

Do Local Newspapers Matter to Institutional Investors?

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Abstract: This study examines the informational role of local newspapers in institutional investments. Exploring local newspaper closures across U.S. counties, we document that institutional investors significantly reduce their holdings in firms located near closed newspapers. The post-closure decrease in institutional holdings is concentrated for nonlocal or non-hedge fund institutions. In contrast, institutions that are likely to possess information advantages—local institutions or hedge funds—do not decrease or even increase their holdings facing the newfound lack of local news coverage. Further analysis reveals that local newspaper closures adversely impact the institutional investors' ability to predict firms' stock returns—particularly for nonlocal or non-hedge fund institutions. Collectively, we provide novel evidence suggesting that local newspapers are a key channel through which institutional investors acquire geographically scattered information.

Keywords: Local Newspapers, Institutional Investors, Information Acquisition

JEL Classification: D80, G11, G14, M40

1. INTRODUCTION

Investors need access to multiple layers of information for decision making. This is as true at the local level as it is at national and global level, which underscores the importance of understanding the local information environment in which firms operate. While prior studies extensively document the geographically scattered nature of information and its effect on investors (e.g., Coval and Moskowitz 1999, 2001; Baik, Kang, and Kim 2010; Kang, Lawrence-Stice, and Wong 2021), much less evidence exists regarding how local information is unearthed and communicated to a wide range of investors. Exploring the current dynamics of the news media industry, we examine the role played by local newspapers in shaping information environments.

Serving local subscribers, local newspapers publish timelier and more information about the local community—such as politics and business activities therein—than do national newspapers. Articles published in local newspapers are routinely copied, quoted, and elaborated on by other media (e.g., online news services or national newspapers), so they have “ecological” consequences that go well beyond their own audience (Nielsen 2015). For example, newspaper coverage of the Flint water crisis was initiated by Michigan-based local news media, and eventually caught the attention of the national media and the Federal government.¹ The value of local newspapers as a source of information is also acknowledged by professional fund managers. Shearn (2012, p. 175), for example, states that “[s]ome of the best sources of information are trade journals and local newspapers where a business is headquartered. ... Local journalists also have experience in covering the company and may ask questions that reveal deeper insights.”² As such,

¹ More details can be found at <https://www.journalism.org/interactives/flint-water-crisis-draws-local-and-regional-news-media-attention-as-the-extent-of-water-contamination-comes-to-light/>.

² An interview with a fund manager also identifies local newspapers as a crucial information source, stating that “[h]e would read the local newspapers of places where companies that he was looking at were headquartered. ... Most people sit in New York and talk to analysts in New York, but they’re not interested in an area where there’s a lot of

although limited in their reach and resources, local newspapers play a key role as the primary provider of local information that investors otherwise cannot find in national newspapers.³ Therefore, we posit that local newspapers facilitate institutional investors' information acquisition on local businesses and economic conditions.

To examine the effect of local newspapers on institutional investors, we explore exogenous reductions in local news coverage due to newspaper closures. Over the past decade and a half, more than one in five newspapers has been wiped out across U.S. local communities.⁴ To the extent that local newspapers are a key source of local information, their closure creates a credible exogenous shock to the information environment of nearby firms (e.g., Abernathy 2016; Gao, Lee, and Murphy 2020; Heese, Pérez-Cavazos, and Peter 2021; Kim, Stice, Stice, and White 2021). Employing a difference-in-differences method, we find that institutional investors reduce their holdings in firms located near closed newspapers in the newfound lack of local news coverage. Specifically, following local newspaper closures, the change in institutional holdings in firms located near the closed newspaper is -2.1% on average, compared with firms without loss of local news coverage. This result is consistent with our hypothesis that local newspapers make it less costly for investors to acquire local information, thereby facilitating institutional investments.

We next examine whether the effect of newspaper closures varies with investors' ability to acquire and process local information. We posit that local newspapers would matter more when

local information." The full interview is found at https://www8.gsb.columbia.edu/valueinvesting/sites/valueinvesting/files/Graham%20%20Doddsville_Issue%2033_v24.pdf.

³ Significant differences in news content between national and local newspapers are often observed even when covering the same corporate event. For example, for the acquisition of TCF Financial by Huntington Bancshares (both are regional banks in the Midwest), whereas *The Wall Street Journal* and *Bloomberg News* briefly reported facts related to the deal (e.g., price, stock market reaction), local newspapers (e.g., *The Star Tribune* and *The Detroit News*) located near these banks provided extensive coverage of the deal (e.g., interviews with managers and directors, local community reaction, post-deal plans).

⁴ See details at <https://www.nytimes.com/2019/12/21/reader-center/local-news-deserts.html>.

institutions are at an informational disadvantage about local business and economic conditions. Our empirical analysis supports this conjecture: in response to local newspaper closures, nonlocal institutions (i.e., located far from the firms in which they invest) significantly decrease their holdings in firms losing local news coverage, whereas local institutions (i.e., located near the firms in which they invest) do not decrease or even increase their holdings in these firms. A similar pattern emerges when repeating our analysis for non-hedge vs. hedge fund institutions: non-hedge fund institutions significantly reduce their holdings following local newspaper closures, while hedge funds do not. That is, sophisticated investors with information advantages are less likely to suffer from the shortage of information provided by local newspapers. Collectively, our results suggest that local news coverage helps level the playing field among institutional investors by enhancing the accessibility to local information.

We further explore the impact of local newspaper closures in terms of the association between institutional holdings and future stock returns. Prior research suggests that the mass media's coverage of individual stocks increases investors' propensity to buy attention-grabbing stocks, not only among retail investors (e.g., Barber and Odean 2008; Engelberg and Parsons 2011) but also among professional investors (Liu, Sherman, and Zhang 2014; Fang, Peress, and Zheng 2014). In light of this, it could be argued that local newspaper closures simply divert institutional investors' attention away from firms in the affected region, resulting in a reduction in their holdings of those firms. To distinguish the effect of local newspapers on institutional investor attention from their informational role, we examine stock return predictability of institutional holdings and trades and test how it changes around local newspaper closures. If local newspaper closures serve to reduce information-driven (attention-driven) institutional investments, we expect to observe post-closure decrease (increase) in the return predictability of institutional investors. Confirming that

local newspapers provide valuable information rather than just drawing attention, our analysis shows that the shortage of local news coverage reduces the ability of institutional investors to predict the stock returns of firms in the affected region. This pattern is more pronounced for holdings and trades of non-local (non-hedge fund) institutions, which are likely to lack other information channels other than local newspapers, as relative to local (hedge fund) institutional investors.

Our findings are unlikely to be due to the underlying economic downturn of a region negatively affecting both the profitability of local news media and institutional investments in the region. We do not detect any significant decreases in institutional holdings preceding local newspaper closures; the lack of local news coverage does not reduce institutional holdings of investors with information advantages; our robustness analysis finds no evidence that firms in the affected region exhibit significant underperformance—none of which would be observed had deteriorating economic conditions driven our findings. Moreover, we estimate a two-stage least squares regression using the expansion of Craigslist as an instrument for local newspaper closures (e.g., Gao et al. 2020) and show that our main inferences remain unchanged.

We make several contributions to the literature. First, our study provides novel evidence on institutional investors' reaction to the changes currently taking place in the news media industry. Much attention has been focused in recent years on financially distressed newspapers and its consequences in the region that loses local news coverage—in terms of local politics (e.g., Gentzkow, Shapiro, and Sinkinson 2011; Hayes and Lawless 2015), public financing (Gao et al. 2020), and corporate activities (e.g., Heese et al. 2021; Kim et al. 2021). We investigate whether institutional investors are also affected by the information contents in local newspapers. Guest (2021) documents the informational value of *national* news media by examining the editorial

contents of the *Wall Street Journal*. Nevertheless, it is unclear ex ante whether *local* news coverage affects the decisions of information-savvy investors who are well equipped to acquire and process information from various sources. Our empirical analysis documents that local newspaper closures not only lead to a reduction in institutional holdings but also adversely affect institutional investors' return predictability for firms located in the region that loses local news coverage. Local newspapers, as distinct from national news media, thus make up an important component of the information set available to institutional investors.

Second, our identification strategy allows us to establish the causal effect of news media on institutional investors' behavior. Engelberg and Parsons (2011) study the causal effect of local media coverage of earnings announcements, but on local *retail* investors. Other studies that focus on institutional investors document the *association* between news coverage and investment decisions (e.g., Fang et al. 2014; Liu et al. 2014). It is, however, a challenging task to overcome endogeneity issues inherent to the relationship between institutional holdings and news media because news coverage is not random, but rather the product of profit maximization (Gentzkow and Shapiro 2010; George and Waldfogel 2006). News media often cover institutional investors' portfolio choices and report changes in their holdings as disclosed in Form 13F filings. Local newspapers may keep an eye on institutional investments, especially investments in local firms of interest to their local audience (i.e., reverse causality). Moreover, during important corporate events such as mergers and acquisitions, news coverage and institutional trading activities can increase simultaneously (i.e., an omitted variable problem). By exploiting a quasi-natural experiment, we provide the first causal evidence that the *local* press matters to *institutional* investors in their portfolio choice.

Third, this study speaks to the literature on the information asymmetry arising from the geographic distance between investors and assets. It is well documented that investors prefer to hold local firms because of their ease of monitoring or their access to private information about these firms (Coval and Moskowitz 1999, 2001; Baik et al. 2010). Our findings highlight the role of local newspapers as the primary providers and disseminators of local information beyond the region where they are located. We document a significant spillover effect of local newspaper closures on investors with an information disadvantage, namely, nonlocal or non-hedge funds institutions. This result suggests that the information gap among institutional investors can be mitigated by ample local journalism activities.

The remainder of this paper proceeds as follows. Section 2 presents a review of the literature and develops our hypothesis. Section 3 describes our research design and sample construction. We present and discuss our empirical results in Sections 4 and 5. Finally, Section 6 concludes the paper.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1 Vanishing Local Newspapers

Advanced communication technologies have reduced the costs of information dissemination, enabling new forms of news outlets to compete with traditional print newspapers. For example, automated “robo-journalism” articles quickly synthesize and disseminate information from various sources (e.g., firms’ press releases, analyst reports, and stock performance) (Blankespoor, deHaan, and Zhu 2018). Online communication companies such as Facebook and Google also offer cheaper and more targeted advertising strategies than do local print newspapers, resulting in a substantial reduction in advertising revenues (e.g., Seamans and

Zhu 2014). Newspaper advertising revenue peaked in 2000 at \$64 billion, adjusted for inflation, and has fallen sharply since then. Moreover, the circulation of print newspapers in the U.S. plummeted by about 20 percent from 117 million in 2004 to 93 million in 2014 (Abernathy 2016). Along with the migration of advertisers and readers to alternative forms of news media, local newspapers across the U.S. have shuttered, and the number of journalists has halved over the last 15 years, leaving local communities at risk of losing news coverage.⁵ Half of U.S. counties have only one, usually a small weekly, newspaper while about 200 counties have become “news deserts” with no newspapers at all as of 2006.⁶

Prior studies document ample evidence of the adverse real effects of the continued downturn in the newspaper industry on various dimensions. The lack of local news coverage reduces political activism, resulting in lower voter turnout (Gentzkow et al. 2011; Hayes and Lawless 2015), less campaign spending (Schulhofer-Wohl and Garrido 2013), and underworking politicians (Snyder and Strömberg 2010). Reductions of local news coverage also affect firm behavior as well. Responding to investors’ concerns about increased information costs upon local newspaper closures, firms boost dividend pay-outs (Kim et al. 2021). In the absence of a local media watchdog, firms located near closed newspapers increase their toxic emissions (Sun 2021; Jiang and Kong 2021) and engage in more corporate misconduct, as measured by federal violations and resulting penalties (Heese et al. 2021). Furthermore, local newspaper shutdown imposes a significant impact on the financial market—increased stock price crash risk of local firms (An, Chen, Naiker, and Wang 2020) and higher municipal borrowing costs (Gao et al. 2020).

⁵ Local newspapers are likely to offer a wider range of coverage about a community than other local news outlets do. Local newspapers typically have 70 to 100 stories a day while a typical half-hour local TV newscast has no more than 15. See details at <https://www.pewresearch.org/internet/2011/09/26/part-3-the-role-of-newspapers/#fn-263-3>.

⁶ See details at <https://www.usnewsdeserts.com/reports/expanding-news-desert/loss-of-local-news/>.

2.2 Local Information and Institutional Portfolio Choices

Enhancing access to information useful in choosing and monitoring assets, geographic proximity affects portfolio decisions of investors of all stripes, including individual investors (Ivkovic and Weisbenner 2005), mutual fund managers (Coval and Mostkowitz 1999, 2001), institutional investors (Baik et al. 2010; Tesar and Werner 1994; Ahearne, Grier, and Warnock 2004), and funds of hedge funds (Sialm, Sun, and Zheng 2020). These studies show that investors have local information advantage which paves the way for them to earn greater returns from their local holdings relative to their nonlocal holdings. As such, local information does not spread quickly beyond the region, giving rise to the information asymmetry between local and nonlocal investors.

Nonetheless, local information is likely to gradually become available to a large group of investors in various ways. The introduction of direct flights or high-speed rail between regions makes it easier for capital market participants to acquire information about distant firms (Ellis, Madureira, and Underwood 2019; Chen, Ma, Martin, and Michaely 2021). Financial reporting—particularly based on accounting choices familiar to investors—facilitates information acquisition and thus leads to greater institutional ownership in remotely located firms (Bradshaw, Bushee, and Miller 2004; Covrig, Defond, and Hung 2007; Florou and Pope 2012). Local information is also disseminated beyond the region via local Twitter activities (Baik, Cao, Choi, and Kim 2016). Furthermore, institutional investors may gather information otherwise inaccessible from afar via private connections such as school ties (Cohen, Franzini, and Malloy 2008). That said, in the existing literature, little is known about the role of local newspapers as an information source particularly for institutional investors.

2.3 Hypothesis Development

We posit that local newspapers play a unique informational role, such that the closure of local newspapers represents a net loss of information available to institutional investors. To avoid direct competition with national newspapers, local newspapers serve their readership by focusing more on local events (George and Waldfogel 2006). Proximity to news sources thus allows them not only to cover nearby firms more often with longer articles but also to publish more investigative news articles about local businesses than do distant newspapers (Miller and Shanthikumar 2015). Even in the presence of national news media, the role of local newspapers remains significant in investment decisions, as evidenced by local media coverage predicting local retail trading (Engelberg and Parsons 2011).⁷ It is also conjectured that mutual fund managers derive some of their investment ideas from local newspapers (Hong, Kubik, and Stein 2005). While online news channels (e.g., Facebook) disseminate news faster (e.g., Drake, Roulstone, and Thornock 2012) and national newspapers (e.g., *The New York Times*) have more resources, local newspapers are able to keep their local information environment alive. Despite shrinking substantially in recent years, they generate the majority of original local and regional stories, which often spread rapidly through online news portals and national news media via reposting and reprinting.⁸ Meanwhile, online news channels mostly repeat or repackage previously published information; national newspapers are neither sufficiently incentivized nor capable of initiating and maintaining local news coverage. Hence, when local newspapers cease printing, the net supply of unique information about local businesses and economic conditions would decrease, leading to less overall

⁷ The distinct informational value of the content of local newspapers is also acknowledged by journalists of national newspapers. See, for example, <https://www.ft.com/content/48e02694-a54c-4cec-9af6-ada8b4955e20>.

⁸ See more details at <https://www.journalism.org/2010/01/11/how-news-happens/>.

information that other press outlets disseminate to a broader set of either local or nonlocal investors (Kim et al. 2021).

Even if the information provided by local newspapers is less material on its own, it may become valuable when combined with other information signals that investors have. Prior studies suggest that investors do not process various pieces of information in isolation but integrate them when making decisions. Sophisticated investors can enhance their information advantage not only by extracting valuable signals from public information more efficiently or completely than less informed investors (Grossman and Stiglitz 1980; Gârleanu and Pedersen 2018; Chen, Kelly, and Wu 2020) but also by complementing their private information with public information (Kim and Verrecchia 1997; Goldstein and Yang 2015). Enabling investors to make better use of the information set available to them, local news coverage can help them contextualize different pieces of information, such as financial filings, analyst forecasts, and private conversations with corporate executives. That is, the loss of local newspapers is likely to remove a critical portion of the information mosaic that investors assemble when making trading decisions.

Taken together, local newspaper closures would make it more difficult for investors to acquire and process information relevant for firms that lose local news coverage. To the extent that investors' demand for assets decreases with information and monitoring costs (e.g., Grossman and Stiglitz 1980; Kyle 1985; Coval and Moskowitz 1999; Healy, Hutton, and Palepu 1999; Bushee and Noe 2000; Baik et al. 2010), our reasoning leads to our hypothesis, stated in alternative form, as follows:

HYPOTHESIS. Following local newspaper closures, institutional investors reduce their holdings in firms subject to the newfound lack of local news coverage.

Alternatively, one might argue that local newspaper closures impose a trivial impact on local

information environments. Newspaper articles tend to be biased in favor of the companies they cover (Dyck and Zingales 2003). In particular, local media coverage has a more positive slant toward local firms because of their high reliance of advertising revenues generated by local businesses (Gurun and Butler 2012), mitigating the information value of local newspapers. Meanwhile, sophisticated investors (e.g., hedge funds) may increase their information acquisition activities to substitute lost public information (Chen et al. 2020). Therefore, if local newspapers (pre-closure) merely curry favor with local firms and/or institutional investors (post-closure) scale up information acquisition, then changes in institutional holdings following local newspaper closures may be insignificant or even positive, contrary to our prediction.

3. RESEARCH DESIGN AND SAMPLE CONSTRUCTION

3.1 Research Design

Exploring the closures of local newspapers as a source of plausibly exogenous variation to local information environment, we examine the information value of local newspapers for institutional investors. Specifically, we employ a difference-in-differences analysis as follows:

$$Inst\ Own_{ict} = \beta_0 + \beta_1 Closure_{ct} + \Sigma Controls + Firm\ FE + Quarter\ FE + \varepsilon_{ict}, \quad (1)$$

where i , c , and t denote firm, county of firm headquarter location, and quarter, respectively. $Inst\ Own$ is the number of shares of firm i held by institutional investors at the end of quarter t , divided by the number of total shares outstanding. $Closure$ is equal to one for county c in all quarters after the closure of a local newspaper located in that county, and zero otherwise. Firm fixed effects control for any firm-level time-invariant characteristics, and quarter fixed effects account for unobserved heterogeneity across time. Estimating the local average treatment effect is possible because several counties lose their local newspapers in different points during the sample period.

This setting thus helps mitigate the noise and biases inherent in a single event study (e.g., Bertrand, Duflo, and Mullainathan 2004; Roberts and Whited 2013). Equation (1) estimates the change in institutional ownership for firms headquartered in counties that have experienced the loss of local news coverage (i.e., the treatment group) before and after the closure of a local newspaper, as compared to the corresponding change for firms located in counties without a local newspaper closure (i.e., the control group). If institutional investors reduce their holdings in response to the shortage of local information led by a local newspaper closure, then our hypothesis predicts to observe $\hat{\beta}_1 < 0$.

Following prior research (e.g., Gompers and Metrick 2001; Baik et al. 2010), we also control for firm-level characteristics that are likely to affect institutional investors' holding decisions, such as market capitalization (*Size*), market-to-book ratio (*MTB*), preceding stock returns ($RET_{-3,0}$; $RET_{-12,-3}$), firm age (*Age*), return volatility (*Volatility*), trading turnover (*Turnover*), dividend yield (*Yield*), per-share stock price (*Price*), and S&P 500 index membership (*SP500*). Furthermore, controlling for the effect of county-level macroeconomic fundamentals on institutional holdings, we add population growth ($\Delta Population$) and income growth (ΔGDP). All continuous variables are winsorized at the 1% and 99% levels.

3.2 Sample Construction

We identify local newspapers shutdown events from the database compiled by the Center for Innovation and Sustainability in Local Media (CISML), managed by the Hussman School of Journalism and Media at the University of North Carolina (UNC). In the period of years 2004 to

2016, there are 30 closures (56 closures and mergers) of U.S. daily local newspapers identified.⁹ We then manually collect the last edition date of each event (i.e., closure or merger) by internet searching. We do not consider weekly newspaper closures, changes in circulation frequency from daily to weekly, or changes from offline to online only. Figure 1 shows that the local newspaper closures and mergers have taken place across the U.S.

Our initial sample includes all Compustat/CRSP firm-quarters in years 2003 to 2017 with institutional ownership data from Thomson/Refinitiv Institutional (13F) Holdings. The Securities and Exchange Commission (SEC) mandates institutions managing more than \$100 million in equity to file a report (Form 13F) of all calendar-quarter-end equity holdings greater than 10,000 shares or \$200,000 in market value. To capture the geographic coverage of local newspapers, we determine the locations of firms and institutional investors using filings retrieved from the SEC's Edgar platform. For the location of firms (institutional investors), we use historical headquarter addresses found on 10-K (13F) filings.¹⁰ We obtain data from Compustat, CRSP, and the Bureau of Economic Analysis (BEA) to construct our variables for firm-level or county-level economic fundamentals. We exclude observations with total institutional ownership in 13F filings (*Inst Own*) greater than 100%. The final sample consists of 183,477 firm-quarter observations for which the headquarter locations of firms and institutional investors are unambiguously identifiable. Table 1 presents the description of our sample. We find that 6.3% of the firm-quarters in our sample are

⁹ As a leading journalism research institution dedicated to documenting and studying the loss of local newspapers across the U.S., the CISML specializes in identifying the dynamics of the local news media industry. To accurately capture the landscape of local journalism, the CISML not only monitors changes in the number of newspapers in a region but also identifies newspapers with strong connections to local communities by excluding national newspapers, specialty publications, such as lifestyle magazines, and shoppers or similar advertising-based print materials from their database (Abernathy 2016). The list of local newspaper closures and mergers used in this study and the selection process details are available at <http://newspaperownership.com/additional-material/closed-merged-newspapers-map/>.

¹⁰ Firms' location information in Compustat is not historical. That is, when a firm moves its headquarters, Compustat overwrites the address field for each pre-move fiscal year (Kelly and Ljungqvist 2012).

from firms headquartered in a county that experienced a loss of local newspapers in the post-closure period. The mean percentage of institutional ownership (*Inst Own*) during our sample period is 52.6%. When using 100 kilometers as a measure of locality (i.e., the distance between a firm and an institutional investor) following prior studies (e.g., Coval and Moskowitz 2001; Gaspar and Massa 2007; Baik et al. 2010), the mean of local institutional ownership, *Inst Own* (≤ 100 km), is 4.4% and that of non-local institutional ownership, *Inst Own* (> 100 km), is 47.8%.¹¹

4. MAIN EMPIRICAL ANALYSIS

4.1 *The Effect of Newspaper Closures on Institutional Investors*

Table 2 presents the estimation results of Equation (1), which is consistent with our hypothesis that institutional investors own fewer shares of firms located in a region where local newspapers are disappearing. As documented by the coefficient estimate on *Closure* (column 1) being negative and significant (-0.021 , $p < 0.05$), following a local newspaper closure, institutional investors reduce their holdings in firms located in the same county as the closed local newspaper. The economic magnitude of the effect of local newspaper shutdown on institutional investors is also non-trivial. A newspaper closure decreases institutional ownership in that county by 2.1% on average, as compared to that in counties that experience no loss of local newspaper, which represents approximately 4% ($= 2.1/52.6$) of the mean level of institutional ownership. That is, institutional investors lower their exposure to stocks for which they find it more difficult to obtain

¹¹ For the 1995–2007 period, Baik et al. (2010) report that the mean of local (non-local) institutional ownership, i.e., a distance less (greater) than 100 kilometers between a firm and an institutional investor, is 3.8% (34.7%).

related information. The coefficient estimates on control variables are overall consistent with those reported in previous studies (e.g., Gompers and Metrick 2001; Baik et al. 2010).

We alternatively measure *Closure_Neighbor* as a dummy variable equal to one in quarters following a local newspaper closure for not only a county that loses its local newspaper but also its adjacent counties, and zero otherwise. Furthermore, we construct *Closure_Merger*, which is defined similarly to *Closure* but is based on both local newspaper closures and mergers in a given county. We rerun Equation (1) by replacing *Closure* with *Closure_Neighbor* (*Closure_Merger*) and continue to find evidence that reduced local news coverage leads to lower institutional holdings. The coefficient estimate on *Closure_Neighbor* (*Closure_Merger*) is -0.011 (-0.017) statistically significant in column 2 (3) albeit smaller in magnitude compared to that on *Closure* in column 1. Collectively, our empirical results in Table 2 suggest that local newspapers play an important informational role for institutional investors.¹²

4.2 Institutional Investor Characteristics

When the information environment becomes opaque due to newspaper closures, investors with alternative information sources could substitute the lost information to preserve their information advantage (Chen et al. 2020). To shed further light on the channel through which local newspapers affect institutional investors' decisions, this section investigates whether the effect of local newspaper closures varies with the level of information asymmetry among investors, as captured by geographic proximity (Section 4.2.1) and investor sophistication (Section 4.2.2).

¹² The results in Table 2 are robust to alternative sets of fixed effects (FE), including 1) quarter FE, firm FE, industry FE, 2) quarter FE, firm FE, state-year FE, 3) quarter FE, firm FE, industry-year FE, 4) firm FE, county-year FE, and 5) firm FE, state-year FE.

4.2.1 Local vs. Nonlocal Institutional Investors

Local investors have easier access to information about geographically proximate firms, preferring to hold local firms rather than distant ones (Coval and Moskowitz 1999). Specifically, they can visit a local firm easily; they may have close social ties with local figures such as executives, judges, and politicians—all of which help them better informed about local firms and the surrounding business environment. As such, the impact of the local newspaper shutdown is likely to increase with the distance between a firm and an investor. This section examines whether the effect of local newspaper closures on portfolio decisions varies with the proximity of investors to the firms in which they invest.

Panel A of Table 3 presents the estimation results of Equation (1) with institutional ownership measured separately for non-local and local institutional investors. The locality of institutional investors is determined based on either the distance between a firm and an investor (100kms) or their headquartered counties. We continue to find evidence consistent with our hypothesis. Estimating the effect of local newspaper closures on nonlocal investors (i.e., the distance between a firm and an investor is greater than 100 km) in column 1, the coefficient estimate on *Closure* is negative and statistically significant (-0.032, $p < 0.05$).

Our empirical results show that local investors react to local newspaper closures differently from nonlocal investors. Unlike nonlocal investors (distance > 100 km) in column 1, local institutional investors (distance \leq 100 km) increase their holdings following local newspaper closures, as shown by the coefficient estimate on *Closure* being positive and significant (0.011, $p < 0.1$). This finding is consistent with the comparative advantage of local institutions in substituting lost public information about local firms. In a similar vein, Chen et al. (2020) document that sophisticated investors scale up their own information acquisition after exogenous

reductions of analyst coverage due to closures and mergers of brokerage firms. Our inferences remain similar when we examine the proximity between a firm and an investor based on whether they are located in the same county (columns 3 and 4).

4.2.2 Hedge vs. Non-Hedge Funds

Hedge funds presents one of the most sophisticated investor groups (e.g., Brunnermeier and Nagel 2004). Having personnel and technological infrastructure in hand, hedge funds can increase their information acquisition activities following the disruption of public information (Chen et al. 2020). As such, we expect less sophisticated investors (e.g., non-hedge funds) to suffer from the lack of local news coverage.

Panel B of Table 3 separately estimates Equation (1) for stocks held by hedge funds vs. non-hedge funds. Using Thomson global ownership data, we identify institutions primary engaged in hedge fund business (OwnTypeCode = 106, “Hedge Fund”) in columns 1 and 2. Our results are robust to the use of OwnTypeCode = 113 (“Investment Advisor/Hedge Fund”) in columns 3 and 4. Consistent with the assertion that investors avoid assets with greater information acquisition costs, our empirical results reveal that non-hedge funds reduce their stock holdings in firms located closed to local newspaper shutdown, as evidenced by the coefficient estimate on *Closure* being negative and significant (-0.022, $p < 0.01$) in column 1. In contrast, after the closure of local newspapers, hedge funds’ stock holdings exhibit no significant change (column 2), suggesting that the loss of local news coverage has little impact on their ability to acquire information. In columns 3 and 4, we find similar evidence. Combined with the results of firm–investor proximity (Section 4.2.1), our empirical results in this section further confirm the informational role of local newspapers in facilitating investors’ information acquisition.

5. ADDITIONAL EMPIRICAL ANALYSIS

5.1 Trend Analysis

The difference-in-differences method in Equation (1) relies on the parallel trends assumption that firms in counties experiencing the closure of a local newspaper would have exhibited variation in institutional ownership (*Inst Own*) similar to that in non-closure counties had these counties *not* lost their local newspaper. To address concerns that the change in inventors' portfolio decisions may precede the change in local news coverage, we decompose the treatment effect of local newspaper closures into separate periods for each county similar to prior studies (e.g., Bertrand and Mullainathan 2003; Bourveau, Lou, and Wang 2018; Jung, Nam, and Shu 2021). We investigate whether the pre- and post-closure trends in institutional ownership falsify the parallel trends assumption. Specifically, we rerun Equation (1) by replacing *Closure* with dummy variables—*Closure*₋₃, *Closure*₋₂, *Closure*₋₁, *Closure*₀, *Closure*₁, *Closure*₂, *Closure*₃, *Closure*₄, and *Closure*₅₊—which indicate the quarter relative to the closure of a local newspaper. For example, *Closure*₋₂ is a dummy variable that takes the value of one for two quarters before the closure of a local newspaper in a given county, and zero otherwise. The other dummy variables are constructed analogously.

Column 1 of Table 4, which corresponds to Column 1 of Table 2, reports that the coefficient estimates on *Closure*₋₃, *Closure*₋₂, and *Closure*₋₁ are not statistically different from zero. This indicates no significant change in institutional ownership before the closure of a local newspaper, which fails to falsify the parallel trends assumption. In contrast, the coefficient estimates on *Closure*₀, *Closure*₁, *Closure*₂, *Closure*₃, and *Closure*₄ are negative and statistically significant at conventional levels, suggesting that the decrease in institutional ownership starts immediately

upon the closure of a local newspaper and continues into subsequent periods. Furthermore, the coefficient estimate on $Closure_{5+}$, which is an indicator variable capturing the period onward starting five quarters after the closure of a local newspaper in a given county, is negative and significant at the 5% level. This result suggests that the impact of local newspaper closures on the local information environment is not only immediate but also triggers a longer-term change in investors' portfolio choices. We also conduct our trend analysis using alternative dependent variables: nonlocal vs. local institutional investors (columns 2 vs. 3) and non-hedge vs. hedge funds (columns 4 vs. 5), and continue to find similar results. Overall, our empirical results in Table 4 demonstrate that the reduction in institutional ownership does not precede the closure of a local newspaper.

5.2 Cross-Sectional Effects

This section provides several cross-sectional tests to identify potential heterogeneity in the treatment effect of local newspaper closures on institutional ownership. We expect the effect of local newspaper closures on institutional investors' information acquisition to be stronger for firms in more opaque information environments. To explore whether the loss of local news coverage affects institutional investors' portfolio decisions differently, we conduct a subsample analysis (partitioned based on the annual median value of the variable of interest unless stated otherwise) by re-estimating equation (1) as presented in Table 5.

In Panel A, we find that the effect of local newspaper closures on institutional ownership is negative and significant only for young firms (column 1) and for firms that do not belong to the S&P 500 index in a given year (column 3). That is, the reduction in institutional ownership following local newspaper closures is primarily driven by the stocks of firms in an opaque

information environment. Furthermore, the effect of local newspaper closures on institutional holdings is more salient for firms whose operational activities are more locally concentrated (column 6) than diversified (column 5).¹³ This result suggests that investors would find local news coverage more valuable for firms with the high level of geographical business concentration.

Panel B finds that the informational role of local newspapers varies with the availability of alternative communication sources. The effect of local newspaper closures on institutional ownership is more pronounced for firms attracting less media attention, captured by the number of Dow Jones news articles (column 1), or the number of local newspapers as of year 2004 (column 3).¹⁴ Using the prevalence of social clubs and organizations (Rupasingha, Goetz, and Freshwater 2006; Hasan, Hoi, Wu, and Zhang 2017; Kang et al. 2021), we find that local newspaper closures significantly decrease institutional holdings in counties with strong county-level social capital (column 6), but not in those with weak social capital (column 5). Strong social capital in the region enables local journalists to easily access local events, which in turn could lead them to produce more informative news content in local newspapers.¹⁵

Furthermore, we explore the information costs of processing a firm's Form 10-K financial reports, which is a primary source of firm-specific information. Panel C examines how the effect of local newspaper closures on institutional investments varies with information costs associated with financial reporting. Peterson, Schmardebeck, and Wilks (2015) document that a firm's

¹³ García and Norli (2012) count state name mentioning in the sections "Item 1: Business," "Item 2: Properties," "Item 6: Consolidated Financial Data," and "Item 7: Management's Discussion and Analysis" of 10-K filings. The local concentration data collected by García and Norli (2012) only extend to 2008. Similar to Kim et al. (2021), we match later firm-years to the 2007 or 2008 measure (using the latest available). The concentration of local operations is relatively sticky, so this matching procedure is unlikely to induce significant measurement error.

¹⁴ We thank Linsey Slack (the UNC Hussman School of Journalism and Media) for sharing data on county-level local newspapers.

¹⁵ Our measure of social capital captures the county-level degree of physical presence of social clubs and organizations, which is distinct from interpersonal social ties maintained beyond the region (e.g., school ties). Data obtained at <https://aese.psu.edu/nercrd/community/social-capital-resources>.

accounting consistency over time, measured based on accounting footnotes in 10-K filings, is associated with lower information asymmetry. Investors' information costs also increase with a firm's use of special items. Managers opportunistically use special items to manage investor perceptions of their firm's core profitability (McVay 2006; Kolev, Marquardt, and McVay 2008), and investors are unlikely to fully understand the transitory nature of special items (Dechow and Ge 2006). We also examine the effect of 10-K filing formats on financial information users. The use of eXtensible Business Reporting Language (XBRL) tagging enhance small institutional investors' access to financial statement information, thereby leveling the playing field among investors (Bhattacharya, Cho, and Kim 2018). Consistent with the notion that the adverse informational effect of local newspaper closures are more pronounced for firms with greater accounting-related information costs, investors significantly reduce their holdings in firms with low accounting consistency (column 1), firms with high special items (column 4), and firms with no XBRL tagging in their 10-K reports (column 5).¹⁶ Meanwhile, we find no significant post-closure change in institutional holdings for firms with high accounting consistency (column 2), firms with low special items (column 3), and firms with XBRL-tagged 10-K filings (column 6). Our cross-sectional analysis thus provides corroborating evidence in line with the informational role of local newspapers in institutional portfolio choices.

5.3 Return Predictability Following Local Newspaper Closures

To the extent that local newspapers attract investors' attention, one could argue that our results so far can be explained by closed local newspapers no longer drawing investors' attention

¹⁶ We thank the authors of Peterson et al. (2015) and Bhattacharya et al. (2018) for sharing the data of accounting consistency and firm-level XBRL adoption, respectively.

to local businesses. Prior studies document that even professional money managers tend to buy stocks with “attention-grabbing” news coverage even without any new information (e.g., Merton 1987; Liu et al. 2014) and that this tendency is negatively related to future investment performance (Fang et al. 2014). This section further investigates whether the post-closure change in institutional holdings that we document above is information- vs. attention-driven. Specifically, we estimate the effect of local newspaper closures on institutional investors’ return predictability, based on the relationship between institutional ownership and future stock returns, by employing a difference-in-differences model as follows:

$$\begin{aligned}
 Return_{ict+1} = & \gamma_0 + \gamma_1 Closure_{ct} \times \Delta Inst Own + \gamma_2 Closure_{ct} \times Inst Own Lag + \gamma_3 Closure_{ct} + \gamma_4 \Delta Inst Own \\
 & + \gamma_5 Inst Own Lag + \gamma_6 Treat_{ct} \times \Delta Inst Own + \gamma_7 Treat_{ct} \times Inst Own Lag \\
 & + \gamma_8 Treat_{ct} + \Sigma Controls + Industry FE + County FE + Quarter FE + \varepsilon_{ict}, \quad (2)
 \end{aligned}$$

where the dependent variable is a firm’s return for the next quarter. We follow Gompers and Metrick (2001) and Baik et al. (2010) and decompose the current level of institutional ownership (*Inst Own*) into the quarterly change in institutional ownership for a given firm and quarter ($\Delta Inst Own$) and institutional ownership at the end of the previous quarter (*Inst Own Lag*). The change in institutional ownership ($\Delta Inst Own$) captures an institutional information advantage because, if institutional investors are informed, then trading should be related to future stock returns; the level of lagged institutional ownership (*Inst Own Lag*) measures institutional demand.¹⁷ Equation (2) focuses on the coefficients on $Closure \times \Delta Inst Own$ and $Closure \times Inst Own Lag$. Following Lel and Miller (2015), we create *Treat*, which is equal to one for a county that ever loses a local newspaper during our sample period, and zero otherwise. By interacting $\Delta Inst Own$ and *Inst Own Lag* not

¹⁷ Gompers and Metrick (2001) provide two explanations for a positive relationship between institutional ownership (at quarter t) and subsequent stock returns (at quarter t+1); 1) institutional investors are smart in portfolio choices and 2) the overall growth in institutional holdings causes “demand shocks” in the stocks preferred by institutions (i.e., herding). Decomposing institutional ownership into its two components thus disentangles these two explanations.

only with *Closure* but also with *Treat*, γ_1 and γ_2 captures the change in investors' return predictability for firms located near a closed local newspaper, as compared to the corresponding change for those without local newspaper closure nearby.

In particular, if investors' trading ability deteriorates following the shortage of local news coverage, we expect $\hat{\gamma}_1 < 0$. However, if local news coverage merely induces uninformed holdings by drawing investors' attention to certain stocks, then the closure of local newspapers could enhance their stock-picking ability (i.e., $\hat{\gamma}_1 > 0$). In Table 6, for the total level of institutional ownership (Panel A), we find a post-closure decrease in institutional investors' return predictability as evidenced by the coefficient estimate on *Closure* $\times\Delta$ *Inst Own* ($\hat{\gamma}_1$) being negative and statistically significant (-0.058, $p < 0.10$ in column 2), which reaffirms the informational value, as opposed to the attention-grabbing effect, of local news coverage for institutional investors' portfolio decisions. Yet, when the level of lagged institutional holdings is considered in the model, we find that $\hat{\gamma}_1$ is still negative but is no longer significant at a conventional level (column 1).

Given the substantial variation in investors' ability to substitute the lost information, the effect of local newspaper closures on institutional investors' return predictability would be more pronounced for investors with a relative information disadvantage. To examine this conjecture, we rerun Equation (2) separately for institutional investors with high vs. low information advantages. Panel B (nonlocal vs. local investors) reveals that it is nonlocal institutional investors (i.e., the distance between a firm and an investor is > 100 km) that exhibit a significant reduction in their return predictability in the lack of local newspaper coverage, as evidenced by the coefficient estimate on *Closure* $\times\Delta$ *Inst Own* (> 100 km) being negative and statistically significant (-0.084, $p < 0.10$ in column 1; -0.098, $p < 0.05$ in column 2). In contrast, the coefficient estimate on *Closure* $\times\Delta$ *Inst Own* (≤ 100 km) remains not significant, suggesting that local investors are likely

to restore their lost information after the closure of a local newspaper. These results suggest that local newspaper closures further increase the information asymmetry between local and nonlocal investors. The association between the level of lagged institutional ownership (*Inst Own Lag*) and future returns exhibit no significant change around local newspaper closures. That is, local newspaper closures generate an exogenous information shock—rather than a demand shock—to institutional investors (see footnote 18). The results in Panel C are similar for the subsample analysis for hedge funds vs. non-hedge funds. Consistent with the notion that the effect of local news decreases with investor sophistication, the coefficient estimate on *Closure*× Δ *Inst Own (Non-Hedge)* is negative and significant (-0.070, $p < 0.10$ in column 1; -0.084, $p < 0.01$ in column 2), while that on *Closure*× Δ *Inst Own (Hedge)* is not significant. As such, our empirical analysis in Table 6 reaffirms that local newspapers play a significant role in keeping investors informed about local businesses.

5.4 Alternative Dependent Variable: The Number of Institutional Investors

Table 7 re-estimates Equation (1) using an alternative dependent variable: the number of institutional investors holding a certain stock. Similar to the results of the institutional ownership analysis (Tables 2 and 3), Panel A shows that after the closure of local newspapers, fewer investors own shares of firms located in a region with a loss of local news coverage, compared with firms located in a county without local newspaper closures (column 1). We find similar results for investors with a relative information disadvantage, i.e., nonlocal (column 2) or non-hedge fund investors (column 4), but mixed evidence for investors with an information advantage after the closure of local newspapers. While the number of local investors holding shares in the firms affected by local newspaper closures increases in response to the reduction in local news coverage

(column 3), that of hedge funds significantly decreases (column 5). When focusing on investors holding more than 5% of a firm's shares (*Inst Own*≥5%) in Panel B, we continue to find a significant post-closure reduction in the number of blockholders for the treatment firms compared with the control firms (columns 1, 2, and 4). There is no significant difference in differences observed in the number of local or hedge fund blockholders (columns 3 and 5). Overall, the results in Table 7 provide further empirical support for our hypothesis on the causal effect of local newspaper closures on institutional investors.

5.5 Underlying Economics and Local Newspaper Closures

We recognize the possibility that local newspaper closures and institutional investors' portfolio decisions could be jointly determined by unobservable underlying economic factors. That is, the reduction in institutional ownership documented in this study may stem from the negative outlook of institutional investors on the economic circumstances coinciding with the closure of local newspapers. Our empirical findings so far collectively suggest that local newspaper closures capture an exogenous shock to the local information environment rather than simply representing the economic situation. The reduction in institutional ownership would have been salient for investors with preferential access to information had our findings been primarily driven by investors' concerns about future firm performance. However, after the closure of local newspapers, institutional ownership by local investors (hedge funds) even increases (remains unchanged), as documented in Section 4.2.1 (4.2.2). Moreover, the trend analysis (Section 5.1) shows no significant pre-closure change in institutional ownership, which would be different if investors had reduced their holdings during the economic downturn leading to the closure of local newspapers. Overall, the cross-sectional effects also vary predictably in a way showing that investors reduce

their holdings in response to the loss of local news coverage (Section 5.2). This section further mitigates the concern that our results may be driven by unobservable underlying economic factors by directly examining the change in firm performance change around local newspaper closures (Section 5.5.1) and the expansion of Craigslist (Section 5.5.2).

5.5.1 Firm Performance Following Local Newspaper Closures

Table 8 presents a set of difference-in-differences tests that estimate Equation (1) with alternative dependent variables of firm performance. We find no systematic difference in firm performance, as measured by stock returns (*RET*), return on assets (*ROA*), sales volume (*Sales*), and loss (*Loss*), between the treatment and control firms around local newspaper closures (columns 1–4). The results even show a slight post-closure increase in operating cash flow (*CFO*) for firms headquartered in the same county as the local newspapers that closed, compared with firms in counties without local newspaper closures (column 5). As such, the overall firm performance pattern is not consistent with the view that the average reduction in institutional ownership following local newspaper closures is primarily due to underperforming firms in economically distressed regions.

5.5.2 Craigslist’s Entry and Local Newspaper Closures

This section utilizes the expansion of Craigslist as an instrument for local newspaper closures following prior studies (Gao et al. 2020; Heese et al. 2021; Sun 2021). Craigslist is a classified advertising website that was established in the San Francisco Bay Area in 1995 and has since expanded to other cities in the U.S. and other countries. Craigslist’s entry led to a reduction in advertising revenues for local newspapers, negatively affecting the visibility of the print

newspaper business model (e.g., Gurun and Butler 2012; Kroft and Pope 2014; Seamans and Zhu 2014). The expansion of Craigslist thus creates a plausible shock to the likelihood of local newspaper closures while not directly affecting institutional investments.

Table 9 reports test results of two-stage least square estimation. In the first-stage linear probability model, we regress *Closure* on *Craigslist's* entry (using a 30-mile or 60-mile radius) and the county-specific control variables defined in Equation (1).¹⁸ We find a positive association between Craigslist's entry and local newspaper closures, meeting the relevance condition. In the second-stage model, to see if Craigslist-induced local newspaper shutdown leads to a reduction in institutional holdings, we re-estimate Equation (1) by replacing *Closure* with *Fitted Closure*, the fitted value obtained from the first-stage regression. As evidenced by the coefficient estimate on *Fitted Closure* being negative and significant (columns 2 and 4), we continue to find that investors reduce their holdings following local newspaper closures, consistent with our hypothesis. Overall, these results establish a clear link between newspaper closures and institutional investors' portfolio decisions.

6. CONCLUSION

When local newspapers fail, local communities often find themselves without any news organization to care about, watch over, and report on important events including local politics and business activities. That is, local newspapers are likely to play a role in shaping the information

¹⁸ We construct *Craigslist* at the county-year level based on Craigslist entry history data retrieved from their website and the data generously shared by the authors of Gao et al. (2020). In this section, we exclude counties where Craigslist was established before 2004 to ensure that local newspaper closures did not occur prior to the expansion of Craigslist in our sample period. We also limit our sample period up to 2011 since we cannot completely retrieve the Craigslist's history between 2010 and 2016.

set available to investors. Exploring local newspaper closures across U.S. counties, we establish the causal effect of local newspapers on institutional investments. Consistent with the notion that local news coverage facilitates investors' information acquisition, our empirical analysis finds that following local newspaper closures, institutional investors reduce their holdings in firms located in the same county as the closed local newspaper, as compared to those in firms that experience no loss of local news coverage. We also show that institutional investors' reliance on local newspapers decreases with their ability to acquire and process information from alternative sources. Further analysis on the institutional investors' return predictability reaffirms that local news coverage is not merely attention-grabbing, but is value-relevant for their portfolio choices. Collectively, our study provides novel evidence on the effect of the current collapse of local news media on institutional investors, highlighting the information channel through which local newspapers help investors stay informed.

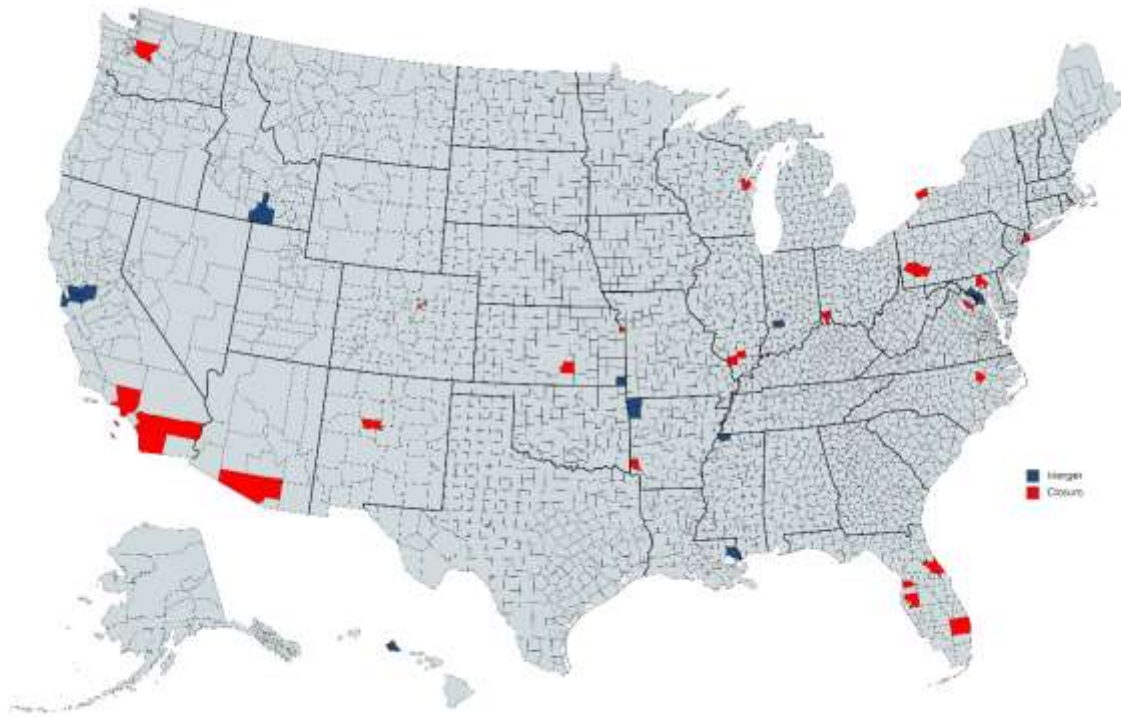
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Figure 1 U.S. Counties that Lost Local Newspapers (2004–2016)



Note: The list of local newspaper closures and mergers are obtained from the Center for Innovation and Sustainability in Local Media (CISML), the UNC Hussman School of Journalism and Media. See details in <http://newspaperownership.com/additional-material/closed-merged-newspapers-map/>.

Appendix 1 Variable Definitions

Variable	Definition
<i>Closure (Closure_Neighbor)</i>	A dummy variable equal to one for a county (and its adjacent counties) in the quarters following the closure of a local newspaper located in that county, and zero otherwise.
<i>Closure_Merger</i>	A dummy variable equal to one for a county in the quarters following the closure or merger of a local newspaper located in that county, and zero otherwise.
<i>Inst Own</i>	The number of shares of firm <i>i</i> held by institutional investors (as reported in 13F filings at the calendar quarter end), scaled by the total number of shares outstanding. We exclude institutional investors and firms with missing or ambiguous addresses, and restrict institutional holdings to between 0% and 100%.
<i>Local (Nonlocal) Ownership</i>	The number of shares of firm <i>i</i> held by institutions investors located less (more) than 100 km from the firm's headquarters, scaled by the total number of shares outstanding. The addresses of institutional investors and firms are those reported in SEC filings (Form 13F for institutional investors; Form 10-K for firms).
<i>Hedge (Non-Hedge) Fund Ownership</i>	The number of shares of firm <i>i</i> held by institutional investors in hedge (non-hedge) funds, scaled by the total number of shares outstanding. Hedge funds ("Investment Advisor/Hedge Fund") are identified by OwnTypeCode = 106 (= 106 or 113) in Thomson global ownership data.
<i>Size</i>	Logarithm of one plus market capitalization.
<i>MTB</i>	Market to book ratio as measured by PRCCQ*CSHOQ/CEQQ (Compustat).
<i>RET_{-3,0}</i>	Three-month stock return earned in the current filing quarter (i.e., return from March 31 to June 30 for a June 30 13F filing, CRSP monthly data).
<i>RET_{-12,-3}</i>	Nine-month stock return preceding the filing quarter (i.e., return from June 30 to March 31 for a June 30 13F filing in the following year).
<i>Age</i>	Firm age based on the first appearance with non-missing stock price
<i>Volatility</i>	Standard deviation of 24-month stock returns.
<i>Turnover</i>	Three-month average monthly trading volume, scaled by the total number of shares outstanding.
<i>Yield</i>	Dividends scaled by market capitalization.
<i>Price</i>	Stock price at the calendar quarter end.
<i>SP500</i>	A dummy variable equal to one if the firm is included in the S&P 500 index in a year, and zero otherwise.
<i>ΔPopulation</i>	Annual growth of county-level population. Data found on Bureau of Economic Analysis.
<i>ΔGDP</i>	Annual growth of county-level gross domestic product. Data found on Bureau of Economic Analysis.
<i>Dow Jones Coverage</i>	The number of Dow Jones news articles relating to a firm published in the current 13F filing quarter (RavenPack).
<i>#Local Newspapers</i>	The number of daily local newspapers located in a certain county at the end of 2004.
<i>Local Concentration</i>	The degree of concentration of a firm's operations in the state where it is headquartered (García and Norli 2012).

<i>Local Social Capital</i>	The number of social clubs and organizations divided by 1,000 people in the county population (Rupasingha et al. 2006). Data found in https://aese.psu.edu/nercrd/community/social-capital-resources .
<i>Consistency</i>	The consistency of a firm's accounting practice over time, as measured by Peterson et al. (2015).
<i>XBRL</i>	A dummy variable equal to one for a firm that files its 10-K with XBRL tagging, and zero otherwise following Bhattacharya et al. (2018).
<i>Ret Next</i>	One-quarter ahead stock return (i.e., June 30 to September 30 for a June 30 13F filing, CRSP monthly data).
<i>Treat</i>	A dummy variable equal to one for a county that experienced the shutdown of local newspaper during the sample period 2003-2017, and zero otherwise.

Table 1 Data Summary

	Mean	Std Dev	Q1	Median	Q3
<i>Closure</i>	0.063	0.243	0	0	0
<i>Closure_Neighbor</i>	0.162	0.461	0	0	0
<i>Closure_Merger</i>	0.082	0.274	0	0	0
<i>Inst Own</i>	0.526	0.293	0.273	0.578	0.781
<i>Inst Own (> 100 km)</i>	0.478	0.281	0.235	0.504	0.720
<i>Inst Own (\leq 100 km)</i>	0.044	0.079	0.000	0.006	0.052
<i>Inst Own (Non-Hedge)</i>	0.481	0.281	0.228	0.522	0.726
<i>Inst Own (Hedge)</i>	0.044	0.059	0.004	0.020	0.061
<i>Size</i>	6.172	1.952	4.727	6.058	7.504
<i>MTB</i>	2.787	4.669	1.168	1.894	3.315
<i>RET_{-3,0}</i>	0.032	0.243	-0.095	0.019	0.137
<i>RET_{-12,-3}</i>	0.111	0.494	-0.156	0.054	0.279
<i>Age</i>	2.626	0.877	2.079	2.708	3.258
<i>Volatility</i>	0.127	0.075	0.074	0.109	0.160
<i>Turnover</i>	0.159	0.163	0.051	0.114	0.207
<i>Yield</i>	0.011	0.020	0.000	0.000	0.016
<i>Price</i>	29.772	54.055	7.720	16.590	31.854
<i>SP500</i>	0.122	0.327	0	0	0
<i>ΔPopulation</i>	0.008	0.010	0.001	0.007	0.013
<i>ΔGDP</i>	0.041	0.042	0.019	0.043	0.066

N (firm-qtr) = 183,477.

Table 2 Institutional Ownership Following Local Newspaper Closures

This table estimates the difference-in-differences effect of local newspaper closures on institutional holdings (*Inst Own*). *Closure* (*Closure_Neighbor*) is equal to 1 for a county (and its neighboring counties) in all quarters after the closure of a local newspaper located in that county, and 0 otherwise. *Closure_Merger* is equal to one for a county in all quarters after the closure or merger of a local newspaper located in that county, and zero otherwise. Quarter and firm fixed effects are included. Standard errors are double-clustered at the county and quarter levels. All continuous variables are winsorized at the 1% and 99% levels. ***, **, and * denote significance at the 1%, 5%, and 10% levels (two-tailed), respectively.

	<i>Inst Own</i> (1)	<i>Inst Own</i> (2)	<i>Inst Own</i> (3)
<i>Closure</i>	-0.021** (-2.33)		
<i>Closure_Neighbor</i>		-0.011*** (-2.68)	
<i>Closure_Merger</i>			-0.017** (-2.01)
<i>Size</i>	0.085*** (27.22)	0.085*** (27.22)	0.085*** (28.36)
<i>MTB</i>	-0.001*** (-4.12)	-0.001*** (-4.13)	-0.001*** (-4.62)
<i>RET</i> _{-3,0}	-0.046*** (-10.60)	-0.046*** (-10.62)	-0.046*** (-17.15)
<i>RET</i> _{-12,-3}	-0.015*** (-6.04)	-0.015*** (-6.07)	-0.015*** (-8.41)
<i>Age</i>	0.051*** (9.14)	0.051*** (9.16)	0.051*** (9.61)
<i>Volatility</i>	-0.153*** (-5.92)	-0.153*** (-5.95)	-0.153*** (-6.34)
<i>Turnover</i>	0.120*** (11.08)	0.120*** (11.08)	0.120*** (15.56)
<i>Yield</i>	-0.181*** (-2.70)	-0.180*** (-2.70)	-0.182*** (-2.96)
<i>Price</i>	-0.000 (-1.41)	-0.000 (-1.40)	-0.000** (-2.06)
<i>SP500</i>	-0.088*** (-6.65)	-0.088*** (-6.66)	-0.087*** (-7.06)
Δ <i>Population</i>	-0.558*** (-3.08)	-0.581*** (-3.24)	-0.556*** (-3.10)
Δ <i>GDP</i>	-0.022 (-0.82)	-0.024 (-0.88)	-0.021 (-0.99)
<i>Constant</i>	-0.123*** (-5.76)	-0.122*** (-5.75)	-0.123*** (-5.82)
N (firm-qtr)	183,477	183,477	183,477
Adj. R ²	0.843	0.843	0.843

Table 3 Institutional Ownership Types and Local Newspaper Closures

This table examines the extent to which the effect of local newspaper closures on institutional ownership (*Inst Own*) varies with institutional investor characteristics; geographic distance (Panel A) and investor sophistication (Panel B). Quarter and firm fixed effects are included. Standard errors are double-clustered at the county and quarter levels. All continuous variables are winsorized at the 1% and 99% levels. ***, **, and * denote significance at the 1%, 5%, and 10% levels (two-tailed), respectively.

Panel A. Geographic Distance between Firms and Institutional Investors

	Proximity		Same County	
	> 100 km <i>Inst Own</i> (1)	≤ 100 km <i>Inst Own</i> (2)	No <i>Inst Own</i> (3)	Yes <i>Inst Own</i> (4)
<i>Closure</i>	-0.032** (-2.45)	0.011* (1.67)	-0.035*** (-2.58)	0.013** (2.10)
<i>Size</i>	0.078*** (24.10)	0.006*** (4.53)	0.083*** (24.68)	0.001** (2.35)
<i>MTB</i>	-0.001*** (-3.87)	-0.000 (-0.76)	-0.001*** (-4.19)	0.000 (0.51)
<i>RET</i> _{-3,0}	-0.043*** (-10.35)	-0.004*** (-3.92)	-0.046*** (-10.54)	-0.001* (-1.85)
<i>RET</i> _{-12,-3}	-0.014*** (-5.76)	-0.002*** (-3.54)	-0.015*** (-5.92)	-0.001** (-2.23)
<i>Age</i>	0.052*** (9.57)	-0.001 (-0.46)	0.050*** (9.30)	0.000 (0.27)
<i>Volatility</i>	-0.150*** (-5.71)	-0.001 (-0.17)	-0.149*** (-5.68)	-0.002 (-0.65)
<i>Turnover</i>	0.110*** (10.50)	0.009*** (2.84)	0.118*** (10.93)	0.001 (0.70)
<i>Yield</i>	-0.151** (-2.17)	-0.032* (-1.95)	-0.178*** (-2.63)	-0.008 (-0.88)
<i>Price</i>	-0.000 (-1.41)	-0.000 (-0.08)	-0.000 (-1.24)	-0.000 (-0.87)
<i>SP500</i>	-0.078*** (-5.58)	-0.008** (-2.20)	-0.085*** (-6.14)	-0.001 (-0.32)
Δ <i>Population</i>	-0.063 (-0.33)	-0.510*** (-5.35)	-0.396** (-2.02)	-0.162** (-2.42)
Δ <i>GDP</i>	-0.048 (-1.25)	0.023 (0.91)	-0.050 (-1.36)	0.024 (1.25)
<i>Constant</i>	-0.134*** (-6.63)	0.008 (0.97)	-0.131*** (-5.91)	0.007** (2.26)
N (firm-qtr)	183,477	183,477	183,477	183,477
Adj. R ²	0.843	0.801	0.843	0.798

Panel B. Investor Sophistication

	Hedge Funds		Investment Advisors/Hedge Funds	
	No <i>Inst Own</i> (1)	Yes <i>Inst Own</i> (2)	No <i>Inst Own</i> (3)	Yes <i>Inst Own</i> (4)
<i>Closure</i>	-0.022*** (-2.71)	0.001 (0.49)	-0.017** (-2.49)	-0.004 (-1.05)
<i>Size</i>	0.085*** (29.89)	-0.000 (-0.37)	0.064*** (25.33)	0.020*** (9.65)
<i>MTB</i>	-0.001*** (-5.14)	0.000 (0.13)	-0.000*** (-2.94)	-0.000*** (-3.25)
<i>RET_{-3,0}</i>	-0.049*** (-11.97)	0.003** (2.52)	-0.038*** (-11.70)	-0.008*** (-3.58)
<i>RET_{-12,-3}</i>	-0.016*** (-6.57)	0.001 (0.97)	-0.013*** (-6.69)	-0.002 (-1.50)
<i>Age</i>	0.050*** (8.96)	0.003 (1.18)	0.036*** (8.46)	0.015*** (4.61)
<i>Volatility</i>	-0.148*** (-6.45)	-0.008 (-1.05)	-0.083*** (-5.30)	-0.071*** (-4.22)
<i>Turnover</i>	0.094*** (9.20)	0.026*** (7.78)	0.074*** (8.00)	0.047*** (7.88)
<i>Yield</i>	-0.028 (-0.48)	-0.148*** (-7.00)	-0.089* (-1.78)	-0.100*** (-2.78)
<i>Price</i>	-0.000 (-0.94)	-0.000** (-2.45)	-0.000** (-2.54)	0.000 (0.74)
<i>SP500</i>	-0.074*** (-5.53)	-0.014*** (-5.68)	-0.058*** (-5.95)	-0.029*** (-5.05)
<i>ΔPopulation</i>	-0.598*** (-3.61)	0.022 (0.35)	-0.499*** (-3.72)	-0.057 (-0.48)
<i>ΔGDP</i>	-0.028 (-1.07)	0.006 (0.53)	-0.027 (-1.12)	0.005 (0.29)
<i>Constant</i>	-0.146*** (-6.30)	0.041*** (5.11)	-0.097*** (-5.85)	-0.027* (-1.80)
N (firm-qtr)	183,477	183,477	183,477	183,477
Adj. R ²	0.847	0.592	0.814	0.750

Table 4 Trend Analysis

This table reports the trend analysis results for the impact of local newspaper closures on institutional holdings (*Inst Own*). *Closure_{-3,...}*, *Closure₄*, *Closure₅₊* are dummy variables set to one for the denoted period (in quarters) relative to local newspaper closures, and zero otherwise. The control variables are not tabulated for brevity. Quarter and firm fixed effects are included. Standard errors are double-clustered at the county and quarter levels. All continuous variables are winsorized at the 1% and 99% levels. ***, **, and * denote significance at the 1%, 5%, and 10% levels (two-tailed), respectively.

	<i>Inst Own</i>	Proximity		Hedge Funds	
		> 100 km	≤ 100 km	No	Yes
	<i>Inst Own</i>	<i>Inst Own</i>	<i>Inst Own</i>	<i>Inst Own</i>	<i>Inst Own</i>
	(1)	(2)	(3)	(4)	(5)
<i>Closure₋₃</i>	-0.004 (-0.76)	-0.011 (-1.09)	0.007 (0.92)	-0.002 (-0.64)	-0.002 (-0.72)
<i>Closure₋₂</i>	-0.008 (-1.18)	-0.017 (-1.29)	0.008 (1.03)	-0.005 (-0.93)	-0.003 (-0.94)
<i>Closure₋₁</i>	-0.010 (-1.48)	-0.018 (-1.46)	0.008 (1.00)	-0.007 (-1.47)	-0.002 (-0.56)
<i>Closure₀</i>	-0.018*** (-2.93)	-0.020** (-2.28)	0.002 (0.51)	-0.014*** (-3.48)	-0.004 (-0.76)
<i>Closure₁</i>	-0.014* (-1.83)	-0.017* (-1.96)	0.003 (0.64)	-0.013** (-2.03)	-0.001 (-0.31)
<i>Closure₂</i>	-0.019*** (-3.04)	-0.020*** (-2.72)	0.000 (0.04)	-0.018*** (-3.92)	-0.001 (-0.22)
<i>Closure₃</i>	-0.017*** (-2.73)	-0.017** (-2.37)	0.000 (0.10)	-0.017*** (-3.21)	-0.001 (-0.31)
<i>Closure₄</i>	-0.013** (-2.08)	-0.015* (-1.91)	0.002 (0.57)	-0.014*** (-2.89)	-0.000 (-0.01)
<i>Closure₅₊</i>	-0.025** (-2.12)	-0.040** (-2.29)	0.015* (1.77)	-0.026** (-2.43)	0.001 (0.38)
N (firm-qtr)	183,477	183,477	183,477	183,477	183,477
Adj. R ²	0.843	0.843	0.802	0.847	0.592

Table 5 Cross-Sectional Effects: Information Asymmetry

This table presents subsample analyses to explore cross-sectional variations in the impact of local newspaper closures on institutional holdings. *Firm Age* is the number of years since a firm's first appearance in Compustat. *SP500* is an indicator variable for S&P 500 membership in a given year. *Local Concentration* is the degree of a firm's operation concentration in its headquartered state (García and Norli 2012). *Dow Jones Newswires* are the number of firm-specific Dow Jones news articles. *#Local Newspapers* is the number of local newspapers located in a county as of 2004. *Local Social Ties* is defined as the number of social clubs divided by 1,000 people in the county population (Rupasingha et al. 2006). *Consistency* is a firm's time-series accounting consistency, gleaned from its 10-K filings (Peterson et al. 2015). *Special Items* are the absolute value of special items, scaled by total assets. *XBRL* is equal to one if a firm's prior-year 10-K is XBRL-tagged, and zero otherwise. Control variables are not tabulated for brevity. Quarter and firm fixed are included. Standard errors are double-clustered at the county and quarter levels. All continuous variables are winsorized at the 1% and 99% levels. ***, **, and * denote significance at the 1%, 5%, and 10% levels (two-tailed), respectively.

Panel A. Firm Characteristics

	<i>Firm Age</i>		<i>SP500</i>		<i>Local Concentration</i>	
	Low	High	No	Yes	Low	High
	(1)	(2)	(3)	(4)	(5)	(6)
	<i>Inst Own</i>	<i>Inst Own</i>	<i>Inst Own</i>	<i>Inst Own</i>	<i>Inst Own</i>	<i>Inst Own</i>
<i>Closure</i>	-0.038*** (-3.60)	-0.007 (-0.72)	-0.020** (-2.57)	-0.007 (-0.53)	-0.025* (-1.74)	-0.051*** (-3.93)
N (firm-qtr)	89,340	94,137	161,146	22,331	30,004	29,825
Adj. R ²	0.845	0.853	0.852	0.643	0.835	0.859

Panel B. Communication

	<i>Dow Jones Newswires</i>		<i>#Local Newspapers</i>		<i>Local Social Capital</i>	
	Low	High	Low	High	Low	High
	(1)	(2)	(3)	(4)	(5)	(6)
	<i>Inst Own</i>	<i>Inst Own</i>	<i>Inst Own</i>	<i>Inst Own</i>	<i>Inst Own</i>	<i>Inst Own</i>
<i>Closure</i>	-0.033*** (-2.84)	-0.016* (-1.81)	-0.031** (-2.36)	-0.009 (-0.78)	-0.002 (-0.15)	-0.037*** (-4.16)
N (firm-qtr)	90,986	92,491	99,673	83,804	91,469	91,569
Adj. R ²	0.794	0.843	0.850	0.840	0.844	0.853

Panel C. Financial Reporting

	<i>Consistency</i>		<i>Special Items</i>		<i>XBRL</i>	
	Low	High	Low	High	No	Yes
	(1)	(2)	(3)	(4)	(5)	(6)
	<i>Inst Own</i>	<i>Inst Own</i>	<i>Inst Own</i>	<i>Inst Own</i>	<i>Inst Own</i>	<i>Inst Own</i>
<i>Closure</i>	-0.063*** (-4.52)	-0.058 (-1.35)	-0.008 (-0.56)	-0.023** (-2.49)	-0.014* (-1.92)	-0.008 (-0.88)
N (firm-qtr)	10,708	10,731	38,111	38,173	97,045	21,838
Adj. R ²	0.855	0.866	0.790	0.799	0.901	0.940

Table 6 Return Predictability and Local Newspaper Closures

This table examines the impact of local newspaper closures on institutional investors' return predictability. The dependent variable is a firm's return in the next quarter (*Ret Next*). $\Delta Inst Own$ is the quarterly change in institutional holdings. *Inst Own Lag* is institutional holdings at the previous quarter end. *Closure* is a dummy variable equal to one for a county in quarters following the closure of a local newspaper located in that county, and zero otherwise. Similar to Lel and Miller (2015), we include *Treat* (a dummy variable equal to one for counties experienced local newspaper closures, and zero otherwise) and its interactions with $\Delta Inst Own$ and *Inst Own Lag*, respectively (untabulated). Control variables are not tabulated for brevity. Quarter, industry, and county fixed effects are included. Standard errors are double-clustered at the county and quarter levels. All continuous variables are winsorized at the 1% and 99% levels. ***, **, and * denote significance at the 1%, 5%, and 10% levels (two-tailed), respectively.

Panel A. Total Level of Institutional Ownership

	(1)	(2)
	<i>Ret Next</i>	<i>Ret Next</i>
<i>Closure</i> × $\Delta Inst Own$	-0.045 (-1.15)	-0.058* (-1.71)
<i>Closure</i> × <i>Inst Own Lag</i>	0.021 (1.59)	
$\Delta Inst Own$	-0.009 (-0.23)	-0.029 (-0.71)
<i>Inst Own Lag</i>	0.032*** (3.05)	
<i>Closure</i>	-0.008 (-0.88)	0.003 (0.56)
N (firm-qtr)	178,967	178,967
Adj. R ²	0.183	0.183

Panel B. Firm–Institution Proximity

	(1)	(2)
	<i>Ret Next</i>	<i>Ret Next</i>
<i>Closure</i> × <i>ΔInst Own</i> (> 100 km)	-0.084*	-0.098**
	(-1.72)	(-2.18)
<i>Closure</i> × <i>ΔInst Own</i> (≤ 100 km)	0.032	0.002
	(0.16)	(0.01)
<i>Closure</i> × <i>Inst Own Lag</i> (> 100 km)	0.018	
	(1.26)	
<i>Closure</i> × <i>Inst Own Lag</i> (≤ 100 km)	0.049	
	(1.60)	
<i>ΔInst Own</i> (> 100 km)	-0.009	-0.008
	(-0.23)	(-0.21)
<i>ΔInst Own</i> (≤ 100 km)	0.028	0.028
	(0.54)	(0.57)
<i>Inst Own Lag</i> (> 100 km)	0.031***	0.032***
	(2.83)	(2.98)
<i>Inst Own Lag</i> (≤ 100 km)	0.044***	0.045***
	(2.81)	(3.09)
<i>Closure</i>	-0.009	0.003
	(-0.91)	(0.63)
N (firm-qtr)	178,967	178,967
Adj. R ²	0.183	0.183

Panel C. Hedge vs. Non-Hedge Funds

	(1)	(2)
	<i>Ret Next</i>	<i>Ret Next</i>
<i>Closure</i> × <i>ΔInst Own</i> (Non-Hedge)	-0.070*	-0.084***
	(-1.89)	(-2.58)
<i>Closure</i> × <i>ΔInst Own</i> (Hedge)	0.045	0.035
	(0.33)	(0.23)
<i>Closure</i> × <i>Inst Own Lag</i> (Non-Hedge)	0.020	
	(1.36)	
<i>Closure</i> × <i>Inst Own Lag</i> (Hedge)	0.011	
	(0.21)	
<i>ΔInst Own</i> (Non-Hedge)	-0.053	-0.052
	(-1.34)	(-1.32)
<i>ΔInst Own</i> (Hedge)	0.400***	0.400***
	(6.92)	(6.95)
<i>Inst Own Lag</i> (Non-Hedge)	0.027***	0.028***
	(2.59)	(2.68)
<i>Inst Own Lag</i> (Hedge)	0.089***	0.090***
	(3.25)	(3.57)
<i>Closure</i>	-0.007	0.003
	(-0.74)	(0.53)
N (firm-qtr)	178,967	178,967
Adj. R ²	0.184	0.184

Table 7 Alternative Dependent Variable: The Number of Institutional Investors

This table estimates the difference-in-differences effect of local newspaper closures on the number of institutional investors holding shares in the firms affected by local newspaper closures. In Panel A (Panel B), *#Investors* (*#Blockholders*) is the number of institutional investors who file 13F reports with non-zero (more than 5%) ownership for a given firm and quarter. Quarter and firm fixed effects are included. Standard errors are double-clustered at the county and quarter levels. All continuous variables are winsorized at the 1% and 99% levels. ***, **, and * denote significance at the 1%, 5%, and 10% levels (two-tailed), respectively.

Panel A. Investors with Non-Zero Ownership

	<i>#Investors</i>	Proximity		Hedge Funds	
		> 100 km	≤ 100 km	No	Yes
	<i>#Investors</i>	<i>#Investors</i>	<i>#Investors</i>	<i>#Investors</i>	<i>#Investors</i>
	(1)	(2)	(3)	(4)	(5)
<i>Closure</i>	-0.079*** (-3.42)	-0.090*** (-3.83)	0.072*** (2.89)	-0.077*** (-3.51)	-0.056** (-2.16)
N (firm-qtr)	183,477	183,477	183,477	183,477	183,477
Adj. R ²	0.894	0.896	0.891	0.897	0.815

Panel B. Investors with 5% Ownership or More

	<i>#Blockholders</i>	Proximity		Hedge Funds	
		> 100 km	≤ 100 km	No	Yes
	<i>#Blockholders</i>	<i>#Blockholders</i>	<i>#Blockholders</i>	<i>#Blockholders</i>	<i>#Blockholders</i>
	(1)	(2)	(3)	(4)	(5)
<i>Closure</i>	-0.033** (-2.54)	-0.056** (-2.56)	0.041 (1.13)	-0.031** (-2.22)	-0.005 (-0.65)
N (firm-qtr)	183,477	183,477	183,477	183,477	183,477
Adj. R ²	0.639	0.637	0.561	0.643	0.455

Table 8 Firm Performance Following Local Newspaper Closures

This table examines the effect of local newspaper closures on firm performance. *RET* is quarterly stock returns. *ROA* is income before extraordinary items scaled by total assets. *Sales* is total revenues. *Loss* is equal to one if income before extraordinary items is negative, and zero otherwise. *CFO* is operating cash flows scaled by total assets. Control variables (identified in Table 2) are not tabulated for brevity. Quarter and firm fixed effects are included. Standard errors are double-clustered at the county and quarter levels. All continuous variables are winsorized at the 1% and 99% levels. ***, **, and * denote significance at the 1%, 5%, and 10% levels (two-tailed), respectively.

	<i>RET</i>	<i>ROA</i>	<i>Sales</i>	<i>Loss</i>	<i>CFO</i>
	(1)	(2)	(3)	(4)	(5)
<i>Closure</i>	-0.000 (-0.38)	0.000 (0.27)	29.810 (0.30)	0.005 (0.55)	0.005* (1.76)
N (firm-qtr)	183,476	183,320	183,299	183,477	182,510
Adj. R ²	0.884	0.581	0.898	0.493	0.606

Table 9 Craigslist Entry and Local Newspaper Closures

This table estimates the effect of local newspaper closures on institutional holdings (*Inst Own*) through the Craigslist entry channel. In the 1st-stage OLS (columns 1 and 3), *Closure* is regressed on *Craigslist* and county-level control variables (quarter, state, and industry-year fixed effects are included). *Craigslist* is equal to one if a county is located within a 30-mile (or 60-mile) radius of the Craigslist entry point, and zero otherwise. In the 2nd-stage OLS (columns 2 and 4), *Inst Own* is regressed on the fitted value from the 1st-stage estimation (*Fitted Closure*) and control variables identified in Table 2 (quarter and firm fixed effects are included). Control variables are not tabulated for brevity. Standard errors are double-clustered at the county and quarter levels. All continuous variables are winsorized at the 1% and 99% levels. ***, **, and * denote significance at the 1%, 5%, and 10% levels (two-tailed), respectively.

Distance from Craigslist Entry	≤ 60 Miles		≤ 30 Miles	
	1 st stage <i>Closure</i> (1)	2 nd -stage <i>Inst Own</i> (2)	1 st -stage <i>Closure</i> (3)	2 nd -stage <i>Inst Own</i> (4)
<i>Craigslist</i>	0.005* (1.73)		0.004 (1.54)	
<i>Fitted Closure</i>		-1.321* (-1.81)		-2.144* (-2.03)
N (firm-qtr)	50,422	50,422	42,224	42,224
Adj. R ²	0.116	0.923	0.107	0.927