Appendix for "Accountability for the Local Economy at All Levels of Government in United States Elections"

Justin de Benedictis-Kessner* Christopher Warshaw†

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Contents

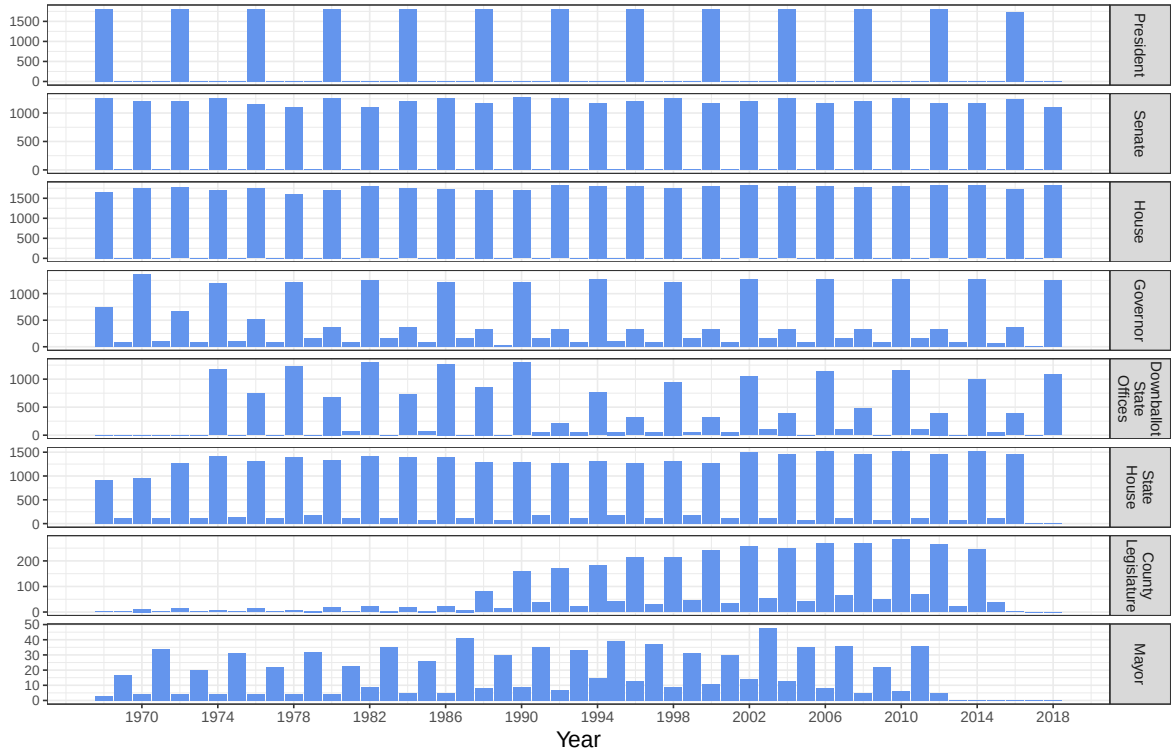
*Assistant Professor, Boston University, jdbk@bu.edu

†Assistant Professor, Department of Political Science, George Washington University, warshaw@gwu.edu

A Data

The elections data in the paper come from a variety of sources, as described in Table 2 of the main paper. We compiled these data to create the panel of county-level election results at multiple levels of government spanning five decades. Figure A-1 shows the breadth of these data over time and across different levels of government in counties with populations over 20,000 people.

Figure A-1: Elections Data



B Validity of Parallel Trends Assumptions

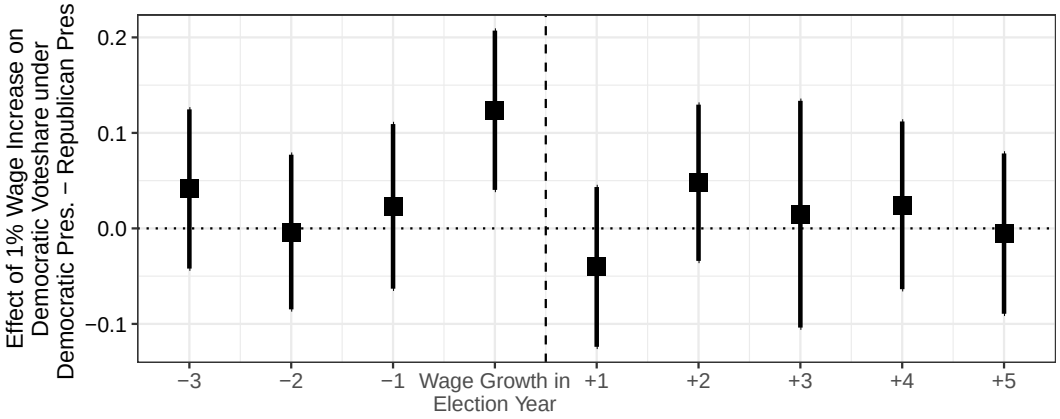
The identification strategy for our panel research design that we use in the main body of our paper relies on the assumption that there are no time-varying confounders, typically called the parallel trends assumption. In order to demonstrate that this assumption is likely to be valid, researchers commonly demonstrate that there are parallel trends in pre-treatment outcomes. In the panel framework that we use in our analyses, we can similarly demonstrate parallel trends by looking at the effects of leads of our main independent variable on contemporaneous outcomes. If future "treatment" (differing economic growth) affected voting in previous elections, we might worry that the groups of counties with worse economic performance were affected by other factors that also affect voting and our assumptions about time-varying confounders would not be validated.

The top panel of Figure B-2 evaluates the validity of this assumption by showing the interaction between lags and leads of economic growth and the indicator for a Democratic president. This figure indicates that future economic growth has no effect on voting for the president's party in our main specification using deltas for both the treatment and outcome variables. The point estimates of the effect of future changes in local economic conditions are all statistically insignificant and close to zero. That is, we do not observe voters "punishing" the president's party for future changes in local economic conditions. This validates the main assumption of the difference-in-difference models that we use for our analyses and gives us confidence in our ability to examine the causal effect of the economy on retrospective voting.

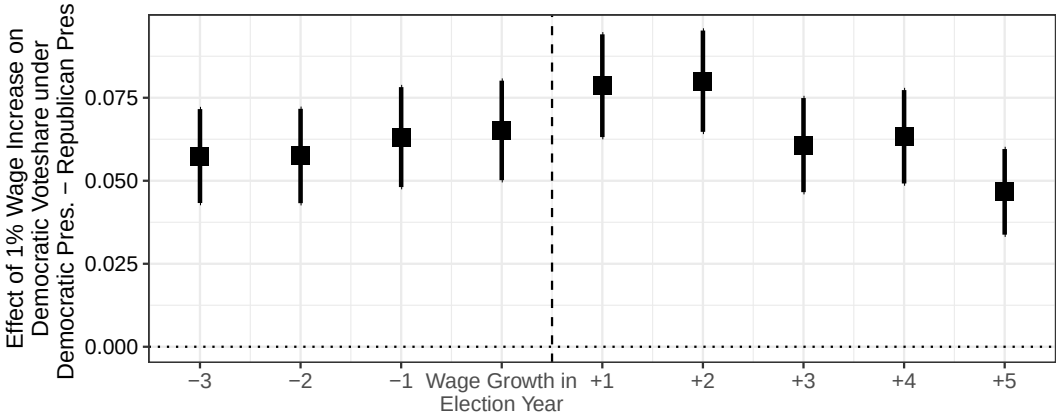
However, the results of these placebo checks were not as reassuring when we used levels rather than deltas for the outcome and/or treatment variables. First, we examined the validity of models using levels for both the treatment (economy) and outcome (election results) variables. This specification is most consistent with standard panel and diff-in-diff models. We found, however, that these models clearly do not satisfy the parallel trends assumptions of difference-in-difference models. Indeed, we found that future levels of wages have roughly the same effect on elections as contemporaneous levels of economic conditions

(middle panel of Figure B-2).

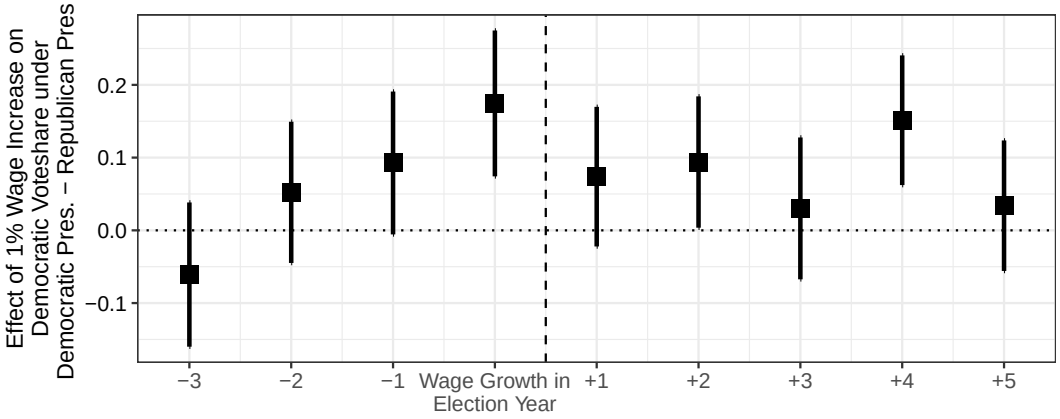
Figure B-2: Validity of Parallel Trends Assumption



(a) Main Specification: Deltas for both Democratic voteshare and wages



(b) Alternative Specification 1: Levels for both Democratic voteshare and wages



(c) Alternative Specification 2: Deltas for wages and levels for Democratic voteshare

We also examined the validity of the DiD assumption using the specification of deltas for wages and levels for Democratic voteshare. There are two problems with this specification. First, conceptualizing the treatment in deltas and the outcome in levels lacks a clear interpretation of the effects. Second, our validity checks indicate that this specification also fails this placebo check, suggesting that the assumption of parallel trends is not satisfied. The bottom panel of Figure B-2 shows that the effects of future changes in the economy on contemporaneous election outcomes are large and, in the year four past the election year, statistically significant.

C Effect of Economy over Entire Electoral Cycle

In this section, we examine whether voters are responsive to changes in the local economy in years prior to the election year, or are myopic and respond only to election-year wage growth. Consistent with the findings in previous studies (e.g., Achen and Bartels, 2017; Healy and Lenz, 2014), we find that changes in wages prior to the election year have little or no effect on federal or state elections. We assess this using our primary regression specification, but including measures of wage growth in the election year as well as wage growth in the three years previous to the election year, the results from which are in Table C-1. These results are shown graphically in Figure C-3 for federal elections and Figure C-4 for state elections.

Figure C-3: Voter Myopia in Federal Elections

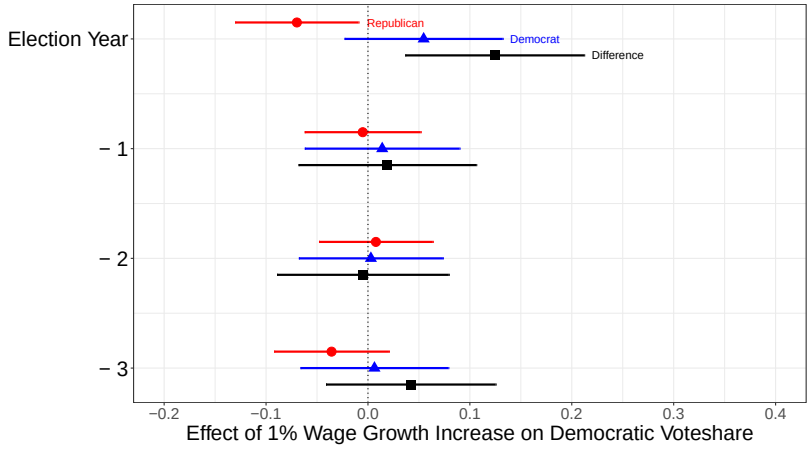


Figure C-4: Voter Myopia in State Elections

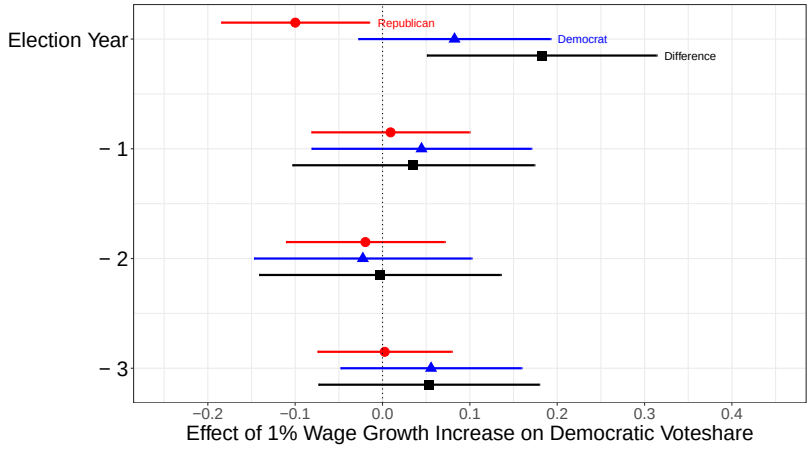


Table C-1: Accountability over Electoral Cycle

	Dependent Variable - Δ in Democratic Vote Share for:	
	Federal Average	State Average
	(1)	(2)
Change in logged wages × Democratic president	0.124***	0.182***
	(0.045)	(0.067)
Change in logged wages (t-1) × Democratic president	−0.070**	−0.100**
	(0.031)	(0.043)
Change in logged wages (t-2) × Democratic president	−0.005	0.009
	(0.029)	(0.046)
Change in logged wages (t-3) × Democratic president	0.008	−0.020
	(0.028)	(0.046)
Change in logged wages	−0.036	0.003
	(0.029)	(0.039)
Change in logged wages (t-1)	0.019	0.035
	(0.044)	(0.071)
Change in logged wages (t-2)	−0.005	−0.003
	(0.043)	(0.071)
Change in logged wages (t-3)	0.042	0.053
	(0.042)	(0.064)
FE for State-Year	X	X
FE for County	X	X
Observations	41,219	37,717
R^2	0.502	0.316
Adjusted R^2	0.465	0.259
Note:	Standard errors clustered by county. *p<0.1; **p<0.05; ***p<0.01	

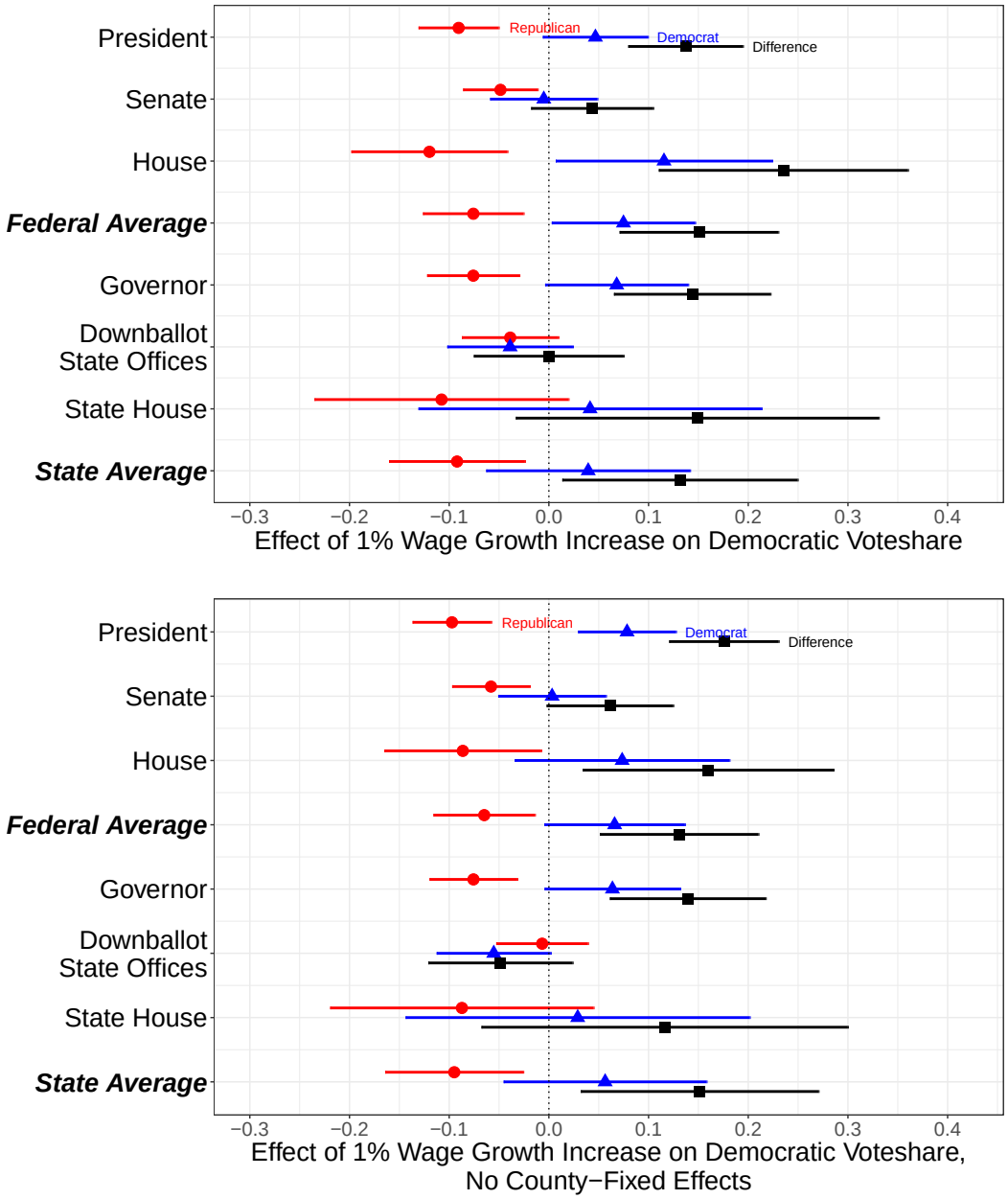
D Additional Specifications

In this section, we present the additional regression specification using the level of Democratic voteshare as the outcome, controlling for a lagged measure of the Democratic voteshare, both with and without unit fixed effects. These results are consistent with those presented in the main text, indicating that voters reward and punish candidates in federal and state elections in accordance with the performance of the economy and whether they share the party of the president. We present these results in Table D-2 for federal and state elections, both with county fixed effects (columns 1 and 3) and without (columns 2 and 4). We present these results in graphical form in Figure D-5, with the top panel showing models with county fixed effects and the bottom panel without them.

Table D-2: Models using levels of voteshare and lagged dependent variable

	Dependent Variable - Δ in Democratic Vote Share for:			
	Federal Average		State Average	
	(1)	(2)	(3)	(4)
Change in logged wages × Democratic president	0.151***	0.131***	0.132**	0.151**
	(0.041)	(0.041)	(0.060)	(0.061)
Change in logged wages	−0.076***	−0.065**	−0.092***	−0.095***
	(0.026)	(0.026)	(0.035)	(0.035)
Lagged Democratic voteshare	0.599***	0.806***	0.688***	0.988***
	(0.009)	(0.006)	(0.011)	(0.009)
FE for State-Year	X	X	X	X
FE for County	X		X	
Observations	44,801	44,801	41,168	41,168
R^2	0.820	0.794	0.773	0.736
Adjusted R^2	0.807	0.788	0.755	0.728
Note:	*p<0.1; **p<0.05; ***p<0.01 Standard errors clustered by county.			

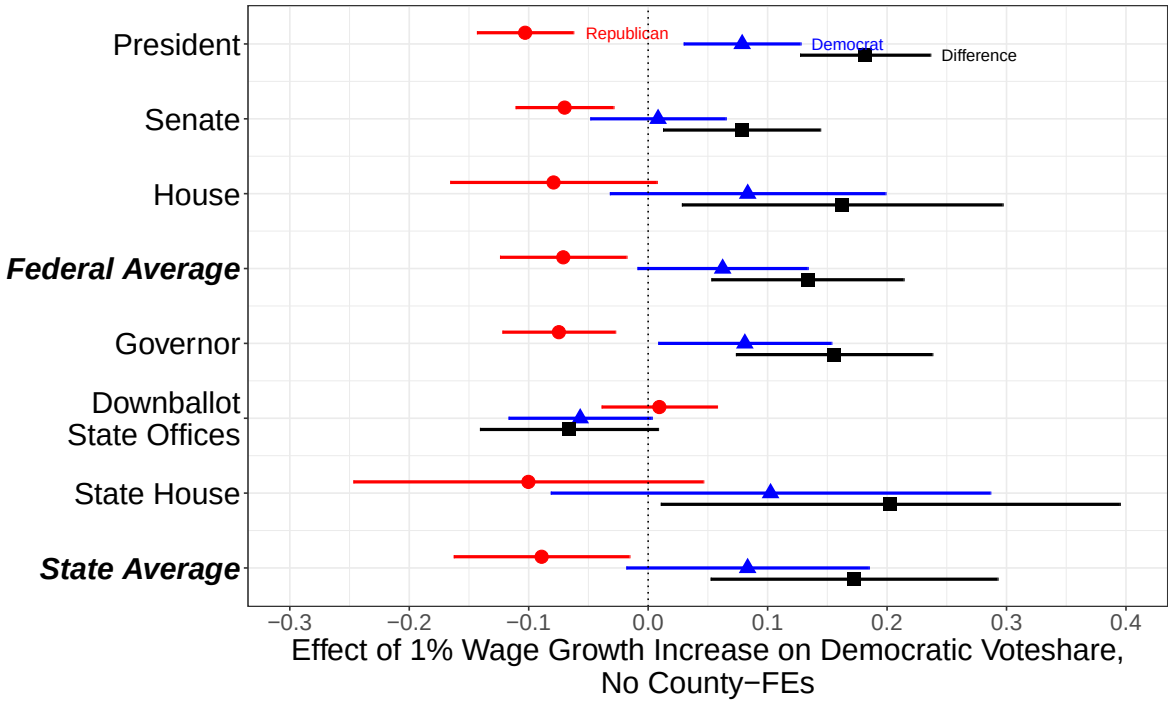
Figure D-5: Models using levels of voteshare and lagged dependent variable



In addition, we show the results from our main panel difference-in-differences specification (i.e. using the change in democratic voteshare and the change in wages per worker) but omitting county fixed effects (from column 3 in Tables 5 and 6 of the main paper) in Figure D-6. These results are largely consistent with those presented in the main paper: the point estimates are quite similar, and the interaction effect is statistically significant in both federal and state elections on average. The fact that our results are not sensitive to the inclusion

of unit fixed effects suggests that the fixed effects are not explaining a large amount of the variation in either wage growth or changes in voteshares.

Figure D-6: Models omitting county fixed effects



E Accountability for Incumbents

This appendix shows the results from both a less saturated and a fully saturated model of accountability for incumbents. First, in Table E-3 shows the results from a model omitting the indicator for a Democratic president – i.e. only including an indicator for the party of the downballot incumbent. These results largely corroborate the results presented in the main text of the paper: that is, that the party of the downballot incumbent only changes the effect of wage growth on votes in gubernatorial and U.S. House elections. Figure E-7 shows these results graphically.

Table E-3: Simplified model of downballot incumbency on economic voting

	Dependent Variable - Δ in Democratic Vote Share for:			
	Senate	House	Governor	State House
	(1)	(2)	(3)	(4)
Change in logged wages × Democratic incumbent	−0.028	0.248***	0.094**	−0.158
	(0.033)	(0.067)	(0.045)	(0.100)
Change in logged wages	−0.031	−0.150***	−0.074***	0.065
	(0.023)	(0.052)	(0.027)	(0.072)
Democratic incumbent		−1.615***		−0.772***
		(0.159)		(0.289)
Observations	29,528	39,401	23,021	33,252
R^2	0.877	0.262	0.816	0.125
Adjusted R^2	0.865	0.207	0.794	0.046
Note:	Standard errors clustered by county. *p<0.1; **p<0.05; ***p<0.01			

Next, in Table E-4 we show the results from a fully-saturated model (i.e. interacting the relevant indicators for a Democratic president and a Democratic downballot incumbent). The results vary a bit across offices. But, overall, incumbents from the president's party are rewarded slightly more in a strong economy and punished more in a weak economy than incumbents from the opposition party.

Figure E-7: Downballot incumbency and economic voting, simplified model

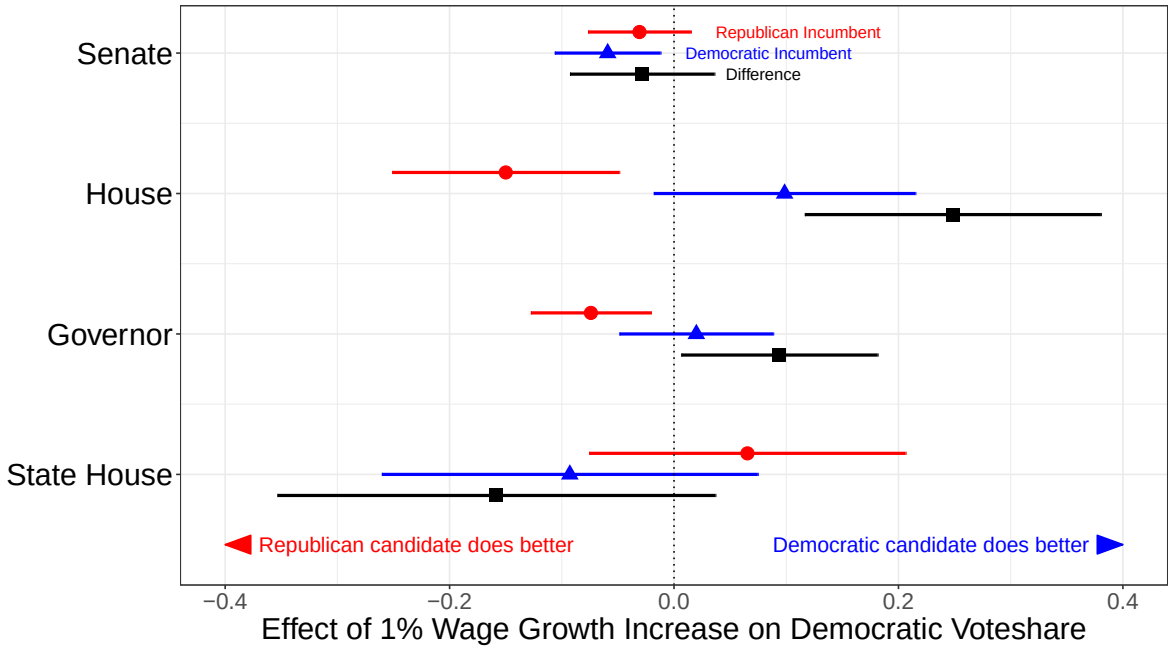


Table E-4: Fully saturated model of downballot incumbency and economic voting

	Dependent Variable - Δ in Democratic Vote Share for:				
	President	Senate	House	Governor	State House
	(1)	(2)	(3)	(4)	(5)
Change in logged wages × Democratic pres. × Democratic incumbent		−0.203***	0.311**	0.078	0.494**
		(0.070)	(0.136)	(0.093)	(0.207)
Change in logged wages × Democratic president		0.179***	0.062	0.125**	−0.071
		(0.053)	(0.098)	(0.063)	(0.146)
Change in logged wages × Democratic incumbent	0.134***	0.048	0.154*	0.057	−0.360**
	(0.030)	(0.043)	(0.089)	(0.058)	(0.145)
Change in logged wages	−0.095***	−0.098***	−0.176***	−0.108***	0.107
	(0.023)	(0.032)	(0.068)	(0.032)	(0.107)
Democratic incumbent			−2.309***		−0.345
			(0.219)		(0.385)
Democratic president × Democratic incumbent			1.708***		−0.952*
			(0.339)		(0.499)
Observations	21,686	29,528	39,401	23,021	33,252
R^2	0.873	0.877	0.263	0.816	0.126
Adjusted R^2	0.858	0.865	0.207	0.795	0.046
Note:	Standard errors clustered by county. *p<0.1; **p<0.05; ***p<0.01				

F Accountability for Party that Controls Legislative Chamber

In this appendix, we examine whether the party that controls offices other than the president influences retrospective voting. For instance, are House candidates from the House majority party rewarded for a strong economy?

Table F-5: Accountability for Partisan Control in Federal Elections

	Dependent Variable - Δ in Democratic Vote Share for:			
	President	Senate	House	Federal Average
	(1)	(2)	(3)	(4)
Change in logged wages × Democratic pres.	0.100**	0.043	0.141*	0.087*
	(0.040)	(0.040)	(0.081)	(0.048)
Change in logged wages × Democratic Senate	0.026	0.044	0.148*	0.145***
	(0.035)	(0.044)	(0.088)	(0.054)
Change in logged wages × Democratic House	−0.063	−0.068	−0.051	−0.078
	(0.045)	(0.045)	(0.095)	(0.062)
Change in logged wages	−0.056	−0.043	−0.128	−0.090*
	(0.036)	(0.032)	(0.080)	(0.051)
FE for State-Year	X	X	X	X
FE for County	X	X	X	X
Observations	21,686	29,670	43,045	44,800
R^2	0.873	0.876	0.283	0.501
Adjusted R^2	0.858	0.864	0.230	0.465
Note:	Standard errors clustered by county. *p<0.1; **p<0.05; ***p<0.01			

Table F-5 shows the results for federal elections. Overall, the results continue to show that the president's party is held accountable, particularly in presidential elections. We find no evidence, however, that it matters which party controls the House of Representatives for any office. We find tentative evidence that voters hold accountable the party that controls the Senate, particularly when we average across elections for all three federal offices (column 4).[1]

[1]It is worth noting, of course, that the party that controls Congress is extremely collinear with the party that controls the presidency. This increases the uncertainty in these results.

Table F-6: Accountability for Partisan Control in State and Local Elections

	Dependent Variable - Δ in Democratic Vote Share for:				
	Governor	Downballot State Offices	State House	County Legislature	State/Local Average
	(1)	(2)	(3)	(4)	(5)
Change in logged wages × Democratic Pres.	0.166***	−0.055	0.193*	0.475	0.145**
	(0.048)	(0.044)	(0.110)	(0.864)	(0.063)
Change in logged wages × Democratic Gov.	0.081*	0.026	0.169		0.085
	(0.046)	(0.046)	(0.119)		(0.064)
Change in logged wages × Democratic Leg.				−0.007	
				(0.676)	
Change in logged wages	−0.119***	−0.012	−0.196*	−0.422	−0.142***
	(0.030)	(0.034)	(0.116)	(0.588)	(0.049)
FE for State-Year	X	X	X	X	X
FE for County	X	X	X	X	X
Observations	23,021	15,918	31,962	2,313	38,548
R^2	0.816	0.860	0.124	0.326	0.339
Adjusted R^2	0.795	0.839	0.043	−0.007	0.286
Note:	Standard errors clustered by county. *p<0.1; **p<0.05; ***p<0.01				

Next, we examine whether voters hold the governor's party accountable in state government elections (Table F-6). Column (1) provides clear evidence that the governor's party is held accountable in gubernatorial elections. Indeed, the effect of holding the governorship is roughly 2/3 of the effect of the president's party. Column (2) indicates that the governor's party is not held accountable in other state-level elections: those for attorney general, treasurer, and secretary of state. The point estimate in Column (3) for state house elections is similar to the one in column (1) for gubernatorial elections, but it is not statistically significant. Column (4) examines whether the party that controls county government is held accountable in local government elections. Overall, we find no evidence that the party that controls local governments is held accountable in local elections (cf. Arnold and Carnes, 2012; Hopkins and Pettingill, 2018). It is worth noting though that it is possible that our null results here stem from a lack of statistical power. Indeed, we have about a tenth as much data on local elections as on state and national ones.

In the last column (5), we show the results when we average across all of these offices. Again, the results show that the party of the president is clearly held accountable for the economy. The result for the party of the governor is suggestive, but does not quite rise to the

level of statistical significance. Overall, these results further reinforce that the president's party is held accountable in state government elections. But there is only clear evidence that the governor's party matters in gubernatorial elections.

G Heterogeneity Over Time in Accountability: Incumbents

In this section, we analyze time trends separately for presidential, U.S. House, Senate, governor, and state house elections. In these analyses, we also find no consistent evidence of substantial changes over time in retrospective voting.

Table G-7

	Dependent Variable - Δ in Democratic Vote Share for:				
	President	Senate	House	Governor	State House
	(1)	(2)	(3)	(4)	(5)
Change in logged wages × Democratic pres. × year	−0.011	0.038	−0.032	−0.156***	0.184
	(0.039)	(0.039)	(0.084)	(0.052)	(0.123)
Change in logged wages × Democratic incumbent × year		0.030	−0.013	−0.096**	−0.109
		(0.033)	(0.071)	(0.047)	(0.114)
Change in logged wages × Democratic pres.	0.116***	0.069*	0.182**	0.180***	0.170
	(0.030)	(0.040)	(0.088)	(0.053)	(0.125)
Change in logged wages × Democratic incumbent		−0.025	0.294***	0.064	−0.116
		(0.033)	(0.072)	(0.047)	(0.113)
Change in logged wages × year	0.026	−0.033	0.057	0.100***	−0.017
	(0.028)	(0.031)	(0.067)	(0.027)	(0.104)
Change in logged wages	−0.084***	−0.062**	−0.231***	−0.100***	−0.076
	(0.018)	(0.028)	(0.065)	(0.029)	(0.104)
Year × Democratic incumbent			−1.850***		−2.153***
			(0.159)		(0.227)
Democratic incumbent			−1.617***		−0.695**
			(0.162)		(0.293)
FE for State-Year	X	X	X	X	X
FE for County	X	X	X	X	X
Observations	21,686	29,528	39,401	23,021	33,252
R^2	0.873	0.877	0.263	0.816	0.127
Adjusted R^2	0.858	0.865	0.208	0.795	0.048
Note:	Standard errors clustered by county. *p<0.1; **p<0.05; ***p<0.01				

H Accountability Before and After 1990

In this section, we analyze accountability in federal and state elections in the era before 1990 and the era after 1990. In these analyses, we also find no consistent evidence of changes over time in retrospective voting.

Table H-8

	Dependent Variable - Δ in Democratic Vote Share for:			
	Federal (pre-1990)	State (pre-1990)	Federal (post-1990)	State (post-1990)
	(1)	(2)	(3)	(4)
Change in logged wages × Democratic pres.	0.145*	0.139	0.088	0.236**
	(0.082)	(0.107)	(0.059)	(0.099)
Change in logged wages	−0.073**	−0.069	−0.060	−0.149**
	(0.036)	(0.052)	(0.046)	(0.074)
FE for State-Year	X	X	X	X
FE for County	X	X	X	X
Observations	17,737	16,222	27,063	24,386
R^2	0.527	0.432	0.505	0.297
Adjusted R^2	0.459	0.342	0.455	0.215
Note:	Standard errors clustered by county. *p<0.1; **p<0.05; ***p<0.01			

Figure H-8: Accountability in Federal Elections, Pre-1990

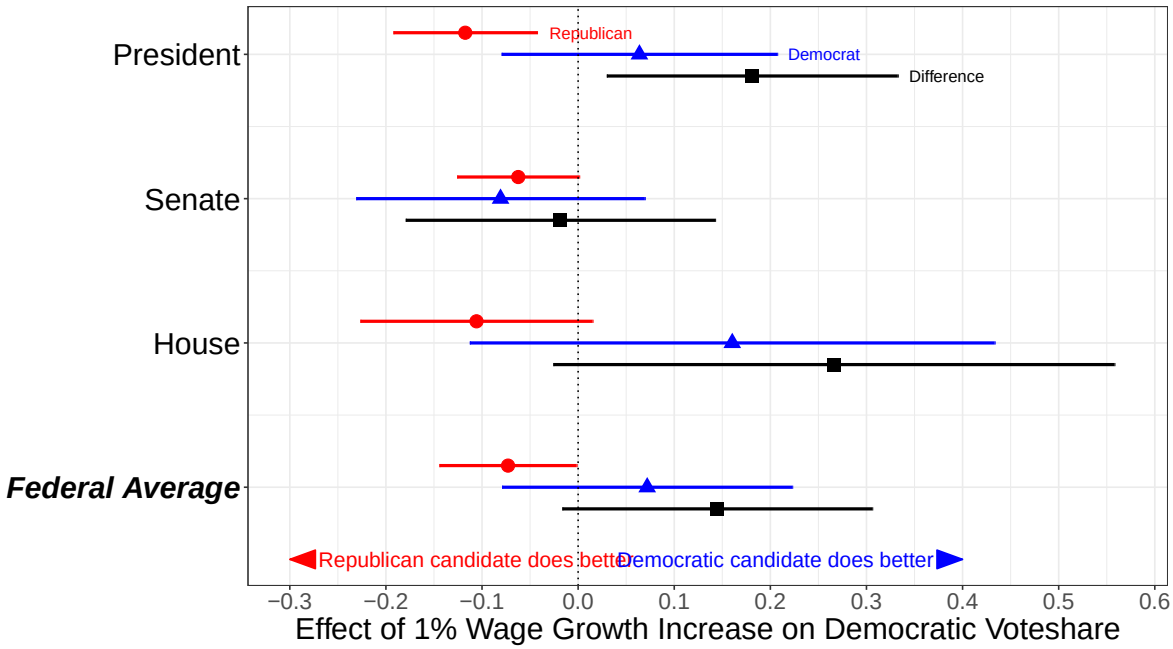


Figure H-9: Accountability in Federal Elections, Post-1990

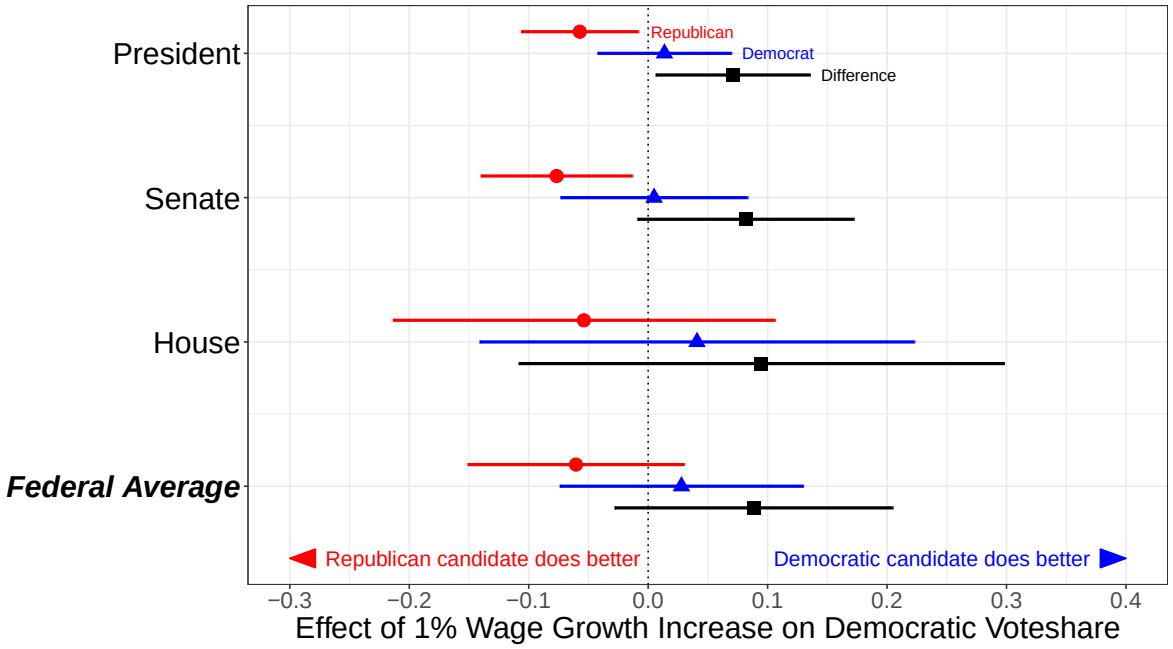


Figure H-10: Accountability in State Elections, Pre-1990

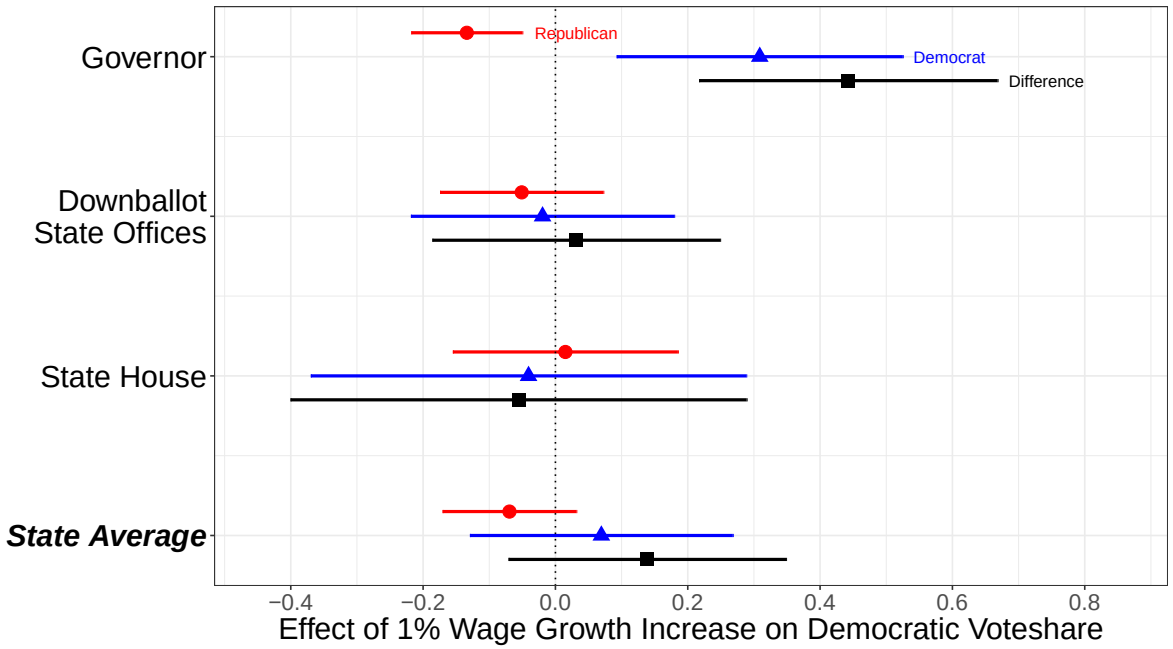
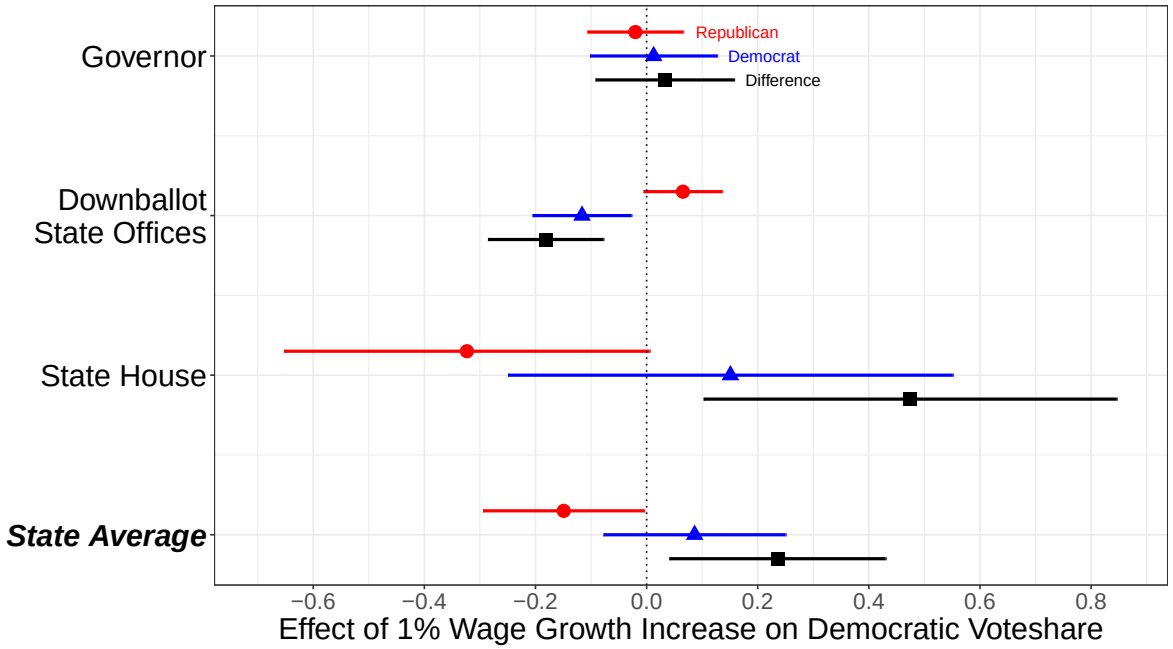


Figure H-11: Accountability in State Elections, Post-1990



I Local Media and Accountability for Incumbents

In this section, we analyze the role of the media separately for presidential, U.S. House, Senate, governor, and state house elections. In these analyses, we also find only suggestive evidence that the media moderates retrospective voting in federal elections.

Table I-9: Media and Accountability: Individual Offices

	Dependent Variable - Δ in Democratic Vote Share for:				
	President	Senate	House	Governor	State House
	(1)	(2)	(3)	(4)	(5)
Change in logged wages × Democratic pres. × newspaper	0.188**	0.053	0.112	−0.070	−0.208
	(0.077)	(0.074)	(0.154)	(0.101)	(0.183)
Change in logged wages ×Democratic incumbent × newspaper		0.041	−0.162	0.011	0.136
		(0.065)	(0.160)	(0.088)	(0.188)
Change in logged wages	−0.097***	−0.061**	−0.253***	−0.107***	−0.023
	(0.025)	(0.030)	(0.065)	(0.031)	(0.101)
Democratic incumbent			−1.658***		−0.748**
			(0.183)		(0.343)
Change in logged wages × Democratic pres.	0.110***	0.064*	0.196**	0.180***	0.223*
	(0.033)	(0.037)	(0.082)	(0.050)	(0.114)
Change in logged wages × newspaper	−0.059	0.028	0.071	−0.078	0.013
	(0.059)	(0.058)	(0.119)	(0.061)	(0.151)
Democratic pres. × newspaper		0.228	0.601**	0.154	0.310
		(0.172)	(0.283)	(0.236)	(0.336)
Change in logged wages×Democratic incumbent		−0.035	0.297***	0.077	−0.161
		(0.035)	(0.073)	(0.048)	(0.112)
Democratic incumbent × newspaper		−0.479***	0.087	−0.247	−0.137
		(0.162)	(0.279)	(0.197)	(0.500)
FE for State-Year-Newspaper	X	X	X	X	X
FE for County	X	X	X	X	X
Observations	21,686	29,528	39,401	23,021	33,252
R^2	0.881	0.877	0.262	0.816	0.125
Adjusted R^2	0.863	0.865	0.207	0.795	0.046
Note:	Standard errors clustered by county. *p<0.1; **p<0.05; ***p<0.01				

J Alternative Measure of Media Coverage

Given the lack of available datasets on newspaper coverage, we attempted to augment our current static measurement of media coverage by collecting additional data on the presence of newspapers in counties over time from the Library of Congress's "Chronicling America" project. The Library of Congress collects historic records of newspapers in the United States from 1690 to the present, and provides information on the years when each paper was published, where it was published, and the frequency with which it was published online, searchable by county and year (Library of Congress, 2019).

We scraped these records from the Library of Congress' website to create a panel of counties across the years in our dataset, with an indicator for whether or not each county had a daily newspaper published in that year. This provides a more dynamic measure of the availability of information than our previous cross-sectional measure of media coverage. However, the construct validity of this measure is more questionable than the one we currently use. It is unclear whether this measure (having a paper in the same county as voters) necessarily translates into voters' access to information about the local economy. For one, the Library of Congress does not record the circulation numbers for the newspapers in its database — meaning that any kind of paper would be given equal weight in this dataset, regardless of whether it is distributed to the majority of the county or only a small portion of voters. In addition, given that newspapers often cover an entire metropolitan area rather than a single county, the presence of a newspaper's headquarters in a county (which is how the data is stored as a paper's location in this database) is not necessarily a good measure of its distribution in that county.

We present our results comparing both the measure we use in the main text of the paper and this alternative measure of newspaper presence in Table J-10. Columns 1 and 2 show the results that we present in the main paper using the cross-sectional measure of newspaper circulation. Columns 3 and 4 use the panel measure we collected from the Library of Congress. The panel measure shows a somewhat smaller effect of the media on

accountability in federal elections than our main results. In both cases, however, there is suggestive, though not statistically significant, evidence the newspaper coverage strengthens accountability for the economy in federal elections. Overall, we think that the cross-sectional measure of newspaper circulation by county that we include in the main text of the paper is the best we can do with available data. The results do not appear to be sensitive to which data source we use.

Table J-10: Media and Accountability: Comparison of Different Newspaper Measures

	Dependent Variable - Δ in Democratic Vote Share for:			
	Federal (XS)	State (XS)	Federal (Panel)	State (Panel)
	(1)	(2)	(3)	(4)
Change in logged wages × Democratic pres. × newspaper	0.131	−0.023	0.056	−0.054
	(0.112)	(0.152)	(0.093)	(0.136)
Change in logged wages × Democratic pres.	0.112**	0.201***	0.084	0.199**
	(0.047)	(0.076)	(0.064)	(0.095)
Change in logged wages × newspaper	−0.006	−0.092	0.054	−0.030
	(0.071)	(0.089)	(0.057)	(0.080)
Change in logged wages	−0.076**	−0.091**	−0.094**	−0.090
	(0.032)	(0.046)	(0.038)	(0.056)
FE for State-Year-Newspaper	X	X	X	X
FE for County	X	X	X	X
Observations	44,800	41,173	41,929	39,091
R^2	0.514	0.348	0.518	0.357
Adjusted R^2	0.465	0.273	0.467	0.282
Note:	Standard errors clustered by county. *p<0.1; **p<0.05; ***p<0.01			

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