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Shareholder Coordination and Stock Price Informativeness

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Abstract

We show that firm-specific information is more likely to be incorporated into stock prices when firms have stronger shareholder coordination. The premise of our work is that geographic proximity reduces communication costs among shareholders, thereby leading to better coordination. The positive coordination-informativeness relation is driven mainly by shareholder coordination among dedicated and independent institutions. We further show that the positive effect is more pronounced for firms with weaker governance mechanisms, suggesting that shareholder coordination could serve as a substitute conduit of price discovery. Lastly, we propose that shareholder coordination improves stock price informativeness through the channel of enhanced voluntary disclosure quality.

Keywords

geographic proximity; shareholder coordination; stock price informativeness

INTRODUCTION

A number of studies highlight that equity ownership by institutional investors has explosively increased over the last 20 years in the U.S. stock market.[1] In addition, corporate ownership structure has become more dispersed in terms of the number and types of institutional investors.[2] Financial theory suggests that when ownership is dispersed among many small individual shareholders, corporate governance benefits from the existence of large shareholders (e.g., Maug, 1998; Shleifer & Vishny, 1986) who are often institutions (e.g., Hartzell & Starks, 2003 ; Kahn & Winton, 1998). Institutional investors actively engage in the monitoring of self-serving managers, acting as a disciplinary mechanism that attenuates agency costs (e.g., Chen, Harford, & Li, 2007; Gillan & Starks, 2000). Past studies on the effectiveness of institutional investors in corporate governance have mostly focused on institutions' information-gathering and analytical abilities (e.g., Ayers, Ramalingegowda, & Yeung, 2011; Chhaochharia, Kumar, & Niessen-Ruenzi, 2012), but have largely overlooked the importance of coordination among institutional shareholders. Shareholder coordination, if in place, can facilitate the cooperation among the institutional investors and thereby enhance monitoring effectiveness by significantly weakening the free-rider problem which aggravates agency conflicts (Grossman & Hart, 1980). This notion is supported by survey evidence documented by McCahery, Sautner, and Starks (2010) showing that 59% of institutional investors among respondents consider coordination with other institutional investors as a way to improve monitoring of managers.

In this article, we study the role of shareholder coordination, proxied by geographic proximity among prominent shareholders such as institutional investors, in increasing a firm's transparency and in encouraging the incorporation of more firm-specific information into stock prices. Monitoring effort and effectiveness is intensified through the coordination among shareholders (e.g., Huang, 2013). As a result, managers under scrutiny are more likely to disclose timely and quality information to the public. On the one hand, uninformed investors drawn by trustworthy public information are more likely to possess ownership and thereby incorporate firm-specific information into stock prices. On the other hand, informed investors are more incentivized to collect private firm-specific information as the marginal benefits of trading with uninformed investors increase. Kyle (1985) demonstrates that private information is incorporated into stock prices through trades placed by informed traders. In other words, we hypothesize that the positive impact of shareholder coordination on stock price informativeness is achieved through greater corporate disclosure by revealing more firm-specific information to the market and encouraging more collection of private information at reduced cost.

To measure the degree of coordination at the firm level, we calculate the average of the geographic distance among institutional investors weighted by ownership. The rationale of our proxy lies in the fact that institutional investors are more likely to coordinate their corporate monitoring efforts when potential connections between them become more likely with proximity. Social network literature suggests that social networks are more likely to develop when there is homophily, i.e. the tendency of individuals to associate and bond with others driven by familiarity, often emanating from geographic proximity.[3] Since the weighted average of distance is inversely associated with the level of coordination, we multiply it by −1 for convenience sake. Therefore, the coordination measure is the inverse of the weighted average of the geographic distance among institutional shareholders (hereafter $COORD$).

Our baseline results show the positive relation between the shareholder coordination and the stock price informativeness, measured as idiosyncratic volatility (IV).[4] Existing literature shows that dedicated (e.g., Bushee, 1998) and independent institutional investors (e.g., Brickley, Lease, & Smith, 1988) are more active

monitors[5] than their counter peers (transient and grey institutional investors). We further find that the positive relation between coordination and stock price informativeness is driven mainly by the coordination among dedicated and independent institutional investors. Our finding supports the notion that coordination among active monitors enhances monitoring effectiveness and thereby improves a firm's information environment.

Next, we examine whether there is a complement or substitution effect between shareholder coordination and other governance mechanisms that have been shown to be related with stock price informativeness.[6] The literature has shown that governance mechanisms such as antitakeover provisions (Ferreira & Laux, 2007), board gender diversity (Gul, Srinidhi, & Ng, 2011), and blockholder ownership (Brockman & Yan, 2009) are significantly positively related to price informativeness. Our results show that the impact of shareholder coordination on price informativeness is more pronounced in firms with weaker alternative governance mechanisms. More specifically, firms with more antitakeover provisions, poison pill provision, low board gender diversity, and low blockholder ownership exhibit more significant and stronger coordination-informativeness relation, suggesting that shareholder coordination acts as a substitute for other existing governance mechanisms.

Although our findings indicate that shareholder coordination improves stock price informativeness, it is plausible that some visible and invisible omitted variables could drive our results. For example, our coordination variable could merely capture the same effect of local ownership on corporate disclosure quality. Meanwhile, the invisible time-invariant factors such as corporate culture could also explain our results, simply because firms with ethical culture are more likely to deliver reliable information to investors. Therefore, to mitigate the omitted variable concern, we take the following steps: (1) we include in our results the model specification with firm fixed effects that absorbs the effects of time-invariant factors; and (2) we control for more variables such as ownership of different types of institutional investors, board characteristics, and managerial ownership in our regressions. Our baseline results continue to hold after controlling for these variables. Another explanation for our finding is that shareholders that are geographically clustered simultaneously invest in stocks that display a high level of stock price informativeness, leading to strong shareholder coordination. To address the reverse causality issue, we conduct three additional analyses: lead-lag analysis, change-on-change analysis, and GMM analysis. The results confirm that shareholder coordination leads to informative stock prices, but not vice versa.

Finally, we explore the potential mechanism through which shareholder coordination improves stock price informativeness. We focus on examining whether shareholder coordination enhances corporate voluntary disclosure. It is well established in the literature that corporate voluntary disclosure can improve price informativeness. For example, Haggard, Martin, and Pereira (2008) uncover a positive relation between corporate voluntary disclosure and price informativeness. Drawing from the literature (e.g., Ajinkya, Bhojraj, & Sengupta, (2005) ; Bamber & Cheon, 1998; Lennox & Park, 2006), we use the frequency of management earnings forecasts to capture the extent of voluntary disclosure. We find that shareholder coordination has a positive impact on the frequency of management earnings forecasts. Moreover, the positive relation is primarily driven by firms with large size, indicating that shareholder coordination affects voluntary disclosure differently for firms of different sizes. Further, after including management earnings forecasts, the coordination-informativeness relation still holds, but is more pronounced in small firms. Taken together, our results imply that for large firms, shareholder coordination enhances price informativeness mainly by inducing managers to increase value-relevant voluntary disclosures, whereas for small firms, shareholder coordination affects price informativeness by facilitating price information collection and incorporation. To further bolster our findings in channel tests, we provide additional evidence by showing that shareholder coordination also positively affects two alternative measures of voluntary disclosure (management forecast occurrence and forecast precision).

Overall, our results suggest that shareholder coordination affects price informativeness through enhancing corporate disclosure quality.

The contribution of our study is threefold. Firstly, we extend the literature that has provided mixed evidence on the relation between governance mechanisms and stock price informativeness. For example, Ferreira and Laux (2007) find that firms with fewer antitakeover provisions display higher levels of price informativeness. Brockman and Yan (2009) find that blockholders increase the probability of informed trading and idiosyncratic volatility. Gul et al. (2011) find that stock prices of firms with gender-diverse boards reflect more firm-specific information. Conversely, Ferreira, Ferreira, and Raposo (2011) find a negative relation between price informativeness and board independence, suggesting a substitution effect between board independence and price informativeness. Our paper makes an important contribution to the literature by documenting that shareholder coordination, serving as an internal governance mechanism, is positively associated with stock price informativeness.

Secondly, there is also an ongoing debate about whether more corporate transparency leads to greater stock price informativeness. While the conventional wisdom is that corporate transparency facilitates more firm-specific information incorporation into stock prices (e.g., Gelb & Zarowin, (2002), Dasgupta, Gan, and Gao (2010) theoretically and empirically show that stock price informativeness can decrease when corporate transparency improves. Our paper makes an important contribution to the ongoing debate by demonstrating that corporate transparency driven by shareholder coordination is positively associated with the incorporation of firm-specific information into stock prices.

Thirdly, our study also adds to the literature on the role of geographic proximity in information gathering and effective monitoring. Prior literature has documented that geographic proximity between firms and shareholders facilitates private information collection and monitoring effort (e.g., Ayers et al., 2011; Chhaochharia et al., 2012). Our findings extend the literature by showing that geographic proximity between a firm's institutional investors can not only improve institutions' monitoring effectiveness but also corporate transparency, and therefore it can have important implications for market efficiency. It is also noteworthy that our paper is different from Huang (2013) in that we focus on investigating whether the degree of shareholder coordination can affect a firm's transparency and thereby encourage the incorporation of more firm-specific information into stock prices, whereas the goal of Huang (2013) is to determine whether shareholder coordination affects firm value.

The remainder of the paper is organized as follows. Section describes the sample, measurement of variables, and summary statistics. Section contains empirical results. Section provides robustness checks. Section discusses a possible mechanism. Second 6 includes concluding remarks.

SAMPLE SELECTION, VARIABLE CONSTRUCTION, AND SUMMARY STATISTICS

Sample selection

We draw data from the Center for Research in Stock Prices (CRSP), Compustat, Thomson Reuters F13 Institutional Holdings, Execucomp and I/B/E/S databases. We place two filters to obtain the final sample: (1) to alleviate market microstructure-related concerns, we focus on S&P 1500 firms; (2) financial firms (SIC 6000–6999) and utilities (SIC 4900–4999) are excluded from the sample because their capital market behaviors are fundamentally different from that of other firms due to regulation and the financial nature of their operations. Our final sample includes 19,028 firm-year observations for the period from 1994 to 2010. The institutional investor classification data is from Brian Bushee's website (http://0-acct.wharton.upenn.edu.libus.csd.mu.edu/faculty/bushee/IIclass.html).[7] We also augment our sample with corporate board data extracted from Compact Disclosure and IRRC and management earnings forecast data

from First Call. We winsorize all continuous variables at the bottom and top 1% level. Appendix includes detailed variable definitions.

Variable construction

Shareholder coordination

To measure geographic proximity among institutional shareholders, we first identify the location of institutions by collecting their headquarters' zip code from Securities and Exchange Commission (SEC) documents (SEC Edgar). We obtain the latitude and longitude for each of the zip codes from the U.S. Census Bureau's Gazetteer Place and Zip Code Database. Following prior research (e.g., Coval & Moskowitz, 2001), we calculate the distance between institution i and j using the following standard formula:

$$D_{i,j} = r \times \arccos\{\cos(lat_i)\cos(lon_i)\cos t(lat_j)\cos(lon_j) + \cos(lat_i)\sin(lon_i)\cos(lat_j)\sin(lon_j) + \sin(lat_i)\sin(lat_j), \quad (1)$$

where $D_{i,j}$ is distance in statutory miles, r denotes the radius of the Earth (approximately 3,963 statutory miles), and lat and lon are latitudes and longitudes of institution headquarters.

For each firm-quarter and institutional investor in the firm, we first calculate the geographic distance between the institution and all other institutional investors in the firm, weighted by their respective fractional holdings of the total institutional ownership in the firm. We then take the product of −1 with the logarithm-transformed fractional holdings weighted-average of these distances across all institutional shareholders of the firm to obtain the geographic-proximity-based shareholder coordination measure for each firm-quarter.[8] The weighting scheme delivers a more accurate gauge of coordination than the simple average of the distances among institutions, because it accounts for the fact that institutions with large shareholdings typically have a more substantial impact on corporate governance. Specifically, the geographic-proximity-based shareholder coordination measure is designed as follows:

$$COORD = -LOG\,(1 + \sum_{i\epsilon\alpha} w_i \sum_{j\epsilon\alpha} w_j DIST_{i,j}), \quad (2)$$

where α is the set of institutional investors, w_i is the ownership weight of institution i in the total ownership held by all institutions in a firm at the end of each quarter, and $DIST_{i,j}$ is the geographic distance between institution i and j. The logarithm transformation, log (1 + weighted-average of geographic distance between institutions) serves the purpose of reducing the skewness of this variable's distribution.

Stock price informativeness

We use idiosyncratic volatility (IV) and probability of informed trading (PIN) as our proxies for stock price informativeness. French and Roll (1986) and Roll (1988) state that idiosyncratic volatility, defined as stock return variation unexplained by market movements, measures the rate of firm-specific information impounded into stock prices. Previous empirical studies support the view that idiosyncratic volatility measures the rate of information flow into stock prices. For instance, Durnev, Morck, Yeung, and Zarowin (2003) show that the stock prices of firms with more idiosyncratic volatility embed more information about future earnings. Idiosyncratic volatility is also commonly used in empirical studies to proxy for the informativeness of stock prices (e.g., Ferreira & Laux, 2007; Ferreira et al., 2011).

We estimate annual firm-specific idiosyncratic volatility by regressing stock returns on the three Fama-French model factors. For each firm-year, firm-specific return variation is estimated by 1 − $R^2_{i,t}$ from the regression:

$$r_{i,t} - r_t^f = \beta_0 + \beta_1\left(r_t^m - r_t^f\right) + \beta_2 \boldsymbol{SMB}_t + \beta_3 \boldsymbol{HML}_t + e_{i,t}, \quad (3)$$

where $r_{i,t}$ is the return of stock i in day t, r_t^f is the risk-free rate of return in day t, r_t^m is the value-weighted market return, SMB (small minus big) is the difference between the daily returns of the small and big of a firm's portfolios, and HML (high minus low) is the difference between the daily returns of high book-to-market and low book-to-market of a firm's portfolios. Since $1 - R_{i,t}^2$ is skewed, we take the logistic transformation of $1 - R_{i,t}^2$ to ensure greater resemblance to a normal distribution. Formally, idiosyncratic volatility $IV_{i,t}$ is defined as:

Summary statistics

Table 1 presents summary statistics. The mean value of idiosyncratic volatility (IV) is 1.329 with a standard deviation of 1.397. The mean value of PIN is 0.149 with a standard deviation of 0.074. Both variables exhibit similar descriptive statistics as those in Ferreira and Laux (2007). The average geographic-proximity-based shareholder coordination $(COORD)$ is −6.480. Our coordination measure exhibits a fair degree of cross-sectional variation across our sample firms. Table 1 also presents summary statistics for other control variables. In particular, institutional shareholders, on average, own 64.5% of the outstanding shares of the average firm.

Table 1 Descriptive statistics

Variable	N	Mean	Median	Std Dev	Min.	Max.
$COORD$	19,028	−6.480	−6.551	0.504	−23.600	−0.071
$COORD^{Indep}$	19,028	−6.109	−6.169	0.622	−23.034	0.000
$COORD^{Grey}$	19,028	−5.038	−5.075	1.022	−20.717	0.000
$COORD^{Ded}$	19,028	−5.139	−5.195	1.083	−20.763	0.000
$COORD^{Tran}$	19,028	−5.778	−5.926	1.564	−17.817	0.000
IV	19,028	1.329	1.168	1.397	−1.097	7.527
$Totown$	19,028	0.645	0.675	0.211	0.008	0.964
$Assets\ (\$\ million)$	19,028	4277.700	858.870	13336.990	3.432	275644.000
$Ln(MB)$	19,028	0.956	0.906	0.751	−1.172	3.323
ROE	19,028	0.073	0.116	0.440	−4.383	2.433
$Std.(ROE)$	19,028	0.290	0.067	1.103	0.007	14.137
$Leverage$	19,028	0.197	0.181	0.173	0.000	2.616
$FirmAge$	19,028	29.668	25.000	16.179	3.000	62.000
$DivDum$	19,028	0.490	0.000	0.500	0.000	1.000
$MultiSeg$	19,028	0.935	1.000	0.247	0.000	1.000
$Ln(DistHQ)$	19,028	1.861	1.878	0.116	1.015	2.127
$Analyst$	19,028	11.594	9.000	9.132	0.000	62.000
$NumInst$	19,028	172.156	119.000	170.263	11.000	957.000
$Dedown$	19,028	0.440	0.455	0.181	0.030	0.807
$Locown$	19,028	0.053	0.015	0.082	0.000	0.891
$Indown$	19,028	0.425	0.429	0.184	0.024	0.815
$BoardSize$	12,836	9.012	9.000	2.404	1.000	22.000
$IndepBoard$	12,836	0.668	0.700	0.174	0.000	1.000
$FemaleBoard$	12,836	0.089	0.091	0.093	0.000	1.000
$CEOown$	11,589	0.031	0.005	0.072	0.000	1.593
PIN	19,028	0.149	0.135	0.074	0.000	1.000
$Management\ Forecast\ Frequency$	19,028	1.310	0.000	2.190	0.000	9.000
$Auditor$	19,028	0.926	1.000	0.261	0.000	1.000
$Litigation$	19,028	0.372	0.000	0.483	0.000	1.000
$Loss$	19,028	0.189	0.000	0.391	0.000	1.000
$Dispfor$	18,300	0.012	0.006	0.048	0.000	4.105
$Earnings\_D$	19,028	0.570	1.000	0.495	0.000	1.000

$Earnvol$	16,747	0.361	0.163	0.669	0.012	4.893
$Beta$	19,028	1.073	1.002	0.567	−1.157	4.440
FD	19,028	0.654	1.000	0.476	0.000	1.000

Note: This table presents descriptive statistics of our sample firms. Please refer to Appendix A for variable definitions.

Table 2 shows the correlation matrix. The stock price informativeness measures, IV and PIN, are positively and significantly correlated with each other. The correlations between shareholder coordination and both stock price informativeness measures are positive and significant, consistent with our prediction that firms with a higher degree of shareholder coordination are associated with more informative stock prices.

Table 2 Correlation matrix

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1)	IV	1.000												
(2)	$COORD$	**0.127**	1.000											
(3)	$Totown$	**−0.439**	**−0.178**	1.000										
(4)	$Ln(Assets)$	**−0.549**	**−0.155**	**0.340**	1.000									
(5)	$Ln(MB)$	**−0.176**	**−0.176**	**−0.031**	−0.010	1.000								
(6)	ROE	**−0.127**	**−0.100**	**0.110**	**0.139**	**0.167**	1.000							
(7)	$Std.(ROE)$	**0.061**	**0.034**	**−0.087**	**−0.081**	**0.182**	**−0.155**	1.000						
(8)	$Leverage$	0.012	0.007	**0.048**	**0.319**	**−0.079**	**−0.043**	**0.081**	1.000					
(9)	$Ln(FirmAge)$	**− 0.266**	**0.044**	**0.168**	**0.464**	**−0.145**	**0.083**	**−0.081**	**0.134**	1.000				
(10)	$DivDum$	**−0.120**	−0.005	**−0.029**	**0.348**	**−0.022**	**0.117**	**−0.091**	**0.162**	**0.459**	1.000			
(11)	$MultiSeg$	**0.129**	−0.010	**−0.045**	**−0.158**	−0.006	**−0.031**	−0.009	**−0.069**	**−0.099**	**−0.054**	1.000		
(12)	$Ln(DistHQ)$	**−0.040**	**−0.066**	**0.015**	**−0.068**	−0.007	**−0.037**	−0.003	**−0.032**	**−0.141**	**−0.123**	0.009	1.000	
(13)	$LnAnalyst)$	**−0.389**	**−0.215**	**0.205**	**0.587**	**0.277**	**0.101**	**−0.057**	**0.028**	**0.066**	**0.061**	**−0.036**	**0.080**	1.000

Note: This table presents Pearson correlation coefficients under the null hypothesis of no correlation between variables employed. Values in bold type have a p-value less than 5%.

EMPIRICAL REGRESSION MODELS AND RESULTS

In this section, we establish our baseline model and provide regression evidence on the relation between shareholder coordination and stock price informativeness.

Impact of shareholder coordination on stock price informativeness

Empirical design: baseline model

We estimate the following baseline empirical model to analyze the relation between shareholder coordination and stock price informativeness.

$$IV_{i,t} = \beta_0 + \beta_1 COORD_{i,t} - 1 + \beta_2 Totown_{i,t-1} + \beta_3 Ln(Assets)_{i,t-1} + \beta_4 Ln(MB)_{i,t-1} + \beta_5 ROE_{i,t-1} + \beta_6 Std.(ROE)_{i,t-1} + \beta_7 Leverage_{i,t-1} + \beta_8 Ln(FirmAge)_{i,t-1} + \beta_9 DivDum_{i,t-1} + \beta_{10} MultiSeg_{i,t-1} + \beta_{11} Ln(DistHQ)_{i,t-1} + \beta_{12} Analyst_{i,t-1} + d_j + d_t + \varepsilon_{i,t}, \quad (5)$$

where i indexes firm, j indexes industry, and t indexes year. Industry/firm and year indicators are denoted by d_j and d_t, respectively. $COORD$ is the geographic-proximity-based shareholder coordination measures for firm i at year $t-1$. We include a number of control variables drawn from the literature on price informativeness. These control variables include institutional ownership ($Totown$), natural logarithm of total assets ($Ln(Assets)$), natural logarithm of market-to-book ratio ($Ln(MB)$), firm profitability (ROE), profits volatility ($Std.(ROE)$), leverage ($Leverage$), natural logarithm of firm age ($Ln(FirmAge)$), a dividend payer dummy ($DivDum$), an internal diversification dummy ($MultiSeg$), the weighted average distance between institutions and a firm's headquarters ($Ln(DistHQ)$) and the natural logarithm of number of analysts following the firm in a year (Analyst). Year dummies are included to account for pervasive macroeconomic factors that could affect the cross-section of firms, and industry or firm dummies are included to control for the unobservable industry or firm characteristics that could drive our results. Standard errors are clustered at the firm level to control for time series dependence within the firm that could bias the statistics, as suggested in Petersen (2009) and Thompson (2011).

Regression results

Columns (1) and (2) of Table 3 present the baseline regression results on the relation between shareholder coordination and idiosyncratic volatility IV estimated from equation (3). Column (1) controls for industry fixed effects. To alleviate the problem of omitted variables that could drive our results, we control for firm fixed effects in column (2). Both specifications deliver consistent results: shareholder coordination is positively and significantly correlated with idiosyncratic volatility IV. Specifically, the coefficient estimate on $COORD$ in column (1) ((2)) is 0.106 (0.067) with a t-statistic of 4.34 (2.65). Our results are also economically significant. A one-standard-deviation increase in $COORD$ increases IV by nearly 5% in the case of the specification shown in column (1) and 3% for the one shown in column (2).

Table 3 Baseline regression

	IV_t	
	(1)	**(2)**
$COORD_{t-1}$	0.106***	0.067***
	(4.34)	(2.65)
$Totown_{t-1}$	−0.569***	−0.837***
	(− 9.11)	(− 9.46)

$Ln(Assets)_{t-1}$	−0.344***	−0.265***
	(− 27.37)	(− 9.91)
$Ln(MB)_{t-1}$	−0.419***	−0.423***
	(− 24.45)	(− 22.44)
ROE_{t-1}	−0.035*	−0.072***
	(− 1.65)	(− 3.16)
$Std.(ROE)_{t-1}$	0.055***	0.058***
	(5.87)	(5.69)
$Leverage_{t-1}$	0.939***	0.712***
	(13.76)	(8.17)
$Ln(FirmAge)_{t-1}$	−0.032*	0.064
	(− 1.65)	(0.99)
$DivDum_{t-1}$	−0.038	−0.009
	(− 1.46)	(− 0.25)
$MultiSeg_{t-1}$	−0.015	−0.046
	(− 0.38)	(− 0.96)
$Ln(DistHQ)_{t-1}$	−0.179*	−0.293
	(− 1.66)	(− 0.67)
$Ln(Analyst)_{t-1}$	−0.177***	−0.096***
	(− 9.48)	(− 4.72)
Constant	6.796***	6.100***
	(23.76)	(7.26)
Year FE	Yes	Yes
Industry FE	Yes	No
Firm FE	No	Yes
Observations	19,028	19,028
Adj. R^2	0.646	0.765

Notes: This table presents results of OLS regressions where the dependent variable is a proxy for stock price informativeness; IV is relative idiosyncratic risk measured as $\mathrm{Ln}([1-R^2]/R^2)$. $COORD$ is the weighted average distances among institutional shareholders and multiplied by −1. Detailed definitions of other variables are listed in Appendix A. Industry (i.e., the first two-digit SIC code), firm, and year dummies are included, but coefficient estimates are omitted to save space. Numbers in parentheses are t-statistics calculated using standard errors adjusted by heteroskedasticity and clustered at the firm level. ***, **, and * indicate a two-tailed test significance level at 1%, 5% and 10%, respectively.

One noteworthy finding in Table 3 is the negative effect of institutional ownership ($Totown$) on price informativeness (IV). At first glance, this result may appear counterintuitive given the evidence documented in the literature that institutional investors promote corporate governance and information transparency. However, Piotroski and Roulstone (2004) argue that although institutional investors could potentially increase the access to firm-specific information by effective monitoring, they may also facilitate information transfer across different firms within their investment portfolios, leading to more stock price synchronicity. Our finding is consistent with the latter argument. The negative relation between firm size ($Ln(Assets)$) and price informativeness (IV) is consistent with the finding in Ferreira and Laux (2007).

Impact of shareholder coordination on stock price informativeness: the role of different ...

Existing literature shows that different types of shareholders may differ in their incentives and abilities to play a governance role. Therefore, it is also possible that the strength of shareholder coordination might vary

depending on the type of institutions involved. To investigate this issue, we first follow Brickley et al. (1988) and classify institutions into independent and grey institutions according to their potential for having business ties to the firm. Independent institutions include mutual funds and investment advisory firms, which are likely to have fewer potential business relationships with the corporations in which they invest. Grey institutions include bank trusts, insurance companies, and other institutions, which have current or prospective business relationships with corporations in which they invest. We then construct separate shareholder coordination measures among independent and grey institutions, respectively. We expect that stronger coordination is more likely to develop among institutions not subject to conflicts of interest or legal constraints associated with having a business relationship with the firm. Accordingly, we predict that the effect of shareholder coordination on stock price informativeness should be driven mainly by independent institutions. The results shown in columns (1) and (3) in Table 4 are consistent with our expectation: coordination among independent institutional investors is the main driver of our findings. Moreover, in Table 4, the coefficient equality tests between coordination among independent institutions ($COORD^{Indep}$) and coordination among grey institutions ($COORD^{Grey}$) further confirm that coordinated independent institutions play a more important role in enhancing the informativeness of stock prices.

Table 4 Baseline regression: by institution type

	(1)	(2)	(3)	(4)
	$\boldsymbol{IV_t}$			
$COORD^{Indep}$	0.062***		0.044**	
	(3.45)		(2.46)	
$COORD^{Grey}$	0.004		0.001	
	(0.46)		(0.07)	
$COORD^{Ded}$		0.019**		0.019**
		(2.22)		(2.24)
$COORD^{Trans}$		−0.009		−0.013**
		(− 1.43)		(− 2.02)
H_0: $COORD^{Indep} = COORD^{Grey}$	[< 0.01]		[0.02]	
H_0: $COORD^{Ded} = COORD^{Trans}$		[< 0.01]		[< 0.01]
Firm Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	No	No
Firm FE	No	No	Yes	Yes
Observations	19,028	19,028	19,028	19,028
Adj. R^2	0.645	0.645	0.765	0.765

Notes: This table presents results of OLS regressions using geographic proximity partitioned by types of institutional shareholders. IV is relative idiosyncratic risk measured as $\mathrm{Ln}([1 - R^2]/R^2)$. $COORD^{Indep}$ and $COORD^{Grey}$ are the weighted average distances among independent and grey institutional shareholders and multiplied by −1, respectively. $COORD_{Ded}$ and $COORD_{Trans}$ are the weighted average distances among dedicated and transient institutional shareholders and multiplied by −1, respectively. Detailed definitions of other variables are listed in Appendix A. Industry, firm, year dummies and other firm-level controls used in Table 3 are included, but coefficient estimates are omitted to save space. Numbers in parentheses are t-statistics calculated using standard errors adjusted by heteroskedasticity and clustered at the firm level. P-values of coefficient equality tests are given in square brackets. ***, **, and * indicate a two-tailed test significance level at 1%, 5%, and 10%, respectively.

Second, following Bushee (2001), we classify institutions into dedicated and transient institutions. Dedicated institutions' investments are associated with low turnover, low diversification, and a long investment horizon. Therefore, dedicated institutions are more likely to play an important role in corporate monitoring and to be

proponents of a better informational environment for the firms in which they invest. Transient institutions, which are characterized by high turnover, high diversification, and a short investment horizon, are less likely to engage in corporate governance and less likely to espouse the view that benefits from an improved information environment significantly outweigh the costs associated with promoting informativeness.

Columns (2) and (4) of Table 4 present the results of the regressions that include shareholder coordination measures among dedicated and transient institutions. Consistent with the notion that dedicated institutions are more effective monitors and promoters of a transparent information environment of firms they invest in, we find that only coordination among dedicated institutions has a significant positive impact on stock price informativeness. It is noteworthy that coordination among transient institutions exhibits either a significant negative or an insignificant effect on stock price informativeness. The coefficient equality tests in Table 4 provide further support to the notion that coordination among dedicated institutions ($COORD^{Ded}$) is more effective at promoting stock price informativeness than transient institutions ($COORD^{Trans}$).

To summarize, we find that stock price informativeness varies with shareholder coordination by different institution types in systematic ways that are consistent with the view that a higher degree of shareholder coordination encourages the collection and incorporation of private information, and thereby leads to more informative stock prices.

Subsample analysis

To explore whether shareholder coordination is a substitute or complement of alternative corporate governance mechanisms, we employ subsample analysis in this subsection. Literature has shown that a variety of governance mechanisms are significantly positively related to price informativeness. For example, Ferreira and Laux (2007) find that firms with fewer antitakeover provisions display a higher level of price informativeness. Brockman and Yan (2009) find that blockholders increase the probability of informed trading and idiosyncratic volatility. Gul et al. (2011) find that stock prices of firms with gender-diverse boards reflect more firm-specific information. More specifically, we examine the effect of shareholder coordination on price informativeness in subsamples classified by governance index, poison pill provision, board gender diversity, and blockholder ownership.

We first hypothesize that shareholder coordination exerts a more significant influence on price informativeness when a firm has more antitakeover provisions or poison pill provision. To test our hypothesis, we first divide the sample into two groups on the basis of the median value of governance index (G-index). Then we run the baseline model for each subsample. The results in Panel A of Table 5 provide evidence in support of our hypothesis. The p-value of t-statistics for cross-equation coefficient tests further corroborates our findings that shareholder coordination is more effective when corporate governance is weaker. We obtain consistent results when we divide sample firms by the presence of poison pill provision. The results in Panel B of Table 5 indicate that the coordination-informativeness relation is stronger when firms have the poison pill provision.

Table 5 Sub-sample analysis

	(1)	**(2)**	**(3)**	**(4)**
Panel A: Corporate Governance (Gindex)				
	Weak	**Strong**	**Weak**	**Strong**
$Coordinate_{t-1}$	0.138***	−0.008	0.133**	−0.005
	(2.63)	(− 0.23)	(2.10)	(− 0.12)
	$H_0: Weak = Strong$	$H_0: Weak = Strong$		
	[< 0.01]	[< 0.01]		
Firm Controls	Yes	Yes	Yes	Yes

Year FE & Industry FE	Yes	Yes	No	No
Year FE & Firm FE	No	No	Yes	Yes
Observations	4,455	6,159	4,455	6,159
Adj. R^2	0.601	0.603	0.726	0.720
Panel B: Poison Pill Provision				
	Yes	**No**	**Yes**	**No**
$Coordinate_{t-1}$	0.139**	−0.024	0.195*	0.034
	(2.02)	(− 0.84)	(1.90)	(0.72)
	$H_0: Yes = No$	$H_0: Yes = No$		
	[< 0.01]	[< 0.01]		
Firm Controls	Yes	Yes	Yes	Yes
Year FE & Industry FE	Yes	Yes	No	No
Year FE & Firm FE	No	No	Yes	Yes
Observations	7,005	3,609	7,005	3,609
Adj. R^2	0.619	0.593	0.748	0.735
Panel C: Female Board				
	High	**Low**	**High**	**Low**
$Coordinate_{t-1}$	0.031	0.126***	0.008	0.088***
	(0.82)	(4.54)	(0.19)	(2.70)
	$H_0: High = Low$	$H_0: High = Low$		
	[< 0.01]	[0.02]		
Firm Controls	Yes	Yes	Yes	Yes
Year FE & Industry FE	Yes	Yes	No	No
Year FE & Firm FE	No	No	Yes	Yes
Observations	6,209	6,627	6,209	6,627
Adj. R^2	0.604	0.610	0.776	0.789
Panel D: Blockholder Ownership				
	High	**Low**	**High**	**Low**
$Coordinate_{t-1}$	0.123**	0.299***	0.046	0.166**
	(2.44)	(5.37)	(0.66)	(2.29)
	$H_0: High = Low$	$H_0: High = Low$		
	[0.08]	[0.04]		
Firm Controls	Yes	Yes	Yes	Yes
Year FE & Industry FE	Yes	Yes	No	No
Year FE & Firm FE	No	No	Yes	Yes
Observations	5,754	5,817	5,754	5,817
Adj. R^2	0.565	0.619	0.685	0.743

Notes: This table presents results of OLS regressions where the dependent variable is the proxy for stock price informativeness, IV. IV is relative idiosyncratic risk measured as $\mathrm{Ln}([1 - R^2]/R^2)$. $COORD$ is the weighted average distances among institutional shareholders and multiplied by −1. In Panel A, we divide sample firms into weak and strong groups of corporate governance (G-index). The high (or low) group is defined as firms with G-index greater (or less) than its median value. In Panel B, we divide sample firms into groups with and without poison pill provision. In Panel C, we divide sample firms into high and low groups of female directors. The high (or low) group is defined as firms with the percentage of female directors greater (or less) than its median value. In Panel D, we divide sample firms into high and low groups of blockholder ownership. The high (or low) group is defined as firms with blockholder ownership above (or below) the median value. Detailed definitions of other variables are listed in Appendix A. Industry, firm, year dummies and other firm characteristics used in Table 3 are included, but coefficient estimates are omitted to save space. Numbers in parentheses are t-statistics calculated using standard errors adjusted by heteroskedasticity and clustered at the firm level. P-values of coefficient

equality tests are given in square brackets. ***, **, and * indicate a two-tailed test significance level at 1%, 5%, and 10%, respectively.

Given the findings in Gul et al. (2011), similarly, we hypothesize that shareholder coordination plays a substitute role when coexisting with the price discovery channel of board gender diversity. In other words, the effect of shareholder coordination becomes stronger when a firm's board is less gender-diverse. Panel C of Table 5 reports supportive evidence. The p-value of t-statistics for cross-equation coefficient tests support the notion that shareholder coordination is a substitute for the alternative information generating mechanism (board gender diversity).

Last, we explore whether there is indeed a substitution effect between shareholder coordination and blockholders. We then divide the sample on the basis of median value of blockholder ownership. Our results in Panel D of Table 5 show that the impact of shareholder coordination on price informativeness is stronger (weaker) in the subsample where blockholders have a weaker (stronger) presence. Therefore, this finding continues to support the substitute effect between shareholder coordination and the alternative governance mechanism (blockholders).

In short, our results generally support the notion that the impact of shareholder coordination on price informativeness is more significant when an alternative governance mechanism is weak.

Omitted variables

To mitigate the concern that our results are driven by omitted variables such as board characteristics and managerial ownership, we add a variety of variables to our baseline model. Gul et al. (2011) find that board gender diversity improves stock price informativeness. Ferreira et al. (2011) find that board structure and stock price informativeness are related. Han, Jin, Kang, and Lobo (2014) find that managerial ownership is positively associated with the quality of analyst reporting. Ferreira and Laux (2007) find a positive relation between corporate governance and information flow. Therefore, we control board size ($Ln(BoardSize)$), independent board ($IndepBoard$), board gender diversity ($FemaleBoard$), managerial ownership ($CEOown$) and governance index ($Gindex$) to augment our baseline regression model. The results are reported in columns (1)–(4) and (7)–(10) of Table 6.

Table 6 Additional controls

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Additional controls for board characteristics, managerial ownership, G-index and institutional investors											
$COORD_{t-1}$	0.148***	0.148***	0.149***	0.186***	0.100*	0.129**	0.075*	0.075*	0.075*	0.088	0.047	0.061
	(3.92)	(3.92)	(3.95)	(4.11)	(1.84)	(2.16)	(1.76)	(1.77)	(1.76)	(1.46)	(0.64)	(0.72)
$Ln(BoardSize)_{t-1}$	0.128**	0.128**	0.118**	0.177***	0.143	0.161**	0.049	0.047	0.048	0.128	0.108	0.088
	(2.36)	(2.36)	(2.15)	(2.77)	(2.02)	(2.15)	(0.70)	(0.68)	(0.69)	(1.37)	(1.08)	(0.74)
$IndepBoard_{t-1}$		0.011	−0.021	−0.021	−0.024	0.034		−0.061	−0.074	−0.027	0.075	0.074
		(0.16)	(− 0.29)	(− 0.24)	(− 0.24)	(0.33)		(− 0.62)	(− 0.75)	(− 0.22)	(0.52)	(0.46)
$FemaleBoard_{t-1}$			0.371***	0.409**	0.385	0.298			0.205	0.348	0.273	0.350
			(2.66)	(2.57)	(2.18)	(1.61)			(1.14)	(1.54)	(1.10)	(1.11)
$CEOown_{t-1}$				0.329	0.249	0.220				−0.060	0.028	−0.203
				(1.39)	(0.92)	(0.89)				(− 0.21)	(0.08)	(− 0.52)
$Gindex_{t-1}$					0.008	0.010					−0.020	−0.018
					(1.19)	(1.37)					(− 1.05)	(− 0.82)
$Ln(NumInst)_{t-1}$						−0.283**						0.023
						(− 3.91)						(0.26)
$Dedown_{t-1}$						0.237						−0.144
						(1.38)						(− 0.64)
$Localown_{t-1}$						−0.491*						0.133
						(− 1.80)						(0.31)
$Indepown_{t-1}$						−0.210						−0.186
						(− 1.18)						(− 0.89)
$Blockown_{t-1}$						0.038						0.127
						(0.47)						(1.13)
$Insiderown_{t-1}$						0.045						0.005
						(0.35)						(0.03)
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No
Firm FE	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	12,836	12,836	12,836	8,037	6,119	4,938	12,836	12,836	12,836	8,037	6,119	4,938
Adj. R^2	0.610	0.610	0.611	0.627	0.605	0.611	0.719	0.719	0.719	0.735	0.731	0.731

Notes: This table presents results of OLS regressions with additional control variables. IV is relative idiosyncratic risk measured as $\mathrm{Ln}([1-R^2]/R^2)$. We include proxies from board characteristics and managerial ownership: $BoardSize$ (the number of board members), $IndepBoard$ (the ratio of number of

independent directors to board size), $FemaleBoard$ (the percentage of female directors on board) and $CEOown$ (the percent of CEO ownership). $Gindex$ is governance index, which is based on 24 antitakeover provisions. We also add different proxies for the presence of institutional investors: $NumInst$ (the number of institutional shareholders in a firm-year), $Dedown$ (the ownership held by dedicated institutional investors), $Localown$ (local institutional ownership, where local institutions are defined as the institutions' headquarters located within 150 miles of a firm's headquarters) and $Indepown$ (the ownership held by independent institutional investors). $Blockown$ is ownership held by institutions whose ownership is above 5%. $Insiderown$ is ownership held by corporate insiders. Insiders are defined as a chief executive officer, other executive officers, and directors. Detailed definitions of other variables are listed in Appendix A. Industry, firm, year dummies and other firm level controls used in Table are included, but coefficient estimates are omitted to save space. Numbers in parentheses are t-statistics calculated using standard errors adjusted by heteroskedasticity and clustered at the firm level. ***, **, and * indicate a two-tailed test significance level at 1%, 5%, and 10%, respectively.

It might be the case that shareholder coordination is merely a variation of other forms of institutional ownership such as number of institutional investors. Thus, we first add number of institutional investors ($Ln(NumInst)$) to our baseline regression. We also control ownership by dedicated institutions ($Dedown$) as they are important drivers of effective monitoring of managers. Gaspar and Massa (2007) find that local institutional investors, who are geographically proximate to a firm's headquarters, are active in shaping corporate governance due to their private information advantage. Similarly, Ayers et al. (2011) find local monitoring institutional investors are effective at constraining earnings management and enhancing corporate disclosure quality. If local institutional investors are effective monitors of corporate behavior, it is likely that the relation between shareholder coordination and price informativeness is driven mainly by local institutions. Thus, we control for local institutional ownership ($Localown$) in the baseline regression. As independent institutional investors are also important players in promoting corporate transparency, we also control ownership by independent institutional investors ($Indepown$). Brockman and Yan (2009) find that stock prices of firms with higher blockholder ownership are more informative. We also examine whether our results are driven by blockholder ownership ($Blockown$). Evidence on the role of insiders shows a positive relation between insider trading and idiosyncratic volatility (e.g., Piotroski & Roulstone, 2004). Therefore, we control insider ownership ($Insiderown$) to augment the baseline model. The results are reported in columns (5)–(6) and (11)–(12) of Table 6.

Results reported in Table 6 show that our results hold with some exceptions: in columns (10)–(12), results for regression models with firm fixed effects are still positive but insignificant. Several reasons contribute to the disappearance of significance. First, the design of the coordination measure is to capture the relatively stable connection among institutional investors over time. If our shareholder coordination truly captures relatively stable connection among institutional investors, including firm fixed effects would definitely absorb at least some of the effects coming from shareholder coordination. Second, the inclusion of additional variables significantly decreases our sample size. We lose nearly 58% of observations (from 19,028 to 8,037). Third, adding a variety of other governance variables would cause multicollinearity problems. One of the features of multicollinearity is that the standard errors of the affected coefficients tend to be large (e.g., Kumar, 1975). As a result, the test of the hypothesis that the coefficient is equal to zero may lead to a failure to reject a false null hypothesis of no effect of the interested variable, a type II error. Moreover, sample size is an import factor in determining the degree of multicollinearity (e.g., Farrar & Glauber, 1967). The severity of multicollinearity could be mitigated in the presence of large sample size. As our sample size significantly decreases, the effect of multicollinearity is magnified.

However, the alternative explanation for the insignificance is that shareholder coordination is merely a proxy for the quality of the firm's corporate governance structure. The insignificant coefficient is due to the addition of other relevant governance structure variables. We admit that we cannot completely rule out the possibility that shareholder coordination could capture some latent governance structure variable, leading to the insignificance once other governance structure variables are included. Therefore, we advise readers to interpret the results with caution.

Establishing causality

As reverse causality can be a serious concern, the results so far do not allow us to draw a strong conclusion regarding the relation between shareholder coordination and stock price informativeness. It is possible that institutional investors do not invest randomly, so that what we label the ‘shareholder coordination effect’ may just be a reflection of preferences by geographically clustered institutions favoring firms with stronger stock price informativeness. To address this concern, in this subsection we perform two tests to provide evidence on the direction of causality.

First, we follow Ramalingegowda and Yu (2012) by adding current and lead shareholder coordination into the baseline regression model (equation) to examine how stock price informativeness is related to lagged, current, and lead shareholder coordination:

$$IV_{i,t} = \beta_0 + \beta_1 COORD_{i,t-1} + \beta_2 COORD_{i,t} + \beta_3 COORD_{i,t+1} + \beta_4 Totown_{i,t-1} + \beta_5 Ln(Assets)_{i,t-1} + \beta_6 Ln(MB)_{i,t-1} + \beta_7 ROE_{i,t-1} + \beta_8 Std.(ROE)_{i,t-1} + \beta_9 Leverage_{i,t-1} + \beta_{10} Ln(FirmAge)_{i,t-1} + \beta_{11} DivDum_{i,t-1} + \beta_{12} MultiSeg_{i,t-1} + \beta_{13} Ln(DistHQ)_{i,t-1} + \beta_{14} Analyst_{i,t-1} + d_j + d_t + \varepsilon_{i,t}, \quad (6)$$

In equation (6), β_1, β_2, and β_3 capture the relation between stock price informativeness and lagged, current, and lead shareholder coordination, respectively. If shareholder coordination improves stock price informativeness, then we would expect $\beta_1 > 0$. Conversely, if reverse causality explains our findings, we should find $\beta_3 > 0$. Evidence of $\beta_2 > 0$ would be consistent with the simultaneity explanation. Panel A of Table 7 reports the results from estimating equation (6). The coefficient estimates of control variables are omitted for brevity. The results are consistent with the notion that the direction of the positive effect is from shareholder coordination to stock price informativeness, not vice versa. For example, in column (2) of Table 7 Panel A, β_1 is equal to 0.071 and significant at the 5% level. In contrast, and inconsistent with the reverse causality explanation, we find that β_2 and β_3 are insignificant or significant with unexpected sign. One exception is that in column (1) of Table 7 Panel A, β_2 is significant and positive, indicating weak evidence supporting the simultaneity explanation. However, as indicated in column (2) of Table 7 Panel A, β_2 becomes insignificant once we control for firm fixed effects rather than industry fixed effects.

Table 7 Reverse causality

	(1)	(2)		
Panel A: Lead-lag Analysis				
COORD_{t-1}	0.075**	0.071**		
	(2.15)	(2.28)		
COORD_{t}	0.083**	−0.019		
	(2.02)	(− 0.37)		
COORD_{t+1}	0.036	0.018		
	(0.96)	(0.43)		
Constant	7.497***	8.292***		
	(18.06)	(6.99)		
Firm Controls	Yes	Yes		
Year FE & Industry FE	Yes	No		
Year FE & Firm FE	No	Yes		
Observations	10,008	10,008		
Adj. R^2	0.608	0.763		
	(1)	(2)	(3)	(4)
Panel B: Change-on-change Analysis				
	$\mathbf{\Delta IV_t}$		$\mathbf{\Delta COORD_t}$	
$\Delta\mathrm{COORD}_{t-1}$	0.085***	0.098***		
	(2.85)	(3.10)		
$\Delta\mathrm{IV}_{t-1}$			−0.003	−0.005
			(− 0.95)	(− 1.36)
$\Delta\mathrm{Totown}_{t-1}$	0.078	0.333***	0.073***	0.107***
	(0.80)	(2.85)	(2.35)	(2.73)
$\Delta\mathrm{Ln(Assets)}_{t-1}$	−0.170***	−0.118***	0.044***	0.050***

	(− 5.75)	(− 3.23)	(4.40)	(3.99)
$\Delta\text{Ln(MB)}_{t-1}$	−0.258***	−0.248***	0.009	0.012*
	(− 14.86)	(− 12.60)	(1.54)	(1.89)
ΔROE_{t-1}	−0.060***	−0.061***	0.004	0.005
	(− 3.07)	(− 2.75)	(0.41)	(0.51)
$\Delta\text{Std. (ROE)}_{t-1}$	0.018	0.014	−0.001	−0.002
	(1.33)	(0.84)	(− 0.31)	(− 0.40)
$\Delta\text{Leverage}_{t-1}$	0.311	0.233	0.019	0.009
	(3.42)	(2.18)	(0.67)	(0.29)
$\Delta\text{Ln(FirmAge)}_{t-1}$	−0.470***	−1.230***	0.066**	−0.053
	(− 5.49)	(− 5.42)	(2.09)	(− 0.64)
$\Delta\text{DivDum}_{t-1}$	0.011	−0.004	−0.009	−0.017
	(0.28)	(− 0.08)	(− 0.74)	(− 1.30)
$\Delta\text{MultiSeg}_{t-1}$	−0.012	−0.013	0.009	0.010
	(− 0.25)	(− 0.24)	(0.69)	(0.66)
$\Delta\text{In(DistHQ)}_{t-1}$	0.551	0.554	−0.174	−0.225
	(1.02)	(0.86)	(− 1.07)	(− 1.13)
$\Delta\text{Ln(Analyst)}_{t+1}$	−0.040**	−0.023	−0.025***	−0.014
	(− 2.07)	(− 1.03)	(− 3.17)	(− 1.60)
Constant	−0.010	0.001	−0.011	0.006
	(− 0.90)	(1.02)	(− 0.35)	(0.15)
Year FE & Industry FE	Yes	No	Yes	No
Year FE & Firm FE	No	Yes	No	Yes
Observations	15,999	15,999	11,701	11,701
Adj. R^2	0.195	0.138	0.024	0.136

Notes: This table presents results of OLS regressions where the dependent variable is the proxy for stock price informativeness, IV. IV is relative idiosyncratic risk measured as $\text{Ln}([1-R^2]/R^2)$. Panel A includes the lead and contemporary weighted average distance among institutional shareholders, $COORD_{t+1}$ and $COORD_t$. Panel B report results of the change-on-change regression. Panel C reports the results of GMM analysis. Detailed definitions of other variables are listed in Appendix A. Industry, firm, and year dummies are included, but omit coefficients to save space. Numbers in parentheses are t-statistics calculated using standard errors adjusted by heteroskedasticity and clustered at the firm level. ***, **, and * indicate a two-tailed test significance level at 1%, 5%, and 10%, respectively.

In our second test, we adopt the change-on-change method that has been widely used in the literature (e.g., Aggarwal, Erel, Ferreira, & Matos, 2011; Chhaochharia et al., 2012). If the degree of shareholder coordination has a significant influence on stock price informativeness as our results imply, then as shareholder coordination increases over time, we would expect to see corresponding increases in stock price informativeness. If causality runs only in this direction, then increases in stock price informativeness should not drive increases in shareholder coordination.

To run the change-on-change regression model, we first replace the dependent variable IV at t with the change in IV from $t-1$ to t (ΔIV). Then we obtain the change in all control variables from $t-2$ to $t-1$. The regression model is redefined as follows:

$$\Delta IV_{i,t} = \beta_0 + \beta_1 \Delta COORD_{i,t-1} + \beta_2 \Delta Totown_{i,t-1} + \beta_3 \Delta Ln(Assets)_{i,t-1} + \beta_4 \Delta Ln(MB)_{i,t-1} + \beta_5 \Delta ROE_{i,t-1} + \beta_6 \Delta Std.(ROE)_{i,t-1} + \beta_7 \Delta Leverage_{i,t-1} +$$

$$\beta_8 \Delta Ln(FirmAge)_{i,t-1} + \beta_9 \Delta DivDum_{i,t-1} + \beta_{10} \Delta MultiSeg_{i,t-}1 + \beta_{11} \Delta Ln(DistHQ)_{i,t-1} + \beta_{12} \Delta Analyst_{i,t-1} + d_j + d_t + \varepsilon_{i,t}, \quad (7)$$

To examine whether the reverse causality exists, we use $\Delta COORD$ as the dependent variable and ΔIV as the main independent variable of interest. Other control variables remain the same. More specifically, we run the following model:

$$\Delta COORD_{i,t} = \alpha_0 + \alpha_1 \Delta IV_{i,t-1} + \alpha_2 \Delta Totown_{i,t-1} + \alpha_3 \Delta Ln(Assets)_{i,t-1} + \alpha_4 \Delta Ln(MB)_{i,t-1} + \alpha_5 \Delta ROE_{i,t-1} + \alpha_6 \Delta Std.(ROE)_{i,t-1} + \alpha_7 \Delta Leverage_{i,t-1} + \alpha_8 \Delta Ln(FirmAge)_{i,t-1} + \alpha_9 \Delta DivDum_{i,t-1} + \alpha_{10} \Delta MultiSeg_{i,t-1} + \alpha_{11} \Delta Ln(DistHQ)_{i,t-1} + \alpha_{12} \Delta Analyst_{i,t-1} + d_j + d_t + \varepsilon_{i,t}, \quad (8)$$

We are particularly interested in the estimate of β_1 in equation (7) and α_1 in equation. A positive and significant β_1 and insignificant α_1 would warrant that the relation between shareholder coordination and stock price informativeness is not bi-directional.

Columns (1) and (2) of Table 7 Panel B report the results for regression models with changes in price informativeness as the dependent variable and lagged changes in shareholder coordination as the main independent variable, while columns (3) and (4) reports results with regressions with changes in coordination as the dependent variable and lagged changes in price informativeness as the main independent variable. In column (1) of Table 7 Panel B, β_1 is equal to 0.085 and significant at the 1% level. In contrast, in columns (3) and (4), the coefficient estimates on the change in idiosyncratic volatility (ΔIV) are not statistically significant, indicating that changes in stock price informativeness do not have any effect on subsequent changes in shareholder coordination. This evidence indicates that the causal link from shareholder coordination to stock price informativeness is considerably stronger than the reverse causal relation.

ROBUSTNESS CHECKS

To solidify our findings, we perform a couple of robustness checks in this subsection. First, institutional investors are highly geographically clustered. To address the concern that our results could be driven by institutions in particular metropolitan areas such as New York and Boston, we reconstruct coordination measures without institutions in above two metropolitan statistical areas (MSAs). We choose these two MSAs because they dominate the landscape of institutional investors. The results in Panel A of Table 8 show that our results continue to hold.

Table 8 Robustness checks

	(1)	**(2)**
Panel A: No NYC & Boston		
$COORD_{t-1}$	0.081***	0.066***
	(5.81)	(4.70)
Firm Controls	Yes	Yes
Year FE & Industry FE	Yes	No
Year FE & Firm FE	No	Yes
Observations	19,028	19,028
Adj. R_2	0.644	0.735
Panel B: Control Prior Connection		
$COORD_{t-1}$	0.009***	0.008**

	(3.08)	(2.35)
Firm Controls	Yes	Yes
Year FE & Industry FE	Yes	No
Year FE & Firm FE	No	Yes
Observations	19,028	19,028
Adj. R_2	0.530	0.696
Panel C: PIN		
$COORD_{t-1}$	0.019***	0.015***
	(4.44)	(3.66)
Firm Controls	Yes	Yes
Year FE & Industry FE	Yes	No
Year FE & Firm FE	No	Yes
Observations	19,028	19,028
Adj. R_2	0.492	0.643

Notes: This table reports three sets of robustness checks. In Panel A, we reconstruct $COORD$ without institutions located in New York and Boston and rerun the baseline regression. In Panel B, we control the proxy designed to capture the prior connection via other shareholdings in other firms. In Panel C, we use PIN as an alternative variable for stock price informativeness. Detailed definitions of other variables are listed in Appendix A. Industry, firm, year dummies and other firm characteristics used in Table 3 are included, but omit coefficients to save space. Numbers in parentheses are t-statistics calculated using standard errors adjusted by heteroskedasticity and clustered at the firm level. ***, **, and * indicate a two-tailed test significance level at 1%, 5%, and 10%, respectively.

Do prior connections among institutional shareholders drive our results? In other words, is the variable (COORD) capturing prior connections or merely geographical proximity? To answer this question, drawing from the literature, we devise a measure, weighted average correlation between institutions' portfolios of stock holdings, to proxy for connections among institutions. The intuition behind this measure is based on the premise that institutions with similar portfolio allocations are more likely to share common investment philosophies and therefore are also more likely to have developed connections. Pareek (2012) classifies mutual managers who have large common portions in their portfolios as informationally connected. He also finds that mutual funds trade together with other funds in their information network and the effect cannot be explained by style invested and geographic location. The results in Panel B of Table 8 show that after controlling the connection proxy, the coefficient estimate of $COORD$ is still positive and significant but of a smaller magnitude, suggesting that $COORD$ captures prior connections in common and beyond. Moreover, Pantzalis and Wang (2017) find that shareholder coordination proxied by $COORD$ acts as an information diffusion channel and causes a lead-lag relation in stock returns between firms with high shareholder coordination (strong connection or network) and firms with low shareholder coordination (weak connection or network). Their findings are consistent with the notion that $COORD$ captures prior connections rather than merely geographic proximity. In short, evidence in Panel B of Table 8 and the literature suggest that rather than merely reflect geographic proximity among institutional investors, our shareholder coordination measure ($COORD$) captures strength of connections evolving over time.

In Panel C of Table 8, we use the alternative measure of stock price informativeness (PIN) as the dependent variable and rerun the baseline model. The results indicate that shareholder coordination still has a positive impact on price informativeness.

To further address the endogeneity concern, we conduct the dynamic panel generalized-method-of-moments (GMM) analysis. GMM dynamic panel estimation is robust to endogeneity problems due to reverse causality, simultaneity, and unobserved heterogeneity (Wintoki, Linck, & Netter, 2012). Appendix shows that our results

continue to hold. We find that COORD is significantly and positively related to price informativeness. Noticeably, the GMM coefficient estimate (0.469) is much larger than the OLS coefficient estimate (0.106), which could be due to a reduction in measurement error. Appendix shows the results of AR(1) and AR(2) tests of the null hypothesis of no first or second order serial correlation, respectively. For our GMM estimates, if the assumptions of our specification are valid, by construction the residuals in first differences (AR(1)) should be correlated, but there should be no serial correlation in second differences (AR(2)). Results of these tests confirm that this is the case: the AR(1) test yields a p-value of <0.01 and the AR(2) test yields a p-value of 0.452. Additionally, the Hansen test suggests that the instruments are valid (p-value = 0.361).

A POSSIBLE CHANNEL

In this section, we explore a possible channel through which shareholder coordination affects stock price informativeness. Using the AIMR-FAF annual corporate disclosure ratings, Gelb and Zarowin (2002) find that greater disclosure is associated with stock prices that are more informative about future earnings. Haggard et al. (2008) find that enhanced voluntary disclosure increases stock price non-synchronicity. Higher disclosure quality implies more accurate firm-specific information is released to the public. The decreased information uncertainty would create more incentives for investors to collect and trade on private information. Therefore, a high level of shareholder coordination can influence stock price informativeness by improving corporate disclosure quality.

To examine whether firms with a high level of shareholder coordination are associated with high disclosure quality, we elect the frequency of management earnings forecasts to proxy for corporate disclosure quality.[9] Management earnings forecast has been widely used in the literature to capture the extent of voluntary disclosure (e.g., Bamber & Cheon, 1998). Drawing from the literature (e.g., Ajinkya, Bhojraj, & Sengupta, 2005), we design the regression model below:

$$Frequency_{i,t} = \gamma_0 + \gamma_1 COORD_{i,t-1} + \gamma_2 Totown_{i,t-1} + \gamma_3 Ln(Assets)_{i,t-1} + c_4 Ln(MB)_{i,t-1} + \gamma_5 Auditor_{i,t-1} + \gamma_6 Litigation_{i,t-1} + \gamma_7 Loss_{i,t-1} + \gamma_8 Dispfor_{i,t-1} + \gamma_9 Earnings\_D_{i,t-1} + \gamma_{10} Earnvol_{i,t-1} + \gamma_{11} Ln(Analyst)_{i,t-1} + \gamma_{12} Beta_{i,t-1} + \gamma_{13} FD_{i,t-1} + d_j + d_t + \varepsilon_{i,t}, \quad (9)$$

We control firm size ($Ln(Assets)$) because prior literature document a positive relation between firm size and management earnings forecasts. Institutional ownership ($Totown$) is also controlled as literature provides evidence in support of the monitoring role of institutional investors in enhancing corporate transparency (Chen et al., 2007). Bamber and Cheon (1998) show that proprietary cost is related to management earnings forecasts. Following the literature, here we use market-to-book ratio as a proxy to control it. Prior research (e.g., Lang & Lundholm, 1993) find that firms using Big 5 auditors tend to have better disclosure. Thus we include Auditor to capture the effect of top auditors on management earnings forecasts. $Auditor$ is a dummy variable that equals 1 if a firm uses one of the Big 5 auditors in that year, and 0 otherwise. Francis, Philbrick, and Schipper (1994) find that shareholder litigation affects corporate disclosure quality. Therefore we add to our model $Litigation$, which equals 1 if a firms fall into an industry that is more vulnerable to shareholder litigation, and 0 otherwise. Management's ability to forecast earnings would be circumscribed for firms making losses (e.g., Hayn, 1995). So we include the dummy variable, $Loss$, which equals 1 if the firm reported losses, and 0 otherwise. Analyst forecast dispersion would make it more difficult for managers to forecast earnings. Therefore, we control $Dispfor$, the standard deviation of analyst forecasts, in the regression model. We also control for analyst coverage ($Ln(Analyst)$) to account for the fact that analyst coverage is associated with corporate disclosure quality. Literature has documented that the direction of earnings changes and earnings volatility are related to

management earnings forecast (e.g., Ajinkya et al., 2005; Waymire, 1985). Thus we include an earnings dummy ($Earnings\_D$) and earnings volatility ($Earnvol$) in our regression model. Beta is added to control for market risk. Heflin, Subramanyam, and Zhang (2003) find that managers issue more earnings forecasts after Regulation FD. So our last control variable in our channel test model is FD, a dummy variable that equals 1 if a firm-year observation falls after year 2000, and 0 otherwise.

Our results in Panel A of Table 9 indicate that shareholder coordination has a positive impact on the frequency of management earnings forecasts. Our results also suggest that shareholder coordination can directly improve corporate disclosure quality by well-coordinated monitoring effort and enhanced monitoring efficacy. Moreover, the positive relation between shareholder coordination and the frequency of management earnings forecasts is driven primarily by firms of relatively larger size, indicating that shareholder coordination affects voluntary disclosure differently for firms of different sizes. Panel B of Table 9 also shows the effect of shareholder coordination on stock price informativeness after controlling for management earnings forecasts. It is noteworthy that earnings forecast itself is significant in all regressions, indicating that voluntary disclosure is significantly positively associated with stock price informativeness. What's more important is that, although shareholder coordination is significant with expected sign in all regressions, the positive relation between shareholder coordination and price informativeness is much stronger and more significant in firms of small size.[10] The implication of our results is that for large firms, shareholder coordination enhances price informativeness mainly by inducing managers to increase value-relevant voluntary disclosures; for small firms, shareholder coordination affects price informativeness by facilitating price information collection and incorporation.

Table 9 The possible channel

	(1)	**(2)**	**(3)**
	Full Sample	**Large Firms**	**Small Firms**
Panel A: Forecast Frequency			
$COORD_{t-1}$	0.184**	0.269*	0.021
	(2.31)	(1.78)	(0.27)
$Totown_{t-1}$	0.497***	0.468	0.774***
	(2.88)	(1.52)	(4.26)
$Ln(Assets)_{t-1}$	0.236***	0.289***	0.084
	(7.51)	(4.83)	(1.58)
$Ln(MB)_{t-1}$	0.172***	0.162**	0.098*
	(3.51)	(2.14)	(1.94)
$Auditor_{t-1}$	0.020	−0.394	0.069
	(0.19)	(− 2.01)	(0.58)
$Litigation_{t-1}$	0.142***	0.024	0.235***
	(2.75)	(0.33)	(3.44)
$Loss_{t-1}$	−0.046	−0.287	0.138
	(− 0.33)	(− 1.15)	(0.89)
$Dispfor_{t-1}$	−0.558***	−0.507***	−0.546***
	(− 9.73)	(− 5.26)	(− 8.30)
$Earnings\_D_{t-1}$	−1.592	−6.130***	−0.586
	(− 1.55)	(− 4.85)	(− 1.01)
$Earnvol_{t-1}$	−0.067**	−0.113**	−0.031
	(− 1.99)	(− 2.31)	(− 0.74)
$Ln(Analyst)_{t-1}$	0.000***	0.000**	−0.004***
	(3.18)	(2.39)	(− 2.93)
$Beta_{t-1}$	−0.479***	−0.571***	−0.305***

	(− 9.76)	(− 6.44)	(− 5.77)
FD_{t-1}	−0.134	−0.326	0.146
	(− 1.17)	(− 1.77)	(1.07)
Constant	−2.888***	−3.497***	−1.370**
	(− 5.36)	(− 3.14)	(− 2.41)
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Observations	16,239	8,094	8,145
Adj. R^2	0.256	0.284	0.232
Panel B: IV_t			
$COORD_{t-1}$	0.158***	0.079*	0.170***
	(4.34)	(1.69)	(3.68)
$Forecast\ Frequency_{t-1}$	0.020***	0.010**	0.018***
	(4.64)	(2.13)	(2.91)
$Totown_{t-1}$	−0.583***	−0.291***	−0.375***
	(− 9.38)	(− 3.08)	(− 4.93)
$Ln(Assets)_{t-1}$	−0.349***	−0.295***	−0.509***
	(− 27.72)	(− 13.99)	(− 20.90)
$Ln(MB)_{t-1}$	−0.424***	−0.355***	−0.505***
	(− 24.28)	(− 14.78)	(− 22.15)
ROE_{t-1}	−0.045**	−0.072**	−0.044
	(− 2.07)	(− 2.42)	(− 1.57)
$Std.(ROE)_{t-1}$	0.057***	0.067***	0.049***
	(5.90)	(4.44)	(4.60)
$Leverage_{t-1}$	0.924***	0.981***	1.087***
	(13.54)	(10.19)	(12.32)
$Ln(FirmAge)_{t-1}$	−0.033*	−0.050**	−0.007
	(− 1.68)	(− 1.99)	(− 0.28)
$DivDum_{t-1}$	−0.039	−0.029	−0.033
	(− 1.52)	(− 0.90)	(− 1.01)
$MultiSeg_{t-1}$	−0.018	−0.013	−0.025
	(− 0.44)	(− 0.27)	(− 0.40)
$Ln(DistHQ)_{t-1}$	−0.151	−0.240*	−0.187
	(− 1.40)	(− 1.78)	(− 1.31)
$Ln(Analyst)_{t-1}$	−0.181***	−0.107***	−0.199***
	(− 9.77)	(− 4.70)	(− 7.68)
Constant	7.145***	5.349***	8.216***
	(21.66)	(11.61)	(19.15)
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Observations	19,028	9,492	9,536
Adj. R^2	0.644	0.566	0.587

Notes: This table reports the results of the channel test. Large/Small firms are classified based on the median value. Panel A presents results of OLS regressions where the dependent variable is the frequency of management earnings forecasts. Panel B reports the results of the coordination-informativeness relation test after including the frequency of management earnings forecasts as a control variable. Detailed definitions of other variables are listed in Appendix A. Industry and year dummies are included, but omit coefficients to save space. Numbers in parentheses are t-statistics calculated using standard errors adjusted by heteroskedasticity

and clustered at the firm level. ***, **, and * indicate a two-tailed test significance level at 1%, 5%, and 10%, respectively.

To further bolster our findings in the channel test, we provide additional evidence by showing that shareholder coordination also positively affects two alternative measures of voluntary disclosure (management forecast occurrence and forecast precision).[11] Overall, our results suggest that shareholder coordination affects price informativeness through enhancing corporate disclosure quality.

CONCLUDING REMARKS

Although the role of institutional investors in improving corporate transparency has been recognized by many prior studies, the question of whether coordination among institutional shareholders can improve the corporate information environment has not been fully answered. In this paper, we demonstrate that shareholder coordination has implications for stock price informativeness. We use geographic proximity between institutional investors as the basis for designing the measure of shareholder coordination. We find that a higher degree of shareholder coordination is associated with more informative stock prices. The positive relation between shareholder coordination and price informativeness stands up to a variety of endogeneity tests and robustness checks. We also find that shareholder coordination plays a more important role when alternative governance mechanisms are weak, suggesting that there is a substitution effect between shareholder coordination and the existing governance mechanisms. We also propose a possible channel through which shareholder coordination can affect stock price informativeness. Taken together, our results support the notion that shareholder coordination improves stock price informativeness.

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Notes

1 For example, Lewellen (2011) documents that institutions in the 13F database held32% of total market value at the beginning in 1980. The number increases to 68% by the end of 2007.

2 For example, in our sample, the number of institutions holding an average stock is 41 in 1994, but the number increases to 131 in 2010.

3 Geographic proximity has been shown to be influential in the development of close relationships such as dealings among floor traders (Baker, 1984), the forming of interlocked corporate boards (Kono, Palmer, Friedland, & Zafonte, 1998), and investment patterns of venture capital firms (Sorenson & Stuart, 2001). Finance literature has also shown that geographic proximity facilitates communication and the exchange of ideas among mutual fund managers (e.g., Grinblatt & Keloharju, 2001; Hong, Kubik, & Stein, 2005; Ivković &Weisbenner, 2005). Therefore, geographic proximity among institutional shareholders is a legitimate proxy for shareholder coordination.

4 Idiosyncratic volatility and probability of informed trading have been widely used as proxies for stock price informativeness in the literature (e.g., Ferreira & Laux, 2007; Ferreira, Ferreira, & Raposo, 2011).

5 Bushee (1998) finds that the investment horizon of institutional investors is positively associated with a firm's R&D spending that could create long-term value. Brickley et al. (1988) show that independent institutional investors aremore likely to pass proposals on antitakeover amendments.

6 Corporate governance mechanisms can generally be classified into two categories: internal and external governance mechanisms. Large shareholders and board directors are often viewed as the main internal governance mechanisms (e.g., Franks & Mayer, 1996), while takeovers and the market for corporate control are the main external governance mechanisms (e.g., Jensen, 1993).We view shareholder coordination as the internal governance mechanism in that if institutional investors can coordinate with ease, they can form a coalition and perform the role of large shareholders to mitigate the free-rider problem in corporate monitoring.

7 We thank Brian Bushee for generously providing the institutional investor classification data.

8 In the following regression analysis, we take the simple average of shareholder coordination over the four quarters in the past year, *t*–1.

9 AIMR-FAF rating data is available up to 1995 but our sample begins in 1994. In addition, one limitation with AIMR-FAF ratings, as Healy and Palepu (2001) point out, is that 'it is unclear whether the analysts on the AIMR panels take the ratings seriously, how they select firms to be included in the ratings, and what biases they bring to the ratings.'

10 The cross-equation coefficient equality test indicates that the difference between the two coefficients on shareholder coordination is significant at the 5% level.

11 The results are not tabulated but available upon request.

APPENDIX A: DEFINITIONS OF VARIABLES

IV	Annual logistic transformed relative volatility estimated from the Fama-French three factor model. [Data source: CRSP]
$COORD$	The inverse of the average of log(1 + weighted-average geographic distance between institutional shareholders of the firm) in each firm-quarter in year $t-1$, where weight is the ratio of ownership held by institution i to the total ownership held by all institutions in a firm at quarter q. [Data source: Thomson-Reuters Institutional Holdings (F13)]
$COORD^{Indep}$	Institutional shareholder coordination measured among independent institutions (mutual funds and independent investment advisors). [Data source: Thomson-Reuters Institutional Holdings (F13)]
$COORD^{Grey}$	Institutional shareholder coordination measured among grey institutions (bank trusts, insurance companies, and other institutions). [Data source: Thomson-Reuters Institutional Holdings (F13)]
$COORD^{Ded}$	Institutional shareholder coordination measured among dedicated institutions (e.g. Bushee, 2001). [Data source: Thomson-Reuters Institutional Holdings (F13)]

$COORD^{Trans}$	Institutional shareholder coordination measured among transient institutions (e.g. Bushee, 2001). [Data source: Thomson-Reuters Institutional Holdings (F13)]
$Totown$	The average percentage of aggregated share holdings by institutional investors to total shares outstanding in year t−1. [Data source: Thomson-Reuters Institutional Holdings (F13)]
$Ln(Assets)$	Natural logarithm of total assets. [Data source: Compustat]
$Ln(MB)$	Natural logarithm of the market-to-book ratio. [Data source: Compustat]
ROE	Return on equity, calculated as earnings before extraordinary items divided by book value of equity by the end of prior year. [Data source: Compustat]
$Std.(ROE)$	Standard deviation of *ROE* during the past 3 years. [Data source: Compustat]
$Leverage$	Leverage, defined as the ratio of long-term debt to total assets. [Data source: Compustat]
$Ln(FirmAge)$	Natural logarithm of firm age, defined as the number of years since the stock was included in the Compustat database. [Data source: Compustat]
$DivDum$	Dividend dummy, which equals 1 if the firm pays dividends, and 0 otherwise. [Data source: Compustat]
$MultiSeg$	Diversification dummy which equals 1 when a firm operates in multiple segments, and 0 otherwise. [Data source: Compustat]
$Ln(DistHQ)$	The weighted average distance between institutions and a firm's headquarters.
$Analyst$	Natural logarithm of number of analysts following the firm in a year. [Data source: I/B/E/S]
$NumInst$	The number of institutional shareholders in a firm-year. [Data source: Thomson-Reuters Institutional Holdings (F13)]
$Dedown$	Ownership held by dedicated institutions. [Data source: Thomson-Reuters Institutional Holdings (F13)]
$Localown$	Ownership held by institutions located within 150 mile radius of a firm's headquarters. [Data source: Thomson-Reuters Institutional Holdings (F13)]
$Indepown$	Ownership held by independent institutional investors. [Data source: Thomson-Reuters Institutional Holdings (F13)]
$Blockown$	Ownership held by institutions whose ownership is above 5%. [Data source: Thomson-Reuters Institutional Holdings (F13)]
$Insiderown$	Ownership held by corporate insiders. Insiders are defined as a chief executive officer, other executive officers, and directors. [Data source: Investor Responsibility Research Center (IRRC)]
$BoardSize$	The number of board members. [Data source: CDA/Spectrum Compact Disclosure and Investor Responsibility Research Center (IRRC)]
$IndepBoard$	Ratio of number of independent directors to board size. [Data source: CDA/Spectrum Compact Disclosure and Investor Responsibility Research Center (IRRC)]
$FemaleBoard$	The percentage of female directors on the board. [Data source: CDA/Spectrum Compact Disclosure and Investor Responsibility Research Center (IRRC)]

$CEOown$	The percent of CEO ownership. [Data source: ExecuComp]
$Gindex$	Governance index, which is based on 24 antitakeover provisions [Data source: Investor Responsibility Research Center (IRRC)]
PIN	The probability of informed trading. [Data source: https://scholar.rhsmith.umd.edu/sbrown/pindata].
$Management\ Forecast\ Frequency$	Total number of earnings forecasts issued by a firm per year. [Data source: First Call]
$Auditor$	A dummy that equals1 if the company is audited by one of the Big 5 auditors, and 0 otherwise. [Data source: Compustat]
$Litigation$	A dummy that equals 1 for all firms in the biotechnology (2833–2836 and 8731–8734), computers (3570–3577 and 7370–7374), electronics (3600–3674), and retail (5200–5961) industries, and 0 otherwise. [Data source: Compustat]
$Loss$	A dummy that equals 1 if the firm reported losses in the current period, and 0 otherwise. [Data source: Compustat]
$Dispfor$	Standard deviation of analysts' forecasts divided by the median forecast. [Data source: I/B/E/S]
$Earnings\_D$	A dummy that equals 1 if the current-period EPS is greater than or equal to the previous-period EPS, and 0 otherwise. [Data source: Compustat]
$Earnvol$	Standard deviation of the operating earnings in the last five years. [Data source: Compustat]
$Beta$	Market risk derived from a one-factor market model using daily stock return data. [Data source: CRSP]
FD	A dummy that equals 1 if a firm-year observation is after 2000, and 0 otherwise. [Data source: Compustat]

APPENDIX B: GMM ANALYSIS

This table reports estimation results from the dynamic panel GMM estimation method. The dependent variable is a proxy for stock price informativeness; *IV* is relative idiosyncratic risk measured as $\mathrm{Ln}([1-R^2]/R^2)$. $COORD$ is the weighted average distances among institutional shareholders and multiplied by −1. All variable definitions are given in Appendix A. Industry (i.e., the first two-digit SIC code), firm, and year dummies are included, but coefficient estimates are omitted to save space. Numbers in parentheses are *t*-statistics calculated using standard errors adjusted by heteroskedasticity and clustered at the firm level. ***, **, and * indicate a two-tailed test significance level at 1%, 5%, and 10%, respectively.

	(1) $\boldsymbol{IV_t}$
IV_{t-1}	0.311*** (5.05)
IV_{t-2}	0.114** (2.08)
IV_{t-3}	0.025 (0.49)
$COORD_{t-1}$	0.469*** (2.64)
$Totown_{t-1}$	0.123 (0.35)

$Ln(Assets)_{t-1}$	−0.058 (−0.96)
$Ln(MB)_{t-1}$	−0.155* (−1.66)
ROE_{t-1}	−0.107 (−0.78)
$Std.(ROE)_{t-1}$	0.028 (0.59)
$Leverage_{t-1}$	1.210*** (3.17)
$Ln(FirmAge)_{t-1}$	−0.076 (−0.91)
$DivDum_{t-1}$	−0.112 (−0.91)
$MultiSeg_{t-1}$	0.185* (1.79)
$In(DistHQ)_{t-1}$	−0.520 (−0.31)
$Ln(Analyst)_{t+1}$	−0.139** (−2.14)
$Constant$	4.111 (1.24)
$Year\ FE$	Yes
$Industry\ FE$	Yes
$Observations$	11,701
$AR(1)$	<0.01
$AR(2)$	0.452
Hansen	0.361