Universal Vote-by-Mail Has No Impact on Partisan Turnout or Vote Share

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Abstract: In response to COVID-19, many scholars and policymakers are urging the U.S. to expand voting-by-mail programs to safeguard the electoral process. What are the effects of vote-by-mail? In this paper, we provide a comprehensive design-based analysis of the effect of universal vote-by-mail—a policy under which every voter is mailed a ballot in advance of the election—on electoral outcomes. We collect data from 1996-2018 on all three U.S. states who implemented universal vote-by-mail in a staggered fashion across counties, allowing us to use a difference-in-differences design at the county level to estimate causal effects. We find that: (1) universal vote-by-mail does not appear to affect either party's share of turnout; (2) universal vote-by-mail does not appear to increase either party's vote share; and (3) universal vote-by-mail modestly increases overall average turnout rates, in line with previous estimates. All three conclusions support the conventional wisdom of election administration experts and contradict many popular claims in the media.

Keywords: Vote-by-Mail; Elections; COVID-19; partisanship

Significance Statement: In response to COVID-19, many scholars and policymakers are urging the U.S. to expand voting-by-mail programs to safeguard the electoral process, but there are concerns that such a policy could favor one party over the other. We estimate the effects of universal vote-by-mail, a policy under which every voter is mailed a ballot in advance of the election, on partisan election outcomes. We find that universal vote-by-mail does not affect either party's share of turnout or either party's vote share. These conclusions support the conventional wisdom of election administration experts and contradict many popular claims in the media. While it is difficult to predict whether either party might benefit from the expansion of vote-by-mail during an unprecedented public health crisis, our results imply that the outcomes of vote-by-mail elections in normal times closely resemble in-person elections.

1 Introduction

The COVID-19 pandemic threatens the 2020 U.S. election. Fears that the pandemic could deter many people from voting—or cause them to become infected if they do vote—have spurred calls for major electoral reforms. As election administration experts Nathaniel Persily and Charles Stewart put it: "The nation must act now to ensure that there will be no doubt, regardless of the spread of infection, that the elections will be conducted on schedule and that they will be free and fair."[1]

Persily and Stewart recommend expanding vote-by-mail programs to allow Americans the opportunity to vote from the safety from their own homes, but many question the potential political consequences of such a policy. President Trump declared that, if it was implemented, "you'd never have a Republican elected in this country again."[2] On the other hand, Brian Dunn, a former Obama campaigner and founder of a company that works on vote-by-mail programs, says that "There is justified concern that Democratic-leaning voters may be disadvantaged through vote-by-mail systems."[3] This debate continues in part because, in the academic literature, as Charles Stewart points out, "evidence so far on which party benefits [has] been inconclusive."[4]

We expand the existing evidence on the partisan effects of vote-by-mail programs by collecting new data on voting and election outcomes in California and Utah, which we combine with data on Washington state originally from Gerber, Huber, and Hill (2013), extended to present day in our study. Together, this dataset allows us to study the full universe of county-level universal vote-by-mail programs with staggered roll-outs. Universal vote-by-mail is the strongest form of vote-by-mail; in all three states we study, every registered voter is sent a ballot and in-person voting options decrease dramatically. Policy experts and policymakers are primarily recommending that states without robust pre-existing vote-by-mail programs

[1] https://www.lawfareblog.com/ten-recommendations-ensure-healthy-and-trustworthy-2020-election

[2] https://www.theguardian.com/us-news/2020/apr/08/trump-mail-in-voting-2020-election

[3] https://www.nytimes.com/2020/04/10/us/politics/vote-by-mail.html

[4] https://www.nytimes.com/2020/04/10/us/politics/vote-by-mail.html

expand access by lifting requirements that voters provide a valid excuse in order to receive an absentee ballot, while stopping short of moving to universal vote-by-mail[5]—as such, by studying a more dramatic version of the recommended policies, our paper provides a useful upper bound related to these discussions. While a large literature in political science studies various forms of convenience voting—see Table S1 for a full review—there has not been any comprehensive analysis of vote-by-mail that employs clear designs for causal inference to estimate effects on partisan outcomes.[6] The existing research supporting the neutral partisan effects of vote-by-mail compares turnout in Oregon before and after it implemented its statewide universal vote-by-mail reform, or extrapolates from the behavior of irregular voters to make predictions about partisan effects (Karp and Banducci 2000; Berinsky, Burns, and Traugott 2001; Berinsky 2005).[7]

We find that implementing universal vote-by-mail has no apparent effect on either the share of turned-out voters who are Democrats or the share of votes that go to Democratic candidates, on average, although these latter estimates are a bit less precise. We also find

[5]For example, the proposed Klobuchar-Wyden bill calls for all Americans to have access to no-excuse absentee voting. See `https://www.klobuchar.senate.gov/public/_cache/files/0/0/00bfcd4c-8bff-4e40-8082-9c509e6bf168/C874798F600EED86B58DED75D3FE5875.naturaldisasterandeba.pdf`.

[6]The existing papers with clear causal designs for the effect of universal vote-by-mail study overall turnout (Gerber, Huber, and Hill 2013), roll-off (Marble 2017), political information and accountability (Szewczyk 2020*a*,*b*), the participation of low-propensity voters (Gerber, Huber, and Hill 2013), or precinct-level rather than county-level interventions (Elul, Freeder, and Grumbach 2017), and only study one state at a time. The closest analogue to the effect of universal vote-by-mail on a party's vote share comes from Gerber, Huber, and Hill (2013) which finds that the turnout rates of high-propensity voters increase by less than those of low-propensity voters, who some may assume have different political leanings from regular voters. Fowler (N.d.) explicitly estimates the heterogeneous turnout effects of a convenience voting reform in West Virginia using a county-level difference-in-difference design and finds no evidence for different effects by party. Yet, the logic that expanding the pool of voters may favor one party is not flawed–for example, compulsory voting laws appear to improve the performance of the Labor party in Australia (Fowler 2013). Table S1 in the Appendix summarizes the large existing literature on vote-by-mail reforms which generally studies the effect on turnout with findings ranging from a large increase Magleby (1987); Southwell and Burchett (2000); Richey (2008); Larocca and Klemanski (2011), to a modest increase or null effect (Berinsky, Burns, and Traugott 2001; Gronke, Galanes-Rosenbaum, and Miller 2007; Southwell 2009; Gerber, Huber, and Hill 2013; Menger, Stein, and Vonnahme 2015), to a decrease (Kousser and Mullin 2007; Elul, Freeder, and Grumbach 2017).

[7]Meredith and Malhotra (2011) presents evidence that vote-by-mail can change primary election outcomes since many voters mail their ballots before candidates withdraw. Szewczyk (2020*b*) finds the introduction of vote-by-mail in Washington lead to less taxation.

that it increases turnout by roughly 2 percentage points, on average—very similar to the estimate reported in Gerber, Huber, and Hill (2013) for Washington state.

These findings are consistent with the conventional wisdom in the convenience-voting literature (see Gronke et al. (2008) for a review). However, they should increase our confidence in these views, both because our data permits a stronger research design than was previously possible and because our dataset runs through the 2018 midterm elections, allowing for the most up-to-date analysis available.

Three main caveats are warranted in interpreting our findings. First, our evidence is about the effects of counties opting into universal vote-by-mail programs during normal times—that is, the counterfactual we are comparing voting-by-mail to is a normally administered in-person election. The effect of vote-by-mail programs relative to the counterfactual of an in-person election during COVID-19 might be quite different, and the effect would depend on whether we believe COVID-19 disproportionately deters Democrats or Republicans from voting. In addition to being unsure what the effects of expansions of vote-by-mail might be in the context of COVID-19, we should also stress that our focus is on the causal effects of implementing vote-by-mail programs, and not on raw correlations between those states that expand vote-by-mail and partisan outcomes. As the issue of vote-by-mail becomes increasingly partisan, it is possible that Democratic-leaning states will lean into expanding vote-by-mail more than Republican states. If this occurs, the subsequent correlation between vote-by-mail expansions and the Democratic leanings of the electorate in these states will not necessarily indicate that vote-by-mail caused these states to become more Democratic.

Second, our results say nothing about whether vote-by-mail should be implemented nationwide. There may be reasons to worry about rolling out nationwide vote-by-mail that we cannot study; for example, it might have disparate impact on minority voters, who some claim utilize vote-by-mail at a lower rate (though also see McGhee et al. (2019)), [8] or it may

[8] https://www.nytimes.com/2020/04/10/us/politics/vote-by-mail.html

simply be too expensive to administer to be worth the cost. Finally, even if vote-by-mail did have partisan effects, there might still be good reasons to support it as a policy.

Third, and finally, our paper directly studies the effects of what we call universal vote-by-mail programs—the policy in which states mail every single registered voter a ballot. Many of the policy proposals for the 2020 election fall short of universal vote-by-mail, and instead focus on expanding opportunities for voters to opt into voting absentee. We do not have direct evidence on the effects of these "no-excuse" vote-by-mail programs, but the universal vote-by-mail programs we study represent a more dramatic intervention than no-excuse vote-by-mail. We suspect, therefore, that univeral vote-by-mail might provide an upper bound on the effect of no-excuse vote-by-mail.

Even with these caveats, our paper has a clear takeaway: claims that vote-by-mail fundamentally advantages one party over the other appear overblown. In normal times, based on our data at least, vote-by-mail modestly increases participation while not advantaging either party.

2 Voting-by-Mail and County Roll Outs

Led by Oregon in 2000, six states in the US have now adopted, or are in the process of adopting, universal vote-by-mail elections.[9] In some of these cases, the state has implemented the vote-by-mail program across the entire state. For example, Oregon, Colorado, and Hawaii made statewide switches to vote-by-mail elections beginning in 2000, 2014, and 2020, respectively.[10] Estimating the effects of these statewide adoptions of universal vote-by-mail on partisan election outcomes, turnout, and the partisan composition of the electorate is difficult, as these switches happen concurrently with other statewide changes and provide no within-state counterfactuals.

[9]Colorado, Hawaii, Oregon, Utah, and Washington now conduct all elections by mail (see `https://www.ncsl.org/research/elections-and-campaigns/all-mail-elections.aspx`).

[10]We summarize these changes in Table S2 in the Appendix.

To study the effect of switching to universal vote-by-mail elections, in which all registered voters are sent a ballot and nearly all votes are cast by mail, we narrow our focus to the three states that rolled out universal vote-by-mail at the county-level in a staggered fashion: California, Utah, and Washington.[11] By comparing counties that adopt a vote-by-mail program to counties within the same state that do not adopt the program, we are able to compare the election outcomes and turnout behavior of voters who have different vote-by-mail accessibility but who have the same set of candidates on the ballot for statewide races.

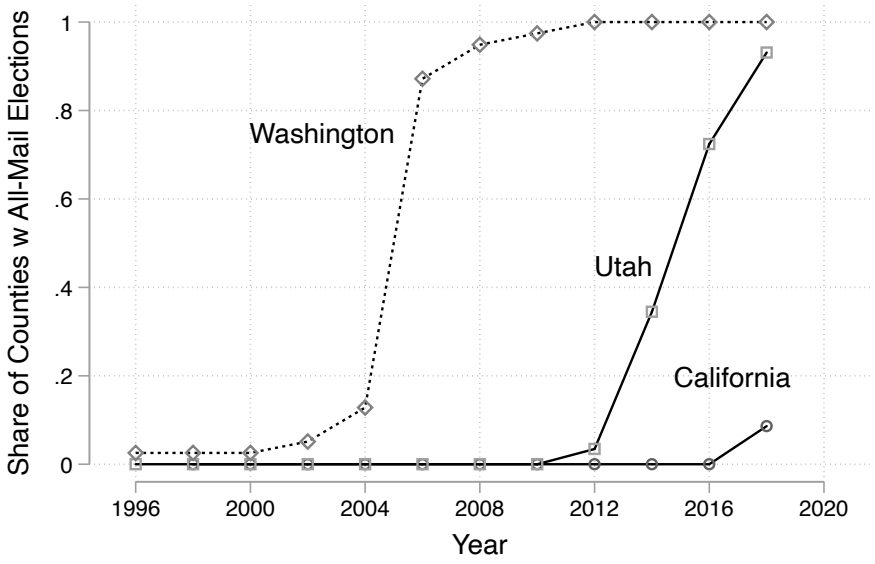
Each of these three states' reforms are slightly different, but all share a similar feature: counties adopting universal vote-by-mail mailed an absentee ballot to every eligible voter in the county, not just voters who had requested receiving a mailed absentee ballot. Voters can mail their completed ballot to their county elections office, or deposit their ballot in secure ballot drop-off locations throughout the county. Alternatively, each of these states' reforms also replaces traditional polling places with some form of in-person voting, though these options vary considerably by state.[12]

In Utah and Washington, each county has now adopted the vote-by-mail program described above. In California, the county-level roll-out is ongoing. Following the adoption of

[11] In California, Utah, and Washington, vote-by-mail has become increasingly common. Figure 1 shows the share votes cast in the general election that are vote-by-mail, in California and Washington in each election year from 1998-2018. In the late 1990s, the majority of votes cast in both states came from non-VBM options. By the late 2010s, nearly every county in California had a majority of their votes cast using VBM and Washington had all-mail elections.

[12] In California, counties that adopt all-mail elections are required to have one in-person voting center for every 10,000 registered voters on election day (see `https://www.sos.ca.gov/elections/voters-choice-act/about-vca/`). Utah also offers some opportunities for in-person voting in existing government offices to ensure those with disabilities or issues with their ballots are able to participate (see https://www.youtube.com/watch?v=LkZntyrpNyQ). As of 2011, all counties in Washington were required to have at least one in-person voting center for general, primary, and special elections (see "voting centers" at `https://app.leg.wa.gov/RCW/default.aspx?cite=29a.40`). At least some vote-by-mail counties in Washington had an in-person voting option prior to 2011 to comply with the federal Help America Vote Act (see, e.g., `https://web.archive.org/web/20061031134553/http://www.kitsapgov.com/aud/elections/disabilityaccess.htm`).

Figure 1 – Increase in the Adoption of Universal Vote-by-Mail, California, Utah, and Washington General Elections, 1996 to 2018.



California's Voter's Choice Act (VCA), 5 of California's 58 counties adopted universal vote-by-mail for the 2018 elections, followed by an additional 10 counties for the 2020 elections.[13]

Figure 1 shows the timing of each state's county-level roll out of vote-by-mail reforms, and it illustrates the main source of variation we exploit in this study. The vertical axis represents the share of counties in each of the three states we study that adopt universal vote-by-mail. As we can see, each state rolled out its vote-by-mail program in a staggered fashion over several election cycles.

2.1 Outcomes of Interest

We collect data on a variety of outcomes to see how universal vote-by-mail might affect elections. First, we are interested in how vote-by-mail affects the performance of Democratic versus Republican candidates. We collect county-level general election results for each state

[13]For the 2018 election 14 of California's 58 counties were allowed to opt into this new format for conducting elections, and all of California's counties were allowed to adopt these changes beginning in 2020. See `https://www.sos.ca.gov/elections/voters-choice-act/about-vca/`.

from its Secretary of State website to construct the Democratic two-party vote share in each Presidential, Gubernatorial, and Senatorial general election.[14]

Second, we are interested in how vote-by-mail might affect the partisan composition of the electorate. For this outcome, we use the California and Utah voter files, provided by L2, a private data vendor. The voter files contain information on each individual's name, registration address, date of birth, date of registration, party registration, and turnout history. Using the voter file, we can observe whether universal vote-by-mail led to a more Democratic or Republican electorate, based on the party registration of those who turn out to vote.

Finally, we are interested in the effect of vote-by-mail on turnout and vote-by-mail usage. For California and Utah, we collect the number of ballots cast in each general election from official state sources. For Washington, we use turnout provided by Gerber, Huber, and Hill (2013). To construct a turnout share, we divide the total number of ballots cast by the county's citizen voting age population in that year.[15] For California and Washington, we also observe each county's turnout by vote mode, so we can construct a measure of the share of total votes in a county that come via vote-by-mail.

Table 1 summarizes the information that we have collected from each of the three states that we study. Overall, the data we have collected covers a wide range of years (1996-2018). It includes each election cycle's turnout and election results from all three states. Vote-by-mail usage comes from California and Washington, and our analyses on the partisan composition of the electorate that use the voter file come from California.

[14] In California, we use only Gubernatorial, not Presidential, election results. This is because the earliest county California to adopt universal vote-by-mail was in 2018, and a Presidential general election has not yet occurred since then.

[15] Each county's citizen voting age population is collected from `https://www.census.gov/programs-surveys/decennial-census/about/voting-rights/cvap.html`.

Table 1 – Information Included in Various Data Sources. Each column denotes a state, and checkmarks indicate features or observable information in that state. Turnout data is missing in California for the year 2000. While we have presidential election data for California, it did not implement its vote-by-mail program until after the 2016 presidential election. Similarly, while we have senatorial election data for California, it implemented a top-two primary system and its general election race for Senate included two Democrats in 2018.

	California	Utah	Washington
General Election Turnout	✔	✔	✔
Vote-by-Mail Ballot Usage	✔		✔
Gubernatorial Election Results	✔	✔	✔
Senatorial Election Results	N/A	✔	✔
Presidential Election Results	N/A	✔	✔
Voter File	✔	✔	
Years Included	1998-2018	1996-2018	1996-2016

3 Empirical Approach: Difference-in-Differences

Estimating the effect of vote-by-mail programs is difficult because the states that have implemented vote-by-mail differ systematically from those that have not. Figure S1 in the Appendix shows that states that go on to adopt universal VBM (those listed in Table S2) are states that have had higher average Democratic vote shares for President, on average, than states that do not adopt these policies. Moreover, the gap in Democratic vote shares in VBM states an non-VBM states has grown over time. If we found, for example, that vote-by-mail programs are correlated with higher turnout for Democratic voters using a statewide design, we could not conclude that vote-by-mail causes Democratic voters to turn out more; it could be that Democratic voters simply turn out to vote more in liberal states. To get at the actual effect of the vote-by-mail program, we need to approximate an experiment in which some elections occur under vote-by-mail while other, similar elections do not.

To do something like this, we take advantage of the staggered rolling out of vote-by-mail across counties, within California, Utah, and Washington, as we explained above. In

particular, we estimate the following equation:

$$\mathrm{Y}_{cst} = \beta \mathrm{VBM}_{cst} + \gamma_{cs} + \delta_{st} + \epsilon_{cst}, \tag{1}$$

where Y is an outcome variable—usually partisan turnout rates or vote share—in county c in state s during election t. Our treatment indicator, VBM, takes a value of 1 if the county opts into its state's vote-by-mail program, and 0 otherwise. The γ_{cs} and δ_{st} terms represent county fixed effects and state-by-election fixed effects, respectively. As the above equation makes clear, this is a difference-in-differences design, where we compare within-county changes in turnout over time across changes in vote-by-mail policy. To identify β as the causal effect of universal vote-by-mail, it must be the case that the trends in turnout in counties that do not adopt vote-by-mail provide valid counterfactuals for the trends we would have observed in the treatment counties, had they chosen not to adopt vote-by-mail.

We use a variety of tests to evaluate whether the parallel trends assumption might be reasonable in our case. First, to test for anticipatory effects, following Angrist and Pischke (2009) we plot coefficients on leads of our outcome variables and compare them to our estimated treatment effects. The simple idea of these tests is that a county's vote-by-mail program should not affect our outcomes in the elections prior to its adoption. Second, we relax the parallel trends assumption in a variety of ways by including more flexible sets of fixed effects, like linear or quadratic time trends. We discuss these tests in detail throughout the results sections.

4 Neutral Partisan Effects of Vote-by-Mail

Does vote-by-mail favor either political party in elections? Table 2 presents our main results.[16] The first column shows our basic state-specific difference-in-differences design where the outcome is the share of voters—that is, people who turn out to vote—who are Democrats. In this specification, we estimate that the Democratic turnout share increases by 0.7 percentage points as a result of vote-by-mail. This specification uses state-by-year fixed effects, estimating state-specific time shocks, and therefore makes the within-state comparisons that Gerber, Huber, and Hill (2013) recommends.

In columns 2 and 3, we also examine the possibility that counties may be on different trends by including linear (column 2) and quadratic (column 3) county-specific time trends. The inclusion of these trends attenuates the estimates dramatically, to only 0.1 percentage points, while also shrinking the standard errors. In the latter two specifications, which are our most precise specifications, even the upper bound of the 95% confidence interval is only about 0.3 percentage points, a very small effect. We conclude from these estimates that, while our simplest difference-in-differences estimate suggests a small but detectable effect on Democratic share of turnout, more plausible estimates suggest a truly negligible effect.

The latter three columns use the same set of specifications to explore the difference-in-differences estimates for the effect of vote-by-mail on Democratic candidate two-party vote share, pooling together Democratic gubernatorial candidates, Democratic senate candidates, and Democratic presidential candidates.[17] In column 4, when we use state-by-year fixed effects without time trends, we estimate a 2.8 percentage-point increase for Democrats—however, when we add trends in columns 5 and 6, this estimate attenuates markedly. While

[16] The in-person voting options vary some by state, as we discussed in Section 2. For this reason, and since these states vary in other ways, we show the results separately for each state in Section S8 of the Appendix. The results are reassuring. In particular, we do not see any evidence of a larger effect of vote-by-mail expansion in Washington, the state with the most extreme expansion. The estimates appear to be similarly null in all three contexts.

[17] The number of counties increases in columns 4-6 because we have data from all three states, whereas in columns 1-3 we have partisan turnout data from California and Utah. In Table S3 in the Appendix, we show the same version of Table 2, but using only California and Utah for all six columns. The results remain substantively similar.

Table 2 – Vote-by-Mail Expansion Does Not Appear to Favor Either Party.

	Dem Turnout Share [0-1]			Dem Vote Share [0-1]		
	(1)	(2)	(3)	(4)	(5)	(6)
VBM	0.007	0.001	0.001	0.028	0.011	0.007
	(0.003)	(0.001)	(0.001)	(0.011)	(0.004)	(0.003)
# Counties	87	87	87	126	126	126
# Elections	23	23	23	31	31	31
# Obs	986	986	986	1,998	1,998	1,998
County FE	Yes	Yes	Yes	Yes	Yes	Yes
State by Year FE	Yes	Yes	Yes	Yes	Yes	Yes
County Trends	No	Linear	Quad	No	Linear	Quad

Robust standard errors clustered by county in parentheses. The number of counties is smaller in columns 1-3 because we have partisan turnout share for CA and UT, but not WA. Columns 4-6 use data from all three states.

the standard errors on these estimates are larger than the standard errors on the turnout share estimates, they continue to suggest modest or null effects, and they are nowhere near the magnitude necessary to represent a major, permanent electoral shift towards the Democratic party.[18]

In sum, looking across turnout and vote share outcomes, the substantively small size of the estimated effects leads us to conclude that vote-by-mail does not have meaningful partisan effects on election outcomes. We find the estimates on the Democratic share of turnout, which are particularly precise, to be most compelling. Universal vote-by-mail does not appear to tilt turnout towards the Democratic party, nor does it appear to affect election outcomes meaningfully.

[18]We show graphical evidence of the neutral partisan effects of vote-by-mail in Figure S5 in the Appendix.

5 Universal Vote-by-Mail Modestly Increase Turnout

Having evaluated the partisan effects of vote-by-mail, we now evaluate its effect on political participation as measured by the share of the eligible population that turns out to vote in general elections.

Table 3 presents formal estimates of the effect of universal vote-by-mail on participation.[19] The first three columns report estimates of the effect on the number of voters participating as a share of the citizen voting-age population. As in Table 2, Column 1 reports reports the within-state estimate, and columns 2 and 3 add linear and quadratic county-specific trends, respectively. Looking across the columns, we see a stable estimate showing that vote-by-mail causes around a 2-percentage-point increase (estimates range from 2.1 to 2.2 percentage points) in the share of the citizen voting-age population that turns out to vote.[20]

The final three columns, using the same regression specifications as columns 1 through 3, show that universal vote-by-mail produces a large increase in the share of ballots that are mailed in—roughly a 14 to 19 percentage-point increase across specifications. This is not a surprising finding, but it does show that large numbers of voters appreciate the chance to mail in their ballot.[21]

6 Conclusion

This paper has offered new data to offer the most up-to-date, most credible causal evidence on the effects of universal vote-by-mail programs on partisan electoral outcomes and participation during normal times. In our data, we confirm important conventional wisdom among election experts: vote-by-mail offers voters considerable convenience, increases turnout rates modestly, but has no discernible effect on party vote shares or the partisan share of the electorate.

[19] We show the results separately for each state in Section S9 of the Appendix.

[20] We show graphical evidence of the participation effect in Figure S6 in the Appendix.

[21] Existing work on universal vote-by-mail in California and Oregon reaches a similar conclusion that voters take advantage of the opportunity to vote by mail (Southwell 2004; Bryant 2019).

Table 3 – Vote-by-Mail Expansion Increases Participation.

	Turnout Share [0-1]			Vote-by-Mail Share [0-1]		
	(1)	(2)	(3)	(4)	(5)	(6)
VBM	0.021	0.022	0.021	0.186	0.157	0.136
	(0.009)	(0.007)	(0.008)	(0.027)	(0.035)	(0.085)
# Counties	126	126	126	58	58	58
# Elections	30	30	30	10	10	10
# Obs	1,240	1,240	1,240	580	580	580
County FE	Yes	Yes	Yes	Yes	Yes	Yes
State by Year FE	Yes	Yes	Yes	Yes	Yes	Yes
County Trends	No	Linear	Quad	No	Linear	Quad

Robust standard errors clustered by county in parentheses.

Our results should strengthen the field's confidence in these effects of vote-by-mail. While the design we implement is by no means perfect, our new data does permit empirical approaches stronger than those used in the existing literature. Only one existing paper in the vote-by-mail literature employs a similar design, and it studies only participation and only in the state of Washington. As such, we believe our paper is the most comprehensive confirmation to date of vote-by-mail's neutral partisan effects.

As the country debates how to run the 2020 election in the shadow of COVID-19, politicians, journalists, pundits, and citizens will continue to hypothesize about the possible effects of vote-by-mail programs on partisan electoral fortunes and participation. We hope that our study will provide a useful data point for these conversations.

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Supporting Information Appendix: Universal Vote-by-Mail Has No Impact on Partisan Turnout or Vote Share

Daniel M. Thompson, Jennifer Wu, Jesse Yoder, and Andrew B. Hall

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S1 Summary of the Extant Literature on Vote-by-Mail Effects

This section summarizes the literature to date on the effects of vote-by-mail programs. Each row of Table S1 represents a study on the effects of vote-by-mail, and the columns summarize the study's setting research design, effect on overall turnout, and a summary of its effect on the composition of the electorate, if any.

Table S1 – Review of Vote-by-Mail Effects Literature. Note: Magelby (1987) studies a selection of cities in the United States and Canada. All other settings are state abbreviations. X-Section refers to a cross-sectional design, and DiD refers to a difference-in-differences design.

Paper	Setting	Design	Turnout Effect	Composition Effect	Partisan Effect
Magelby (1987)	USA, CAN	Pre-Post	Large +		
Karp and Banducci (2000)	OR	Pre-Post	Modest − to Modest +	↑ Frequent Voters	
Southwell and Burchett (2000)	OR	Pre-Post	Large +		
Berinsky, Burns, and Traugott (2001)	OR	Pre-Post	Modest +	↑ Frequent Voters	No Effect
Gronke et al. (2007)	OR	State Panel	Modest +		
Kousser and Mullin (2007)	CA	X-Section	Modest -		
Richey (2008)	OR	State Panel	Modest/Large +		
Southwell (2009)	OR	Pre-Post	Modest − to Null		
Bergman and Yates (2011)	CA	Pre-Post	Large −		
Larocca and Klemanski (2011)	OR, WA	X-Section	Modest/Large +		
Gerber, Huber, and Hill (2013)	WA	County DiD	Modest +	↑ Infrequent Voters	
Menger, Stein, and Vonnahme (2015)	CO	Pre-Post	Modest +		
Elul et al. (2017)	CA	Precinct DiD	Modest −		
Keele and Titiunik (2018)	CA	Geo RDD	Modest −		
Atsusaka (2019)	CO	Pre-Post	Modest +	↑ Infrequent Voters	

S2 Universal Vote-by-Mail Adoption by State

In this section, we provide a summary of states that have adopted programs to mail every registered voter a ballot by default. Table S2 shows this information, along with the level at which the vote-by-mail program was rolled out and some information about the timing of its implementation. As we can see, three states, Oregon, Colorado, and Hawaii have implemented statewide vote-by-mail programs in 2000, 2014, and 2020, respectively. The three states we focus on, California, Utah, and Washington, are those that have rolled out their vote-by-mail programs in a staggered fashion by county. The roll-out in California is still ongoing.

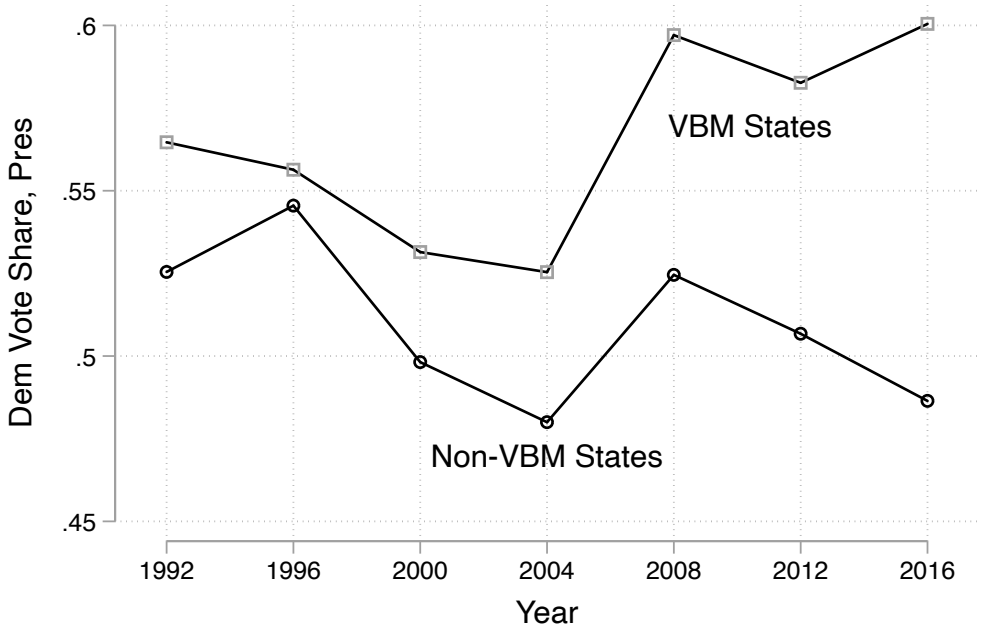
Table S2 – States With Programs to Mail Every Registered Voter a Ballot. Note: This table shows states where every county in the state is eligible to adopt a program to mail every registered voter a ballot for primary and general elections. Nebraska and North Dakota allow only some counties to conduct all-mail elections, and several other states allow some counties to conduct special elections or local elections by mail.

State	Level of Roll-Out	Year Started	Year Fully Implemented
California	County	2018	Ongoing
Colorado	State	2014	2014
Hawaii	State	2020	2020
Oregon	State	2000	2020
Utah	County	2012	2020
Washington	County	2006	2010

S3 Differences Between VBM and non-VBM States

In this section, we show a key difference in the voting patterns of states that have adopted vote-by-mail programs and those that have not. We collect state-level presidential election results for each state from 1992-2016. In Figure S1, we plot the Democratic Presidential two-party vote share separately for states that adopt a VBM program at some point and those that do not. The VBM states (those listed in Table S2) tend to vote for Democratic presidential candidates at higher rates than non-VBM states. Moreover, this gap has increased over time: in recent presidential elections, the average Democratic presidential vote share was about 10 percentage points higher in VBM states compared to non-VBM states. Overall, this illustrates the disadvantage of studying the effects of vote-by-mail programs at the state-level. The six states that have adopted vote-by-mail programs not only tend to vote for Democratic candidates at higher rates, but they also are trending more quickly in a Democratic direction than states that have not adopted VBM.

Figure S1 – Democratic Presidential Two-Party Vote Share over time, by Vote-by-Mail. VBM states are those listed in Table S2.

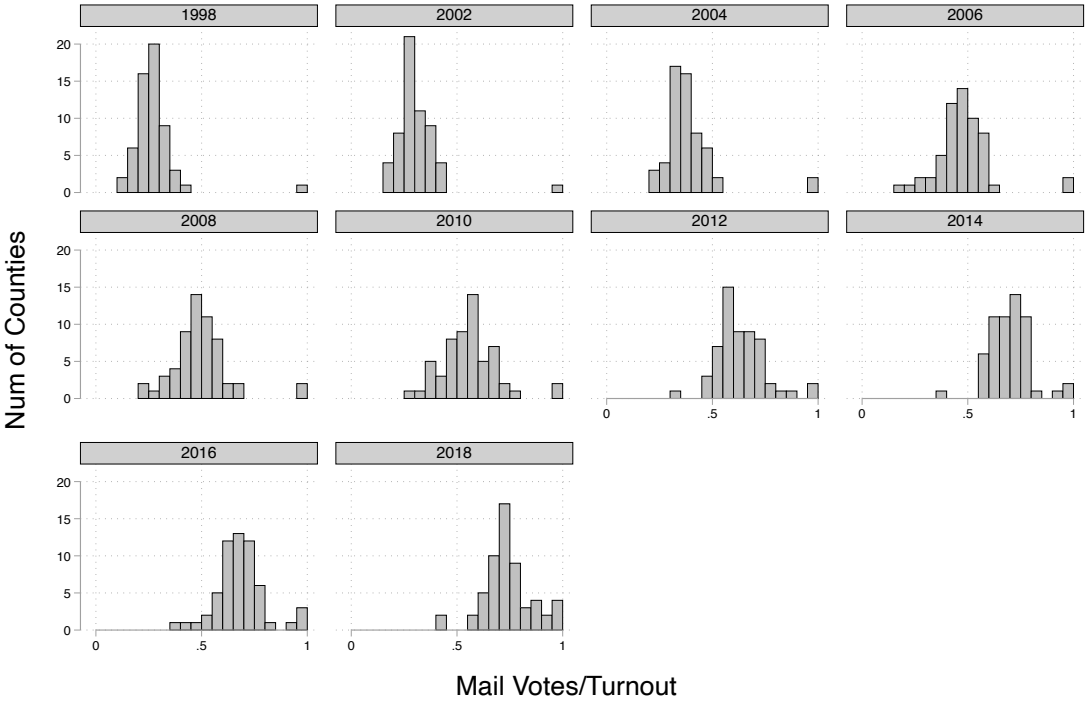


S4 Increasing Use of Vote-by-Mail

In this section, we show the fraction of votes cast using vote-by-mail over time for California and Washington. As we show, vote-by-mail usage has become increasingly common over time in both states.

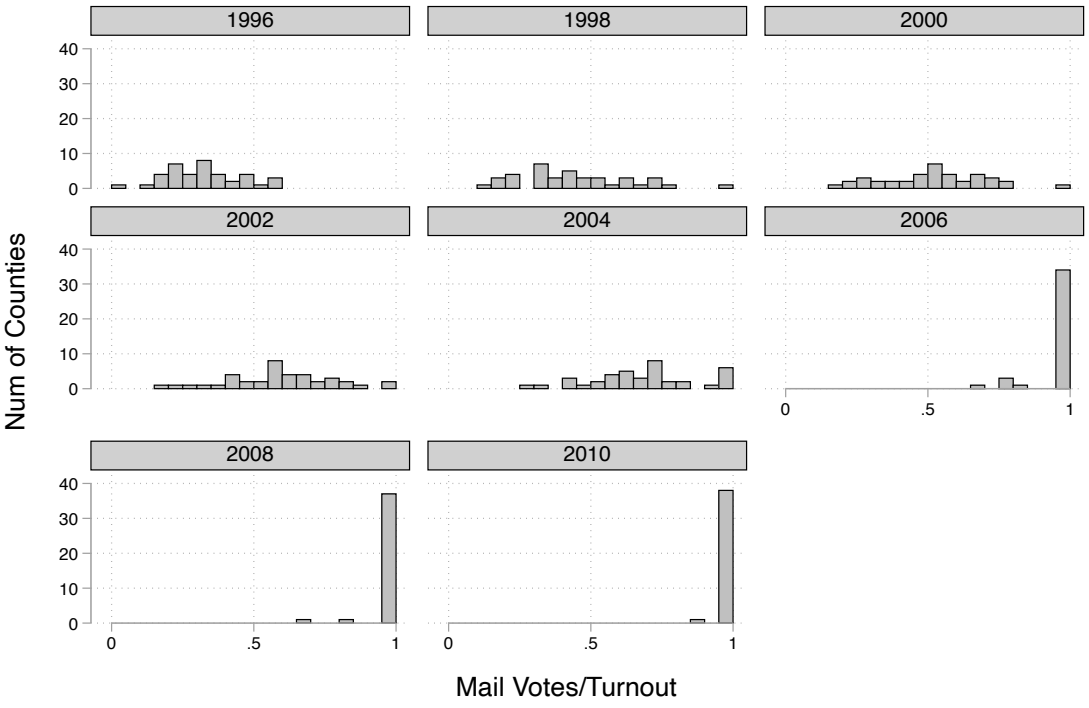
First, in Figure S2 we show vote-by-mail usage in California general elections over time. Each plot is a histogram of California counties, with the x-axis representing the share of total votes that were cast using vote-by-mail. As we can see, nearly all California counties received less than half of their ballots from vote-by-mail in 1998, but by 2018 nearly all counties in California received more than half of their ballots from vote-by-mail.

Figure S2 – Use of Vote-by-Mail in CA General Elections, 1998 to 2018.



Next, we show the same set of histograms of vote-by-mail usage over time for Washington. Most of the counties adopted Washington's switch to exclusively vote-by-mail starting in 2006, which is where we see the largest shift toward vote-by-mail usage. By 2010, nearly all Washington counties had switched to the exclusive vote-by-mail program.

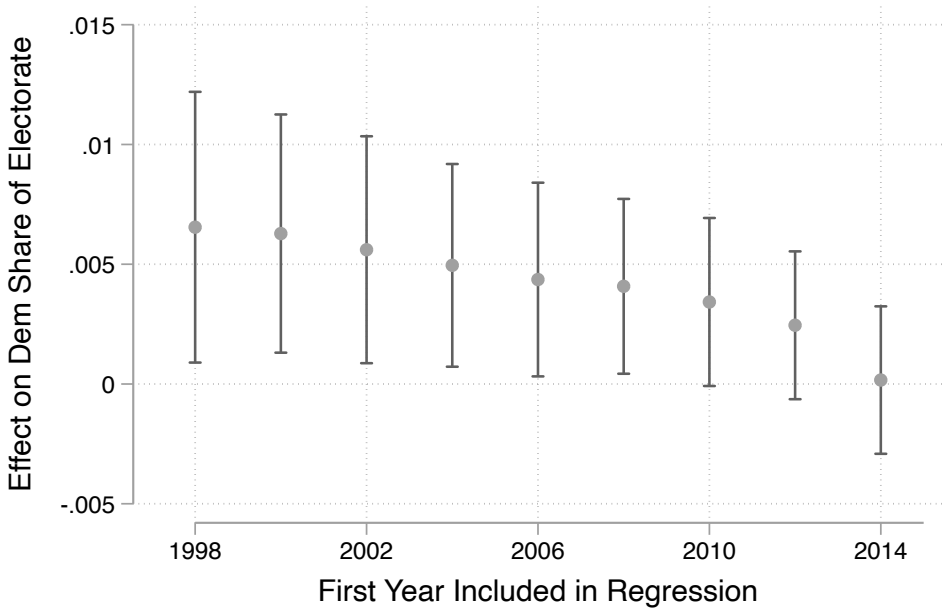
Figure S3 – Use of Vote-by-Mail in WA General Elections, 1996 to 2010.



S5 Robustness of Composition Effects to Elections Included

In this section, we show the robustness of our main results on the effects of vote-by-mail on the partisan composition of the electorate (columns 1-4 of Table 2). For all of our results on the composition of the electorate, we use the California voter file. One concern with using this data is that voters removed from the voter file over time may be different from those remaining on the lists. In particular, we know that older voters in 1998 are much less likely to still be in the 2019 voter file we are using. This problem should be much smaller in elections that were held closer to the time when the voter file was compiled. In Figure S4, we evaluate the sensitivity of our results to the number of elections prior to 2018 that we include in the difference-in-differences regression. We find that the results are substantively unchanged when we include fewer elections and, if anything, shrink toward zero.

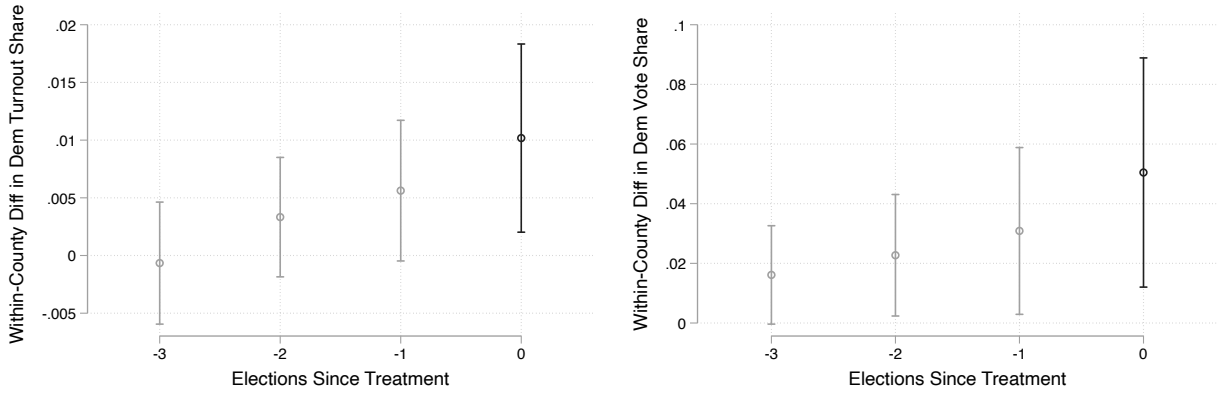
Figure S4 – Partisan Composition Effects Not Sensitive to Years Included in Sample.



S6 Graphical Evidence of Partisan Effects of Vote-by-Mail

In this section, we provide a graphical examination of vote-by-mail's effects on our outcomes in Table 2, which further suggests that there are no vote-by-mail effects on partisan turnout or vote share beyond the pre-trending issue. Figure S5 plots estimated "effects" of vote-by-mail for three pre-treatment periods as well as for the actual treatment period. These are estimated by including four dummy variables in the regression corresponding to column 2 in Table 2: three leads that take the value if the county became treated three elections in the future, two in the future, or one in the future, as well as the standard treatment dummy indicating the the county was a vote-by-mail county. As the plot shows, the pre-treatment effects are nearly as large as the estimated post-treatment effect, and they trend upwards steadily, with the estimated post-treatment effect essentially on trend. This further suggests to us that even the small partisan vote-share effect we estimate in our regressions is likely to be the result of residual pre-trending rather than a real effect.

Figure S5 – Vote-by-Mail Reform and Pre-Trends.



S7 Partisan Effects Limiting to California and Utah

In this section, we show a version of Table 2 where we limit the analysis to California and Utah. For columns 1-3, where the outcome is Democratic turnout share, the results remain the same as in Table 2 because we have partisan composition for those two states, but not for Washington. For the Democratic vote share results in columns 4-6, in the main results in our paper we pool all three states. Here, to make sure the sample we are studying is consistent across the two outcome variables, we limit the vote share analysis to just California and Utah. The results are slightly noisier because we have dropped Washington, but the takeaway remains substantively similar to our main results in Table 2.

Table S3 – Vote-by-Mail Expansion Does Not Appear to Favor Either Party (California and Utah).

	Dem Turnout Share [0-1]			Dem Vote Share [0-1]		
	(1)	(2)	(3)	(4)	(5)	(6)
VBM	0.007	0.001	0.001	0.041	0.009	0.004
	(0.003)	(0.001)	(0.001)	(0.021)	(0.007)	(0.006)
# Counties	87	87	87	87	87	87
# Elections	23	23	23	21	21	21
# Obs	986	986	986	1,218	1,218	1,218
County FE	Yes	Yes	Yes	Yes	Yes	Yes
State by Year FE	Yes	Yes	Yes	Yes	Yes	Yes
County Trends	No	Linear	Quad	No	Linear	Quad

Robust standard errors clustered by county in parentheses.

S8 Partisan Effects by State

In this section, we show our effects of vote-by-mail on partisan outcomes separately for each of the three states we study. The specifications in each of the table mirror those in our main results in Table 2. In each of these tables, we report confidence intervals for our estimates using the block bootstrap procedure described Cameron, Gelbach, and Miller (2008), clustered by county, due to the small number of clusters when estimating the effects independently for each state.

We show the results for California in Table S4. The effect on the Democratic turnout share is close to zero, and it is precisely estimated. The results for Democratic vote share are also similar to when we pool across all three states. At first it appears that vote-by-mail might lead to a small increase in Democratic vote share, but when we account for possible pre-trending by including county trends, it becomes clear that the effect is close to zero.

Table S4 – Vote-by-Mail Expansion Does Not Appear to Favor Either Party in California.

	Dem Turnout Share [0-1]			Dem Vote Share [0-1]		
	(1)	(2)	(3)	(4)	(5)	(6)
VBM	0.003	-0.004	-0.001	0.030	0.001	-0.012
	[-0.004,0.013]	[-0.008,-0.001]	[-0.009,0.005]	[0.001,0.058]	[-0.017,0.014]	[-0.052,0.027]
# Counties	58	58	58	58	58	58
# Elections	11	11	11	11	11	11
# Obs	638	638	638	638	638	638
County FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
County Trends	No	Linear	Quad	No	Linear	Quad

Block wild bootstrap confidence intervals clustered by county in brackets.

We show the results for Utah in Table S5. Similar to the results for California, it appears at first that vote-by-mail might increase democratic vote shares by a small amount, but once we move to our more plausible specifications in columns 5 and 6, it appears that the increases we observe can be explained almost entirely by pre-trending.

Finally, we show the results on Democratic vote share for Washington in Table S6. We do not show the results for partisan share of turnout in Washington because we only have that information for California and Utah. In each of the specifications in Table S6, the effect of vote-by-mail on the Democratic vote share is small.

Table S5 – Vote-by-Mail Expansion Does Not Appear to Favor Either Party in Utah.

	Dem Turnout Share [0-1]			Dem Vote Share [0-1]		
	(1)	(2)	(3)	(4)	(5)	(6)
VBM	0.009	0.003	0.001	0.044	0.012	0.008
	[0.000,0.017]	[-0.001,0.006]	[-0.001,0.004]	[-0.013,0.105]	[-0.008,0.032]	[-0.007,0.024]
# Counties	29	29	29	29	29	29
# Elections	12	12	12	10	10	10
# Obs	348	348	348	580	580	580
County FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
County Trends	No	Linear	Quad	No	Linear	Quad

Block wild bootstrap confidence intervals clustered by county in brackets.

Table S6 – Vote-by-Mail Expansion Does Not Appear to Favor Either Party in Washington.

	Dem Vote Share [0-1]		
	(1)	(2)	(3)
VBM	0.015	0.012	0.008
	[0.006,0.022]	[0.004,0.020]	[0.001,0.016]
# Counties	39	39	39
# Elections	10	10	10
# Obs	780	780	780
County FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
County Trends	No	Linear	Quad

Block wild bootstrap confidence intervals clustered by county in brackets.

S9 Participation Effects by State

In this section, we show our effects of vote-by-mail on participation outcomes separately for each of the three states we study. The specifications in each of the table mirror those in our main results in Table 3. In each of these tables, we report confidence intervals for our estimates using the block bootstrap procedure described Cameron, Gelbach, and Miller (2008), clustered by county, due to the small number of clusters when estimating the effects independently for each state.

We show the results for California in Table S7. We can see that vote-by-mail increases turnout by about 1.4 to 1.8 percentage points in California, which is slightly smaller than the pooled effect we report in Table 3. Our results in columns 4-6 for the vote-by-mail share are the same as Table 3 because we only use California in that analysis.

Table S7 – Vote-by-Mail Expansion Increases Participation in California.

	Turnout Share [0-1]			Vote-by-Mail Share [0-1]		
	(1)	(2)	(3)	(4)	(5)	(6)
VBM	0.018	0.014	0.014	0.186	0.157	0.136
	[-0.010,0.044]	[-0.006,0.040]	[-0.013,0.063]	[0.123,0.259]	[0.065,0.253]	[-0.198,0.266]
# Counties	58	58	58	58	58	58
# Elections	10	10	10	10	10	10
# Obs	580	580	580	580	580	580
County FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
County Trends	No	Linear	Quad	No	Linear	Quad

Block wild bootstrap confidence intervals clustered by county in brackets.

Next, we show the results for Utah in Table S5. In Utah, vote-by-mail appears to have increased turnout by a little over 3 percentage points, which is slightly higher than the pooled effect we report in Table 3. We do not have information on vote-by-mail usage in Utah, so we do not show results of vote-by-mail's effect on the VBM share in Utah.

Finally, we show the results for Washington in Table S9. The effect of vote-by-mail on turnout in Washington hovers around 1 percentage point across specifications, which is lower than the pooled effect. Just looking at Washington alone, it looks like the effect of vote-by-mail on turnout is very modest. In columns 4-6, we show the effect of vote-by-mail on the share of voters using VBM. Because the reform in Washington sends the vote-by-mail share to 1 for all treated counties, the effect on the vote-by-mail share is massive. We do not include Washington in our main results because we wanted to measure voters' preferences for vote-by-mail, given the option. For that reason, in the main results we subset just to California, where voters have the option to mail in their ballot or vote in person at a voting center in their county.

Table S8 – Vote-by-Mail Expansion Increases Participation in Utah.

	Turnout Share [0-1]		
	(1)	(2)	(3)
VBM	0.032	0.032	0.034
	[-0.009,0.073]	[0.006,0.058]	[0.009,0.061]
# Counties	29	29	29
# Elections	12	12	12
# Obs	348	348	348
County FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
County Trends	No	Linear	Quad

Block wild bootstrap confidence intervals clustered by county in brackets.

Table S9 – Vote-by-Mail Expansion Increases Participation in Washington.

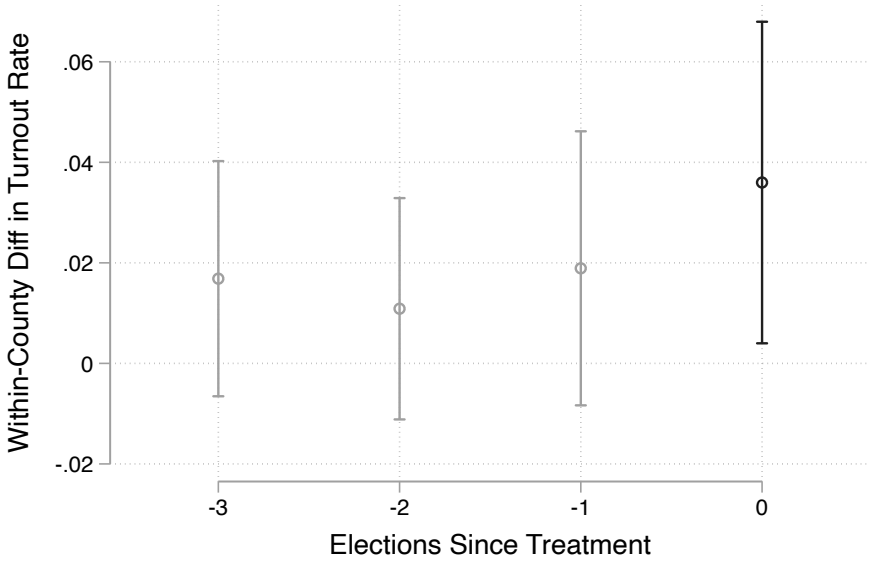
	Turnout Share [0-1]			Vote-by-Mail Share [0-1]		
	(1)	(2)	(3)	(4)	(5)	(6)
VBM	0.009	0.011	0.004	0.300	0.312	0.304
	[-0.001,0.019]	[-0.001,0.022]	[-0.009,0.018]	[0.226,0.367]	[0.225,0.404]	[0.175,0.436]
# Counties	39	39	39	39	39	39
# Elections	8	8	8	8	8	8
# Obs	312	312	312	312	312	312
County FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
County Trends	No	Linear	Quad	No	Linear	Quad

Block wild bootstrap confidence intervals clustered by county in brackets.

S10 Graphical Evidence of Vote-by-Mail Effect on Participation

Figure S6 presents visual evidence of the effect on turnout. Each point represent represents a regression coefficient with the first three points being leads that anticipate a county's switch into vote-by-mail by three elections, two elections, and one election. The fourth point is the main estimated treatment effect, using four and more elections prior to vote-by-mail as a baseline. As in Table 3, the plot clearly captures that turnout increased in the year immediately following the introduction of vote-by-mail and turnout was not meaningfully higher before the counties adopted voting by mail.

Figure S6 – Vote-by-Mail Reform Modestly Increases Turnout.



S11 Effect of Universal Vote-by-Mail on Republican Participation

In this section, we show that the non-effects of universal vote-by-mail on Democratic turnout in Table 2 hold when we instead look at Republican turnout share. The turnout share that we construct in columns 1-3 of Table 2 is the number of those who voted in the election that are registered as Democrats divided by the total number of those who voted in the election, regardless of their party affiliation. Because we include third-party and unaffiliated voters in the denominator, a non-effect on the Democratic turnout share does not guarantee a non-effect on the Republican turnout share.

In Table S10 we estimate the effects of vote-by-mail on the Republican turnout share. The specifications mirror columns 1-3 in our main results in Table 2. The first column shows the within-state difference-in-differences estimate, which is a decrease in Republican turnout share of approximately two and a half percentage points. The last two columns show that this result does not hold once we include county-level trends to control for possible pre-trending if counties that enter vote-by-mail are trending less Republican over time compared to other counties. In those specifications, the estimate is closer to zero, and in each case we cannot reject the null hypothesis of no effect.

Table S10 – Vote-by-Mail Expansion Does Not Have Large Effects on Republican Share of the Electorate.

	Rep Turnout Share [0-1]		
	(1)	(2)	(3)
VBM	-0.024	-0.004	-0.007
	(0.007)	(0.004)	(0.004)
# Counties	87	87	87
# Elections	23	23	23
# Obs	986	986	986
County FE	Yes	Yes	Yes
State by Year FE	Yes	Yes	Yes
County Trends	No	Linear	Quad

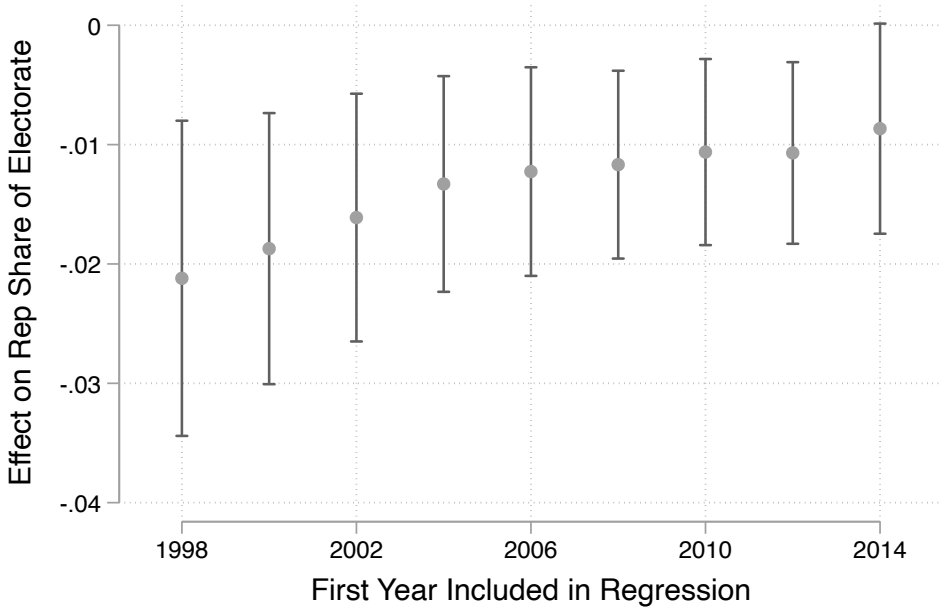
Robust standard errors clustered by county in parentheses.

To investigate the source of pre-trending more, we show the robustness of our difference-in-differences estimate (column 1 of Table S10) based on years included in the sample. One concern with using the voter file data is that voters removed from the voter file over time may be different from those remaining on the lists. In particular, we know that older voters in 1998 are much less likely to still be in the 2019 voter file we are using. This problem should be much smaller in elections that were held closer to the time when the voter file was compiled. In Figure S7, we evaluate the sensitivity of our results to the number of elections prior to 2018 that we include in the difference-in-differences regression. We find that the

estimate attenuates quite a bit when we include only recent elections, which suggests that registered Republicans were likely dropping out of the voter file at a higher rate in counties that adopted VBM early compared to counties that adopted VBM later.

Overall, even if we take the difference-in-differences estimates in column 1 of Table S10 at face value, once we restrict the sample to years where we are more confident in our estimates of the composition of the electorate, it is clear that we can rule out large effects of vote-by-mail on the Republican share of the electorate.

Figure S7 – Republican Composition Effects Attenuate as We Include Just Recent Years in the Sample.



S12 Effects On Age of Electorate

In this section, we present evidence on the effect of vote-by-mail on the age composition of the electorate. We construct a variable that is the share of the electorate – meaning the share of those who turn out to vote – that is age 55 or above. We show the effects of vote-by-mail on that outcome in Table S11. The specifications mirror those in columns 1-3 of Table 2. In our difference-in-differences design in column 1, we estimate that vote-by-mail decreased the share of the electorate age 55 or above by about one and a half percentage points. Once we include county-level time trends in columns 2 and 3, the estimates shrink to be close to zero. In all cases with adjustments for county trends, we cannot reject the null hypothesis that vote-by-mail does not affect the age composition of the electorate. Though the estimates are slightly noisier than our main results on the partisan composition of the electorate, we interpret these results as evidence that vote-by-mail programs to not dramatically change the age composition of those who turn out.

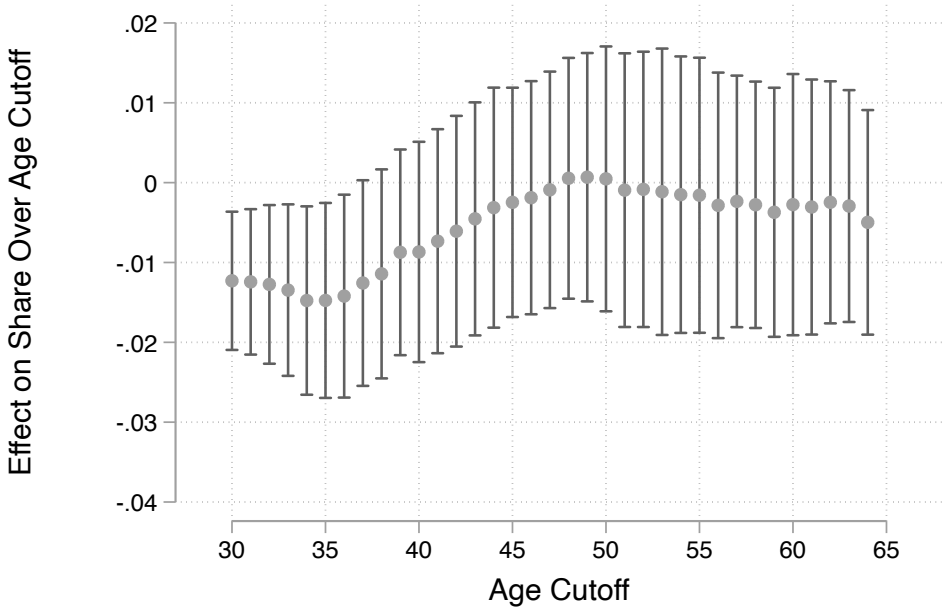
Table S11 – Vote-by-Mail Expansion Does Not Appear Have Large Effects on Age Composition of the Electorate.

	Turnout Share Age 55+ [0-1]		
	(1)	(2)	(3)
VBM	-0.016	-0.004	-0.005
	(0.012)	(0.009)	(0.010)
# Counties	87	87	87
# Elections	23	23	23
# Obs	986	986	986
County FE	Yes	Yes	Yes
State by Year FE	Yes	Yes	Yes
County Trends	No	Linear	Quad

Robust standard errors clustered by county in parentheses.

The results in Table S11 rely on the somewhat arbitrary choice of age 55 as the relevant age cutoff. To show that our results are not simply an artifact of this choice of cutoff, in Figure S8 we show our estimates across a range of age cutoff values. For example, the leftmost estimate in Figure S8 shows the estimated effect of vote-by-mail on the share of the electorate over the age of 30, and we do the same for each value of age from 30 to 65. The figure shows the effect of vote-by-mail on the age of the electorate is close to zero across a range of age cutoffs.

Figure S8 – Potentially Larger Effect on Electorate Age Using Higher Age Cutoff.



S13 Effects On Socio-Economic Status and Racial Composition of Electorate

In this section, we present evidence on the effect of vote-by-mail on the socio-economic status and racial composition of the electorate. We construct a variable that captures the share of the electorate that lives in census tracts with a 13% or higher poverty rate in the 2011-2016 American Community Survey five year sample. Using the same ACS data merged to the voter file, we measure the share of the electorate that lives in tracts that are more than 70% white.[22] We show the effects of vote-by-mail on these two outcomes in Tables S12 and S13. The specifications mirror those in columns 1-3 of Table 2.

Across all specifications in Table S12, the share of respondents coming from high-poverty tracts is not affected by vote-by-mail.

Table S13 estimates the effect of universal vote-by-mail on the turnout share from largely-white census tracts – columns 1 through 3 are substantively close to zero and cannot be distinguished from zero statistically.

Table S12 – Vote-by-Mail Expansion Does Not Appear Have Large Effects on Socio-Economic Status of the Electorate.

	Turnout Share High-Poverty Tracts [0-1]		
	(1)	(2)	(3)
VBM	-0.001	0.003	0.002
	(0.006)	(0.005)	(0.004)
# Counties	80	80	80
# Elections	23	23	23
# Obs	904	904	904
County FE	Yes	Yes	Yes
State by Year FE	Yes	Yes	Yes
County Trends	No	Linear	Quad

Robust standard errors clustered by county in parentheses.

The results in Tables S12 and S13 rely on the arbitrary choice of the median tract to define the poverty rate and white-share cutoff. As in Figure S8, to show that our results are not simply an artifact of this choice of cutoff, in Figures S9 and S10 we show our estimates across a range of cutoff values. The figures show the effect of vote-by-mail on the race and poverty rate of the electorate is close to zero across a range of cutoffs.

[22] 13% is the median poverty tract poverty rate for California and Utah, and 70% is the median tract white share of the population.

Table S13 – Vote-by-Mail Expansion Does Not Appear Have Large Effects on Share of the Electorate from Overwhelmingly-White Tracts.

	Turnout Share High-White-Share Tracts [0-1]		
	(1)	(2)	(3)
VBM	-0.002	0.006	0.004
	(0.004)	(0.004)	(0.003)
# Counties	87	87	87
# Elections	23	23	23
# Obs	986	986	986
County FE	Yes	Yes	Yes
State by Year FE	Yes	Yes	Yes
County Trends	No	Linear	Quad

Robust standard errors clustered by county in parentheses.

Figure S9 – No Effect on Electorate Poverty Regardless of Cutoff.

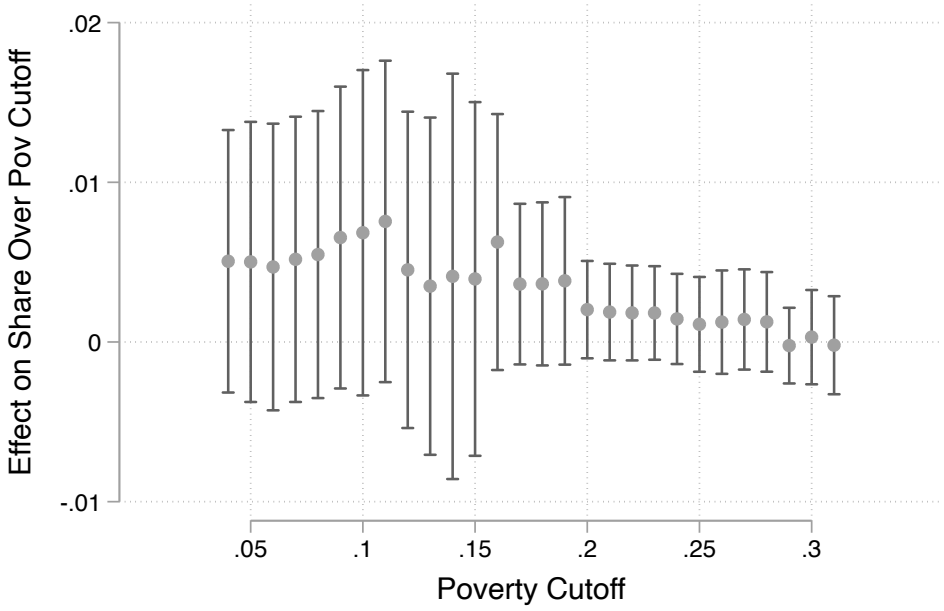
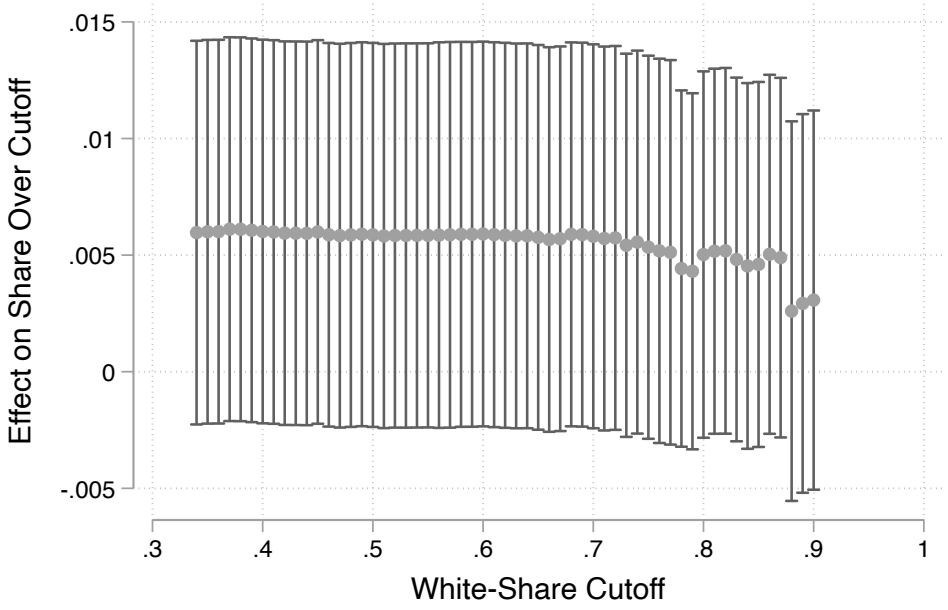



Figure S10 – No Effect on Electorate Race Regardless of Cutoff.