Gubernatorial Elections Change Demand for Local Newspapers

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Abstract

How do partisans react when their candidate wins or loses a gubernatorial election? Previous work shows that when parties win presidential elections, demand for their affiliated local newspapers decreases relative to the losing party's newspapers. However, it is unclear if this negative link extends beyond presidential races into state-level elections. To test this relationship, we analyze demand for partisan and non-partisan newspapers in Virginia and New Jersey—two states that hold off-cycle gubernatorial elections with no competition from federal elections—from 1933-2005. We find demand for local newspapers associated with the winning party declines after gubernatorial elections compared to demand for other newspapers. The results also shed light on whether (and which) winning partisans are disengaging completely or shifting their consumption to independent newspapers. Taken together, our study suggests that state-level elections significantly influence local newspaper consumption and adds valuable local context to our understanding of the political dynamics of news demand.

Keywords: gubernatorial elections, local newspapers, news media demand

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Local newspapers connect Americans to their government by reporting on the politicians and bureaucratic officials in their states and communities, and serve as the most powerful mechanism of accountability in local government (Hopkins and Pettingill 2018). However, local newspapers are in a period of steep decline, with economics and technology usually accorded the blame (Grieco 2020; Hindman 2015). Since 2006, advertising revenues are down 66.4 percent, the newspaper workforce fell by 47 percent, and weekday circulation decreased by nearly 40 percent (Pew 2018). A recent and growing literature shows how severely this trend endangers American democracy: healthy local newspapers improve civic engagement (Shaker 2014), increase voter turnout (Gentzkow et al. 2011), encourage more candidates to run for office (Schulhofer-Wohl and Garrido 2013), increase knowledge about candidates (Hayes and Lawless 2015, 2018) and elected officials (Lyons, Jaeger, and Wolak 2012), and even improves policy outcomes such as spending on public works projects (Snyder and Stromberg 2010) and air pollution (Campa 2018). Given the substantial benefits of local news and its precarious status, it is more important than ever to understand which factors influence the demand for local news, including those that go beyond economics and technology. We focus on the role of political factors, which are often overlooked in studies of news consumption.

Some political outcomes can shift demand for local newspapers: presidential election results stimulate demand for local newspapers affiliated with the losing party compared to those of the winning party, likely due to anxiety-fueled information-seeking produced by losing (Archer 2018). While elections for the U.S. House do not affect newspaper circulations (Archer 2018), it is unclear whether and how the results of more prominent state and local elections influence demand for local news. Gubernatorial campaigns, for example, frequently spend millions of dollars in support of their candidate, and these election results matter greatly for

policy outcomes (Mulvihill 2018). This suggests voters will not just pay attention to state-level elections but also monitor events in their aftermath using local news outlets. If consumers react to wins and losses in the governor's office by shifting their local news consumption, and if partisans' reactions are asymmetrical, those choices could influence the local news environment and alter that most powerful pathway to elite monitoring, accountability, and representation. Does demand for local newspapers change in reaction to wins and losses by state-level executives—and do these demand dynamics operate similarly for Republican, Democratic, and independent news sources?

We isolate the influence of gubernatorial elections on news consumers' behavior using original datasets that capture the change in newspaper circulations after "off-cycle" gubernatorial elections in Virginia and New Jersey, the only two states that hold their elections during the year following a presidential election. Our results uncover main effects for these state-level elections that are similar to presidential elections (Archer 2018): demand for newspapers affiliated with the winning party decreases relative to demand for newspapers not affiliated with the gubernatorial winner, and robustness tests with out-of-state newspapers show that these results are not due to broader trends.

We also find partisan asymmetries in demand for independent local newspapers. When their party's candidate wins the governor's office, Democrats seem to shift their consumption towards independent newspapers while Republicans do not, consistent with other studies showing greater Democratic openness to non-partisan news content (Iyengar and Hahn 2009). Gubernatorial elections therefore affect local news demand: local partisan media from the winning party suffer following a victory compared to demand for other news outlets, and non-partisan news demand is differentially affected by the party of the winner.

In a time of severe crisis for local newspapers, when many are closing (Darr, Hitt, and Dunaway 2018), being gutted by hedge funds (Pompeo 2020), or laying off the reporters that cover state and local politics (Peterson 2021), understanding local news demand is a democratic imperative. Local media uniquely facilitate political learning and retrospective voting in local elections (Hopkins and Pettingill 2018; Moskowitz 2021). Consistent and equal demand for local news among electoral winners and losers helps ensure citizens are effectively monitoring politicians' performances in office and using that information to hold elites accountable by writing letters, protesting, or voting in the next election (Dahl 1998). Yet we find that the results of subnational elections shift demand for the local newspapers that supply those key mechanisms of accountability, suggesting local media habits are not stable but change significantly in response to elections and in differential ways depending on electoral wins and losses.

Election Outcomes and News Demand

Those interested in politics may seek out partisan news that helps them achieve directional goals, affirming that their opinions are correct, or non-partisan news that delivers informational goods (Levendusky 2013). Elections can create conditions that shape preferences for these media and can influence decisions about how much news to consume at all. After a win, demand for partisan news outlets affiliated with the winner is not likely to increase. Those aligned with the victorious party may stick with their own information-seeking habits for learning about politics instead of increasing their political engagement. Emotions must run high for people to break with well-established habits (Lazarsfeld et al. 1948; Marcus and MacKuen 1993; Marcus et al. 2000), and losing elicits more powerful reactions than winning (Pierce, Rogers, and Snyder 2016). Alternatively, winning partisans may not turn to partisan-friendly outlets as much as losers since the winner's victory is covered extensively in mainstream news

sources without an explicit partisan affiliation, which tend to be larger and produce more extensive statehouse reporting (Matsa and Boyles 2014). Winning partisans may switch from partisan-friendly to mainstream news sources for this very reason.

Conversely, those who supported the electoral loser might be worried about the policies of the new oppositional administration and might seek out more information about politics (Albertson and Gadarian 2015; Marcus and MacKuen 1993; Marcus et al. 2000). The positive effects of anxiety on information seeking (Albertson and Gadarian 2015; Marcus and MacKuen 1993; Marcus et al. 2000) as well as the power of motivated reasoning (Lodge and Taber 2013) and selective exposure (Stroud 2008) suggest that a loss might lead to increased demand for news, particularly news from a partisan-friendly source.

Losing partisans may also engage in wishful thinking after an election, and therefore, seek out partisan-friendly news. Wishful thinking refers to humans' "tendency to fit perceptions of reality into a mold that is heavily influenced by their preferences" (Dolan and Holbrook 2001, 28). In-party news outlets are particularly effective in promoting wishful thinking before an election (Searles et al. 2018). Wishful thinking may also occur in the wake of an election, as losers turn to friendly partisan news to help them cope with their loss by criticizing the winner, blaming others for their party's defeat, or strategizing for the next election. While some may tune out from politics after a loss to avoid reminders of their disadvantaged status, partisan-friendly news allows the highly attentive news consumer to continue to follow politics in a more palatable manner than non-partisan news. This is particularly pertinent for consumers of newspapers, the medium this study focuses on, as these individuals are among the most politically attentive (Moy et al. 2004).

More recent patterns in partisan cable TV news viewership also support the notion that electoral losers do not avoid political news, particularly in comparison to winners. After elections, the relative demand for cable news channels affiliated with the losing party increases compared to those affiliated with the winner. For instance, in the year after the 2008 presidential election, Fox News' median prime time viewership increased by about 19% compared to MSNBC's 2.5% increase (Archer 2018). Similar patterns in these channels' relative demand emerged after 2012 and particularly after the 2016 election, when Fox's prime-time viewership actually decreased by 2% while MSNBC's increased by 47%. Electoral losers do not seem to exit politics: instead, they appear to increase their demand for partisan-friendly news relative to electoral winners (Archer 2018).

While prior work finds demand for partisan local newspapers affiliated with the *presidential* winner decreases compared to those newspapers affiliated with the loser (Archer 2018), we ask whether *state-level* elections can also affect demand for these *local* newspapers. State politics is less of a draw for consumers (Hopkins 2018), but the vast majority of American elections are held at the state and local level. Local news consumers should care more about state politics and experience both the emotional and economic consequences of a shift in power in their state house. There are large partisan differences in expectations of gubernatorial victory: committed supporters of opposing candidates may differ by 20 to 30 percent in their assessments of their candidate's chances to win (Delevande and Manski 2012), setting up possible disappointment after the election and other emotional consequences.

Gubernatorial elections also create conditions for changes in attitudes about state government by separating its bureaucratic and partisan functions: attitudes toward the police change during gubernatorial elections, which are "focusing events" in state politics (Walker and

Waterman 2010). Governors hold significant powers to enact policies related to issues on political agendas across the country, from immigration to healthcare. A governor's sole focus is on her state, and her actions may, therefore, have a stronger tie to local news. Citizens interested in reading more or less about state politics in the aftermath of an election will likely adjust their local news consumption first.

For these reasons, we expect that gubernatorial election results will affect local news consumption. We draw on previous scholarship (Archer 2018; Albertson and Gadarian 2015; Marcus and MacKuen 1993; Marcus et al. 2000) in our expectation of a negative link between the outcomes of gubernatorial elections and relative demand for the winner's local newspapers compared to those associated with the losing party and unaffiliated newspapers. Specifically, demand for newspapers associated with the winning party should decrease compared to other newspapers for a variety of possible reasons: losing partisans may consume more partisan-friendly news for emotional support and help rationalizing their loss, winning partisans may tune out of partisan-friendly news now that the party in power is one they can trust to govern without close monitoring, and/or winning partisans may switch to non-partisan news for higher quality coverage of the winning administration.[i]

> **H1**. *Demand for local newspapers affiliated with the party of the gubernatorial winner will decrease relative to demand for local newspapers not affiliated with the winning party.*

Two major trends in media supply and demand occurred during the period for which we have data: local newspapers mostly shed their official partisan identity in favor of an "independent" label, and Republicans' attitudes towards the media grew more negative (Ladd and Podkul 2019). In an additional hypothesis below, we examine a corollary of these trends:

whether independent newspapers' circulations are differentially impacted by Republican or Democratic gubernatorial victories. We assess this hypothesis during times in which individuals had both partisan and non-partisan local news options as well as the more recent era with only independent local newspapers. Doing so builds on previous work that excludes non-partisan news sources (Archer 2018).

Individual-level experimental studies have found that, while Democrats are open to news from both partisan-friendly outlets (CNN) and non-partisan outlets (NPR), Republicans prefer to only read stories from a partisan-friendly source (Fox News; Iyengar and Hahn 2009). Due in part to decades of GOP elite rhetoric criticizing the press (Watts et al. 1999) that emerged in the mid- to late-20th century, Republicans simply perceive more bias in the mainstream media than Democrats: 77 percent of Republicans believe the news on television, newspapers, and radio is biased, compared to only 44 percent of Democrats (Knight Foundation 2018).

The Republican consensus that most media are biased—including mainstream media without partisan affiliations—should mean that in the aftermath of a victory and when given a choice between partisan and non-partisan news, they will continue to seek out like-minded outlets instead of potentially switching to higher quality coverage of their candidate in independent, mainstream news. Conversely, Democrats facing a choice between partisan or non-partisan news after a win will be more open to the latter. For these reasons, we expect Democrats will be likelier to consume independent newspapers following an electoral win than Republicans, since they should perceive those sources as more trustworthy relative to Republicans.[ii]

H2: Demand for independent newspapers will increase following a Democratic gubernatorial victory compared to a Republican gubernatorial victory.

We will assess this hypothesis first by examining the era in which citizens could choose between partisan and independent news sources in their local media diets. We expect similar patterns will hold in the more recent era of solely independent local newspapers given Democrats' greater openness to independent news (Iyengar and Hahn 2009) and will test this possibility as well.

Finally, it is entirely possible we will find that gubernatorial elections simply do not matter for local newspaper demand. A null result would still meaningfully contribute to the literature, however. Politics are increasingly nationalized for a variety of reasons (Darr, Hitt, and Dunaway 2018; Hopkins 2018): as local politics receive less overall attention (Martin and McCrain 2019), their ability to affect citizens' behaviors may also be lessened. Further, presidential election results overpower results of concurrent House elections in affecting demand for local partisan news (Archer 2018); other local elections like a gubernatorial race may also have no effect. Given the demonstrated relationship between news availability and political accountability (Hopkins and Pettingill 2018), a null effect would suggest that the demand for politically consequential information is unrelated to changing political outcomes. We include an explicit null hypothesis because this area of scholarship is so unexplored: it is worth questioning whether there is any relationship between gubernatorial elections and demand for any kind of local newspaper. Results that reject or fail to reject this null expectation will contribute to our understanding of politicized local news demand.

H0. *Demand for local newspapers is unrelated to gubernatorial election results.*

We test these hypotheses by examining patterns in state-level demand for local newspapers over time as a function of gubernatorial elections in Virginia and New Jersey. Focusing on local newspapers allows us to study the relationship of interest across multiple decades. Our results will provide evidence regarding whether gubernatorial elections can

influence the circulations of local newspapers in the aggregate, and if so, the nature of that effect. Our aggregate-level data cannot adjudicate between the individual-level mechanisms outlined above and supported by previous individual-level research. However, our dataset is rich in ecological validity and will demonstrate whether gubernatorial elections can affect the relative demand for newspapers at all—or whether it is solely presidential elections that change demand for local news (Archer 2018).

Gubernatorial Elections and Local Newspaper Demand

Virginia and New Jersey hold their gubernatorial elections in the year *after* presidential elections, a practice dating back to the 1860s in Virginia and 1949 in New Jersey, when the state switched from three-year to four-year gubernatorial terms. This schedule allows us to isolate the degree to which a prominent, *state*-level election affects local newspaper circulations separate from the effects of presidential elections. The political environment during these gubernatorial election years is also not crowded with midterm campaigns for the House and Senate.

Virginia and New Jersey are also ideal because they routinely elect both Democratic and Republican governors. In Virginia, between 1933 and 2005 (the election years our analyses span), there were 5 Republican governors and 13 Democratic governors. Over the period examined in New Jersey, 1949 to 2005, there were 24 years of Republican governors and 32 years of Democratic governors, providing good partisan balance and regular switches in partisan control.[iii]

We first collected data for every gubernatorial election outcome in Virginia from 1933 to 2005. These years fell in an era of high literacy rates (Archer 2018) with other forms of media (e.g., radio) already established as alternative news sources (Sterling 1984, as cited in Gentzkow et al. 2011). Our primary independent variable is newspaper affiliation with the political party

that won the gubernatorial election (*Party Won*), a dummy variable coded as 1 if the newspaper's party won the election and 0 if the newspaper's party did not win or if the newspaper is independent. The newspaper's partisan affiliation is self-reported by the news outlet and was taken from the *Editor and Publisher International Yearbook*.

Content analyses suggest the self-identified partisan reputations reported by local newspapers at this time reflected actual newspaper coverage. In their study of the electoral effects of newspaper entry and exit that uses similar circulation data, Gentzkow et al. (2011) confirm that the declared partisan affiliation of newspapers in the late 19th century and the 20th century correlate with "latent" forms of partisan bias prevalent at the time, such as increased attention paid to favored political elites (Kaplan 2002, as cited in Gentzkow et al. 2011). While there may be concerns that newspapers' partisan affiliations are driven solely by the electoral endorsements that their editorial boards make, such endorsements still contribute to the partisan *reputation* of the news source. Source reputation matters separate from content: in experiments, when content remains the same but the source changes, partisans still select the source that favors their party (Iyengar and Hahn 2009). And because the partisan affiliations we use in our analyses are reported by the newspapers themselves, they should reflect the reputations of the newspapers regardless of whether their content matches that reputation.

Our dependent variable uses original data on the circulations of every local, daily English-language newspaper in Virginia in the year after the gubernatorial elections of 1933 to 2005, and the year after the gubernatorial elections from 1949 to 2005 in New Jersey.[iv] We gathered circulation information from the *Editor and Publisher International Yearbook* for the year directly following gubernatorial elections to allow the electoral outcome time to permeate the state and potentially affect consumption behavior.[v] For each newspaper within our dataset,

we collected information on its partisan affiliation, its circulation, and the county (and county population) in which the newspaper operates. Unlike similar analyses that classify the partisanship of a newspaper based on its first appearance in the *Editor and Publisher International Yearbook* (Gentzkow et al. 2011; Archer 2018), the partisan affiliation of a newspaper in our dataset is updated for each year a given newspaper appears. The three partisan categories for the newspapers are: Republican, Democratic, and pure independent.[vi]

We include both partisan and non-partisan newspapers in our analysis because only a subset of the years under examination had both Democratic and Republican options (1961-1973 for Virginia and only 1953 for New Jersey). Therefore, citizens in these states during the span of our analyses mostly faced a choice between a partisan or non-partisan newspaper as compared to two opposing partisan options, which our models reflect.[vii]

Our dependent variable represents the change in demand (circulations) for local newspapers in Virginia and New Jersey from the year following one gubernatorial election to the year following the next. Similar to analyses in Archer (2018), the dependent variable illustrates how the demand for different types of newspapers changed over time in response to different gubernatorial elections. For instance, if we were to examine the gubernatorial election of 2005, we would compare the circulations from 2006 to those of 2002, the year after the prior gubernatorial election in 2001. We use the circulation following the last gubernatorial election as the relevant baseline for a given observation instead of, for instance, the previous calendar year because it allows for a comparison between years facing similar political environments directly following the same state-wide election.[viii] Given an election year t, we create a dependent variable that subtracts circulations in year $t-3$ from circulations in year $t+1$ for each type of newspaper. We convert the change in circulations to a percentage of total newspapers in our

dataset within the given state and year (*t+1*) to prevent years with greater circulations (due to larger populations) from dominating our results. Additionally, should an economic downturn or war equally affect newspapers in our dataset, we essentially control for the common effect of that event on circulations by focusing on changes (Card and Krueger 1994). This helps ensure our analyses can identify the effect of gubernatorial elections separate from other concurrent factors. The unit of analysis is year-party of newspaper.[ix]

Our first model regresses our dependent variable of changes in circulations on the independent variable of *Party Won*. *Party Won*'s coefficient characterizes the average difference between the change in circulations for newspapers affiliated with the winning party compared to those not affiliated with the winning party and will aid in our assessment of H_1. All models are run separately by state and include variables accounting for linear and quadratic time trends, *Time* and *Time^2*, to detrend the data and reduce the possibility that a general taste for non-partisan versus partisan newspapers over time are affecting our results. Model 1 presents the equation including robust standard errors clustered by year.

$$\Delta\ circulations_i[\%] = \ \alpha + \ \beta_1 PartyWon_i + \beta_2 Time_i + \beta_3 Time_i^2 + \varepsilon_{i(y)} \quad \text{(Model 1)}$$

We estimate additional models to account for other variables that may affect news demand. In Model 2, we add a control to Model 1 for whether the newspapers serve the state's capital: Richmond, Virginia, or Trenton, New Jersey. Given prior findings that those in the capital might pay attention to local politics more (Delli Carpini et al. 1994) and also given that those living in the capital region are more likely to be government employees of some type, we suspect there may be behavioral differences between those within and outside of the Richmond and Trenton areas. Demand for local newspapers in the capital region may be impervious to the political environment because interest is consistently high. In Model 3, we add a variable

assessing percent change in personal income within a state to Model 1, which may affect

newspaper circulations through changes in purchasing power.[x] Negative and significant results

for *Party Won* in Models 1, 2 and 3 would strongly suggest that gubernatorial elections affect the

relative demand for local newspapers in support of Hypothesis 1, even accounting for a variety

of apolitical factors that are traditionally thought to affect newspaper consumption.

$$\Delta\ circulations_i[\%] = \alpha + \beta_1 PartyWon_i + \beta_2 Capital_i + \beta_3 Time_i + \beta_4 Time_i^2 +$$

$$\varepsilon_{i(y)} \qquad \text{(Model 2)}$$

$$\Delta\ circulations_i[\%] = \alpha + \beta_1 PartyWon_i + \beta_2 \%\ \Delta\ income_i + \beta_3 Time_i +$$

$$\beta_4 Time_i^2 + \varepsilon_{i(y)} \qquad \text{(Model 3)}$$

Gubernatorial elections often occur alongside state legislative elections, and the exercise

of gubernatorial power typically requires working with this branch, so we also account for state

legislative control. We include a model controlling for whether the party of the gubernatorial

winner also has control of the state legislature after the election, as the effect of winning could be

amplified in years with unified government. This model helps us separate the effect of

concurrent state legislative elections from gubernatorial elections. Given limitations in data

availability from the National Conference of State Legislatures (NCSL), we can only run this

analysis for Virginia.[xi] In Virginia, state senators serve four-year terms, while members of the

House of Delegates serve two-year terms. Only members of the lower house are elected

concurrently with the governor. The variable *UnifiedGovt* accounts for years in which the party

that won the gubernatorial election also has control of the two state legislative chambers after the

concurrent lower chamber elections.[xii]

$$\Delta\ circulations_i[\%] = \alpha + \beta_1 PartyWon_i + \beta_2 UnifiedGovt_i + \varepsilon_{i(y)} \qquad \text{(Model 4)}$$

We also employ a series of sample restrictions to account for changes in professed partisanship of newspapers across time. Because Virginia is a southern state, there is very little history of Republican newspapers, given Democrats' historical one-party dominance there (Key 1949): Republican newspapers only appear in Virginia from 1961 to 1981. Further, the state's last Democratic newspaper dropped its affiliation after 1973. In New Jersey, newspapers only listed their partisanship in the early years of our sample. Due to these realities, we also present results from samples restricted to gubernatorial elections where there is a partisan newspaper: 1933 to 1981 in Virginia,[xiii] and 1949 to 1965 in New Jersey.

Finally, we assess Hypothesis 2, which focuses on partisan asymmetries in independent news demand, in two ways. First, we analyze the effect of gubernatorial elections on the relative demand for Democratic and independent newspapers as well as their effect on the relative demand for Republican and independent newspapers. Comparing the effect of a win on both outcomes will shed light on whether the relative demand for independent newspapers is greater when considering Democratic or Republican victories and their respective newspapers. Second, we model the effect of Democratic versus Republican gubernatorial victories on the change in independent newspaper demand in more recent decades that do not have explicitly partisan local news sources to add to our understanding of how state-level elections affect local news demand in the current era.

Analyses: Virginia and New Jersey

Table 1 presents the results for Models 1 through 3 for all years in our dataset and Model 4 in accordance with the restrictions noted above. Each model is run separately by state, and the coefficient for *Party Won* indicates the influence of partisan victory in gubernatorial elections on the relative change in local newspapers' circulation. Across all models and both states, there is a

significant and substantial relative decrease in the circulation of newspapers affiliated with the winning gubernatorial candidate's party compared to demand for newspapers not affiliated with the winner's party (i.e., those aligned with the loser and non-partisan newspapers).

In Virginia, the average difference between the change in circulations for newspapers affiliated with the winner versus those not affiliated with the winner is roughly -5.12 percentage points (p = 0.007) in the model with only time trends, as newspapers affiliated with the winner gained fewer circulations than other newspapers. That average difference between changes in demand is similar in the model accounting for capital-area residency at -7.35 percentage points (p = 0.006), in the model accounting for changes in per capita income at -5.19 percentage points (p = 0.008), and in the model accounting for the composition of the state legislature at -3.93 percentage points (p = 0.029). Each is statistically distinguishable from zero, in support of H_1, and each suggests we can reject H_0. These results are also quite similar in magnitude: even when controlling for determinants of newspaper demand such as region, income, composition of the state legislature, or time trends,[xiv] the effects of gubernatorial elections are similar.

[Table 1 about here]

The observed coefficients for *Party Won* in New Jersey (columns 5-7 of Table 1) are smaller but similar, and across all models there is a significant and negative relative effect of gubernatorial party victory on co-partisan newspaper circulation. Across models, the results are clustered around -4 percentage points: -4.23 percentage points in Model 1 (p < 0.00), -4.03 percentage points in Model 2 (p = 0.003), and -4.06 percentage points in Model 3 (p < 0.00).

The consistency of these results across both states and several specifications gives us confidence that there is a roughly 4-5 percentage point negative effect of gubernatorial victory on the relative demand for winning party-affiliated newspapers compared to demand for those not

affiliated with the winner. Substantively, these results suggest that newspapers not affiliated with the winning party gained roughly 66,442 more circulations throughout Virginia and roughly 63,439 more circulations throughout New Jersey than newspapers affiliated with the winning party in their respective states.[xv] We find robust evidence in support of H_1 that gubernatorial elections are meaningful events for the economic prospects of local media in their states. Again, we observe these results in states where gubernatorial elections are politically isolated from more prominent presidential and midterm elections that may complicate or mitigate these effects when held alongside gubernatorial contests.

Additional tests are needed, however, to ensure that the results are not skewed by years without partisan newspapers in the sample. As described above, we conducted alternative analyses with samples restricted to years with expressly partisan newspapers active in the state. Models are otherwise the same, including robust standard errors clustered by election cycle. Results are presented in Table 2.

[Table 2 about here]

The results are largely unchanged when the sample is restricted to those years with partisan newspapers in the sample: all key coefficients are negative and statistically significant. Even the more restricted sample in New Jersey, which includes only the elections of 1949, 1953, 1957, 1961 and 1965, produces a point estimate roughly consistent with previous results. These additional analyses give us confidence that our results are not an artifact of the circulation totals in years without partisan newspapers.

We run one final robustness test to ensure we are not picking up spurious trends across the nation by examining whether demand shifted for newspapers in other locations in the same years. If all partisans of the winning gubernatorial party in Virginia or New Jersey stopped

reading partisan-friendly newspapers throughout the country due to national political dynamics or otherwise unmeasured events, this could contribute to the patterns in local newspaper demand we detect. To rule this out, we conducted a robustness test using an original dataset of newspaper circulation in major out-of-state cities: Chicago and New York. Like before, we collected circulation information in the years following Virginia and New Jersey gubernatorial elections. New York's newspapers in our sample, the *New York Times* and the *Wall Street Journal*, are major sources of national news, and can be viewed as indicators of national interest in politics (Waldfogel and George 2006). In Chicago, which is located much further away from Virginia and New Jersey, we collected circulation data from the *Chicago Tribune* and the *Chicago Sun-Times.*[xvi]

If there is no relationship between changes in Chicago or New York newspaper circulations and the results of the Virginia and New Jersey gubernatorial elections, we can be more confident that our results in Tables 1 and 2 are not due to spurious national trends. We assess only Model 1, given that neither city is a state capital, and employ the same party victory variable used before. *VA (NJ) winner* is coded based on whether the newspaper is affiliated with the winner of the gubernatorial election in Virginia (New Jersey), and its coefficient indicates the average difference in the change in circulations for newspapers affiliated with the gubernatorial winner and those not affiliated with the winner. Results are reported in Table 3 below.

[Table 3 about here]

There are no statistically significant changes in relative demand for either the Chicago or New York newspapers following the results of gubernatorial elections in Virginia and New Jersey. Thus, there is no evidence of nationwide shocks to newspaper demand that could explain our results for Virginia and New Jersey newspapers. These analyses increase our confidence in

the findings in support of H1 above: demand decreases for local newspapers associated with the winner of gubernatorial elections compared to demand for other local newspapers.

Do Democrats and Republicans React Differently to a Win?

The results thus far suggest that demand for newspapers affiliated with the gubernatorial winner decreases compared to newspapers not affiliated with the winner. What is less clear is whether this pattern is due to winning partisans disengaging from news altogether, winners shifting their demand to independent news outlets, losing partisans engaging more, or some combination of all of those factors. It is also unclear if all partisans are responding similarly to gubernatorial elections. Though we do not have individual-level data to directly parse these mechanisms, our data can still speak to the expected partisan asymmetry outlined in Hypothesis 2. Our aggregate data can also shed light on some of these individual-level mechanisms, particularly the question of whether certain winning partisans are disengaging from news altogether or simply shifting their consumption from partisan to independent newspapers.

First, we examine patterns of consumption after a win or a loss by directly comparing changes in the circulations of each set of partisan newspapers against changes in demand for independent newspapers in Virginia. We reconfigure our data so that each row represents a gubernatorial election year (t), with columns for the circulation changes for Democratic, Republican and independent newspapers from year t-3 to t+1. The dependent variable directly compares the change in Democratic (or Republican) newspapers to the change in independent newspapers. In so doing, we are able to hold constant any external factors that affected these newspapers' circulations equally. The formal specification of the dependent variable comparing, for instance, Democratic newspapers to independent ones is: $(D_{t+1}-D_{t-3}) - (I_{t+1}-I_{t-3})$, where D_{t+1} represents the circulations for Democratic newspapers in year t+1, D_{t-3} represents Democratic

circulations in *t-3*, I_{t+1} represents independent circulations in *t+1*, and I_{t-3} represents independent circulations in *t-3*.

The independent variable is simply whether or not the party affiliated with the partisan newspaper in the comparison won the gubernatorial election in year *t*. Its coefficient will indicate how a win versus a loss affects the degree to which demand for Democratic (or Republican) newspapers moves in tandem with changes in demand for independent newspapers. Considering the comparison of Democratic newspapers against independent ones, a negative and significant coefficient would indicate that years with a Democratic winner experience a significantly smaller surge in demand for Democratic newspapers as compared to the change in demand for independent newspapers *relative to years in which a Democrat lost the governorship*. The years of our analyses are determined by the years in which Virginia had each type of partisan newspaper: Democratic newspapers existed between 1933 and 1973, while Republican newspapers existed from 1961 to 1981.

The results in columns 1 and 2 of Table 4 suggest an asymmetry between Democratic and Republican newspapers. Column 1 finds a negative and marginally significant link when comparing the effect of winning an election on changes in Democratic newspapers versus independent ones (b=-78,958.13; p=0.08, two-tailed). Conversely, the coefficient of interest for the comparison between Republican and independent newspapers is positive and insignificant (b=4,827.83; p=0.93, two-tailed). The difference in effects for *Party Won* across columns 1 and 2 is marginally significant (p=0.076, one-tailed).[xvii] This suggests that an electoral win produces a negative link in the relative demand for Democratic versus independent newspapers but has no effect when comparing Republican versus independent newspapers. Even more, the direction of the effect for Democratic versus independent newspapers aligns with the

interpretation that Democrats are more open to independent newspapers after a win than a loss. While it is possible that Democrats are disengaging after a loss—and we cannot disentangle individual-level effects based on the aggregate nature of our data—it is also possible they are shifting their consumption to independent newspapers that were bound to cover the winning candidate and subsequently, their administration, frequently.[xviii]

[Table 4 about here]

We also observe partisan differences in the current era characterized solely by independent local newspapers. To assess H_2 and speak directly to the ways in which state elections affect local newspapers in the modern era, we examine whether the party of the gubernatorial winner differentially affects the change in non-partisan newspaper demand. The dependent variable in these analyses represents the change in non-partisan newspaper demand from the year after one gubernatorial election to the year after the next. This is converted to a percent of total newspapers in the given state and year. Column 1 of Table 5 examines the years in which there have only been independent local newspapers in Virginia (1985-2005) and finds a partisan asymmetry similar to previous analyses but in more recent decades. Because the winner can no longer be aligned with a newspaper's party in an era of solely non-partisan newspapers, we examine differences in years with Democratic gubernatorial winners (coded as a 1 for *Dem Win*) as compared to years with Republican winners (coded as 0).

The results suggest a surge in demand for independent newspapers in years with a Democratic winner versus years with a Republican winner (b=8.71; p<0.00, one-tailed) in Virginia.[xix] That is, between 1985-2005, when only independent newspapers existed in the state, the change in (independent) newspaper demand was greater after years with Democratic victors than years with Republican ones. This asymmetry aligns with more recent studies that find

Democrats are more open to mainstream news sources than Republicans (Iyengar and Hahn 2009; Ladd and Podkul 2020). The same is also true for New Jersey in column 2: between 1969 and 2005, the years in which only independent newspapers existed in the state, the coefficient for *Dem Won* is positive albeit marginally significant (b=3.46, p=0.08, one-tailed). In column 3 of Table 5, we restrict the analysis to the same, more modern era as Virginia (1985-2005). Here, the key coefficient is positive and significant, showing that independent newspaper readership grew more after Democratic gubernatorial victories (b=2.67; p=0.01, one-tailed).[xx]

[Table 5 about here]

The findings in Tables 4 and 5 provide evidence in support of H_2: demand for independent newspapers increases following a Democratic gubernatorial victory compared to a Republican one. Our results shed light on this partisan asymmetry in two ways. First, we examine the relative change in demand for each partisan newspaper compared to independent newspapers in Virginia and find a negative relationship between Democratic gubernatorial victories and the relative demand for Democratic versus independent newspapers. This contrasts with the stability among the relative demand for Republican and independent newspapers after elections in Virginia at the time. Second, analyses of the more recent decades characterized by nonpartisan local newspapers find demand for local independent news in both states increases more after Democratic gubernatorial victories compared to Republican ones. In Virginia, this effect is stronger in more recent years, likely as conservative elites' attacks on the press crystallized rank-and-file Republicans' distrust of the mainstream news (e.g., Watts et al. 1999; Ladd and Podkul 2020). Even in the current era of largely nonpartisan local news and more nationalized politics (Hopkins 2018), gubernatorial elections matter for local news demand.

Discussion

Across several models, we find evidence that state politics can influence local media consumption, a political behavior that greatly affects the exercise of political accountability. Americans' motivations to seek political information are not merely the product of economic or media-environmental factors: political outcomes can also affect behavior. While this dynamic is known at the national level (Archer 2018), it is notable to see it at work in state politics. Gubernatorial elections have real stakes for not only employment, policy, and the economy in states, but also information seeking, which contributes critically to political accountability and representation.

Our findings are consistent with work that suggests electoral losers seek out friendlier partisan news due to anxiety from a loss (e.g., Albertson and Gadarian 2015; Marcus et al. 2000; Archer 2018). Our results are also consistent with the interpretation that partisans disengage from in-party media in their local information environment at the moment their party's candidate acquires the reins of power. However, it seems not all winning partisans change their news consumption in the same way: we show that Democrats may shift their attention to independent newspapers in the wake of a gubernatorial win more so than Republicans. Rather than consistent effort and equal interest across partisans following elections, we find asymmetric changes in media consumption behavior that could influence mechanisms of accountability and representation given the central role played by local media in that process (Hopkins and Pettingill 2018; Meeks 2020). This is particularly noteworthy considering the surges in independent newspaper circulations after a Democratic victory compared to a Republican one in the current era, which suggests differential rates of news consumption and political learning by party.

This study has several limitations that offer directions for future research. We measure the relative changes in newspaper circulations at the aggregate-level, and are therefore unable to definitively state whether the losing partisans are reading more in-party media, among whom independent news might benefit, or whether the winning party's membership is actively dropping partisan subscriptions. An individual-level study matching subscriber lists to voter lists would be necessary to disentangle these dynamics driving our aggregate-level findings and would be a welcome addition to the literature. Unfortunately, there are not nearly enough panel surveys of state and local politics, due to the cost of administering such surveys, leaving scholars with limited individual-level datasets on these topics. It is reassuring that our results based on aggregate measures of news consumption rich in external validity are consistent with individual-level studies of information seeking (e.g., Albertson and Gadarian 2015; Marcus et al. 2000; Iyengar and Hahn 2009). The infrequency of gubernatorial elections also limits our sample such that it is difficult to measure heterogeneous treatment effects: for instance, whether these dynamics differ substantially across endorsement patterns or coverage content.

Future work can also assess the impact of gubernatorial elections held concurrently with presidential or midterm Congressional elections. Do the effects of state politics endure when pitted against more salient national contests? Presidential elections consistently raise more money and command more national media attention than all other contests, but when assessed separately, we now know state-level concerns can affect behavior. Examining the two directly against one another represents an interesting next step for research. Representation, participation, and accountability are federalized in the American system, and disentangling influences at all levels remains an important task for scholars of electoral politics and the media.

Finally, the clear link between the existence of local newspapers and democratic performance suggests that more studies should examine not only the political factors that influence local news demand, but also the ways in which politics affect news content. Newspapers are, first and foremost, interested in economic success, and will target their coverage according to the markets and groups that they expect to produce that success (Hamilton 2004). Future research could examine if newspaper content—in print and online—shifts to retain or attract new audiences following a gubernatorial transition. In-depth interviews or surveys of editors and journalists could also be conducted to assess news professionals' awareness of these dynamics. And as the local media landscape continues to become more populated with partisan news websites (Alba and Nicas 2020), future work examining how state-level elections affect consumption of these local partisan outlets will be needed.

Conclusion

Our study finds that electoral outcomes in state politics influence demand for local newspapers. While prior work finds presidential elections affect local news consumption (Archer 2018), such elections are somewhat removed from policy decisions that affect the employment and lives of most Americans. In this article, we examined the impact of gubernatorial elections on demand for local newspapers in Virginia and New Jersey, where gubernatorial elections are held off-cycle from presidential and midterm elections. We find that newspapers associated with the winning party gained fewer circulations relative to oppositional and non-partisan newspapers following the election.

Gubernatorial races in Virginia and New Jersey did not affect demand for newspapers outside of those two states, according to our robustness tests, bolstering our confidence that our results are not spurious. Additionally, we find evidence consistent with the interpretation that

Democrats seem more willing than Republicans to consume independent newspapers after a political win particularly in the current era of nonpartisan local news outlets. This finding suggests the results of gubernatorial elections may continue to reinforce polarized views on institutional, mainstream news sources in today's high-choice digital media environment (Knight Foundation 2018).

Elections are high-stakes events with important policy consequences for citizens, even when those elections are off-cycle and at the state level. We document another important yet overlooked set of consequences in the aftermath of state-level elections by examining how local news demand changes in response to gubernatorial election outcomes. Consumption of local news, the very tool that empowers citizens to hold their officials accountable, is also affected by the partisan results of those elections. As the local news crisis continues to deepen, political scientists interested in state-level dynamics of partisanship and accountability should continue to explore the factors—especially the *political* factors—that contribute to local news demand.

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Endnotes

[i] While it could be the case that losing partisans turn to non-partisan news in the aftermath of

their defeat, previous literature strongly suggests this will not be the case. If it is, then it will be

more difficult for us to find evidence in support of Hypothesis 1. Further, given the aggregate

nature of our data, we will be unable to directly adjudicate between these individual-level

mechanisms. However, our data capture real-world consumption of local news sources after real

local elections. And while studying cable news or newer forms of news media would also be

interesting, our focus on newspapers allows us to assess the effects of local elections on relative

local news demand in a broader historical context across multiple decades.

[ii] Our theoretical framework suggests that after a loss, individuals will turn to partisan-friendly

news (not non-partisan news) regardless of party.

[iii] Virginia governors can only serve one term, unlike New Jersey governors.

[iv] New Jersey did not switch to holding gubernatorial elections in the year after presidential

elections until 1949, when it also adopted four-year terms.

[v] The *Editor and Publisher International Yearbooks* typically report newspaper circulations from

September of each calendar year. See Archer (2018) for a similar research design.

[vi] Figures depicting the circulations of each type of newspaper by state are available in the supplemental appendix. We do not include newspapers labeled as independent-Republican or independent-Democrat because it is theoretically unclear whether they should be considered partisan or independent. When considering the first year a newspaper appears in our dataset, these leaning newspapers only account for 10% of our sample.

[vii] This limited choice set likely makes it harder to uncover our hypothesized effects. For instance, when given the choice between only an oppositional newspaper or an independent one, partisans were likely steadfast in their consumption of the non-partisan news outlet *regardless* of the electoral context. Hypothesis 1 suggests partisans who experience a loss will turn more to partisan-friendly newspapers. However, if the only partisan news source available is oppositional, then it is likely the person will simply continue to consume the independent newspaper option available to them. Hypothesis 1 also suggests that partisans who experience a win will consume less partisan-friendly news, and possibly more non-partisan news. If again there is no partisan-friendly newspaper to begin with, this limited choice set would likely mean the individual was already consuming non-partisan news; therefore, we would observe no overall change after the election. These factors combined make our task of uncovering changes in newspaper demand after gubernatorial elections more difficult.

[viii] While this is not a traditional difference-in-differences research design, we are effectively assuming that circulation trends would follow parallel trajectories over time from the prior election if there were no election at year t (Abadie 2005).

[ix] Our data are organized so that each observation represents the circulations of party j's newspapers in a given year within and outside of the state capital region. We organize the data by region because we later control for whether or not newspapers are inside the capital.

[x] Personal income represents the total personal income in the state divided by the total midyear population. Its percentage change is calculated from the year after one gubernatorial election to the year after the next. These data are from the Bureau for Economic Analysis's website.

[xi] These data only go back to 1978. Unfortunately, New Jersey has only independent newspapers starting after the 1965 election, which prevents us from being able to run this model on the state.

[xii] Here, the controls for time and time-squared are not used given their strong correlations with *UnifiedGov't* (-0.47 and -0.50, respectively).

[xiii] Accessible state legislative election results only exist going back to 1978 (see endnote xi), and there are only partisan newspapers in Virginia until the 1980s. Therefore, there are not enough years to estimate Model 4 in Virginia for this analysis in Table 2. (See Angrist and Pischke (2010) for an explanation of small sample bias and robust standard errors.)

[xiv] Population growth is indirectly accounted for by converting the dependent variable to a percentage of total newspapers and including controls for time trends in our models. When controlling for population growth directly for Virginia from 1965-2005 (the years with census data), the results are substantively similar though less significant (b=-5.11; p = 0.099). See online appendix for full results; data limitations prohibit us from running this analysis for New Jersey.

[xv] These values were calculated by multiplying *Party Won*'s coefficient from Model 1 for each state by their mean number of total newspapers across the time period under examination (1933-2005 for Virginia and 1949-2005 for New Jersey) and then dividing that by 100.

[xvi] We focus on the *Chicago Sun-Times*, *Chicago Tribune*, *New York Times*, and *Wall Street Journal* in our robustness tests for several additional reasons. First, the newspapers' partisan reputations allow us to designate each one as aligned or not aligned with the winner of the Virginia or New Jersey governor's race. The *Chicago Sun-Times* has historically been viewed as

a progressive newspaper (Bosman and Ember 2017), while the *Chicago Tribune* is viewed as

conservative (Gentzkow and Shapiro 2010). Similarly, the *New York Times* and *Wall Street*

Journal have liberal and conservative reputations, respectively (Gentzkow and Shapiro 2010).

Also, the gubernatorial elections in Illinois and New York do not occur in the year after

presidential elections. From 1932 to 1976, Illinois elected its governor in presidential election

years. Since then, its gubernatorial contests are held in the same years as midterms. In New

York, governors were elected every two years from 1932 to 1938. Since then, elections have

been held every four years in the same years as Congressional midterms. Finally, the two pairs of

newspapers in this section represent outlets that primarily serve local audiences (the Chicago

newspapers) and more national audiences (the New York City-based newspapers). Thus, our

robustness tests will shed light on whether our previous findings were spuriously tapping

underlying demand patterns in other local media environments and the national environment.

[xvii] This is based on analyses that simultaneously estimate models 1 and 2. We use a one-tailed

test here and in the rest of this section given the directional nature of Hypothesis 2.

[xviii] Similar analyses could not be run for New Jersey because there was only one year with

Democratic newspapers. However, because our previous results for New Jersey rely heavily on

years with Republican and independent newspapers in the mid-20th century, this suggests some

limitations on our conclusions for Table 4 about how the relative demand for Republican and

non-partisan news is affected by gubernatorial elections, at least during the mid-1900s.

[xix] The analyses here drop the outlier year of 1989, which could be an outlier due to the election

of Douglas Wilder, the first African-American elected governor in any state since

Reconstruction. Noticeably, the effect for *Dem Win* is significantly larger (p<0.00) when

examining 1985-2005 compared to 1933-2005 (b=2.25, p=0.23). This suggests the greater

relative demand for independent local newspapers after a Democratic versus a Republican

gubernatorial victory has increased over time, likely as Republican elites increased their attacks

on the mainstream press (Watts et al. 1999).

[xx] The effects do not differ significantly over time in New Jersey when comparing *Dem Win* for

the full sample (1949-2005) versus 1969-2005 (p=0.72) or 1985-2005 (p=0.88).

Tables

Table 1. Regression analysis of the relationship between partisan gubernatorial victory and relative change in newspaper circulations: 1933-2005 for Virginia (except Model 4, which spans 1977-2005) and 1949-2005 for New Jersey.

	Virginia				New Jersey		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3
Party won	-5.12***	-7.35***	-5.19***	-3.93**	-4.23***	-4.03***	-4.06***
	(1.67)	(2.31)	(1.72)	(1.44)	(0.92)	(1.14)	(0.78)
Capital county		-8.43**				0.57	
		(3.43)				(1.91)	
Time	0.46	0.80	0.42		-0.36	-0.37	-0.83
	(0.85)	(0.94)	(0.80)		(1.04)	(1.09)	(1.06)
Time^2	-0.01	-0.02	-0.02		-0.01	-0.01	0.01
	(0.04)	(0.04)	(0.04)		(0.05)	(0.05)	(0.05)
Change in per capita income			-0.09				0.04
			(0.07)				(0.05)
Unified gov't				5.90			
				(7.31)			
Constant	1.63	1.85	5.20	3.90**	6.27	6.13	7.73*
	(4.08)	(4.09)	(4.86)	(1.44)	(4.60)	(4.44)	(4.23)
N	46	46	46	18	35	35	35
R^2	0.08	0.21	0.09	0.06	0.22	0.23	0.23

Note. Robust standard errors clustered by year in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 2. Regression analysis of the relationship between partisan gubernatorial victory and relative change in newspaper circulations, sample restricted to those years with a partisan newspaper. (Note: N is insufficient to obtain reliable estimates for Model 4; see endnote xiii).

	Virginia (1933-1981)			New Jersey (1949-1965)		
	(1)	(2)	(3)	(4)	(5)	(6)
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Party won	-4.75**	-5.98**	-4.70**	-5.59**	-7.53**	-4.15***
	(1.74)	(2.12)	(1.74)	(1.83)	(2.12)	(0.003)
Capital county		-4.70**			-4.10*	
		(1.76)			(1.80)	
Time	1.22	1.56	-1.01	-11.33	-12.76*	-12.73***
	(1.65)	(1.77)	(2.22)	(5.60)	(5.48)	(2.68)
Time^2	-0.08	-0.10	0.07	0.80	0.89*	0.91***
	(0.11)	(0.11)	(0.14)	(0.39)	(0.38)	(0.19)
Change in per capita income			-0.15			0.12***
			(0.11)			(0.02)
Constant	-0.002	-0.29	12.07	42.18*	48.92*	44.34***
	(5.37)	(5.33)	(10.80)	(19.61)	(19.30)	(8.57)
N	34	34	34	15	15	15
R^2	0.16	0.26	0.23	0.09	0.21	0.15

Note. Robust standard errors clustered by year in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 3. Change in circulation of newspapers in New York (*New York Times & Wall Street Journal*) and Chicago (*Chicago Tribune & Chicago Sun-Times*) following gubernatorial elections in Virginia and New Jersey.

	Chicago newspapers		New York newspapers	
	(1)	(2)	(3)	(4)
VA winner	0.09		-3.00	
	(1.46)		(2.23)	
NJ winner		-0.90		-2.20
		(1.59)		(2.56)
Time	-1.22	1.78	1.43	-0.54
	(0.99)	(1.58)	(1.08)	(1.83)
Time^2	0.03	-0.08	-0.08*	-0.01
	(0.05)	(0.07)	(0.05)	(0.07)
Constant	8.08*	-9.10	2.67	13.66
	(4.05)	(7.86)	(5.43)	(12.03)
N	36	30	36	30
R^2	0.28	0.14	0.20	0.25

Note. Robust standard errors clustered by year in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 4. Circulation change by gubernatorial election results and newspaper partisanship, Virginia.

	(1) VA Dem. vs. Ind. Newspapers: 1933-1973	(2) VA Rep. vs. Ind. Newspapers: 1961-1981
Party Won	-78,958.13* (39,904.60)	4,827.83 (54,708.36)
Constant	-6,400.50 (3,611.72)	-64,778.50*** (10,070.34)
N	10	5
R^2	0.11	0.002

Robust standard errors clustered by year in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 5. Circulation change for independent newspapers by gubernatorial election results, Virginia and New Jersey.

	(1) VA Ind. Newspapers: 1985-2005	(2) NJ Ind. Newspapers: 1969-2005	(3) NJ Ind. Newspapers: 1985-2005
Dem Win	8.71***	3.46*	2.67***
	(0.71)	(2.28)	(0.73)
Time	45.39***	5.87	-13.54**
	(1.41)	(3.34)	(3.45)
Time^2	-1.39***	-0.22*	0.37**
	(0.04)	(0.11)	(0.11)
Constant	-368.35***	-40.06	117.82***
	(11.30)	(24.16)	(27.95)
N	10	20	12
R^2	0.21	0.21	0.34

Robust standard errors clustered by year in parentheses. *** p<0.01, ** p<0.05, * p<0.1. The analyses in Column 1 drop outlier year of 1989.