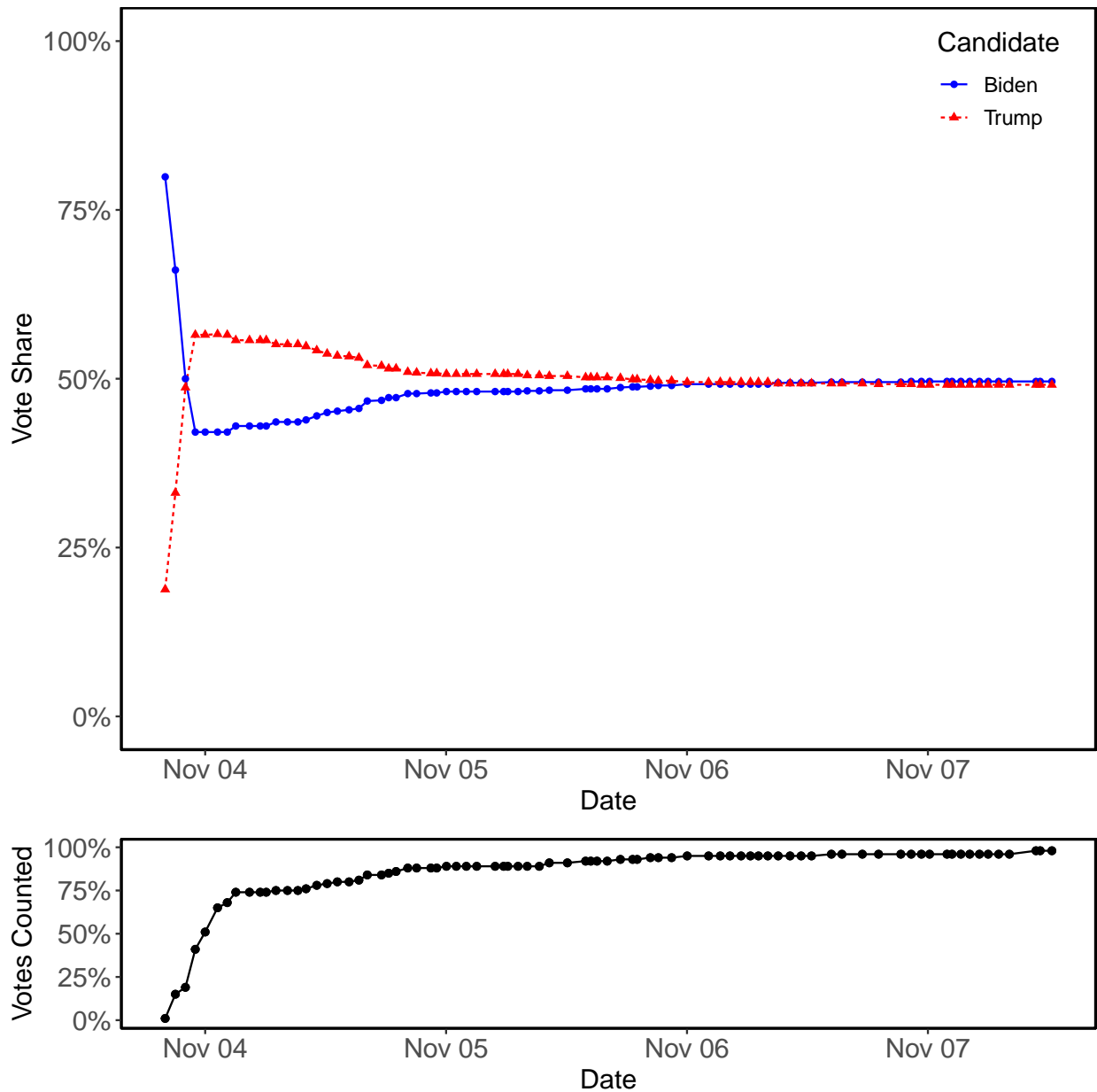


Supplemental Material
for
Why Do Election Results Change After Election Day?
The “Blue Shift” in American Elections

1 Vote Share Shift in 2020 Presidential Election in PA

Figure A1: Vote Shares in 2020 Presidential Election in PA as Ballots Were Counted



2 Administrative Data

We make use of administrative data in some of the key analyses in our paper, and as some readers may not be familiar with administrative data like this, here we provide some details about the quality

and accuracy of these data.

Currently in the United States, per the requirements of the *Help America Vote Act* (HAVA, 2002), states like California are required to have statewide voter registration databases. The maintenance of these databases, though, is regulated by the earlier *National Voter Registration Act* (NVRA, 1993). California's NVRA regulations are specified by the California's Secretary of State (<https://www.sos.ca.gov/elections/voter-registration/nvra/laws-standards/nvra-manual>). Specifically, these detailed regulations govern the process by which potentially ineligible voters (usually because of death or change of residence) can be moved to inactive status or removed from the file. Orange County, whose administrative data we use in this paper, has for quite some time used a variety of innovative and proactive methodologies to develop as accurate a list as possible (<https://www.ocvote.com/registration/maintaining-an-accurate-voter-list>).

As has been noted in recent research using these administrative data from Orange County ?, in a jurisdiction of this size, there will be record changes, new records, and removed records. However, this recent research has shown that these changes in the administrative data are relatively small in relation to the overall file, and there is no research that we are aware of that would indicate that file maintenance or inaccuracies in the administrative data more generally should have any effect on our estimate of the quantities we examine in our paper.

3 Details about The 2018 Survey of Registered Voters

In California, voters can provide contact information (like a telephone number or email address) when they register to vote. Of the approximately 1.6 million voter registration records in the County in the 2018 general election, over 500,000 of those records were associated with an email address. In association with the Orange County Registrar of Voters (OCROV), we built a self-completion online survey aimed to evaluate voter experience in the November 2018 General Election. We invited registered voters (via email) to participate in our voter experience survey between Thursday,

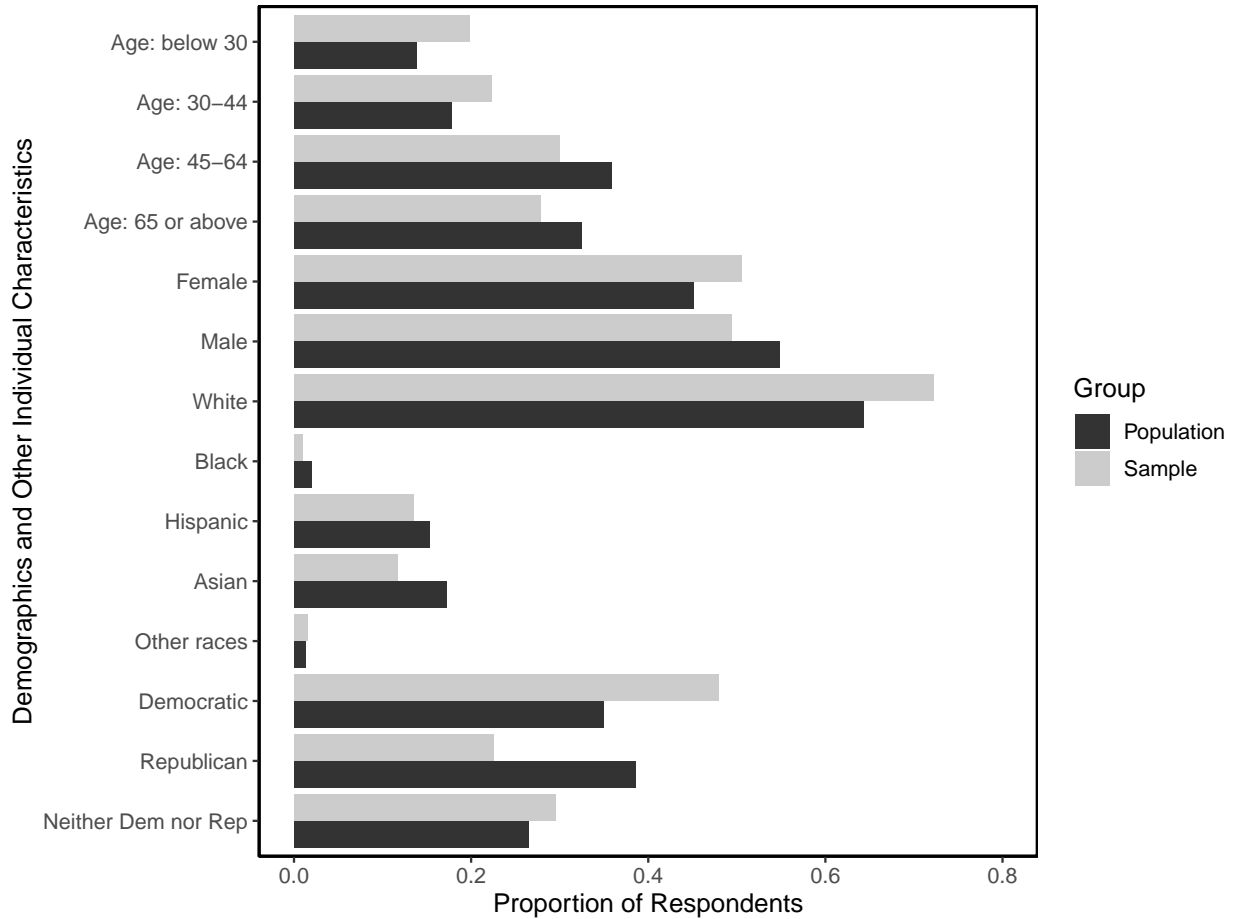


Figure A2: Respondent Composition of the Survey

November 8, 2018 and Tuesday, November 13, 2018. From 531,777 invites to all registered voters with email addresses, we received 6,952 complete responses (response rate: 1.3%). The survey took about 12 to 15 minutes to complete (the median duration was 13 minutes) and was provided in English.

Figure A2 displays a number of the important demographic and administrative features of our survey respondents who voted by mail, and for the population of Orange County voters who participated in the November 2018 General Election by mail. Younger voters are somewhat over-represented in our survey sample, with 6.0% and 4.5% more respondents below the age of 30 and between the age of 30 and 44, respectively, compared to the population of voters. Female voters and white voters are also somewhat over-represented in our survey sample, by 5.4% and 8.0%, respectively.

Our survey sample exhibits additional imbalances in party registration. While 38.5% of voters who turned out in the November 2018 General Election by mail registered with the Republican party in Orange County, only 22.5% of those by-mail voters who completed our survey are Republican voters. On the other hand, 48.0% of respondents who voted by mail registered with the Democratic party, compared to 35.0% in the population of by-mail voters. The disparities in terms of party registration present in our survey sample are expected given our knowledge about survey participation in general and consistent with other surveys with voluntary participation. The distribution of cities of residence for our sample tracks the population well.

Given the disparities in terms of some demographics and registration characteristics, to make our analysis representative of Orange County registered voters, it's necessary to construct survey weights and incorporate them in our analysis. We use a standard calibration weighting procedure known as raking. Our raking algorithm matches sample moments on age, gender, race/ethnicity, party registration, and city of residence to their population counterparts, to produce weights that we use in our statistical analyses to produce representative results. These survey weights are incorporated into the results we reported in this paper.

4 Details about Gender and Race/Ethnicity for Administration Records

To determine the gender of a voter in the administrative records in Orange County (CA), North Carolina, and Colorado, we use (in descending order of priority) (1) voter provided gender, (2) voter provided title (Mr., Mrs., Miss., Ms.), (3) inferred probability from first name, or (4) inferred probability from middle name. To determine the race/ethnicity of a voter, we use (1) voter provided race/ethnicity (only available in North Carolina), or (2) inferred probability of being non-Hispanic white from last name. Aggregating the gender and race information/probabilities yields our precinct percentages of voters below the age of 45 and nonwhite voters. For our individual-level analysis,

we code a voter as female/male if we know from the voter provided gender or infer with probability at least 90%. We code a voter as a non-Hispanic white if we know from the voter provided race or infer so with probability at least 80%. Our results are robust to tightening or loosening these thresholds.

5 Summary of Hypotheses

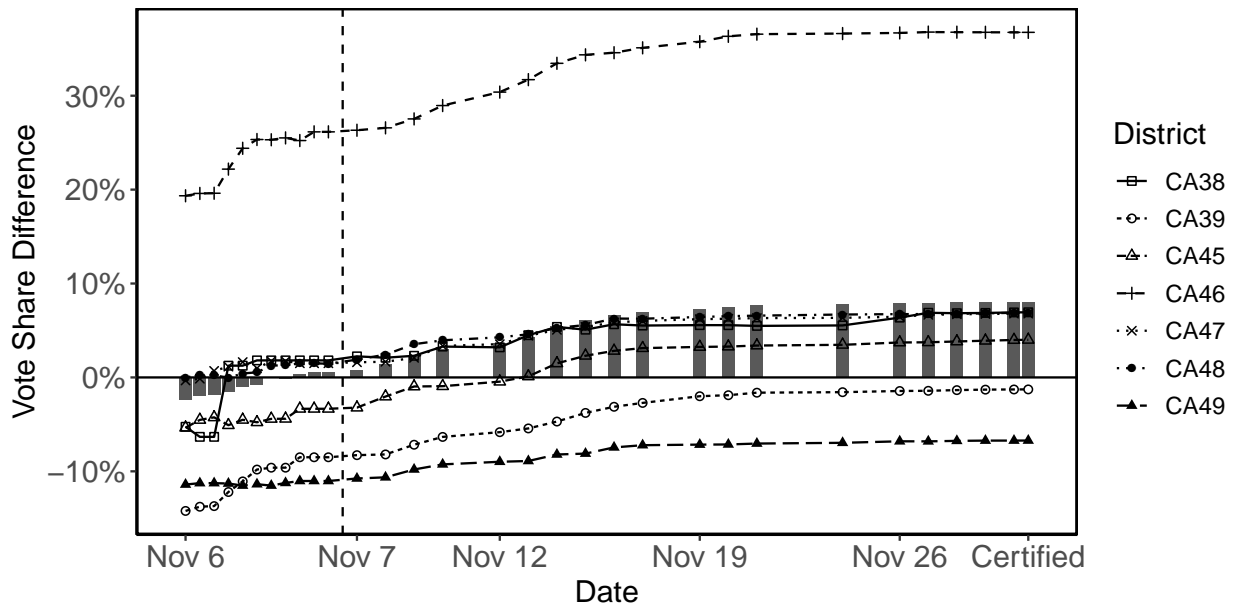
- **Hypothesis 1:** Hypotheses regarding volume of different type of ballots:
 - **Hypothesis 1a:** Precincts with a larger percentage of polling place ballots that are counted later in the process on average have a larger “Blue Shift” after Election Day.
 - **Hypothesis 1b:** The percentage of permanent absentee voters in a precinct is not correlated with the magnitude of the “Blue Shift”, but precincts with a larger percentage of mail ballots that are counted later in the process on average have a larger “Blue Shift” after Election Day.
- **Hypothesis 2:** Hypotheses regarding individual voter characteristic:
 - **Hypothesis 2a:** Young and non-white voters are more likely to cast polling place ballots that are counted later in the process.
 - **Hypothesis 2b:** Young and non-white voters are more likely to cast mail ballots that are counted later in the process.
 - **Hypothesis 2c:** Voters registered with the two major parties are less likely to cast polling place or mail ballots that are counted later in the process.
- **Hypothesis 3:** Hypotheses regarding precinct voter composition:
 - **Hypothesis 3a:** Precincts with a larger percentage of young voters and non-white voters

on average have a larger “Blue Shift” after Election Day.

- **Hypothesis 3b:** Precincts with a larger percentage of registered Democratic (Republican) voters on average have a smaller (larger) “Blue Shift” after Election Day.
- **Hypothesis 3c** (alternative hypothesis to **3b**): Precincts with a larger percentage of registered Democratic (Republican) voters on average have a larger (smaller) “Blue Shift” after Election Day.

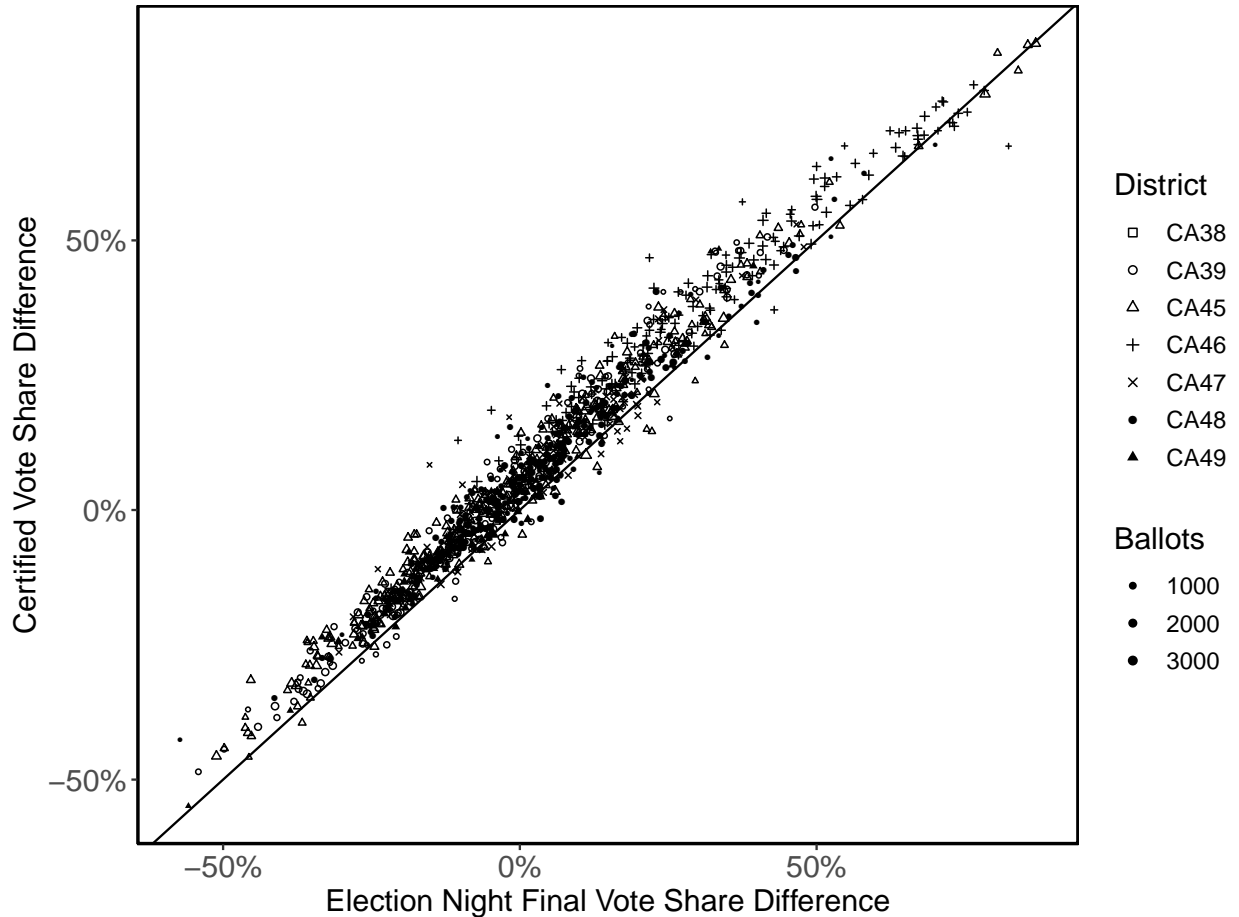
6 The Blue Shift in Orange County, California (House of Representatives)

Figure A3: Vote Share Shifts as Canvass Progresses, Orange County, November 2018 (House of Representatives)



Note: The figure reports the vote share differences (Democratic vote share minus Republican vote share) at different points during the canvass at county level (bars) and district level (lines and points), for the U.S. House of Representatives races in Orange County in the November 2018 General Election.

Figure A4: Election Night Final and Certified Precinct Vote Share Differences, Orange County, November 2018 (House of Representatives)



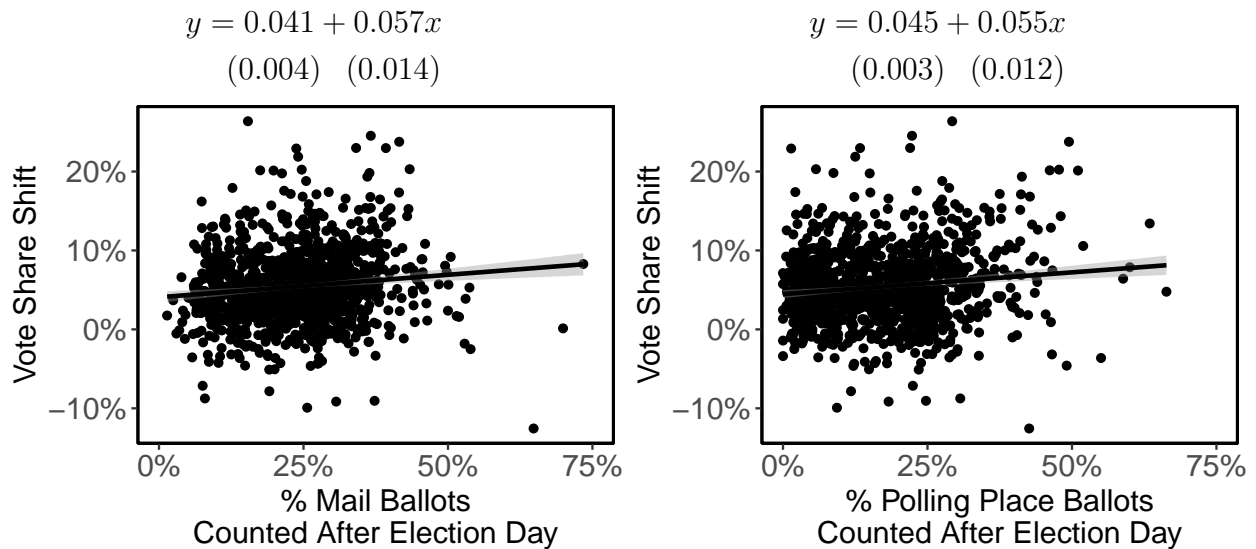
Note: The figure reports the precinct-level vote share differences (Democratic vote share minus Republican vote share) by the end of Election Night and the canvass, for the U.S House of Representatives races in Orange County in the November 2018 General Election. Sizes of the points and other shapes are proportional to the number of ballots cast.

7 Precinct-Level Analysis: Volume of Ballots Counted After Election Day

Table A1: Fraction of Mail and Polling Place Ballots Counted After Election Day and Precinct Vote Share Shift

	Governor	SE	House	SE
Intercept	0.032	0.004	0.039	0.004
Mail Ballots	0.055	0.014	0.025	0.013
Polling Place Ballots	0.054	0.012	0.059	0.011
N	1115		1115	
Adj. R-squared	0.029		0.026	

Figure A5: Fraction of Mail and Polling Place Ballots Counted After Election Day and Precinct Vote Share Shift



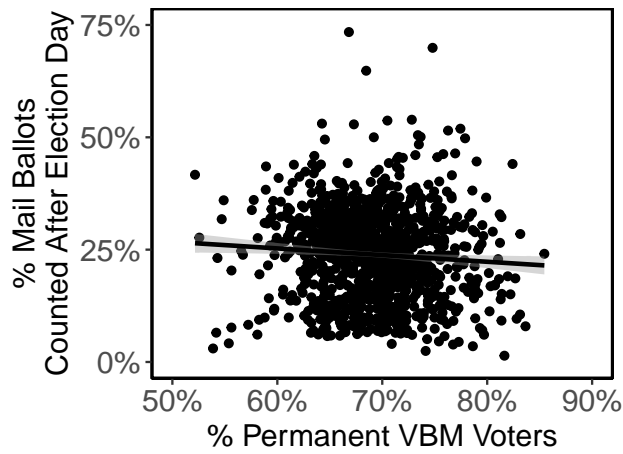
Note: These scatterplots display the relationships between precinct vote share shifts and fractions of mail and polling place ballots counted after Election Day, respectively (N = 1,115 precincts). Solid lines and shaded areas correspond to fitted least squares and 95% confidence intervals.

8 Precinct-Level Analysis: Volume of Mail Ballots Counted After Election Day and Percent of Permanent VBM Voters

Figure A6: Volume of Mail Ballots Counted After Election Day and Percent of Permanent VBM Voters

$$y = 0.342 - 0.148x$$

(0.041) (0.060)



Note: The scatterplot displays the relationship between the fraction of mail ballots counted after Election Day and the percent of permanent vote-by-mail voters at precinct level (N = 1,115 precincts). Solid lines and shaded areas correspond to fitted least squares and 95% confidence intervals.

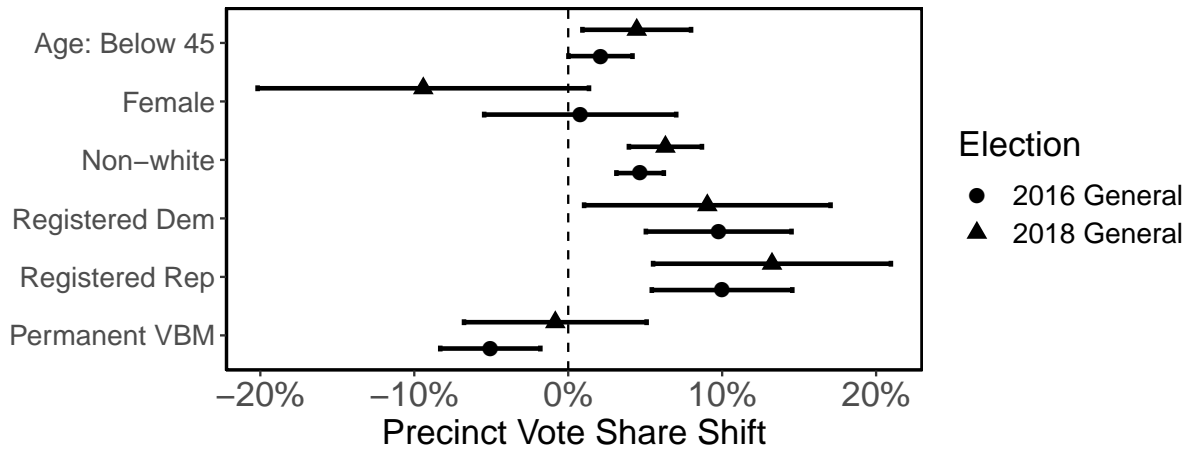
9 Precinct-Level Analysis: Voter Composition

Table A2: Association between Voter Composition and Precinct Vote Share Shift

	2018 General		2016 General	
	Estimate	SE	Estimate	SE
Age: Below 45	0.046	0.019	0.033	0.012
Female	-0.075	0.057	0.009	0.036
Non-white	0.093	0.013	0.045	0.009
Registered Dem	0.146	0.042	0.095	0.028
Registered Rep	0.184	0.041	0.118	0.027
Permanent VBM	-0.017	0.031	-0.022	0.019
Cong. District FE	Included		Included	
N	1115		1365	
Adj. R-squared	0.646		0.349	

10 Precinct-Level Analysis: Voter Composition (House of Representatives)

Figure A7: Association between Voter Composition and Precinct Vote Share Shift (House of Representatives)



Note: The figure reports coefficient estimates and 95% confidence intervals from linear regressions. Precinct vote share shifts are defined as the changes between the last run during Election canvass and the last run on Election night in precinct-level vote share differences (Democratic candidate vote share minus Republican candidate vote share). Independent variables include the proportion of voters in a precinct who are of age below 45, female, non-white, registered with the Democratic party, registered with the Republican party, and signed up for permanent vote-by-mail ballots, as well as Congressional district fixed effects.

11 Voter-Level Analysis: Voter Survey

Table A3: Association between Voter Characteristics and Returning Mail Ballots on Election Day: Voter Survey (Logistic Regressions with Survey Weights)

	Estimate	SE	AME	SE
Age: Below 45	0.780	0.111	0.119	0.016
Female	0.289	0.101	0.044	0.016
Non-white	0.372	0.108	0.057	0.017
College Graduate	-0.141	0.111	-0.021	0.017
Following Politics	-0.401	0.104	-0.061	0.016
Homeowner	-0.145	0.110	-0.022	0.017
Married/With Partner	0.128	0.104	0.019	0.016
Registered Dem	-0.337	0.109	-0.051	0.017
Registered Rep	-0.005	0.131	-0.001	0.020
First Time Voter	0.149	0.180	0.023	0.027
Cong. District FE	Included			
N	3840			

12 Voter-Level Analysis: Administrative Records

Table A4: Association between Voter Characteristics and Casting Types of Ballots Counted Later in the Process (Logistic Regressions)

	Mail				Polling Place			
	Est.	SE	AME	SE	Est.	SE	AME	SE
Age: Below 45	0.914	0.007	0.153	0.001	0.532	0.010	0.070	0.001
Female	0.123	0.006	0.021	0.001	0.055	0.009	0.007	0.001
Non-white	0.202	0.007	0.034	0.001	0.271	0.010	0.036	0.001
Registered Dem	-0.120	0.008	-0.020	0.001	-0.184	0.011	-0.024	0.001
Registered Rep	-0.121	0.008	-0.020	0.001	-0.258	0.012	-0.034	0.002
First Time Voter	0.298	0.010	0.050	0.002	0.794	0.013	0.105	0.002
Cong. Dist. FE	Included				Included			
N	683,930				379,775			

13 Beyond Orange County California

Table A5: Association between Voter Characteristics and Returning Mail Ballots close to Election Day in North Carolina and Colorado (Logistic Regressions)

	North Carolina				Colorado			
	Est.	SE	AME	SE	Est.	SE	AME	SE
Age: Below 45	1.094	0.018	0.153	0.002	1.098	0.003	0.196	0.001
Female	0.104	0.018	0.015	0.002	0.089	0.003	0.016	0.001
Non-white	0.248	0.021	0.035	0.003	0.273	0.003	0.049	0.001
Registered Dem	-0.182	0.020	-0.025	0.003	-0.343	0.004	-0.061	0.001
Registered Rep	-0.060	0.023	-0.008	0.003	-0.187	0.004	-0.033	0.001
Cong. Dist. FE	Included				Included			
N	97,571				2,436,226			