The Information Asymmetry between Top Management and Rank-and-File Employees: Determinants and Consequences

Kelly Huang
Assistant Professor of Accounting
School of Accounting
Florida International University
Email: huangx@fiu.edu

Meng Li
Assistant Professor of Accounting
School of Management
University of Texas at Dallas
Email: meng.li7@utdallas.edu

Stanimir Markov
Ashbel Smith Professor of Accounting
School of Management
University of Texas at Dallas
Email: stan.markov@utdallas.edu

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Abstract:
In modern firms, relevant information is widely distributed but difficult to acquire by management due to agency and information costs, resulting in intra-firm information asymmetry. We compare management earnings forecasts with rank-and-file employees' outlook (predictions of future firm performance available on the social media platform Glassdoor.com) to quantify this phenomenon and examine its determinants and consequences. We find that information asymmetry is lower when firms have more centralized organizational structure and effective internal controls; when employees report higher satisfaction with the company/management and receive more stock options; and when CEOs are more experienced and internally focused. We do not find that managers incorporate positive outlook in their forecasts even when they have strong incentives to disclose positive news, or that their personal trades reflect knowledge of outlook, alleviating the concern that managers choose to overlook employees' information in their forecasts. Finally, we find that the consequences of high information asymmetry include poorer future firm performance and a higher likelihood of CEO turnover.

Keywords: Intra-firm information asymmetry; Top management; Rank-and-file employees; Social media.

1. Introduction

Researchers have long recognized that knowledge relevant to centralized decision making is widely distributed among employees across different hierarchies, and that information costs and agency costs prevent this information from being fully used, resulting in intra-firm information asymmetry (Prendergast, 1993; Stein, 2002). Alleviating this information asymmetry is a major driver of organizational design (Hofmann and van Lent, 2015) and an objective of various corporate initiatives, including the internal prediction markets that many large companies operate in order to extract employees' information on product demand, project completion time, and other variables (Wolfers and Zitzewitz, 2004; Dvorak, 2008; Cowgill and Zitzewitz, 2015). At the same time, the difficulty of quantifying information asymmetry has prevented researchers from empirically assessing its significance and examining its determinants and consequences. In this study, we propose a new measure of intra-firm information asymmetry that has several appealing features, and use this measure to examine the determinants and the consequences of information asymmetry.

Adopting the perspective of top management, we partition the set of relevant information available to employees into information available only to the employees, E, and common information to both top management and employees, C. We define information asymmetry as E/E+C and demonstrate that this ratio is equivalent to the slope coefficient in a regression of management forecast errors on employees' earnings forecasts (see Section 2 for details). Intuitively, managers face lower information asymmetry when the fraction of employees' information that is hidden from them is lower. Lower asymmetry should reduce the ability of employee information to predict managers' forecast errors. Note that lower information

asymmetry implies higher management forecast accuracy but not the other way around, as managers may acquire information orthogonal to employees' information.

We measure managers' information using management earnings forecasts, similar to Gallemore and Labro (2015).[1] We use a novel database from a popular job site, Glassdoor.com, to construct a measure of employees' information.[2] On this site, current and former employees predict whether, in the next six months, company performance will "get better," "stay the same," or "get worse," which we code as +1, 0, and -1, respectively. Employee predictions have been shown to be incrementally useful in predicting future performance (Hales et al, 2018; Huang et al., 2018; Sheng, 2018), and therefore serve as a reasonable proxy for rank-and-file employees' information. Thus, we average current employees' predictions made within 30 days prior to the issuance of the management forecast to obtain our measure of employees' information ("employee outlook," henceforth). We acknowledge that employees may not have strong incentives to provide accurate forecasts, but note that this biases against finding evidence of information asymmetry.

Our sample consists of 91,978 individual employee predictions and 11,686 annual management forecasts for 994 unique firms from May 2012 to September 2017. Controlling for other determinants of management forecast error, we find a positive and significant coefficient on employee outlook (*Outlook*), consistent with managers lacking full access to employees' information set. In terms of economic significance, one standard deviation increase in *Outlook*

[1] See Baik et al. (2011) and Lee et al. (2012) for evidence that managers have strong incentives to issue accurate forecasts.

[2] Our study differs from other studies that also use Glassdoor data (e.g., Hales et al., 2018; Huang et al., 2018; Sheng, 2018) in that we use these data to study the flow of information within the firm, while the other authors use these data to study the flow of information to capital market.

increases the management forecast error by 0.05 percentage points, which is equivalent to 51% of our sample mean forecast error.

An alternative explanation for these results is that management has access to employees' information but chooses not to use it in forecasting. We present two results inconsistent with this explanation. First, managers do not incorporate positive outlook in their forecasts even when they have strong economic incentives to do so—for example, when they work in firms with high financial distress, external financing needs, high product market competition, or high insider selling. Second, managers' personal trades are unrelated to employee outlook, even though outlook is predictive of future return and could therefore improve trading performance.

To further validate our measure of information asymmetry and help understand its determinants, we develop and test a set of cross-sectional predictions. Drawing on prior work in managerial accounting (Feng et al., 2009; Li et al., 2014; Hofmann and Lent, 2015), we predict that information asymmetry is lower in firms with a more centralized structure, since centralization makes collecting and aggregating employees' information less costly (Garrett et al., 2014); in firms with effective internal controls, since controls reduce information-processing errors and delays; and in firms with more employee stock options, since stock options incentivize employees to communicate private information to their superiors. Following Garrett et al. (2014), we suggest that higher employee satisfaction increases employees' motivation and trust in management, resulting in greater information sharing. Finally, we expect that more experienced and internally focused CEOs are generally more knowledgeable about firm operations and more engaged with company employees, which should facilitate the flow of information from their employees to them. To test each of these predictions, we interact *Outlook*

with an indicator variable equal to one when the value of a determinant is high (above the sample median for continuous determinants).

As expected, we find that the coefficient on *Outlook* (our measure of information asymmetry) declines when firms are more centralized, have effective internal controls, or have greater employee stock options. Using employees' Glassdoor.com ratings of senior management, firm culture and values, compensation and benefits, and career opportunities to measure various aspects of employee satisfaction, we find that the coefficient on *Outlook* is lower when employees are more satisfied in each area except for career opportunities. Additionally, the coefficient on *Outlook* is lower when the CEO is more experienced (measured by founder status or longer tenure) or internally focused (measured by lower participation in investor conferences).[3]

The premise of all of our cross-sectional predictions is that the amount of common information, C, increases as the amount of information available only to the employees, E, decreases. For many of our determinants, however, an argument can be made that C increases with no change in E. For example, firms with better internal controls may have lower information asymmetry because they generate more information that was previously unavailable to management and employees. To discriminate between these two explanations, we test whether *Outlook* is a stronger predictor of future performance when the value of an information asymmetry determinant is high, and find that Outlook's ability to predict future performance improves only in the case of employee satisfaction. We conclude that increased flow of information from employees to management, rather than increased acquisition of common information by management and employees, accounts for our results.

[3] Our cross-sectional results also help address an alternative explanation that managers have access to employee's information but cognitive biases prevent them from using this information.

If managers do not acquire and use employees' information in operational and investment decisions, then firm performance will suffer. And if the board of directors understand the link between intra-firm information asymmetry and firm performance, then managers who acquire a smaller fraction of the information available to their employees are more likely to be removed.

Estimating variation in information asymmetry based on firm-year specific slope coefficients leads to substantial sample attrition and noisy coefficient estimates, so we take a different approach in our consequence analysis. High information asymmetry, indicated by a large slope coefficient, means that extreme positive (negative) outlook is accompanied by even more extreme positive (negative) management forecast errors. To identify variation in information asymmetry, we first sort management forecast errors and outlook into quintiles, then create an information asymmetry indicator variable: one if both variables fall in the same extreme (i.e., largest or smallest) quintile in any of the previous three years, and zero otherwise. We observe that firms with high information asymmetry experience a decline in ROA (Tobin's Q) that is equivalent to 16 (10) percent of sample mean. In addition, the likelihood of CEO turnover in these firms increases by 3.7 percentage points, representing an increase of 48 percent from the average turnover rate for firms without high information asymmetry.

Our primary contribution is toward quantifying an important organizational phenomenon—the information asymmetry between top managers and rank-and-file employees—and examining its determinants and consequences. To our knowledge, Chen et al. (2018) is the only study that directly examines intra-firm information asymmetry. That study proposes that the quantity of information possessed by top managers and divisional managers can be inferred from their trading profits, and shows that a trading profit–based measure of information asymmetry is

negatively (positively) associated with management forecast quality (error-driven accounting restatements).

We complement and extend Chen et al. (2018) four ways. First, whereas Chen et al. (2018) study information asymmetry between top managers and a small number of employees at the very top of the organization, we study information asymmetry between top managers and a large number of employees in the middle or at the bottom of the organizational hierarchy. Second, while Chen et al. (2018) rely on individuals' trading behavior to identify their information sets, we rely on individuals' reporting behavior. Given that the influences on trading behavior are difficult to control for, there is value in pursuing an alternate identification strategy. Third, our notion of information asymmetry is distinct from theirs. In fact, Chen et al.'s notion of information asymmetry—the idea that the difference between the trading profits of top managers and divisional managers reflects the difference in their respective information sets—corresponds to the notion of information advantage in our framework.[4] Fourth, we examine a different set of determinants and different consequences of information asymmetry.

By identifying the reduction of information asymmetry as a channel to increase the information available to top managers, our study also fits within a broader literature that explores how firms can improve the quality of information used by top managers (Feng et al., 2009; Dorantes et al., 2013; Garrett et al., 2014; Ittner and Michels, 2017, among others). Our finding that effective internal controls reduce information asymmetry speaks to the mechanism by which effective controls increase forecast accuracy (Feng et al., 2009). Our result that employee satisfaction, arguably a measure of trust in management, reduces information asymmetry

[4] Please refer to Section 2 for more details.

corroborates the Garrett et al. (2014) finding that trust improves financial reporting quality through improved information sharing.

The rest of the paper is organized as follows. In Section 2, we discuss our theory and measurement of information asymmetry. In Section 3, we discuss our sample and provide descriptive statistics. In Section 4, we present the results of our empirical analyses. We conclude in Section 5.

2. Theory and measurement

Organizational theories have long recognized that knowledge relevant to centralized decision making is widely distributed among employees across different hierarchies (Aghion and Tirole, 1997), and that information costs and agency costs prevent this information from being fully used. For example, soft information possessed by rank-and-file employees, by nature, cannot be credibly communicated and transferred (Stein, 2002). Employees may choose to withhold or distort information due to career concerns or distrust in management (Prendergast, 1993; Garrett et al., 2014), and top managers may not seek employees' information or may disregard it as unimportant. Finally, organizational factors such as decentralization and ineffective internal information systems may impede the flow of information from rank-and-file employees to top management (Feng et al., 2009).

With the notable exception of Chen et al. (2018), prior literature does not quantify the extent to which information available to company employees remains unused by top managers. This has prevented researchers from addressing basic questions about the significance, determinants, and consequences of this type of information asymmetry. In this section, we define

and operationalize the notion of information asymmetry, and discuss our framework in the context of prior literature.

2.1. Information asymmetry: definition and measurement

We assume that earnings information can be represented as the sum of N independently distributed standard normal variables: $\delta^{m}_{i\in\{1,\ldots,M\}}$ observed only by the manager, $\delta^{e}_{i\in\{1,\ldots,E\}}$ only by the employees, $\delta^{c}_{i\in\{1,\ldots,C\}}$ by both, and $\delta^{r}_{i\in\{1,\ldots,R\}}$ by neither, with $N = M + E + C + R$. From the manager's perspective, information asymmetry can be defined intuitively as E: the amount of information observed by the employees but not by the manager. Because E is likely to be smaller (larger) when employees possess less (more) information in total, we scale E by employees' total information, $E + C$. From the employees' perspective, information asymmetry can be defined as $M/M + C$. Because the sole focus of our study is on decision making at the top of the organization, we use "intra-firm information asymmetry" and "information asymmetry" solely in reference to the information asymmetry faced by the top manager. We note that subtracting employees' information, $E + C$, from the manager's information, $M + C$, yields a measure of informational advantage or disadvantage, depending on the sign of the measure.

Our measure of information asymmetry, $E/E + C$, is equivalent to the slope coefficient from a regression of management forecast errors on employees' earnings forecasts. Specifically, a rational manager forecasts earnings as $\sum_{i=1}^{M}\delta_i^m + \sum_{i=1}^{C}\delta_i^c$, resulting in a forecast error of $\sum_{i=1}^{E}\delta_i^e + \sum_{i=1}^{R}\delta_i^r$, while rational employees forecast earnings as $\sum_{i=1}^{E}\delta_i^e + \sum_{i=1}^{C}\delta_i^c$. The covariance between the management forecast error and the employees' forecast is $COV(\sum_{i=1}^{E}\delta_i^e + \sum_{i=1}^{R}\delta_i^r\ ,\sum_{i=1}^{E}\delta_i^e + \sum_{i=1}^{C}\delta_i^c) = E$, and the variance of the employees' forecast is $E + C$.

Information asymmetry is reduced when (1) the manager observes elements of δ^e (reducing E and increasing C) or (2) the manager and the employees observe elements of δ^r (increasing C and reducing R). We interpret (1) as employees sharing more information with managers or managers more actively seeking and using employees' information, and (2) as increased production of information due to, for example, increased investment in information technology. We note that only (2) predicts an increased predictive ability of employees' earnings forecast.

Our framework clarifies that a reduction in information asymmetry implies increased management forecast accuracy but not vice versa. For example, if a manager observes elements of δ^r, i.e., if she acquires information orthogonal to employees' information (increasing M and reducing R), her earnings forecast accuracy would increase but information asymmetry, $E/E + C$, would remain the same. In other words, reducing information asymmetry is just one way of improving a firm's internal information environment (Gallemore and Labro, 2015).[5]

2.2. Measuring managers' and employees' information

We use management earnings forecasts to measure managers' information, similar to Gallemore and Labro (2015), among others. Although evidence suggests that managers have strong incentives to issue accurate forecasts (Baik et al., 2011; Lee et al., 2012; Yang, 2012), it is still possible that managers have access to employees' information but choose not to incorporate it in their forecasts for strategic reasons. We conduct a battery of tests to assess this possibility in Section 4.2.

[5] Gallemore and Labro (2015) define the quality of a firm's internal information environment "in terms of the accessibility, usefulness, reliability, accuracy, quantity, and signal-to-noise ratio of the data and knowledge collected, generated, and consumed within an organization." In our setting, M+E+C represents information available within the organization, while M+C represents information available to the manager.

Another possibility is that bounded rational managers have full access to employees' information but use it only partially. In Section 2.3, we use organizational theory to derive predictions about how access to information varies cross-sectionally; we test these predictions in Section 4.3.

We use employee outlook from Glassdoor.com to measure employees' information. Specifically, employee reviewers choose from three options to predict their companies' six-month business outlook: "get better," "stay the same," or "get worse." Several studies report that average employee outlook is useful in predicting future accounting and market performance (Hales et al., 2018; Huang et al., 2018; Sheng, 2018), consistent with the existence of information asymmetry between employees who contribute to Glassdoor and the capital market. But whether employee outlook can be used to construct a viable measure of intra-firm information asymmetry remains an open question, since the information in outlook could be used in management forecasts or available to but omitted by top managers.

2.3. Determinants and consequences of information asymmetry

We explore the roles of firm-, employee-, and CEO-level factors in alleviating information asymmetry. We briefly motivate each factor, deferring discussion on measurement until Section 4.3.

We suggest that information asymmetry is likely to be lower in firms with centralized organizational structure, because they collect more information from employees to support centralized decision making; in firms with effective internal controls, because they experience smaller losses and shorter delays in information flows; and in firms that grant more employee stock options, because stock options incentivize employees to work harder and to reveal information to management. Information asymmetry is also likely to be lower when employees

express higher satisfaction with the company. Higher satisfaction indicates greater trust in management, which is conducive to information sharing (Garrett et al., 2014). Finally, firms with more experienced and internally focused CEOs are likely to have lower information asymmetry because the overlap between a bounded rational CEO's information set and employees' information sets is likely to be increasing in the CEO's knowledge of the company and its employees, and in the extent of her internal interactions.

Potential consequences of higher information asymmetry include lower company performance and higher likelihood of CEO turnover. Specifically, a manager's failure to incorporate employee information in her decision making may hinder the company's performance, which could prompt the board of directors to replace her. Prior literature finds that higher information asymmetry leads to lower management forecast accuracy (Chen et al., 2018), and that lower management forecast accuracy leads to worse firm performance and CEO career outcomes (Lee et al., 2012; Goodman et al., 2014). However, a direct link between information asymmetry and firm performance and CEO career outcomes has not been established.

Establishing such a link is important for two reasons. First, it would help establish intra-firm information asymmetry as a critical factor in shaping the quality of the information used in centralized decision making. Second, it would contribute much-needed large-sample evidence on the consequences of intra-information asymmetry (supplementing Chen et al., 2018) to the managerial accounting and organizational theory (Hofmann and van Lent, 2015).

2.4. Differences from prior studies

Prior studies find that effective management controls, including SOX 404 internal controls, enterprise systems, and risk-based forecasting and planning processes improve management forecast accuracy (Feng et al., 2009; Dorantes et al., 2013; Ittner and Michels,

2017). However, these studies do not clarify whether these management practices ameliorate information asymmetry. As the discussion in Section 2.1 makes it clear, a reduction in information asymmetry is sufficient but not necessary for accuracy to improve.

Ke et al. (2019) find that social connections within the top management team are associated with higher management forecast accuracy, consistent with social connections fostering information sharing. Garrett et al. (2014) find that employees' trust in management is associated with higher financial reporting quality, consistent with trust improving information sharing. These results speak indirectly to the role of connections and trust in reducing information asymmetry, as social connections and trust may enhance management forecast accuracy and financial reporting quality by encouraging effort and information production in general (rather than information sharing). In our paper, we test whether trust in management is a determinant of information asymmetry.

Chen et al. (2018) suggest that the quantity of information possessed by top managers and divisional managers can be inferred from their trading profits, and show that a trading profit–based measure of information asymmetry is positively (negatively) associated with management forecast quality (error-driven accounting restatements). Our study complements Chen et al. (2018) in several ways. First, while Chen et al. (2018) study information asymmetry only between top managers and *divisional managers* (who often directly report to the CEO and can be viewed as members of the extended top management team), we study information asymmetry between top managers and employees in the middle and at the bottom of the organizational hierarchy.[6] Second, our approach of inferring individuals' information from their forecasts

[6] In our sample, on average, there are 3.5 divisional managers, identified as per Chen et al. (2018), and 65 reviewers in a firm-year. Also, only 1% of employee reviewers in our sample have high-level manager job titles such as "president," "executive," "chief … officer," "division manager," or "divisional manager."

complements Chen et al.'s (2018) approach of inferring individuals' information from their trading profits.[7] Third, our notion of information asymmetry is distinct from theirs. In their paper, the trading profits of top managers and the trading profits of divisional managers reflect their private information—$(M + C)$ and $(E + C)$, respectively. Thus, Chen et al.'s notion of information asymmetry corresponds to the notion of information advantage $(M - C)$ in our framework.[8]

3. Data and descriptive statistics

3.1. Sample selection and key variable definitions

Launched in 2008, Glassdoor.com is a website where current and former employees anonymously review companies and their management. An employee review includes an overall company rating; optional ratings of senior management, career opportunities, compensation and benefits, work/life balance, culture and values; approval of the company CEO; and whether the employee would recommend the company to a friend. Since May 2012, reviewers have also had the option of assessing their company's outlook over the next six months.

We obtain data directly from Glassdoor for the period from May 2012 to September 2017. In this period, more than 1 million reviews, covering 6,790 public firms, include employee outlook. Merging these data with the Compustat universe (using both ticker symbols and company names) reduces the sample to 928,725 reviews of 5,200 unique firms; 506,691 of these reviews are by current employees.

[7] Both approaches have their own limitations. Biases and strategic considerations may drive a wedge between what employees and managers know and what they choose to report (this study), while concerns about insider trading litigation and liquidity shocks may drive a wedge between what managers know and their trading profits (Chen et al., 2018).

[8] As another illustration: when the manager acquires information orthogonal to employees' information (i.e., the manager observes elements of δ_r but the employees do not), her trades become more profitable than employees' trades. This results in lower information asymmetry, as defined in Chen et al. (2018) but not in our study.

We obtain management forecasts and the corresponding earnings per share actuals for the same period from the I/B/E/S Guidance database. We focus on annual earnings forecasts because they are more prevalent than quarterly forecasts, and we exclude forecasts issued after the end of the year because they are considered pre-announcements. When a manager issues a range forecast, we use the midpoint to estimate her earnings expectation.[9] We define management forecast error as actual minus forecast, as per our framework, and scale by price to reduce heteroscedasticity. There are 24,609 management forecast errors for 5,495 firm-years.

One empirical challenge in using management forecasts and employee outlook to measure differences in information sets between the two groups is that the forecasts and outlook are issued at different times. If we match a forecast to outlook provided during 30 days prior to the forecast issuance date, our tests are biased against documenting information asymmetry, because information that was available only to company employees during the prior 30 days may become available to the manager through other sources on the forecast issuance date. If we match a forecast and outlook in the same calendar month, our tests would be biased in favor of documenting information asymmetry, because outlook issued in the days after a management forecast may benefit from the arrival of new information. To address this, we measure *Outlook* as the average of individual employee outlook provided within 30 days prior to the forecast issuance date; we then use untabulated analysis to confirm that our results hold when *Outlook* is measured as the average of individual outlook issued during the same calendar month of the forecast issuance date.[10]

[9] Ciconte et al. (2014) suggest that the upper bound of range forecasts is closer to managers' true expectations than the midpoint in recent years. Therefore, in untabulated analysis, we replace the midpoint with the upper bound of range forecasts to compute management forecast error and find robust results.

[10] In untabulated analyses, we average individual employee outlook issued in the preceding 60 days or 90 days and find similar results. On one hand, expanding this window increases timing bias; on the other hand, it yields a more accurate measure of employees' information by averaging a larger number of individual predictions, and increases sample size by relaxing the matching criterion.

We find matched outlook for 11,937 management earnings forecasts from 3,630 firm-years. Requiring availability of Compustat, CRSP, I/B/E/S information to measure control variables reduces our sample to 11,686 management forecast-outlook pairs for 3,520 firm-years.

3.2. Summary statistics

Table 1 reports descriptive statistics for our sample data.[11] The mean (median) management forecast error is 0.0010 (0.0015), suggesting that management, on average, issues lowball forecasts in order to report a positive earnings surprise. The mean (median) *Outlook* is 0.31 (0.33), indicating that, on average, employees expect firm performance to improve.[12] *Outlook* varies substantially, increasing from 0 at the first quartile to 0.8 at the third quartile. Our sample firms are large (mean market capitalization of 17.3 billion), well capitalized (mean market-to-book ratio of 4.7), and profitable (mean return on assets of 6.2%).

4. Empirical results

4.1. Estimating information asymmetry

We estimate the following model:

$$MFE_{i,t+1} = \beta_0 + \beta_1 Outlook_{i,t} + \beta_2 Controls_{i,t} + \sum Industry\ FE + \sum Time\ FE + \varepsilon_{i,t+1} \quad (1)$$

where *MFE* is management forecast error, measured as actual earnings per share for year t+1 minus management earnings forecast for year t+1, scaled by the closing price at the end of fiscal year t, and *Outlook* is the average value of the outlook assessments provided by current employees within 30 days prior to the issuance date of the management forecast. There are several types of control variables from year t. First are standard firm characteristics: market

[11] To mitigate the influences of outliers in the data, we winsorize the top and bottom one percent of all continuous variables except *Outlook*.

[12] Our sample firms indeed experience an improvement in performance, as indicated by a positive change in ROA.

value of equity (*LogMVE*), market-to-book ratio (*MTB*), and leverage ratio (*Leverage*). Second are performance-related variables: return on assets (*ROA*), sales growth (*SalesGrowth*), incidence of loss (*Loss)*, level of accruals (*TAcc*), and stock returns (*Return*). Third are measures of uncertainty: earnings volatility (*StdROA*) and return volatility (*StdRet*). We also include litigation risk (*LitiRisk*), because greater litigation risk may deter managers from issuing optimistic forecasts (Francis et al., 1994); analyst coverage (*Analyst*), because greater analyst coverage brings more public scrutiny of management disclosure (Lang and Lundholm, 1996); and forecast horizon (*Horizon*) because forecasts with longer horizons are more likely to be optimistic (Ajinkya et al., 2005). Finally, we include Chen et al. (2018)'s trading-based measure of information asymmetry between divisional managers and top managers (*DIFRET*), because it has also been shown to affect management forecast error.[13] We provide detailed variable definitions in the Appendix.

In Table 2, we present results from the estimation of three specifications: (1) no control variables, (2) control variables except *DIFRET* included, and (3) all control variables included. The coefficient estimates on *Outlook* are positive and statistically significant at the 5% level in all specifications. In terms of economic significance, a one-standard-deviation increase in *Outlook* in specification (2) is associated with an increase of *MFE* by 0.0005, which is about 51% of sample mean *MFE*.[14] These findings are consistent with the information asymmetry hypothesis, which asserts that managers do not have full access to employee's information.[15]

[13] We do not control for *DIFRET* throughout the paper as it reduces our sample size by more than half.
[14] As a reference, the economic effect of outlook is comparable to that of accruals as examined in Gong et al. (2009) and is about half the effect of earnings volatility, a known key determinant of management forecast error.
[15] Because employee outlook information on Glassdoor.com is publicly available, our results also imply that managers fail to acquire this information from Glassdoor or efficiently use it in their forecasts.

Turning to control variables, we generally confirm prior findings that management forecasts are predictable based on available information due to strategic considerations or behavioral biases. For example, *Horizon* is negatively associated with forecast error, consistent with managers' strategy of issuing more optimistic forecasts first and walking down their estimates later (Richardson et al., 2004). The significant coefficients on *ROA* and *TAcc* suggest that managers do not efficiently incorporate publicly available information in their forecasts, probably due to their behavioral biases (Gong et al., 2009).

The above results raise the natural concern that managers might have full access to employees' information but (1) choose not to use it for strategic reasons or (2) use it inefficiently due to behavioral biases. To address (1), we conduct a battery of tests in Section 4.2; to address (2), we rely on our determinants analyses in Section 4.3.

4.2. Strategic choice to overlook employees' information

As suggested above, our finding of a positive slope coefficient on *Outlook* is also consistent with managers having full access to employees' information but choosing not to incorporate in their forecasts. We address this explanation in two ways.

4.2.1. Subsample analysis

Prior research identifies several incentives for optimistic disclosure: financial distress (Frost, 1997; Koch, 2002), external financing needs (Frankel et al., 1995; Lang and Lundholm, 2000), product market competition (Newman and Sansing, 1993), and insider trading (Noe 1999; Aboody and Kasznik, 2000). The strategic choice explanation predicts that when managers have strong incentives to provide optimistic disclosure, they will incorporate good news that is available to them from employees. We therefore regress management forecast error on positive employee outlook in subsamples of high financial distress, high external financing, high industry

competition (measured by low product market concentration), and high insider selling. As shown in Table 3, the coefficients on *Outlook* are significantly positive in all four subsamples, inconsistent with the strategic choice hypothesis.

4.2.2. Trade analysis

Because rational managers who have access to employees' information should use this information to trade more profitably, we also examine whether managers' non-routine trades in their own companies' stocks reflect knowledge of employee outlook.[16]

We regress trades by top managers (chairman, vice chairman, CEO, CFO, or COO) (*MgmTrade*) on the average of employee outlook issued within 30 days prior to the trades (*Outlook*).[17] Control variables include firm size (*LogMVE*); measures of current performance such as return on assets (*ROA*), total accruals (*TAcc*), and accounting loss (*Loss*) (Beneish and Vargus, 2002); and trading multiples such as past stock returns (*Return*), market-to-book ratio (*MTB*), sales growth (*SalesGrowth*), and earnings-price ratio (*EP*) (Rozeff and Zaman, 1998; Piotroski and Roulstone, 2005).

We report results in Column (1) of Table 4. The coefficient on *Outlook* is negative and insignificant, suggesting that the managers' trades are driven by information that is largely orthogonal to the employees' information. That is, in a setting absent of strategic considerations, information available to employees remains unused by top managers, consistent with managers lacking access to such information.

In column (2), we report results from a regression of post-trade 30-day size-adjusted return (*AbnRet*) on *MgmTrade*, *Outlook*, and control variables, which also include R&D expense

[16] See Sheng (2018) and Huang et al. (2018) for evidence that employee outlook predicts future stock returns.
[17] The classification of top managers is consistent with that of Chen et al. (2018). Our inference is unchanged when we use trades made by CEOs and CFOs only.

(*R&D*), stock return volatility (*StdRet*), stock liquidity (*ShareTurnover*), litigation risk (*LitiRisk*), and timing of trade relative to the earnings announcement (*Window*) (Aboody and Lev, 2000; Frankel and Li, 2004; Huddart et al., 2007; Brochet, 2010; Jagolinzer et al., 2011).[18] We find that *Outlook* and *MgmTrade* are incrementally useful in predicting future returns. One standard deviation increase in *MgmTrade* (*Outlook*) is associated with 16 (27) basis point increase in future return.

We conclude while management trades are already profitable, managers could have made even better trading decisions had they acted based on information embedded in employee outlook. The fact that they did not alleviates the concern that strategic considerations explain why management forecasts do not incorporate information embedded in outlook.

4.3. Information asymmetry determinants

In this section, we explore the roles of various firm-, employee-, and CEO-related factors in alleviating information asymmetry. We generalize equation (1) by interacting $Outlook_{i,t}$ with $Factor_{i,t}$, where *Factor* indicates a proxy for a firm-, employee-, or CEO-related factor.

4.3.1. Organizational factors

We predict that intra-firm information asymmetry is lower in more centralized firms, firms with effective internal controls, and firms with more employee stock options. To measure centralization, we obtain the first factor from the principal component analysis of the number of business segments, the number of geographic segments, and the number of employees (Garrett et al., 2014).[19] We define *Centralization* as an indicator variable equal to one if the factor is below

[18] We exclude these additional control variables in Column (1) because they influence the volume of buy and sell trades in the same direction and because the dependent variable is signed trading volume. Our results are largely unchanged when these variables are included.

[19] Our principal component analysis reveals that a single factor adequately explains the variation in these three variables.

the sample median, and zero otherwise. Similarly, *NoICW* is an indicator variable equal to one if a firm does not disclose an internal weakness in the fiscal year, and zero otherwise; and *EmpStockOptionD* is an indicator variable equal to one if non-executive employee stock options scaled by the number of shares outstanding is above the sample median, and zero otherwise.

Panel A of Table 5 reports descriptive statistics on the variables. Our sample firms generally have multi-segments and many employees: they have, on average, 2.6 business segments, 3.4 geographic segments, and 35,766 employees. Also, 96.4% of our sample firms disclose no internal control weakness. Our sample firms incentivize their employees using equity-based compensation: non-executive stock options, on average, account for 3.6% of the number of shares outstanding.

Regression results, as shown in Panel B of Table 5, are consistent with our predictions. Specifically, the coefficients on the interaction terms between *Outlook* and *Centralization*, between *Outlook* and *NoICW*, and between *Outlook* and *EmpStockOptionD* are all significantly negative. The economic magnitudes are not minimal: for example, one standard deviation increase in *Outlook* increases the management forecast error by 0.04 percentage points more for firms with low employee stock options than for firms with high employee stock options, which is equivalent to 41% of our sample mean forecast error.

4.3.2. Employee satisfaction

We predict that intra-firm information asymmetry decreases with employee satisfaction. We consider four types of employee satisfaction that are reported on Glassdoor.com: (1) senior management, (2) corporate culture and values, (3) compensation and benefits, and (4) career opportunities.[20] Each employee satisfaction metric is on a five-point scale, with five being "most

[20] We do not consider employee ratings of work/life balance because it is unclear how work/life balance affects intra-firm information asymmetry.

satisfied" and one being "least satisfied." We average measures of individual employee satisfaction in the 30-day period prior to the issuance of a management forecast to construct a measure of employee satisfaction (similar to how we measure *Outlook*).

Panel A of Table 6 describes the distributions of these variables. The average rating ranges from 2.97 for satisfaction with senior management to 3.35 for satisfaction with compensation and benefits. The median rating ranges from 3.00 for satisfaction with senior management to 3.42 for satisfaction with culture and values. The descriptive statistics indicate that, on average, employees are satisfied with their management and company.

Panel B presents the regression results. Each proxy for a specific aspect of employee satisfaction—*SeniorMgmt*, *Culture*, *Compensation*, or *CareerOpp*—is measured as an indicator variable equal to one if the average rating is above the sample median. We find that the interaction terms on employee satisfaction proxies and outlook are negative and significant in Columns (1) to (3), suggesting that information asymmetry is lower when employees give higher ratings to senior management, culture and values, and compensation and benefits. The coefficient on the interaction term *Outlook*×*CareerOpp* in Column (4) is negative but insignificant. In Column (5), we conduct principal component analysis to construct an overall satisfaction score based on all four aspects of employee satisfaction,[21] and create an indicator variable, *SatisfFactor*, that is equal to one if the score is above the sample median. We find that the interaction term between *SatisfFactor* and *Outlook* loads negatively and significantly (-0.0007, t = 3.16). The overall results are consistent with our prediction that employee satisfaction encourages information sharing by employees and therefore reduces information asymmetry.

4.3.3. CEO experience and internal focus

[21] In the principal component analysis, only the first factor identified has an eigenvalue greater than one, suggesting that this single factor adequately explains the variation in our four employee satisfaction ratings.

Our last prediction is that information asymmetry is lower when managers have more experience with the firm or are more engaged with company employees. We measure CEO experience using CEO founder status and tenure. Lacking a direct measure of interactions with employees, we propose that the frequency of a CEO's interactions with employees is inversely related to her frequency of interactions with outsiders, as proxied by investor conference participation. Accordingly, we construct three indicator variables: *FounderCEO* equals one if the CEO is a founder of the company, and zero otherwise; *CEOTenure* equals one if the number of years the CEO has worked for the company is longer than the sample median, and zero otherwise; and *InternalOrientedCEO* equals one if the number of investor conferences the CEO attends in a year is less than our sample median, and zero otherwise. Panel A of Table 7 shows that in our sample, 18.5% of the CEOs are founders; the mean (median) CEO tenure is 7.4 (5.3) years; the mean (median) number of conferences attended by a CEO in a year is 6.9 (6).

We report regression results in Panel B of Table 7. The coefficients on *Outlook*×*FounderCEO* and *Outlook*×*CEOTenure* in Columns (1) and (2) are negative and significant, consistent with our prediction that founder CEOs and CEOs with longer tenure gather and incorporate more employee information in their earnings forecasts.[22] The coefficient on *Outlook*×*InternalOrientedCEO* in Column (3) is also significantly negative, consistent with the notion that CEOs who have fewer interactions with outsiders are more internally focused and, therefore, obtain more information from their employees.

In conclusion, the above results that information asymmetry is explained by various firm-, employee-, and CEO-related factors are consistent with organizational theory; and they also

[22] Although *Outlook* + *Outlook*×*CEOFounder* and *Outlook* + *Outlook*×*CEOTenure* are negative, they are statistically insignificant.

alleviate the concern that our information asymmetry measure reflects solely inefficient use of employees' information due to managers' cognitive biases.

4.3.4. Information sharing versus information production

As we demonstrate in Section 2.1, information asymmetry is reduced when (1) managers observe elements of δ^e and (2) both managers and employees observe elements of δ^r. Our theory of what alleviates information asymmetry focuses on the first channel, but many of our variables could affect either channel (1 or 2). For example, information asymmetry in firms with effective controls may be lower because (1) employees' information is transmitted to top managers with a smaller loss or shorter delay *or* (2) more information (previously unavailable to management and employees) is produced and made available to all. Firms that award more employee stock options may have lower information asymmetry because (1) employees share more information with their superiors *or* (2) more information production takes place. For brevity we refer to (1) as information sharing and (2) as information production.

If a factor moderates information asymmetry through the information production channel, then the ability of outlook to predict future performance should be greater when the factor is equal to one. We test this prediction by estimating the following model:

$$ROA_{i,t+1} = \beta_0 + \beta_1 Outlook_{i,t} + \beta_2 Factor_{i,t} + \beta_3 Outlook_{i,t} \times Factor_{i,t} + \beta_4 Controls_{i,t} + \sum Industry\ FE + \sum Time\ FE + \varepsilon_{i,t+1} \quad (2)$$

where *ROA* is the average return on assets in year t+1.[23] Because *ROA* is at the firm-year level rather than forecast level, *Outlook* in Model (2) is defined as the average value of the outlook assessments provided by current employees during fiscal year t. *Factors* are as defined earlier, except that we use the average of employee ratings over fiscal year t to construct the employee

[23] We use ROA to measure future earnings to be consistent with prior research on employee outlook (Hales et al., 2018; Huang et al., 2018).

satisfaction variables *SeniorMgmt*, *Culture*, *Compensation*, *CareerOpp*, and *SatisfFactor*.[24] Control variables are the same as in Model (1), except that forecast horizon is excluded.

Table 8 reports the results. Panels A, B, and C present results on firm characteristics, employee satisfaction, and CEO attributes, respectively. The coefficients on *Outlook* are positive and significant across all the specifications, consistent with prior findings that employee outlook is useful in predicting future earnings (Hales et al., 2018; Huang et al., 2018). More importantly, the coefficients on the interaction terms between *Outlook* and *Factor* are largely insignificant. The lone exceptions are the coefficients on *Outlook*×*SeniorMgmt* and *Outlook*×*Culture*, which are significantly positive. These results indicate that, except for employee satisfaction with senior management and firm culture, our determinants of information asymmetry work via the information sharing channel.[25]

4.4. Consequences of information asymmetry

To examine the consequences of intra-firm information asymmetry, we develop a firm-year specific measure of information asymmetry using an indicator variable approach. The basic idea is that higher information asymmetry—indicated by higher slope coefficients on *Outlook*—leads to more extreme management forecast errors, i.e., more favorable (unfavorable) outlook is associated with more extremely positive (negative) errors. To identify variation in information asymmetry, we first sort management forecast errors and outlook into quintiles, then create an indicator variable, *HighInfoAsym*, that is equal to one if both variables fall in the same extreme (i.e., largest or smallest) quintile in any of the previous three years, and zero otherwise. An

[24] Other determinants of information asymmetry, such as *Centralization*, are already at the firm-year level.
[25] For the cases of employee ratings of senior management and firm culture, it is possible that employee outlook has greater predictive ability because managers share more information with employees (i.e., C increases but M+C stays the same) and not because more information becomes available to both managers and employees (i.e., M+C increases). We assess this possibility in untabulated analysis and find that management forecast accuracy increases with employee ratings of senior management and of firm culture and values; this suggests that more information is available to managers (i.e., M+C increases).

alternative approach for measuring the firm-year information asymmetry is to estimate firm-year specific slope coefficients on *Outlook*. We do not use this approach because it leads to substantial sample attrition and noisy estimates.[26]

4.4.1. Future performance analysis

We predict that firms with higher information asymmetry between top management and employees have lower future performance. We test this prediction by estimating the following model:

$$Performance_{i,t} = \beta_0 + \beta_1 HighInfoAsym_{i,t-3,t-1} + \beta_2 Controls_{i,t-3,t-1} + \sum Industry\ FE + \sum Time\ FE + \varepsilon_{i,t} \quad (3)$$

where *Performance* is defined as accounting performance (*ROA*) or market valuation (*TobinQ*) in year *t*, and *HighInfoAsym* is defined as above. Control variables include market value of equity (*LogMVE*), leverage ratio (*Leverage*), return on assets (*ROA*), sales growth (*SalesGrowth*), tangible assets (*Tangible*), R&D expenses (*R&D*), return volatility (*StdRet*), and institutional ownership (*InstOwn*). We control for management forecast accuracy (*MFAccuracy*) and employee overall rating from Glassdoor (*EmpOverallSatisf*) because forecast accuracy is associated with investment efficiency (Goodman et al., 2014) and because employee satisfaction improves firm performance (Edmans, 2011). Finally, we control for employee outlook (*Outlook*) in order to separate the predictive value of outlook on future performance from the economic consequence of intra-firm information asymmetry. For consistency with the definition of *HighInfoAsym*, all the control variables take the average value from the past three years.

Table 9 reports our results. Panel A reports descriptive statistics of the sample used for the future performance analysis. Firms in this sample are profitable (mean return on assets of

[26] The average number of observations in a regression of management forecast error on outlook at firm-year level is only three. Nevertheless, in untabulated analysis, we estimate regressions of management forecast errors on employee outlook in the prior three years, requiring at least ten observations per regression; the correlation between this measure and *HIghInfoAsym* is 0.17 (significant at 1% level).

0.05) and have high market value (mean Tobin's Q of 2.26). About 16% of our sample firms have high intra-firm information asymmetry in the past three years.

Panel B reports regression results. We find that the coefficients on *HighInfoAsym* are negative and significant across all specifications, whether or not we control for employee outlook. These results are consistent with our prediction that higher information asymmetry is associated with poorer future accounting performance and lower firm valuations.[27] In terms of economic magnitude (based on the specifications with the most complete control variables), compared with other firms, firms with high asymmetry have lower *ROA* (*TobinQ*) by 0.008 (0.231), equivalent to 16% (10%) of the sample mean. With respect to control variables, management forecast accuracy and employee overall rating are positively associated with future firm value, consistent with findings in prior literature (Goodman et al., 2014; Edmans, 2011). Employee outlook is also positively associated with future firm value, consistent with Hales et al. (2018) and Huang et al. (2018).

4.4.2. CEO turnover analysis

To examine whether information asymmetry leads to a higher likelihood of CEO turnover, we estimate the following model:

$$CEOTurnover_{i,t} = \beta_0 + \beta_1 HighInfoAsym_{i,t-3,t-1} + \beta_2 Controls_{i,t-3,t-1} + \sum Industry\ FE + \sum Time\ FE + \varepsilon_{i,t} \quad (4)$$

where *CEOTurnover* equals one if there is a CEO turnover in the year, and zero otherwise. Following Lee et al. (2012), we control for a list of determinants of CEO turnover, including firm accounting and stock performance, size, earnings volatility and return volatility, and institutional ownership, as well as CEO age, tenure, and power. In addition, we control for

[27] The results in Tables 9 and 10 are robust to including the trading-based measure of information asymmetry between divisional managers and top managers (*DIFRET*) from Chen et al. (2018).

management forecast accuracy in order to distinguish our effect from the Lee et al. (2012) finding that CEO turnover is negatively associated with management forecast accuracy conditional on poor performance. Finally, we control for employee satisfaction and employee outlook for the same reason as in our future performance analysis in Section 4.4.1. For consistency with the definition of *HighInfoAsym*, all the control variables take the average value from the past three years.

Table 10 reports our results on the relation between our information asymmetry measure and CEO turnover. Panel A reports descriptive statistics of all variables used in the regression. In our sample, the average CEO turnover rate is 0.10, and about 16% of the sample firms have high information asymmetry in the past three years. Our sample firms are profitable, with average return on equity of 0.05. As for CEO characteristics, the average CEO age is 56, the average CEO tenure is 7.4 years, and 56% of the CEOs also serve as chairman of the board.

Panel B reports regression results. We find that the coefficients on *HighInfoAsym* are positive and significant in all specifications, whether or not we control for CEO characteristics, employee overall satisfaction, and employee outlook. These results suggest that higher information asymmetry is associated with a higher likelihood of future CEO turnover. In terms of economic magnitude (based on the specification with the most complete list of control variables), relative to other firms, the likelihood of CEO turnover in firms with high information asymmetry is greater by 3.7 percentage points, equivalent to a 48 percent increase. Turning to control variables, consistent with our expectations, we find that future CEO turnover is negatively associated with past firm accounting and stock performance, positively associated with CEO age and tenure, and negatively associated with CEO ownership. We also find that the

likelihood of CEO turnover decreases with employee satisfaction in the past three years. Finally, we do not find a significant relation between CEO turnover and management forecast accuracy.[28]

5. Conclusion

In this study, we use employees' predictions of firm business outlook from Glassdoor.com and management earnings forecasts to examine the existence, determinants, and consequences of information asymmetry between rank-and-file employees and top managers. We find that management earnings forecasts do not fully incorporate employees' information. We further observe that the information asymmetry between top management and employees is alleviated by organizational factors such as centralized decision making, effective internal controls, and the use of stock options; employee satisfaction; and CEO experience and internal engagement. Finally, we document that firms with higher information asymmetry have lower future performance and higher CEO turnover.

Our study takes an important step toward understanding intra-firm information asymmetry, and has important implications for both academics and practitioners. Organizational theory has long recognized that information is widely dispersed among firm employees. Extensive research has identified organizational designs that promote the use of appropriate organizational knowledge in decision-making. The large sample evidence from recent years in our study suggests that despite the substantial efforts made by organizational designers, significant information asymmetry still exists between management and employees, and that this asymmetry has significant negative consequences. The fact that the business outlook information

[28] Our sample period of 2012-2017 is different from the sample period of 1996-2006 in Lee et al. (2012). In addition, we do not examine CEO turnover conditional on poor firm performance. These differences may explain why we do not find significant relation between management forecast accuracy and CEO turnover.

disclosed by employees through social media is coarse and represents the lower bound of the information held by firm employees suggests that the information asymmetry problem may be greater than is revealed in our study. Internal information asymmetry appears to be an important issue that warrants close attention from firm management.

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Appendix: Variable definitions

Variable	Definition
Outlook	The average assessment of business outlook made by current employees within 30 days prior to the issuance date of management forecast. We code "getting better" as 1, "staying the same" as 0, and "getting worse" as -1. Data source: Glassdoor
MFE	Management forecast error, measured as the actual earnings per share for year t+1 minus the management earnings forecast for year t+1, scaled by the closing price at the end of year t. Data source: I/B/E/S Guidance
LogMVE	The natural logarithm of market value of equity (prcc_f × csho). Data source: Compustat
MTB	Market-to-book ratio, measured as market value of equity divided by the book value of equity (ceq). Data source: Compustat
Leverage	Leverage ratio, calculated as long-term debt divided by total assets (dltt/at). Data source: Compustat
ROA	Return on asset, measured as income before extraordinary items (ib) divided by total assets at the beginning of the quarter (at). Data source: Compustat
SalesGrowth	Sales growth, measured as sales in year t minus sales in year t-1, divided by sales in year t-1. Data source: Compustat
Loss	An indicator variable equal to one if earnings before extraordinary items are negative (ib), and zero otherwise. Data source: Compustat
TAcc	Total accruals, measured as the difference between earnings (ib) and operating cash flows (oancf-xidoc), scaled by beginning total assets (ib). Data source: Compustat
Return	Cumulative stock return over the fiscal year t. Data source: CRSP
StdROA	Standard deviation of return on assets during the past five years. Data source: Compustat
StdRet	Standard deviation of daily stock returns over the fiscal year t. Data source: CRSP
LitiRisk	Litigation risk, measured as an indicator variable equal to one for litigious industries including Bio-Technology (SIC 2833 to 2836), Computer Hardware (SIC 3570 to 3577), Electronics (SIC 3600 to 3674), Retailing (SIC 5200 to 5961), and Computer Software (SIC 7370 to 7374), and zero otherwise. Data source: Compustat
Analyst	The natural logarithm of the number of analysts following the company. Data source: I/B/E/S
Horizon	Management forecast horizon, measured as the difference between fiscal year end of forecasting year and forecast issuance date, scaled by 365. Data source: I/B/E/S Guidance
DIFRET	The difference of insider trading profits between divisional managers and top managers as defined in Chen et al. (2018). Trading profit of

	divisional (top) managers is measured as the average cumulative size-adjusted abnormal return over the period of six months from the transaction date for all divisional (top) managers' opportunistic open market insider trades during the recent three fiscal years. For open market sale transactions, we take the opposite sign when calculating the abnormal return. Data source: Thomason Financial/CRSP
Variables used in managerial incentive and insider trade analysis	
Financial Distress	Altman's Z score, computed as (1.2 × working capital/total assets + 1.4 × retained earnings/total assets + 3.3 × operating income/total assets + 0.6 × market value of equity/total liabilities + sales/total assets). Data source: Compustat
External Financing	The sum of equity and debt financing scaled by lagged total assets, where equity financing equals cash proceeds from the sale of common and preferred stock minus cash payments for the purchase of common and preferred stock and cash payments for dividends, and net debt issuance equals cash proceeds from the issuance of long-term debt minus cash payments for long-term debt reductions and the net changes in current debt. Data source: Compustat
Industry Concentration	Industry concentration, measured by the Herfindahl-Hirschman index, calculated as the sum of the squares of the market shares of the firms' sales within each four-digit SIC industry. Data source: Compustat
Insider Selling	Net abnormal sales made by top managers (including chairman, vice chairman, CEO, CFO, and COO), measured as the net sales (i.e., number of shares sold minus number of shares purchased) made during the 30-day period following the management earnings forecast date, minus the net sales made during the 90-day period before management earnings forecast date, scaled by the number of shares outstanding. Data source: Thomson Financial
MgmTrade	Insider trades made by top managers (including chairman, vice chairman, CEO, CFO, and COO), measured as the number of shares purchased or sold scaled by the number of shares outstanding and then ranked into deciles and transformed to range from zero to one. We exclude routine trades as defined in Cohen et al. (2012) and take the opposite sign when calculating the number of shares sold. Data source: Thomson Financial
AbnRet	Abnormal stock returns, measured as the cumulative 30-day size adjusted stock return following the insider trade. Data source: CRSP
EP	Earnings-price ratio, measured as earnings per share divided by stock price per share at the end of the fiscal year. Data source: Compustat
ShareTurnover	Share turnover, measured as trading volume divided by the number of shares outstanding. Data source: CRSP
Window	An indicator variable equal to one if the insider trade occurs within 30 days following an earnings announcement. Data source: Thomson Financial
Variables used in cross-sectional analysis	
Centralization	An indicator variable equal to one if the firm decentralization score is below the median, zero otherwise. The decentralization score is computed as the first factor of principal component analysis based on

	the number of business segments, the number of geographic segments, and the number of employees. Data source: Compustat
NoICW	An indicator variable equal to one if the firm discloses no internal control weakness, zero otherwise. Data source: AuditAnalytics
EmpStockOptionD	An indicator variable equal to one if the number of rank-and-file employee stock option is above sample median, and zero otherwise. Rank-and-file employee stock option is calculated as total employee stock options minus stock options owned by top executives, scaled by the number of shares outstanding. Data source: Compustat and ExecuComp
Compensation	An indicator variable equal to one if the average of the five-point scale ratings of compensation and benefits by current employees within 30 days prior to the issuance date of management forecast is above sample median, zero otherwise. Data source: Glassdoor
CareerOppor	An indicator variable equal to one if the average of the five-point scale ratings of career opportunities by current employees within 30 days prior to the issuance date of management forecast is above sample median, zero otherwise. Data source: Glassdoor
SatisfFactor	An indicator variable equal to one if the factor calculated based on senior management, culture and values, compensation and benefits, and career opportunities made by current employees within 30 days prior to the issuance date of management forecast is above sample median, and zero otherwise. Data source: Glassdoor
FounderCEO	An indicator variable equal to one if the CEO is a founder of the company, zero otherwise. Data source: https://site.warrington.ufl.edu/ritter/files/2018/04/FoundingDates.pdf and ExecuComp
CEOTenure	An indicator variable equal to one if the CEO tenure is above sample median, zero otherwise. CEO tenure is measured as the number of years the CEO has been in office. Data source: ExecuComp
InternalOrientedCEO	An indicator variable equal to one if the number of investor conferences the CEO attends is below sample median, and zero otherwise. Data source: Bloomberg Corporate Events Database.
Variables used in future performance and turnover analysis	
HighInfoAsym	High information asymmetry, measured as an indicator variable equal to one if management forecast error is in the most positive (negative) quintile and employee outlook is in the most favorable (unfavorable) quintile in any of the past three years, zero otherwise. Data source: I/B/E/S Guidance and Glassdoor
TobinQ	Market value of assets divided by book value of assets. Data source: Compustat
Tangible	Net property, plant, and equipment, scaled by beginning assets. Data source: Compustat

R&D	Research and development expense (xrd), scaled by beginning sales. Data source: Compustat
InstOwn	Institutional ownership, measured as the percentage of shares owned by institutional investors. Data source: Thomson Financial
MFAccuracy	The absolute value of the difference between the management forecasted EPS and the actual EPS scaled by the stock price at the beginning of the fiscal year, multiplied by -1. Data source: I/B/E/S Guidance
EmpOverallSatisf	Employee overall satisfaction, measured by the five-point scale overall ratings provided by current employee reviewers. Data source: Glassdoor
CEOTurnover	An indicator variable equal to one if the CEO experiences a turnover in the fiscal year. Data source: Thomson Financial
ROE	Return on equity, measured as earnings before extraordinary items (ib) scaled by equity (ceq). Data source: Compustat
CAR	Cumulative market-adjusted abnormal return in a fiscal year. Data source: CRSP
LogSales	The natural logarithm of sales. Data source: Compustat
CEOAge	The current CEO's age. Data source: ExecuComp
CEOAge65	An indicator variable equal to one if the age of the CEO is more than 65 years old, zero otherwise. Data source: ExecuComp
Tenure	The number of years the CEO has been in office. Data source: ExecuComp
CEOOwnership	The number of stocks owned by CEO, scaled by the number of shares outstanding. Data source: ExecuComp
CEOChairDurality	An indicator variable equal to one if the CEO is also the chairman of the board, zero otherwise. Data source: ExecuComp

Table 1
Descriptive statistics: main variables

	N	Mean	STD	P25	Median	P75
MFE	11,686	0.0010	0.0103	0.0000	0.0015	0.0041
Outlook	11,686	0.3084	0.5627	0.0000	0.3333	0.8000
LogMVE	11,686	8.6779	1.5192	7.6014	8.6592	9.7500
MTB	11,686	4.7495	7.8155	1.9093	3.0567	5.1210
Leverage	11,686	0.2346	0.1695	0.1027	0.2276	0.3354
ROA	11,686	0.0623	0.0728	0.0293	0.0595	0.0956
SalesGrowth	11,686	0.0750	0.1473	0.0008	0.0516	0.1216
Loss	11,686	0.0954	0.2938	0.0000	0.0000	0.0000
TAcc	11,686	-0.0574	0.0578	-0.0785	-0.0485	-0.0257
Return	11,686	0.1676	0.3066	-0.0164	0.1467	0.3191
StdROA	11,686	0.0366	0.0504	0.0111	0.0207	0.0384
StdRet	11,686	0.0180	0.0072	0.0130	0.0164	0.0214
LitiRisk	11,686	0.3691	0.4826	0.0000	0.0000	1.0000
Analyst	11,686	2.5290	0.6351	2.1972	2.6391	2.9957
Horizon	11,686	0.5787	0.3455	0.3589	0.5836	0.8438

This table reports descriptive statistics for the main variables. All variables are winsorized at 1% and 99% percentiles. Variable definitions are provided in the Appendix.

Table 2
Information asymmetry estimation: baseline results

	Dependent variable: MFE_{t+1}		
	(1)	(2)	(3)
Outlook	**0.0010*** **	**0.0009*** **	**0.0006** **
	(3.34)	(3.48)	(2.33)
DIFRET			0.0034
			(1.15)
LogMVE		0.0001	-0.0003
		(0.76)	(1.07)
MTB		0.0000	0.0000
		(0.44)	(0.50)
Leverage		-0.0008	-0.0005
		(0.37)	(0.22)
ROA		-0.0055***	-0.0030
		(2.59)	(0.56)
SalesGrowth		-0.0027	-0.004**
		(1.40)	(2.07)
Loss		-0.0006	0.0004
		(0.77)	(0.42)
TAcc		-0.0087**	-0.0058
		(2.08)	(0.84)
Return		0.0015	0.0017
		(1.57)	(0.96)
StdROA		0.0220***	0.0183*
		(5.60)	(1.67)
StdRet		-0.1134**	-0.0233
		(2.12)	(0.25)
LitiRisk		-0.0001	0.0000
		(0.09)	(0.05)
Analyst		0.0002	0.0007
		(0.39)	(1.16)
Horizon		-0.0038***	-0.0029***
		(4.98)	(3.00)
Industry/Time FE	Yes	Yes	Yes
Observations	11,686	11,686	4,490
Adjusted R^2	0.026	0.05	0.073

This table presents coefficient estimates and t-statistics (in parentheses) from OLS regressions of management forecast errors on employee outlook. See the Appendix for variable definitions. Industry fixed effects are based on the Fama-French 48 industry classification. Standard errors are clustered by firm and year. Significance at the 10%, 5%, and 1% level is denoted with *, **, and ***, respectively.

Table 3
Information asymmetry estimation: subsample analysis

	Dependent variable: MFE_{t+1}			
	Subsample:			
	High Financial Distress	High External Financing	High Industry Competition	High Insider Selling
	(1)	(2)	(3)	(4)
Outlook	**0.0010****	**0.0011*****	**0.0008*****	**0.0003***
	(2.44)	**(4.45)**	**(2.80)**	**(1.87)**
LogMVE	0.0005	0.0003	0.0002	0.0000
	(1.15)	(1.48)	(0.52)	(0.06)
MTB	0.0000**	0.0000	0.0000	0.00040
	(1.96)	(1.26)	(1.03)	(0.07)
Leverage	0.0012	0.0002	-0.0011	0.0004
	(0.39)	(0.08)	(0.43)	(0.35)
ROA	-0.0165**	-0.0035	-0.0086**	-0.0051**
	(2.12)	(1.02)	(2.43)	(2.23)
SalesGrowth	-0.0047***	-0.0038***	-0.0036***	-0.0033***
	(3.91)	(2.73)	(4.10)	(2.93)
Loss	0.0008	0.0002	0.0003	-0.0009
	(0.49)	(0.11)	(0.22)	(1.57)
TAcc	0.0104	-0.0016	0.0031	-0.0002
	(1.03)	(0.37)	(0.78)	(0.57)
Return	0.0030***	0.0023***	0.0012	0.0014***
	(3.57)	(5.87)	(1.5)	(2.59)
StdROA	0.0250***	0.0203***	0.0240***	0.0157***
	(3.36)	(5.12)	(6.00)	(5.02)
StdRet	0.0595	0.0032	-0.0052	0.0085
	(0.79)	(0.07)	(0.13)	(0.38)
LitiRisk	0.0004	0.0015**	-0.0001	0.0005
	(0.44)	(2.44)	(0.07)	(0.76)
Analyst	0.0005	0.0003	0.0002	0.0002
	(0.61)	(0.60)	(0.42)	(0.29)
Horizon	-0.0037***	-0.0021***	-0.0009	-0.0014***
	(3.33)	(2.98)	(0.97)	(2.59)
Industry/Time FE	Yes	Yes	Yes	Yes
Observations	3,229	4,854	3,750	5,151
Adjusted R^2	0.111	0.076	0.075	0.067

This table presents coefficient estimates and t-statistics (in parenthesis) from OLS regressions of management forecast error on employee outlook when employee outlook is positive and managers have incentives to incorporate good news in their forecasts. The high financial distress subsample includes observations with Z-score above the sample median; the high external financing subsample includes observations with firm equity and debt issuance above the sample median; the high industry competition subsample includes observations with the Herfindahl-Hirschman index below the sample median; and the high insider selling subsample includes observations with abnormal selling by top managers above the sample median. All control variables, including fixed affects, are the same as in Table 2, and detailed variable definitions appear in the Appendix. Standard errors are clustered by firm and year. Significance at the 10%, 5%, and 1% level is denoted with *, **, and ***, respectively.

Table 4
Management trade analysis

	Dependent variable:	
	MgmTrade	***AbnRet***
	(1)	(2)
Outlook	**-0.0146**	**0.0060****
	(1.17)	(2.00)
MgmTrade		**0.0049***
		(1.78)
LogMVE	0.0801***	0.0006
	(12.10)	(0.27)
ROA	0.0993	-0.0082
	(1.28)	(0.51)
TAcc	-0.0916	-0.0009
	(0.84)	(0.03)
Loss	0.0885**	0.0008
	(2.04)	(0.20)
Return	-0.0315*	-0.0097***
	(1.75)	(2.89)
MTB	-0.0014*	0.0005**
	(1.78)	(2.29)
EP	-0.1858	-0.0033
	(0.77)	(0.08)
SalesGrowth	-0.0452	-0.0166*
	(1.03)	(1.73)
R&D		0.0015
		(0.33)
StdRet		-0.8054***
		(2.90)
Analyst		-0.0056
		(1.42)
ShareTurnover		0.0132***
		(4.88)
LitiRisk		-0.0076**
		(2.03)
Window		0.0006
		(0.15)
Industry/Time FE	Yes	Yes
Observations	13,006	13,006
Adjusted R^2	0.183	0.028

This table examines the relation between insider trades, employee outlook, and future stock returns. *MgmTrade* is the number of shares purchased or sold by top managers scaled by the number of shares outstanding and then ranked into deciles and transformed to range from zero to one. We exclude routine trades and take the opposite sign when calculating the number of shares sold. *Outlook* is the average employee outlook made by current employees within 30 days prior to the manager trading date. *AbnRet* is abnormal future return, measured as the cumulative 30-day size-adjusted stock return following the trade. Detailed variable definitions are in the Appendix. Fama-French 48 industry fixed effects and year fixed effects are included. t-statistics are reported in parentheses. Standard errors are clustered by firm and year. Significance at the 10%, 5%, and 1% level is denoted with *, **, and ***, respectively.

Table 5
Firm-level information asymmetry determinants

Panel A: Descriptive statistics

	N	Mean	STD	25th	50th	75th
No. of Business Segments	8,610	2.5995	1.6291	1	2	4
No. of Geographic Segments	8,610	3.3976	2.4117	1	3	5
No. of Employees	8,610	35.766	60.615	5.558	13.500	37.300
NoICW	11,399	0.9639	0.1864	1	1	1
EmpStockOption	9,774	0.0360	0.0320	0.0113	0.0300	0.0513

Panel B: Regression analysis

	Dependent variable: MFE_{t+1}		
	(1)	(2)	(3)
Outlook	0.0011**	0.0056**	0.0011***
	(2.32)	(2.48)	(3.59)
Centralization	0.0012 ***		
	(2.64)		
Outlook×Centralization	**-0.0004****		
	(2.22)		
NoICW		0.0068***	
		(2.92)	
Outlook×NoICW		**-0.0046***	
		(1.74)	
EmpStockOptionD			0.0001
			(0.31)
Outlook×EmpStockOptionD			**-0.0007****
			(2.43)
Controls	Yes	Yes	Yes
Industry/Time FE	Yes	Yes	Yes
Observations	8,610	11,399	9,774
Adjusted R^2	0.075	0.031	0.054

This table examines whether information asymmetry depends on organizational factors such as centralized organizational structure, effective internal controls, and employee stock options. *Centralization* is an indicator variable equal to one when the first factor derived from principal component analysis based on the number of business segments, geographic segments, and employees is below the sample median. *NoICW* is an indicator variable equal to one if the firm discloses no internal control weakness. *EmpStockOptionD* is an indicator variable equal to one when the number of rank-and-file employee stock option is above the sample median. Panel A reports descriptive statistics. *No. of Business Segments* is the number of business segments. *No. of Geographic Segments* is the number of geographic segments. *No. of Employees* is the number of employees (in thousands). Panel B presents OLS regression results. All control variables are the same as in Table 2, and detailed variable definitions appear in the Appendix. Fama-French 48 industry fixed effects and year fixed effects are included. t-statistics are reported in parentheses. Standard errors are clustered by firm and year. Significance at the 10%, 5%, and 1% level is denoted with *, **, and ***, respectively.

Table 6
Employee satisfaction as an information asymmetry determinant

Panel A: Descriptive statistics

	N	Mean	STD	25th	50th	75th
SeniorMgmt_Rating	11,629	2.9734	0.9938	2.3333	3.0000	3.6667
Culture_Rating	11,629	3.3373	1.0187	2.7857	3.4167	4.0000
Compensation_Rating	11,633	3.3528	0.8792	2.9853	3.4000	4.0000
CareerOppor_Rating	11,631	3.1538	0.9374	2.6000	3.1111	3.8333

Panel B: Regression analysis

	Dependent variable: MFE_{t+1}				
	(1)	(2)	(3)	(4)	(5)
Outlook	0.0010***	0.0007***	0.0005***	0.0006***	0.0010***
	(6.05)	(3.82)	(3.76)	(4.89)	(6.42)
SeniorMgmt	0.0007*				
	(1.88)				
Outlook×SeniorMgmt	**-0.0009*** **				
	(10.15)				
Culture		0.0001			
		(0.59)			
Outlook×Culture		**-0.0005****			
		(2.04)			
Compensation			0.0002**		
			(2.37)		
Outlook×Compensation			**-0.0003****		
			(2.00)		
CareerOpp				0.0000	
				(0.03)	
Outlook×CareerOpp				**-0.0002**	
				(1.18)	
SatisfFactor					0.0003
					(0.85)
Outlook×SatisfFactor					**-0.0007****
					(3.16)
Controls	Yes	Yes	Yes	Yes	Yes
Industry/Time FE	Yes	Yes	Yes	Yes	Yes
Observations	11,629	11,629	11,633	11,631	11,092
Adjusted R^2	0.054	0.054	0.050	0.051	0.053

This table examines whether information asymmetry depends on employee satisfaction. *SeniorMgmt*, *Culture*, *Compensation*, and *CareerOpp* are indicator variables equal to one if the employee ratings of senior management, culture and values, compensation and benefits, and career opportunities are above the sample median respectively, and zero otherwise. *SatisfFactor* is an indicator variable equal to one if the factor calculated based on the principal component analysis of senior management, culture and values,

compensation and benefits, and career opportunities is above the sample median, and zero otherwise. Panel A presents the descriptive statistics of average employee ratings of senior management (*SeniorMgmt_Rating*), of culture and values (*Culture_Rating*), of compensation and benefits (*Compensation_Rating*), and of career opportunities (*CareerOppor_Rating*) within 30 days prior to the management forecast issuance date. Panel B presents the regression results. All control variables are the same as in Table 2, and detailed variable definitions appear in the Appendix. Fama-French 48 industry fixed effects and year fixed effects are included. t-statistics are reported in parentheses. Standard errors are clustered by firm and year. Significance at the 10%, 5%, and 1% level is denoted with *, **, and ***, respectively.

Table 7
CEO-level information asymmetry determinants

Panel A: Descriptive statistics

	N	Mean	STD	P25	Median	P75
FounderCEO	5,056	0.1847	0.3881	0	0	0
CEOTenure_year	9,471	7.3680	6.7203	2.6356	5.2521	9.8521
No. of Conferences	9,202	6.8935	5.1808	3	6	9

Panel B: Regression results

	Dependent variable: MFE_{t+1}		
	(1)	(2)	(3)
Outlook	0.0014*	0.0014***	0.0008***
	(1.71)	(3.32)	(3.62)
FounderCEO	0.0017		
	(1.39)		
Outlook×FounderCEO	**-0.0029****		
	(2.01)		
CEOTenure		0.0001	
		(0.18)	
Outlook×CEOTenure		**-0.0017*****	
		(2.97)	
InternalOrientedCEO			0.0001
			(0.49)
Outlook×InternalOrientedCEO			**-0.0005*****
			(3.03)
Controls	Yes	Yes	Yes
Industry/Time FE	Yes	Yes	Yes
Observations	5,056	9,471	9,202
Adjusted R^2	0.062	0.065	0.067

This table examines whether information asymmetry depends on CEO experience (measured by founder status and tenure) and internal engagement (measured by investor conference participation). *FounderCEO* is an indicator variable equal to one if the CEO is a founder of the company, and zero otherwise. *CEOTenure* is an indicator variable equal to one if the CEO tenure is above the sample median, and zero otherwise. *InternalOrientedCEO* is an indicator variable equal to one if the number of conferences the CEO attends is below the sample median, and zero otherwise. Panel A presents descriptive statistics. *CEOTenure_year* is the number of years the CEO has been in office. *No. of Conferences* is the number of investor conferences the CEO has attended in the current year. All control variables are the same as in Table 2, and detailed variable definitions appear in the Appendix. Fama-French 48 industry fixed effects and year fixed effects are included. t-statistics are reported in parentheses. Standard errors are clustered by firm and year. Significance at the 10%, 5%, and 1% level is denoted with *, **, and ***, respectively.

Table 8
Predicting future earnings with employee outlook

Panel A: Interacting outlook with firm-level determinants

	Dependent variable: ROA_{t+1}		
	(1)	(2)	(3)
Outlook	0.0413***	0.0230***	0.0198***
	(3.34)	(9.11)	(4.65)
Centralization	0.0039		
	(0.81)		
Outlook×Centralization	**-0.0025**		
	(0.45)		
NoICW		0.0202***	
		(3.35)	
Outlook×NoICW		**-0.0200**	
		(1.46)	
EmpStockOptionD			-0.0016
			(0.46)
Outlook×EmpStockOptionD			**0.0046**
			(1.13)
Controls	Yes	Yes	Yes
Industry/Time FE	Yes	Yes	Yes
Observations	3,390	2,583	2,768
Adjusted R^2	0.639	0.622	0.528

Panel B: Interacting outlook with employee satisfaction

	Dependent variable: ROA_{t+1}				
	(1)	(2)	(3)	(4)	(5)
Outlook	0.0115***	0.0127***	0.0258***	0.0274***	0.0158***
	(7.85)	(10.94)	(8.07)	(10.18)	(11.26)
SeniorMgmt	0.0005				
	(0.33)				
Outlook×SeniorMgmt	**0.0045****				
	(2.05)				
Culture		-0.0026			
		(1.43)			
Outlook×Culture		**0.0065*****			
		(3.60)			
Compensation			-0.0042		
			(0.95)		
Outlook×Compensation			**-0.0081**		
			(1.06)		
CareerOpp				0.0020	

				(0.67)	
Outlook×CareerOpp				**-0.0043**	
				(0.73)	
SatisfFactor					-0.0020
					(1.53)
Outlook×SatisfFactor					**0.0018**
					(0.84)
Controls	Yes	Yes	Yes	Yes	Yes
Industry/Time FE	Yes	Yes	Yes	Yes	Yes
Observations	3,449	3,461	3,471	3,462	3,435
Adjusted R^2	0.607	0.604	0.606	0.605	0.607

Panel C: Interacting outlook with CEO-level determinants

	Dependent variable: *ROA$_{t+1}$*		
	(1)	(2)	(3)
Outlook	0.0194***	0.0181***	0.0139***
	(4.94)	(3.64)	(3.52)
FounderCEO	0.0105***		
	(3.00)		
Outlook×FounderCEO	**-0.0121**		
	(1.26)		
CEOTenure		0.0037	
		(1.31)	
Outlook×CEOTenure		**-0.0042**	
		(0.69)	
InternalOrientedCEO			0.0018
			(0.59)
Outlook×InternalOrientedCEO			**0.0102**
			(1.36)
Controls	Yes	Yes	Yes
Industry/Time FE	Yes	Yes	Yes
Observations	1,553	2,776	2,678
Adjusted R^2	0.621	0.603	0.573

This table examines whether the ability of employee outlook to predict future earnings varies with the information asymmetry determinants examined in Tables 5, 6, and 7. *ROA* is average return on assets in year t+1. *Outlook* is the average employee outlook made by current employees over the fiscal year t. In Panels A and C, the information asymmetry determinants are defined exactly the same as in Tables 5 and 7. In Panel B, *SeniorMgmt*, *Culture*, *Compensation*, and *CareerOpp* are indicator variables that equal one if the average employee ratings of senior management, culture and values, compensation and benefits, and career opportunities, respectively, over the fiscal year t is above the sample median, and zero otherwise. *SatisfFactor* is an indicator variable equal to one if the factor calculated based on employee

ratings of senior management, culture and values, compensation and benefits, and career opportunities during the fiscal year t is above the sample median, and zero otherwise. All variables control variables are the same as in Table 2, except that we exclude *Horizon*. See the Appendix for variable definitions. Fama-French 48 industry fixed effects and year fixed effects are included. t-statistics are reported in parentheses. Standard errors are clustered by firm and year. Significance at the 10%, 5%, and 1% level is denoted with *, **, and ***, respectively.

Table 9
Information asymmetry and future performance

Panel A: Descriptive statistics

	N	Mean	STD	25th	50th	75th
ROA	2,673	0.0506	0.0806	0.0227	0.0515	0.0890
TobinQ	2,673	2.2574	1.2781	1.3756	1.8268	2.6878
HighInfoAsym	2,673	0.1620	0.3685	0.0000	0.0000	0.0000
LogMVE	2,673	8.3075	1.5193	7.2068	8.2104	9.3362
Leverage	2,673	0.2181	0.1688	0.0824	0.2047	0.3143
SalesGrowth	2,673	0.0766	0.1220	0.0056	0.0559	0.1266
Tangible	2,673	0.2191	0.2055	0.0712	0.1425	0.2942
R&D	2,673	0.0270	0.0465	0.0000	0.0019	0.0338
StdRet	2,673	0.0192	0.0072	0.0140	0.0177	0.0230
InstOwn	2,673	0.7085	0.1660	0.6106	0.7355	0.8228
MFAccuracy	2,673	-0.0083	-0.0145	-0.0022	-0.0042	-0.0083
EmpOverallSatisf	2,673	3.2916	0.7312	2.8810	3.3333	3.7647
Outlook	2,673	0.2699	0.4366	0.0000	0.2861	0.5542

Panel B: Regression analysis

	Dependent variable:			
	ROA_t	$TobinQ_t$	ROA_t	$TobinQ_t$
	(1)	(2)	(3)	(4)
$HighInfoAsym_{t-3,t-1}$	**-0.0084***	**-0.2422*****	**-0.0081***	**-0.2305*****
	(1.83)	(3.27)	(1.79)	(3.08)
$LogMVE_{t-3, t-1}$	0.0041***	0.0775**	0.0041***	0.0789**
	(3.25)	(2.35)	(3.27)	(2.39)
$Leverage_{t-3, t-1}$	0.0070	0.3218	0.0072	0.3346
	(0.76)	(1.34)	(0.80)	(1.39)
$ROA_{t-3, t-1}$	0.6862***	6.5833***	0.6833***	6.4544***
	(23.13)	(8.58)	(23.01)	(8.34)
$SalesGrowth_{t-3, t-1}$	-0.0073	1.3994***	-0.0101	1.2706***
	(0.49)	(4.75)	(0.66)	(4.32)
$Tangible_{t-3, t-1}$	0.0142	0.3331	0.0136	0.3036
	(1.53)	(1.39)	(1.44)	(1.25)
$R\&D_{t-3, t-1}$	0.0122	12.4798***	0.0095	12.3563***
	(0.22)	(8.37)	(0.17)	(8.36)
$StdRet_{t-3, t-1}$	-1.1792***	5.9556	-1.1623***	6.7117
	(3.32)	(0.85)	(3.26)	(0.96)
$InstOwn_{t-3, t-1}$	0.0015	0.1027	0.0011	0.0819
	(0.16)	(0.46)	(0.11)	(0.37)
$MFAccuracy_{t-3, t-1}$	-0.1356	4.7611**	-0.1347	4.8000**
	(0.90)	(2.46)	(0.90)	(2.45)

EmpOverallSatisf$_{t-3, t-1}$	0.0034*	0.1777***	0.0015	0.0935*
	(1.75)	(3.96)	(0.58)	(1.68)
Outlook$_{t-3, t-1}$			0.0048	0.2155**
			(1.07)	(2.44)
Industry/Time FE	Yes	Yes	Yes	Yes
Observations	2,673	2,673	2,673	2,673
Adjusted R^2	0.522	0.433	0.522	0.435

This table examines the relation between information asymmetry and future performance. *HighInfoAsym* is an indicator variable equal to one if management forecast error is in the most positive (negative) quintile and employee outlook is in the most favorable (unfavorable) quintile in any of the past three years, and zero otherwise. *ROA* is the return on assets in the current year. *TobinQ* is Tobin's Q in the current year. Panel A presents descriptive statistics. Panel B presents OLS regression results. All control variables are calculated as the average over the past three years. See the Appendix for variable definitions. Industry fixed effects are based on the Fama-French 48 industry classification. t-statistics are reported in parentheses. Standard errors are clustered by firm. Significance at the 10%, 5%, and 1% level is denoted with *, **, and ***, respectively.

Table 10
Information asymmetry and future CEO turnover

Panel A: Descriptive statistics

	N	Mean	STD	25th	50th	75th
CEOTurnover	1,561	0.1044	0.3059	0	0	0
HighInfoAsym	1,561	0.1585	0.3653	0	0	0
ROE	1,561	0.0502	0.0493	0.0402	0.0556	0.0700
CAR	1,561	0.0522	0.1617	-0.0437	0.0400	0.1376
LogSales	1,561	8.2253	1.4604	7.2462	8.1990	9.2301
StdROA	1,561	0.0344	0.0388	0.0125	0.0214	0.0396
StdRet	1,561	0.0176	0.0061	0.0131	0.0165	0.0208
InstOwn	1,561	0.7234	0.1519	0.6304	0.7441	0.8256
MFAccuracy	1,561	-0.0079	-0.0138	-0.0022	-0.0040	-0.0083
Age	1,561	56.3822	6.5172	52	56	60
Age65	1,561	0.0909	0.2876	0	0	0
Tenure	1,561	7.3680	6.7203	2.6356	5.2521	9.8520
CEOOwnership	1,561	0.0138	0.0354	0.0008	0.0024	0.0076
CEOChairDuality	1,561	0.5608	0.4964	0	1	1
EmpOverallSatisf	1,561	3.2660	0.7761	2.8333	3.3333	3.7736
Outlook	1,561	0.2379	0.4636	0	0.2564	0.5338

Panel B: Regression analysis

	Dependent variable: $CEOTurnover_t$			
	(1)	(2)	(3)	(4)
$\mathbf{HighInfoAsym_{t-3,\,t-1}}$	**0.4208****	**0.5092****	**0.4329****	**0.4365****
	(2.07)	(2.38)	(2.00)	(2.03)
$ROE_{t-3,\,t-1}$	-3.6065**	-4.0334***	-3.8825***	-3.9406***
	(2.39)	(2.80)	(2.73)	(2.74)
$CAR_{t-3,\,t-1}$	-1.8301***	-1.9159***	-1.9035***	-1.9229***
	(3.03)	(2.89)	(2.86)	(2.80)
$LogSales_{t-3,\,t-1}$	0.0622	0.0617	0.0798	0.0813
	(0.94)	(0.87)	(1.14)	(1.15)
$StdROA_{t-3,\,t-1}$	4.0700*	4.6110*	4.9247**	4.8839**
	(1.91)	(1.81)	(2.03)	(2.04)
$StdRET_{t-3,\,t-1}$	-4.0479	12.7947	10.0446	10.1881
	(0.22)	(0.66)	(0.51)	(0.52)
$InstOwn_{t-3,\,t-1}$	0.4329	0.2240	0.3091	0.3057
	(0.75)	(0.37)	(0.52)	(0.52)
$MFAccuracy_{t-3,\,t-1}$	-2.0259	3.4375	3.3444	3.2837
	(0.32)	(0.50)	(0.50)	(0.49)
$CEOAge_{\,t-3,\,t-1}$		0.0537***	0.0520***	0.0522***
		(3.34)	(3.19)	(3.21)

CEOAge65$_{t-3, t-1}$		0.6800***	0.7206***	0.7210***
		(2.68)	(2.85)	(2.85)
Tenure$_{t-3, t-1}$		0.0001***	0.0001***	0.0001***
		(3.27)	(3.34)	(3.34)
CEOOwnership$_{t-3, t-1}$		-13.0557***	-12.9732**	-12.9637**
		(2.65)	(2.50)	(2.50)
CEOChairDuality$_{t-3, t-1}$		-0.0963	-0.0957	-0.0975
		(0.50)	(0.49)	(0.50)
EmpOverallSatisf$_{t-3, t-1}$			-0.2928***	-0.3142**
			(2.82)	(2.21)
Outlook$_{t-3, t-1}$				0.0538
				(0.22)
Industry/Time FE	Yes	Yes	Yes	Yes
Observations	1,561	1,561	1,561	1,561
Adjusted R^2	0.065	0.109	0.114	0.114

This table examines the relation between information asymmetry and future CEO turnover. *HighInfoAsym* is an indicator variable equal to one if management forecast error is in the most positive (negative) quintile and employee outlook is in the most favorable (unfavorable) quintile in any of the past three years, and zero otherwise. *CEOTurnover* is an indicator equal to one if the firm experiences a CEO turnover in the current year, and zero otherwise. Panel A presents descriptive statistics. Panel B presents logistic regression results. All control variables are calculated as the average over the past three years, except that *CEOAge65* and *CEOChairDuality* are equal to one if they take the value of one in any of the past three years. See the Appendix for variable definitions. Industry fixed effects are based on the Fama-French 48 industry classification. t-statistics are reported in parentheses. Standard errors are clustered by firm. Significance at the 10%, 5%, and 1% level is denoted with *, **, and ***, respectively.