022). Thus, some of the research points to disparities in voter knowledge and experience with vote centers, which indicates that targeted outreach to underrepresented communities is important. Overall, the mixed results indicate that local implementation of vote centers is critical in producing positive results.

Adopting vote centers typically means reducing the number of voting locations, which tends to lower voter turnout (Tomkins et al. 2022; Bitzer et al. 2023). Nevertheless, previous research also yields somewhat mixed results on the impact of vote centers on voter turnout. Some research finds that the added convenience of voter centers increases turnout (Stein and Vonnahme, 2008, 2012; Bryant, 2019; McGhee et

al., 2019). Cortina and Rottinghaus (2019) also find a modest turnout increase in vote centers, but only in low turnout, off-cycle elections. A study in California also finds that vote center voters traveled further to cast their ballots than voters at traditional polling places (Romero et al., 2019). Other studies, examining Indiana counties and a southern municipal election, find no effect of vote centers on voter turnout (Folz, 2014; Scheele et al., 2009). Overall, the impact of vote centers on turnout tends to be modest.

While efforts to examine polling place locations are growing (Shepherd et al. 2021), there is less research on the differential local impact of vote centers on voter turnout. For some voters, the adoption of vote centers means the loss of a neighborhood polling place, and the need to find a more distant location or an alternative method of casting a ballot. Changing polling place assignments or increasing the distance to a voting location tends to reduce voter turnout (e.g., Gimpel and Schuknecht, 2003; Haspel and Knotts, 2005; Brady and McNulty, 2011; Tomkins et al. 2022; Bitzer et al. 2023). Other voters may benefit if a vote center is located near their home. A recent study identifies many “turnout deserts” (local communities with low turnout) in the United States, particularly in minority neighborhoods (Barber and Holbein, 2022). Are minority neighborhoods more likely to lose polling places after the transition to vote centers? Does voter turnout decline after the transition in neighborhoods that lose local polling places? In a Texas study, rural and Latino voters saw travel distances increase in order to vote at vote centers, which reduces turnout for some voters in midterm elections, but not in presidential elections (Cortina and Rottinghaus, 2021). Research on the impact of the VCA in California also examines the impact on turnout for young voters and different racial and ethnic groups (e.g., McGhee

et al., 2019; Romero, Meier, and Pavia, 2022). Lower turnout rates among Latino voters persisted in California counties that adopted VCA reforms (Romero et al. 2022). There is more to learn about the local impact of adopting vote centers.

The Move to Vote Centers in Fresno County and St. Louis County

Fresno County and St. Louis County are similar jurisdictions in population and the time of adopting vote centers. However, the two counties differ in terms of geography, the state regulatory environment, the number of poll workers and polling places, and the use of vote-by-mail options.¹ Table 1 provides a comparison of the two jurisdictions in 2018 (before the adoption of vote centers) and 2022 (after adoption). The table shows a significant drop in Election Day polling locations after transition to vote centers. Although the populations are similar, St. Louis County had over four times as many polling places on election day in 2022 (after the implementation of vote centers) and more than six times the number of poll workers as compared to Fresno County. A notable reason for this disparity is the use of absentee/vote-by-mail (VBM) is much higher in Fresno County, leading to far fewer election day voters in that county. Even before the VCA, California allowed no-excuse absentee voting and permanent absentee voting, while Missouri requires voters to provide an excuse for voting absentee by mail and requires most mail ballots to be notarized. Fresno County also covers a geographic area ten times larger than St. Louis County. As we note below, most Fresno County residents live in and around the central city of Fresno, with large swaths of land to the

¹ While the counties have roughly the same population size, the number of registered voters is significantly higher in St. Louis County with roughly 645,000 registered voters compared to approximately 455,600 in Fresno County. This is likely due to the number of eligible voters in the population. Fresno has a large immigrant population, including a large number of undocumented residents.

east and west of the city containing relatively few people. As a suburban jurisdiction, St. Louis County is more densely populated than Fresno County. These features influence decisions by local election officials about voting locations.

St. Louis County's implementation of vote centers is a unique case. Other states with vote centers, like California, have passed laws to mandate them or allow local jurisdictions to adopt them. Missouri law says nothing about vote centers, but St. Louis County determined that state law also does not prohibit vote centers. Missouri law requires all registered voters to be assigned to a polling place, but it does not require people to vote at their assigned polling place (Missouri Revised Statutes, 115.115). In addition, other states that have adopted vote centers have simultaneously introduced other convenience measures, particularly early in-person voting or voting by mail (or both). Missouri generally does not have those other convenience options, although the state adopted a two-week early in-person voting period in time for the November 2022 election. In any case, St. Louis County is the only jurisdiction in Missouri to implement vote centers, and the county did so largely on its own, without new legislation or guidance from the state. Since the VCA has specific requirements about vote centers, including consulting community groups in selecting locations, while Missouri law says nothing about these matters, (H1) *we hypothesize that Fresno County will produce a more equitable distribution of voting locations than St. Louis County.*

Table 1. Transition in Election Administration from 2018 to 2022

	Fresno County, CA		St. Louis County, MO	
Election Year	2018	2022	2018	2022
ED polling places	268	53 (+68 drop boxes)	411	239
Poll workers	1600	400	3,439	2,753
Turnout	256,972 36.8% of VAP 56.4% of RV	221,419 28.4% of VAP 44.3% of RV	460,349 59.2% of VAP 69.2% of RV	372,162 49% of VAP 57.7% of RV
Absentee/VBM	60.5%	87.2%	12%	21%
In-person	39.5%	12.8%	88%	79%

When considering the approaches taken by St. Louis County and Fresno County, the most substantial difference is the legal/regulatory environment in which they are operating. Because of the provisions in the Voter's Choice Act, local election officials (LEOs) in Fresno County were operating in a top-down approach with very specific state requirements they had to abide by when it comes to the number of polling locations, as well as voter outreach and education efforts. Conversely, in Missouri there are no requirements for the vote center or 'vote anywhere' approach. LEOs in St. Louis County developed their own approach to vote centers, a bottom-up approach. St. Louis County largely maintained the existing precinct locations that were housed in public facilities and eliminated most of those locations that were housed in private facilities. Fresno County, on the other hand, moved out of neighborhoods and into larger spaces on main

streets and bus routes, as required by law, though like St. Louis, primarily utilized public facilities as vote centers.

As Table 1 shows, both jurisdictions significantly reduced the number of in-person voting locations in the transition to vote centers. Previous studies find that reducing the number of polling places, or increasing the distance voters need to travel to voting locations, can reduce voter turnout (Clinton et al. 2021, Tomkins et al. 2022, Bitzer et al. 2023). Thus, (H2) *we expect that voters in Fresno and St. Louis counties who lose a nearby polling place will be less likely to vote than other registered voters.* The reduction in Election Day voting locations can be offset by increases in mail and early voting (Clinton et al. 2021; Tomkins et al. 2022; Bitzer et al. 2023). Since California offers more alternatives to Election Day voting than Missouri, we expect that (H3) *the substitution effect of these voting alternatives will help minimize the impact of losing polling places on voter turnout to a greater degree in Fresno County than in St. Louis County.*

Fresno County Approach

The Voter's Choice Act (VCA), passed in 2016, made extensive changes to California's voting system, including vote centers, and gave counties the option of adopting the new system. Fresno is one of fifteen counties that adopted the VCA provisions by 2020. Prior to the passage of the VCA, California already offered no-excuse absentee voting and permanent vote-by-mail options. The most significant change created by the VCA is the institution of all-mail elections, meaning that each registered voter received a ballot in the mail. The VCA also expands the number of

ways absentee voters could return ballots by requiring counties to provide ballot drop boxes and multiple locations for early in-person voting. The VCA also allows counties to transition from a precinct/polling place voting model to a vote center model for Election Day. Finally, the VCA included conditional same day voter registration, allowing voters to register or update their registration and vote on the same day via a provisional ballot. The VCA changes should increase voter turnout through early voting, mailed ballots, and by replacing traditional provisional ballots with conditional voter registration. The number of reforms implemented at once effectively created a complete overhaul of the election administration in the adopting counties.

In addition to the requirements about the number of locations and dropboxes, the VCA requires election officials to present an Election Administration Plan to the Secretary of State prior to the implementation. This plan includes information about how the community will be involved in choosing locations and how the election official will conduct voter outreach and public education campaigns, both of which are required under the VCA.² In 2020, the County Clerk sent three direct mailers to each registered voter in the county letting them know about the change to the vote center model and informing voters they would be receiving a mail ballot. This was replicated in 2022. Voters in Fresno County also receive a printed voter guide with information about all races and ballot measures in the county.³ The voter guide also includes information about vote centers, lists of vote center and dropbox locations, and information and instruction about how to complete and return VBM ballots. In addition to these direct

² The original and revised versions of the 2020 Fresno County Election Administration Plan are available at: <https://www.co.fresno.ca.us/departments/county-clerk-registrar-of-voters/voters-choice-act/election-administration-plan/election-administration-plan-archive>

³ All federal and statewide races are in the printed voter guide that comes from the Secretary of State.

mailers, the Clerk runs social media ads and public service announcements on radio and television. They also do outreach to social and civic organizations in the county and ask them to share information with their members. These efforts should result in a high level of voter awareness that they can vote at any location in the county because all communications include information about both vote centers and VBM.

We examine the shift in in-person voting options in Fresno County by comparing the polling place locations in the 2018 general election to the vote center and drop box locations in the 2022 general election. The 2018 midterm election was the last general election prior to the county's implementation of VCA reforms, and 2022 was the first midterm election after VCA adoption. Fresno County covers a large area, slightly more than 6,000 square miles. The eastern third of the county's land mass, bordering the Sierra Nevada mountains, is sparsely populated, as is the western section of the county, which borders the Coast Range. Well over half of the county population resides in and around the city of Fresno, in the north central portion of the county.

As we note above, Fresno County replaced 268 assigned polling places in the 2018 general election with 53 vote centers and 68 drop boxes in the 2022 general election. Thus, there were only about one-fourth of the number of in-person locations in 2022, although voters could choose to use any one of them. We examine the geographic distribution of in-person locations in Table 2. Fresno County is governed by a five-person Board of Supervisors, with each Supervisor elected from a single-member district. The county recently redrew the boundaries of Supervisor districts after the 2020 census, and each district contains roughly 200,000 residents. Since so much of the county population is concentrated around the city of Fresno, each district contains at

least a portion of the city, in order to produce districts with approximately equal population.

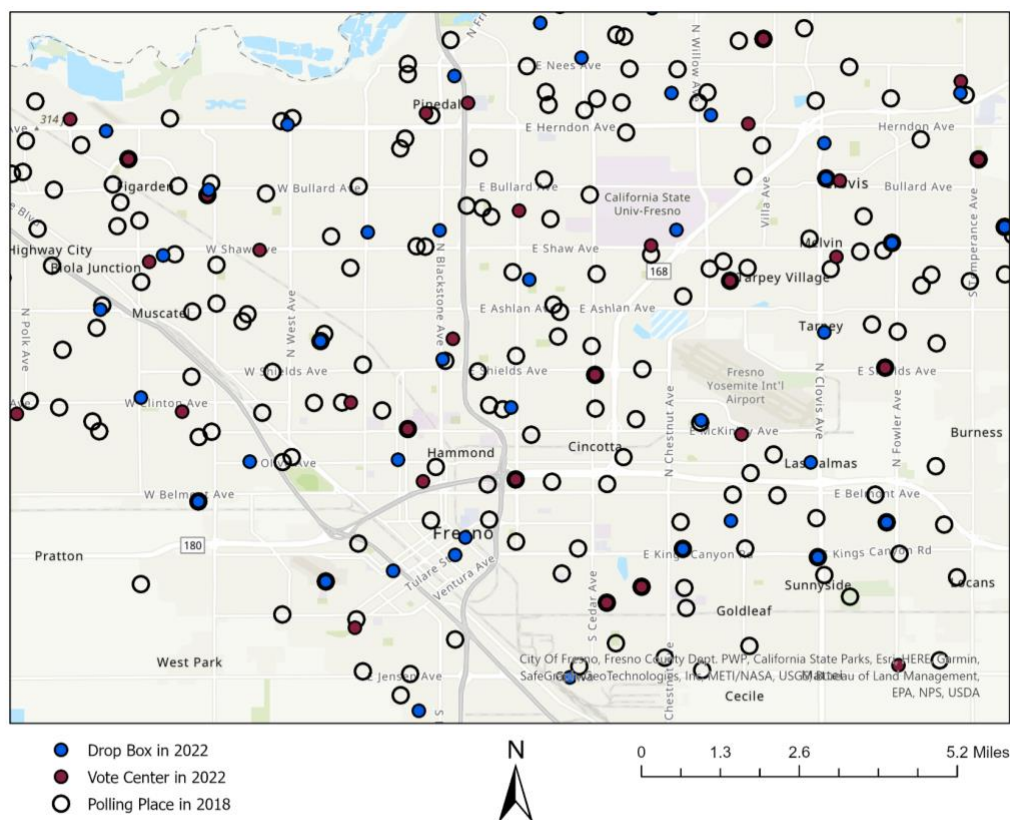
If voting locations are distributed equally in terms of geography, we might expect an equal number of voting locations in each district. However, districts 2 and 3 are much more densely populated, and cover a much smaller landmass, than the other three districts. Furthermore, according to the 2020 census, the voting age population in districts 1 and 3 is smaller than the voting age population in the other districts, particularly when compared to district 2 (see Table 2). Nevertheless, each district was assigned between 9 and 13 vote centers, and between 10 and 16 drop boxes, in the 2022 election. District 3 has somewhat fewer in-person locations in the 2022 election than the other four districts, likely due to the rules that govern the placement of voting centers (i.e. number of required locations based on registered population density and vote mode).

Table 2. *In-Person Voting Locations in Fresno County by Supervisor District*

Supervisor District	Voting Age Population (2020)	Polling Places in 2018	Vote Centers in 2022	Drop Boxes in 2022
1	139,800	51	9	16
2	156,372	61	13	15
3	142,697	46	9	10
4	144,467	47	12	14
5	146,861	63	10	13

We also map the voting locations in the most populous part of the county, centered around the city of Fresno (see Figure 1 below). The area in the map is the most densely populated portion of the county, where most residents live. The hollow circles indicate polling places in the 2018 election. The red circles represent the location of vote centers in the 2022 election, and blue circles denote the location of drop boxes in the 2022 election. The map shows the scale of the change in adopting vote centers, as many assigned polling places were replaced by vote centers and drop boxes that were distributed fairly evenly throughout the region.

Figure 1. Voting Locations in Fresno: 2018 & 2022 General Elections



In switching to vote centers, some local communities lost nearby voting locations. We tested whether there were disparities in the location of polling place closures when Fresno County shifted to vote centers. There were 472 precincts with residents who voted in the 2022 general election. We identify 92 precincts (19 percent) in which at least one former polling place closed but neither a vote center nor a drop box were placed within the precinct for the 2022 election. Another 11 precincts lost three or more polling places and only replaced them with one vote center or drop box. We estimate two logit regression models to test predictors of each measure of polling place closures.

We merge block-level data from the 2020 census with each precinct to compute the racial composition of the voting age population in each precinct. According to the 2020 census, the voting age population in Fresno County is 49.6% Hispanic, 31.0% non-Hispanic White, 4.4% Black, 11.1% Asian American, and 3.9% other races or more than one race. We control for the logged number of registered voters, to test whether polling place closures were concentrated in precincts with the most voters. We also include a control for precincts in the densely populated 2nd and 3rd supervisor districts. The results are presented in Table 3.

The model estimates indicate that polling place closures are not associated with a precinct's racial or ethnic minority share of the voting age population (models 1 and 2). The second model suggests that polling places were more likely to close in precincts with a large number of registered voters. We find a strong tendency for the county to place vote centers and drop boxes in the most heavily populated precincts (model 3). A one-standard deviation increase in the size of a precinct is associated with a 45 percentage point increase in the predicted probability of hosting a vote center or drop

box. We also find that voting locations in 2022 are positively correlated with the Native American share of the voting age population, although the magnitude of the relationship is modest (marginal effect of 8 percentage points). We do not observe any other significant relationship between the racial or ethnic minority share of a precinct's voting age population and the location of vote centers and drop boxes in the 2022 general election. Overall, it appears that the location of voting options in 2022 was equitable in terms of location and local demographics.

Table 3. Regression results for polling place closures, Fresno County

	Precinct lost polling locations - narrow	Precinct lost polling locations - broad	Precinct hosted a vote center or drop box in 2022
	(1)	(2)	(3)
Hispanic share of VAP	-0.001 (0.008)	-0.010 (0.008)	-0.002 (0.008)
Black share of VAP	0.06 (0.04)	0.02 (0.04)	-0.03 (0.04)
Native Am. share of VAP	-0.14 (0.16)	0.05 (0.13)	0.37* (0.16)
Asian Am. share of VAP	0.009 (0.020)	0.006 (0.020)	-0.02 (0.02)
Registered voters (log)	0.19 (0.15)	0.52* (0.18)	1.31* (0.25)
Supervisor District 2 or 3	0.30 (0.35)	0.26 (0.33)	-0.43 (0.36)
Constant	-2.47* (1.19)	-4.40* (1.40)	-10.60* (2.01)
N	472	472	472

Note: All models are binary logit. Precincts are weighted by the number of registered voters. Robust standard errors in parentheses.

* $p < 0.05$

St. Louis County Approach

As we note above, St. Louis County is the only jurisdiction in Missouri to adopt vote centers, and the COVID-19 pandemic was the most immediate cause. Many poll workers quit just before the March 2020 presidential primary election (BOE Minutes March 24, 2020), and one of the polling place venues decided not to open for Election Day (Bilchik 2020: 173). Matters came to a head in the summer of 2020, when most private locations in St. Louis County (particularly churches, nursing homes, and private schools) backed out of polling place commitments for the August primary elections (St. Louis County Board of Elections, 2021). Under state law, only public venues can be compelled to serve as polling places. With a severe reduction in the number of available polling places, the St. Louis County Board of Elections (BOE) decided to adopt a vote center model allowing county voters to cast their ballots at any polling place on Election Day.

The legacy of racial discrimination and residential segregation complicates the implementation of vote centers in St. Louis County. The county is fragmented by 87 municipalities and other unincorporated areas. Many small municipalities in the northern part of the county were incorporated by white residents during the mid-20th century, who then adopted single family zoning and other restrictive ordinances, in order to resist annexation by another municipality and thwart the migration of Black residents (Gordon 2008, chapter 3; Jones 2000, chapter 2). These efforts ultimately failed, and decades later most of these small municipalities, with the same boundaries, have majority-Black populations. Since these small municipalities were created as bedroom communities,

they tend to lack critical infrastructure to provide city services. For example, most use a trailer or small house as the city hall.

This is relevant to election administration because the city hall served as a polling place in most of these communities under the previous system (see an example in Figure 2). This was a convenient voting location for many local residents, since they could walk from home to the polling place. However, these locations are too small and have insufficient parking to serve as vote centers. Thus, in some parts of the county several majority-Black communities lost a neighborhood polling place in the transition to vote centers. It has been a challenge to find large venues with suitable parking and public access that can serve as vote centers in some of these communities. While vote centers are largely popular among voters and poll workers in St. Louis County (Bryant et al., 2024), local election officials received pushback from some small municipalities after the adoption of vote centers. Thus, we expect that Black voters in St. Louis County may experience the transition to vote centers a bit differently than white voters.

Figure 2. Velda Village Hills City Hall (former polling place)



St. Louis County reduced the number of voting locations from 411 assigned polling places in the 2018 general election to 239 vote centers in the 2022 general

election. A new state law, passed in 2022, allowed two weeks of in-person early voting for the first time. As a result, St. Louis County had seven early voting locations for the 2022 election. Overall, there were slightly more than half as many in-person locations in 2022 as in 2018, although voters could now cast a ballot at any polling place. St. Louis County is governed by a seven-person County Council, with each member elected from a single-member district. The county council boundaries were redrawn after the 2020 census, and each council district contains roughly 143,000 residents. Districts 1 and 4 are majority-Black districts. The other five county council districts have white majorities.

We examine the geographic distribution of in-person voting locations in Table 4. Each council district experienced a similar decline in the number of voting locations from 2018 to 2022. Each district hosted between 30 and 39 vote centers in 2022, slightly more than half the number of assigned polling places in each district in 2018. The county also placed one early voting location in each council district for the 2022 election. In interviews with two of the authors, county election officials reported that they tried to achieve an equal geographic distribution of voting locations around the county when they adopted vote centers (Manion et al. 2023).

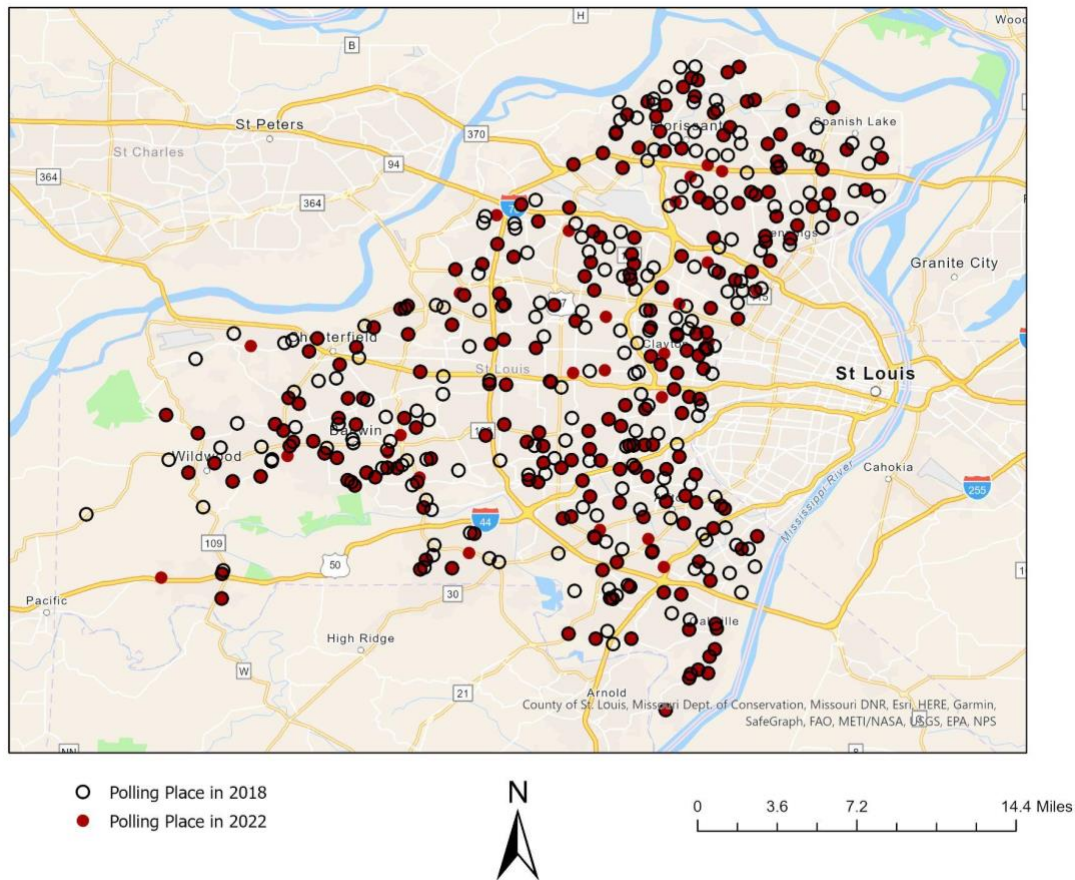
Table 4. *In-Person Voting Locations in St. Louis County by Council District*

Council District	Voting Age Population (2020)	Polling Places in 2018	Vote Centers in 2022
1	109,855	68	39
2	113,930	54	33
3	111,332	65	35
4	108,777	59	30

5	114,170	60	39
6	115,697	51	31
7	110,616	54	32

We also map the voting locations in St. Louis County in Figure 3 below. The hollow circles denote assigned polling places in the 2018 election. The red circles represent the location of vote centers in the 2022 election. As the map shows, the transition to vote centers was not as dramatic in St. Louis County as in Fresno County. Prior to 2022, Missouri did not allow no-excuse absentee voting, and St. Louis County officials anticipated that the vast majority of voters would still cast their ballots in person on Election Day. As a result, there were a large number of vote centers for the November 2022 election, and they appear to be spread across the county.

Figure 3. Voting Locations in St. Louis County: 2018 & 2022 General Elections



We tested whether there were disparities in polling place closures after the adoption of vote centers. There were 952 precincts in St. Louis County with residents who voted in the 2022 general election. A precinct in St. Louis County is roughly the size of a neighborhood, or a few square blocks. The median precinct contains approximately 600 registered voters. There are 131 precincts (14 percent) which lost a voting location in the transition to vote centers. That is, those precincts hosted a polling place in 2018 but did not host a vote center in 2022. Once again, we merge block-level data from the 2020 Census with the county's voting precincts to measure the racial composition of the voting age population in each precinct. According to the 2020 Census, the voting age population (VAP) in St. Louis County is 65.9% White, 23.1%

Black, 4.8% Asian American, and 6.2% other races or more than one race. St. Louis County has a high degree of racial segregation. There is a strong negative correlation between the white share and Black share of VAP in voting precincts ($r = -0.90$). Thus, we test whether polling place closures and vote center locations are associated with the racial minority composition of each precinct. We also control for the logged number of registered voters, to test whether polling place closures were concentrated in precincts with the most voters. We estimate two logit regression models to examine predictors of polling place closures and vote center locations in the 2022 election. The results are presented in Table 5.

The model estimates indicate that polling place closures are slightly correlated with a precinct's racial composition. The first model indicates that a one standard deviation increase in the Black share of a precinct's voting age population is associated with a 4 percentage point increase in the predicted probability of losing polling places in the transition to vote centers. The first model also indicates that polling places were more likely to be closed in precincts with a large number of registered voters. The second model indicates a strong tendency for the county to place vote centers in the precincts with the most registered voters. A one-standard deviation increase in the size of a precinct is associated with a 41 percentage point increase in the predicted probability of hosting a vote center in 2022. We do not observe any significant relationship between the racial composition of a precinct's voting age population and the siting of vote centers in the 2022 general election. Overall, the results slightly support our first hypothesis, since the loss of polling places is correlated with race in St. Louis County but not in Fresno County.

Table 5. Regression results for voting locations, St. Louis County

	Precinct lost polling locations	Precinct hosted a vote center in 2022
	(1)	(2)
Black share of VAP	0.008* (0.004)	0.001 (0.003)
Asian Am. share of VAP	0.005 (0.02)	0.006 (0.02)
Other race share of VAP	0.03 (0.05)	0.02 (0.06)
Registered voters (log)	0.36* (0.17)	1.30* (0.20)
Constant	-4.27* (1.21)	-9.76* (1.38)
<i>N</i>	952	952

Note: All models are binary logit. Precincts are weighted by the number of registered voters.

Robust standard errors in parentheses.

* $p < 0.05$

We find a similar pattern when we examine registered voters. We geocoded the address of each registered voter, to compute the distance to the nearest polling place in 2018 and the nearest vote center in 2022. We also estimate each registered voter's race. We do this using the *wru* package in *R* (Imai and Khanna 2016), which calculates the probability of a person's race based on the Census Bureau's surname list and residence (Grumbach & Sahn 2019). We used the voter's first name and last name, and the *wru* package predicted the probability that a registered voter's race was white, Black, Hispanic/Latino, Asian/Pacific Islander, and other/mixed based on demographic geolocation data from the 2020 U.S. Census. We infer that a voter member is white in cases where the probability that a person is white is higher than all other race probabilities. Similarly, we infer a board member is Black in cases where the predicted

probability of being Black is the highest. To sharpen our focus on white and Black donors, we combined the predicted probability that a donor was Hispanic/Latino, Asian/Pacific Islander, and other/mixed into the other race variable. We then created three dummy variables to signify the racial category with the highest predicted probability for each contributor. Based on these estimates, 72.5% of registered voters in St. Louis County are white, 22.7% are Black, and 4.8% are other races. These estimates are similar to the racial composition of the county's voting age population, based on the 2020 census. Other researchers have found that the *wru* package, along with local Census data, infers individual race with high accuracy, particularly for Black and non-Hispanic white residents (Clark, Curiel, and Steelman 2022; Grumbach and Sahn 2019).

As Table 6 shows, Black voters in St. Louis County were more likely to lose a polling place from their precinct, and less likely to have a vote center located in their precinct, than voters of other races. We think some of the racial differences are due to difficulties in finding suitable vote center locations in and around many of the small municipalities described above. For example, there are 23 municipalities within the footprint of the Normandy School District, where roughly 90 percent of registered voters are Black. Roughly 21,000 registered voters live in this area, and 18 of these 23 municipalities have less than 1,500 registered voters. In this part of the county, 21 percent of registered voters lost a polling place in their precinct, as compared to 17 percent in the rest of the county.

We also find that the median and mean change in distance to the nearest voting location is basically the same for all three racial groups. As we note in Table 1, slightly

less than half of the county’s polling places were removed in the transition to vote centers. With many of the old voting locations still in use as vote centers, the transition was not very disruptive to a majority of voters. However, the transition may have been more disruptive in some small majority-black communities.

Table 6. *Transition to Vote Centers in 2022 by Race, St. Louis County*

Voter Race	Lost Polling Places in Precinct	Hosted a Vote Center in Precinct	Median Change in Distance to Nearest
White	16.3%	34.8%	No change
Black	22.5%	29.6%	No change
Other	17.0%	33.5%	No change

Polling Place Changes and Voter Turnout

Our final analysis examines whether voter turnout is affected by the change in voting locations in both counties. Starting with Fresno County, we examine data from the county voter file to test whether voting locations are associated with turnout and voting mode choices in the 2022 general election. We acquired the voter file in March 2023, so the data do not exactly match the registered voters in the county at the time of the November 2022 election. For example, we exclude people who registered after the November 2022 election from the analyses presented below. We are also missing some voters who moved out of the county after the election. Approximately 44 percent of registered voters in Fresno County participated in the 2022 midterm election. Our analyses are based on 494,064 registered voters, of whom 219,017 voted in the November 2022 election.

We merged data on each voter's precinct, particularly whether the precinct lost voting locations in the VCA implementation and whether the precinct hosted a vote center or drop box in 2022, to the voter file. We estimate a series of logit regression functions of turnout and voting mode as a function of precinct characteristics, with control variables for registration status, party affiliation, and age. We find small estimated effects of precinct characteristics on voter turnout and slightly larger relationships with voting mode.

As the first column of Table 7 shows, losing polling places from one's precinct is not a statistically significant predictor of turnout in the 2022 election. Fresno County's implementation of the VCA provided enough voting options that the removal of polling places did not appear to reduce the voter participation of nearby residents. However, having a vote center or drop box in one's precinct is associated with slightly higher turnout in the November 2022 election. These estimated effects are modest (a 1 percentage point increase in voting probability for vote centers, a 2 percentage point increase for drop boxes), but provide further evidence that drop boxes can boost voter turnout (McGuire et al. 2020). Given that 41% of Fresno County registered voters live in a precinct with a vote center or drop box, the positive effect on turnout of hosting a voting location outweighs the weak negative effect of losing a polling place. Consistent with prior research, we also find that voter participation increases with age, and the relationship diminishes among elderly voters. Furthermore, registered Republicans turned out at a higher rate than Democrats, and turnout among major party voters was higher than for Independent and third party voters. Finally, active registered voters are more likely to vote than those on inactive status.

Table 7. Predictors of Turnout and Voting Mode in November 2022 Election, Fresno County

Independent variable	Voted in 2022 election	Voted mail ballot in 2022	Vote center voter in 2022	Drop box voter in 2022
	(1)	(2)	(3)	(4)
Voter precinct lost polling locations in 2022	-0.006 (0.008)	0.05* (0.02)	0.04* (0.01)	-0.09* (0.01)
Voter precinct hosted a vote center in 2022	0.04* (0.008)	-0.14* (0.02)	0.26* (0.01)	-0.17* (0.01)
Voter precinct hosted a drop box in 2022	0.10* (0.008)	-0.01 (0.02)	-0.07* (0.01)	0.18* (0.01)
Active registration status	1.01* (0.05)	0.83* (0.10)	-0.32* (0.09)	0.36* (0.09)
Age (years)	0.07* (0.001)	-0.04* (0.002)	0.03* (0.002)	0.01* (0.001)
Age-squared	-0.0003* (0.00001)	0.0006* (0.00002)	-0.0004* (0.00002)	-0.0002* (0.00001)
Democratic voter	0.44* (0.008)	0.40* (0.02)	-0.23* (0.01)	0.21* (0.01)
Republican voter	0.93* (0.008)	-0.43* (0.02)	0.40* (0.01)	-0.04* (0.01)
<i>N</i>	494,064	219,017	219,017	219,017
<i>Pseudo R</i> ²	.12	.04	.04	.01

Source: Fresno County voter file, March 2023

Note: All models are binary logit (standard errors in parentheses).

* $p < 0.05$, two-tailed

We also find that the estimated impact of voting locations on turnout is most pronounced among low propensity voters. The regression model coefficients are presented in Table A1 of the appendix, but we summarize the marginal effects in Table 8 below. We measure voting frequency based on each registered voter's level of participation in the 2018 primary and general elections, the 2020 primary election, and

the 2022 primary election. The changes in voting locations had no statistically significant impact on voter turnout for high propensity voters. However, losing a polling place is associated with a one percentage point drop in voter turnout for low propensity voters, while having a nearby vote center or drop box is associated with a similar boost in turnout for low propensity voters. Again, the positive impact of vote center and drop box locations is large enough to more than offset the negative impact of losing a polling place for low propensity voters.

Table 8. *Marginal Effect of Voting Changes on Turnout in 2022, Fresno County*

Voting Frequency	Lost Polling Places in Precinct	Hosted a Vote Center	Hosted a Drop Box
Low	-.01*	.01*	.02*
High	.001	-.003	.001

* $p < 0.05$, two-tailed

We find a somewhat stronger relationship between precinct-level voting options and voting mode. As part of VCA implementation, Fresno County mailed a ballot to all registered voters for the November 2022 election. In that election, 87 percent of voters cast their ballots by mail (although some returned their mail ballots to vote centers or drop boxes), while just 13 percent voted in person. As the second column of Table 7 shows, losing polling place in one's precinct increases the probability of voting by mail by a small amount (1 percentage point) rather than in person. Having a vote center in

one's precinct reduces the probability of voting by mail by roughly 2 percentage points. Having a drop box in one's precinct is unrelated to the decision to vote by mail or in person.

We also observe partisan differences in voting mode among Fresno County voters. Perhaps a reflection of partisan rhetoric around absentee voting in the United States, Democrats are more likely to cast their ballots by mail than Republicans and Independents. However, the expected probability of voting by mail is high for Democrats (.92) and Republicans (.83). Finally, active voters are more likely to vote by mail than inactive voters.

Under the provisions of the VCA, Fresno County voters may turn in their mail ballot at a vote center or drop box, and that information is also recorded in the voter file. In the November 2022 election, 37 percent of county voters cast their ballots at a drop box, while 25 percent voted or dropped off their ballot at a vote center. We observe a local siting effect here as well (columns 3 and 4). If a vote center is located in one's precinct then a voter is more likely to cast one's ballot at a vote center and less likely to vote by drop box. Similarly, voters are more likely to vote by drop box and less likely to vote at a vote center when a drop box is located in their precinct. When a precinct loses a polling place, voters in that precinct are slightly more likely to vote at a vote center and less likely to vote by drop box in 2022. These are modest relationships, ranging from 1 to 5 percentage points.

We find some evidence that a substitution effect in response to the shift in voting locations is more pronounced among high propensity voters. For example, the loss of a polling place increases the probability of voting by mail for frequent voters, but not for

infrequent voters. High propensity voters also seem more comfortable voting by mail, since high frequency voters are more likely to vote by mail or at a drop box, and less likely to vote at a vote center, than infrequent voters. Finally, having a vote center or drop box nearby increases the probability of voting at a vote center or drop box, respectively, regardless of voting propensity.

We also observe partisan differences in line with the voting by mail patterns described above. Democrats are more likely than Republicans and Independents to vote at a drop box, while Republicans are more likely than Democrats and Independents to vote at a vote center. The partisan differences are roughly twice as large as the differences based on voting locations in a precinct. Active voters are more likely to vote by drop box than inactive voters, but inactive voters are more likely to cast their ballot at a vote center than active voters.

Turning to St. Louis County, we examine data from the county voter file to test whether changes in voting locations are associated with turnout in the 2022 general election. We acquired the St. Louis County voter file in January 2023. The voter file includes voter history (turnout) but does not include information about voting mode. Thus, turnout is the only outcome we examine. Once again, the data in the voter file do not exactly mimic the registered voters in the county at the time of the November 2022 election. Under Missouri law, election authorities may label a voter as inactive if the U.S. Postal Service alerts the authority that the voter no longer lives at the last known address. Voter turnout is extremely low among registered voters on inactive status. Among almost 40,000 inactive voters in the St. Louis County voter file, only 42 voted in the 2022 midterm election. As a result, we exclude inactive voters from the analysis.

Missouri does not have party registration; so, the voter file does not indicate a voter's party affiliation. Approximately 58 percent of registered voters in St. Louis County participated in the 2022 midterm election. Our analyses are based on 642,410 registered voters, of whom 372,134 voted in the November 2022 election.

We merged data on each voter's precinct, particularly whether the precinct lost voting locations in the adoption of vote centers and whether the precinct hosted a vote center 2022, to the voter file. We also geocoded the home address of registered voters and computed the change in distance to the nearest polling place from 2018 to 2022. We estimate a logit regression function of turnout as a function of precinct characteristics, while controlling for age. As in Fresno County, we find small estimated effects of precinct characteristics on voter turnout.

As the first column in Table 9 indicates, losing polling places from one's precinct is associated with slightly lower turnout in the 2022 election. The expected probability of voting is roughly 2 percentage points lower for registered voters who live in a precinct that lost voting locations in the transition to vote centers. Similarly, having a vote center in one's precinct is associated with slightly higher turnout in the November 2022 election. The estimated vote center effect is again modest (a 1 percentage point increase in the expected probability of voting). Almost twice as many registered voters live in a precinct hosting a vote center as those whose precinct lost a polling place. Thus, the estimated positive effect of a nearby vote center offsets the negative effect of losing a nearby polling place. These estimated location effects remain the same when we include the change in distance to the nearest voting location in the model, as we find that increasing the distance to the nearest voting location is associated with a slight

increase in turnout (less than one percentage point). Once again, we find that voter participation increases substantially with age, and the relationship diminishes among elderly voters.

Table 9. Predictors of Turnout in November 2022 Election, St. Louis County

Independent variable	Voted in 2022 election	Voted in 2022 election	Voted in 2022 election
	(1)	(2)	(3)
Voter frequency		2.98*	2.96*
		(0.01)	(0.01)
Voter precinct lost polling locations in 2022	-0.11* (0.008)	-0.11* (0.01)	-0.12* (0.01)
Lost polling place X Voter frequency		-0.05 (0.03)	
Voter precinct hosted a vote center in 2022	0.06* (0.006)	0.05* (0.007)	0.04* (0.01)
Hosted vote center X Voter frequency			0.02 (0.02)
Change in distance to nearest location (km)	0.03* (0.01)	0.03* (0.01)	0.03* (0.01)
Age (years)	0.12* (0.001)	0.06* (0.001)	0.06* (0.001)
Age-squared	-0.0008* (0.00007)	-0.0006* (0.00009)	-0.0006* (0.00009)
N	642,410	536,606	536,606
Pseudo R ²	.07	.17	.17

Source: St. Louis County voter file, January 2023

Note: All models are binary logit (standard errors in parentheses).

* $p < 0.05$, two-tailed

In the second and third columns of Table 9 we examine whether relationships vary by voter frequency. The interaction terms are not statistically significant, which indicates that the estimated voting location effects do not appear to be more

pronounced for low propensity voters. When we compute the impact of location changes in terms of predicted probabilities (see Table 10), the estimated effects are somewhat larger for low propensity voters than for high propensity voters. For example, the expected probability of voting is roughly 2 percentage points lower for a low propensity voter, but 1 percentage point lower for a high propensity voter, who lives in a precinct that lost voting locations in the transition to vote centers. However, this difference occurs largely because low propensity voters are closer to the middle of the probability distribution, where marginal effects are larger.

Table 10. *Marginal Effects of Location Changes on Turnout in 2022, St. Louis County*

Voting Frequency	Lost Polling Places in Precinct	Hosted a Vote Center
Low	-.02*	.01*
High	-.01*	.004*

* $p < 0.05$, two-tailed

Finally, we examine whether the association between voting locations and turnout varies by voter race. We present the full model estimates in Table A2 of the appendix, and we present the marginal effects by race in Table 11 below. Overall, turnout in the 2022 midterm election is higher for white voters (63%) than for Black voters (43%) or voters of other races (40%). The estimated negative effect of losing a polling place is larger for Black voters (2 percentage points) than for voters of other races. Similarly, the positive effect of hosting a vote center in one's precinct is

statistically significant for white voters (1 percentage point) and other race voters (2 percentage points), but not for Black voters. Thus, the positive effect of a nearby vote center offsets any negative effect of losing a polling place for white and other race voters, but not for Black voters.

Table 11. *Marginal Effect of Voting Changes on Turnout by Race, St. Louis County*

Voter Race	Lost Polling Places in Precinct	Hosted a Vote Center in Precinct
White	-.01*	.01*
Black	-.02*	.001
Other	.03*	.02*

* $p < 0.05$, two-tailed

Conclusion

Implementing vote centers, as with any significant election reform, requires careful planning and management of the many interdependent functions of the election administration ecosystem (Hale et al., 2015; Huefner et al., 2007). St. Louis and Fresno Counties adopted vote centers in the crucible of the COVID-19 pandemic. While Fresno County adopted vote centers in compliance with the Voter Choice Act, St. Louis County implemented vote centers without state guidance. Despite a different legal environment and implementation approach, the response from voters and poll workers to vote centers has been largely positive in both counties.

Election officials in both counties gave serious consideration to the location of vote centers during the transition. In both cases, election officials tried to distribute new

voting locations evenly throughout the county's geography and were largely successful in doing so. Officials in both counties demonstrated a tendency to place vote centers in precincts with a large number of registered voters. For the most part, the loss of polling places and siting of vote centers is not concentrated among precincts with any particular racial or ethnic groups.

Implementing vote centers may pose a challenge in jurisdictions with a history of residential segregation. It may be difficult to locate vote centers in less populous communities that lack investment and infrastructure, which may be common features of "turnout deserts" (Barber and Holbein 2022). In St. Louis County we find that Black voters are more likely to lose a local polling place and less likely to host a nearby vote center than voters of other races. Similarly, there is a modest positive correlation between polling place closures in St. Louis County and the Black share of the local voting age population.

Decisions about which polling places to close and where to locate vote centers may influence voter participation. In both counties we observe slightly higher voter turnout rates in precincts where vote centers or drop boxes are located. In St. Louis County, we also find a small drop in turnout in precincts that lost polling places during the transition to vote centers. In Fresno County, we see evidence of voters who lost a nearby polling place shifting to mail ballots. It is important to use caution in interpreting these results, since they are based on observational data. In addition, our findings are based on a midterm election, where voting locations may have a bigger impact on turnout than in presidential elections (Cortina and Rottinghaus, 2021).

As more jurisdictions move toward vote center implementation, it is important to examine the impact the changes have on voters, poll workers, and the entire election ecosystem. Not all groups experience new voting procedures in the same way, and it is important for election officials to be aware of that. For example, the transition to vote centers in St. Louis County seems to have a more negative effect on voter turnout for Black voters than for other voters. Local officials might consider additional outreach to communicate the voting options to residents of underserved communities.

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Appendix

Table A1. Predictors of Turnout in November 2022 Election, Fresno County

Independent variable	Voted in 2022 election (1)	Voted in 2022 (2)	Voted in 2022 (3)
Voting frequency	4.05* (0.01)	4.10* (0.01)	4.11* (0.01)
Voter precinct lost polling places in 2022	-0.07* (0.01)	-0.04* (0.01)	-0.04* (0.01)
Voting frequency X lost pp in 2022	0.08* (0.03)		
Voter precinct hosted a vote center in 2022	0.03* (0.01)	0.06* (0.01)	0.03* (0.01)
Voting frequency X hosted VC in 2022		-0.09* (0.03)	
Voter precinct hosted a drop box in 2022	0.08* (0.01)	0.08* (0.01)	0.13* (0.01)
Voting frequency X hosted DB in 2022			-0.12* (0.03)
Active registration status	1.06* (0.07)	1.06* (0.07)	1.06* (0.07)
Age (years)	0.05* (0.001)	0.05* (0.001)	0.05* (0.002)
Age-squared	-0.0004* (0.00001)	-0.0004* (0.00001)	-0.0004* (0.00002)
Democratic voter	0.04* (0.01)	0.04* (0.01)	0.04* (0.01)
Republican voter	0.56* (0.01)	0.56* (0.01)	0.56* (0.01)
<i>N</i>	480,321	480,321	480,321
<i>Pseudo R</i> ²	.37	.37	.37

Source: Fresno County voter file, March 2023

Note: All models are binary logit (standard errors in parentheses).

* $p < 0.05$, two-tailed

Table A2. Predictors of Turnout in November 2022 Election by Race, St. Louis County

Independent variable	Voted in 2022 election (1)
Black voter	-0.83* (0.01)
Other race	-0.93* (0.02)
Voter precinct lost polling places in 2022	-0.05* (0.01)
Lost polling places X Black voter	-0.05* (0.02)
Lost polling places X Other race	0.18* (0.04)
Precinct hosted a vote center in 2022	0.04* (0.007)
Hosted a vote center X Black voter	-0.03* (0.01)
Hosted a vote center X Other race	0.06 (0.03)
Age (years)	0.12* (0.001)
Age-squared	-0.0008* (0.00001)
N	642,410
Pseudo-R ²	.10

Source: St. Louis County voter file, January 2023

Note: All models are binary logit (standard errors in parentheses).

* $p < 0.05$, two-tailed