

How Electoral Institutions Affect Political Accountability: Evidence from All-Mail Elections*

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Abstract

A central question in the study of democratic governance concerns the conditions under which voters can make informed choices at the ballot box. I exploit the staggered implementation of an electoral reform in a U.S. state to study the effects of electoral institutions on voter information and political accountability. I find that all-mail elections cause a decrease in ballot roll-off on statewide ballot measures in presidential election years, which is consistent with my argument that voters gather more information about politics when voting by mail. Further, switching from traditional polling place elections to vote-by-mail results in a decrease in negative findings on accountability audit reports and a decrease in taxing and spending in municipal governments. Using data from the Catalist voter file I show that these results cannot be explained by changes in the composition of the electorate caused by vote-by-mail.

Word Count: 9870

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Introduction

An enduring problem of democracy is determining how to overcome the informational asymmetries between elected officials and the public in order to ensure that policy makers are faithful agents of the electorate. Indeed, voters often do not have sufficient knowledge to make informed choices while voting because relevant political information is simply unavailable or citizens choose not to seek it out. The task that voters are faced with is especially difficult in democracies where there are many layers of government and, consequently, many incumbents that voters must evaluate in any given election. This lack of political knowledge among voters can result in the electorate selecting incompetent politicians or not effectively monitoring incumbent elected officials. This causes a breakdown in elections' accountability-inducing mechanisms that are essential for an effective democracy. However, a large literature on formal models of elections suggests that institutions that increase voters' access to political information can result in politicians working harder for and more in line with the interests of their constituents (e.g. Besley 2006).

I propose that electoral institutions can shape how voters gather information about politics and evaluate incumbents, which affects the behavior of elected officials. Particularly, I argue that all-mail elections result in voters obtaining more information about politics than they do when voting in a traditional polling place. A voter is able to gain relevant political information when voting in an all-mail election, because when filling out his ballot he has the ability and time to learn more about the races that he knew nothing or little about before receiving his ballot. However, if an individual comes across a race in which he knows little about the candidates when voting at a polling place, he is unable to obtain additional information before casting his vote. Increases in information among voters strengthens the electorate's ability to hold politicians accountable through elections.

I analyze the effects of vote-by-mail on elections and governance by exploiting the staggered implementation of the institution in an American state. This allows me to use a difference-in-difference design to credibly estimate the effects of vote-by-mail on a variety of outcomes.

Specifically, leveraging a law passed in the state of Washington that allowed individual counties to decide if and when they wanted to switch to all-mail elections, I find evidence that voters seek out more information when using vote-by-mail and that the institution also affects the behavior of elected officials and policy outcomes in the state's municipalities.

With respect to voters, I show that switching to vote-by-mail causes a decrease in ballot roll-off for statewide ballot measures in presidential election years, which is consistent with the logic that vote-by-mail results in voters seeking out more political information. I then examine how vote-by-mail affects two dimensions of the behavior of politicians in Washington's municipalities. I find that when a municipality is assigned to vote-by-mail that the average number of violations documented in accountability audits completed by the state government decreases. Further, consistent with models of political economy (Persson and Tabellini 2000) and previous work that suggests voters punish incumbents for high levels of spending (Besley and Case 1995*b*, Peltzman 1992), I also find that switching to vote-by-mail results in a decrease in revenue, especially from property taxes, and a decrease in total expenditures in municipalities in Washington. These results are conditioned by the presence of a mayor-council form of government and the competitiveness of elections in a municipality. Finally, using data from Catalist on the demographic characteristics of voters I show that these results cannot be explained by changes in the composition of the electorate caused by vote-by-mail.

The findings that I present in this paper have implications for our understanding of responsiveness in local governments as well as, more broadly, the consequences of electoral institutions. As Trounstein (2010) notes there is a lack of research on responsiveness and accountability at the local level. Thus, this paper builds on more recent work that demonstrates how fiscal policy outcomes in cities are affected by the ideology of citizens (e.g. Einstein and Kogan 2016, Tausanovitch and Warshaw 2014) by showing how electoral institutions also shape these policies. Further, although there is a large literature on the effects of vote-by-mail in the United States (e.g., Bergman and Yates 2011, Berinsky, Burns and Traugott 2001, Gerber, Huber and Hill 2013, Gronke and Miller 2012, Kousser and Mullin 2007, Magleby 1987, Richey 2008), it focuses almost

exclusively on how the institution affects voter turnout (Gronke et al. 2008). Therefore, I expand our understanding of vote-by-mail in at least two ways. First, I propose a new theory of how the institution affects the behavior of voter: vote-by-mail leads voters to gather more information about elected officials. Second, I move beyond previous work on vote-by-mail by examining how these changes in voter behavior shape the incentives of elected officials and affect policy outcomes. Electoral institutions such as the timing of elections (Anzia 2011), the type of ballot used (Fujiwara 2015), and compulsory voting (Bechtel, Hangartner and Schmid 2016, Fowler 2013) have been shown to affect the policymaking process. The analysis, thus, demonstrates that an electoral institution that has been given little attention in the literature on the policy consequences of electoral reforms has profound effects on electoral accountability and public policy.

How Vote-by-Mail Affects the Acquisition of Political Information

The central theoretical argument in this paper is that holding elections by mail results in voters gathering more political information than they would have in a polling place election. The mechanism that increases the probability that voters in all-mail elections will obtain relevant information about elected officials is simple: voters have the ability and time to more gather information about candidates and races for which they would otherwise have little or no information when they participate via vote-by-mail rather than at a polling place.

Due to the large number of elected offices and multiple layers of governments in the United States there are many officials that voters are tasked with holding accountable during through elections (Berry and Gersen 2009). However, when casting a ballot most citizens do not have sufficient information or interest in a particular office to evaluate all of these elected officials. That is, there are typically many races on the ballot in a given election for which voters have little information about the candidates running for office or the performance of the incumbent if he is running for reelection. Moreover, when casting a ballot at a polling place if an individual

comes across a race that he has very little information on or knows nothing about, he has no time or ability to obtain additional information about these races.

However, when elections take place entirely by mail the process of voting is much different. Voters receive their ballots multiple weeks before an election and are able to examine the ballot for an extended period of time before deciding how to vote. Thus, voters have the ability to gather information about the candidates running for office and relevant policy issues. This informational effect will be particularly large for the numerous races for local office that are not very salient. Anecdotal evidence suggests that individuals do indeed seek out political information while filling out their ballot when they participate in an election that takes place entirely by mail. For example, one voter in Washington said, “When I voted at the polls, I would not read up as much. Now that I have the absentee, I have the time to really read things” (Reed 2007). Indeed, voters do seem to use the additional time that they have with their ballot when they receive it through the mail to gather additional information about candidates and policy issues.

Further, others have argued that all-mail elections add a new social aspect to voting that results in discussion about politics. For example, an opinion piece in the newspaper *The Columbian* observes that under vote-by-mail, “Many voters enjoy gathering with children to share the research, deliberation and voting experiences” (*In Our View: A Good Way to Vote* 2010). Thus, not only are voters taking more time to research politics under a vote-by-mail system but they are also building additional discussion about the issues into their voting experience. Further, this shows that the informational mechanism that I posit in this paper has been used in the popular press in support of vote-by-mail, which suggests that the public, and especially elected officials, are aware of the potential for the institution to increase the level of information about politics that voters obtain.

Political Information and Electoral Accountability

A rich theoretical literature on political agency models sheds light on the principal-agent relationship between citizens and their elected officials by looking at how elections induce accountability among politicians (Ashworth 2012). For example, Besley (2006) presents a two-period model where voters evaluate the incumbent based on her performance in office and the incumbent's behavior is conditioned by her anticipation of the voters' decision rule. As in all agency models, the key strategic tension in this model is that elected officials have an informational advantage over citizens about the ideal policy, which creates a number of problems for monitoring incumbents and the selection of competent policy makers. That is, voters are likely to be poorly informed about the optimal policy that should be implemented as the government has more knowledge about the nuances of the policy environment. Moreover, it may also be the case that voters do not observe what policies are implemented and the consequences of those policy choices, which also contributes to this informational asymmetry.

That being said, this literature suggests that increasing voters' information about incumbents will lead them to work harder for their constituents. Specifically, Besley (2006) argues that increasing policy relevant information about the incumbent increases voter welfare. This prediction is consistent with other models in the political agency literature and as Ashworth (2012) notes, "Most models considered in the literature have similar, and very sharp, predictions for ...informational changes. The voter observes a noisy measure of the incumbent's action. And the likelihood of responsiveness is decreasing in the amount of noise" (191). As I have argued, the institution of vote-by-mail increases the probability that voters seek out information about elected officials and, thus, decreases the noise in voters' knowledge of the actions of incumbents. As a result, I expect that in political jurisdictions where vote-by-mail elections are held, elected officials will be more competent and more responsive to their constituents.

In sum, based on the theoretical work on electoral accountability I argue that when institutions are put in place that help voters obtain relevant political information, politicians should work harder to implement policies that are more in line with the preferences of the electorate

and behave more competently. Moreover, I propose that holding all-mail elections helps voters overcome these informational asymmetries. Specifically, vote-by-mail increases the probability that voters acquire information about the incumbent's performance, which induces political accountability.

Observable Implications

This theory generates a number of observable implications about the effects of vote-by-mail on the behavior of voters and elected officials. I now turn to a discussion of the specific predictions tested in this paper.

Voter Behavior. To examine if vote-by-mail results in voters gathering more information about elected officials, I analyze the effect of switching to vote-by-mail on ballot roll-off. Ballot roll-off is a concept that captures the proportion of individuals that cast a ballot in an election but do not vote in a given race. For example, ballot roll-off could measure the proportion of individuals who vote for president but not their congressman. Previous research has found that one of the main contributors to ballot roll-off is the low levels of information about certain races (Bullock and Dunn 1996, Wattenberg, McAllister and Salvanto 2000). In fact, Wattenberg, McAllister and Salvanto (2000) even compare voting to taking an SAT test and argue that voters choose to only participate in races about which they are informed. Further, others have found that processes that increase information about lower salience elections, such as campaign spending (Hall and Bonneau 2008; 2012) and partisan cues (Schaffner, Streb and Wright 2001), decrease ballot roll-off. Thus, if vote-by-mail causes voters to obtain information about politics, I expect that switching to the institution will decrease ballot roll-off.

Elected Official Behavior. I examine two different dimensions of the behavior of elected officials. First, if voters obtain more information about incumbents, then elected officials should behave in a more competently. That is, under vote-by-mail elected officials will avoid misappro-

priating resources or breaking laws, which hurt their reelection chances, as they anticipate these actions are more likely to be observed. This is consistent with previous work that examines how electoral incentives affect corrupt behavior among politicians (e.g. Ferraz and Finan 2011). Further, even if elected officials are not directly engaging in misconduct themselves, I still expect that if they are managing the government well that there will be fewer violations of protocol among career civil servants. Thus, in political jurisdictions with vote-by-mail elections I predict that there will be more safeguards of public resources and fewer breaches of good governance policies.

Not only should increased political information affect the general levels of competence among elected officials, but it should also lead to higher levels of responsiveness to the policy preferences of voters. Although individual voters may differ with regard to which policy they think is optimal among a host of different choices, most voters prefer that government services are provided to the public efficiently and at a low cost. Indeed, previous research suggests that voters punish incumbents for high levels of taxation and spending (Besley and Case 1995*b*, Peltzman 1992), and the relevant political agency literature argues that incumbents who exert relatively higher levels of effort will provide services at a lower cost (Persson and Tabellini 2000). Further, empirical evidence indicates that when government officials have to face reelection that taxing and spending decreases (Alt, De Mesquita and Rose 2011, Besley and Case 1995*a*, Sances 2016). This is also consistent with research that finds that when voters are faced with ballot measures, and thus policy outputs are more likely to reflect the preference of the median voter, that the level of government spending and tax rates decrease (Matsusaka 2004). Therefore, I hypothesize that vote-by-mail elections will cause politicians to decrease taxing and spending as a result of increased responsiveness.

Estimating the Effects of Vote-by-Mail

Identifying the causal effects of an institutional change is often challenging due to the absence of a counterfactual unit that is exactly the same as the one observed except for the institution of interest. I overcome this issue by leveraging a quasi-natural experiment that is the result of a staggered roll-out of vote-by-mail in Washington state. I now discuss the institutional context of the state.

Municipal Elections in Washington

Elections for municipal office in Washington are low-information environments that are held off-cycle in November of odd-numbered years. Although it may be the case that holding local elections off-cycle results in more attention being paid to local politics rather than voters solely focusing on national races, off-cycle elections are typically low-salience and low-turnout contexts (Berry and Gersen 2010, Hajnal and Lewis 2003). Indeed, previous research has shown that these types of local elections are indicative of an electoral environment in which voters have little access to political information and in which incumbents are not held accountable. For example, Kogan, Lavertu and Peskowitz (2016) find that the implementation of school performance measures in Ohio had little effect on retrospective evaluations of elected school board officials in the state. Thus, the theoretical framework that I have presented is especially applicable for thinking about accountability in local elections as there are relatively low levels of information about elected officials and relevant policy.

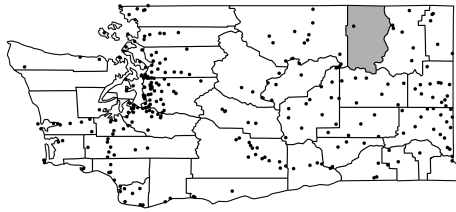
Further, Washington's municipal elections in particular lack a number of features that would typically send informational signals to voters. Specifically, these local elections are non-partisan and there is no marking of who the incumbent is on the ballot. It is widely known that party ID serves as a strong heuristic for voters and the absence of this shortcut greatly decreases the informational content of the ballot (Schaffner, Streb and Wright 2001). Moreover, because there is no signal of who the incumbent is on the ballot, voters who have relatively low levels of political

information and do not even know the name of the incumbent will not be able to perform a simple retrospective evaluation of his performance. Therefore, an institutional change, like vote-by-mail, that affects how voters' access political information should have a significant effect on electoral accountability in this type of environment.

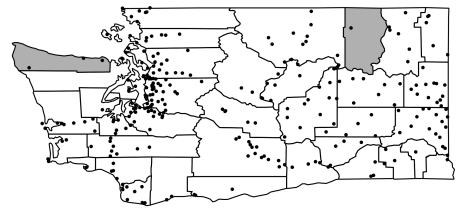
The Staggered Implementation of Vote-by-Mail in Washington

Most importantly for this study, Washington presents an excellent case for analyzing the effects of vote-by-mail on electoral accountability due to the staggered implementation of the institution in the state. Washington experienced a gradual transition from traditional polling places to vote-by-mail that I exploit in order to estimate the causal effects of vote-by-mail on political behavior and policy outcomes. Starting as early as 1915, Washington allowed for absentee voting using a mail-in ballot, and voters were able to apply to receive their ballot in the mail rather than going to a polling place if they could provide a reason as to why they could not vote on election day (Reed 2007). Further, in 1993 the state passed a law that allowed voters to apply for permanent absentee status (Reed 2007). This allowed voters to receive their ballot in the mail without an excuse for every election.

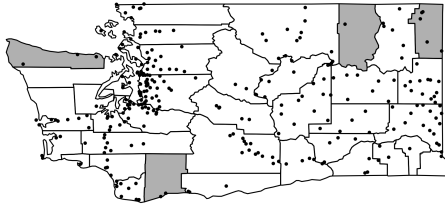
There were also a number of reforms in Washington that gradually forced citizens to vote-by-mail, which is the source of treatment in this study, rather than individual voters being able to choose to receive their ballot in the mail. First, in 1967 the state allowed county auditors in the state's 39 counties to assign precincts with fewer than 200 registered voters to hold vote-by-mail elections (Reed 2007). They were known as mail ballot precincts. During this time, many rural counties with small populations redrew their precincts so that they were sufficiently small to allow the entire county to hold vote-by-mail elections. Second, in 2005 the state legislature passed a law, HB 1754, that included a number of electoral reforms including a statute that allowed individual counties to decide to hold all of their elections entirely by mail, regardless of the size of their precincts. Individual counties, under the direction of their county councils, gradually switched to vote-by-mail elections in the years following HB 1754. Finally, in 2011, when only one



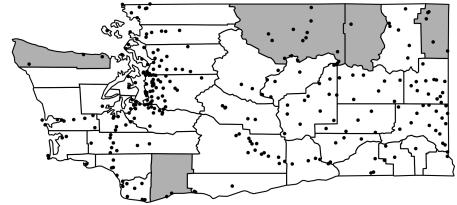
(a) 2001



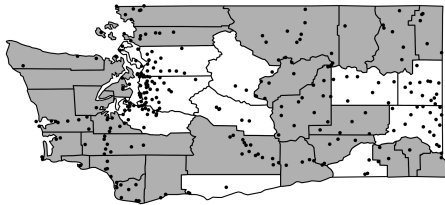
(b) 2002



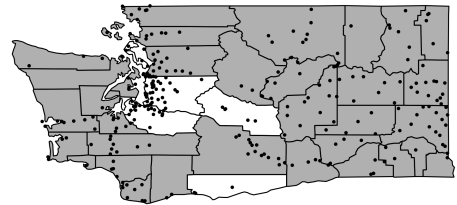
(c) 2003



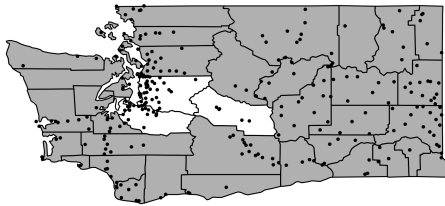
(d) 2004



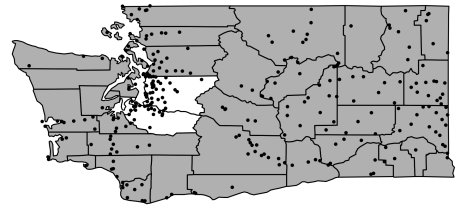
(e) 2005



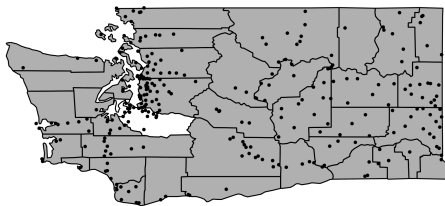
(f) 2006



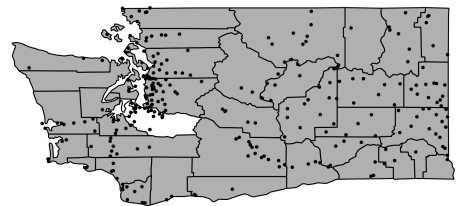
(g) 2007



(h) 2008



(i) 2009



(j) 2010

Figure 1: Maps of Washington's counties and municipalities (black dots). Grey indicates that a county held vote-by-mail elections in a given year.

county had yet to switch to vote-by-mail, the state legislature enacted another law that switched all elections in the state to vote-by-mail.

Figure 1 displays maps that depict the transition to vote-by-mail in the state of Washington from 2001 - 2010. The outlines of each county are displayed on the map as well as black dots representing each municipality in the state. In each panel, grey shading on the map indicates that a particular county held all-mail elections in a given year while the counties shown in white held traditional polling place elections. As can be seen in the maps depicting which counties had vote-mail elections prior to 2005, a total of five counties had sufficiently small precincts to allow vote-by-mail elections for the entire county. After the state allowed individual counties to switch to vote-by-mail in 2005, many counties decided to immediately discontinue polling place elections. Then, almost every year after 2005 more counties switched to vote-by-mail until the state legislature required that all elections in the state were held using vote-by-mail in 2011. In Figure E.1 in the Online Appendix, I also display a figure that gives counts of the number of counties and municipalities that held vote-by-mail elections in each year.

In the analyses presented in this paper, I exploit this staggered implementation of vote-by-mail with a difference-in-differences estimation strategy. Using difference-in-differences allows me to compare changes in municipalities and counties where officials were elected using vote-by-mail, the treatment group, to changes in municipalities and counties where officials were elected using a traditional polling place election, the control group. I classify a county and all municipalities within it¹ as being in treatment for all of the years in which the county held vote-by-mail elections and the control group consists of all other counties and municipalities that have not yet switched to vote-by-mail in a given year. Because it is reasonable to assume that counties, and the municipalities nested within them, where the local election officials intentionally redrew precincts to force vote-by-mail elections prior to 2005 may be different than other counties and municipalities in, I run all of my empirical models using the full sample of political units in

¹I omit the 6 municipalities in Washington that cross county borders from my analyses.

the state as well as a restricted sample that is only the subset of counties or municipalities that switched to vote-by-mail in 2005 or later.

The Impact of Vote-by-Mail on Voters

My first set of analyses considers the effects of vote-by-mail on the behavior of voters. Specifically, in relation to the theory presented above, I am interested in examining if switching to vote-by-mail resulted in voters gathering more information about their elected officials than they would have otherwise. As discussed, I argue that vote-by-mail elections increase the amount of information that voters obtain about politics. Conditional on a voter casting a ballot, this should, consequently, result in voters being more likely to vote in lower salience races under a vote-by-mail electoral system, which will decrease ballot roll-off.

I test this hypothesis using ballot roll-off rates for statewide ballot measures. In Washington there is a robust system of direct democracy where voters regularly vote on if certain proposals should become law. A number of these measures appear on the ballot every year. It is appropriate to use voting rates on ballot measures to examine ballot roll-off because they appear on the ballot for everyone across the entire state, which aids in the comparison of polling place and vote-by-mail voters. On the other hand, if I were to examine ballot roll-off in sub-state races there would be a concern that there may be some unobservable factor that, say, affects the level of participation in certain local elections in a particular year but not races in other jurisdictions, which would violate the parallel trends assumption necessary for unbiased difference-in-differences estimates. Further, it is not possible to construct a measure of ballot roll-off across all municipalities in Washington, because the total number of ballots cast by individuals residing in a given municipality is not uniformly available over time or across jurisdictions, which is necessary to create the measure of ballot roll-off. Finally, examining ballot roll-off on statewide ballot measures is also desirable because it is a hard test of the theory due to the fact that ballot measures in Washington can sometimes be high profile because citizens are voting on important policy issues. I

now discuss the data used in this set of analyses. Summary statistics of all data used in the paper are displayed in Section A of the Online Appendix.

Data

Statewide Ballot Measures. In order to create the dependent variable measuring ballot roll-off, I collect the results of all statewide ballot measures in Washington from 2000 - 2010 broken down by county as well as county-level voter turnout from the Washington Secretary of State's website and individual county election offices.² Specifically, the variable $BallotRollOff_{c,t}$ is created by dividing the number of individuals in a county who voted for a given ballot measure by the total number of ballots cast in that county. Then, this quantity is subtracted from 1 and averaged across all ballot measures being voted on in every county in a given year. The variable ranges from 0 to 1 with 1 indicating that no voters in a county voted for a given ballot measure and 0 indicating that there was no ballot roll-off.

Vote-By-Mail. The main independent variable of interest in my analyses, $VBM_{c,t}$, is created using information from the Washington Secretary of State's Office about when each county switched to vote-by-mail. It is a dummy variable that is equal 1 in all years when a county, or municipality in later analyses, holds all-mail elections and 0 otherwise.

Results

I now present the results of my models examining the effect of vote-by-mail on ballot roll-off. Within the difference-in-differences framework, I estimate the following equation,

$$BallotRollOff_{c,t} = \beta_1 VBM_{c,t} + \lambda_c + \tau_t + \epsilon_{c,t} \quad (1)$$

²Note that there were no statewide ballot measures in 2004.

where the dependent variable is $BallotRollOff_{c,t}$ is, as discussed, the proportion of individuals who did not cast a vote for a ballot measure out of the total number of ballots returned. The main independent variable in the model is $VBM_{c,t}$, which is a dummy variable equal to one in the years in which a county held vote-by-mail elections and zero for the years before the electoral reform in the county. The estimated value of the coefficient β_1 is the causal effect of interest. Further, λ_c represents a set of county dummy variables in order to control for time invariant unobserved differences between counties that may affect the timing of the switch to vote-by-mail and ballot roll-off, and τ_t are year fixed effects to control for year-specific factors. Finally, $\epsilon_{c,t}$ is the error term. Because treatment is applied at the county level, I report robust standard errors clustered by county. I run these models with various subsets of the data based on the timing of elections, because I expect that the effect of vote-by-mail on ballot roll-off should vary based on the salience of statewide ballot measures relative to other races on the ballot in that election.

The results of the models of this form are displayed in Table 1. Column 1 and Column 2 show the relationship between vote-by-mail and ballot roll-off in all November general elections in Washington from 2000 - 2010 with the full and restricted sample of counties, respectively. The coefficient on the vote-by-mail indicator in these models is in the expected direction. That being said, it is quite small and not statistically significant for the full sample though it is marginally significant with the restricted sample. This seems to indicate that vote-by-mail has, if anything, a very substantively small effect on ballot roll-off on statewide ballot measures. However, these results may be due to the fact that the data used in the model displayed in Column 1 and Column 2 includes off-cycle elections. In these years, as discussed, elections for local offices in Washington are held. Consequently, there may not be much roll-off for statewide races in these years, like ballot measures, because these are some of the most salient races of those election cycles.

Thus, I run models with subsets of the data that only include even-year elections and then just presidential election years, which is when statewide ballot measures may be less salient for many voters. The results of the models with only even-year elections are displayed in Column 3 (full sample) and Column 4 (restricted sample) of Table 1. In even-years, which includes presiden-

Table 1: The Effects of Vote-by-Mail on Ballot Roll-Off

	<i>Dependent variable:</i>					
	All Elections		Ballot Roll-Off Even-Year Elections		Presidential Elections	
	(1)	(2)	(3)	(4)	(5)	(6)
Vote-by-Mail	-0.004 (0.003)	-0.004* (0.002)	-0.002 (0.004)	-0.003 (0.004)	-0.015** (0.006)	-0.012* (0.007)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Municipal FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	390	340	195	170	78	68
Adjusted R ²	0.740	0.755	0.736	0.741	0.658	0.634

Note: Results with full data are displayed in Columns 1, 3, and 5. Results with restricted data are displayed in Columns 2, 4, and 6. Robust standard errors clustered by county in parentheses. *p<0.1; **p<0.05; ***p<0.01.

tial and midterm elections, vote-by-mail still does not have a significant effect on ballot roll-off. However, when examining only presidential elections in Column 5 (full sample) and Column 6 (restricted sample) vote-by-mail significantly decreases ballot roll-off for statewide ballot measures in Washington. The estimated effect is -0.015 when using the full sample of data and -0.012 when using the restricted sample of data. These coefficients on the vote-by-mail variable are statistically significant and indicate that vote-by-mail causes fewer voters to cast their ballot without voting for statewide ballot measures.

This is indeed a substantively large effect. Over the time period of interest, 2,824,466 individuals cast their ballot in presidential elections in Washington on average.³ The difference-in-differences estimate using the full sample of counties in Column 5 of Table 1 indicates that holding vote-by-mail elections causes a 1.5% increase in the number of individuals that vote for statewide ballot measures, which is equivalent to 43,179 more individuals voting for statewide ballot measures. This is an especially significant finding considering the fact that previous studies have shown that switching to vote-by-mail in Washington resulted in an increase in voter turnout

³This figure is the average turnout across the 2000, 2004, and 2008 presidential elections. The data was obtained from the Washington Secretary of State's website: <https://www.sos.wa.gov/elections/voter-participation.aspx>

in presidential election years. Specifically, Gerber, Huber and Hill (2013) find that turnout in Washington increased by 2.8% in presidential election years after switching to vote-by-mail and that this effect is driven by registrants that participated less frequently before vote-by-mail. It is likely that these voters have relatively low levels of political information because they did not regularly participate in politics prior to vote-by-mail. Thus, despite that fact that vote-by-mail is driving voters with lower levels of political information to cast their ballot in these elections, ballot roll-off still decreases.

In all, these findings are consistent with the theory presented in this paper. Holding vote-by-mail elections results in voters gathering more information about lower salience races on the ballot, which, in turn, results in individuals voting in these races and not only voting, say, for President. Although the results presented thus far pertain to ballot roll-off in voting for statewide ballot measures, I argue that this finding should also hold for other low-salience races and that vote-by-mail also increases the amount of information that voters gather in these elections. Specifically, I expect that this mechanism also operates for municipal elections, which, as discussed, are particularly low information environments. Thus, in the next section of this paper I analyze the effects of vote-by-mail on the behavior of elected officials in Washington's municipalities.

The Impact of Vote-by-Mail on Elected Officials

I now turn to an analysis of how vote-by-mail affects the behavior of politicians and policy outcomes in Washington's municipalities. As discussed, if vote-by-mail leads voters to gather more information about those running for office this should induce elected officials to work harder and to behave more in line with the interests of their constituents. Specifically, I analyze the effect of vote-by-mail on the likelihood that municipal governments receive negative accountability audit findings as well as on the finances of municipalities. I next discuss the data used in these analyses before presenting the results.

Data

Audit Reports. First, I gather information from audit reports that the Washington State Auditor's Office releases for every governmental entity in the state, including municipalities. Municipalities are regularly subject to "accountability audits" and "financial audits" that are completed by representatives of the State Auditor's Office. Accountability audits are intended to ensure that municipalities are safeguarding public resources and following necessary policies and laws in day-to-day governance, while financial audits assess whether or not a municipality's financial statements are being completed accurately. Accountability audits are completed at least once every three years in each municipality and financial audits are done yearly for municipalities that have revenues that exceed a specified threshold. After an audit is completed, the auditor summarizes any bad behavior in the municipality by noting if there are any "findings." Each finding explicitly states a specific breach of law or protocol by a municipal official and if a municipality has zero findings for a given audit period this indicates that no violations were found. These reports include the misconduct of both career government employees as well as elected officials. But, elected officials - either the mayor or a city manager that is directly accountable to the city council - are directly in charge of managing the government so I expect that a shock, such as vote-by-mail, that induces elected officials to act more responsibly will affect the outcomes of these audits. Figure 2 displays examples of some of the activities for which a municipality would receive a finding.

I obtain the audit reports from the Washington State Auditor's website where a PDF of each report from January 2005 to present is publicly available.⁴ The audit periods covered in my data, however, begin prior to 2005 because the audit reports are typically released a few years after the audit is completed. The type of audit that was being completed, the exact time period for which the government's activities were being audited, and the number of "findings" that the auditor discovered were all scraped from the reports. This information is used to create the dependent

⁴These reports were obtained from the following website in January of 2017: <http://portal.sao.wa.gov/reportsearch>.

Schedule of Audit Findings

City of Spokane
Spokane County
November 15, 2006

2. The City of Spokane did not follow competitive bid law.

Description of Condition

The City is required to formally bid public works projects in excess of \$70,000 unless an allowable exception to the bidding requirements is identified. The City paid \$2,317,639 to a contractor to build a gondola in Riverfront Park without going through a formal bid process.

(a) Example of Audit Finding in City of Spokane

Schedule of Audit Findings and Responses

City of Arlington
Snohomish County
August 5, 2010

1. The City of Arlington does not have adequate support for its allocation of shared costs to utility funds.

Background

Cities incur costs from their central services, such as general administration, human resources, payroll and purchasing, that are shared among all departments that benefit from the services. The City has a responsibility to adopt a fair and equitable method of distributing these shared costs among departments. Additionally, state law prohibits resources restricted for certain uses, such as utilities that collect usage-based fees from citizens, to benefit other funds.

(b) Example of Audit Finding in City of Arlington

Figure 2: Examples of audit findings in two municipalities in Washington.

variable, $NumFindings_{m,t}$, which is the number of findings in audit reports for a municipality in a given time period. This is a measure of the frequency in which laws and regulations were broken by the municipality or public resources were misappropriated over a specified period of time.

Municipal Revenue and Expenditures. To test my hypotheses on the effect of vote-by-mail on municipal revenue and expenditures, I collect data from the Washington State Auditor's Office on the finances of Washington municipalities from 2001 - 2010.⁵ The Auditor's Office systematically collects detailed revenue and expenditure data from each municipality in the state at the end of every calendar year and the law requires that each municipality report this information. This allows me to create a panel of municipal finances in Washington over the time period of interest.

⁵Spreadsheets containing detailed financial data on all of Washington's political entities are available on the State Auditor's website (<http://portal.sao.wa.gov/LGCS/Reports/ViewExportedData.aspx>) The variables that were constructed from this data were generated after correspondence with the State Auditor's Office to ensure the proper calculation of municipal revenue and expenditures.

I use this data to examine the taxing and spending behavior of municipalities. First, I create variables measuring the total revenue and the sources of this revenue in Washington's municipalities. Specifically, I generate the following variables: $\text{LogRevenuePerCapita}_{m,t}$, $\text{LogTaxRevenuePerCapita}_{m,t}$, and $\text{LogPropertyTaxRevenuePerCapita}_{m,t}$. These are measures in each year from 2001-2010 of each municipality's total revenue as well as total tax revenue and, specifically, property tax revenue. Second, I create a dependent variable measuring total spending municipalities, $\text{LogExpendituresPerCapita}_{m,t}$. All of these variables are generated by taking the total amount of money in a given category and then normalizing the amount to 2001 real dollars using the consumer price index. Then, I divide the totals by the population in the municipality and log this value in order to adjust for skew in the data.

Municipal Election Results. I collect the results of city council and mayoral elections for all municipalities in Washington from 2001 to 2010. The results were collected for all odd-year November general elections from individual county election offices and then were coded in order to create a dataset of all municipal elections over the time period of interest.⁶ This dataset was used to create a variable to measure the $\text{Competitiveness}_{m,t}$ of the elections in a given municipality in each election year. In order to create this variable I simply divide the number of votes for the second highest vote getter in a give race by the total number of votes for the candidate who won. Then, I take the average of this proportion across all races in a given municipality for each election year. Thus, the measure of competitiveness is equal to 0 when all races in a municipality are uncontested and 1 if the the top two candidates tied in all races. Due to the timing of municipal elections in Washington, this variable is only observed every other year.

United States Census. Finally, in some of my analyses I control for the demographic characteristics of Washington's municipalities using data from the 2000 Decennial U.S. Census and the 2009 and 2010 American Community Survey's 3 Year Estimates. I interpolate the Census data for each missing year of the panel (2001 - 2008) using the interpolation method recommended by

⁶The results were obtained from individual county election offices.

the U.S. census for intercensal estimates.⁷ I control for the racial characteristics of municipalities by creating the variables $PercentAfricanAmerican_{m,t}$ and $PercentLatino_{m,t}$. Further, I include the variables $PercentHighSchoolDegree_{m,t}$ and $MedianIncome_{m,t}$, which measure the socioeconomic characteristics of municipalities. I also control for the proportion of elderly in a municipality, $Percent65Older_{m,t}$, how urban a municipality is, $PercentUrban_{m,t}$, and each municipality's population, $TotalPopulation_{m,t}$. These are demographic characteristics that may have influenced the timing of the switch to vote-by-mail in Washington and may also affect the level of revenue and expenditures in municipalities.

Results: Accountability Audits

I first examine how vote-by-mail affects the quality of elected officials and the governments that they are tasked with overseeing using the audit report data. Specifically, I expect that in municipalities with vote-by-mail elections, which results in incumbents anticipating that voters will gather more information about them, that elected officials will be less likely to break laws or misappropriate public resources.

The audit report data presents a number of challenges because audits do not take place at universal intervals across all municipalities and there are sometimes multiple types of audits happening simultaneously in a given municipality. For example, the period of time that the auditor is examining can be greater than 1 year (in the data, the length of the audit period ranges from 1 year to 4 years) and a municipality could have its financial records audited while, say, a three year accountability audit is also taking place. This presents a problem because the data are not in the standard panel format where each observation would be a municipality-year. Thus, I can not use the same approach as in the previous section where I adapt the difference-in-differences framework over multiple periods to a single regression.

In order to examine the effect of vote-by-mail on the average number of findings that a municipality receives in a given year, I calculate a series of non-parametric difference-in-differences

⁷This method for linear interpolation of census data for years without census estimates can be found at the following link: https://www.census.gov/popest/methodology/2000-2010_Intercensal_Estimates.Methodology.pdf

estimates where I compare changes in treated municipalities after a switch to vote-by-mail to changes in those municipalities which have not yet been treated. Specifically, in order to estimate the difference-in-differences estimator of the effect of vote-by-mail on the number of findings I calculate the sample analogs of the population quantities in the following equation.

$$\hat{\beta} = (E[NumFindings_{m,t} | m = Treated, t = 1] - E[NumFindings_{m,t} | m = Treated, t = 0]) - (E[NumFindings_{m,t} | m = Control, t = 1] - E[NumFindings_{m,t} | m = Control, t = 0]) \quad (2)$$

In this framework, $t = 0$ indicates the time period before a switch to vote-by-mail and $t = 1$ indicates the time period after a switch to vote-by-mail. The municipalities in the group $m = Treated$ are those that switched to vote-by-mail in a given year and the municipalities in the group $m = Control$ are the municipalities that have not yet been treated and are not treated in the year in which the effect is being estimated. As a results of this setup, as we move away from the year in which most counties decided to switch to vote-by-mail (2005) the number of counties left to be treated or to be a part of the control group drops dramatically. In fact, after 2006 there are only 5 counties that have not yet been treated with vote-by-mail. This creates issues because there are few municipalities with which to estimate the effect and, further, because treatment is applied at the county level there are an insufficient number of clusters for valid inference (Cameron, Gelbach and Miller 2008).

Therefore I restrict my analyses of these data to examining the effect of switching to vote-by-mail on the municipalities that switched to the institution in 2005 and 2006.⁸ Specifically, I estimate the sample averages and plug them into Equation 2, first, by using data on audit reports that began and ended in the year prior to vote-by-mail ($t=0$) and began and ended by the year after the switch to vote-by-mail ($t=1$). For example, for those municipalities that switched in 2005, I compare the average number of findings for reports completed in 2004 to those completed in 2005 or 2006. Then, I estimate the same model but expand this bandwidth to include reports that

⁸I do not analyze years prior to 2005, because the earliest observations in the accountability report data are in 2002.

ended within two years and then within three years of the switch to vote-by-mail. In order to calculate the standard error for these estimates I employ the block bootstrap with each county being its own cluster. The standard error is calculated as the standard deviation of 500 block bootstraps of the difference-in-differences estimator, which is then used to construct confidence intervals around the estimates.

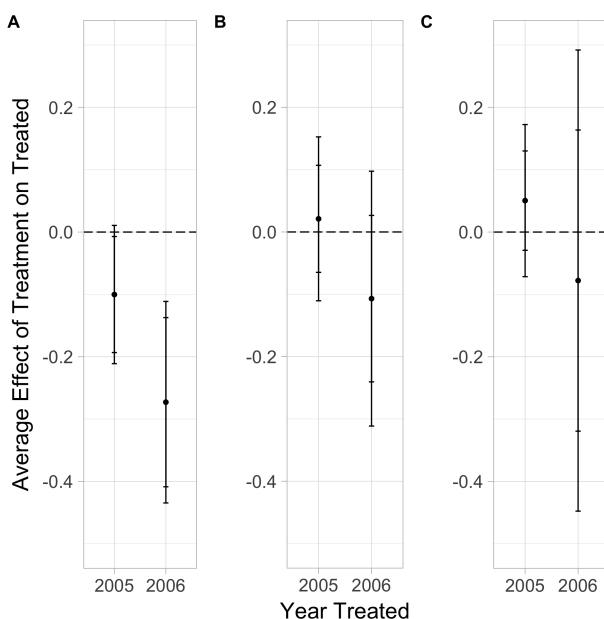


Figure 3: The effect of vote-by-mail on the average number of municipal audit findings. One-year, two-year, and three-year bandwidth estimates are displayed in Panel A, B, and C, respectively. Panels display point estimates as well as block-bootstrap (county level blocks) 90 % and 95 % confidence intervals.

The estimates are displayed in Figure 3. Panel A shows the estimated effect of vote-by-mail on the average number of audit findings using a bandwidth of one year around the switch to vote-by-mail. The difference-in-differences estimates indicate that, as expected, switching to vote-by-mail has a negative effects on audit report findings. For 2005, the point estimate (-0.104) is distinguishable from zero with 90% confidence but the 95% confidence interval crosses zero. Further, the point estimate for 2006 (-0.286) is substantively larger and statistically significant. As I expand the bandwidth to two years before and after (Figure 3 Panel B) as well as three years before and after (Figure 3 Panel C) the switch to vote-by-mail the estimated effect of vote-by-mail loses its significance. This could be the result of a process where as time moves further away from when

the switch to vote-by-mail took place, the effect of the institution on the behavior of elected officials diminishes. Or, it could also be the case that as I expand the bandwidth around the switch to vote-by-mail that I introduce noise, which increases the size of the standard errors.⁹

In all, these findings provide suggestive evidence that in the year directly after the switch to vote-by-mail that the institution had a negative effect on the number of findings documented in audit reports. This is a substantively important finding. As discussed, an audit report finding represents a substantial breach of law so a decrease in these types of violations indicates that government officials are behaving more competently and as more faithful agents of their constituents. This provides evidence in line with the theory that elected officials strategically respond to their expectation that voters will gather more information about incumbents when voting in an all-mail election. Further, these results cannot be explained by any potential changes in the composition of the electorate that are a result of vote-by-mail, which provides additional evidence that the informational mechanism that I have proposed is indeed operating. That being said, this set of analyses has its drawbacks because I am only able to examine the effects of vote-by-mail in a small subset of municipalities in the state of Washington. Thus, I next turn an analyses of the finances of municipalities in Washington.

Results: Municipal Fiscal Policy

To estimate the effects of vote-by-mail on municipal revenue and expenditures, I again estimate models of the following form,

$$Y_{m,t} = \beta_1 VBM_{m,t} + \boldsymbol{\delta}^T \mathbf{X}_{m,t} + \lambda_m + \tau_t + \epsilon_{m,t} \quad (3)$$

where $Y_{m,t}$ are the dependent variables pertaining to the revenue and expenditures of municipalities. I specifically on estimate the effect of vote-by-mail on *LogRevenuePerCapita* _{m,t} ,

⁹In Figure B.1 in the Online Appendix, I present a series of placebo tests to examine if there are pretreatment differences between treatment and control groups.

$\text{LogTaxRevenuePerCapita}_{m,t}$, $\text{LogPropertyTaxRevenuePerCapita}_{m,t}$, and $\text{LogExpendituresPerCapita}_{m,t}$.

The estimate of β_1 represents the causal effect of vote-by-mail on these outcomes. $\mathbf{X}_{m,t}$ is a vector of demographic control variables obtained from the U.S. Census that are included in some specifications of the model. As before, λ_m and τ_t are municipal and year fixed effects, and I report cluster-robust standard errors with clusters at the county level.

Recall that under the assumption that voters are fiscal conservatives, I expect when a political jurisdiction switches to vote-by-mail that taxing and spending will decrease. Table 2 displays the results of the models with total revenue (Columns 1-4) and total expenditures (Columns 5-8) as the dependent variable across a variety of specifications. Across all of the models there is a consistent theme: when a municipality switches to vote-by-mail, total revenue and expenditures decrease. The results maintain standard levels of statistical significance for both the full and restricted sample as well as with or without the set of control variables. For example, in the model with the full sample of municipalities and controls for demographic characteristics, switching to vote-by-mail leads to a statistically significant 0.059 decrease in log revenue per capita (Column 2). Taking into account the log transformation of the dependent variable, this is equivalent to a 5.9% decrease in total revenue per capita. In the analogous model with the log expenditures per capita dependent variable the coefficient on the vote-by-mail variable is statistically significant and equal to -0.071, which indicates that vote-by-mail elections cause a 7.1% decrease in total expenditures per capita. This provides convincing evidence that vote-by-mail causes elected officials to implement more conservative fiscal policies Washington's municipalities.

I next turn to an analysis of the effects of vote-by-mail on revenue obtained from taxes. If elected officials are really responding to the electoral incentives created by vote-by-mail then we should expect that there is a decrease in revenue sources, namely taxes, that particularly impact the pocketbooks of voters. The results of these models are displayed in Table 3. First, Columns 1-4 display the effect of vote-by-mail on log total tax revenue per capita. Although, the sign of the coefficient on the vote-by-mail variable is negative across the different specifications of the model it is never statistically significant. However, Columns 5-8, which display the models with

Table 2: The Effects of Vote-by-Mail on Municipal Revenue and Expenditures

	<i>Dependent variable:</i>							
	Log Revenue Per Capita				Log Expenditures Per Capita			
	Full Sample		Restricted Sample		Full Sample		Restricted Sample	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Vote-by-Mail	−0.051*	−0.059*	−0.055**	−0.066**	−0.064**	−0.071**	−0.071***	−0.080***
	(0.029)	(0.031)	(0.026)	(0.028)	(0.026)	(0.029)	(0.022)	(0.025)
Controls	No	Yes	No	Yes	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipal FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,598	2,589	2,387	2,378	2,598	2,589	2,387	2,378
Adjusted R ²	0.704	0.707	0.707	0.709	0.695	0.700	0.697	0.701

Note: Robust standard errors clustered by county in parentheses. *p<0.1; **p<0.05; ***p<0.01.

log property tax revenue per capita as the dependent variable, indicate that the decrease in total revenue documented in Table 2 seems to be largely driven by a decrease in property taxes. Depending on the specification of the model the results show that vote-by-mail caused a 3.6% (Column 6) to 4.0% (Column 7) decrease in revenue from property taxes in Washington's municipalities.¹⁰ Thus, not only does vote-by-mail cause lower levels of revenue and expenditures, but also these decreases in total revenue are driven by a decrease in property taxes, which is a revenue source that is most likely to directly effect many voters.

In sum, the results presented thus far are consistent with the theory of I have put forth in this paper. Specifically, vote-by-mail causes voters in Washington to obtain more information about politics than they would when voting at a traditional polling place. Consequently, elected officials behave more competently and shift public policy to be more reflective of the preference of voters, which results in lower levels of taxing and spending in Washington's municipalities.

¹⁰In the Online Appendix, I present robustness checks of these results. First, I estimate models with leads and lags of the vote-by-mail independent variable to assess if the parallel trends assumption necessary for a causal interpretation of difference-in-differences estimates holds (Tables C.1 - C.4). Second, I estimate models that include a municipality specific time trend (Tables C.5 and C.6).

Table 3: The Effects of Vote-by-Mail on Municipal Tax Revenue

	<i>Dependent variable:</i>							
	Log Tax Revenue Per Capita				Log Property Tax Revenue Per Capita			
	Full Sample	Restricted Sample			Full Sample	Restricted Sample		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Vote-by-Mail	−0.019 (0.014)	−0.022 (0.015)	−0.020 (0.014)	−0.025 (0.016)	−0.038*** (0.010)	−0.036*** (0.009)	−0.040*** (0.011)	−0.037*** (0.010)
Controls	No	Yes	No	Yes	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipal FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,598	2,589	2,387	2,378	2,597	2,588	2,386	2,377
Adjusted R ²	0.957	0.958	0.956	0.957	0.934	0.935	0.932	0.933

Note: Robust standard errors clustered by county in parentheses. *p<0.1; **p<0.05; ***p<0.01.

Vote-by-Mail, Municipal Institutions, and Electoral Competition

In this section, I examine if the relationship between vote-by-mail and municipal revenue and expenditures varies across municipalities with different institutional arrangements and levels of electoral competition. First, I analyze how municipal finance outcomes vary across cities with mayor-council governments compared to those with council-manager governments. Scholars generally argue that in cities with strong mayors that policies better reflect the preferences of citizens (Sharp 1997, but see Tausanovitch and Warshaw 2014), so I expect that mayor-council governments will be more responsive to the switch to vote-by-mail. Specifically, I estimate the following equation,

$$\begin{aligned}
Y_{m,t} = & \beta_1 VBM_{m,t} + \beta_2 MayorCouncil_m + \\
& \beta_3 VBM_{m,t} \times MayorCouncil_m + \\
& \delta^T \mathbf{X}_{m,t} + \tau_t + \epsilon_{m,t}
\end{aligned} \tag{4}$$

where $MayorCouncil_m$ is a dummy variable equal to 1 if a municipality has a mayor-council government and $Y_{m,t}$ represents the various municipal finance dependent variables. I exclude municipality fixed effects from these analyses because mayor-council status is time invariant. Therefore, these estimates from these analyses do not have a causal interpretation, but nevertheless can shed light on the consequences of the implementation of vote-by-mail in Washington. The results of these models are displayed in Columns 1 (expenditures), 3 (revenue), 5 (total taxes), and 7 (property taxes) of Table 4. The results show that the coefficient on the vote-by-mail indicator is consistently positive but only statistically significant for the total taxes dependent variable, but across all of the dependent variables the interaction between vote-by-mail and the mayor-council dummy variable is negative and statistically significant. This indicates that the expected level of revenue and expenditures is lower in vote-by-mail municipalities with mayor-council governments compared to those with council-manager governments, which is consistent with the logic that policy outcomes in municipalities with mayor-council governments are more responsive to electoral incentives.

I next examine if the competitiveness of elections for municipal office conditions the effects of vote-by-mail. I expect that electoral competition will magnify the effects of vote-by-mail, because incumbents who believe that they will face strong challengers may be more likely to be responsive to changes in electoral systems and their constituents. I test this hypothesis by estimating equations of the following form,

$$\begin{aligned}
Y_{m,t} = & \beta_1 VBM_{m,t} + \beta_2 Competitiveness_{m,(t-1|t-2)} + \\
& \beta_3 VBM_{m,t} \times Competitiveness_{m,(t-1|t-2)} + \\
& \delta^T \mathbf{X}_{m,t} + \lambda_m + \tau_t + \epsilon_{m,t}
\end{aligned} \tag{5}$$

where $Competitiveness_{m,(t-1|t-2)}$ measures the average division of votes in city council and mayoral elections in the previous election cycle, and the other variables are the same as before. The results, displayed in Table 4, show that for the expenditures (Column 2), revenue (Column 4),

and total taxes (Column 6) dependent variables that the interaction between the vote-by-mail dummy and the competitiveness variable is negative. This indicates that the impact of vote-by-mail becomes more negative as electoral competition increases. However, the interaction term in the model with property tax revenue as the dependent variable (Column 8) is positive, which is opposite of what is expected.

Table 4: The Effects of Vote-by-Mail on Municipal Revenue and Expenditures (Full Data)

	<i>Dependent variable (log per capita):</i>							
	Expenditures		Revenue		Total Taxes		Property Taxes	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Vote-by-Mail	0.108 (0.087)	−0.050 (0.038)	0.119 (0.076)	−0.028 (0.040)	0.077** (0.039)	−0.001 (0.019)	0.015 (0.042)	−0.031*** (0.011)
Mayor-Council	0.131 (0.123)		0.132 (0.113)		0.023 (0.100)		0.115* (0.067)	
Vote-by-Mail*Mayor	−0.219*** (0.076)		−0.222*** (0.064)		−0.078* (0.047)		−0.084* (0.046)	
Competitiveness		−0.015 (0.048)		0.005 (0.052)		0.040** (0.018)		−0.025 (0.021)
Vote-by-Mail*Comp		−0.040 (0.068)		−0.108 (0.074)		−0.077*** (0.025)		0.035 (0.031)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipal FE	No	Yes	No	Yes	No	Yes	No	Yes
Observations	2,589	2,162	2,589	2,162	2,589	2,162	2,588	2,161
Adjusted R ²	0.191	0.729	0.179	0.730	0.436	0.964	0.461	0.945

Note: Robust standard errors clustered by county in parentheses. *p<0.1; **p<0.05; ***p<0.01.

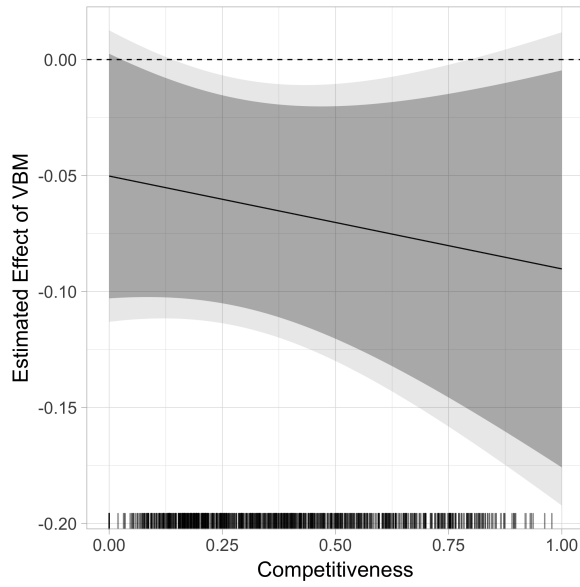
In order to aid in the interpretation of the interaction variables, Figure 4 displays the marginal effect of vote-by-mail on the dependent variables of interest across different levels of competitiveness using the results from the models with the full sample of municipalities. The solid black line in the figures represents the estimated marginal effect of switching to vote-by-mail at different values of the competitiveness variable. The light shaded region around the line is a 95% confidence interval on these estimates and the dark shaded region is an 90% confidence interval. The marginal effects plots indicate that as competitiveness increases the negative effect of vote-

by-mail on total expenditures (Panel A), total revenue (Panel B), and total tax revenue (Panel C) becomes more larger. This relationship appears to be strongest for the total revenue and total tax dependent variables. Somewhat surprisingly Panel D of Figure 4 shows that the relationship between electoral competitiveness and revenue from property taxes is in the the opposite direction. Specifically, as competition increases the estimated marginal effect of vote-by-mail becomes statistically indistinguishable from zero.

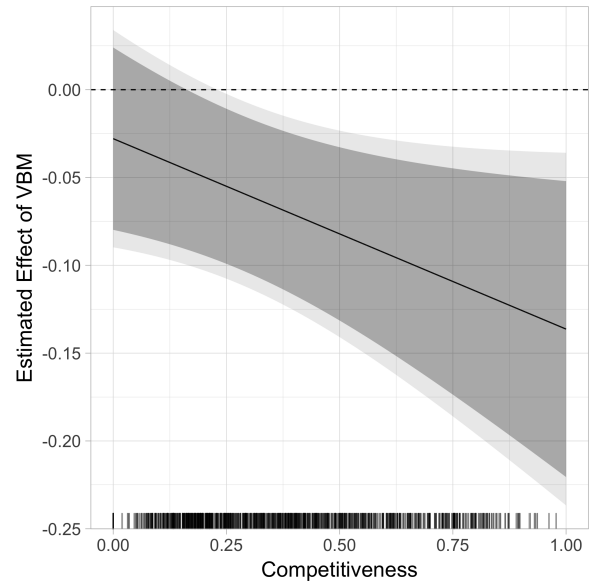
Nevertheless, these results indicate that the relationship between vote-by-mail and levels of taxing and spending in Washington's municipalities varies with municipal institutions as well as the competition of elections. When there are institutions in place that increase accountability or competitive elections, municipal fiscal policy outcomes are generally more responsive the constituent interests after the switch to vote-by-mail. These results provide additional support for the theory put forth in this paper that vote-by-mail induces responsiveness among politicians through electoral incentives.

Alternative Explanation: Composition of the Electorate

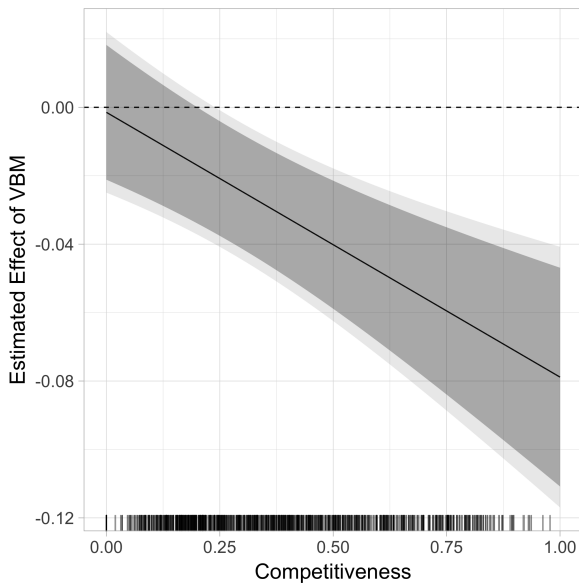
I have argued in this paper that the public policy consequences of vote-by-mail are a result of the informational effects of the institution. However, a potential alternative explanation for these results is that vote-by-mail changes the *composition* of the electorate and not only the information environment of elections. Specifically, there are two potential effects that vote-by-mail may have on the composition of the electorate. First, vote-by-mail may *decrease* the socioeconomic bias in the electorate, because mailing a ballot to potential voters substantially decreases the costs of voting. On the other hand, vote-by-mail could *increase* the socioeconomic bias in the electorate by increasing the political power of homeowners and those with more permanent living situations. If this latter hypotheses were to be confirmed then it could possibly explain the effect of vote-by-mail on municipal finances that I have documented in this paper. However, if it is not the case that vote-by-mail increases the socioeconomic bias in the electorate, then we can have more



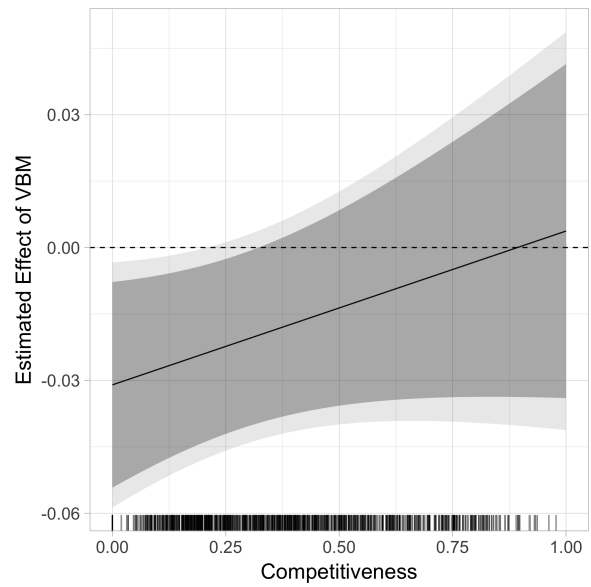
(a) Log Total Expenditures Per Capita



(b) Log Total Revenue Per Capita



(c) Log Total Tax Revenue Per Capita



(d) Log Property Tax Revenue Per Capita

Figure 4: Marginal effects of vote-by-mail on municipal revenue and expenditures. 95% and 90% confidence intervals are displayed in light and dark grey, respectively. Observed values of the competitiveness variable are marked on the x-axis.

confidence that these findings are the result of voters gathering more information about their elected officials and not changes in the composition of the electorate.

In order to assess this alternative explanation, I examine the effect of vote-by-mail on the composition of the electorate in Washington's municipal elections using data from the Catalist voter file. Catalist merges voter files with a variety of commercial and Census data using a proprietary matching algorithm (Ansolabehere and Hersh 2012), which allows me to enumerate the number of voters in Washington's municipal elections that have into a variety of demographic characteristics. Particularly, I am able to examine the housing choices by measuring the *ProportionHomeowner_{m,t}* and *ProportionRenter_{m,t}* in Washington's electorate. Further, I examine the effects of vote-by-mail on the distribution of family income in the electorate by creating the variables *ProportionIncome<\$40,000_{m,t}* and *ProportionIncome>\$100,000_{m,t}* as well as the effect of the institution on the distribution of ages in the electorate using the variables *ProportionUnder30_{m,t}* and *ProportionOver65_{m,t}*.

Table 5 shows the results of models in the form of Equation 3 with the composition of the electorate dependent variables using the full sample of municipalities.¹¹ First, the results indicate that switching to vote-by-mail does not have a statistically significant effect on the proportion of homeowners (Column 1) or renters (Column 2) in the electorate.¹² But, it could be the case that the null results reported here are simply the a consequence of a lack of statistical power or measurement error in the dependent variable. Therefore, I present 90% confidence intervals with the coefficient estimates as Rainey (2014) argues that if the values within a 90% confidence interval are substantively small a researcher can argue for a negligible effect. The upper bound on the confidence interval for the proportion of homeowners dependent variable is 0.009, which is indeed substantively negligible. This indicates that, at best, vote-by-mail results in .9 % increase in the number of homeowners in the electorate in municipal elections in Washington. This is substantively very small and unlikely to induce the changes in revenue and expenditures reported

¹¹The results with the restricted sample are consistent with those presented here and are displayed in Table D.1 in the Online Appendix.

¹²In Tables D.2 and D.3 in the Online Appendix I present results with an alternative coding of the homeownership variable.

in this paper. Therefore, it is evident that vote-by-mail does not result in an increase in the electoral power of homeowners, which in turn causes changes in municipal fiscal policy.

Table 5: The Effects of Vote-by-Mail on the Composition of the Electorate (Full Data)

	<i>Dependent variable:</i>					
	Homeowner	Renter	< \$40,000	> \$100,000	Under 30	65 and Older
	(1)	(2)	(3)	(4)	(5)	(6)
Vote-by-Mail	−0.028 (−0.066, 0.009)	0.015 (−0.006, 0.035)	0.012* (0.001, 0.024)	−0.020 (−0.046, 0.005)	0.002*** (0.001, 0.003)	−0.018** (−0.030, −0.006)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Municipal FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,374	1,374	1,374	1,374	1,374	1,374
Adjusted R ²	0.970	0.773	0.946	0.979	0.713	0.775

Note: Results with full data. 90 % confidence intervals in parentheses. *p<0.1; **p<0.05; ***p<0.01.

In Table 5, I present additional evidence against the hypothesis that vote-by-mail increases socioeconomic bias in the electorate. Column 3 shows that vote-by-mail increases the proportion of individuals in the electorate with an annual household income less than \$40,000 and Column 4 indicates that there is no significant effect of vote-by-mail on the proportion of the electorate with a household income greater than \$100,000 per year. Further, Columns 5 and 6 indicate that switching to vote-by-mail causes an increase in the proportion of voters younger than 30 and a decrease in the proportion of voters older than 65. These results indicate that vote-by-mail increases the proportion of lower income and younger voters who participate and, thus, diminishes the socioeconomic bias of the electorate in Washington’s municipal elections. These are the types of individuals that we would least expect to be vocal and organized proponents of decreases in taxing and spending. In all, this section provides compelling evidence that the effects of vote-by-mail on municipal revenue and expenditures documented in this paper are not the result of changes to the composition of the electorate. Rather, it appears that vote-by-mail slightly increase the proportion of less affluent voters who participate in Washington’s municipal elections. Future work should consider how these compositional effects of vote-by-mail, as well as other electoral reforms, vary across the timing and salience of elections.

Conclusion

The rules that govern how elections are run can have profound implications on the incentives of elected officials and electoral accountability (e.g., Anzia 2011, Bechtel, Hangartner and Schmid 2016, Fowler 2013, Fujiwara 2015). Consequently, who gets to vote and how a voter casts his ballot affects the types of policies that are implemented in democracies. This paper examines how a particular electoral institution, vote-by-mail, affects electoral accountability in the context of Washington state. I document how vote-by-mail results in voters obtaining more information about incumbents, which causes a decrease in the number of violations reported in audits of municipal governments as well as a decrease in revenue, property taxes and expenditures in these municipalities. Exploiting a law that resulted in staggered overtime changes in the use of vote-by-mail in Washington's counties, these findings provide compelling evidence that vote-by-mail induces elected officials to be more responsive to their constituents.

As more political jurisdictions begin to adopt all-mail elections it is imperative that scholars understand the consequences of this institution. Since Oregon switched to vote-by-mail in 1998 there are now three states (Oregon, Washington, and Colorado) in the United States that hold exclusively vote-by-mail elections and some counties in California will begin to switch to all-mail elections in 2018. Further, at least one other state (Hawaii) has legislation pending that would switch the electoral system to vote-by-mail and there are also rules in states that require certain sub-state jurisdictions to hold their elections by mail or give them the option to do so if they so choose. Moreover, entire countries, including Switzerland, hold all-mail elections. Thus, it is clear that we should have solid understanding of how this institution shapes the incentives and behaviors of elected officials. There has been much debate about the effects of vote-by-mail on voter turnout (e.g., Bergman and Yates 2011, Berinsky, Burns and Traugott 2001, Gerber, Huber and Hill 2013, Gronke and Miller 2012, Karp and Banducci 2000, Kousser and Mullin 2007, Magleby 1987, Richey 2008), but scholars have generally ignored other potential effects of the institution (Gronke et al. 2008). The findings documented in this paper, consequently, broaden this literature by examining how vote-by-mail affects the information environment of elections and shapes

the incentives of elected officials as well as policy outcomes. However, many questions about the effects of vote-by-mail still remain. For example, do all-mail elections still induce greater levels of accountability among politicians at the state and national level? Do these effects vary in different states?

More broadly, these results speak to the nature of electoral accountability in the United States. It is well documented that the American electorate is biased in favor of those with a higher socioeconomic status (e.g. Schlozman, Verba and Brady 2012) and that public policy favors the affluent (e.g. Bartels 2016). Other work finds that institutions that provoke accountability among local officials actually further bias policy outcomes away from the interests of individuals of a low socioeconomic status (Sances 2016), and I find that vote-by-mail, which many proponents describe as dramatically reducing the cost of voting, only results in small changes to the composition of the electorate. Thus, although the institution of vote-by-mail induces elected officials to implement policies more in line with their constituents interests, this results in public policy - lower property taxes and lower levels of spending - that actually further biases outcomes in favor of high socioeconomic status individuals. Do other electoral reforms in the United States that allegedly increase access to the ballot actually result in a more biased policy outcomes? Although scholars have noted that this indeed may be the case (e.g. Berinsky 2005), there is still a great deal of work to be done to understand how the patchwork of electoral rules across the United States affects which groups of citizens policy outcomes favor.

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Online Appendix

A Summary Statistics

Summary statistics for all data used in the paper are in Table A.1 (ballot measures), Table A.2 (audit reports), Table A.3 (vote-by-mail indicator and competitiveness), Table A.4 (municipal revenue and expenditures and U.S. Census data), and Table A.5 (Catalist data).

Table A.1: Summary Statistics of Statewide Ballot Measure Data

Statistic: Ballot Roll-Off	N	Mean	St. Dev.	Min	Max
<i>Full Sample</i>					
All Elections	390	0.052	0.019	0.014	0.133
Even-Year Elections	195	0.055	0.017	0.028	0.115
Presidential Elections	78	0.059	0.018	0.032	0.115
<i>Restricted Sample</i>					
All Elections	340	0.051	0.019	0.014	0.133
Even-Year Elections	170	0.054	0.017	0.028	0.115
Presidential Elections	68	0.058	0.018	0.032	0.115

Table A.2: Summary Statistics of Audit Report Data

Statistic: Number of Findings	N	Mean	St. Dev.	Min	Max
Full Data	4,036	0.182	0.537	0	8
<i>2005 Sample</i>					
One-Year Bandwith	403	0.176	0.556	0	4
Two-Year Bandwith	582	0.172	0.529	0	4
Three-Year Bandwith	713	0.171	0.562	0	7
<i>2006 Sample</i>					
One-Year Bandwith	319	0.172	0.536	0	4
Two-Year Bandwith	587	0.169	0.582	0	7
Three-Year Bandwith	699	0.166	0.560	0	7

Table A.3: Summary Statistics of Vote-by-Mail Indicator and Electoral Competitiveness

Statistic	N	Mean	St. Dev.	Min	Max
<i>Full Sample</i>					
Vote-By-Mail	2,602	0.488	0.500	0	1
Competitiveness	2,225	0.293	0.260	0.000	0.978
<i>Restricted Sample</i>					
Vote-By-Mail	2,391	0.461	0.499	0	1
Competitiveness	2,004	0.298	0.259	0.000	0.933

Table A.4: Summary Statistics of Full Sample of Municipal Revenue, Expenditure, and Demographic Data

Statistic	N	Mean	St. Dev.	Min	Max
<i>Full Sample</i>					
Log Revenue Per Capita	2,598	7.431	0.606	4.834	10.583
Log Total Tax Revenue Per Capita	2,598	6.164	0.642	3.908	8.042
Log Property Tax Revenue Per Capita	2,597	5.140	0.591	3.134	6.989
Log Expenditures Per Capita	2,598	7.401	0.616	4.256	10.441
Percent African American	2,598	1.440	2.527	0.000	17.566
Percent 65 or Older	2,598	14.176	6.840	1.500	79.200
Percent Latino	2,598	11.857	18.241	0.000	98.536
Median Income	2,589	49,206.670	23,577.640	4,750.000	204,375.000
Percent High School Degree	2,598	83.609	12.597	20.011	100.000
Percent Urban	2,598	0.611	0.468	0.000	1.000
Total Population	2,598	13,864.590	43,458.670	24.000	595,240.000
<i>Restricted Sample</i>					
Log Revenue Per Capita	2,387	7.430	0.602	4.834	10.583
Log Total Tax Revenue Per Capita	2,387	6.181	0.628	3.908	7.952
Log Property Tax Revenue Per Capita	2,386	5.164	0.585	3.134	6.989
Log Expenditures Per Capita	2,387	7.400	0.614	4.256	10.441
Percent African American	2,387	1.534	2.611	0.000	17.566
Percent 65 or Older	2,387	13.822	6.669	1.500	79.200
Percent Latino	2,387	11.999	18.466	0.000	98.536
Median Income	2,378	50,679.110	23,955.590	4,750.000	204,375.000
Percent High School Degree	2,387	83.879	12.844	20.011	100.000
Percent Urban	2,387	0.642	0.458	0.000	1.000
Total Population	2,387	14,895.390	45,181.160	24.000	595,240.000

Table A.5: Summary Statistics of Catalist Data

Statistic	N	Mean	St. Dev.	Min	Max
<i>Full Sample</i>					
Proportion Homeowner	1,404	0.387	0.267	0.000	1.000
Proportion Likely Homeowner	1,404	0.144	0.103	0.000	0.750
Proportion Homeowner or Likely Homeowner	1,404	0.531	0.292	0.000	1.000
Proportion Renter	1,404	0.0004	0.001	0.000	0.019
Proportion Likely Renter	1,404	0.036	0.045	0.000	0.348
Proportion Renter or Likely Renter	1,404	0.036	0.045	0.000	0.348
Proportion Income < 40,000	1,404	0.335	0.182	0.000	1.000
Proportion Income > 100,000	1,404	0.167	0.210	0.000	1.000
Proportion Under 30	1,404	0.009	0.016	0.000	0.111
Proportion Over 65	1,404	0.485	0.107	0.000	1.000
<i>Restricted Sample</i>					
Proportion Homeowner	1,289	0.409	0.266	0.000	1.000
Proportion Likely Homeowner	1,289	0.146	0.103	0.000	0.750
Proportion Homeowner or Likely Homeowner	1,289	0.555	0.287	0.000	1.000
Proportion Renter	1,289	0.0004	0.001	0.000	0.019
Proportion Likely Renter	1,289	0.037	0.046	0.000	0.348
Proportion Renter or Likely Renter	1,289	0.037	0.046	0.000	0.348
Proportion Income < 40,000	1,289	0.329	0.184	0.000	1.000
Proportion Income > 100,000	1,289	0.178	0.216	0.000	1.000
Proportion Under 30	1,289	0.009	0.016	0.000	0.111
Proportion Over 65	1,289	0.481	0.107	0.000	1.000

B Robustness Checks: Audit Report Results

Placebo tests for the analyses examining the effects of vote-by-mail on the average number of findings are displayed in Figure B.1. The point estimates displayed in the figure are the effect of vote-by-mail in treated municipalities (calculated in the same way as Equation 2 in the body of the paper) in time period $t - 1$ (the year before switching) and $t - 2$ (two years before switching) on the average number of findings. The results indicate no pretreatment differences between treatment and control groups for municipalities that switched in both 2005 and 2006. Due to data availability I am only able to analyze $t - 1$ for municipalities that switched to vote-by-mail in 2005.

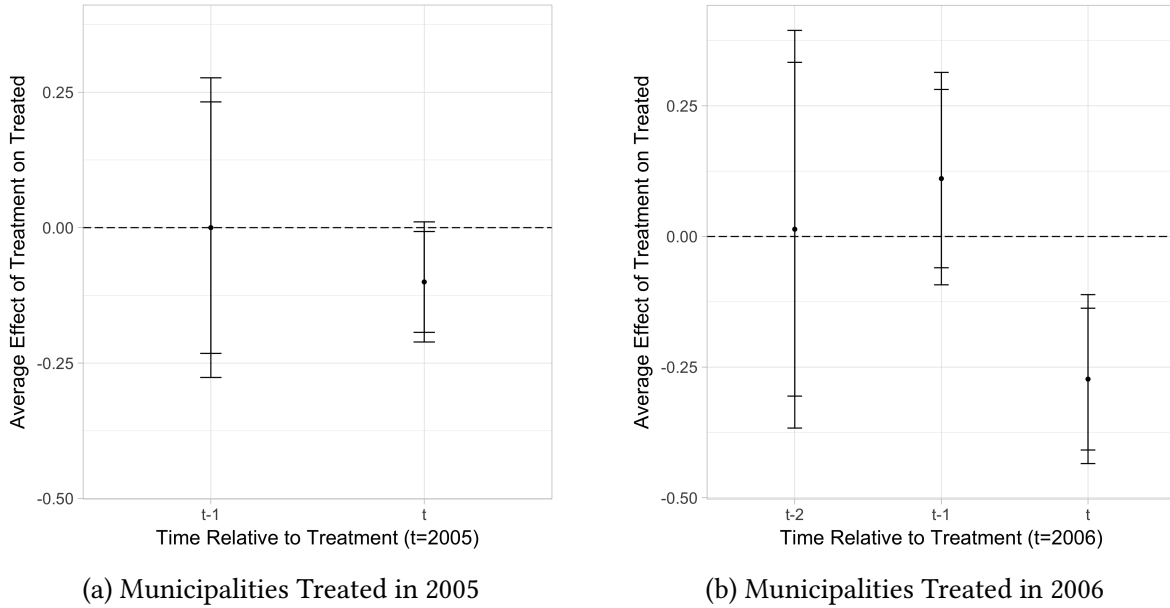


Figure B.1: Placebo test of the effect of vote-by-mail on average number of audit findings for municipalities treated in 2005 (Panel A) and 2006 (Panel B) with one-year bandwidth around treatment year. Point estimates as well as block-bootstrapped (county-level blocks) 90 % and 95 % confidence intervals are displayed. Estimates at time t are the same as in the body of the paper. Estimates at time $t - 1$ and $t - 2$ represent the effect of switching to vote-by-mail either one year or two years in the future.

C Robustness Checks: Municipal Fiscal Policy Results

C.1 Leads and Lags

I estimate a series of models similar to the Granger test for causality in order to examine the validity of the parallel trends assumption, which is the necessary identifying assumption for a difference-in-differences design (Angrist and Pischke 2009). Specifically, I estimate a series of models of the following form,

$$Y_{m,t} = \sum_{\tau=0}^n \beta_{-\tau} VBM_{m,t-\tau} + \sum_{\tau=1}^q \beta_{\tau} VBM_{m,t+\tau} + \delta^T \mathbf{X}_{m,t} + \lambda_m + \tau_t + \epsilon_{m,t} \quad (6)$$

where the variable $VBM_{m,t}$ now only takes on a value of one in the year in which a municipality switched to vote-by-mail and, thus, $VBM_{m,t-1}$ is one only in the year before a municipality switched to vote-by-mail. As before, $Y_{m,t}$ are the municipal fiscal policy dependent variables, $\mathbf{X}_{m,t}$ is a vector of demographic controls, and λ_m and τ_t are municipal and year fixed effects. The sums in the empirical model allow for lead and lag variables. Specifically, I vary the value of n to allow for up to 3 lagged variables, or potential pretreatment effects, and the value of q to allow for a lead variable, or potential posttreatment effects. The expectation is that the lead variables should not be statistically significant, because if they were that would indicate pretreatment differences between treatment and control groups.

The results of these models for the log revenue per capita and log expenditures per capita are displayed in Table C.1 and Table C.2, respectively. All of the lead variables are statistically insignificant, which provides evidence that there are not pretreatment differences between the two groups and support that the parallel trends assumption holds. Further, the indicator for the year of the switch to vote-by-mail and the lagged variable are negatively across all specifications of the model and statistically significant in most.

Moving next to Table C.3, I run the leads and lags models with log total tax revenue per capita as the dependent variable. In the models that include one lead and one lag variable, the lead variable is statistically significant with both the full (Column 1) and restricted (Column 4) samples. This indicates that it is possible municipalities with lower levels of tax revenue selected into vote-by-mail before other municipalities. However, I argue that this is not concerning for a number of reasons. First, this is not a very robust finding and as additional lead variables are included, the effect disappears. Second, as the results in the body of the paper showed the effect of vote-by-mail had the least robust effect on total tax revenue. Finally, the leads and lags models with the other dependent variables do not indicate that there are similar selection issues.

In Table C.4 I present that models with log property tax revenue per capita as the dependent variable. Across all of the specifications of the model there is no evidence that municipalities with lower property taxes switched to vote-by-mail earlier. In fact, if anything it appears that the coefficients on the lead variables are positive and in one specification (Column 2) marginally significant.

Table C.1: The Effects of Vote-by-Mail on Municipal Revenue

	<i>Dependent variable:</i>					
	Log Revenue Per Capita					
	Full Sample			Restricted Sample		
	(1)	(2)	(3)	(4)	(5)	(6)
VBM_{t-3}			-0.020 (0.048)			-0.037 (0.046)
VBM_{t-2}		-0.018 (0.030)	-0.028 (0.043)		-0.026 (0.028)	-0.046 (0.041)
VBM_{t-1}	-0.013 (0.032)	-0.018 (0.038)	-0.038 (0.049)	-0.008 (0.031)	-0.017 (0.037)	-0.050 (0.051)
VBM_t	-0.038 (0.027)	-0.035 (0.032)	-0.045 (0.040)	-0.052** (0.023)	-0.057* (0.031)	-0.084** (0.036)
VBM_{t+1}	-0.053* (0.031)	-0.048 (0.032)	-0.047 (0.033)	-0.079** (0.033)	-0.077** (0.036)	-0.089*** (0.035)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Municipal FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,314	2,041	1,769	2,126	1,876	1,627
Adjusted R ²	0.718	0.729	0.733	0.718	0.728	0.735

Note: Robust standard errors clustered by county in parentheses. *p<0.1; **p<0.05; ***p<0.01.

Table C.2: The Effects of Vote-by-Mail on Municipal Expenditures

	<i>Dependent variable:</i>					
	Log Expenditures Per Capita					
	Full Sample			Restricted Sample		
	(1)	(2)	(3)	(4)	(5)	(6)
VBM_{t-3}			-0.024 (0.050)			-0.047 (0.047)
VBM_{t-2}		-0.010 (0.036)	-0.024 (0.054)		-0.012 (0.034)	-0.040 (0.053)
VBM_{t-1}	-0.024 (0.029)	-0.031 (0.033)	-0.050 (0.046)	-0.022 (0.027)	-0.032 (0.031)	-0.066 (0.046)
VBM_t	-0.037 (0.024)	-0.047 (0.030)	-0.059 (0.042)	-0.046** (0.021)	-0.066** (0.027)	-0.102*** (0.039)
VBM_{t+1}	-0.061** (0.031)	-0.060* (0.032)	-0.066* (0.037)	-0.090*** (0.033)	-0.096*** (0.035)	-0.121*** (0.036)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Municipal FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,314	2,041	1,769	2,126	1,876	1,627
Adjusted R ²	0.709	0.714	0.719	0.709	0.712	0.720

Note: Robust standard errors clustered by county in parentheses. *p<0.1; **p<0.05; ***p<0.01.

Table C.3: The Effects of Vote-by-Mail on Total Municipal Tax Revenue

	<i>Dependent variable:</i>					
	Log Tax Revenue Per Capita					
	Full Sample			Restricted Sample		
	(1)	(2)	(3)	(4)	(5)	(6)
VBM_{t-3}			0.009 (0.011)			0.011 (0.010)
VBM_{t-2}		0.002 (0.015)	0.003 (0.018)		0.005 (0.010)	0.009 (0.013)
VBM_{t-1}	-0.022* (0.011)	-0.020 (0.015)	-0.018 (0.022)	-0.020** (0.008)	-0.015 (0.011)	-0.007 (0.015)
VBM_t	-0.035** (0.015)	-0.025 (0.018)	-0.028 (0.021)	-0.037** (0.016)	-0.021 (0.018)	-0.021 (0.017)
VBM_{t+1}	-0.021 (0.014)	-0.019 (0.013)	-0.017 (0.014)	-0.021 (0.017)	-0.017 (0.016)	-0.010 (0.016)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Municipal FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,314	2,041	1,769	2,126	1,876	1,627
Adjusted R ²	0.964	0.968	0.971	0.964	0.969	0.972

Note: Robust standard errors clustered by county in parentheses. *p<0.1; **p<0.05; ***p<0.01.

Table C.4: The Effects of Vote-by-Mail on Municipal Property Tax Revenue

	<i>Dependent variable:</i>					
	Log Property Tax Revenue Per Capita					
	Full Sample			Restricted Sample		
	(1)	(2)	(3)	(4)	(5)	(6)
VBM_{t-3}			0.016 (0.010)			0.011 (0.011)
VBM_{t-2}		0.023* (0.012)	0.021 (0.016)		0.013 (0.009)	0.007 (0.013)
VBM_{t-1}	0.010 (0.010)	0.014 (0.012)	0.003 (0.017)	0.006 (0.011)	0.007 (0.012)	-0.012 (0.017)
VBM_t	0.003 (0.010)	-0.001 (0.013)	-0.011 (0.018)	-0.002 (0.009)	-0.009 (0.012)	-0.029* (0.017)
VBM_{t+1}	-0.003 (0.010)	-0.003 (0.012)	-0.015 (0.016)	-0.003 (0.010)	-0.007 (0.012)	-0.028* (0.017)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Municipal FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,314	2,041	1,769	2,126	1,876	1,627
Adjusted R ²	0.941	0.946	0.954	0.939	0.945	0.954

Note: Robust standard errors clustered by county in parentheses. *p<0.1; **p<0.05; ***p<0.01.

C.2 Time Trends

I further probe the municipal fiscal policy results by running models with municipal specific time trends. To do this I estimate models of the following form,

$$Y_{m,t} = \beta_1 VBM_{m,t} + \delta^T \mathbf{X}_{m,t} + \lambda_m + \lambda_m * t + \tau_t + \epsilon_{m,t} \quad (7)$$

which is the same as the baseline specification except for the fact that I now include a time trend, t , multiplied by municipality dummies, which allows each municipality to follow a different trend. The results for with the models in which log expenditures per capita and log total revenue per capita are the dependent variables are displayed in Table C.5. The models with the tax revenue dependent variables are displayed in Table C.6.

Table C.5: The Effects of Vote-by-Mail on Municipal Revenue and Expenditures

	<i>Dependent variable:</i>							
	Log Revenue Per Capita				Log Expenditures Per Capita			
	Full Sample		Restricted Sample		Full Sample		Restricted Sample	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Vote-by-Mail	−0.039 (0.034)	−0.039 (0.034)	−0.051* (0.028)	−0.051* (0.028)	−0.032 (0.032)	−0.033 (0.032)	−0.042 (0.027)	−0.042 (0.027)
Controls	No	Yes	No	Yes	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipal FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipal FExYr Trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,598	2,589	2,387	2,378	2,598	2,589	2,387	2,378
Adjusted R ²	0.744	0.747	0.747	0.749	0.739	0.742	0.742	0.745

Note: Robust standard errors clustered by county in parentheses. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

The results of these models are largely consistent with those presented in the body of the paper and, notably, across all of the specifications the coefficient on the vote-by-mail dependent variables stays negative and substantively similar to the models without the time trends. That being said, in some of the models with log revenue per capita and log expenditures per capita the coefficient on the vote-by-mail dependent variable does not maintain standard levels of statistical significance.

Table C.6: The Effects of Vote-by-Mail on Municipal Tax Revenue

	<i>Dependent variable:</i>							
	Log Tax Revenue Per Capita				Log Property Tax Revenue Per Capita			
	Full Sample		Restricted Sample		Full Sample		Restricted Sample	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Vote-by-Mail	−0.034** (0.016)	−0.033** (0.015)	−0.043*** (0.013)	−0.041*** (0.013)	−0.030** (0.012)	−0.030** (0.012)	−0.028* (0.014)	−0.027* (0.015)
Controls	No	Yes	No	Yes	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipal FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipal FExYr Trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,598	2,589	2,387	2,378	2,597	2,588	2,386	2,377
Adjusted R ²	0.975	0.975	0.975	0.975	0.958	0.959	0.957	0.957

Note: Robust standard errors clustered by county in parentheses. *p<0.1; **p<0.05; ***p<0.01.

D Robustness Checks: Composition of Electorate Results

D.1 Restricted Data

Table D.1 displays the estimated effect of vote-by-mail on the composition of the electorate in Washington's municipal elections with the restricted data. The results are largely consistent with those displayed in the body of the paper.

Table D.1: The Effects of Vote-by-Mail on the Composition of the Electorate (Restricted Data)

	<i>Dependent variable:</i>					
	Homeowner	Renter	< 40,000	> 100,000	Under 30	65 and Older
	(1)	(2)	(3)	(4)	(5)	(6)
Vote-by-Mail	−0.031 (−0.073, 0.010)	0.016 (−0.007, 0.039)	0.009 (−0.004, 0.023)	−0.023 (−0.050, 0.005)	0.002* (0.0001, 0.003)	−0.016** (−0.029, −0.003)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Municipal FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,259	1,259	1,259	1,259	1,259	1,259
Adjusted R ²	0.968	0.770	0.956	0.979	0.721	0.778

Note: 90 % confidence intervals in parentheses. *p<0.1; **p<0.05; ***p<0.01.

Table D.2 and Table D.3 displays the results of models with the disaggregated housing measures available in the Catalist data with the full and restricted samples of municipalities, respec-

tively. Specifically, rather than combining “likely homeowners” and “homeowners” as well as “likely renters” and “renters” into the same category I run models with each individual category as the dependent variable. The results are similar to those presented in the text of the paper. Vote-by-mail does not have a statistically significant effect on any of the housing dependent variables, and, further, the bounds 90% confidence intervals presented indicate substantively negligible effects (Rainey 2014).

Table D.2: The Effects of Vote-by-Mail on the Composition of the Electorate (Full Data)

	<i>Dependent variable:</i>			
	Homeowner (1)	Likely Homeowner (2)	Renter (3)	Likely Renter (4)
Vote-by-Mail	−0.032 (−0.079, 0.015)	0.004 (−0.007, 0.014)	−0.00005 (−0.0002, 0.0001)	0.015 (−0.006, 0.036)
Year FE	Yes	Yes	Yes	Yes
Municipal FE	Yes	Yes	Yes	Yes
Observations	1,374	1,374	1,374	1,374
Adjusted R ²	0.966	0.878	0.673	0.770

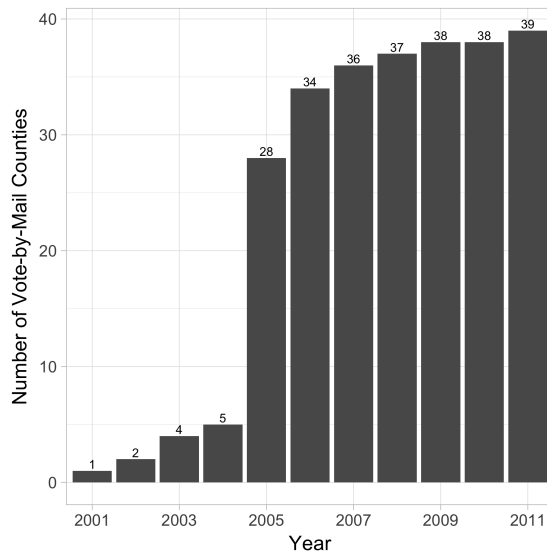
Note: 90 % confidence intervals in parentheses. *p<0.1; **p<0.05; ***p<0.01.

Table D.3: The Effects of Vote-by-Mail on the Composition of the Electorate (Restricted Data)

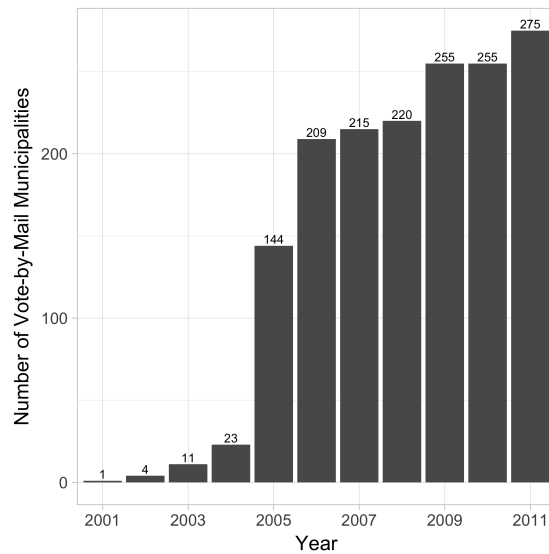
	<i>Dependent variable:</i>			
	Homeowner (1)	Likely Homeowner (2)	Renter (3)	Likely Renter (4)
Vote-by-Mail	−0.038 (−0.088, 0.013)	0.006 (−0.003, 0.016)	−0.0001 (−0.0002, 0.0001)	0.016 (−0.007, 0.039)
Year FE	Yes	Yes	Yes	Yes
Municipal FE	Yes	Yes	Yes	Yes
Observations	1,259	1,259	1,259	1,259
R ²	0.972	0.902	0.743	0.815

Note: 90 % confidence intervals in parentheses. *p<0.1; **p<0.05; ***p<0.01.

E Count of Treated Units By Year



(a) Number of Counties



(b) Number of Municipalities

Figure E.1: Number of counties (Panel A) and municipalities (Panel B) holding vote-by-mail elections in Washington 2001 - 2011. Note that the 6 municipalities whose borders cross county boundaries are removed from the sample.