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The wisdom of crowds and the market's response to earnings news: Evidence using the geographic dispersion of investors



Jason V. Chen ^{*}

University of Illinois at Chicago, USA

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ABSTRACT

The wisdom of crowds suggests that groups with more diversely informed individuals reach more informed decisions because their members are collectively more knowledgeable. I study this idea in the context of the market's response to earnings announcements by examining how information diversity across investors affects the efficiency of the price response to earnings news. I measure investors' information diversity based on their geographic dispersion, which I estimate using the locations of the requests for firms' filings to EDGAR. Greater geographic dispersion is associated with greater trading during the announcement period; this supports the use of geographic dispersion as a measure of information diversity. Consistent with my predictions, the price response to a firm's earnings news is more efficient when the firm's investors have greater information diversity. In further analysis, I find that the initial heightened trading for firms with more diversely informed investors subsides quickly after the announcement period.

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^{*} E-mail address: jchen19@uic.edu.

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1. Introduction

The concept that investors possess diverse information is a fundamental aspect of financial markets (Beaver, 1997). However, while theoretical and anecdotal arguments have been made that information diversity affects the efficiency of the market's response to earnings news, empirical evidence consistent with these arguments is limited, potentially due to the difficulty of measuring investors' information diversity. This study fills this gap in the literature and advances knowledge of the implications of information diversity on the efficiency of the price response to earnings news.

The wisdom of crowds (Hong and Page, 2001; Surowiecki, 2004) suggests that diversely informed groups reach more informed decisions because their members are collectively more knowledgeable than groups with less diversely informed individuals (Watson et al., 1993). Groups are more diversely informed when more of their members possess information that is different from others in the group. In the context of the market's response to earnings announcements, research suggests that the price response to earnings news is relatively more efficient when investors are more diversely informed (Kim and Verrecchia, 1994). However, other theoretical studies suggest that information diversity among investors can result in price drifts (Allen et al., 2006; Hong and Stein, 2007; Banerjee et al., 2009). The net effect of information diversity on the efficiency of the price response to earnings news is therefore unclear *ex ante*, and my study provides evidence on this empirical question.¹

I exploit dispersion (i.e., variation) in investors' geographic locations to measure investors' information diversity. Dispersion in geographic locations is likely associated with information diversity because investors in different locations have access to different local information sources (Grinblatt and Keloharju, 2001; Brown et al., 2005; Hong et al., 2005). Constraints on attention and other resources inhibit local investors from acquiring information from nonlocal sources (Hirshleifer and Teoh, 2003), and acquiring nonlocal information is costly, even for sophisticated market participants (Coval and Moskowitz, 2001; Giroud, 2013).

I measure the geographic dispersion of a firm's investors as the variation in the locations of requests for the firms' filings to the SEC EDGAR system. Studies suggest that the requests for firms' filings to EDGAR correspond with their investor base, as the number of requests has explanatory power for the response to their earnings news (Drake et al., 2015, 2020). Consistent with this conclusion, I find that these requests are more likely to come from areas with more significant financial activity (e.g., Manhattan), and their geographic distribution comports with estimates of worldwide investment in the U.S. I strengthen the ability of my measure to capture the diversity of relevant information across investors by using only requests that originate from locations likely of importance to a firm and/or its industry; I identify such locations from the firm's 10-K filing and the 10-Ks of other firms in its industry (Addoum et al., 2015). I calculate the geographic dispersion of requests over the year prior to each earnings announcement as the sum of the variances of their locations' latitudes and longitudes; greater values of this measure indicate greater geographic dispersion.² My data set covers the period from January 1st, 2006, to March 31st, 2016.

To assess the construct validity of my measure of investors' information diversity, I first test the association between the geographic dispersion of requests and trading during the announcement period. Prior research generally indicates that having more diversely informed investors is associated with increased trading in response to earnings announcements (Harris and Raviv, 1993; Kandel and Pearson, 1995). Kim and Verrecchia (1994) suggest that this is because greater information diversity means that more investors can learn different things from processing earnings news, which increases investors' incentives to process this news and leads to increased trading. I find that firms with greater geographic dispersion of requests have higher abnormal share turnover during the announcement period; this result is consistent with greater information diversity leading to increased trading and supports the use of greater geographic dispersion of requests as a measure of greater information diversity across firms' investors.

To test whether greater information diversity is associated with a more efficient price response to earnings news, I examine the associations between the geographic dispersion of the requests and (1) the overall magnitude of the price response during the announcement period; (2) the earnings response coefficient (the relation between unexpected earnings and the price response during the announcement period, hereafter ERC); (3) post-earnings announcement drift (hereafter PEAD); and (4) intra-period timeliness (hereafter IPT) (Bushman et al., 2010; Twedt, 2016; Blankespoor et al., 2018). For these four tests, I find that the firms with greater geographic dispersion of requests have (1) a greater overall magnitude price response during the announcement period, (2) a higher ERC, (3) an attenuated PEAD with no evidence of a reversal in the price response, and (4) greater IPT. These findings suggest a stronger and more complete price response to earnings news during the announcement period, which indicates that the price response to earnings news is more efficient for firms with more diversely informed investors. This is consistent with greater information diversity increasing the informedness of the price response during the announcement period, outweighing its potential impact on price drifts.

In an additional analysis, I examine whether the initial heightened trading for firms with more diversely informed investors subsides quickly after the announcement period. Given that greater information diversity is associated with increased trading during the announcement period and a more efficient price response (as my results indicate), I expect that such trading peak then subsides more quickly for firms with greater information diversity (Holthausen and Verrecchia, 1990; Kim

¹ Following prior research, I define an efficient price response to earnings news as one that is both complete and timely (Ball, 1992; Drake et al., 2015).

² For brevity, I refer to the geographic dispersion of requests that originate from near locations of importance to the firm as the geographic dispersion of requests.

and Verrecchia, 1994). To test this, I compare the relative trading volume in the three-day window around firms' quarterly earnings announcements to the volume over a given number of days after the earnings announcement (Barth et al., 2020). For firms with greater dispersion of requests, I find that relatively more trading occurs during the announcement period and less occurs in the days after the earnings announcement. Consistent with expectations, this result suggests that the heightened announcement period trading does indeed subside more quickly.

My findings are robust to a battery of additional tests and specifications. First, I use propensity score matching (PSM) to control for covariates potentially associated with the geographic dispersion of requests and/or the response to earnings news. My results are robust to using this methodology, which provides additional evidence that the findings are not driven by differences in such factors between high and low dispersion firms. Second, I account for the possibility that some filings requests may come not from investors but rather from individuals working for data aggregators, particularly in India (A major aggregator based in the U.S. confirmed that some of their data sets are collected through their operations in India.). After removing all requests from India from the sample and recomputing the geographic dispersion of requests measure, I find that the results (untabulated) are not materially affected. Finally, my results are also robust to using alternative screens that eliminate automated requests to EDGAR, alternative specifications for identifying locations with relevant local information sources (see Section 3.3. For further details), and value-weighted returns tests.

This study contributes to the literature in several ways. First, it adds to the literature on how investors' information shapes their responses to public signals—specifically, how information heterogeneity among investors affects the market's response to earnings news (Kandel and Pearson, 1995). An obstacle in this literature is finding plausible archival settings in which investors possess diverse information. By providing empirical evidence of an association between information diversity and the response to earnings news, this study complements a stream of theoretical research showing that investor information diversity affects price formation and the response to public signals (Kim and Verrecchia, 1994; Hong and Stein, 2007; Banerjee et al., 2009).

Next, research that explores the effects of the locations of investors has mostly focused on investors' distance from a firm's headquarters and its effects on (1) trading profits (e.g., Coval and Moskowitz, 2001; Grinblatt and Keloharju, 2001; Feng and Seasholes, 2004) and (2) the response to firms' announcements (e.g., Chi and Shanthikumar, 2017). Investors' distance from a firm's headquarters describes their average distance from a specific location, which is a first moment construct, and geographic dispersion describes the variance in investors' locations, a second moment construct.³ Geographic dispersion has an incremental association relative to investors' distance from firm headquarters with the response to earnings news, which extends the understanding of the role of investors' geographic locations by providing evidence that geographic dispersion is a distinct yet important aspect of investors' locations.

Lastly, this study contributes to research exploring market participants' use of EDGAR and studies that use EDGAR in their research design. Prior research shows that substantial variation exists in the number of requests for firms' filings across time and firms (Drake et al., 2015, 2016, 2020; Lee et al., 2015; Neilson, 2022). My study deepens the understanding of EDGAR users by highlighting variations in their locations, which future studies can exploit for other research questions.

2. Hypothesis development

The wisdom of crowds suggests that groups with more diversely informed individuals reach more informed decisions because their members are collectively more knowledgeable. Following this intuition, the completeness of the price response to earnings news likely depends not only on whether investors process the earnings news (e.g., Hirshleifer and Teoh, 2003; Dellavigna and Pollet, 2009) but also on the diversity of the information that investors possess (Harris and Raviv, 1993; Coval and Moskowitz, 2001; Giroud, 2013).^{4,5} That is, when investors possess a greater diversity of information, leading to collectively greater information across investors, the market's response to earnings news will be more complete.

However, while the response will be more complete, it is unclear whether it will be timely. This distinction is important because both completeness and timeliness are necessary elements of a more efficient response. The wisdom of crowds generally acknowledges that diversity is not costless and that these costs can lead to coordination problems among diverse individuals: "As we've seen, diversity is essential to good decision making. But diversity can also make solving coordination problems harder" (Surowiecki, 2004, p. 153). Therefore, the response to earnings news may not be timely when greater diversity exists, as it could take more time to overcome these greater costs associated with having more diversity.

Kim and Verrecchia (1994) (hereafter KV) analytically model the impact of diversely informed investors on the price response to earnings news. They describe a world in which traders can possess a diverse signal, at a cost, that informs their trading on earnings news; once this trading is complete, the true cash flows of the firm for the period are revealed. The equilibrium documented in their study suggests that greater information diversity is associated with a relatively more

³ All analyses in this study control for investors' distance from firms' headquarters.

⁴ In their analysis of problem solving by diverse individuals, Hong and Page (2001) broadly echo this sentiment in the following quote: "If all people encoded and solved problems identically, multiple heads would be no better than one" (p. 130); this idea is the basis of the wisdom of crowds (Surowiecki, 2004).

⁵ The information that investors utilize when evaluating earnings news can affect their assessments of this news directly (e.g., Kim and Verrecchia, 1994) and/or indirectly through its impact on how this news is incorporated (e.g., Harris and Raviv, 1993; Bamber et al., 1999).

efficient price response to earnings announcements. This outcome stems from their initial finding that greater information diversity leads to more investors processing earnings news during the announcement period: Greater ex ante information diversity allows more investors to learn different things when processing earnings news, which increases diversely informed investors' incentive to process this news.

Building on this result, KV indicate that greater information diversity leads to investors' net demand for firms' shares (in response to earnings news) constituting a more informed response; this is in line with the general intuition from the wisdom of crowds. This would lead to a greater overall magnitude price response in the announcement period (KV Proposition 3). Moreover, since prior research indicates that earnings news reasonably reflects firms' future profitability (Ball and Brown, 1968), greater information diversity could also manifest in a stronger relation between the announcement period price response and earnings news (i.e., higher ERC).^{6,7} Consequently, if greater information diversity leads to a more informed price response to earnings news during the announcement period (KV Proposition 4), this suggests that earnings news is incorporated in price more efficiently overall, i.e., a more timely and complete price response. Therefore, greater information diversity could also manifest in a lower relation between earnings news and post-announcement returns (i.e., lower PEAD and no reversal in price) and a greater portion of the price response occurring during the announcement period (i.e., greater IPT).

Other studies, however, suggest that greater information diversity can result in greater price drifts, impairing the efficiency of the price response to earnings news. Keynes (1936) highlights the importance of higher-order beliefs in understanding financial markets: Investors' behavior is determined not only by their beliefs about assets' future payoffs but also by their beliefs about other investors' beliefs, and so on. Motivated by this insight, Allen et al. (2006) and Banerjee et al. (2009) illustrate how the higher-order beliefs of diversely informed investors can lead to price drifts. Based on a behavioral argument that investors are bounded rationally, Hong and Stein (1999) suggest that information can diffuse gradually among investors who are diversely informed, resulting in short-term underreactions and price drifts.

These studies suggest that the relation between information diversity and the efficiency of the price response to earnings news depends on the net impact of information diversity on the completeness of the announcement period price response and on delaying the price response, i.e., price drifts. Since the net effect of information diversity on the efficiency of the price response is unclear ex ante, I state my prediction in the null form as follows.

H1 - There is no association between the diversity of information possessed across investors and the efficiency of the price response to earnings news.

3. Investor locations and information diversity

3.1. Investors' location diversity as a proxy for information diversity

KV describe diverse information as a costly signal that informs investors trading on earnings news available to any trader willing to purchase it. Two facets of this theoretical description are important in terms of how they relate to investors' locations. The first is that the costly nature of information acquisition is a central reason why information diversity exists in their model. (If there were no costs, then every investor would be fully informed.) Similarly, in my setting, the costliness of nonlocal information acquisition is a key component driving variation in the diversity of information across investors.

The second important facet of KV's description is how the costly signal helps inform investors trading on earnings announcements. Their model describes earnings announcements as containing a true earnings news component and an error component. The costly signal available to investors allows them to have a different relevant interpretation of earnings, which reduces the impact of the error component in their interpretation of this news. Correspondingly, if the information investors gather from local sources allows them to have a different relevant interpretation of earnings news, this would reduce the impact of the error component of earnings news in their interpretation. As I will discuss in further detail in Section 3.3, I focus my sample on locations more likely to have relevant local information sources.

3.2. Data preparation

To estimate the locations of a firm's investors, I use the locations of the requests for their filings to the EDGAR filing system. The EDGAR system, which was phased in by the SEC over the three years ending May 6th, 1996, provides an electronic method for public companies to submit their filings to the SEC. It also provides a comprehensive repository of all public companies' filings, which the public can freely access via the internet. The web server log files for EDGAR are provided by the SEC through

⁶ Related studies examine the effect of greater precision of earnings news signals on the ERC (Holthausen and Verrecchia, 1988; Kim and Verrecchia, 1991). Broadly speaking, the intuition from these studies is similar to the intuition proposed here: The greater the market's understanding of what earnings news implies about firm value, the stronger the price response to that news.

⁷ Prior research finds that having more (informed) investors processing earnings news is associated with a higher ERC (Bartov et al., 2000; Drake et al., 2014).

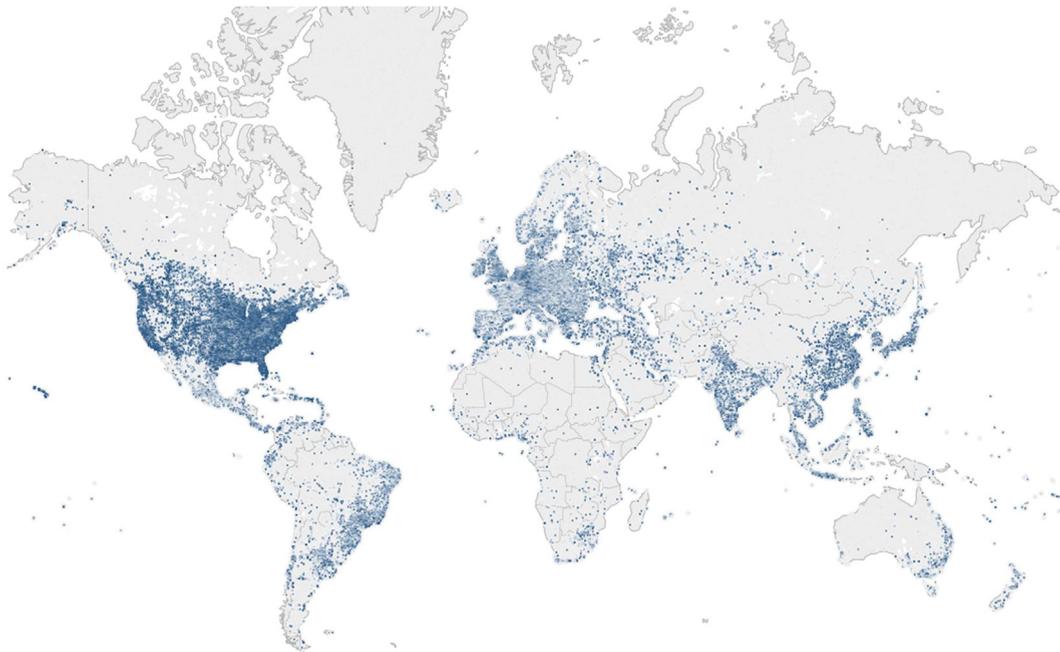


Fig. 1. Locations of the Requests for Firms Filings to EDGAR World-Wide Between 2006 and 2016. This figure presents the locations of requests for firms' filings to the EDGAR filing system worldwide between January 1st, 2006, and March 31st, 2016. The figure is constructed using approximately 1.16 billion requests. The relative darkness of each point's color indicates the relative number of requests originating from the estimated latitude and longitude point. Approximately 78% of all requests are from the United States. (For interpretation of the references to color in this figure legend, the reader is referred to the Web version of this article.)

its website.⁸ I use log files covering the period from January 1st, 2006, to March 31st, 2016, containing data for approximately 16.18 billion requests to EDGAR.^{9,10}

I remove requests that are likely from automated programs because this study focuses on investors and not on the automated downloading of filings. Following the screen for automated downloads used in Lee et al. (2015), I remove all requests from a given IP address for a given day if more than 50 unique firms' filings were requested from the IP address.¹¹ Their analysis suggests that a small percentage of IP addresses download immense quantities of filings, accounting for most of the requests to EDGAR, which is consistent with automated robot behavior and is in line with general traffic patterns found on the internet (Nicks, 2013). This step reduces my sample to approximately 1.75 billion requests, an 89% reduction (see Appendix B for further details). The magnitude of this reduction is similar to that in Lee et al. (2015).¹²

For the remaining sample of requests, I use internet address to location lookup tables provided by MaxMind to estimate the latitudinal and longitudinal location of the internet address associated with each request (see Appendix C for details). These tables map blocks of internet addresses to specific latitudes and longitudes. MaxMind indicates that the tables are 99% accurate at the country level, and that within the U.S., the locations are precise to approximately the center of the associated postal ZIP code.¹³ MaxMind further indicates roughly 1%–5% turnover of internet addresses each month. Therefore, simply using the most recent IP address locations can lead to inaccurate location estimates in my sample, due to the number of years in my panel. Instead, I use monthly historic internet address locations to estimate the locations of each request to EDGAR more accurately. Using these monthly mappings, I could not find location information for 213 million (12%) of the non-automated requests. After matching the remaining requests to GVKEY, the final sample has 1.16 billion requests. Summary statistics for the sample indicate an upward trend in the number of requests, from 39 million in 2006 to 331 million in 2015, the last full year of my sample (see Appendix B for further details).

⁸ The EDGAR web server log files can be found at <https://www.sec.gov/data/edgar-log-file-data-set.html>.

⁹ The sample begins on January 1st, 2006 because this is the earliest date that the MaxMind IP address to locations data is available.

¹⁰ The log files do not include requests made through the EDGAR FTP server.

¹¹ IP address refers to the unique Internet Protocol Version 4 (IPV4) address of the request.

¹² Drake et al. (2015) use different screens to remove automated downloads; the screens are primarily based on the number of requests from a given IP address during a given period of time. Using their alternative method does not materially affect my findings.

¹³ Further investigation suggests that the location information may be more granular than the ZIP code level for certain regions of the U.S. However, this was not officially confirmed by MaxMind.

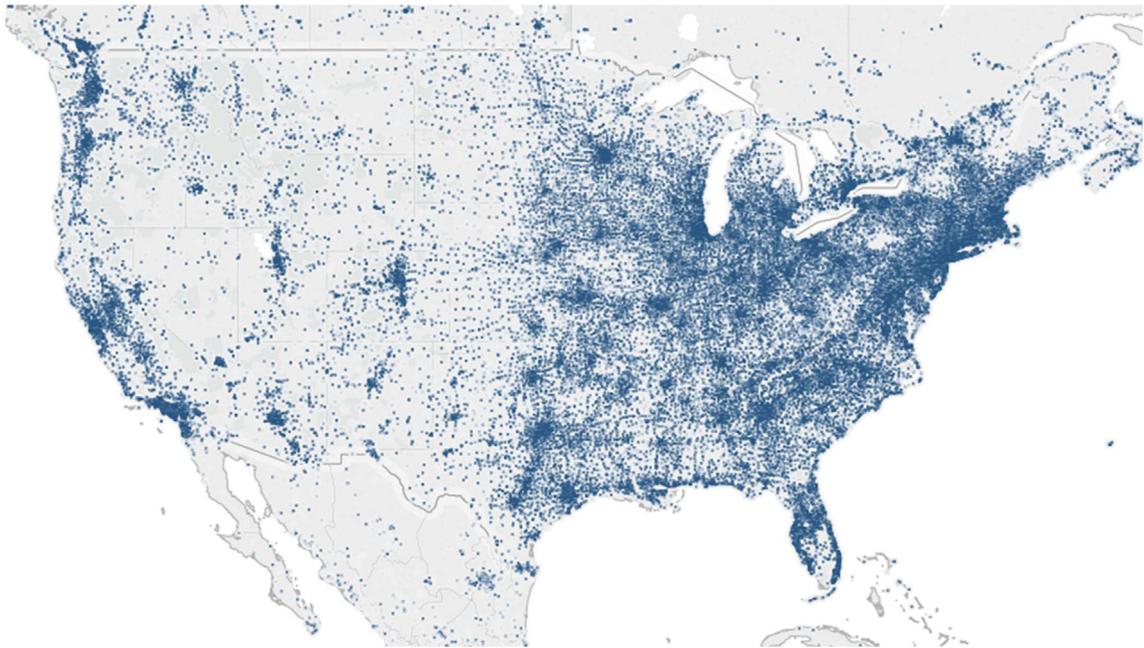


Fig. 2. Locations of the Requests for Firms Filings to EDGAR Within the United States Between 2006 and 2016. This figure presents the locations of requests for firms' filings to the EDGAR filing system around the lower 48 U.S. states between January 1st, 2006, and March 31st, 2016. The relative darkness of each point's color indicates the relative number of requests originating from the estimated latitude and longitude point. (For interpretation of the references to color in this figure legend, the reader is referred to the Web version of this article.)

3.2.1. Locations overview and validation

To further validate that my sample of locations reasonably reflects firms' investors and to provide insight into the locations of requests to EDGAR, I examine where the requests originate and whether these locations are consistent with research and anecdotal information about investors' locations in the U.S. capital market. Fig. 1 shows the locations of the requests worldwide. In my sample, 78.01% of the requests originate from within the U.S. This finding is expected since EDGAR is primarily for U.S.-based companies, and this percentage comports with estimates of foreign direct investment in the U.S. (OFII, 2017). In addition to the U.S., China, India, Canada, Great Britain, Hong Kong, Germany, Japan, France, and Singapore comprise the top 10 countries from which requests to EDGAR originate. Fig. 2 illustrates the locations of the requests within the U.S. The largest group of U.S.-based requests comes from the state of New York, accounting for 14.89% of all requests in my sample and 19.09% of all requests from within the U.S. This finding is consistent with the Global Financial Centres Index 25 ranking of global financial centres, which places New York first in its rankings (Yeandle and Wardle, 2019). New York is followed by California, Texas, and New Jersey, which account for 11.76%, 7.66%, and 5.58%, respectively, of all requests.

I next examine the requests originating from New York City at a borough level to test further the notion that, if these requests represent investors in U.S. companies, more of the requests should originate from areas with greater financial activity. According to the city's 2011 employment analysis, approximately 12% of all individuals employed in Manhattan are associated with the financial services industry, compared to only 2.8% in the other four boroughs (NYCEDC, 2013). If investors are drivers of the EDGAR requests, then I expect most New York City area requests to come from Manhattan. Fig. 3 shows the locations of the requests from the New York City area. Approximately two-thirds of the requests originate from Manhattan, which is consistent with this expectation.

3.3. Identifying requests near relevant local information sources

Since my predictions are based on investors having relevant diverse information from local sources, I restrict the sample of requests to those most likely located near areas with local information of importance to the firm. I do this by first searching Item 1 (Business Section) and Item 7 (Management's Discussion and Analysis Section, hereafter MD&A) of each firm's annual 10-K filing for the unique states and countries mentioned. Studies suggest that information about other companies in the same industry is also valuable for understanding a firm (Foster, 1981; Han et al., 1989; Rammath, 2002). Therefore, I estimate the locations of relevant information about a firm to be the unique states and countries mentioned in its filing or mentioned in

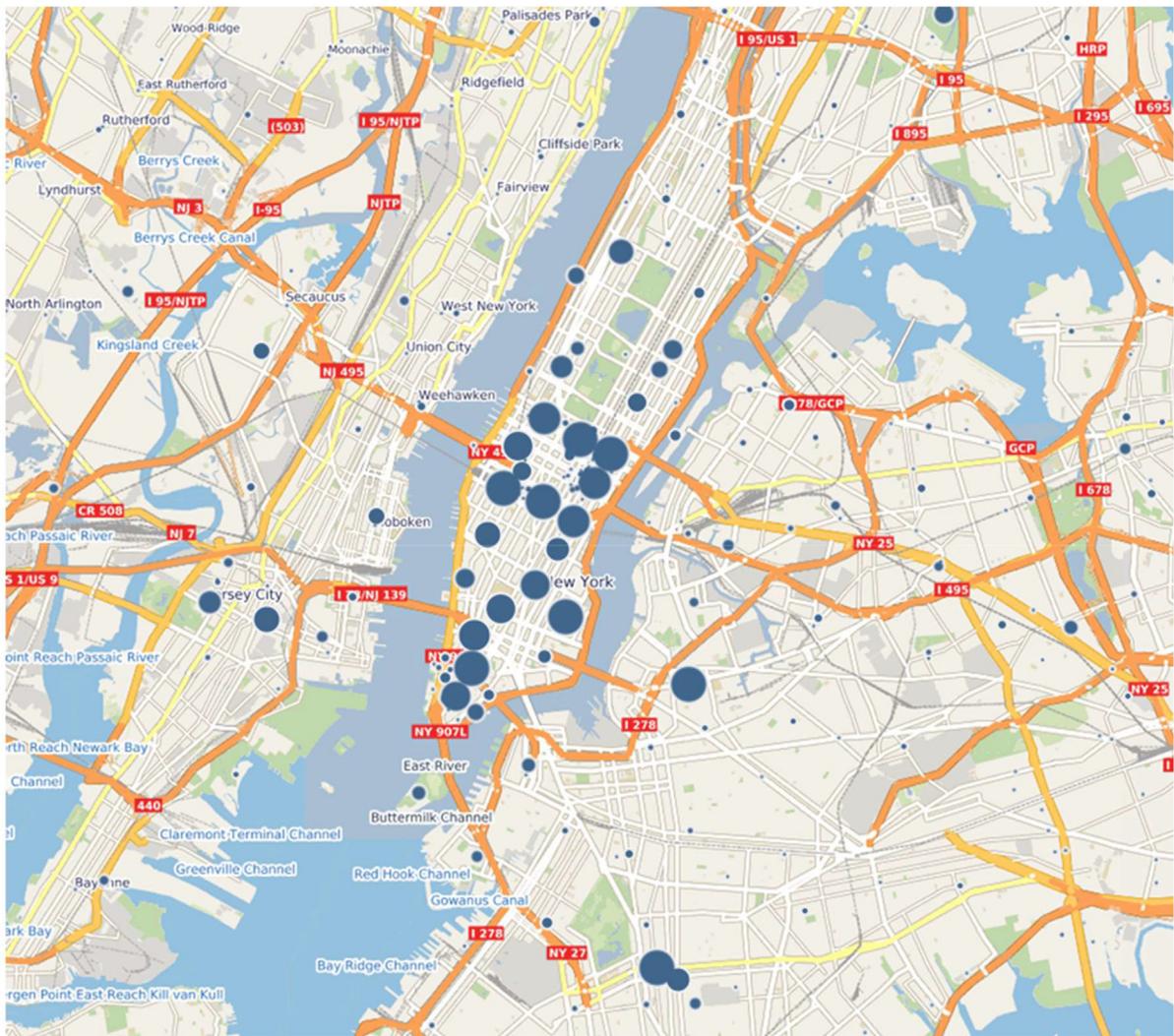


Fig. 3. Locations of the Requests for Firms Filings to EDGAR Within New York City Between 2006 and 2016. This figure presents the locations of requests for firms' filings to the EDGAR filing system within New York City between January 1st, 2006, and March 31st, 2016. Each point's relative size indicates the relative number of requests originating for the estimated latitude and longitude point.

the filings of at least 10% of the firms within the same three-digit SIC industry code. Using this list of locations, I then identify and limit my sample to requests that originate from a state (or country, if outside of the U.S.), on the list.^{14,15,16} Approximately 67% of the requests originate from a state or country on these lists, which suggests a substantial overlap between their locations and the locations of relevant information about the firm.

¹⁴ For robustness, I also use 5% and 15% industry cutoffs. My findings using these alternative cutoffs are similar (one exception is that the relation between trading and dispersion using the 5% cutoff is now significant at the 10% level using a one-sided *t*-test).

¹⁵ When I exclude the use of information from peer industry firms entirely, my results are generally weaker—several of my findings are still significant in the same direction or insignificant but are never significant in the opposite direction. These findings are expected (according to the theory in KV and related prior research) if my main measure captures a greater amount of the diversity of relevant information across a firm's investors. This is consistent with information gleaned from industry peers playing a significant role in investors' valuations of companies' earnings news (Foster, 1981).

¹⁶ Using the locations mentioned by peer firms may also reduce the impact of idiosyncratic disclosure choices by firms on how they describe the locations of their operations (which could partially explain the weaker results when not incorporating industry, mentioned in footnote 15). For example, the following is an excerpt from the business section of the Science Applications International Corporation's (SAIC) 10-K filing for the fiscal period ending January 29th, 2016, which contains the most relevant discussion of the geography of their operations, "We serve our customers through approximately 1700 active contracts and task orders and employ approximately 15,000 individuals ... Serving our country's national security and civilian markets, along with commercial customers and state and local governments" This quote suggests that they likely operate across many geographic locations in the U.S., but their discussion contains no specifics about where. (Further investigation using their job application website (<https://jobs.saic.com/>) shows that they have positions available in many U.S. states, suggesting that they indeed have operations in many areas.) Since they do not name specific states, my method is not able to compute a dispersion measure from their disclosure.

3.3.1. Locations with relevant local information further discussion

My measure of how diversely informed investors are is based on the geographic dispersion of a firm's investors, which I estimate using the locations of the requests for their filings from EDGAR. The analysis from Section 3.3 suggests a significant overlap between these locations and the locations of potentially relevant information sources about a given firm. To isolate the effect of more diversely informed investors from the number of locations with relevant local information, I control for the number of locations throughout my analysis in several ways. Specifically, all my tests control for the number of unique states and countries mentioned in the Business and MD&A sections of their 10-K filing (denoted $NumLocations_{i,t}$).¹⁷ I also create and use a propensity score matched sample that incorporates the number of locations mentioned and other characteristics in constructing the propensity score (see Section 4.1.1.). Lastly, all of my analyses include industry fixed effects to account for variation in the number of locations with relevant information across industries.

3.4. Measuring the geographic dispersion of requests

I measure the geographic dispersion of the requests for a firm's filings located near relevant information as the log of the sum of the variance of the latitudes and the variance of longitudes of the requests' locations; greater values of this measure indicate greater variation in these locations. I use the requests over the prior year to eliminate the possibility that the response to the earnings announcement leads investors to seek information from EDGAR, which could cause simultaneity between the response and my measure if the requests around the announcement are used in its construction.¹⁸ I calculate the measure as follows.

$$GeoDisp_{i,t} = \log\left(\sigma_{latitudes}^2 + \sigma_{longitude}^2\right) \quad (1)$$

where $GeoDisp_{i,t}$ is the geographic dispersion of the requests for the firm's filings over the year prior to the quarterly earnings announcement date t (trading days $t-255$ to $t-5$, where t is the date of the announcement); σ_x^2 is the variance of x , where x is the latitudes or longitudes of the requests. The measure is logged to reduce skewness in its distribution.

3.5. Descriptive statistics

I combine the geographic dispersion of requests measure with quarterly accounting data from Compustat Fundamentals Quarterly, data about analysts and their estimates from Institutional Brokers' Estimate System (I/B/E/S), market data from CRSP and Eventus, news article data from RavenPack, and data scraped from firms' annual 10-K filings using PERL. After requiring the necessary data for my analysis, the sample comprises 119,160 firm quarter observations from January 1st, 2006 to March 31st, 2016. The sample contains 5902 unique GVKEYs. Summary statistics for the main independent variables, shown in Table 1 Panel A, show that the mean (median) firm in my sample has a market value of \$672 (\$639) million and a mean (median) geographic dispersion of 7.24 (7.60). Dispersion varies between 6.13 at the 25th percentile and 8.24 at the 75th percentile of the distribution. Consistent with investors' local bias, 29% of requests originate from within 250 miles of the firm's headquarters (Chi and Shanthikumar, 2017).

4. Empirical tests and findings

4.1. Announcement period abnormal turnover and the geographic dispersion of requests, and empirical controls

I first examine the association between the geographic dispersion of requests and trading during the announcement period, in order to assess the construct validity of my measure of investors' information diversity and provide support for the use of geographic dispersion of requests as a measure of information diversity. Prior research generally indicates that greater information diversity across investors leads to increased trading in response to earnings announcements (Harris and Raviv, 1993; Kim and Verrecchia, 1994; Kandel and Pearson, 1995). Therefore, if firms with greater geographic dispersion of requests are associated with greater information diversity across investors, they should exhibit increased trading during the announcement period.

I use equation (2) to test the association between the geographic dispersion of requests and trading during the announcement period. The coefficient of interest in the equation is β_1 ; $\beta_1 > 0$ ($\beta_1 < 0$) suggests that firms with greater geographic dispersion of requests are associated with higher (lower) abnormal turnover in the three-day window around earnings announcements. Equation (2) is as follows.

$$ATurnover_{i,t} = \beta_0 + \beta_1(High) GeoDisp_{i,t} + \beta_1 \Sigma Controls + FixedEffects + \epsilon, \quad (2)$$

¹⁷ See Section 4 for a full discussion of the controls included throughout my analysis.

¹⁸ I thank the Editor for this suggestion.

Table 1
Summary statistics and correlations.

Panel A - Summary Statistics																					
Variable	N	Mean	P1	P25	Med.	P75	P99	σ													
GeoDisp _{it}	119,160	7.24	4.32	6.13	7.60	8.24	9.19														
ATurnover _{it}	119,160	0.57	-0.98	-0.04	0.20	0.75	6.58														
IPT _{it,5}	90,780	4.13	-4.24	2.99	4.20	5.30	12.05														
IPT _{it,10}	94,451	7.73	-9.41	5.34	7.86	10.13	24.39														
IPT _{it,15}	96,785	11.08	-16.45	7.37	11.30	14.87	37.30														
IPT _{it,20}	98,588	14.36	-24.15	9.20	14.55	19.57	52.57														
VolM _{it}	119,160	0.20	0.02	0.14	0.19	0.25	0.48														
VolA _{it}	119,160	0.32	0.01	0.11	0.25	0.49	0.90														
Size _{it}	119,160	6.51	2.42	5.13	6.46	7.80	11.34														
FirmLocations _{it}	119,160	9.34	2.00	6.00	8.00	12.00	27.00														
Book-to-Market _{it}	119,160	0.63	-0.35	0.28	0.52	0.84	2.94														
Analysts _{it}	119,160	1.52	0.00	0.69	1.61	2.30	3.40														
InstOwn _{it}	119,160	0.58	0.01	0.35	0.64	0.81	1.14														
Requests OL _{it}	119,160	8.52	3.95	7.80	8.62	9.35	11.51														
Requests EA _{it}	119,160	4.23	0.00	3.50	4.49	5.30	7.33														
Requests Fin EA _{it}	119,160	4.22	0.00	3.43	4.37	5.20	7.37														
Requests OL EA _{it}	119,160	4.13	0.00	3.47	4.23	4.94	6.91														
%Local _{it}	119,160	0.29	0.01	0.17	0.28	0.41	0.70														
Abs UEarnings _{it}	119,160	4.50	0.00	2.00	5.00	7.00	9.00														
ReportLag _{it}	119,160	35.29	14.00	26.00	33.00	40.00	85.00														
Abs QtrAReturns _{it}	119,160	0.11	0.00	0.04	0.08	0.15	0.62														
MgmtGuidance _{it}	119,160	0.20	0.00	0.00	0.00	0.00	1.00														
NewsArticles _{it}	119,160	1.23	0.00	1.10	1.39	1.61	2.71														

Panel B - Pearson and Spearman Pairwise Correlations																							
Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1 GeoDisp _{it}		0.24	0.07	0.09	0.07	0.07	0.21	0.19	0.14	0.19	-0.25	0.17	0.16	0.23	0.20	0.27	0.30	-0.21	-0.05	0.04	0.03	0.20	0.18
2 ATurnover _{it}	0.17		0.21	0.23	0.21	0.20	0.61	0.47	0.31	0.15	-0.19	0.38	0.38	0.24	0.26	0.29	0.31	-0.11	-0.11	-0.07	0.03	0.23	0.28
3 IPT _{it,5}	0.06	0.14		0.43	0.26	0.17	0.26	0.37	0.09	0.04	-0.03	0.09	0.09	0.05	0.06	0.08	0.08	-0.02	-0.03	-0.04	-0.02	0.05	0.08
4 IPT _{it,10}	0.07	0.15	0.30		0.55	0.38	0.27	0.40	0.09	0.05	-0.05	0.10	0.10	0.06	0.07	0.08	0.09	-0.02	-0.03	-0.04	-0.02	0.06	0.09
5 IPT _{it,15}	0.05	0.14	0.16	0.41		0.62	0.25	0.37	0.07	0.03	-0.04	0.08	0.09	0.05	0.06	0.07	0.08	-0.01	-0.03	-0.04	-0.02	0.06	0.07
6 IPT _{it,20}	0.05	0.13	0.10	0.24	0.48		0.21	0.34	0.06	0.03	-0.03	0.07	0.08	0.04	0.05	0.05	0.07	-0.01	-0.02	-0.04	-0.02	0.05	0.06
7 VolM _{it}	0.20	0.53	0.20	0.20	0.18	0.15		0.53	0.15	0.09	-0.14	0.24	0.21	0.15	0.15	0.18	0.19	-0.08	-0.07	-0.06	0.03	0.16	0.18
8 VolA _{it}	0.20	0.45	0.28	0.30	0.29	0.26	0.51		0.21	0.10	-0.11	0.23	0.24	0.15	0.16	0.18	0.20	-0.06	-0.09	-0.08	-0.03	0.15	0.19
9 Size _{it}	0.15	0.17	0.07	0.07	0.05	0.04	0.09	0.18		0.36	-0.36	0.71	0.57	0.56	0.48	0.49	0.51	-0.12	-0.47	-0.31	-0.21	0.24	0.50
10 FirmLocations _{it}	0.18	0.07	0.03	0.03	0.02	0.02	0.05	0.08	0.37		-0.13	0.29	0.27	0.30	0.26	0.23	0.23	-0.08	-0.08	0.00	-0.01	0.10	0.20
11 Book-to-Market _{it}	-0.23	-0.13	-0.03	-0.04	-0.03	-0.02	-0.09	-0.11	-0.38	-0.12		-0.25	-0.17	-0.19	-0.16	-0.17	-0.19	0.09	0.30	0.02	0.00	-0.13	-0.14
12 Analysts _{it}	0.17	0.28	0.07	0.08	0.06	0.05	0.18	0.22	0.71	0.29	-0.25		0.54	0.49	0.41	0.43	0.43	-0.08	-0.40	-0.28	-0.08	0.30	0.46
13 InstOwn _{it}	0.18	0.29	0.08	0.08	0.07	0.06	0.17	0.24	0.56	0.25	-0.21	0.56		0.30	0.27	0.29	0.25	-0.07	-0.29	-0.19	-0.07	0.29	0.37
14 Requests OL _{it}	0.25	0.16	0.04	0.04	0.03	0.03	0.10	0.13	0.52	0.28	-0.15	0.45	0.30		0.73	0.71	0.74	-0.11	-0.14	-0.06	-0.05	0.11	0.30
15 Requests EA _{it}	0.19	0.17	0.05	0.04	0.04	0.03	0.10	0.13	0.41	0.22	-0.12	0.34	0.24	0.64		0.84	0.74	-0.08	-0.11	-0.07	-0.03	0.10	0.28
16 Requests Fin EA _{it}	0.27	0.22	0.06	0.05	0.05	0.03	0.13	0.16	0.46	0.22	-0.13	0.38	0.28	0.68	0.78		0.79	-0.07	-0.12	-0.07	-0.03	0.12	0.31
17 Requests OL EA _{it}	0.31	0.23	0.06	0.06	0.05	0.05	0.15	0.19	0.49	0.22	-0.16	0.40	0.26	0.73	0.64	0.76		-0.16	-0.13	-0.06	-0.05	0.11	0.31
18 %Local _{it}	-0.23	-0.08	-0.02	-0.02	-0.01	-0.01	-0.07	-0.06	-0.12	-0.08	0.08	-0.08	-0.07	-0.11	-0.07	-0.06	-0.15		0.02	-0.03	-0.01	-0.03	-0.06
19 Abs UEarnings _{it}	-0.04	-0.05	-0.02	-0.03	-0.02	-0.02	-0.04	-0.09	-0.47	-0.08	0.33	-0.41	-0.30	-0.12	-0.09	-0.10	-0.12	0.02		0.26	0.22	-0.21	-0.25
20 ReportLag _{it}	0.05	-0.04	-0.03	-0.03	-0.03	-0.03	-0.03	-0.08	-0.31	-0.03	0.05	-0.27	-0.21	-0.06	-0.08	-0.05	-0.05	-0.02	0.26		0.13	-0.06	-0.23
21 Abs QtrAReturns _{it}	0.04	0.06	-0.02	-0.02	-0.02	-0.01	0.03	-0.05	-0.23	-0.03	0.07	-0.10	-0.11	-0.03	-0.02	-0.01	-0.03	0.00	0.24	0.13		-0.04	-0.09
22 MgmtGuidance _{it}	0.21	0.18	0.04	0.05	0.04	0.04	0.13	0.16	0.23	0.09	-0.13	0.29	0.29	0.10	0.07	0.11	0.10	-0.04	-0.21	-0.05	-0.05	0.31	
23 NewsArticles _{it}	0.18	0.18	0.06	0.06	0.05	0.04	0.13	0.17	0.48	0.19	-0.13	0.42	0.34	0.27	0.23	0.27	0.28	-0.07	-0.22	-0.21	-0.09	0.27	

Panel A presents summary statistics for the main variables used in this study. *GeoDisp_{it}* is the geographic dispersion of the requests for the firm's filings over the year before the quarterly earnings announcement date *t* (trading days *t*-255 through *t*-5); further details about the measure are found in Section 3. *ATurnover_{it}* is abnormal turnover for firm *i* in the three-day window around the earnings announcement (trading days *t*-1 through *t*+1). *IPT_{it,LN}* is measured following [Bushman et al. \(2010\)](#); details about the measure can be found in Section 4.2.3. *VolA_{it}* (*VolM_{it}*) is earnings announcement volume (volatility) persistence measured as the ratio of the sum of daily trading volume (return volatility) around the earnings announcement divided by the sum of daily trading volume (return volatility) over the announcement month. *Size_{it}* is the log of the market value of firm *i*'s equity. *FirmLocations_{it}* is the number of unique states and countries mentioned in the Business and MD&A sections of the firm's 10-K filing. *Book-to-Market_{it}* is the book value of equity divided by market value. *Analysts_{it}* is log of 1 plus the number of unique forecasts in the given quarter. *InstOwn_{it}* is the percentage of institutional holdings in the firm, calculated as the total number of shares held by institutional investors divided by the total number of shares outstanding. *Requests OL_{it}* is the log of 1 plus the total number of requests likely located near value relevant information over the year before the earnings announcement. *Requests EA_{it}* is the log of 1 plus the total number of requests for the firm's filings from EDGAR in the three-day window around the earnings announcement. *Requests Fin EA_{it}* is the log of 1 plus the total number of requests that come from within 250 miles of a financial center in the three-day window around the firm's earnings announcement. *Requests OL EA_{it}* is the log of 1 plus the number of requests that originate from a state or country, if outside of the U.S., mentioned in the firm's Business or MD&A sections of the 10-K filing around the firm's earnings announcement. *%Local_{it}* is the percentage of requests for a firm's filings that come from within 250 miles of the firm's headquarters. *Abs UEarnings_{it}* is the decile-ranked absolute value of unexpected earnings scaled by price. *ReportLag_{it}* is the number of days between the fiscal period end date and the earnings announcement date. *Abs QtrAReturn_{it}* is the absolute value of the firm's quarterly buy-and-hold returns minus the value-weighted market index. *MgmtGuidance_{it}* is an indicator set to 1 if management provided earnings guidance for the period, 0 otherwise. *NewsArticles_{it}* is the log of 1 plus the number of earnings announcement related articles in the three-day window around earnings announcements.

Panel B presents Pearson (below diagonal) and Spearman (above diagonal) pairwise correlations for the main variables used. Descriptions for each of the variables are in [Appendix A](#) and at the bottom of Panel A.

where *ATurnover_{it}* is the difference between the average daily market-adjusted turnover in the three-day window around a firm's quarterly earnings announcement and the firm's average daily market-adjusted turnover over the non-event period ([Garfinkel, 2009](#)). I calculate market-adjusted turnover for a given day as the difference between the firm-specific turnover and the market-wide turnover for the given day. I define the non-event period as trading days *t*-41 to *t*-5 from the quarterly

earnings announcement date t . $GeoDisp_{i,t}$ is the geographic dispersion of the requests for the firm's filings over the year prior to the quarterly earnings announcement date t (trading days $t-255$ to $t-5$). $High\ GeoDisp_{i,t}$ is an indicator set to 1 if geographic dispersion is above the median and 0 otherwise.¹⁹ $FixedEffects$ is industry, measured using the two-digit SIC code, and year-quarter (e.g., 2009Q1) fixed effects. The model is estimated using ordinary least squares (OLS) with standard errors clustered by firm and year-quarter, and continuous variables are winsorized at the 1% and 99% levels.

Controls include variables to account for the following: (1) variation in overall investor interest and attention, as well as their determinants, which research suggests are associated with the response to earnings news and are potentially associated with the diversity of information across investors (Kim and Verrecchia, 1994; Drake et al., 2012; Twedt, 2016); (2) local bias to the headquarters (Chi and Shanthikumar, 2017); (3) the geographic makeup of the firm (García and Norli, 2012); and (4) other characteristics of earnings announcements associated with the response and/or information diversity (Blankespoor et al., 2018).

To control for (1) the overall amount of interest and attention and variation in this from differing types of investors, I first include three variables based on the requests for firms' filings in the three-day window around announcements (i.e., during the announcement period): the total number of requests ($Requests\ EA_{i,t}$), the number of requests near areas that have more sophisticated investors (measured as the number of requests originating from locations near financial centres, $Requests\ Fin\ EA_{i,t}$), and the number of requests located near relevant information ($Requests\ OL\ EA_{i,t}$). Next, I control for characteristics of firms and their environments associated with attention, from prior research: the attention from the media ($News-Articles_{i,t}$ —calculated as the log of 1 plus the number of earnings-related news articles) (Drake et al., 2014), firm size ($Size_{i,t}$), book-to-market ($Book-to-Market_{i,t}$), analyst following ($Analysts_{i,t}$), institutional ownership ($InstOwn_{i,t}$)²⁰, and whether management guidance was issued for the quarter ($MgmtGuidance_{i,t}$). Lastly, I control for the number of requests used to calculate my geographic dispersion measure ($Requests\ OL_{i,t}$).²¹

Next, to account for (2) investors' local bias to the firm's headquarters, I control for the percentage of requests from within 250 miles of the firm's headquarters in the three-day window around the announcement ($\%Local_{i,t}$) (Chi and Shanthikumar, 2017). Local bias is associated with investors' geographic dispersion because when requests are more local to a firm's headquarters, they are located near the same geographic area and, thus, are less dispersed. This suggests a negative correlation between the two measures. However, a lack of local bias does not signify greater dispersion, as it does not indicate how much variation exists in the locations. Therefore, while the two measures (local bias and geographic dispersion) are associated to a certain degree, they each reveal a unique facet of locations (i.e., local bias is a first moment characteristic of locations, while dispersion is a second moment). The correlation of -0.23 between $GeoDisp_{i,t}$ and $\%Local_{i,t}$, shown in Table 1 Panel B, suggests that the two measures are associated in the expected direction, and the modest magnitude of the correlation indicates that the measures indeed have unique variation.

To take into account (3) the firm's geographic makeup, I control for the number of unique locations mentioned in the Business and MD&A sections of firms' 10-K filings ($NumLocations_{i,t}$). Lastly, I control for (4) other characteristics of the firm and the earnings announcement that research indicates are related to the earnings news response and could be associated with information diversity: the absolute value of unexpected earnings ($Abs\ UEarnings_{i,t}$), the number of days between the end of the quarter and the date of the announcement ($ReportLag_{i,t}$), and the absolute value of abnormal returns over the current quarter ($Abs\ QtrAReturns_{i,t}$).

4.1.1. High and low geographic dispersion of requests propensity score matched sample

As an alternative way to account for differences in the covariates between firms with high and low geographic dispersion of requests throughout my analysis, I employ propensity score matching (hereafter PSM), using the controls to model dispersion. Since the measure of dispersion is continuous, I follow the continuous PSM methodology from Guardabascio and Ventura (2013) to construct a propensity score for each observation (Hirano and Imbens, 2005) and create a variable named $High\ GeoDisp_{i,t}$ that is an indicator set to 1 when dispersion is above the median and 0 otherwise. I match, without replacement, each high dispersion observation to one with low dispersion using the propensity scores and use $High\ GeoDisp_{i,t}$ as my variable of interest when using this matched sample. To achieve strong matches, I set the caliper of the matching to 0.2 of the standard deviation of the propensity scores (Wang et al., 2013).

Fig. 4 shows the controls' standardized differences in the full unmatched sample and the PSM sample (Normand et al., 2001). Absolute standardized differences below 0.1 are recommended for matched sample covariate balance when using

¹⁹ The high dispersion indicator ($High\ GeoDisp_{i,t}$) is used in the equation when using the propensity score matched sample (see Section 4.1.1.).

²⁰ Prior studies suggest that firms with greater institutional ownership have investors that are more sophisticated. Sophistication differs from having relevant local information sources, as the former speaks to the ability to process information (Bartov et al., 2000) while the latter speaks to having unique information (Coval and Moskowitz, 2001).

²¹ My tests account for the impact of overall attention during the announcement period directly in two ways: 1. As described in Section 3.4, I construct the geographic dispersion measure using filings requests prior to the earnings announcement period, and 2. I control for overall attention (and variation in the number of filings requests) during the announcement period (e.g., Drake et al., 2012; Drake et al., 2015) in the ways discussed above. To further account for the attention (search) prior to the announcement period (i.e., during the period used to construct my measure) beyond the other included controls, I control for the total number of requests for firms' filings used to construct my geographic dispersion of requests measure. The conclusions from my empirical results, and my ability to completely rule out overall attention (search) as an alternative explanation for my empirical findings, may be limited to the extent that my linear controls (and propensity score matching, see Section 4.1.1.) do not fully account for overall attention (search).

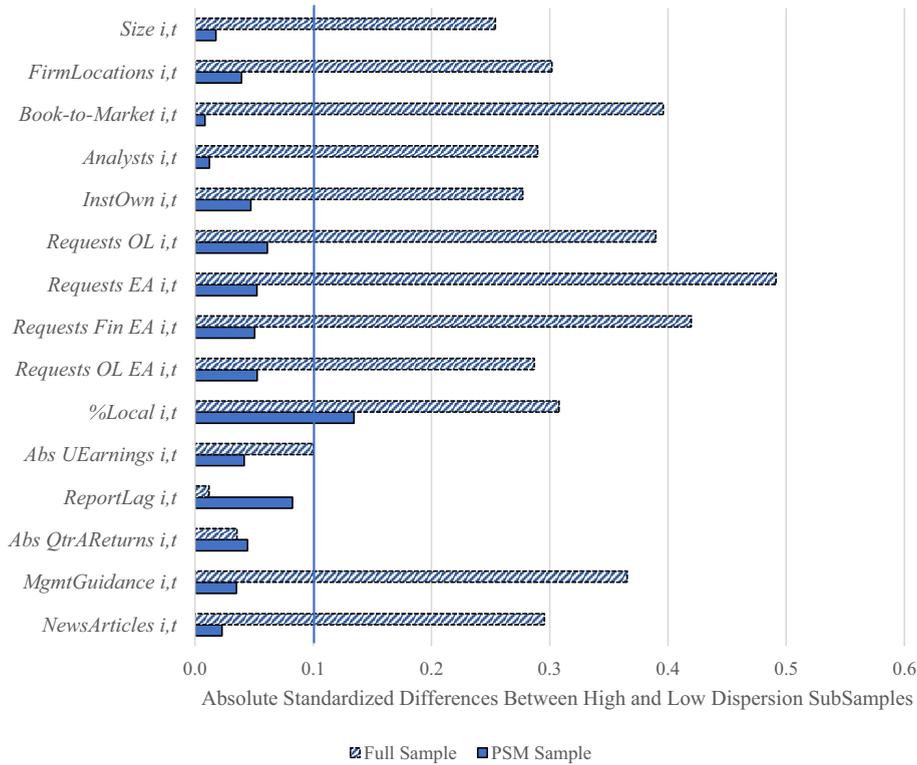


Fig. 4. Propensity Score Matching and Full Sample Covariate Balance. This figure presents the standardized differences of the variables between the high and low geographic dispersion subsamples for the entire sample and the propensity score matched sample (Normand et al., 2001). The standardized difference between high and low dispersion for the given variable x is calculated as follows:

$$\text{Standardized Difference} = \frac{\bar{X}_{\text{highdispersion}} - \bar{X}_{\text{lowdispersion}}}{\sqrt{\frac{s_{\text{highdispersion}}^2}{n_{\text{highdispersion}}} + \frac{s_{\text{lowdispersion}}^2}{n_{\text{lowdispersion}}}}}$$

PSM (Austin, 2009). For the full sample, the figure shows that the absolute standardized differences between high and low dispersion subsamples for most covariates exceed 0.1. On the other hand, for the PSM sample, only the absolute standardized difference between the high and low dispersion subsamples of 0.13 for %Local $_{i,t}$ marginally exceeds the suggested threshold of 0.1. Therefore, matching significantly reduces differences in the covariates between high and low dispersion observations in my sample. These covariates are also included as separate controls when using the matched sample to further account for differences in them between high and low dispersion observations.

4.1.2. Announcement period abnormal turnover and the geographic dispersion of requests findings

My findings, shown in Table 2, suggest that greater geographic dispersion of requests is associated with higher abnormal turnover during the announcement period for quarterly earnings news. Column 1 presents the main specification of the model with controls, and shows that the estimated coefficient for geographic dispersion ($GeoDisp_{i,t}$) is positive and significant at the 1% level. My results using the PSM sample, shown in column 2, show a positive and significant estimated coefficient for high dispersion ($High\ GeoDisp_{i,t}$) at the 5% level. The magnitudes of the estimated coefficients from columns 1 and 2 suggest that a one standard deviation change in dispersion (high dispersion) is associated with approximately 2.5% (3.0%) of the standard deviation of abnormal turnover. These results are consistent with the prediction that greater information diversity leads to more trading, as well as the presumption that greater geographic dispersion of requests is associated with greater information diversity across firms' investors, supporting the use of geographic dispersion of requests as a measure of information diversity.

4.2. Efficiency of the price response to earnings news and diversely informed investors

4.2.1. Magnitude of the announcement period price response and the geographic dispersion of requests

I first test the relation between the magnitude of the overall announcement period price response and having more diversely informed investors. I measure the magnitude of the announcement period price response using returns in the three-day window around quarterly earnings announcements (trading days $t-1$ to $t+1$, where t is the announcement date). In equation (3), β_1 indicates the association between the geographic dispersion of requests and the magnitude of the overall

Table 2
Announcement period trading and the geographic dispersion of requests.

Variable	Predict	Full Sample	PSM Sample
		(1)	(2)
		$ATurnover_{i,t}$	$ATurnover_{i,t}$
$GeoDisp_{i,t}$	+	0.024*** (2.85)	
$High\ GeoDisp_{i,t}$	+		0.035** (2.13)
$Size_{i,t}$		-0.102*** (-9.28)	-0.109*** (-9.70)
$FirmLocations_{i,t}$		-0.004** (-2.41)	-0.003* (-1.86)
$Book-to-Market_{i,t}$		-0.179*** (-9.43)	-0.210*** (-9.14)
$Analysts_{i,t}$		0.219*** (16.50)	0.206*** (15.62)
$InstOwn_{i,t}$		0.719*** (13.84)	0.784*** (14.14)
$Requests\ OL_{i,t}$		-0.007 (-0.57)	-0.018 (-1.40)
$Requests\ EA_{i,t}$		0.160*** (9.20)	0.202*** (10.94)
$Requests\ Fin\ EA_{i,t}$		0.053*** (6.65)	0.050*** (5.66)
$Requests\ OL\ EA_{i,t}$		-0.007 (-1.17)	-0.009 (-1.43)
$\%Local_{i,t}$		-0.173*** (-3.78)	-0.240*** (-4.94)
$Abs\ UEarnings_{i,t}$		0.025*** (9.32)	0.025*** (9.09)
$ReportLag_{i,t}$		-0.000 (-0.48)	-0.001 (-1.12)
$Abs\ QtrAReturns_{i,t}$		0.637*** (12.15)	0.621*** (11.62)
$MgmtGuidance_{i,t}$		0.073*** (2.96)	0.068** (2.58)
$NewsArticles_{i,t}$		0.063*** (4.79)	0.066*** (4.71)
Observations		119,160	79,651
Adj. R-Squared		0.208	0.190

This table presents results for the regression of abnormal turnover during the earnings announcement period on the geographic dispersion of requests. Variable definitions are in Appendix A. The constant, and industry (SIC2) and year-quarter (e.g., 2009Q1) fixed effects are untabulated. T-stats are reported in parentheses below their respective coefficients. Standard errors are clustered by firm and year-quarter. ***, **, and * denote two-tailed statistical significance at 1%, 5%, and 10%, respectively.

announcement period returns. $\beta_1 > 0$ ($\beta_1 < 0$) suggests a higher (lower) magnitude of announcement period returns for firms with greater geographic dispersion of requests. Equation (3) is as follows:

$$Abs\ ARet_{i,t,a,b} = \beta_0 + \beta_1 (High)\ GeoDisp_{i,t} + \beta_i \Sigma Controls + FixedEffects + \varepsilon, \quad (3)$$

where $Abs\ ARet_{i,t,a,b}$ represents the absolute value of abnormal returns, calculated as the difference between firm i 's buy-and-hold returns minus value-weighted market returns over trading days a and b relative to the earnings announcement date t ; for this test a and b are -1 and 1 , respectively. $GeoDisp_{i,t}$ is the geographic dispersion of the requests for the firm's filings over the year prior to the quarterly earnings announcement date t (trading days $t-255$ to $t-5$). $High\ GeoDisp_{i,t}$ is an indicator set to 1 if dispersion is above the median and 0 otherwise. $Controls$ are the same as those from equation (2). $FixedEffects$ is industry (measured using the two-digit SIC code) and year-quarter fixed effects. The equation is estimated using OLS with standard errors clustered by firm and year-quarter to account for cross-sectional and time-series correlations in the residual. All continuous variables are winsorized at the 1% and 99% levels.

4.2.1.1. *Magnitude of the announcement period price response and the geographic dispersion of requests findings.* Table 3 Panel A presents the results from estimating equation (3). Column 1 shows results using the full sample. The estimated coefficient for geographic dispersion ($GeoDisp_{i,t}$) is positive and significant at the 1% level. Column 2 shows results using the PSM matched sample, and the estimated coefficient for high geographic dispersion ($High\ GeoDisp_{i,t}$) is also positive and significant at the 1%

Table 3
Announcement period price response and the geographic dispersion of requests.

Panel A - Magnitude of the Announcement Period Price Response			
Variable	Predict	Full Sample	PSM Sample
		(1)	(2)
		<i>Abs ARet_{i,t,-1,1}</i>	<i>Abs ARet_{i,t,-1,1}</i>
<i>GeoDisp_{i,t}</i>	+	0.166*** (5.10)	
<i>High GeoDisp_{i,t}</i>	+		0.225*** (3.25)
<i>Size_{i,t}</i>		-0.825*** (-24.59)	-0.844*** (-24.52)
<i>FirmLocations_{i,t}</i>		0.009 (1.61)	0.012* (1.89)
<i>Book-to-Market_{i,t}</i>		-0.178 (-1.47)	-0.442*** (-3.80)
<i>Analysts_{i,t}</i>		0.729*** (16.59)	0.669*** (14.70)
<i>InstOwn_{i,t}</i>		1.408*** (10.67)	1.49*** (9.78)
<i>Requests OL_{i,t}</i>		-0.039 (-0.96)	-0.085** (-2.08)
<i>Requests EA_{i,t}</i>		0.575*** (10.91)	0.695*** (12.47)
<i>Requests Fin EA_{i,t}</i>		0.106*** (3.16)	0.122*** (3.80)
<i>Requests OL EA_{i,t}</i>		0.018 (1.05)	0.006 (0.23)
<i>%Local_{i,t}</i>		-0.000 (-0.00)	-0.159 (-0.89)
<i>Abs UEarnings_{i,t}</i>		0.244*** (21.30)	0.244*** (18.19)
<i>ReportLag_{i,t}</i>		-0.007*** (-2.72)	-0.005 (-1.67)
<i>Abs QtrAReturns_{i,t}</i>		5.249*** (19.25)	5.192*** (17.93)
<i>MgmtGuidance_{i,t}</i>		0.007 (0.10)	0.088 (1.08)
<i>NewsArticles_{i,t}</i>		0.237*** (5.27)	0.282*** (5.62)
Observations		119,160	79,651
Adj. R-Squared		0.159	0.147
Panel B - Earnings Response Coefficient			
Variable	Predict	Full Sample	PSM Sample
		(1)	(2)
		<i>ARet_{i,t,-1,1}</i>	<i>ARet_{i,t,-1,1}</i>
<i>UEarnings_{i,t}</i>		1.054*** (10.92)	1.144*** (9.54)
<i>GeoDisp_{i,t}</i>		0.042 (1.42)	
<i>UEarnings_{i,t} × GeoDisp_{i,t}</i>	+	0.105*** (10.18)	
<i>High GeoDisp_{i,t}</i>			0.068 (0.82)
<i>UEarnings_{i,t} × High GeoDisp_{i,t}</i>	+		0.192*** (8.50)
<i>Size_{i,t}</i>		0.049 (1.10)	0.016 (0.32)
<i>UEarnings_{i,t} × Size_{i,t}</i>		-0.140*** (-11.15)	-0.168*** (-11.18)
<i>FirmLocations_{i,t}</i>		0.009** (2.16)	0.012** (2.10)
<i>UEarnings_{i,t} × FirmLocations_{i,t}</i>		-0.002 (-0.71)	-0.002 (-0.82)
<i>Book-to-Market_{i,t}</i>		0.682*** (7.86)	0.593*** (5.08)
<i>UEarnings_{i,t} × Book-to-Market_{i,t}</i>		-0.011 (-0.42)	-0.082** (-2.48)

(continued on next page)

Table 3 (continued)

Panel B - Earnings Response Coefficient			
Variable	Predict	Full Sample	PSM Sample
		(1)	(2)
		$ARet_{i,t,-1,1}$	$ARet_{i,t,-1,1}$
$Analysts_{i,t}$		-0.072*	-0.021
		(-1.74)	(-0.43)
$UEarnings_{i,t} \times Analysts_{i,t}$		0.237***	0.231***
		(15.29)	(11.91)
$InstOwn_{i,t}$		0.374***	0.273*
		(2.93)	(1.81)
$UEarnings_{i,t} \times InstOwn_{i,t}$		0.449***	0.470***
		(7.07)	(6.59)
$Requests\ OL_{i,t}$		-0.072*	-0.075
		(-1.72)	(-1.31)
$UEarnings_{i,t} \times Requests\ OL_{i,t}$		-0.131***	-0.129***
		(-11.17)	(-8.39)
$Requests\ EA_{i,t}$		-0.071	-0.089
		(-1.59)	(-1.46)
$UEarnings_{i,t} \times Requests\ EA_{i,t}$		0.105***	0.121***
		(7.70)	(6.52)
$Requests\ Fin\ EA_{i,t}$		-0.019	-0.030
		(-0.45)	(-0.64)
$UEarnings_{i,t} \times Requests\ Fin\ EA_{i,t}$		0.000	0.025*
		(0.04)	(1.83)
$Requests\ OL\ EA_{i,t}$		-0.003	0.013
		(-0.10)	(0.35)
$UEarnings_{i,t} \times Requests\ OL\ EA_{i,t}$		0.014	-0.000
		(1.39)	(-0.03)
$\%Local_{i,t}$		-0.116	-0.138
		(-0.71)	(-0.71)
$UEarnings_{i,t} \times \%Local_{i,t}$		-0.029	-0.186**
		(-0.45)	(-2.61)
$Abs\ UEarnings_{i,t}$		-0.029*	-0.029
		(-1.95)	(-1.64)
$UEarnings_{i,t} \times Abs\ UEarnings_{i,t}$		-0.019**	-0.030***
		(-2.60)	(-3.52)
$ReportLag_{i,t}$		-0.017***	-0.018***
		(-4.04)	(-3.89)
$UEarnings_{i,t} \times ReportLag_{i,t}$		-0.006***	-0.005***
		(-6.49)	(-4.53)
$Abs\ QtrAReturns_{i,t}$		-0.194	-0.561
		(-0.61)	(-1.63)
$UEarnings_{i,t} \times Abs\ QtrAReturns_{i,t}$		-0.177	-0.080
		(-1.60)	(-0.52)
$MgmtGuidance_{i,t}$		-0.244***	-0.284**
		(-2.77)	(-2.49)
$UEarnings_{i,t} \times MgmtGuidance_{i,t}$		-0.076*	-0.093*
		(-1.85)	(-1.91)
$NewsArticles_{i,t}$		0.058	0.065
		(1.37)	(1.16)
$UEarnings_{i,t} \times NewsArticles_{i,t}$		0.091***	0.116***
		(5.83)	(5.91)
Observations		119,160	79,651
Adj. R-Squared		0.096	0.098

Panel A presents results for regressions of the absolute value of abnormal returns in the three-day window around quarterly earnings announcements on the geographic dispersion of requests. $ARet_{i,t,a,b}$ are abnormal returns for firm i measured between days a and b relative to the earnings announcement for date t . $GeoDisp_{i,t}$ is geographic dispersion of the requests for the firm's filings over the year prior to the quarterly earnings announcement date t (trading days $t-255$ through $t-5$); further details about the measure are found in Section 3. $High\ GeoDisp_{i,t}$ is an indicator set to 1 if dispersion is above the median and 0 otherwise. Variable definitions are in Appendix A. The constant, and industry (SIC2) and year-quarter (e.g., 2009Q1) fixed effects are untabulated. T-stats are reported in parentheses below their respective coefficients. Standard errors are clustered by firm and year-quarter. ***, **, and * denote two-tailed statistical significance at 1%, 5%, and 10%, respectively.

Panel B presents results for regressions of abnormal returns in the three-day window around quarterly earnings announcements on unexpected earnings interacted with the geographic dispersion of requests. $ARet_{i,t,a,b}$ are abnormal returns for firm i measured between days a and b relative to the earnings announcement for date t . $GeoDisp_{i,t}$ is geographic dispersion of the requests for the firm's filings over the year prior to the quarterly earnings announcement date t (trading days $t-255$ through $t-5$); further details about the measure are found in Section 3. $High\ GeoDisp_{i,t}$ is an indicator set to 1 if dispersion is above the median and 0 otherwise. Variable definitions are in Appendix A. The constant, and industry (SIC2) and year-quarter (e.g., 2009Q1) fixed effects are untabulated. T-stats are reported in parentheses below their respective coefficients. Standard errors are clustered by firm and year-quarter. ***, **, and * denote two-tailed statistical significance at 1%, 5%, and 10%, respectively.

level. The magnitudes of the estimated coefficients indicate that a one standard deviation change in geographic dispersion (high dispersion) is associated with approximately 3.6% (3.9%) of the standard deviation of the magnitude of announcement period returns. Consistent with predictions, these results indicate a significantly positive relation between the magnitude of the overall price response during the announcement period and having more diversely informed investors.

4.2.2. Earnings response coefficient and the geographic dispersion of requests

Next, I test differences in the announcement period price response to earnings news associated with having more diversely informed investors, using the association between unexpected earnings and the change in price (i.e., the ERC) in the three-day window around quarterly earnings announcements (trading days $t-1$ to $t+1$, where t is the date of the announcement). In equation (4), β_2 is the main relation between unexpected earnings and change in price during the announcement period, i.e., the ERC. The coefficient of interest in the equation is β_3 , which indicates the incremental differences in the ERC associated with requests' geographic dispersion. $\beta_3 > 0$ ($\beta_3 < 0$) indicates a higher (lower) ERC for firms with greater geographic dispersion of requests. Equation (4) is as follows.

$$ARet_{i,t,a,b} = \beta_0 + \beta_1(High)GeoDisp_{i,t} + \beta_2UEarnings_{i,t} + \beta_3UEarnings_{i,t} \times (High) GeoDisp_{i,t} + \beta_i \Sigma Controls + \beta_i \Sigma UEarnings_{i,t} * Controls + FixedEffects + \epsilon, \quad (4)$$

where $ARet_{i,t,a,b}$ represents abnormal returns, calculated as the difference between firm i 's buy-and-hold returns minus value-weighted market returns over trading days a and b relative to the earnings announcement date t ; for the ERC test, a and b are -1 and 1 (i.e., $t-1$ through $t+1$), respectively. $UEarnings_{i,t}$ is decile ranked unexpected earnings scaled by price. $GeoDisp_{i,t}$ is the geographic dispersion of the requests for the firm's filings over the year prior to the quarterly earnings announcement date t (trading days $t-255$ to $t-5$). $High GeoDisp_{i,t}$ is an indicator set to 1 if dispersion is above the median and 0 otherwise. $Controls$ are the same as those from equation (2). $FixedEffects$ is industry (measured using two-digit SIC code) and year-quarter fixed effects. All variables are centered using their sample means so that the main effects are interpretable as holding all other variables to their average. The equation is estimated using OLS with standard errors clustered by firm and year-quarter to account for cross-sectional and time-series correlations in the residual. All continuous variables are winsorized at the 1% and 99% levels.

4.2.2.1. Earnings response coefficient and the geographic dispersion of requests findings. Table 3 Panel B presents the results from estimating equation (4). Column 1 shows the findings using the full sample. The estimated coefficient for the interaction between unexpected earnings and geographic dispersion ($UEarnings_{i,t} \times GeoDisp_{i,t}$) is positive and significant at the 1% level. Column 2 shows results using the PSM matched sample. The estimated coefficient for the interaction between unexpected earnings and high geographic dispersion ($UEarnings_{i,t} \times High GeoDisp_{i,t}$) is also positive and significant at the 1% level. The coefficient for the interaction from column 1 suggests that a one standard deviation increase in geographic dispersion is associated with a higher ERC of 0.13; The coefficient for the interaction from column 2 indicates that high dispersion is associated with a 0.19 higher ERC. Overall, my findings indicate a significantly positive relation between the price response to earnings news during the announcement period and having more diversely informed investors.

4.2.3. Post-earnings announcement drift and the geographic dispersion of requests

The equation used to test post-earnings announcement drift (PEAD) is nearly identical to equation (4), the equation used to test the relation between the geographic dispersion of requests and the ERC, except that returns over a period following the announcement are used as the dependent variable. In the PEAD equation, β_2 is the main relation between unexpected earnings and post-earnings returns for the firm. $\beta_2 > 0$ ($\beta_2 < 0$) indicates a drift (reversal) in returns, which is consistent with an underreaction (overreaction) for the mean firm with a low $GeoDisp_{i,t}$ (i.e., $High GeoDisp_{i,t} = 0$).

The primary coefficient of interest in the equation is β_3 , which indicates the incremental difference in post-earnings returns associated with the geographic dispersion of requests. $\beta_3 < 0$ indicates that, on average, firms with greater geographic dispersion of requests have incrementally lower drift in the same direction as earnings news. However, this can result from a return drift in the opposite direction of the earnings surprise, e.g., an initial overreaction followed by a subsequent reversal in the market's response to earnings news, which may not necessarily be indicative of a more efficient price response. Therefore, to rule out this possibility, I test whether the overall earnings response with respect to geographically dispersed investors does not drift in the opposite direction of earnings news (Chen et al., 2021; Neilson, 2022). That is, if β_2 is positive and β_3 is negative and $\beta_2 + \beta_3 * High Dispersion \geq 0$ (i.e., I do not reject the null that this value is ≥ 0 ; < 0 is consistent with an overreaction followed by a reversal), then this is consistent with a more timely and complete price response to earnings news for firms with more geographically dispersed investors.

Table 4
Relation between PEAD and the geographic dispersion of requests.

Panel A - Abnormal Returns Over the Month Following Announcements [t+2 to t+5, t+10, t+15, and t+20]									
Variable	Predict	Full Sample				PSM Sample			
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		<i>ARet_{t,t+2,5}</i>	<i>ARet_{t,t+2,10}</i>	<i>ARet_{t,t+2,15}</i>	<i>ARet_{t,t+2,20}</i>	<i>ARet_{t,t+2,5}</i>	<i>ARet_{t,t+2,10}</i>	<i>ARet_{t,t+2,15}</i>	<i>ARet_{t,t+2,20}</i>
<i>UEarnings_{it}</i> (a)		0.197*** (4.15)	0.170** (2.32)	0.165** (2.06)	0.353*** (3.47)	0.156** (2.58)	0.105 (1.22)	0.045 (0.42)	0.254* (1.82)
<i>GeoDisp_{it}</i>		-0.005 (-0.23)	-0.020 (-0.52)	-0.035 (-0.65)	-0.004 (-0.05)				
<i>UEarnings_{it} x GeoDisp_{it}</i> (b)	-	-0.006 (-0.98)	-0.023** (-2.69)	-0.025** (-2.21)	-0.018 (-1.48)				
<i>High GeoDisp_{it}</i>						-0.021 (-0.52)	-0.074 (-1.20)	-0.162 (-1.60)	-0.115 (-0.90)
<i>UEarnings_{it} x High GeoDisp_{it}</i> (c)	-					-0.004 (-0.33)	-0.042** (-2.19)	-0.052** (-2.38)	-0.020 (-0.80)
P-value from F-test (H0)									
(a) + (b) * [75th - 25th <i>GeoDisp_{it}</i>] ≥ 0		1.000	0.945	0.920	0.999				
(a) + (c) ≥ 0						0.990	0.767	0.475	0.961
<i>Size_{it}</i>		0.032 (1.26)	0.009 (0.18)	-0.003 (-0.05)	-0.048 (-0.57)	0.037 (1.33)	0.009 (0.19)	-0.017 (-0.24)	-0.071 (-0.81)
<i>UEarnings_{it} x Size_{it}</i>		-0.025*** (-3.81)	-0.033** (-3.14)	-0.034** (-2.68)	-0.037*** (-2.71)	-0.022*** (-3.00)	-0.029** (-2.39)	-0.026 (-1.56)	-0.032* (-1.90)
<i>FirmLocations_{it}</i>		0.001 (0.20)	-0.005 (-0.92)	-0.006 (-0.89)	-0.003 (-0.34)	-0.000 (-0.06)	-0.004 (-0.62)	-0.008 (-1.08)	-0.002 (-0.29)
<i>UEarnings_{it} x FirmLocations_{it}</i>		-0.001 (-1.03)	0.001 (0.59)	0.005** (2.18)	0.004* (1.96)	-0.001 (-0.63)	0.002 (0.75)	0.005** (2.27)	0.006* (1.98)
<i>Book-to-Market_{it}</i>		0.372*** (6.02)	0.654*** (5.74)	0.724*** (4.79)	0.779*** (4.15)	0.333*** (4.08)	0.605*** (4.31)	0.694*** (4.08)	0.763*** (3.75)
<i>UEarnings_{it} x Book-to-Market_{it}</i>		0.009 (0.76)	0.001 (0.06)	0.010 (0.44)	0.020 (0.71)	0.018 (1.15)	0.010 (0.54)	0.019 (0.70)	0.021 (0.60)
<i>Analysts_{it}</i>		0.010 (0.28)	0.090 (1.52)	0.136* (1.92)	0.175* (1.97)	-0.017 (-0.41)	0.079 (1.23)	0.123 (1.66)	0.215** (2.30)
<i>UEarnings_{it} x Analysts_{it}</i>		0.008 (0.70)	-0.008 (-0.63)	-0.019 (-1.20)	-0.014 (-0.78)	0.012 (1.04)	-0.007 (-0.45)	-0.021 (-1.11)	-0.022 (-1.07)
<i>InstOwn_{it}</i>		0.415*** (3.62)	0.394** (2.12)	0.524** (2.16)	0.696*** (2.81)	0.439*** (3.61)	0.366* (1.73)	0.543** (2.15)	0.696** (2.64)
<i>UEarnings_{it} x InstOwn_{it}</i>		0.031 (1.15)	0.014 (0.32)	-0.045 (-0.91)	-0.089 (-1.47)	0.025 (0.86)	0.009 (0.20)	-0.027 (-0.52)	-0.054 (-0.87)
<i>Requests OL_{it}</i>		-0.048 (-1.45)	-0.016 (-0.32)	-0.001 (-0.02)	-0.013 (-0.15)	-0.025 (-0.60)	0.011 (0.19)	0.044 (0.53)	0.044 (0.46)
<i>UEarnings_{it} x Requests OL_{it}</i>		-0.014 (-1.56)	-0.036*** (-2.97)	-0.046*** (-3.30)	-0.045*** (-2.79)	-0.015 (-1.27)	-0.040** (-2.53)	-0.065*** (-3.56)	-0.063*** (-3.10)
<i>Requests EA_{it}</i>		0.037 (1.29)	0.021 (0.50)	0.028 (0.54)	0.019 (0.29)	0.042 (1.20)	0.013 (0.23)	0.031 (0.48)	0.014 (0.18)
<i>UEarnings_{it} x Requests EA_{it}</i>		-0.006 (-0.61)	0.005 (0.35)	0.015 (1.06)	-0.001 (-0.05)	-0.013 (-1.23)	0.000 (0.02)	0.003 (0.17)	0.001 (0.04)
<i>Requests Fin EA_{it}</i>		-0.036* (-1.74)	0.006 (0.20)	0.022 (0.75)	-0.014 (-0.44)	-0.046* (-1.94)	0.004 (0.10)	0.012 (0.31)	-0.018 (-0.37)
<i>UEarnings_{it} x Requests Fin EA_{it}</i>		0.024*** (3.11)	0.033** (2.33)	0.039*** (2.80)	0.039** (2.44)	0.034*** (3.14)	0.040*** (2.70)	0.048*** (2.95)	0.033* (1.96)
<i>Requests OL EA_{it}</i>		0.006 (0.27)	-0.022 (-0.65)	-0.049 (-1.64)	-0.036 (-1.08)	0.005 (0.20)	-0.034 (-0.79)	-0.061 (-1.67)	-0.054 (-1.13)
<i>UEarnings_{it} x Requests OL EA_{it}</i>		-0.009 (-1.05)	-0.012 (-0.87)	-0.017 (-1.22)	-0.020 (-1.32)	-0.013 (-1.30)	-0.012 (-1.22)	-0.010 (-0.85)	-0.006 (-0.49)
<i>%Local_{it}</i>		-0.095 (-0.84)	-0.185 (-1.00)	-0.134 (-0.72)	0.098 (0.42)	-0.153 (-0.99)	-0.276 (-1.10)	-0.329 (-1.26)	-0.170 (-0.62)
<i>UEarnings_{it} x %Local_{it}</i>		-0.070 (-1.67)	-0.146** (-2.68)	-0.120* (-1.94)	-0.217*** (-3.17)	-0.085 (-1.62)	-0.151** (-2.18)	-0.100 (-1.29)	-0.165 (-1.67)
<i>Abs UEarnings_{it}</i>		0.008 (0.70)	0.011 (0.56)	0.004 (0.16)	-0.009 (-0.29)	0.003 (0.27)	0.011 (0.54)	-0.009 (-0.31)	-0.014 (-0.49)
<i>UEarnings_{it} x Abs UEarnings_{it}</i>		0.009*** (2.70)	0.027*** (4.86)	0.028*** (4.41)	0.033*** (4.02)	0.011*** (2.78)	0.031*** (5.37)	0.033*** (4.35)	0.036*** (3.73)
<i>ReportLag_{it}</i>		-0.005 (-1.21)	-0.006 (-1.00)	-0.002 (-0.24)	0.001 (0.15)	-0.004 (-0.97)	-0.004 (-0.63)	0.002 (0.30)	0.007 (0.78)
<i>UEarnings_{it} x ReportLag_{it}</i>		-0.001 (-1.14)	-0.001 (-1.20)	-0.002 (-1.23)	-0.003 (-1.56)	-0.001 (-0.86)	-0.001 (-1.17)	-0.001 (-1.04)	-0.003 (-1.66)
<i>Abs QtrAReturns_{it}</i>		0.022 (0.09)	0.222 (0.54)	0.411 (0.79)	0.574 (0.89)	-0.004 (-0.02)	-0.083 (-0.19)	-0.070 (-0.13)	0.242 (0.39)
<i>UEarnings_{it} x Abs QtrAReturns_{it}</i>		-0.105 (-1.56)	-0.288** (-2.50)	-0.342** (-2.59)	-0.406** (-2.56)	-0.064 (-0.86)	-0.181 (-1.33)	-0.224 (-1.48)	-0.362* (-1.80)
<i>MgmtGuidance_{it}</i>		-0.005 (-0.11)	0.038 (0.63)	0.083 (1.08)	0.052 (0.60)	-0.045 (-0.73)	0.001 (0.02)	0.041 (0.42)	-0.012 (-0.12)

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Table 4 (continued)

Panel A - Abnormal Returns Over the Month Following Announcements [$t+2$ to $t+5$, $t+10$, $t+15$, and $t+20$]									
Variable	Predict	Full Sample				PSM Sample			
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		$ARet_{i,t,2,5}$	$ARet_{i,t,2,10}$	$ARet_{i,t,2,15}$	$ARet_{i,t,2,20}$	$ARet_{i,t,2,5}$	$ARet_{i,t,2,10}$	$ARet_{i,t,2,15}$	$ARet_{i,t,2,20}$
$UEarnings_{i,t} \times MgmtGuidance_{i,t}$		-0.046**	-0.047	-0.026	0.009	-0.028	-0.019	-0.005	0.017
		(-2.32)	(-1.59)	(-0.77)	(0.23)	(-1.14)	(-0.48)	(-0.12)	(0.34)
$NumArticles_{i,t}$		0.083**	0.122	0.123**	0.160**	0.086**	0.127**	0.145**	0.194**
		(2.31)	(2.47)	(2.09)	(2.52)	(2.08)	(2.27)	(2.07)	(2.34)
$UEarnings_{i,t} \times NumArticles_{i,t}$		0.018	0.029	0.012	0.011	0.017	0.023	0.014	0.013
		(1.61)	(1.58)	(0.51)	(0.49)	(1.21)	(1.06)	(0.53)	(0.47)
Observations		119,160	119,160	119,160	119,160	79,651	79,651	79,651	79,651
Adj. R-Squared		0.010	0.015	0.016	0.017	0.010	0.014	0.017	0.017

Panel B - Abnormal Returns Over the Quarter and Year Following Announcements [$t+2$ to $t+60$ and $t+255$]					
Variable	Predict	Full Sample		PSM Sample	
		(1)	(2)	(3)	(4)
		$ARet_{i,t,2,60}$	$ARet_{i,t,2,255}$	$ARet_{i,t,2,60}$	$ARet_{i,t,2,255}$
$UEarnings_{i,t}$ (a)		1.202***	3.262***	0.998***	2.904***
		(3.00)	(3.66)	(2.74)	(3.35)
$GeoDisp_{i,t}$		0.021	-0.269		
		(0.17)	(-0.77)		
$UEarnings_{i,t} \times GeoDisp_{i,t}$ (b)	-	-0.029	-0.248***		
		(-1.23)	(-3.70)		
$High\ GeoDisp_{i,t}$				-0.083	-0.956
				(-0.34)	(-1.44)
$UEarnings_{i,t} \times High\ GeoDisp_{i,t}$ (c)	-			-0.042	-0.315**
				(-0.79)	(-2.06)
P-value from F-test (H0)					
(a) + (b) * [75th - 25th $GeoDisp_{i,t}$] ≥ 0		0.997	0.999		
(a) + (c) ≥ 0				0.993	0.998
$Size_{i,t}$		-0.181	-1.112**	-0.217	-1.251**
		(-1.07)	(-2.09)	(-1.21)	(-2.32)
$UEarnings_{i,t} \times Size_{i,t}$		-0.054**	-0.128**	-0.021	-0.052
		(-2.52)	(-2.17)	(-0.71)	(-0.63)
$FirmLocations_{i,t}$		0.012	0.072	0.011	0.093
		(0.75)	(1.34)	(0.57)	(1.51)
$UEarnings_{i,t} \times FirmLocations_{i,t}$		0.005	-0.007	0.003	-0.003
		(0.87)	(-0.55)	(0.53)	(-0.21)
$Book-to-Market_{i,t}$		1.767***	5.332***	1.813***	4.187**
		(3.43)	(3.72)	(3.45)	(2.64)
$UEarnings_{i,t} \times Book-to-Market_{i,t}$		0.001	-0.166	0.043	-0.288
		(0.02)	(-1.00)	(0.56)	(-1.45)
$Analysts_{i,t}$		0.073	0.165	0.193	0.550
		(0.34)	(0.27)	(0.85)	(0.76)
$UEarnings_{i,t} \times Analysts_{i,t}$		-0.071	-0.146	-0.114**	-0.153
		(-1.58)	(-1.51)	(-2.11)	(-1.35)
$InstOwn_{i,t}$		0.940*	4.077**	0.666	2.541
		(1.85)	(2.50)	(1.31)	(1.67)
$UEarnings_{i,t} \times InstOwn_{i,t}$		-0.361***	-1.018**	-0.362***	-1.152***
		(-3.31)	(-2.53)	(-2.87)	(-2.78)
$Requests\ OL_{i,t}$		-0.009	0.366	-0.010	-0.072
		(-0.05)	(0.77)	(-0.05)	(-0.16)
$UEarnings_{i,t} \times Requests\ OL_{i,t}$		-0.022	0.048	-0.045	0.001
		(-0.64)	(0.71)	(-1.21)	(0.01)
$Requests\ EA_{i,t}$		0.252**	0.059	0.224	-0.057
		(2.10)	(0.15)	(1.67)	(-0.14)
$UEarnings_{i,t} \times Requests\ EA_{i,t}$		0.003	0.043	0.022	0.089
		(0.09)	(0.53)	(0.54)	(0.90)
$Requests\ Fin\ EA_{i,t}$		0.166**	0.837***	0.153	0.894***
		(2.13)	(3.28)	(1.30)	(2.83)
$UEarnings_{i,t} \times Requests\ Fin\ EA_{i,t}$		0.009	0.011	-0.039	-0.065
		(0.27)	(0.18)	(-0.86)	(-0.76)
$Requests\ OL\ EA_{i,t}$		-0.206***	-0.856***	-0.182*	-0.678***
		(-2.80)	(-5.23)	(-1.86)	(-3.18)
$UEarnings_{i,t} \times Requests\ OL\ EA_{i,t}$		-0.039	-0.068	-0.011	-0.026
		(-1.37)	(-1.20)	(-0.31)	(-0.46)
$\%Local_{i,t}$		-0.016	-0.704	0.053	-1.160
		(-0.04)	(-0.46)	(0.11)	(-0.63)
$UEarnings_{i,t} \times \%Local_{i,t}$		-0.042	-0.344	0.148	-0.271
		(-0.31)	(-0.80)	(0.70)	(-0.54)

(continued on next page)

Table 4 (continued)

Panel B - Abnormal Returns Over the Quarter and Year Following Announcements [$t+2$ to $t+60$ and $t+255$]					
Variable	Predict	Full Sample		PSM Sample	
		(1)	(2)	(3)	(4)
		$ARE_{i,t,2,60}$	$ARE_{i,t,2,255}$	$ARE_{i,t,2,60}$	$ARE_{i,t,2,255}$
$Abs\ UEarnings_{i,t}$		-0.049 (-0.86)	-0.186 (-1.18)	-0.057 (-0.95)	-0.213 (-1.20)
$UEarnings_{i,t} \times Abs\ UEarnings_{i,t}$		0.029* (1.92)	0.003 (0.09)	0.032* (1.84)	0.003 (0.07)
$ReportLag_{i,t}$		-0.039*** (-2.76)	-0.198*** (-5.34)	-0.041*** (-3.29)	-0.204*** (-6.34)
$UEarnings_{i,t} \times ReportLag_{i,t}$		-0.010** (-2.37)	-0.020** (-2.28)	-0.010** (-2.52)	-0.018** (-2.05)
$Abs\ QtrAReturns_{i,t}$		-0.219 (-0.14)	-3.375 (-0.92)	-0.152 (-0.09)	-1.798 (-0.45)
$UEarnings_{i,t} \times Abs\ QtrAReturns_{i,t}$		-0.538 (-1.60)	-1.301** (-2.22)	-0.277 (-0.79)	-1.236 (-1.54)
$MgmtGuidance_{i,t}$		0.069 (0.34)	0.251 (0.39)	-0.091 (-0.37)	-0.086 (-0.11)
$UEarnings_{i,t} \times MgmtGuidance_{i,t}$		0.101 (1.22)	0.114 (0.52)	0.079 (0.85)	-0.066 (-0.28)
$NumArticles_{i,t}$		0.278** (2.30)	1.399*** (3.68)	0.220 (1.56)	1.629*** (3.78)
$UEarnings_{i,t} \times NumArticles_{i,t}$		0.021 (0.48)	0.097 (0.96)	0.033 (0.59)	0.016 (0.13)
Observations		119,160	119,160	79,651	79,651
Adj. R-Squared		0.027	0.041	0.026	0.040

Panel A presents results for regressions of abnormal returns over the month following earnings announcements on unexpected earnings interacted with the geographic dispersion of requests. $ARE_{i,t,a,b}$ are abnormal returns for firm i measured between days a and b relative to the earnings announcement date t . $GeoDisp_{i,t}$ is the geographic dispersion of the requests for the firm's filings over the year prior to the quarterly earnings announcement date t (trading days $t-255$ through $t-5$); further details about the measure are found in Section 3. $High\ GeoDisp_{i,t}$ is an indicator set to 1 if dispersion is above the median and 0 otherwise. All variables are centered using their respective means. Variable definitions are in Appendix A. The constant, and industry (SIC2) and year-quarter (e.g., 2009Q1) fixed effects are untabulated. T-stats are reported in parentheses below their respective coefficients. Standard errors are clustered by firm and year-quarter. ***, **, and * denote two-tailed statistical significance at 1%, 5%, and 10%, respectively.

Panel B presents results for regressions of abnormal returns over the quarter and year following earnings announcements on unexpected earnings interacted with the geographic dispersion of requests. $ARE_{i,t,a,b}$ are abnormal returns for firm i measured between days a and b relative to the earnings announcement date t . $GeoDisp_{i,t}$ is the geographic dispersion of the requests for the firm's filings over the year prior to the quarterly earnings announcement date t (trading days $t-255$ through $t-5$); further details about the measure are found in Section 3. $High\ GeoDisp_{i,t}$ is an indicator set to 1 if dispersion is above the median and 0 otherwise. All variables are centered using their respective means. Variable definitions are in Appendix A. The constant, and industry (SIC2) and year-quarter (e.g., 2009Q1) fixed effects are untabulated. T-stats are reported in parentheses below their respective coefficients. Standard errors are clustered by firm and year-quarter. ***, **, and * denote two-tailed statistical significance at 1%, 5%, and 10%, respectively.

4.2.3.1. *Post-earnings announcement drift and the geographic dispersion of requests findings.* Table 4 Panel A shows the results from tests of the relation between dispersion and PEAD, measured using returns windows over the month following earnings announcement ($t+2$ through $t+5$, $t+10$, $t+15$, and $t+20$). Columns 1 through 4 present results using the full sample, and columns 5 through 8 show results using the PSM sample.²² Using the full sample, columns 2 and 3 each show a negative and statistically significant estimated coefficient at the 5% level for the interaction between unexpected earnings and geographic dispersion ($UEarnings_{i,t} \times GeoDisp_{i,t}$). The coefficients suggest that a one standard deviation increase in geographic dispersion is associated with approximately a 0.03 lower relation between unexpected earnings and returns in both columns.

Next, to test whether greater dispersion is associated with an attenuation of PEAD and not an overreaction during the announcement period followed by a reversal to earnings news, I test whether the overall relation between unexpected earnings and future returns is not negative for firms with high dispersion. Since $GeoDisp_{i,t}$ is a continuous variable, I test this using the difference between the 75th and 25th percentile of $GeoDisp_{i,t}$ to estimate the impact of high dispersion on the overall relation between unexpected earnings and returns.²³ In these columns, I cannot reject the null that the difference in the relation between unexpected earnings and returns at the 75th minus the 25th percentile of geographic dispersion (computed using the estimated coefficients for $UEarnings_{i,t}$ and $UEarnings_{i,t} \times GeoDisp_{i,t}$) is greater than or equal to 0. Therefore, the magnitudes of the estimated coefficients do not indicate a reversal in the response to earnings news for firms with high geographic dispersion.

For the PSM sample, columns 6 and 7 each show that the estimated coefficient for the interaction between unexpected earnings and high dispersion ($UEarnings_{i,t} \times High\ GeoDisp_{i,t}$) is negative and statistically significant at the 5% level. The

²² To understand the magnitude of PEAD in my setting, using the estimated coefficient on the main effect of unexpected earnings ($UEarnings_{i,t}$) across the columns in panel B, I find that the difference in returns between the 75th minus the 25th percentile of $UEarnings_{i,t}$ yields returns of approximately 5.5% for the quarter and 14% for the year. This comports with Ng et al. (2008), who explore PEAD using a sample of NYSE and AMEX firms from 1988 to 2005 and find that exploiting the accrual anomaly yields quarterly returns of 5.38% and annual returns of 11.92%.

²³ I find similar results using the difference between the 99th and 1st percentiles of the distribution of geographic dispersion in this calculation for the tests shown in both panels A and B.

estimated coefficients suggest that high dispersion is associated with a 0.04 and 0.05 lower relation between unexpected earnings and returns, respectively. Because $High\ GeoDisp_{i,t}$ is an indicator, I test whether greater dispersion is associated with an attenuation of PEAD and not a reversal in price by testing whether the sum of the estimated coefficients on unexpected earnings and its interaction with high geographic dispersion is greater than 0. I find that we cannot reject the null that the sum of the estimated coefficients of these terms is greater than or equal to 0 in these columns. The estimated coefficients for the interactions between unexpected earnings and (high) geographic dispersion are negative but statistically insignificant in columns 1, 4, 5, and 8. In total, in both the full and PSM samples, I find evidence that more diversely informed investors are associated with an attenuated PEAD, measured using returns windows over the month following announcements.

Table 4 Panel B presents results for PEAD using returns over the quarter and year following earnings announcements ($t+2$ through $t+60$ and $t+255$, respectively). If investors' responses to earnings news require more than one month to be fully reflected in prices, then the findings in Panel A, using returns over the following month, may not fully capture the market's response. Columns 1 and 2 present results for the full sample using returns horizons of one quarter and one year, respectively, following the announcement. Columns 3 and 4 show results for the PSM sample using the one-quarter and one-year returns horizons, respectively.

In column 2, I find a negative and statistically significant estimated coefficient for the interaction between unexpected earnings and geographic dispersion ($UEarnings_{i,t} \times GeoDisp_{i,t}$) at the 1% level for the one-year returns horizon. The estimated coefficient suggests that a one standard deviation increase in dispersion is associated with a 0.31 lower relation between unexpected earnings and returns. I cannot reject the null that the difference in the relation between unexpected earnings and returns at the 75th minus the 25th percentile of geographic dispersion (computed using the estimated coefficients for $UEarnings_{i,t}$ and $UEarnings_{i,t} \times GeoDisp_{i,t}$) is greater than or equal to 0. Therefore, the magnitudes of the coefficients do not suggest a reversal in the response. For the PSM sample, column 4 shows a negative and statistically significant estimated coefficient at the 5% level for the interaction between unexpected earnings and high geographic dispersion ($UEarnings_{i,t} \times High\ GeoDisp_{i,t}$). The coefficient suggests that high dispersion is associated with a 0.32 lower relation between unexpected earnings and returns. Similar to findings in column 2, in column 4, we cannot reject the null that the sum of the estimated coefficients for unexpected earnings and the interaction between unexpected earnings and high geographic dispersion is greater than or equal to 0. The estimated coefficients for the interactions for the tests using the quarterly returns horizon for both the full and PSM sample, shown in columns 1 and 3, are both negative but statistically insignificant. On balance, I find some evidence consistent with an attenuated PEAD over longer returns windows when investors are more diversely informed.

4.2.4. Intra-period timeliness and the geographic dispersion of requests

I next test the relation between having more diversely informed investors and IPT, measured around quarterly earnings announcements. IPT measures how quickly price moves using an area under the curve approach (Bushman et al., 2010; Twedt, 2016). While tests of the relation between dispersion and PEAD can lead to similar inferences as the tests using IPT, PEAD tests explore the relation between unexpected earnings and returns more directly than IPT does. This is because IPT is constructed only using price movements and does not make assumptions about the relation between unexpected earnings and returns. Therefore, IPT tests can provide complementary evidence of the relation between more diversely informed investors and the completeness of the announcement period price response to earnings news.

I measure IPT over four different windows, which begin on trading day $t-1$ and extend to $t+n$, where t is the date of the earnings announcement and n is 5, 10, 15, and 20 trading days. These windows are similar to those used in prior studies that use IPT to examine the response to earnings announcements (Twedt, 2016). To construct the measure, for each of the days between $t-1$ and $t+n-1$, inclusive, I calculate cumulative abnormal returns between $t-1$ to the given day divided by the cumulative abnormal returns over the entire window. I then estimate the area under the curve as $IPT_{i,t,n} = \sum_{t=-1}^{n-1} (AReturn_{i,t} / AReturn_{i,n}) + 0.5$. I exclude observations with absolute cumulative abnormal returns of less than 2% over the window to mitigate a small denominator effect on the calculation of IPT (Blankespoor et al., 2018).

I examine the relation between having more diversely informed investors and IPT using equation (5). The coefficient of interest in the equation is β_1 . $\beta_1 > 0$ ($\beta_1 < 0$) suggests a quicker (slower) price response to announcements associated with greater dispersion of requests. Equation (5) is as follows.

$$IPT_{i,t,n} = \beta_0 + \beta_1(High\ GeoDisp_{i,t}) + \beta_i \Sigma Controls + FixedEffects + \epsilon, \tag{5}$$

where $IPT_{i,t,n}$ is the IPT metric measured over n trading days around the quarterly earnings announcement date t for firm i . $GeoDisp_{i,t}$ is the geographic dispersion of the requests for the firm's filings over the year prior to the quarterly earnings announcement date t (trading days $t-255$ to $t-5$). $High\ GeoDisp_{i,t}$ is an indicator set to 1 if dispersion is above the median and 0 otherwise. $Controls$ are the same as those from equation (2). $FixedEffects$ is industry (measured using two-digit SIC code) and year-quarter fixed effects, and the equation is estimated using OLS and standard errors clustered by firm and year-quarter.

4.2.4.1. Intra-period timeliness and the geographic dispersion of requests findings. Table 5 shows the results of the estimation of equation (5). Columns 1 through 4 present results using the full sample, and columns 5 through 8 show results using the PSM sample. Across the four horizons used to measure IPT, using the full sample, the estimated coefficients for geographic dispersion ($GeoDisp_{i,t}$) are significantly positive at the 1% level for three of them (columns 1, 2, and 4) and positive yet insignificant in one (column 3). Using the PSM sample, I find similar results. Specifically, high geographic dispersion ($High\ GeoDisp_{i,t}$) is positive and significantly associated with IPT at the 5% or 10% level for three of the horizons used to calculate IPT

Table 5
Inter-period timeliness and the geographic dispersion of requests.

Variable	Predict	Full Sample				PSM Sample			
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		$IPT_{i,t,5}^+$	$IPT_{i,t,10}^+$	$IPT_{i,t,15}^+$	$IPT_{i,t,20}^+$	$IPT_{i,t,5}^+$	$IPT_{i,t,10}^+$	$IPT_{i,t,15}^+$	$IPT_{i,t,20}^+$
$GeoDisp_{i,t}$	+	0.047*** (3.79)	0.110*** (5.74)	0.066 (1.55)	0.173*** (3.76)				
$High\ GeoDisp_{i,t}$	+					0.076** (2.41)	0.125** (2.12)	0.117 (1.08)	0.222* (1.71)
$Size_{i,t}$		0.028*** (3.13)	0.031* (1.74)	-0.053 (-1.53)	-0.034 (-0.67)	0.029** (2.66)	0.048** (2.02)	-0.058 (-1.60)	-0.026 (-0.40)
$FirmLocations_{i,t}$		0.002 (0.81)	0.006 (1.34)	-0.004 (0.64)	0.007 (0.78)	0.001 (0.62)	0.003 (0.72)	0.002 (0.29)	0.010 (0.93)
$Book-to-Market_{i,t}$		0.028 (1.05)	-0.057 (-1.26)	-0.161** (-2.18)	0.026 (0.34)	0.008 (0.22)	-0.131** (-2.31)	-0.262*** (-3.10)	-0.190* (-1.83)
$Analysts_{i,t}$		0.054*** (4.04)	0.162*** (6.26)	0.210*** (5.30)	0.227*** (3.25)	0.056*** (4.59)	0.159*** (5.15)	0.156*** (3.58)	0.107 (1.11)
$InstOwn_{i,t}$		0.285*** (7.04)	0.680*** (8.21)	1.066*** (6.73)	1.641*** (8.87)	0.238*** (4.65)	0.650*** (6.74)	1.317*** (7.18)	1.886*** (8.18)
$Requests\ OL_{i,t}$		-0.060*** (-4.11)	-0.150*** (-5.10)	-0.169*** (-3.98)	-0.266*** (-4.29)	-0.061*** (-3.94)	-0.178*** (-5.42)	-0.163*** (-3.35)	-0.269*** (-3.36)
$Requests\ EA_{i,t}$		0.069*** (4.51)	0.150*** (4.58)	0.232*** (5.75)	0.402*** (6.39)	0.083*** (4.92)	0.153*** (4.19)	0.241*** (4.91)	0.393*** (5.05)
$Requests\ Fin\ EA_{i,t}$		0.017 (1.34)	0.016 (0.85)	0.030 (0.96)	-0.125*** (-2.80)	0.023 (1.61)	0.013 (0.51)	0.045 (1.00)	-0.092 (-1.51)
$Requests\ OL\ EA_{i,t}$		0.008 (0.82)	0.018 (1.13)	0.036 (1.49)	0.076*** (2.80)	0.004 (0.35)	0.023 (1.01)	0.029 (1.00)	0.064 (1.28)
$\%Local_{i,t}$		0.060 (0.95)	0.246** (2.39)	0.423** (2.50)	0.429 (1.46)	0.057 (0.86)	0.202 (1.37)	0.424** (2.08)	0.143 (0.36)
$Abs\ UEarnings_{i,t}$		0.019*** (4.10)	0.043*** (5.62)	0.047*** (4.36)	0.066*** (5.01)	0.017*** (3.47)	0.049*** (5.76)	0.052*** (3.67)	0.073*** (4.53)
$ReportLag_{i,t}$		-0.003*** (-3.94)	-0.006*** (-3.23)	-0.012*** (-2.82)	-0.017** (-2.32)	-0.003*** (-2.98)	-0.005** (-2.53)	-0.011** (-2.55)	-0.018** (-2.48)
$Abs\ QtrAReturns_{i,t}$		-0.156** (-2.18)	-0.202 (-1.26)	-0.815*** (-2.76)	-0.639* (-1.78)	-0.080 (-0.88)	-0.064 (-0.36)	-0.702* (-1.86)	-1.211** (-2.64)
$MgmtGuidance_{i,t}$		0.020 (0.79)	0.045 (0.93)	0.053 (0.60)	0.092 (0.80)	0.035 (1.05)	0.018 (0.27)	0.082 (0.76)	0.221 (1.47)
$NewsArticles_{i,t}$		0.049*** (2.93)	0.104*** (3.40)	0.160*** (2.85)	0.097 (1.53)	0.045** (2.40)	0.124*** (3.11)	0.163*** (2.92)	0.071 (0.78)
Observations		90,780	94,451	96,785	98,588	61,385	63,833	65,142	66,286
Adj. R-Squared		0.014	0.017	0.013	0.011	0.011	0.013	0.011	0.010

This table presents results for the regression of intra-period timeliness (IPT) on the geographic dispersion of requests. Variable definitions are in Appendix A. The constant, and industry (SIC2) and year-quarter (e.g., 2009Q1) fixed effects are untabulated. T-stats are reported in parentheses below their respective coefficients. Standard errors are clustered by firm and year-quarter. ***, **, and * denote two-tailed statistical significance at 1%, 5%, and 10%, respectively.

(columns 5, 6, and 8) and insignificant for one (column 7). A one standard deviation change in geographic dispersion is associated with, on average, approximately 2.3% of the standard deviations of IPT across the three significant horizons in the full sample. For the PSM sample, high dispersion, on average, is associated with 2.5% of the standard deviation of IPT across the three statistically significant horizons. These findings are consistent with a quicker price movement in response to earnings news when investors are more diversely informed.

4.2.5. Price response to earnings news and diversely informed investors conclusion

When viewed together, my findings of a greater overall price response magnitude during the announcement period, higher ERC, an attenuated PEAD, and greater IPT suggest a more efficient price response to earnings news for firms with more diversely informed investors. This indicates that, on average, the effect of information diversity on the completeness of the announcement period price response to earnings news outweighs its potential impact on price drifts. These findings are consistent with the wisdom of crowds argument and predictions from prior research that greater information diversity across investors leads to a more efficient price response to earnings news.

4.3. Additional analysis: relative amount of announcement period trading and the geographic dispersion of requests

Since my findings indicate that greater information diversity is associated with heightened announcement period trading and a more efficient price response, I expect that such trading peak then subsides more quickly for firms with greater information diversity (Holthausen and Verrecchia, 1990; Kim and Verrecchia, 1994). To test this, I use equation (6) below. The coefficient of interest in the equation is β_1 , the relation between the geographic dispersion of requests and the relative amount of announcement period trading to the trading over a given number of days after the announcement. Equation (6) is as follows.

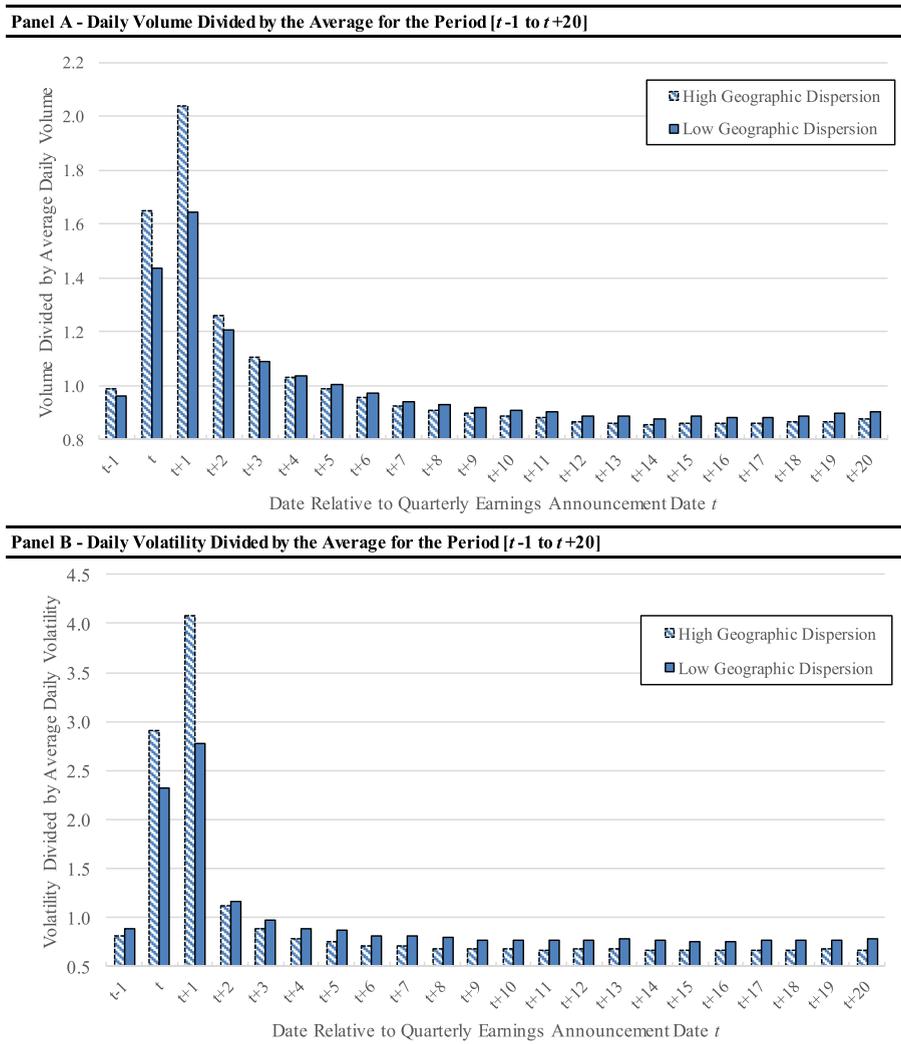


Fig. 5. Relative Daily Trading Volume (Volatility) by High and Low Geographic Dispersion of Requests. This figure presents the relative daily trading around earnings announcements by high and low geographic dispersion. It is calculated as daily trading volume (Panel A) and volatility (Panel B) divided by the average over trading days $t-1$ through $t+20$, where t is the date of the quarterly earnings announcement (Barth et al., 2020). High (Low) Geographic Dispersion are firm quarters where the geographic dispersion of the requests for the firm's filings is above (below) the median. See Section 3 for details about how the locations of a firm's investors are measured and how dispersion is calculated. Volume is the daily trading volume of the firm. Volatility is the daily squared residual stock return for the day estimated using the Fama and French (1993) three-factor model augmented with momentum (Carhart, 1997).

$$VolA(VolM)_{i,t} = \beta_0 + \beta_1(High) GeoDisp_{i,t} + \beta_i \Sigma Controls + FixedEffects + \epsilon, \tag{6}$$

where $VolA_{i,t}$ and $VolM_{i,t}$ are the two measures of the relative amount of announcement period trading from Barth et al. (2020). $VolA_{i,t}$ is the sum of daily equity volatility over the $t-1$ to $t+1$ trading days window around quarterly earnings announcement date t divided by the sum of daily equity volatility over trading days $t-1$ through $t+20$.^{24,25} Following Landsman and Maydew (2002), daily equity volatility is calculated as the square of the residual stock return for the given trading day. Daily residual stock return is measured as the difference between the realized daily stock return and the expected return using the Fama and French (1993) three-factor model, augmented with momentum from Eventus (Carhart, 1997). $VolM_{i,t}$ is the sum of daily trading volume over the $t-1$ through $t+1$ trading days window around quarterly earnings announcement date t divided by the sum of daily trading volume over the $t-1$ through $t+20$ trading days window. $GeoDisp_{i,t}$ is

²⁴ I follow Barth et al. (2020) and use $t-1$ through $t+20$ as the full earnings announcement window to calculate the two main specifications of the measures. Therefore, any trading in response to earnings news outside of this window is not captured in the measure.

²⁵ I find similar results using shorter windows of $t-1$ through $t+5$, $t+10$, and $t+15$ trading days to calculate the measures, untabulated.

Table 6
Relative amount of announcement period trading and the geographic dispersion of requests.

Variable	Predict	Full Sample		PSM Sample	
		(1)	(2)	(3)	(4)
		$VolM_{i,t}$	$VolA_{i,t}$	$VolM_{i,t}$	$VolA_{i,t}$
$GeoDisp_{i,t}$	+	0.004*** (7.88)	0.011*** (7.19)		
$High\ GeoDisp_{i,t}$	+			0.006*** (5.31)	0.018*** (5.24)
$Size_{i,t}$		-0.006*** (-11.15)	0.000 (0.29)	-0.006*** (-10.89)	-0.000 (-0.26)
$FirmLocations_{i,t}$		-0.000 (-1.29)	0.000 (0.40)	-0.000 (-1.21)	0.000 (0.08)
$Book\text{-}to\text{-}Market_{i,t}$		-0.004*** (-3.27)	-0.005* (-2.01)	-0.006*** (-4.24)	-0.011*** (-3.63)
$Analysts_{i,t}$		0.013*** (13.25)	0.025*** (12.67)	0.012*** (12.40)	0.023*** (10.80)
$InstOwn_{i,t}$		0.021*** (8.05)	0.102*** (17.29)	0.022*** (8.23)	0.107*** (16.56)
$Requests\ OL_{i,t}$		-0.001** (-2.36)	-0.013*** (-8.10)	-0.002*** (-3.03)	-0.013*** (-7.29)
$Requests\ EA_{i,t}$		0.007*** (10.23)	0.016*** (9.43)	0.009*** (10.36)	0.021*** (10.01)
$Requests\ Fin\ EA_{i,t}$		0.001* (1.99)	0.001 (1.24)	0.001* (1.94)	0.002 (1.30)
$Requests\ OL\ EA_{i,t}$		0.000 (1.31)	0.003*** (2.89)	0.000 (0.97)	0.002 (1.51)
$\%Local_{i,t}$		-0.004 (-1.33)	0.007 (1.00)	-0.009** (-2.40)	-0.003 (-0.38)
$Abs\ UEarnings_{i,t}$		0.001*** (5.96)	0.004*** (9.48)	0.001*** (5.39)	0.004*** (7.70)
$ReportLag_{i,t}$		-0.000*** (-3.88)	-0.001*** (-5.73)	-0.000** (-2.64)	-0.001*** (-4.58)
$Abs\ QtrAReturns_{i,t}$		0.017*** (4.84)	-0.037*** (-5.21)	0.018*** (4.68)	-0.035*** (-4.05)
$MgmtGuidance_{i,t}$		0.003** (2.53)	0.014*** (4.46)	0.003** (2.31)	0.013*** (3.72)
$NewsArticles_{i,t}$		0.005*** (6.90)	0.012*** (6.63)	0.005*** (6.47)	0.014*** (6.64)
Observations		119,160	119,160	79,651	79,651
Adj. R-Squared		0.125	0.137	0.103	0.115

This table presents results from the relative amount of earnings announcement period trading on the geographic dispersion of requests. Variable definitions are in Appendix A. The constant, and industry (SIC2) and year-quarter (e.g., 2009Q1) fixed effects are untabulated. T-stats are reported in parentheses below their respective coefficients. Standard errors are clustered by firm and year-quarter. ***, **, and * denote two-tailed statistical significance at 1%, 5%, and 10%, respectively.

the geographic dispersion of the requests for the firm's filings over the year prior to the quarterly earnings announcement date t (trading days $t-255$ through $t-5$). $High\ GeoDisp_{i,t}$ is an indicator set to 1 if dispersion is above the median and 0 otherwise. Controls are the same as those from equation (2). FixedEffects is industry (measured using two-digit SIC code) and year-quarter fixed effects. The equation is estimated using OLS with standard errors clustered by firm and year-quarter, and all continuous variables are winsorized at the 1% and 99% levels.

4.3.1. Relative amount of announcement period trading and the geographic dispersion of requests findings

Fig. 5 illustrates the relative amount of trading around earnings announcements for firms with high and low geographic dispersion of requests. Panels A and B present daily trading volume and daily volatility, respectively, divided by the average of that over trading days $t-1$ through $t+20$, where t is the earnings announcement date. The figure shows that a greater relative amount of volume and volatility occurs in the three-day window around earnings announcements for firms with high geographic dispersion of requests.

The results from estimating equation (6), shown in Table 6, support the findings from Fig. 5. Columns 1 and 2 present results using the full sample and show a positive and significant relation at the 1% level between geographic dispersion ($GeoDisp_{i,t}$) and the two measures of the persistence of the announcement period trading ($VolM_{i,t}$ and $VolA_{i,t}$). The estimated coefficients for geographic dispersion in columns 1 and 2 suggest that a one standard deviation change in dispersion is associated with 5.5% and 5.4% of the standard deviations of the $VolM_{i,t}$ and $VolA_{i,t}$, respectively. For the PSM sample, the estimated coefficients for high geographic dispersion ($High\ GeoDisp_{i,t}$) in columns 3 and 4 are both positive and significant at the 1% level. The magnitudes of the estimated coefficients suggest that high dispersion is associated with approximately 6.7% and 7.2% of the standard deviation of the $VolM_{i,t}$ and $VolA_{i,t}$, respectively. Together, these findings indicate that, for firms that have a greater geographic dispersion of requests, relatively more trading occurs during the announcement period and less

occurs during days after the earnings announcement. Consistent with expectations, this result suggests that the initial heightened trading for firms with a greater diversity of information across investors subsides more quickly.

4.4. Additional robustness tests

4.4.1. ERC and PEAD using value-weighted portfolio tests

Prior research suggests that cross-sectional returns tests may not fully account for the impact of firm size on returns (Fama and French, 1993). Therefore, as an alternative way to account for firm size and provide additional evidence that differences in size do not explain my returns findings, I conduct the ERC and PEAD analyses using a value-weighted portfolio pricing methodology (Ng et al., 2008; Hirshleifer et al., 2009; Dimitrov and Jain, 2011).²⁶ To construct the value-weighted portfolios, I first create deciles of geographic dispersion ($GeoDisp_{i,t}$) and unexpected earnings based on quarterly independent double sorts of each measure. This procedure results in 100 quarterly portfolios (10x10) formed on the decile rankings of unexpected earnings and geographic dispersion. Next, within each portfolio, I compute each firm's weight as its percentage share of the portfolio's total market value, calculated as the firm's market value divided by the sum of the market values of all firms in the portfolio. I then weight each firm's abnormal returns for the given test period (e.g., returns for the period $t-1$ to $t+1$ for the ERC test) by their percentage weight and compute the value-weighted returns of each portfolio for the given period by summing the value-weighted returns across the portfolios' firms.

In untabulated results for the period $t-1$ to $t+1$ (i.e., the ERC returns window), I first find that the difference in returns between the top and bottom deciles of unexpected earnings is greater for firms in the top decile of geographic dispersion than for the bottom decile. This indicates that the price response to earnings news is more pronounced for firms with the highest level of geographic dispersion when compared to the lowest level, which is consistent with my cross-sectional ERC test. Next, in my tests of PEAD using the portfolio pricing methodology, across all of my returns windows ($t+2$ to $t+5$, $t+10$, $t+15$, $t+20$, $t+60$, and $t+255$ trading days), I find that firms in the highest decile of geographic dispersion of investors are associated with a lower difference between the highest and lowest deciles of unexpected earnings, consistent with my cross-sectional findings. Combined, my results from these portfolio pricing analyses suggest that firms with a higher geographic dispersion of investors are associated with a greater ERC and lower PEAD; this provides further evidence consistent with my predictions. Moreover, these results further mitigate concerns that differences in size drive my returns findings.

4.4.2. Removing filings requests from India

One possible concern regarding the robustness of the requests to EDGAR reflecting investors is that many of the requests that originate from India may not come from investors but rather from individuals working for data aggregation firms. Collecting and categorizing data found in companies' filings can be very time-consuming, and some companies hire low-cost outsourcing firms located in India to perform this work. A representative from a large U.S.-based financial data aggregator confirmed that some of their data sets are collected through operations located in India. Therefore, to address this concern, I remove requests originating from India from my sample, recalculate my measure of the geographic dispersion of requests, and rerun my main tests. I find that this does not materially affect my findings in untabulated results.

5. Conclusion

The findings in this study suggest that the diversity of information possessed across investors plays an important role in the efficiency of the price response to earnings news. I measure information diversity using the variation in investors' geographic locations, estimated using the locations of the requests for firms' filings to the EDGAR filing system. Firms with greater geographic dispersion of requests have higher abnormal turnover during the announcement period, which supports the geographic dispersion of requests as a measure of the diversity of information across investors. My findings of a (1) greater overall magnitude price response during the announcement period, (2) higher ERC, (3) lower PEAD, and (4) higher IPT associated with greater geographic dispersion of requests are consistent with theories that suggest that a greater diversity of information across investors leads to a relatively more efficient price response to earnings news. In further analysis, I find that the heightened level of trading during the announcement period for firms with greater investors' information diversity subsides quickly.

This study makes several contributions to the literature. First, my findings add to research on the effects of information diversity in the market, suggesting a more efficient response to earnings news when investors are more diversely informed. Second, it contributes to the burgeoning literature that explores the effects of location on investor's information and its implications on the market. Research on the impact of investors' locations on the response to earnings announcements has primarily focused on the effects of investor's distance to a firm's headquarters, which is a first moment construct of locations. My findings provide evidence that dispersion in a firm's investors' locations, a second moment construct, also has

²⁶ Following Hou et al. (2020), I also conducted cross-sectional value-weighted returns tests using weighted least squares and the market value of each firm's equity as weights. My findings from these untabulated analyses are consistent with a higher ERC and lower PEAD for firms with greater geographic dispersion of investors, which aligns with my tabulated cross-sectional analysis. These results provide further evidence that differences in firm size do not explain my returns findings.

implications for the market's response to earnings news. Furthermore, this study gives insight into the locations of the requests to the EDGAR filing system, which provides additional context to the findings in prior studies that utilized this setting.

This study primarily focuses on exploring the market's assessments of and responses to firms' disclosures, specifically the relation between the degree to which investors are diversely informed and the market's response to earnings news. Having more diversely informed investors may have further implications for the pricing of information available across different geographic operations of a firm (García and Norli, 2012) and the conditions under which stock price is more likely to be informative (Fama, 1998; Lee, 2001; Kothari, 2001; Beyer et al., 2010). Future research could help shed light on the implications of having diversely informed investors on these and other related areas of study.

Appendix A. Variables Definitions

Variable	Definition	Data Source(s)
$\%Local_{i,t}$	The proportion of requests for a firm's filings that originate from within 250 miles of their headquarters over the year prior to earnings announcement date t (trading days $t-255$ through $t-5$) (Chi and Shanthikumar, 2017).	EDGAR, MaxMind, SAS Zipcode, Hand Collection
$Abs\ QtrAReturns_{i,t}$	The absolute value of buy-and-hold returns over the quarter (trading days $t-54$ through $t-5$, where t is the date of the earnings announcement) minus the returns of the value-weighted market index. Buy-and-hold and market index returns are calculated using Eventus.	CRSP/Eventus
$Analysts_{i,t}$	Log of 1 plus the number of analysts forecasts used to calculate unexpected earnings for the firm's earnings announcement on date t .	I/B/E/S
$ARet_{i,t,a,b}$	Abnormal returns, calculated as the difference between the firm's buy-and-hold returns minus the value-weighted market returns over trading days a and b relative to the earnings announcement date t . I use Eventus to calculate buy-and-hold and market index returns.	CRSP/Eventus
$ATurnover_{i,t}$	Abnormal turnover is calculated as the market-adjusted turnover in the three-day window around the firm's earnings announcement date t (trading days $t-1$ through $t+1$) minus that over the non-event window (trading days $t-41$ through $t-5$). Market-adjusted turnover is the difference between the average daily turnover and the average of the market over the given window (Garfinkel, 2009).	CRSP/Eventus
$Book\text{-}to\text{-}Market_{i,t}$	The book-to-market ratio calculated as the book value of equity divided by the market value of equity.	Compustat, CRSP
$FirmLocations_{i,t}$	The number of locations with potentially relevant local information sources, calculated as the number of unique states and countries mentioned in the firm's Business Section (Item 1) and Management Discussion and Analysis (Item 7) of the 10-K filing. Countries are restricted to the top 50 economically developed countries, as defined by the United Nations 2012 GDP report.	10-K Filings
$(High)\ GeoDisp_{i,t}$	The amount of dispersion (i.e., variation) in the locations of the requests for a firm's filings from EDGAR likely near local information sources that are relevant to the firm. I use requests for the firms' filings over the year prior to the earnings announcement date t (trading days $t-255$ through $t-5$). I calculate dispersion as the log of the sum of the variance of the latitudes and the variance of the longitudes of the locations of the requests. $High\ GeoDisp_{i,t}$ is an indicator set to 1 if $GeoDisp_{i,t}$ is above the median and 0 otherwise.	EDGAR, Maxmind
$InstOwn_{i,t}$	The proportion of institutional holdings in the firm, calculated as the number of shares held by institutional investors divided by the total number of shares outstanding from the firm's 13 F filings.	Thomson Reuters 13 F
$IPT_{i,t,n}$	Intra-period timeliness is calculated as 0.5 plus the sum of daily abnormal returns from trading days $t-1$ through $t+n-1$ divided by the cumulative abnormal returns from $t-1$ through $t+n$ around the firm's earnings announcement date t (Bushman et al., 2010). I calculate IPT using 5, 10, 15, and 20 trading days for n . Absolute cumulative abnormal returns of less than 2% over the window are excluded (Blankespoor et al., 2018).	CRSP/Eventus
$MgmtGuidance_{i,t}$	An indicator set to 1 if management provided earnings guidance for the earnings announcement and 0 otherwise.	I/B/E/S Guidance
$NewsArticles_{i,t}$	Log of 1 plus the number of earnings announcement related articles in the three-day window around the firm's earnings announcement date t (trading days $t-1$ through $t+1$). Articles are from RavenPack Dow Jones edition and only articles with a relevancy score of 100 are kept (Drake et al., 2014; DeHaan et al., 2015).	RavenPack Dow Jones Edition
$ReportLag_{i,t}$	The number of days between the fiscal period end date and the earnings announcement date t (Blankespoor et al., 2018).	Compustat
$Requests\ EA_{i,t}$	Log of 1 plus the total number of requests for the firm's filings from EDGAR in the three-day window around the earnings announcement date t (trading days $t-1$ to $t+1$, where t is the date of the quarterly earnings announcement).	EDGAR

(continued on next page)

(continued)

Variable	Definition	Data Source(s)
$Requests\ Fin\ EA_{i,t}$	Log of 1 plus the number of requests that originate from within 250 miles of a financial center in the three-day window (trading days $t-1$ through $t+1$) around the earnings announcement date t . Financial center cities are the 102 cities named in The Global Financial Centres Index 25 report.	EDGAR, Global Financial Centres Index 25, Hand Collection
$Requests\ OL_{i,t}$	The number of requests used in the calculation of the geographic dispersion of requests ($GeoDisp_{i,t}$). Calculated as the log of 1 plus the total number of requests that are likely near local information relevant to the firm over the year prior to the firm's earnings announcement at date t (trading days $t-255$ through $t-5$).	10-K Filings, EDGAR
$Requests\ OL\ EA_{i,t}$	Log of 1 plus the number of requests that originate from a state or country, if outside of the U.S., mentioned in the firm's Business Section (Item 1) or Management Discussion and Analysis (Item 7) of the 10-K filing in the three-day window (trading-days $t-1$ through $t+1$) around the firm's earnings announcement date t .	10-K Filings, EDGAR
$Size_{i,t}$	Log of the market value of the firm's equity calculated as the share price at the end of the quarter multiplied by the total number of shares outstanding, denoted in millions.	Compustat
$UEarnings_{i,t}$	Decile ranking (0–9) of unexpected earnings following Blankespoor et al. (2018). Unexpected earnings (UE) is defined as the median consensus analyst quarterly forecast minus actual earnings from IBES divided by the price of the firms shares at the end of the quarter. If an analyst consensus is not available, then the seasonal random walk UE is used. The seasonal random walk UE is calculated as the difference between current quarter $eps_{i,t}$ and one-year lagged $eps_{i,t}$ divided by the price at the end of the quarter.	I/B/E/S, Compustat, CRSP
$VolM_{i,t}$ ($VolA_{i,t}$)	Persistence of the earnings announcement period trading. It is calculated as the sum of daily trading volume (return volatility) over trading days $t-1$ through $t+1$ around the firm's earnings announcement date t divided by the sum of daily trading volume (return volatility) over trading days $t-1$ through $t+20$ (Barth et al., 2020).	CRSP/Eventus

Appendix B. Summary of EDGAR Log Sample

Table AB.1. Requests to EDGAR Sample Preparation

Panel A - Summary of Requests			
	Requests	Less	% Reduction
Total Requests	16,182,192,202		
Less: Automated Requests		14,430,604,529	89%
(a) Requests	1,751,587,673		
Less: No Location Information		213,225,908	12%
Less: No GVKEY to CIK Match		374,666,099	21%
(b) Requests after Preprocessing	1,163,695,666		
Panel B - Summary of Requests by Year			
Calendar Year	Months Available	(a) Requests	(b) Requests after Preprocessing
2006	12	39,292,385	24,340,774
2007	12	63,386,757	44,739,490
2008	12	80,891,499	60,898,806
2009	12	125,164,705	86,986,233
2010	12	147,781,399	103,299,930
2011	12	192,431,817	135,534,139
2012	12	173,240,369	123,143,589
2013	12	239,161,096	169,400,648
2014	12	286,447,202	190,204,895
2015	12	330,792,376	185,748,850
2016	3	72,998,068	39,398,312
Total	123	1,751,587,673	1,163,695,666

This table provides a summary of the number of requests to the EDGAR web server. The main sample of requests covers the period from January 1st, 2006, to March 31st, 2016. Panel A summarizes the total number of requests and the number of requests removed during each part of the sample selection. Automated Requests come from automated programs; details about how such requests are identified are found in Section 3.1. Panel B presents the number of months represented in the given year and the number of requests by calendar year.

Appendix C. Estimating the Locations of the IPV4 Addresses in the EDGAR Server Logs

Internet protocol (IP) addresses in the EDGAR log files are denoted in IP version 4 (IPV4) format. The last octet of each of the IPV4 addresses in the log files is masked to protect the privacy of the specific person or entity making the request to EDGAR. For example, an IPV4 address would be represented in the log files as 192.168.71.abc. The last octet of the address is masked and is denoted as abc in the example.

To determine the locations of the requests, I first look up the locations of the highest and lowest IPV4 address of the network denoted by the first three octets of the address and check if they are equal. Since IPV4 addresses are allocated in sequential chunks, if the locations of the highest and lowest addresses in the given space are equal, then it is likely that all the addresses in between were allocated to the same entity. Therefore, even though the last octet of the IPV4 address is masked, it is reasonable to assume that all the addresses in the given space belong to the same entity if the locations of the highest and lowest IP addresses are identical. To illustrate, to estimate the location of the example masked IPV4 address above, I find the latitude and longitude location of addresses 192.168.71.255 and 192.168.71.000. If the locations of these two addresses match, I use that location as the estimated location for the masked IP address.

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