Clarity Begins at Home: Internal Information Asymmetry and External Communication Quality

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Abstract

This paper investigates the effect of internal information asymmetry (hereafter IIA) within conglomerate firms on the quality of management forecasts and financial statements. We develop a novel measure to capture IIA between divisional managers and top corporate managers, computed as the difference in their respective trading profits on their own company's stock (*DIFRET*). Firms with higher *DIFRET* issue less accurate management forecasts that also exhibit greater pessimistic bias and lower specificity. Management forecasts are also less frequent among firms with higher *DIFRET*. Furthermore, the likelihood of error-driven accounting restatements increases with *DIFRET*, and weaknesses in internal control systems are particularly detrimental for the quality of both management forecasts and financial statements when *DIFRET* is higher. Our results are robust to controlling for endogeneity and cannot be attributed to restrictions on top managers' insider trading.

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I. Introduction

A firm's external communication with the capital markets is crucial for facilitating efficient asset allocation and for increasing firm value. Financial statements, earnings announcements and various forms of voluntary disclosures represent attempts by the firm to convey to the market the firm's internal knowledge of its own operations, strategies and financial performance and health. A challenge for conglomerates in their external communications is that a firm's internal knowledge varies across its numerous levels and divisions. For example, CEOs and CFOs are likely responsible for, and hence most informed about the overall strategy for the firm's future, the implications of each division's performance for overall firm health and performance, etc. But divisional managers, by virtue of the firm's reliance on them to execute its broad strategies and plans, are more intimately familiar with specific operational details, competitive advantages with customers, bargaining power with suppliers, division-level investment opportunities, etc.

The objective of this study is to examine the influence of internal information asymmetry on a firm's external communication. External communication, particularly regarding earnings information (for example, voluntary earnings forecasts and mandatory 10-ks), is typically cleared at the highest level within the firm before its release – the CFO, the CEO and the Board of Directors. This is appropriate, as top managers in conglomerate entities often enjoy an information advantage over divisional managers, due to their ability to assimilate information from multiple business units and to aggregate that information into meaningful data, trends and patterns at the firm level. In turn, top managers rely heavily on information flowing to corporate headquarters from numerous divisions and business units. The lack of free-flowing information from divisional managers to corporate headquarters constrains top management's ability to

accurately assess their firms' performance, financial health and future prospects. This inability in turn can adversely affect the quality of their external communications. We refer to the disparity in firm knowledge between corporate headquarters and divisional managers as internal information asymmetry (IIA). IIA is conceptually a directional characteristic. At one end of the spectrum are firms in which top managers possess significantly superior knowledge about their firms relative to divisional managers. As top managers' ability to extract and/or process information from various divisions becomes weaker, their relative information advantage over divisional managers is progressively eroded. Thus, at the other end of IIA are firms in which the average divisional manager conceivably possesses greater private information about the firm than the average corporate manager.

Variation in IIA between corporate managers (i.e., top executives) and divisional managers can arise for a number of reasons. Divisional level information can be soft in nature, and therefore difficult to transmit to headquarters in large conglomerates (Stein 2002). Incentives due to career concerns and internal competition for resources can also motivate divisional managers to distort or withhold information from top management (Harris and Raviv 1996). In addition, numerous factors can also hinder top managers' ability to extract, process and synthesize information from divisional managers; including geographic dispersion, diversity of growth opportunities, segment proliferation, ambiguously specified responsibilities and decision rights and absence of clear communication channels (Rajan and Zingales 1998; Rajan, Servaes and Zingales 2000; Scharfstein and Stein 2000; Shroff, Verdi and Yu 2013).

Since top managers bear the ultimate responsibility for the preparation and release of voluntary and mandatory disclosures, we expect disclosure quality to be negatively affected by top managers' information disadvantage relative to divisional managers. Empirically, we thus

require a measure that captures not just information uncertainty but the relative information advantage between corporate and divisional managers. In constructing such a measure, we rely on the following rationale: even though managers at various levels possess private information about their own business units and divisions that they conceivably do not share with others in the firm, the ex post profitability of their trades in their own firm's stock will reveal this information. Prior studies, for example, Ravina and Sapienza (2010) argue that the difference between the future market-adjusted returns to the trades of two inside parties captures the difference in their private information sets.[1] Thus, the difference in the profitability of insider trades between divisional managers and corporate managers, which we denote *DIFRET*, should capture variation in the internal information asymmetry between executives at divisions and those at corporate headquarters.

To increase *DIFRET*'s power to capture private information sets, we impose two additional requirements. First, we focus on only those insider trades that would qualify as informed, using the methodology proposed in Cohen, Malloy and Pomorski (2012). Second, we compute *DIFRET* only for those firms in which both divisional and corporate managers have non-zero insider trades. Since *DIFRET* relies on the presence of informed insider trades by both parties, it essentially captures their relative information advantage. More positive *DIFRET* implies a stronger (weaker) relative information advantage for divisional (top) managers.

Studies such as Feng, Li and McVay (2009) and Jennings, Seo and Tanlu (2015) examine the association between external communication properties and various facets of the internal information environment, such as internal control system weaknesses and organizational complexity. We contribute to this literature by focusing on the *relative* superiority of the

[1] Ravina and Sapienza (2010) compare private information between independent directors and top executives by using the difference in the profitability of their insider trades.

information sets of divisional versus top managers. Factors such as organizational complexity can possibly contribute to higher *DIFRET*. However, the relative information advantage of divisional managers over top managers can also vary dynamically with information flow, for example, as divisional managers privately receive or observe new information regarding their divisions' investment opportunities.[2] The private information flows themselves may be unobservable, but *DIFRET* captures the ex post revelation of the flow of this information via the profitability of informed trades. Therefore *DIFRET* constitutes an internal information asymmetry measure that parsimoniously summarizes the influence of many different sources into a signed and time-varying indicator of the relative information advantage between top and divisional managers.

On average, informed trades by both divisional managers and top managers associate with positive returns, which helps confirm that these trades are indeed informed. The positive returns to trades are particularly interesting for divisional managers, and imply that the private information about their own divisions revealed by their insider trades is significantly related to overall firm valuation. Mean *DIFRET* is negative, consistent with top managers possessing superior information about the firm relative to divisional managers, on average. In 50% of the observations, *DIFRET* is positive, indicating divisional managers' private information sets can dominate that of top managers in many instances. While 50% may appear to be surprisingly large, recall that this sample is conditioned on both divisional managers and top managers executing informed trades on their firms' stock.

In our first exercise, we use division-level data to examine whether *DIFRET* exhibits economically intuitive patterns. We find that *DIFRET* is significantly higher when divisions

[2] For example, the within-firm serial correlation coefficient in *DIFRET* is only 0.48, which suggests that there is significant within-firm variation in this measure.

experience higher operating volatility. Badertscher, Shroff and White's (2013) find that private corporations' information environment quality varies positively with the presence of public firms in the same industry. In further testing, we observe that *DIFRET* is higher when there are fewer public firms in the same industry. Although these tests use more limited division-level data, they provide assurance regarding the validity of *DIFRET* as a proxy for internal information asymmetry.

Next, we turn to our primary hypotheses. We study the impact of *DIFRET* on properties of voluntary earnings forecasts and the restatement likelihood of mandatory financial reports. We expect variation in IIA to induce variation in various aspects of voluntary disclosure. First, we expect top managers' ability to provide accurate forecasts to suffer when their relative information advantage is lower. Indeed, in our empirical tests, we observe that *DIFRET* is negatively associated with management forecast accuracy. Second, if top managers recognize their reduced forecasting capacities due to IIA, they may adjust their forecasting behavior accordingly. Consistent with this prediction, we find that firms characterized by greater *DIFRET* tend to issue less specific forecasts, presumably reflecting top managers' awareness of the imprecision and incompleteness of their information.

We also examine "low-balling", the issuance of management forecasts that are systematically lower than eventually realized earnings. It is well-established that firms enjoy capital market benefits from reporting positive surprises at the time of earnings announcements (Bartov, Givoly and Hayn 2002; Soffer, Thiagarajan and Walther 2000; Kasznik and McNichols 2002). In response, managers guide down analysts' expectations via their earnings forecasts (Matsumoto 2002; Richardson, Teoh and Wysocki 2004). We expect that corporate managers who are unsure of the completeness and relative superiority of their information sets will issue

forecasts that are biased downwards, with the goal of increasing the likelihood of meeting or beating their own expectations. Our results confirm that management earnings forecasts exhibit a more pronounced pessimistic bias relative to eventually realized earnings in firms with higher *DIFRET*. Finally, we find that management forecast frequency is significantly negatively associated with *DIFRET*. In other words, when top management's information set relative to that of divisional managers is inferior, their ability and/or willingness to issue management forecasts is lower.

Turning now to the second key aspect of external communication, financial statements, we test whether weaker relative information advantage of top managers is associated with higher restatement likelihood. Preparation of financial statements relies crucially on managerial estimates and judgment, such as those with respect to asset values, bad debt expenses, expected returns on sales from customers, etc. We expect that estimations and judgments are likely to be more error-prone when corporate managers lack access to information about the firm's constituent divisions, which in turn increases the likelihood of revisions to published financial statements. Consistent with our hypothesis, *DIFRET* is positively correlated with the probability of error-driven restatements. We do not observe a significant association between *DIFRET* and the probability of restatements reflecting "irregularities", that is, purposeful managerial interventions with the objective of misleading stakeholders.

Our results are robust to the inclusion of firm or industry fixed effects as appropriate, along with year fixed effects and to clustering of standard errors by firm. *DIFRET* by construction captures a phenomenon clearly distinct from uncertainty. Nevertheless, for all regressions with management forecast attributes as the dependent variables, we include various controls for uncertainty, including earnings volatility, dispersion in analyst forecasts, the

incidence of a loss, forecast horizon, etc. As expected, our results are robust to these controls. Similarly, our analysis of restatement probability also controls for various factors known to influence it; including the presence of a Big N audit firm, the number of segments, the presence of a qualified audit opinion, equity and debt issuance, prior restatements, etc. Our results indicate that *DIFRET* has a strong incremental effect on restatement probability.

We conduct placebo tests where we replace *DIFRET* with an equivalent measure constructed using routine rather than informed trades of top and divisional managers. This alternative measure does not exhibit any association with the properties of voluntary and mandatory disclosures, strengthening our inference from the results we obtain with *DIFRET*.

It is possible that corporate managers' policies and practices with respect to issuing forecasts and preparing financial statements determine, in part, the extent to which they seek, extract and process information from divisional managers. In our next analysis, we use a 2SLS estimation procedure that relies on two instrumental variables based on the geographic location of the firm to identify exogenous variation in IIA. Locational decisions regarding divisions are most likely driven by strategic considerations regarding product markets, tax incentives, cost structures, etc., and are thus relatively less likely to be influenced by policies and practices underlying voluntary disclosures and financial statement reporting.

The two instrumental variables in our 2SLS analysis are: (a) the average flight time between a conglomerate's headquarters and its divisions and (b) the average GARMAISE Index of the states where the divisions are located. We expect that the farther separated the corporate headquarters are from divisions, the greater the opportunity for divisional managers to enjoy an information advantage over corporate managers. The state-level GARMAISE Index measures the average enforcement toughness of non-competition clauses for company executives in the

respective state. When non-competition clauses are enforced more strictly, managers' within-state outside employment opportunities are more limited. Hence, strict enforcement of non-competition clauses can provide divisional managers with incentives to protect their internal human capital by being less forthcoming about their private information to corporate headquarters.

To validate the instruments, we identify instances in which flight time and the GARMAISE index exhibit discrete changes for specific divisions and confirm that *DIFRET* for the affected divisions changes significantly in such instances. Our two instruments satisfy the exclusion restriction condition and pass weak instrument tests. In these 2SLS tests, *DIFRET* continues to exhibit negative associations with management forecast accuracy, specificity, bias, and frequency, and a positive association with the probability of error-driven restatements.

Further tests reveal that *DIFRET*'s negative association with external communication quality is particularly pronounced when *DIFRET* is positive. Positive *DIFRET* is most likely to represent cases where information flow from divisional managers to top managers is impeded enough that the average divisional managers' private information about the firm exceeds that of the average top manager. These results suggest that top managers' lack of access to divisional managers' private information, and not just their lack of ability to aggregate this information meaningfully, is responsible for the decline in external communication quality.

We next examine whether the adverse effects of top managers' relative information disadvantage on voluntary earnings forecasts and restatements are more severe in the presence of weak internal control systems. To proxy for weak internal control systems, we use an indicator variable that captures whether the firm reported an internal control weakness in the current year. We find that the negative influence of *DIFRET* on management forecast accuracy, specificity,

bias and frequency, and its positive influence on restatement likelihood, are more pronounced in the presence of weak internal control systems. The influence of internal control systems on the quality of financial statements and voluntary disclosures has been of significant interest to academics (Doyle, Ge and McVay 2007; Feng et al. 2009; Dorantes, Li, Peters and Richardson 2013). Our paper contributes to this literature by providing evidence on a specific context in which internal control system weaknesses can be particularly detrimental for the quality of external communication: i.e., when top managers' relative information advantage over divisional managers is weaker.[3]

To examine the possibility that the negative association we document between *DIFRET* and disclosure quality is driven by firms in which top managers trade less frequently than divisional managers, we divide the sample into two groups. The groups are formed based on the sign of the difference in average insider trading volumes between top managers and divisional managers. We find that the negative relation between *DIFRET* and external communications quality holds among both groups. In particular, the influence of *DIFRET* is not concentrated among firms where top managers trade *less* than divisional managers. Indeed our evidence is equally or more statistically significant in firms where top managers trade *more* than divisional managers. Relatedly, we also confirm that our results hold for instances in which insider trading profits are positive for at least one set of managers, divisional or corporate.

The influence of information asymmetry between divisional and corporate managers on corporate policy has received considerable interest in the literature. A long line of theory papers

[3] The literature has also been interested in the influence of governance on the quality of financial statements and voluntary disclosures (Beasley 1996; Klein 2002; Bushman, Chen, Engel and Smith 2004; Karamanou and Vafeas 2005). Using an index of governance constructed via a principal component analysis of the G-Index (Gompers, Ishii and Metrick 2003), the duality of CEO as Chair and the lack of board independence, we document that the influence of *DIFRET* on voluntary and mandatory disclosure quality is more pronounced in the presence of weak governance. The results are thus similar to those obtained with internal control systems but they are statistically weaker, probably because of the sharply reduced sample size upon requiring data to compute both *DIFRET* and governance variables.

(Harris, Kriebel and Raviv 1982; Harris and Raviv 1996; Harris and Raviv 1998; Bernardo, Cai and Luo 2004; and Wulf 2009) posit the critical role of IIA in internal capital allocation decisions. Several prior studies, such as Giroud (2013), Graham, Harvey and Puri (2015), Duchin and Sosyura (2013) and Shroff et al. (2013), present empirical evidence consistent with the relations between divisional and corporate managers having salient influences on investment efficiency in the presence of internal information asymmetry. In the context of this literature, our paper makes two crucial contributions. First, we introduce and validate an empirical measure of information asymmetry within organizations that also captures the relative information advantage of top managers in the firm versus divisional managers. Second, our paper highlights that information asymmetry between divisional and top managers within a firm can induce information asymmetry between the firm and its external stakeholders.

II. Literature review and hypothesis development

Internal Information Asymmetry

The role of the internal information environment has been examined in the literature, particularly in the context of capital budgeting and investment efficiency. Graham et al. (2015) present survey evidence suggesting that CEOs rely on the inputs of divisional managers for decision-making and internal capital allocation. This reliance is particularly more pronounced when firms are large and complex, with multiple segments. Duchin and Sosyura (2013) provide evidence that social ties between divisional managers and corporate managers can influence capital allocation among divisions. In particular, CEOs rely more on social ties to divisional managers in firms characterized by higher IIA. Shroff et al. (2013) examine how the information asymmetry between parent companies and their cross-border subsidiaries can influence international investments in MNCs (multinational corporations). They find that the external

information environment in countries where subsidiaries operate is associated positively with investment responsiveness to growth opportunities. They conclude that the external information environment ameliorates internal information asymmetry.

The literature linking internal information asymmetry between divisional managers and corporate managers to the quality of external communication is more limited. Doyle et al. (2007) and Feng et al. (2009) respectively document that the quality of mandatory and voluntary disclosures is poorer in firms with internal control weaknesses. Gallemore and Labro (2015) examine whether higher internal information quality (IIQ) is associated with lower effective tax rates. They define IIQ as "*…the accessibility, usefulness, reliability, accuracy, quantity and signal-to-noise ratio of the data and knowledge collected, generated and consumed within an organization.*" Their empirical proxies for IIQ include, among other measures, management forecast accuracy, internal control weaknesses and error-driven restatements. Gallemore and Labro (2015) thus assume equivalence in the characteristics of external and internal communication and regard them as capturing the same underlying phenomenon, that is, internal information quality.

In another related paper, Jennings, Seo and Tanlu (2015) examine the effect of organizational complexity on voluntary disclosure practices. Jennings et al. (2015) capture organizational complexity via diversity in geographic and industry membership of its segments as well as the ability of sales alone to predict firm performance, which they attribute to variation in cost structure complexity. The properties of voluntary disclosure we examine are similar to those studied by Jennings et al. (2015), although they do not investigate mandatory disclosures.

We contribute to this literature by incorporating the sign of the internal information asymmetry into our analyses. The objective of our paper is distinct from existing literature in two

important ways. First, we develop a measure that parsimoniously summarizes the influence of many different sources of information asymmetry into a signed and time-varying indicator of the relative information advantage between top and divisional managers. Second, we test whether the sign of the internal information asymmetry matters. In particular, we expect disclosure quality to be adversely affected when managers exercising the greatest control over disclosure policies and practices (i.e., top managers) are at an informational disadvantage relative to divisional managers, on whom the former rely on for information.

Management earnings forecasts

Management earnings forecasts have a significant influence on the market's future cash flow expectations, analysts' forecast revisions and stock returns (Ajinkya and Gift 1984; Jennings 1987; Anilowski, Feng and Skinner 2007). In providing guidance, managers have to trade off various incentives. On the one hand, providing earnings forecasts is associated with capital market benefits, for example, lower cost of capital (Botosan 1998). On the other hand, when managers provide guidance, they bear an implicit responsibility to provide reasonably accurate forecasts. Accurate guidance is rewarded, for example, via career-advancement opportunities for the CEO (Zamora 2009), whereas inaccurate guidance is associated with a higher probability of CEO turnover (Lee, Mastsunaga and Park 2012). Furthermore, in addition to being accurate, managers also face capital markets pressure to meet or beat their earnings forecasts (Kasznik and McNichols 2002). Managers thus have incentives to "low-ball", that is, guide market expectations down to a level where they are likely to be pessimistic with respect to eventually announced earnings. Various forces, including litigation risk and investors' aversion to negative earnings surprises, are forwarded in the literature as explanations for this "walk-down" of expectations vis-à-vis earnings realizations (Skinner 1994; Soffer et al. 2000; Matsumoto

2002; Richardson et al. 2004; Ke and Yu 2006). Based on a survey of 400 executives, Graham, Harvey and Rajgopal (2005) conclude that managers consider meeting or beating analyst consensus forecasts a very important organizational goal and they trade off the short-term need to deliver earnings with the long-term objective of value-maximizing investment decisions.

The trade-offs top managers make with respect to voluntary disclosures and consequently the properties of their earnings forecasts arguably depend on the extent to which managers can be confident of their own information set. We expect that when top managers lack full access to the private information possessed by divisional managers, their earnings forecasts are less likely to be accurate ex post. Indeed, when information flow from divisional managers is more restricted, top managers will experience greater difficulty estimating their firm's future earnings, which we expect will manifest in less specific forecasts. Further we expect that top managers will guide expectations down to a greater extent when their relative information advantage is weaker, because they are less certain about the accuracy of their own forecasts and are particularly averse to appearing optimistic ex post. Thus, their earnings forecasts are likely to be more pessimistic relative to eventually realized earnings when their relative information advantage is weaker. Finally, given the costs of inaccuracy, top managers are expected to be less willing to provide earnings guidance when they have difficulty in obtaining divisional information and hence assess a higher probability of their guidance being inaccurate. This implies a lower frequency of management earnings forecasts when top managers' relative information advantage is weaker.

Our first hypothesis is stated below in alternate form:

Hypothesis 1 (alternate): The accuracy, bias, specificity and frequency of management earnings forecasts is lower when top managers' relative information advantage over divisional managers is weaker.

Earnings restatements

In addition to influencing voluntary disclosures, internal information asymmetry can also adversely affect corporate managers' communication with external parties via mandatory financial reports. Restatements of prior financial reports have been typically used by researchers to identify poorer-quality financial reporting ex post. Existing research on accounting misstatements has demonstrated various negative consequences when firms restate their financial reports. For example, Palmrose et al. (2004) find a significantly negative market reaction to earnings restatements; Hribar and Jenkins (2004) find a negative association between restatements and cost of capital; Arthaud-Day et al. (2006), Desai et al. (2006), and Hennes et al. (2008) document that restatements increase executive turnover; Srinivasan (2005) demonstrates higher audit committee turnover after restatements. These studies generally conclude that accounting restatements lead to significant adverse consequences to the restating firms' shareholders and to various other stakeholders.

Internal information asymmetry can influence the likelihood of accounting restatements. Poorer knowledge about individual divisions can impair top managers' judgments when estimating accruals. For example, in determining the necessity for and the magnitude of inventory and PP&E write-downs, corporate managers need to understand the physical condition and productivity of assets typically under divisional control. Lack of divisional information can lead to inaccuracies and errors in accounting statements that are eventually revealed in future periods, necessitating restatements of previously issued reports.

Hennes et al. (2008) draw a distinction between restatements reflecting accounting errors (i.e., unintentional misapplications of GAAP) and those driven by accounting irregularities (i.e.,

intentional misreporting).[4] Our arguments on the link between IIA and restatements apply primarily to error-related restatements. Note that error-driven restatements can very well undermine capital market participants' faith in financial statements and are detrimental for a firm's overall information environment. However, on the even more egregious issue of restatements resulting from intentional misreporting by managers (that is, irregularities) the implications are more ambiguous. It is unclear whether being at an information disadvantage relative to divisional managers has any bearing on top managers' incentives or ability to intentionally mislead stakeholders. Thus we leave this an open empirical question.

Hypothesis 2a (alternate): The likelihood of error-related accounting restatements is higher when top managers' relative information advantage over divisional managers is weaker.

Hypothesis 2b (null): There is no association between irregularity-related accounting restatements and top managers' relative information advantage over divisional managers.

III. Data, variables, and validation tests

Data

We first match insider trading records in TFN Insider Filing Database from 1986 with firm records in the COMPUSTAT Annual files and require that firms be covered by the COMPUSTAT Segments database. Specifically, we obtain 6,936 unique multi-segment firms (33,656 firm-years) from the COMPUSTAT and the sample size reduces to 5,514 firms (29,531 firm-years) after merging with the TFN Insider Trading database. Our sample period starts from 1994, the first year of First Call database for management earnings forecast. After excluding pre-1994 firm-years, we select those firm-years with at least one open-market insider trading

[4] The literature points to willful earnings misstatements motivated by executive incentives and capital market pressure. For example, Burns and Kedia (2006), Efendi et al. (2007) and Burks (2010) study executive compensation and incentives to restate earnings. Kedia and Philippon (2009) study the economics of fraudulent reporting. Richardson et al. (2004) suggest that capital market pressures motivate companies to adopt more aggressive accounting policies leading to restatements.

transaction in the previous three fiscal years over our sample period of 1994-2011. This procedure yields 22,487 firm-year observations (4,886 unique firms). To calculate the empirical measure of internal information asymmetry (denoted *DIFRET*), we further require at least three *opportunistic* insider trades by both headquarter managers and division managers in the previous three fiscal years, consistent with Cohen et al. (2012).[5] The data requirement causes a significant decrease in the sample size, resulting in a remaining sample of 5,855 firm-years (1,167 unique firms). Finally, we exclude financial and utility firms and require that data be available for management earnings forecasts and the control variables used in the regression analysis. Our final sample consists of 11,454 management earnings forecasts (including both quantitative and qualitative forecasts) for 2,311 firm-years and 662 unique firms. Among these management earnings forecasts, we use only quantitative earnings forecasts (10,312 forecasts) for the tests of forecast accuracy and forecast bias. For forecast frequency tests, we include those firm-years without any management forecast (i.e., forecast frequency is zero for these firm-year observations). We require that firms appear in the First Call database at least once to be included in the sample.[6] The sample for forecast frequency tests consists of 3,662 firm-year observations.

To develop the sample for the accounting restatement analysis, we use the firm-years with *DIFRET* available and require that these firms be covered by the Audit Analytics database of accounting restatements. Audit Analytics provides restatements with announcement date from year 2000 and we focus on the restatement period for multi-segment firms' restatement cases dated back till 1997. We merge these two datasets to obtain the sample of firm-years from 1997 to 2011. We then exclude those firm-years with missing values for control variables. Our final sample of accounting restatements contains 4,067 firm-year observations, among which 421

[5] The identification of opportunistic trades is discussed in the next section as part of the construction of *DIFRET*.
[6] We impose this requirement to mitigate the probability that certain firms exhibit no management forecasts because First Call systematically excludes them from its sample (coverage bias).

firm-year observations have restatements due to accounting errors, 43 firm-year observations have accounting irregularities, and 3,603 firm-year observations do not have any restatement ("clean" firm-years). Audit Analytics provides the data for classifying accounting restatements as either arising from errors or irregularities. Table 1 describes the detailed selection procedures for various samples.

Measurement of internal information asymmetry: DIFRET

Our main independent variable is the measure of internal information asymmetry denoted *DIFRET*. Section V provides a detailed discussion of the advantages and limitations of *DIFRET* as a proxy for IIA. This subsection exclusively focuses on the construction of the metric. We measure *DIFRET* using insider trading information for divisional managers and top managers. Insiders are often compensated by stock options and/or restricted stocks. As a result, stockholdings of their own firms represent a nontrivial percentage of their wealth. Therefore, they are typically net sellers of stocks (Cohen et al. 2012), who often trade for personal liquidity and diversification reasons. However, some of their insider trades may benefit from the private information about their own respective firms.

As a first step towards computing *DIFRET*, we separate trades that are likely information-based from those that probably occur for liquidity and other routine reasons and exclude the routine trades from our measure. We closely follow the framework in Cohen, Malloy and Pomorski (2012) to sort insider trades into "routine" trades and information-based or "opportunistic" trades. Specifically, to identify routine trades, we examine insiders' trading patterns during the entire sample period. If an insider makes open-market insider trades in the same calendar month over a period of at least three consecutive years, the trades are labeled as routine. For that insider, trades made in other months that do not fit the calendar pattern during

the same period are labeled as opportunistic. In contrast to routine trades, opportunistic trades likely reflect managers' incentive to take advantage of their own private information.

DIFRET has two components, *DIV_RET* and *TOP_RET*. $DIV\_RET_{i,t}$ represents the trading profit of divisional managers for firm *i* in year *t*, measured as the average cumulative size-adjusted abnormal return over the six-month period following opportunistic trades made during the prior three fiscal years (t-3 to t-1). We identify divisional managers' "opportunistic" trades using transactions by two types of corporate insiders as indicated in the TFN Insider Trading Data. First, we locate Divisional Officers (relationship code=OX) and Officer of Subsidiary Company (OS). Second, we locate other non-top executives (i.e., VP, Senior VP, and other executives) whose mailing address, as shown in the insider trading filings, is out of the state where the corporate headquarters is located, or is at least 500 kilometers (around 300 miles) away from the headquarters in the same state.[7,8] Similarly, $TOP\_RET_{i,t}$ represents trading profit of managers at the corporate headquarters for firm *i* in year *t*, measured by the average cumulative size-adjusted abnormal return over the six-month period following their opportunistic trades over the prior three fiscal years. Corporate or top managers represent company executives with the following roles: chairman, vice chairman, CEO, CFO and COO. For all open-market sale transactions, we assign the opposite sign when computing the associated abnormal stock returns to these transactions. The difference between $DIV\_RET_{i,t}$ and $TOP\_RET_{i,t}$ ($DIV\_RET_{i,t} - TOP\_RET_{i,t}$) yields $DIFRET_{i,t}$, the empirical measure for internal information asymmetry. As *DIFRET* becomes more positive, top managers' relative information advantage is weaker.

Measurement of voluntary disclosure properties

[7] We identify other non-top executives mainly based on relationship code "rolecode1", which represents the primary role of insiders (specifically, role code = AV, EVP, O, OP, OT, S, SVP, VP, GP, LP, M, MD, OE, TR, GM, C, CP).
[8] We conduct robustness tests using 400 or 600 kilometers and the results are both quantitatively and qualitatively similar.

To test hypothesis 1, our dependent variables are forecast accuracy, bias and specificity, denoted *ACCURACY*, *BIAS* and *SPEC*, respectively. *ACCURACY* is calculated as the negative of forecast error magnitude, which in turn is the absolute difference between management earnings forecast and actual earnings, scaled by the stock price at the beginning of the fiscal period. Therefore, *ACCURACY* increases when forecasts are closer to earnings realizations. *BIAS* is the signed difference between management earnings forecast and actual earnings, scaled by the stock price at the beginning of the fiscal period. More negative values of *BIAS* imply more pronounced pessimistic bias in managerial earnings forecasts. Finally *SPEC* is an ordered rank variable, set equal to four if the firm issues a point forecast during a fiscal period, three if an interval forecast, two if an open-ended forecast, and one if a qualitative forecast. Thus, *SPEC* assumes higher values when managers are more specific. For the forecast frequency tests, *FREQ* is measured as the natural logarithm of one plus the number of management earnings forecasts issued in the current year at the firm-year level.

Measurement of restatement likelihood

To test hypothesis 2, our dependent variables are restatements driven by either accounting errors (*RES_ERR*) or irregularities, that is, accounting fraud (*RES_IRR*). More specifically, *RES_ERR* is coded as one for firm-years for which the firm reported a restatement due to accounting errors, zero otherwise; *RES_IRR* is coded as one for firm-years for which the firm reported a restatement due to financial irregularity and zero otherwise.

Descriptive statistics

Tables 2-3 present descriptive statistics for our sample, along with correlation coefficients between various variables used in our tests. As shown in Table 2, the average value

of *DIV_RET* and *TOP_RET* is 0.034 and 0.043, respectively, for the management forecast sample. The average values are lower for the restatement sample (0.025 and 0.034 for *DIV_RET* and *TOP_RET*, respectively). Hence on average top managers trade more profitably than division managers, implying that top managers are more informed. Not surprisingly, *DIFRET* is negative for both samples of management forecasts and accounting restatements (-0.008 in Panel A; -0.009 in Panel B). Table 3 Panel A reports correlations at the firm forecast level, and includes variables capturing forecast properties such as accuracy, bias, and specificity, while Panel B reports correlations at the firm level, and includes forecast frequency. Table 3 Panel C reports correlations for the sample of firms used in the restatement tests. As the univariate correlations demonstrate, *DIFRET* is associated negatively with *ACCURACY*, *BIAS*, *SPEC* and *FREQ*. On the other hand, *DIFRET* is associated positively with the likelihood of error-driven restatements but uncorrelated with the likelihood of irregularity-driven restatements. In addition, *DIFRET* is negatively associated with *RELATED* for all three panels, though the association is insignificant for Panel C. The evidence suggests that top managers in multi-segment firms with more related divisions, are more informed relative to divisional managers. This is probably because correlated information across multiple segments allows top managers to synthesize the information from various divisions more efficiently.

Validation tests

As a validation exercise, we use division-level data to correlate *DIFRET* for a specific division with that division's ROA volatility and industry information environment. Industry information environment for a given division is measured by the number of publicly traded firms from the same two-digit SIC industry as the division (*NUMPEER*).

Divisional managers are likely to have greater opportunities for withholding information from top managers when the division operates in a more volatile environment (Demsetz and Lehn 1985). We therefore expect *DIFRET* to be associated positively with division's ROA volatility. Further, Badertscher, Shroff and White (2013) argue that greater presence of publicly listed firms enriches the industry' information environment and thus reduces uncertainty about all member firms. They find that private firms invest more efficiently when they operate in industries with a greater presence of public firms. If indeed publicly available industry information reduces the information advantage that divisional managers can possess relative to top managers, we expect *DIFRET* to be associated negatively with *NUMPEER*.

Table 4 reports the relations *DIFRET* exhibits with divisional ROA volatility and the availability of public industry information using a subsample of S&P 1500 firms for which we hand collect division-level data. See Appendix C for detailed description of the data collection procedure at the divisional level. We control for firm characteristics such as firm size, book-to-market, R&D, number of business segments, relatedness of divisions, and the number of analysts (Wu 2014). Since *DIFRET* is measured over years t-3 to t-1, we measure all control variables as of year t-2. Measuring control variables as of year t-3 or year t-1 would yield very similar results.

We find that divisional ROA volatility (*STDROA*) is associated positively with *DIFRET* while *NUMPEER* is associated negatively with *DIFRET*, as expected. In other words, top managers' relative information advantage over divisional managers is weaker when divisions face greater operating volatility and when there are fewer comparable publicly listed peers. These results offer some assurance that *DIFRET* indeed is a valid measure capturing variation in top managers' relative information advantage over divisional managers.

IV. Results

IIA and management forecasts

Table 5 column (1) reports results with management forecast accuracy as the dependent variable. Results obtained with control variables generally conform to those in existing literature (Ajinkya, Bhojraj and Sengupta 2005; Hui, Matsunaga and Morse 2009) and economic intuition. We find that forecast accuracy is associated negatively with the earnings surprise and positively with size and market-to-book. The incidence of losses, the magnitude of R&D expenditures and forecast horizon have a negative influence on forecast accuracy. Turning to our primary variable of interest, the coefficient on *DIFRET* is negative and statistically significant at the 5% level. The results imply that a single standard deviation increase in *DIFRET* is associated with a decline in forecast accuracy of 0.26 percent points, which appears significant relative to the mean *ACCURACY* in the sample of 1.5%.

Turning to other forecast properties, we observe that management forecasts are more downward-biased when *DIFRET* is higher. The coefficient on *DIFRET* is significantly negative in column (2) with *BIAS* as the dependent variable. The coefficient implies that a single standard deviation increase in *DIFRET* is associated with a decline in forecast bias by 0.45 percent points, which seems significant relative to the absolute mean bias of 1.5%. *DIFRET* is also associated with managers issuing less specific forecasts. The coefficient on *DIFRET* in column (3) with *SPEC* as the dependent variable is significantly negative. It implies that a single standard deviation increase in *DIFRET* is associated with a decline in forecast specificity by 0.71, which seems economically meaningful relative to mean specificity of 3.112.[9] Finally, we observe that *DIFRET* is associated negatively with the frequency of management forecasts (coefficient = -0.057 with t=-2.21).

[9] Recall that specificity is measured as an ordinal variable assuming the values four, three, two and one. Our results are robust to the estimation using ordered probit model.

Collectively, the results suggest that top managers are less likely to issue forecasts when their relative information advantage is weaker. Conditional on issuance, top managers tend to be less specific and more pessimistically biased in their forecasts when their relative information advantage is weaker. Nevertheless, their forecasts tend to be less accurate in such cases.

IIA and earnings restatements

In Table 6, we present results of testing the relation between IIA and the likelihood of earnings restatement following the model specification in DeHaan, Hodge and Shevlin (2013). Restatements are classified into two subsamples: restatements reflecting accounting errors (*RES_ERR*) and those reflecting irregularities suggestive of management fraud (*RES_IRR)*. Results with control variables reveal that prior period restatements reliably increase the likelihood of both types of restatements in the current period. Further, irregularity-driven restatements are more likely for larger firms and for firms with seasoned equity offerings (SEOs). Turning to our primary explanatory variable, the coefficient of *RES_ERR* on *DIFRET* is positive and statistically significant at the 5% level. Holding the control variables at the sample mean, the marginal effect of *DIFRET* on restatement probability is 2.16 percent points, which is economically meaningful given the 10.5% of the sample firm-years (421/4,024) are classified as the restatements due to accounting errors. In contrast, we do not find any association between *DIFRET* and the likelihood of irregularity-driven restatements. Collectively, results from Table 6 suggest that *DIFRET* increases management's propensity to make errors of estimation and judgment in preparing financial statements, resulting in a higher likelihood of accounting errors and consequent restatements. In contrast, we do not find significant evidence of an association between *DIFRET* and the propensity to willfully misstate financial reports, captured by *REG_IRR*.

Placebo tests

We repeat the analyses in Tables 5 and 6 in Table 7 Panels A and B respectively, replacing *DIFRET* with an equivalent measure denoted *DIFRET_ROUTINE*, constructed using the returns to managers' routine trades (instead of informed ones as in *DIFRET*). The tests in Table 7 thus serve as a placebo exercise, since the components of *DIFRET_ROUTINE* should not capture either top or divisional managers' private information. Both the mean and median trading profit for routine trades is close to zero for both top managers and division managers. The mean trading profit for both groups of managers is statistically indistinguishable from zero. This evidence provides credence to Cohen et al. (2012)'s classification scheme.[10] We do not observe a significant association between *DIFRET_ROUTINE* and the properties of voluntary disclosure or restatement likelihood, which strengthens our inference from the results we obtain with *DIFRET*.

2SLS estimation

The results from prior sections indicate an association between *DIFRET* and both firm voluntary disclosure policy and financial reporting quality. In this section, we attempt to address endogeneity arising from the possibility that policies related to voluntary and mandatory disclosure influence the extent to which top managers gather information from divisional managers.

We employ two instrumental variables for *DIFRET*. The first instrument is the flight time between a firm's headquarters and its divisions (*FLIGHT_TIME*). Appendix B describes in detail the measurement of *FLIGHT_TIME* in our paper. Flight time affects top managers' information advantage relative to divisional managers because information acquisition costs

[10] The sample size drops significantly because fewer trades are classified as routine trades based on the classification scheme described in Section III.

generally vary positively with flight time (Giroud 2013). The evidence in Giroud (2013) suggests that top managers visit divisions more easily and more often when the flight time between headquarters and divisions is significantly shorter. Geographically diverse regions often have their own distinct economic micro-environments that local managers are more familiar with. On-site visits allow top managers to personally observe the divisions' operations, along with other aspects of their divisions' economic circumstances such as their product market demand, employees' well-being, on-site morale etc. Giroud (2013) also points to the possibility that divisional managers are more likely to share information when they believe that their efforts are more visible to headquarters, and hence expect that they are more likely to be rewarded (via promotions etc.). Conversely, we would expect that the more separated corporate headquarters are from divisions, the greater the possibility that divisional managers enjoy an information advantage over corporate managers.

Our second instrument is the local GARMAISE index (GARMAISE). The index measures the enforceability of non-competition clauses in employment contracts for every state, and is an ordinal rank variable that ranges from 0 to 9, with 9 corresponding to highest enforceability. GARMAISE is computed as the average GARMAISE index (Garmaise 2011) across the states where division managers are located. Stronger non-competition clauses can reduce managers' in-state opportunities for employment outside their current firms. This exogenous restriction on their external human capital can provide divisional managers incentives to withhold information from corporate headquarters in order to tilt the balance of power in their favor and preserve their internal human capital.

Both flight time and the GARMAISE index rely on the geographic location of the firm's divisions, which should be reasonably exogenous with respect to voluntary and

mandatory disclosures. Furthermore, it is difficult to conceive any reason that *FLIGHT_TIME* and *GARMAISE* would independently influence the quality of external communication, that is, via channels that do not involve weakening the relative information advantage of top managers.

To validate the two instruments, we conduct both univariate and multivariate tests to analyze the change in *DIFRET* surrounding exogenous changes in flight time and GARMAISE index. Following Giroud (2013), we identify 78 significant flight time decreases and 39 significant flight time increases between a given division and headquarters since 1986, the first year when insider trading data became available.[11] These changes correspond to 111 and 52 division managers, respectively. With respect to the GARMAISE index, Texas decreased the enforcement of non-competition agreements in 1994 while Florida increased it in 1996. We identify 68 and 25 division managers located in Texas and Florida, respectively.

Table 8, Panel A presents univariate statistics on changes in *DIFRET* from the three years before to the three years after changes in flight time and the GARMAISE index. In instances where there was a decline in flight time (mean decrease = 193 minutes), *DIFRET* significantly declined from -0.010 to -0.028. The 0.018 decline in *DIFRET* represents 9.5 percent of the mean absolute value of *DIFRET* in the sample. In the sample with flight time increases (mean increase = 175 minutes), average *DIFRET* increases significantly from -0.012 to 0.021, the change of 0.033 representing 21 percent of *DIFRET*'s mean absolute value in that corresponding sample.

We also consider two separate samples partitioned on the sign of decrease in GARMAISE. In the sample with a decline in the GARMAISE index from 5 to 3 (Texas), *DIFRET* decreases significantly from 0.010 to -0.062. The change represents 35.6% of the mean absolute value of *DIFRET* in the sample. In the second sample, which experiences an increase in

[11] To ensure that a flight time change is economically meaningful enough to affect travel decisions of company executives and thus influence the flow of information, we consider instances when flight times change by at least a hundred minutes. Results are qualitatively similar using 60 or 120 minutes as the threshold.

the GARMAISE index from 7 to 9 (Florida), *DIFRET* increases from -0.016 to 0.028, but the change is not statistically significant at conventional levels, possibly due to small sample size.

The changes in *DIFRET* in response to both increases and decreases in flight time and to decreases in the GARMAISE index are economically significant. The evidence from the univariate analysis is consistent with our argument that the relative information advantage of top managers relative to divisional managers weakens with both flight time and the enforceability of non-competition agreements.

In Table 8, Panel B we report the multivariate analysis, controlling for firm characteristics similarly to Table 4. After controlling for these firm characteristics, we continue to find a significant decline in *DIFRET* subsequent to both a decrease in flight time and an increase in the GARMAISE index between the given division and corporate headquarters (columns (1) and (3)). Consistent with the results in Panel A, we continue to find an increase in *DIFRET* following increases in flight time and an increase in the GARMAISE index (columns (2) and (4)). Thus, Table 8 provides additional validation for the two instruments for *DIFRET*.

Table 9 reports the results of estimation based on 2SLS. Panel A of Table 9 reports results with forecast accuracy and forecast bias. Panel B of Table 9 reports results with forecast specificity and forecast frequency. Panel C of Table 9 reports results with restatement likelihood. The first-stage results in every specification indicate that both *FLIGHT_TIME* and the GARMAISE index exhibit a significantly positive association with *DIFRET*, consistent with our results reported in Table 8.[12] In column (1) of Table 9, Panel A, a one-standard deviation increase in *FLIGHT_TIME* is associated with an increase of 0.0136 in *DIFRET*, which represents

[12] We also perform the first-stage Cragg and Donald tests. The F-stats in weak-instrument tests exceed the theoretical threshold of two instruments (11.59), suggesting "weak instrument" is not an issue. In addition, we perform over-identification tests and none of our five tests rejects the null hypothesis that our instrumental variables are exogenous.

15 percent of *DIFRET*'s mean absolute value. A one-standard-deviation increase in the GARMAISE index is associated with an increase of 0.008 in *DIFRET*, accounting for 9 percent of its mean absolute value. Thus, the effect of both distance and enforceability of anti-competition law on *DIFRET* is economically significant.

The second stage results confirm that instrumented *DIFRET* is associated negatively with management forecast accuracy, bias, specificity and frequency, while it is associated positively with the likelihood of error-driven restatements. Given the robustness of our results to two-stage estimation, we conclude that our findings are unlikely to be driven by endogeneity.

The sign of DIFRET

Note that variation in IIA can arise from two sources: (a) top managers' lack of access to the private information of divisional managers and (b) top managers' relative lack of ability to synthesize the information across all divisions to arrive at forecasts of performance and financial health that are superior to those possible by individual divisional managers. While both factors likely contribute to variation in top managers' relative information advantage over divisional managers, the first factor, that is, lack of information flow up the line is likely to be more pronounced in firms with positive *DIFRET*. When insider trading profits are higher for the average divisional manager than the average top manager, it is much more likely that top managers lack access to divisional managers' private information.

To assess whether top managers' lack of access to divisional managers' private information plays a role in the relation we document between *DIFRET* and external communication attributes, we test whether the strength of those relations exhibit any variation with the sign of *DIFRET*. In other words, we include in the regression an indicator variable *POS* that is set equal to one if *DIFRET* is greater than zero and is set equal to zero otherwise. *POS* has

a mean value of 0.504, implying that *DIFRET* is positive for around 50% of our sample observations.

The coefficient on *DIFRET* is negative across all columns but only statistically significant in column (1) in Panel A; and positive but insignificant in Panel B of Table 10. The coefficient on *DIFRET*POS* is significantly negative across all columns in Panel A (where management forecast attributes are the dependent variables) and it is significantly positive in Panel B (where restatement likelihood is the dependent variable). Thus, *DIFRET*'s negative relation with management forecast accuracy, specificity, bias and frequency and its positive association with restatement likelihood is more pronounced when *DIFRET* is positive. The results suggest that top managers' lack of access to divisional managers' private information likely plays a significant role in the negative association we observe between top managers' relative information advantage and external communication quality.

Internal control systems

Existing studies present evidence that the quality of voluntary and mandatory disclosures depends on the strength of internal control systems used to record and disseminate the information that serves as the basis for communication with external parties (Doyle et al. 2007; Feng et al 2009; Morris 2011; Dorantes et al. 2013). We reason that weaknesses in internal control systems have a more detrimental effect on external communication when information asymmetry among internal parties restricts information flow about the firm to top managers, reducing their relative information advantage.

Table 11, Panels A and B presents results when our base models in Tables 5 and 6 are augmented with internal control weakness, denoted *ICW*. *ICW* captures the presence of an internal control weakness identified by the firm management in the current year, and is obtained

from the Audit Analytics database. The tests in Panel A of Table 11 show significantly negative coefficients on *DIFRET*ICW* with management forecast accuracy, bias, specificity, and frequency as the dependent variables, indicating that weaknesses in control systems are particularly detrimental for voluntary disclosure quality when top managers' relative information advantage is weaker. We also observe that *ICW* is negatively associated with forecast accuracy but positively associated with forecast bias, both of which are consistent with prior studies. In addition, *DIFRET* loads negatively across all four regressions, although the coefficient on *DIFRET* is significantly negative at the 10 percent level with accuracy, bias and specificity as the dependent variables, but not forecast frequency. The results nevertheless suggest that even when internal control systems are weakness-free, top managers' relative information advantage over divisional managers still has an effect on disclosure quality. Furthermore, with the likelihood of error-driven restatements as the dependent variable in Panel B of Table 11, the coefficient on *DIFRET*ICW* is significantly positive. Thus, weaknesses in internal control systems lead to a higher probability of errors in financial reports and consequent restatements when top managers' relative information advantage over divisional managers is weaker.

Trading patterns, IIA and disclosure quality

In this section, we examine how differential trading patterns of top versus divisional managers influence our results. Specifically, consider the following alternative hypothesis. Firms with poorer information environments exhibit lower-quality voluntary and mandatory disclosures due to inherent uncertainties and volatility. But due to the scrutiny such firms face (i.e., the threat of litigation or regulatory intervention), their top managers are unable to execute insider trades based on their private information (Cohen et al. 2012). Since divisional managers likely face less scrutiny than top managers, they are less fettered from trading on their private information,

leading to positive differential profits between the insider trades of divisional versus top managers. Thus one might observe a correspondence between poorer quality disclosures and higher *DIFRET* because of constraints on top managers' trading.

To test if this alternative explanation underlies our observed results we partition firms into two groups based on whether top managers' average dollar trading volume is higher than or lower than that by divisional managers. A significant association between *DIFRET* and disclosure quality when dollar volume of trading by top managers exceeds that by divisional managers makes it unlikely that our evidence is driven by differential insider trade constraints experienced by the former.

In Table 12 the "HIGH" ("LOW") group represents observations when the average dollar insider trading volume of top managers is higher (lower) than that of divisional managers. Panel A presents results with voluntary disclosure properties, while Panel B present results for error-driven restatements. In Panel A, the coefficient on *DIFRET* is negative and statistically significant for the HIGH group consistently across all management forecast properties. Additionally the coefficient on *DIFRET* is negative for the LOW group but only statistically significant when the dependent variable is either forecast specificity or forecast frequency. In Panel B, with restatement likelihood as the dependent variable we observe a positive and statistically significant coefficient on *DIFRET* for both the HIGH and LOW group.

Overall, the results indicate that the relation between *IIA* and disclosure quality is stronger when top managers trade more than divisional managers. Thus it is unlikely that more constrained insider trading by top managers (because of greater scrutiny and litigation risk) is responsible for the empirical relation we document.

V. Advantages and Limitations of *DIFRET*

Based on the construction of *DIFRET* and the insights from the results above, we provide a summary of some advantages and limitations of the measure.

Advantages

Since it is based on the occurrence of informed trades by insiders, *DIFRET* is a powerful tool to measure the difference in the value implications between top managers' and divisional managers' private information sets. Thus *DIFRET* captures not just the existence of information asymmetry but also provides a quantified estimate of its magnitude, and indicates whether the net asymmetry is to the advantage of top managers or divisional managers. This is particularly useful in settings similar to the ones we examine in which primary responsibility for the quality of a corporate activity (external disclosures) resides with one party (top managers) but is contingent on the inputs from another party (divisional managers).

Unlike many existing measures of internal information quality, *DIFRET* is capable of capturing dynamic evolution in the information asymmetry between divisional managers and top managers. To the extent that the new information managers learn or observe is reflected in their insider trades, *DIFRET* will change over time as managers' information sets evolve. Thus *DIFRET* allows for the information asymmetry between divisional and top managers to be time-varying for a specific firm. In our tests, this manifests in a significant effect of *DIFRET* on the properties of earnings forecasts and the likelihood of restatements, even after controlling for firm fixed effects.

Limitations

Information asymmetry may arise between top and divisional managers due to a disparity in their information sets. In other words, the private information sets of the two sets of managers

many not necessarily be subsets or supersets of one another, but may instead be non-overlapping. For example, Graham et al. (2015) argue that top managers have more information about corporate merger and acquisition activity, whereas divisional managers have greater knowledge about investment opportunities. If top and divisional managers trade on completely independent information, *DIFRET* would lack the power to detect the total "volume" of IIA in such situations. However, by construction, *DIFRET* would still faithfully indicate the relative advantage of top versus divisional managers in terms of the differential impact of their revealed private information on stock price. The significant influence of *DIFRET* on voluntary disclosure properties and restatement likelihood, along with the validation tests which yield significant results in predicted directions, suggest that a lack of power may not be a significant concern.

A second limitation of *DIFRET* is that it is interpretable only when there are revelatory informed insider trades by both top managers and divisional managers. We caution against attributing zero trades by either party to a lack of private information, as it could also reflect a conscious choice not to trade on that information. Conditional on observing trades, however, *DIFRET* identifies the differential implications of divisional and top managers' private information about the firm.

VI. Conclusion

Our paper uses a directional measure of information asymmetry to capture the relative superiority of the private information sets of divisional managers versus top managers in conglomerate entities. Following Ravina and Sapienza (2010), we capture the private information of various internal parties to the firm using the profitability of their respective informed trades. We find that when top managers' private information advantage over divisional

managers is weaker, various aspects of external communication seem to suffer. Managers' voluntary earnings forecasts are less accurate, less specific, more negatively biased and less frequent. Mandatory financial statements are more subject to restatements. The results further indicate that weaknesses in internal control mechanisms are significantly more detrimental to external communication quality when top managers' relative information advantage is weaker.

The academic literature has been interested in the internal information environment of the firm and its relation to external communication. Existing studies often proxy for the influence of the internal information environment via firm characteristics such as organizational complexity, geographic dispersion, number of segments etc. While such characteristics can contribute to internal information asymmetry (IIA), they are often very persistent and lack the power to capture evolutions in IIA arising from the flow of private information over time (for example, do divisional managers have information about segment-level investment opportunities in a given year?). Our measure captures the summary effect of any evolution in firm characteristics-driven IIA as well as IIA resulting from private information flow within the same firm. Furthermore, we highlight that the relation between internal and external communication quality is not simply a reflection of generally uncertain information environments. It matters whether the information asymmetry translates into a net benefit for top managers or divisional managers. Since external communications are primarily under the control of top managers, it is when they lack access to the private information of divisional managers within the firm that the quality of firm disclosures, both voluntary and mandatory, becomes inferior.

Importantly our results should not be interpreted as suggesting that it is always beneficial for top managers to possess an information advantage over divisional managers. A more valid interpretation of our results is that the quality of decisions taken within the firm, for example

those involving external reporting, is primarily determined by the internal information advantage of those parties that are in control of the respective decisions, in this case top managers. Other settings, for example ones in which divisional managers have primary control over corporate decisions, would generate the reverse predictions and provide a fertile area of future research made possible by adopting our empirical approach.

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Appendix A
Variable Definitions

This appendix describes the variable definitions in our empirical tests.

Variables for the tests of management forecast attributes

$ACCURACY_{i,t}$	=	The negative value of the forecast error. The forecast error is calculated as the absolute value of the difference between management earnings forecast (quarterly or annual EPS forecasts) and actual EPS, scaled by the stock price at the beginning of the fiscal period (quarter or year). A higher value of this variable implies higher forecast accuracy (and lower forecast error).
$BIAS_{i,t}$	=	Forecast bias, calculated as the difference between management earnings forecast and actual EPS), scaled by the stock price at the beginning of the fiscal period.
$SPEC_{i,t}$	=	Value for forecast specificity, defined as 4 for point forecasts, 3 for interval forecasts, 2 for open-ended forecasts, and 1 for qualitative forecasts.
$FREQ_{i,t}$	=	Natural logarithm of one plus the number of management earnings forecasts the firm issued in the current year.
$DIFRET_{i,t}$	=	The difference between $DIV\_RET_{i,t}$ and $TOP\_RET_{i,t}$ for opportunistic trades as defined in Section III
$DIFRET\_ROUTINE_{i,t}$	=	The difference between $DIV\_RET_{i,t}$ and $TOP\_RET_{i,t}$ for routine trades as defined in Section III.
$DIV\_RET_{i,t}$	=	The average cumulative size-adjusted abnormal return over the period of six months from the transaction date for all division managers' open market insider trades during the prior three fiscal years (year t-3 to t-1). For open market sale transactions, we take the opposite sign when calculating the abnormal return. For two-stage least squares (2SLS) analysis, the insider trading profit in the first stage is based on insider trades over the three-year period ending with the current year (year t-2 to t).
$TOP\_RET_{i,t}$	=	The average cumulative size-adjusted abnormal return over the period of six months from the transaction date for all top executives' open market insider trades during the prior three fiscal years (year t-3 to t-1). For open market sale transactions, we take the opposite sign when calculating the abnormal return. For two-stage least squares (2SLS) analysis, the insider trading profit in the first stage is based on insider trades over the three-year period ending with the current year (year t-2 to t).
$SUR_{i,t}$	=	Absolute value of the difference between management earnings forecasts and the median analyst earnings forecasts, scaled by the stock price at the beginning of the fiscal period.
$DISP_{i,t}$	=	The standard deviation of analysts' forecasts divided by the absolute value of the median analyst forecast for the fiscal period.
$NUMANALYST_{i,t}$	=	The natural logarithm of one plus the number of analysts who issue earnings forecasts for firm i during the fiscal year t.
$EARNVOL_{i,t}$	=	The standard deviation of quarterly earnings over 12 quarters ending in the current fiscal period, divided by the median quarterly asset value of these quarters.
$SIZE_{i,t}$	=	Natural logarithm of the market value of a firm's common equity at the end of the fiscal period.
$NUMSEG_{i,t}$	=	The number of business segments.

$NUMSEGGEO_{i,t}$ = The number of geographical segments.

$RELATED_{i,t}$ = The ratio based on the difference between the number of business segments and the number of unique two-digit SIC industry involving with these business segments, divided by the number of business segments.

$MTB_{i,t}$ = The ratio of the market value to the book value of common equity at the end of the fiscal period.

$LOSS_{i,t}$ = 1 if the firm reported losses in the current fiscal period, and 0 otherwise.

$NEWS_{i,t}$ = 1 if the EPS of the current period is greater than or equal to the EPS of the previous period, and 0 otherwise.

$RD_{i,t}$ = The research and development expenditures (Compustat item XRD) divided by sales revenues (Compustat item SALE).

$HORIZON_{i,t}$ = The number of days between the forecast date and the fiscal period-end date.

$ANNUAL_{i,t}$ = 1 if the management forecast is an annual earnings forecast and 0 otherwise.

Additional Variables for the tests of the likelihood of accounting restatements

$RES\_ERR_{i,t}$ = 1 for firm-years of which a firm's earnings is restated due to accounting errors in year t and otherwise, as per Audit Analytics database.

$RES\_IRR_{i,t}$ = 1 for firm-years of which a firm's earnings is restated due to financial fraud in year t and 0 otherwise, as per Audit Analytics database.

$BIGN_{i,t}$ = 1 if the firm's auditor is one of the four (five) largest audit firms after (before) 2001, as per Audit Analytics database.

$AUDITOP_{i,t}$ = 1 for auditor's opinions other than an unqualified audit opinion and 0 otherwise, as per COMPUSTAT item AUOP.

$SEO_{i,t}$ = 1 if the firm had a seasoned equity offering during the year, as indicated by non-zero value for COMPUSTAT variable SCSTKC.

$ISSUANCE_{i,t}$ = 1 if the firm issued new debt during the year. Identified as firms with a current year's total debt (COMPUSTAT items DLTT + DLC) greater than 105 percent of the prior year's total debt.

$ROA_{i,t}$ = Return on assets ratio. COMPUSTAT items NI / AT.

$LEV_{i,t}$ = Calculated as total debt divided by market value of assets.
COMPUSTAT items (DLTT + DLC) / (PRCC_F * CSHO + DLTT).

$PRE\_RES_{i,t}$ = 1 if the firm's financial statements for either of the previous two years have been restated due to accounting errors or financial frauds, as per Audit Analytics database.

Instrument variables (IVs) for 2SLS analysis

$FLIGHT\_TIME_{i,t}$ = The log value of the average flight time (in minutes) between individual division managers' locations and the headquarters of a firm. We first identify the nearest airports to headquarters and the addresses of division managers whose insider transactions are used for the measure of internal information asymmetry. Then we determine the fastest airline route between any two airports by using the itinerary information from the T-100 Domestic Segment Database. The flight time is the ramp-to-ramp time of the flight between two airports. We use car driving time between the locations of headquarters and division managers when locations are in close areas without flight lines or when the fastest airline route is still longer than

the car driving time. Please also see Appendix B for the detailed procedures for this flight time measure.

$GARMAISE_{i,t}$ = Average Garmaise index (Garmaise 2011) of the states where the division managers are located.

Variables for additional analyses

$POS_{i,t}$ = 1 if a firm-year observation has a positive *DIFRET* in year t, and zero otherwise.

$ICW_{i,t}$ = 1 if a firm discloses SOX302 internal control weakness in the current year, and 0 otherwise.

Appendix B
The Measure of Flight Time between Divisions and Corporate Headquarters
FLIGHT_TIME

This appendix describes the measure of flight time between divisions and corporate headquarters.

- First, we identify the respective locations of headquarters and divisions and also the nearest airports to these locations.
- Second, we determine the fastest airline route between any two airports using the itinerary information from the T-100 Domestic Segment Database (for the period 1990 to 2011). The T-100 contains monthly data for each airline and route ("segment") in the U.S. The data include the origin and destination airports, flight duration, scheduled departures, departures performed, passengers enplaned, and aircraft type. These data are compiled from Form 41 of the U.S. Department of Transportation and provided by the Bureau of Transportation Statistics.
- The flight time (in minutes) is the ramp-to-ramp time of the flight between two airports.
- Some division managers are located within driving distance, rather than flight time, to the headquarters. Similar to Giroud (2013), we compute car driving time (in minutes) between headquarters and divisions. We use driving time instead of flight time for cases with no airline route because of divisions' proximity to headquarters and for cases where the fastest air travel takes longer than driving (i.e., car driving time is used as the benchmark against air travel time).[13]
- Finally, after obtaining the flight time for individual divisions of a firm, we compute the mean value (in minutes) of this measure across all divisions, take natural logarithm transformation of the mean value, and use it as the firm-level measure of flight time.[14]
- The summary statistics of flight time between non-local divisions and corporate headquarters show a mean value of 85 minutes and median value of 52 minutes. When we exclude those divisions within car-driving distance from headquarters, the mean and median flight time increases to 133 minutes and 106 minutes respectively.

[13] Note that Giroud (2013) assumes that one hour is spent at the origin and destination airports combined and that each layover takes one hour. Our measure only captures the ramp-to-ramp time of the flight between two airports without adding the assumed time spent at airports and the layover time for indirect flights.

[14] We obtain location information of division managers from the insider trading database. For each firm-year, we use the reported locations of division managers based on their trades within the previous three years, consistent with *DIFRET* measure.

Appendix C: The Procedure of Hand-collection of Division Data

This appendix describes the procedure of hand-collecting division-level data. To make our hand-collection work manageable, we focus on S&P 1500 firms. Following Duchin and Sosyura (2013), among multi-segment firms included in S&P 1500 index, we identify division managers by the title of divisional president, executive vice president, or senior vice president. As indicated in Duchin and Sosyura (2013), divisional managers' responsibilities are relatively transparent from their job title, biographic summary, the firm's organizational structure, and the description of segments in the annual report. To match division managers' insider trading data information with the division and firm's financial data, we search companies' annual reports.

The following example illustrates the detailed matching procedure. According to Compustat, Pinnacle West Capital Corporation (PNW) had three business segments in 2010: APS, Transmission Operation, and Nuclear. By referencing the annual report of PNW, we find that Donald Robinson, President and Chief Operating Officer of APS, was in charge of the APS division; Steven Wheeler, Senior Vice President was in charge of Transmission Operation; Randall Edington, Executive Vice President and Chief Nuclear Officer was in charge of Nuclear division, in 2010. Next, we match the Compustat segment financial data with the TNF Insider Trading Database based on division manager names.

In some cases, there is no one-to-one correspondence between divisional managers disclosed in the annual report and the segment data in Compustat. Such difference arises when a firm's segment reporting on Compustat is done at a more aggregate level compared to its divisional structure (e.g., several divisions are combined into one reporting unit). For example, Crane Company disclosed five segments at Compustat in 2008, including a segment called Aerospace and Electronics. By reading the sections of executive management and segment reporting in Crane's annual report, we find that the Aerospace unit and the Electronics unit, while combined for the purpose of segment financial reporting, are each overseen by their own divisional president: David Bender, Group President, Electronics; and Gregory Ward, Group President, Aerospace, respectively. In this case, we assign both group presidents to the Aerospace and Electronics division. We manually reconcile each of these differences to ensure the accuracy of matching and to avoid the loss of observations. If multiple managers are assigned to a segment reported on Compustat, our empirical tests use the average differential trading profit (*DIFRET*) across these divisional managers for that particular segment.

Last, some firms use a functional organization structure to define the responsibilities of their executives. For these companies, the executives are assigned to functional roles, such as vice president of marketing, vice president of operations, and vice president of finance, and each executive supervises his or her entire functional area across all business units. Since we are unable to establish a clear correspondence between an executive and the business segment she is associated with, we exclude these firms from our sample. We also eliminate companies for which we are unable to identify division managers based on our data sources or for which division managers do not show up in the TFN insider Trading Database, as discussed above. In the end, our hand-collected sample includes 22,382 firm-year-division observations for 593 unique multi-segment firms.

TABLE 1
Sample Selection

This table describes the procedure we follow to arrive at our final samples for tests involving management earnings forecasts and earnings restatements

	# of firm-years	# of firms	# of management earnings forecasts*
Data requirement for DIFRET			
Firm-years in which there was at least one insider trade (by any insider) in the previous three years for the corresponding firm during the period of 1994 – 2011.	22,487	4,886	
Firm-years in which there was at least one *opportunistic insider trade* by *either* top or divisional managers, in the previous three years (i.e., excluding those with only routine insider trades and also excluding those insiders who are neither top nor divisional managers)	19,072	4,549	
Firm-years in which there was at least one opportunistic insider trade by *both* groups of top and divisional managers in the previous three years	9,882	1,915	
Firm-years in which there were at least *three* opportunistic insider trades by both top and divisional managers in the previous three years.	5,855	1,167	
Firm-years after excluding financial and utilities firms	4,916	1,014	
(1) Match with First Call management earnings forecast database			
Sample with both *DIFRET* and management earnings forecasts (either quantitative or qualitative) issued for the current year, and also with non-missing control variables for the regressions.	2,311	662	11,454
Sub-sample of quantitative management earnings forecasts.	2,178	646	10,312
Sample of firm-years for which the firms are covered by the First Call database (for the forecast frequency analysis)	3,662	815	
(2) Match with Audit Analytics accounting restatement database			
Sample of firm-years with accounting restatements data (those with or without any restatement, including accounting errors or frauds) and also with the control variables for the regressions.	4,067	748	
Sub-sample of firm-years without any restatements or with only accounting errors (i.e., excluding those with accounting frauds).	4,024	728	

*A single firm can issue multiple earnings forecasts in a given year.

TABLE 2
Descriptive Statistics

This table reports summary statistics. Panel A is for the test of the relation between internal information asymmetry, *DIFRET*, and the forecast errors, forecast bias, forecast specificity and forecast frequency of management earnings guidance. Panel B is for the relation between internal information asymmetry, *DIFRET*, and the likelihood of restatements. The sample periods are from 1994 to 2011 in Panel A and from 1997 to 2011 in Panel B. Descriptive statistics for the variables are presented for the maximum number of observations available for that corresponding variable. All variables are defined in Appendix A.

Panel A: Variables for Management Earnings Forecast Tests

	N	Mean	Median	Std Dev	Q1	Q3
$ACCURACY_{i,t}$	10,312	-0.015	-0.004	0.036	-0.013	-0.002
$BIAS_{i,t}$	10,312	0.012	-0.000	0.063	-0.005	0.008
$SPEC_{i,t}$	11,454	3.112	3.000	0.467	3.000	3.000
$FREQ_{i,t}$	3,662	4.586	4.000	3.952	3.000	8.000
$DIV\_RET_{i,t}$	10,312	0.034	0.036	0.188	-0.064	0.086
$TOP\_RET_{i,t}$	10,312	0.043	0.039	0.182	-0.076	0.095
$DIFRET_{i,t}$	10,312	-0.008	0.001	0.164	-0.061	0.063
$SUR_{i,t}$	10,312	0.017	0.011	0.018	0.002	0.027
$DISP_{i,t}$	10,312	0.407	0.428	0.381	0.041	0.705
$NUMANALYST_{i,t}$	10,312	13.707	12.000	8.748	7.000	19.000
$EARNVOL_{i,t}$	10,312	0.328	0.208	0.383	0.128	0.365
$SIZE_{i,t-1}$	10,312	8.000	7.904	1.551	6.945	9.015
$NUMSEG_{i,t}$	10,312	4.542	4.000	1.949	3.000	5.000
$NUMSEGGEO_{i,t}$	10,312	9.128	8.000	6.756	4.000	12.000
$RELATED_{i,t}$	10,312	0.205	0.200	0.122	0.142	0.333
$MTB_{i,t-1}$	10,312	3.037	2.412	2.429	1.667	3.539
$LOSS_{i,t}$	10,312	0.085	0.000	0.279	0.000	0.000
$NEWS_{i,t}$	10,312	0.524	1.000	0.499	0.000	1.000
$RD_{i,t}$	10,312	0.005	0.000	0.009	0.000	0.007
$HORIZON_{i,t}$	10,312	142.775	80.000	104.828	62.000	243.000
$ANNUAL_{i,t}$	10,312	0.593	1.000	0.491	0.000	1.000
$ICW_{i,t}$	2,980	0.060	0.000	0.252	0.000	0.000

Panel B: Variables for Accounting Errors Tests

	N	Mean	Median	Std Dev	Q1	Q3
$RES\_ERR_{i,t}$	4,024	0.105	0.000	0.305	0.000	0.000
$RES\_IRR_{i,t}$	3,646	0.005	0.000	0.637	0.000	0.000
$DIV\_RET_{i,t}$	4,024	0.025	0.022	0.243	-0.073	0.128
$TOP\_RET_{i,t}$	4,024	0.034	0.026	0.227	-0.068	0.139
$DIFRET_{i,t}$	4,024	-0.009	-0.004	0.191	-0.084	0.075
$BIGN_{i,t}$	4,024	0.928	1.000	0.245	1.000	1.000
$SIZE_{i,t}$	4,024	7.025	6.784	1.905	5.977	8.490
$NUMSEG_{i,t}$	4,024	4.261	4.000	1.707	3.000	5.000
$NUMSEGGEO_{i,t}$	4,024	9.137	7.000	6.756	4.000	12.000
$RELATED_{i,t}$	4,024	0.278	0.250	0.227	0.200	0.333
$LOSS_{i,t}$	4,024	0.191	0.000	0.393	0.000	0.000
$AUDITOP_{i,t}$	4,024	0.356	0.000	0.378	0.000	1.000
$SEO_{i,t}$	4,024	0.044	0.000	0.205	0.000	0.000
$ISSUANCE_{i,t}$	4,024	0.097	0.000	0.297	0.000	0.000
$MTB_{i,t}$	4,024	2.770	2.128	2.966	1.372	3.336
$ROA_{i,t}$	4,024	0.029	0.049	0.119	0.013	0.082
$LEV_{i,t}$	4,024	0.242	0.178	0.229	0.072	0.349
$PRE\_RES_{i,t}$	4,024	0.124	0.000	0.329	0.000	0.000

TABLE 3
The Correlation Coefficients among Variables

This table reports Pearson (on the upper-right) and Spearman (on the lower-left) correlations above and below the diagonal, respectively, for the three samples used in main empirical analyses. Panel A is for the tests of management forecast accuracy, bias and specificity. Panel B is for the test of management forecast frequency. Panel C is the test of accounting errors. The sample period is from 1994 to 2011 in Panel A and B and from 1997 to 2011 in Panel C. All variable definitions are given in Appendix A. The bold number is for a significance level of 0.05 or above.

Panel A: Correlation Coefficients for Variables in Management Forecast Accuracy, Bias and Specificity Tests

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
$ACCURACY_{i,t}$ (1)		**-0.645**	**0.092**	**-0.111**	**-0.131**	**-0.031**	**-0.098**	**0.076**	**0.030**	**-0.228**	**0.139**	-0.002	**-0.048**	**0.041**	**0.143**	**-0.266**	**0.036**	**-0.125**	**-0.174**	**-0.150**
$BIAS_{,t}$ (2)	**-0.339**		**0.078**	**0.080**	**0.113**	**-0.034**	**-0.068**	**-0.106**	**-0.057**	**0.126**	**-0.091**	**-0.041**	**0.025**	-0.014	**-0.118**	**0.185**	**-0.018**	**0.058**	**0.066**	**0.035**
$SPEC_{i,t}$ (3)	**0.211**	**0.033**		**-0.068**	**-0.084**	**-0.049**	-0.018	0.003	**0.086**	0.006	**0.067**	-0.007	0.004	0.003	**0.061**	**-0.033**	-0.010	**-0.021**	**-0.029**	0.000
$DIV\_RET_{i,t}$ (4)	**-0.098**	**0.073**	**-0.064**		**0.608**	**0.430**	**-0.039**	**-0.058**	**-0.061**	**0.087**	**-0.171**	**-0.053**	-0.015	-0.009	**-0.166**	**0.205**	-0.002	**0.145**	**-0.024**	**-0.054**
$TOP\_RET_{i,t}$ (5)	**-0.106**	**0.106**	**-0.073**	**0.556**		**-0.415**	-0.007	-0.032	**-0.087**	**0.070**	**-0.210**	**-0.033**	-0.005	**-0.019**	**-0.178**	**0.149**	-0.005	**0.148**	**-0.026**	**-0.043**
$DIFRET_{i,t}$ (6)	**-0.037**	**-0.030**	**-0.051**	**0.409**	**-0.398**		**-0.038**	**-0.032**	**0.027**	**0.022**	**0.038**	-0.005	-0.009	-0.007	0.008	**0.067**	0.003	0.002	0.002	-0.014
$SUR_{i,t}$ (7)	**-0.089**	**-0.064**	**-0.050**	**-0.031**	-0.005	**-0.035**		**0.348**	**0.025**	**0.056**	**0.056**	**0.104**	**0.079**	**-0.049**	**-0.060**	**-0.054**	0.011	**-0.026**	**0.050**	**0.212**
$DISP_{i,t}$ (8)	**0.098**	**-0.021**	0.003	**-0.056**	**-0.029**	**-0.035**	**0.548**		**0.105**	**-0.043**	**0.136**	**0.059**	**0.068**	**-0.038**	**0.021**	**-0.111**	-0.018	**-0.060**	**-0.022**	-0.011
$NUMANALYST_{i,t}$ (9)	**0.030**	**-0.057**	**0.086**	**-0.058**	**-0.086**	**0.026**	**0.025**	**0.105**		**0.036**	**0.645**	**0.117**	**0.097**	**-0.101**	**0.219**	-0.006	-0.007	**0.063**	-0.025	**-0.050**
$EARNVOL_{i,t}$ (10)	**-0.235**	**0.126**	0.005	**0.081**	**0.070**	**0.025**	**0.052**	**-0.040**	**0.031**		**0.024**	**0.090**	**-0.013**	**-0.036**	**-0.062**	**0.265**	0.019	**0.090**	0.012	0.019
$SIZE_{i,t-1}$ (11)	**0.155**	**-0.112**	**0.066**	**-0.167**	**-0.206**	**0.036**	**0.052**	**0.139**	**0.667**	**0.022**		**0.319**	**0.179**	**-0.159**	**0.263**	**-0.182**	0.009	**-0.089**	0.017	**0.059**
$NUMSEG_{i,t}$(12)	**0.024**	**-0.019**	-0.009	**-0.043**	**-0.027**	-0.015	**0.106**	**0.058**	**0.144**	**0.014**	**0.367**		**0.197**	**-0.552**	**-0.022**	**-0.058**	-0.006	-0.016	0.013	**0.054**
$NUMSEGGEO_{i,t}$ (13)	**-0.012**	0.011	0.002	-0.002	-0.009	0.007	**0.057**	**0.033**	**0.092**	**-0.035**	**0.171**	**0.209**		**-0.426**	**0.040**	**0.038**	0.013	**0.207**	-0.016	**-0.024**
$RELATED_{i,t}$ (14)	**0.035**	-0.010	0.005	**-0.031**	-0.011	**-0.027**	**-0.038**	**-0.021**	**-0.091**	**-0.021**	**-0.111**	**-0.042**	**-0.081**		**-0.002**	**-0.054**	-0.004	**-0.104**	0.012	0.013
$MTB_{i,t-1}$ (15)	**0.143**	**-0.116**	**0.067**	**-0.157**	**-0.171**	0.007	**-0.061**	**0.021**	**0.227**	**-0.060**	**0.216**	**-0.022**	**0.041**	-0.002		**-0.058**	0.002	**-0.038**	**-0.015**	**-0.034**
$LOSS_{i,t}$ (16)	**-0.242**	**0.172**	-0.006	**0.198**	**0.137**	**0.061**	**-0.051**	**-0.119**	-0.006	**0.252**	**-0.167**	**-0.057**	**0.038**	**-0.054**	**-0.055**		-0.012	**0.272**	**-0.024**	**-0.083**
$NEWS_{i,t}$ (17)	**0.040**	-0.017	-0.014	-0.003	-0.003	0.003	0.001	-0.015	0.007	0.019	0.009	-0.016	0.013	-0.004	0.001	-0.010		**-0.019**	**-0.030**	0.010
$RD_{i,t}$ (18)	**-0.115**	**0.055**	-0.003	**0.135**	**0.143**	0.001	**-0.023**	**-0.057**	**0.058**	**0.085**	**-0.082**	-0.006	**0.207**	**-0.104**	**-0.034**	**0.225**	-0.018		**0.035**	**-0.098**
$HORIZON_{i,t}$ (19)	**-0.169**	**0.069**	**-0.029**	**-0.022**	**-0.024**	0.002	**0.046**	**-0.116**	**-0.025**	0.012	0.016	0.013	-0.016	0.011	-0.012	**-0.021**	**-0.030**	**0.033**		**0.594**
$ANNUAL_{i,t}$ (20)	**-0.128**	**0.037**	**0.002**	**-0.051**	**-0.041**	-0.013	**0.189**	-0.011	**-0.042**	0.015	**0.055**	**0.054**	**-0.024**	0.013	**-0.034**	**-0.084**	0.011	**-0.102**	**0.551**	

Panel B: Correlation Coefficients for Variables in Management Forecast Frequency Test

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
$FREQ_{i,t}$ (1)		**-0.095**	**-0.089**	**-0.062**	**0.147**	**0.241**	**0.151**	-0.014	0.216	**0.058**	0.025	**0.043**	**0.079**	**-0.113**	0.025	-0.116
$DIV\_RET_{i,t}$ (2)	**-0.111**		**0.575**	**0.465**	**-0.044**	**-0.108**	**-0.069**	**0.043**	-0.219	**-0.076**	**0.001**	**-0.051**	**-0.134**	**0.235**	-0.018	**0.256**
$TOP\_RET_{i,t}$ (3)	**-0.098**	**0.574**		**-0.421**	-0.025	**-0.106**	**-0.080**	0.014	**-0.230**	**-0.069**	-0.006	**-0.034**	**-0.129**	**0.196**	**-0.033**	**0.225**
$DIFRET_{i,t}$ (4)	**-0.054**	**0.392**	**-0.402**		-0.012	-0.006	0.004	**0.031**	**0.015**	0.001	0.005	**-0.018**	-0.013	**0.035**	0.013	**0.032**
$SUR_{i,t}$ (5)	**0.317**	**-0.084**	-0.072	-0.012		**0.145**	**-0.045**	**0.119**	-0.021	**0.082**	0.011	**0.066**	**-0.108**	**-0.003**	-0.018	-0.001
$DISP_{i,t}$ (6)	**0.390**	**-0.090**	-0.094	-0.002	**-0.049**		**0.095**	**-0.048**	**0.149**	**0.036**	0.009	**0.028**	**0.038**	**-0.224**	-0.012	**-0.161**
$NUMANALYST_{i,t}$ (7)	**0.198**	**-0.087**	-0.082	-0.008	**-0.102**	**-0.181**		0.009	**0.645**	**0.040**	**0.079**	**0.065**	**0.211**	**-0.050**	0.026	-0.002
$EARNVOL_{i,t}$ (8)	0.013	**-0.003**	**-0.029**	**0.033**	0.008	-0.015	0.023		**0.037**	**0.073**	**-0.037**	**0.066**	**-0.071**	**0.233**	0.020	**0.110**
$SIZE_{i,t-1}$ (9)	**0.235**	**-0.241**	-0.241	0.010	**-0.215**	**0.176**	**0.651**	**0.143**		**0.291**	**0.154**	**0.243**	**0.252**	**-0.285**	**0.036**	**-0.242**
$NUMSEG_{i,t}$ (10)	**0.058**	**-0.079**	-0.075	0.008	**0.097**	**0.029**	0.011	**0.159**	**0.261**		**0.153**	**-0.098**	**-0.121**	**-0.119**	**0.001**	**-0.098**
$NUMSEGGEO_{i,t}$ (11)	**0.025**	0.008	0.006	-0.008	**0.024**	**0.039**	**0.074**	-0.011	**0.147**	**0.123**		**0.156**	0.001	**0.012**	0.024	**0.187**
$RELATED_{i,t}$ (12)	**0.043**	**-0.055**	-0.049	**-0.023**	**0.068**	0.007	**0.029**	**0.131**	**0.226**	**-0.069**	**-0.054**		**-0.093**	**-0.077**	0.018	**-0.031**
$MTB_{i,t-1}$ (13)	**0.115**	**-0.220**	-0.197	-0.021	**-0.149**	**0.092**	**0.284**	**-0.193**	**0.325**	**-0.152**	0.043	**-0.128**		**-0.090**	**0.041**	**-0.095**
$LOSS_{i,t}$ (14)	**-0.074**	**0.233**	**0.195**	**-0.036**	**0.188**	**-0.133**	**-0.059**	**-0.221**	**-0.277**	**-0.121**	0.017	**-0.085**	**-0.183**		-0.021	0.423
$NEWS_{i,t}$ (15)	0.009	**-0.034**	-0.031	-0.001	0.015	-0.019	0.026	0.004	**0.040**	-0.005	0.021	0.012	**0.071**	-0.018		-0.002
$RD_{i,t}$ (16)	**-0.116**	**0.171**	0.164	0.009	**-0.094**	0.009	**0.072**	-0.014	**-0.142**	**-0.095**	**0.349**	-0.021	**0.076**	**0.297**	0.024	

Panel C: Correlation Coefficients for Variables in Accounting Errors Test

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
$RES\_ERR_{i,t}$ (1)			**0.037**	0.015	**0.035**	**-0.035**	**-0.038**	**0.062**	-0.004	0.008	**0.099**	**-0.031**	**0.043**	-0.006	-0.022	**-0.100**	0.050	**0.582**
$RES\_IRR_{i,t}$ (2)			**-0.035**	**-0.029**	0.009	**-0.031**	0.012	**0.026**	**0.027**	0.018	**0.027**	**0.035**	**-0.043**	**0.082**	-0.006	**-0.031**	0.018	**0.367**
$DIV\_RET_{i,t}$ (3)	**0.054**	-0.020		**0.525**	**0.499**	**-0.056**	**-0.185**	**-0.042**	**-0.057**	**-0.033**	**0.217**	**0.025**	-0.009	**-0.039**	**-0.096**	**-0.238**	**0.116**	0.016
$TOP\_RET_{i,t}$ (4)	0.009	-0.021	**0.524**		-0.442	**-0.039**	**-0.181**	-0.008	**-0.051**	**-0.041**	**0.197**	0.008	-0.025	-0.019	**-0.084**	**-0.202**	**0.081**	0.014
$DIFRET_{i,t}$ (5)	**0.031**	0.009	**0.434**	**-0.411**		-0.012	0.005	**0.032**	-0.009	**-0.027**	0.027	0.017	0.015	-0.023	-0.015	**-0.035**	**0.042**	0.005
$BIGN_{i,t}$ (6)	**-0.034**	**0.031**	**-0.075**	**-0.045**	-0.021		**0.312**	**0.086**	**0.085**	**0.062**	**-0.131**	**-0.081**	0.009	0.001	**0.055**	**0.137**	-0.010	-0.032
$SIZE_{i,t}$ (7)	**-0.051**	0.009	**-0.202**	**-0.200**	0.007	**0.288**		**0.314**	**0.233**	**0.098**	**-0.340**	**-0.069**	**0.008**	-0.041	**0.331**	**0.398**	**-0.278**	-0.028
$NUMSEG_{i,t}$ (8)	**0.065**	0.021	**-0.049**	-0.022	-0.028	**0.103**	**0.285**		**0.204**	**-0.042**	**-0.054**	**-0.055**	0.013	**-0.043**	0.018	**0.034**	**0.053**	**0.075**
$NUMSEGGEO_{i,t}$ (9)	0.008	0.009	-0.031	-0.029	0.003	**0.100**	**0.243**	**0.206**		-0.024	-0.005	**-0.184**	0.026	0.023	**0.045**	**0.032**	**-0.062**	0.017
$RELATED_{i,t}$ (10)	0.013	0.011	-0.030	-0.039	-0.023	**0.061**	**0.091**	**-0.032**	-0.022		0.016	-0.014	-0.010	0.024	0.031	-0.020	**-0.081**	**0.043**
$LOSS_{i,t}$ (11)	**0.099**	0.005	0.222	0.199	0.013	**-0.131**	**-0.320**	**-0.054**	-0.000	**0.058**		**-0.039**	-0.010	0.002	**-0.138**	**-0.693**	**0.271**	**0.082**
$AUDITOP_{i,t}$ (12)	**-0.031**	-0.021	0.027	0.005	0.023	**-0.081**	**-0.078**	**-0.071**	**-0.203**	-0.017	**-0.038**		**-0.041**	0.010	**0.059**	**0.068**	**-0.069**	**-0.090**
$SEO_{i,t}$ (13)	**0.043**	-0.031	-0.006	-0.024	0.013	0.009	-0.000	**0.027**	**0.019**	-0.021	-0.010	**-0.041**		0.003	0.022	-0.030	**0.044**	**0.048**
$ISSUANCE_{i,t}$ (14)	-0.004	-0.006	-0.029	-0.014	-0.023	0.001	**-0.043**	-0.025	0.015	0.032	0.003	0.010	0.003		-0.006	-0.004	**-0.045**	-0.025
$MTB_{i,t}$ (15)	**-0.043**	0.029	**-0.182**	**-0.159**	-0.019	**0.105**	**0.499**	**0.059**	**0.078**	0.019	**-0.252**	**0.068**	0.013	0.016		**0.205**	**-0.260**	-0.041
$ROA_{i,t}$ (16)	**-0.135**	**-0.046**	-0.284	-0.234	-0.035	**0.113**	**0.402**	-0.004	0.014	-0.013	**-0.661**	**0.065**	**-0.066**	-0.010	**0.449**		**-0.306**	**-0.064**
$LEV_{i,t}$ (17)	**0.050**	0.032	0.113	0.071	0.026	0.021	**-0.176**	**0.079**	**-0.054**	-0.027	**0.181**	**-0.077**	**0.059**	-0.028	**-0.407**	**-0.445**		0.024
$PRE\_RES_{i,t}$ (18)	**0.582**	**0.368**	0.029	0.012	0.007	**-0.033**	**-0.038**	**0.079**	**0.036**	0.016	**0.082**	**-0.090**	**0.048**	-0.021	**-0.038**	**-0.112**	0.025	

TABLE 4
Validation Tests of the Internal Information Asymmetry (IIA) Measure: Division-level Analysis

This table presents results testing the relation between the empirical measure of internal information asymmetry (*DIFRET*) at the *division* level, and the two proxies for the information environment of the division. One proxy is the standard deviation of *divisional* return-on-assets for Division *j*, firm *i*, and year *t* ($STDROA_{i,j,t}$) measured over the recent three years (t=0, -1 and -2 years) in Column (1) and the other proxy is the natural logarithm of the average number of public firms in the same industry of two-digit SIC code as Division *j* (*NUMPEER*) over the recent three years in Column (2). *DV* refers to the dependent variable, *DIFRET*, in each column. The division level data are hand collected for S&P1500 firms from 1994 to 2011. The detailed hand-collection procedure is described in Appendix C. The calculation of division-level *DIFRET* follows the procedure of firm-level *DIFRET*. That is, we require (1) the specific divisional managers have at least three opportunistic trades in the recent three years; and (2) the firm's top managers also have at least three opportunistic insider trades in the recent three years. Divisional *DIFRET* is the difference between this divisional manager's trading profitability and that of top managers. All other control variables measured at the firm-level as defined in Appendix A. The t-values are based on the standard errors clustered by firm. *,**,*** denote significance at the 0.10, 0.05, and 0.01 levels, respectively.

	DV = $\boldsymbol{DIFRET_{i,j,t}}$ (for Division *j* of firm *i*)			
	(1)		(2)	
	Est. Coeff.	t-Stat	Est. Coeff.	t-Stat
Intercept	0.100	0.50	0.343*	1.92
$STDROA_{i,j,t}$	0.162**	2.53		
$NUMPEER_{i,j,t}$			-0.015*	-1.93
$SIZE_{i,t-2}$	-0.007	-0.24	-0.039*	-1.69
$MB_{i,t-2}$	-0.019**	-2.30	-0.003	-1.45
$NUMANALYST_{i,t-2}$	-0.001	-0.06	-0.006	-0.28
$RD_{i,t-2}$	-0.472	-1.19	0.037	1.25
$LEV_{i,t-2}$	0.024	0.70	0.006	0.65
$NUMSEG_{i,t-2}$	0.017	0.96	0.010	0.72
$RELATED_{i,t-2}$	-0.018	-0.88	-0.016	-0.89
Firm fixed effects	YES		YES	
Year fixed effects	YES		YES	
Adj. R^2	0.299		0.228	
N	1,335		1,632	

TABLE 5
Internal Information Asymmetry and Management Forecast Attributes

This table presents evidence on the relation between the empirical measure of internal information asymmetry and management forecast accuracy in Column (1), forecast bias in Column (2), forecast specificity in Column (3) and forecast frequency in Column (4). *DV* refers to the dependent variable in each column. The sample period is from 1994 to 2011. All regressions control for firm and year fixed effects. All variables are defined in Appendix A. The t-values are based on the standard errors clustered by firm. *,**,*** denote significance at the 0.10, 0.05, and 0.01 levels, respectively.

	DV = ***ACCURACY*** (1)		DV = ***BIAS*** (2)		DV= ***SPEC*** (3)		DV= ***FREQ*** (4)	
	Est. Coeff.	t-Stat	Est. Coeff.	t-Stat	Est. Coeff.	t-Stat	Est. Coeff.	t-Stat
Intercept	-0.104***	-5.35	0.017	0.71	3.339***	28.64	-0.093	-0.38
$DIFRET_{i,t}$	-0.016**	-2.58	-0.028**	-2.11	-0.043**	-1.98	-0.057**	-2.21
$SUR_{i,t}$	-0.108***	-2.68	-0.069	-1.30	-0.489	-1.59	3.403***	4.45
$DISP_{i,t}$	0.003*	1.73	0.001	0.64	-0.003	-0.25	0.120***	5.14
$NUMANALYST_{i,t}$	-0.001*	-1.74	0.001**	2.28	0.002	0.86	0.004	1.55
$EARNVOL_{i,t}$	0.007	0.79	-0.015*	-1.68	-0.008	-0.46	-0.030	-0.90
$SIZE_{i,t-1}$	0.014***	5.18	-0.004	-1.10	0.016	1.00	0.090***	2.81
$NUMSEG_{i,t}$	0.000	0.15	-0.000	-0.42	-0.001	-0.39	-0.012	-0.57
$NUMSEGGEO_{i,t}$	-0.000	-0.75	0.000	0.72	0.008	0.59	-0.001	-0.14
$RELATED_{i,t}$	0.023	1.19	-0.018	-0.85	-0.008	-0.40	0.017	0.63
$MTB_{i,t-1}$	0.001***	2.70	-0.001***	-3.13	0.001	0.30	0.006	1.28
$LOSS_{i,t}$	-0.014***	-4.25	0.015***	3.26	-0.034*	-1.86	-0.069	-1.57
$NEWS_{i,t}$	0.002**	2.36	-0.002**	-2.17	0.004	0.53	-0.011	-0.32
$RD_{i,t}$	-0.108	-0.66	0.176	0.78	0.117	0.14	-0.103	-0.07
$HORIZON_{i,t}$	-0.000***	-8.43	0.000***	5.79	-0.000	-0.70	--	--
$ANNUAL_{i,t}$	-0.009***	-4.97	0.007***	2.67	-0.022	-1.20	--	--
Firm fixed effects	YES		YES		YES		YES	
Year fixed effects	YES		YES		YES		YES	
$Adj.R^2$	0.420		0.601		0.210		0.531	
N	10,312		10,312		11,454		3,662	

TABLE 6
Internal Information Asymmetry and Accounting Restatement Probability

This table presents evidence on the relation between the empirical measure of internal information asymmetry and the likelihood of an accounting restatement due to errors in Column (1), and the likelihood of an accounting restatement due to irregularities in Column (2). *DV* refers to the dependent variable in each column. The sample period is from 1997 to 2011. All regressions control for industry and year fixed effects. All variables are defined in Appendix A. The z-values are based on the standard errors clustered by firm. *,**,*** denote significance at the 0.10, 0.05, and 0.01 levels, respectively.

	DV = ***RES_ERR*** (1)		DV = ***RES_IRR*** (2)	
	Est. Coeff.	z-Stat	Est. Coeff.	z-Stat
Intercept	-3.125***	-5.10	-8.010***	-4.83
$DIFRET_{i,t}$	0.819**	2.09	-0.421	-0.53
$BIGN_{i,t}$	-0.336	-0.99	0.655	0.56
$SIZE_{i,t}$	0.023	0.43	0.249**	2.14
$NUMSEG_{i,t}$	0.066	0.82	0.176	0.98
$NUMSEGGEO_{i,t}$	-0.010	-0.75	0.018	0.68
$RELATED_{i,t}$	0.015	0.18	-0.125	-0.64
$LOSS_{i,t}$	0.209	0.93	0.683	1.36
$AUDITOP_{i,t}$	-0.008	-0.04	0.001	0.00
$SEO_{i,t}$	0.281	1.07	1.329**	2.57
$ISSUANCE_{i,t}$	0.265	1.00	-1.001	-1.07
$MTB_{i,t}$	0.000	-0.01	-0.012*	-1.83
$ROA_{i,t}$	-0.975	-1.45	-0.475	-0.88
$LEV_{i,t}$	0.148	0.47	-0.975*	-1.69
$PRE\_RES_{i,t}$	3.763***	21.64	4.491***	9.65
Industry fixed effects	YES		YES	
Year fixed effects	YES		YES	
Pseudo R^2	0.391		0.333	
N	4,024		3,646	

TABLE 7
Internal Information Asymmetry Measure based on Insiders' Routine Trades

This table presents the main results when internal information asymmetry (IIA) is measured using insiders' routine trades. Panel A reports the effect of IIA on the attributes of management earnings forecast and Panel B reports the likelihood of error-driven restatements. The sample periods are 1994-2011 in Panel A and from 1997 to 2011 in Panel B. All variables are defined in Appendix A. The t-values/z-values are based on the standard errors clustered by firm. *,**,*** denote significance at the 0.10, 0.05, and 0.01 levels, respectively.

Panel A: Management Earnings Forecast Attributes

	DV =***ACCURACY***	DV = ***BIAS***	DV=***SPEC***	DV=***FREQ***
	(1)	(2)	(3)	(4)
$DIFRET\_ROUTINE_{i,t}$	0.002	-0.007	-0.617	-0.691
	(0.24)	(-0.42)	(-1.16)	(-1.36)
Control	YES	YES	YES	YES
Firm fixed effects	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES
Adj.R^2	0.545	0.526	0.511	0.574
N	1,547	1,547	1,786	693

Panel B: Error-Driven Restatement Likelihood

	DV =***RES_ERR***
$DIFRET\_ROUTINE_{i,t}$	2.421
	(0.62)
Control	YES
Industry fixed effects	YES
Year fixed effects	YES
Pseudo R^2	0.694
N	544

TABLE 8
Changes in Internal Information Asymmetry (IIA) surrounding the Changes in Instrumental Variables

This table presents the changes in internal information asymmetry surrounding the changes in flight time due to the addition (reduction) of new (old) flights, and the changes in *GARMAISE* index due to State laws changes. Specifically, we have 78 (39) flight time decreases (increases), which correspond to 111 (52) division managers. A flight time change is required to exceed at least 100 flying minutes. Appendix B describes the measure of flight time. For *GARMAISE* index, we have one decline in *GARMAISE* index in 1994 in Texas and one increase in *GARMAISE* index in 1996 in Florida (see *GARMAISE* 2011), which correspond to 68 and 25 division managers. The internal information asymmetry (IIA), *DIFRET*, is measured at the division level by using the trading profit of the specific divisional managers who are affected by these events relative to the trading profit of top managers in the same firm. *POST*=0 (1) refers to three years before (after) the events. The univariate and multivariate analysis are presented in Panel A and Panel B, respectively. Variables are defined in Appendix A.

Panel A: Univariate analysis

Variable=	Flight Time Decrease (n= 111 pairs)		Flight Time Increase (n= 52 pairs)		*GARMAISE* Index Decrease (n= 68 pairs)		*GARMAISE* Index Increase (n= 25 pairs)	
DIFRET	Mean	Median	Mean	Median	Mean	Median	Mean	Median
POST=0	-0.010	0.001	-0.012	-0.006	0.010	0.001	-0.016	-0.010
POST=1	-0.028	-0.019	0.021	0.018	-0.062	-0.040	0.028	0.035
P-value for difference	0.017**	0.011**	0.072*	0.081*	0.001***	0.015**	0.089*	0.188

Panel B: Multivariate analysis

	DV = ***DIFRET*** (1) Flight Time Decrease		DV = ***DIFRET*** (2) Flight Time Increase		DV= ***DIFRET*** (3) *GARMAISE* Index Decrease		DV= ***DIFRET*** (4) *GARMAISE* Index Increase	
	Est. Coeff.	t-Stat	Est. Coeff.	t-Stat	Est. Coeff.	t-Stat	Est. Coeff.	t-Stat
Intercept	0.295***	1.50	-0.086	-0.53	-0.859	-1.25	0.072	0.31
$POST_{i,t}$	-0.029**	-2.18	0.031*	1.81	-0.053*	-1.92	0.045	1.39
$SIZE_{i,t}$	-0.063**	-1.99	0.017	0.64	0.018	0.34	-0.009	-0.19
$BM_{i,t}$	-0.010	-0.11	0.054	0.57	0.992*	1.97	0.054	0.42
$NUMANALYST_{i,t}$	0.054	1.54	0.003	0.08	0.023	0.68	0.003	0.05
$RD_{i,t}$	0.468	0.68	-0.067	-0.61	0.891	0.96	-1.148	-1.00
$LEV_{i,t}$	-0.004	-0.31	-0.006	0.46	0.042	0.88	0.065	0.63
$NUMSEG_{i,t}$	0.042*	1.88	-0.020	-1.03	0.031	0.78	-0.004	-0.04
$RELATED_{i,t}$	-0.067	-1.55	0.039	1.35	-0.077	-0.93	-0.024	-0.23
$Adj.R^2$	0.098		0.115		0.133		0.178	
N	216		100		128		46	

TABLE 9

quares Estimation of the Effect of Internal Information Asymmetry on Management Earnings Forecast Attributes and Error-Driven Restatements

LS estimation of the relation between internal information asymmetry and management forecast accuracy and management forecast ent forecast specificity and management forecast frequency in Panel B; and error-driven restatement probability in Panel C. *DV* refers n each column. In the first stage, *DIFRET* is modeled using two instrument variables (IVs): the average flight time (*FLIGHT_TIME*) index (*GARMAISE*) based on Garmaise (2011) for the division managers. The sample periods are from 1994 to 2011 in Panel A and el B. All variables are defined in Appendix A. The t-values/z-values are based on Huber-White-Sandwich standard error. *,**,*** 0.10, 0.05, and 0.01 levels, respectively.

ement Forecast Accuracy and Bias

	First Stage (DV = ***DIFRET***)		Second Stage (DV= ***ACCRUACY***)		Second Stage (DV = ***BIAS***)	
	Est. Coeff.	t-Stat	Est. Coeff.	z-Stat	Est. Coeff.	z-Stat
	-0.151***	-3.86	-0.015	-1.29	-0.028***	-2.68
			-0.033**	-2.13	-0.085**	-2.33
	0.008***	2.83				
	0.004**	2.12				
	-0.239	-1.45	-0.118**	-2.37	-0.267**	-2.51
	-0.012	-1.62	0.005**	2.39	-0.008*	-1.86
	-0.001	-1.13	-0.000**	-2.31	-0.000	-0.08
	0.015	1.60	-0.014***	-3.34	0.014**	2.15
	0.010**	2.12	0.005***	4.04	0.000	-0.04
	-0.002	-0.55	0.001	0.82	-0.002	-1.50
	0.001	1.29	-0.001*	-1.82	0.001	1.36
	-0.003	-0.52	-0.001	-1.05	0.002	1.00
	0.001	0.57	0.001***	3.92	-0.003***	-2.90
	0.041***	3.66	-0.028***	-6.30	0.035***	4.16
	0.003	1.01	0.002***	2.84	-0.002	-1.58
	0.117	0.31	-0.246**	-2.03	0.235	1.04
	0.000	0.25	0.000***	-7.44	0.000***	3.45
	-0.001	-0.10	-0.009***	-4.91	0.009***	2.73
	YES		YES		YES	
	YES		YES		YES	

First Stage Cragg and Donald Test (F-stat, p-value)	(12.098, 0.00)		
Over-Identification Test (Chi-Square, p-value)	(1.690, 0.32)		(0.256, 0.61)
Adj.R^2	0.128	0.209	0.355
N	10,312	10,312	10,312

Panel B: Management Forecast Specificity and Frequency

	First Stage (DV = ***DIFRET***)		Second Stage (DV= ***SPEC***)		First Stage (DV = ***DIFRET***)		Second Stage (DV= ***FREQ***)	
	Est. Coeff.	t-Stat	Est. Coeff.	z-Stat	Est. Coeff.	t-Stat	Est. Coeff.	z-Stat
Intercept	-0.135***	-3.48	3.354***	12.78	-0.098	-1.35	0.611**	2.24
$DIFRET_{i,t}$			-0.257*	-1.92			-0.103**	-2.16
$FLIGHT\_TIME_{i,t}$	0.006**	2.55			0.005**	2.25		
$GARMAISE_{i,t}$	0.003**	2.05			0.004*	1.85		
$SUR_{i,t}$	-0.058	-0.35	-0.909	-1.52	-0.627*	-1.85	6.094***	3.22
$DISP_{i,t}$	0.001	0.30	-0.001	-0.05	-0.013	-1.04	0.299***	5.41
$NUMANALYST_{i,t}$	-0.000	-0.25	0.003	1.33	0.000	0.05	0.000	0.01
$EARNVOL_{i,t}$	0.009	0.91	0.057	1.47	0.011	0.90	0.010	0.19
$SIZE_{i,t-1}$	0.007	1.52	0.029	1.63	0.003	0.68	0.065***	3.26
$NUMSEG_{i,t}$	0.003	0.70	0.005	0.38	0.005	1.11	-0.001	-0.06
$NUMSEGGEO_{i,t}$	0.000	0.43	-0.002	-0.66	0.001	0.75	-0.002	-0.45
$RELATED_{i,t}$	-0.007	-1.33	-0.023	-1.04	-0.008	-1.20	0.022	0.67
$MTB_{i,t-1}$	-0.001	-0.91	0.000	0.02	0.000	-0.03	0.004	0.67
$LOSS_{i,t}$	0.000	-0.03	-0.044	-1.30	0.015	0.81	-0.040	-0.54
$NEWS_{i,t}$	0.006*	1.76	0.012	0.74	0.009	0.69	0.012	0.22
$RD_{i,t}$	0.977***	2.59	2.433	1.17	0.304	0.52	-3.076	-1.52
$HORIZON_{i,t}$	0.000	0.49	0.000	-0.66				
$ANNUAL_{i,t}$	-0.003	-0.50	-0.001	-0.06				
Industry fixed effects	YES		YES		YES		YES	
Year fixed effects	YES		YES		YES		YES	

First Stage Cragg and Donald Test (F-stat, p-value)	(11.179, 0.00)		(5.760, 0.00)	
Over-Identification Test (Chi-Square, p-value)	(0.068, 0.79)		(0.314, 0.58)	
Adj.R^2	0.131	0.189	0.108	0.396
N	11,454	11,454	3,662	3,662

Panel C: Error-Driven Accounting Restatements

	First Stage (DV = ***DIFRET***)		Second Stage (DV= ***RES_ERR***)	
	Est. Coeff.	t-Stat	Est. Coeff.	z-Stat
Intercept	-0.050	-1.22	0.154	0.88
$DIFRET_{i,t}$			0.823**	1.99
$FLIGHT\_TIME_{i,t}$	0.006**	2.14		
$GARMAISE_{i,t}$	0.004*	1.73		
$BIGN_{i,t}$	-0.012	-0.51	-0.033	-1.14
$SIZE_{i,t}$	0.005	1.48	0.005	0.91
$NUMSEG_{i,t}$	0.001	0.27	0.001	0.14
$NUMSEGGEO_{i,t}$	0.001	0.84	0.000	0.16
$RELATED_{i,t}$	-0.007	-1.35	0.000	0.00
$LOSS_{i,t}$	0.004	0.27	0.014	0.65
$AUDITOP_{i,t}$	0.016	1.64	0.014	0.67
$SEO_{i,t}$	0.016	0.92	0.028	0.97
$ISSUANCE_{i,t}$	-0.018	-1.48	0.006	0.24
$MTB_{i,t}$	-0.001	-1.02	-0.001	-0.23
$ROA_{i,t}$	-0.060	-1.01	-0.111	-1.31
$LEV_{i,t}$	0.038*	1.68	0.050	1.08
$PRE\_RES_{i,t}$	-0.009	-0.66	0.521***	16.44
Industry fixed effects	YES		YES	

Year fixed effects	YES		YES
First Stage Cragg and Donald Test (F-stat, p-value)		(7.039, 0.00)	
Over-Identification Test (Chi-Square, p-value)		(1.267, 0.26)	
Adj.R^2	0.111		0.391
N	4,024		4,024

TABLE 10
Non-linear Relation between Internal Information Asymmetry and Management Earnings Forecast Attributes and Error-Driven Restatement Probability

This table presents the results of testing whether the effect of internal information asymmetry is non-linear. Panel A reports results of the effect of internal information asymmetry (*DIFRET*) on management forecast accuracy in Column (1), forecast bias in Column (2), forecast specificity in Column (3) and forecast frequency in Column (4). Panel B reports results of the effect of internal information asymmetry on error-driven restatement likelihood. DV refers to the dependent variable in each column. The indicator variable, *POS*, is coded as one for positive *DIFRET* and zero otherwise. *POS*=1 for 50.4% of the sample for management forecast accuracy test in Panel A, and 49.5% of the sample for the error-driven restatement test in Panel B. The sample periods are from 1994 to 2011 in Panel A and from 1997 to 2011 in Panel B. All variables are defined in Appendix A. The t-values/z-values are based on the standard errors clustered by firm. *,**,*** denote significance at the 0.10, 0.05, and 0.01 levels, respectively.

Panel A: Management Earnings Forecast Attributes

	DV = ***ACCURACY*** (1)		DV = ***BIAS*** (2)		DV=***SPEC*** (3)		DV=***FREQ*** (4)	
	Est. Coeff.	t-Stat	Est. Coeff.	t-Stat	Est. Coeff.	t-Stat	Est. Coeff.	t-Stat
Intercept	-0.094***	-5.43	0.008	0.36	3.435***	20.77	-0.131	-0.53
$DIFRET*POS_{i,t}$	-0.010**	-2.29	-0.040**	-2.09	-0.104**	-2.27	-0.072**	-2.03
$DIFRET_{i,t}$	-0.011*	-1.68	-0.011	-0.96	-0.020	-0.46	-0.017	-1.11
$POS_{i,t}$	-0.002	-1.12	0.003	1.35	-0.022	-1.29	-0.023	-1.07
$SUR_{i,t}$	-0.109***	-2.70	-0.069	-1.30	-1.233***	-3.09	3.722***	4.53
$DISP_{i,t}$	0.003*	1.66	0.002	0.73	0.010	0.67	0.128***	5.12
$NUMANALYST_{i,t}$	-0.001*	-1.68	0.001***	2.32	0.002	0.89	0.004	1.47
$EARNVOL_{i,t}$	0.007	0.76	-0.015*	-1.65	-0.030	-1.28	-0.031	-0.87
$SIZE_{i,t-1}$	0.014***	5.16	-0.004	-1.05	0.005	0.23	0.098***	3.06
$NUMSEG_{i,t}$	0.000	-0.12	0.001	0.34	0.006	-0.32	-0.011	-0.53
$NUMSEGGEO_{i,t}$	0.000	-0.80	0.001	0.78	0.003	0.66	-0.001	-0.15
$RELATED_{i,t}$	0.000	-0.17	-0.001	-0.28	-0.006	-0.23	0.016	0.59
$MTB_{i,t-1}$	0.001***	2.59	-0.001***	-2.98	0.001	0.29	0.007	1.27
$LOSS_{i,t}$	-0.015***	-4.28	0.015***	3.28	-0.028	-1.14	-0.070	-1.57
$NEWS_{i,t}$	0.002**	2.33	-0.002**	-2.13	-0.014	-1.45	-0.010	-0.30
$RD_{i,t}$	-0.107	-0.66	0.177	0.79	0.648	0.59	0.955	0.52
$HORIZON_{i,t}$	-0.000***	-8.43	0.000***	5.78	0.000	-1.26	--	--
$ANNUAL_{i,t}$	-0.009***	-4.94	0.008***	2.69	0.016	0.75	--	--
Firm fixed effects	YES		YES		YES		YES	
Year fixed effects	YES		YES		YES		YES	
$Adj.R^2$	0.420		0.603		0.210		0.539	
N	10,312		10,312		11,454		3,662	

Panel B: Error-Driven Accounting Restatements

DV =**RES_ERR**

	Est. Coeff.	z-Stat
Intercept	-1.094	-1.59
$DIFRET*POS_{i,t}$	0.648**	2.03
$DIFRET_{i,t}$	0.474	1.19
$POS_{i,t}$	0.086	0.40
$BIGN_{i,t}$	-0.370	-1.16
$SIZE_{i,t}$	0.018	0.32
$NUMSEG_{i,t}$	0.097	1.20
$NUMSEGGEO_{i,t}$	-0.010	-0.68
$RELATED_{i,t}$	-0.001	-0.01
$LOSS_{i,t}$	0.184	0.77
$AUDITOP_{i,t}$	0.012	0.06
$SEO_{i,t}$	0.305	1.10
$ISSUANCE_{i,t}$	0.275	1.02
$MTB_{i,t}$	0.001	0.04
$ROA_{i,t}$	-0.951	-1.42
$LEV_{i,t}$	0.278	0.82
$PRE\_RES_{i,t}$	3.669***	19.99
Industry fixed effects	YES	
Year fixed effects	YES	
Pseudo R^2	0.396	
N	4,024	

TABLE 11
The Effects of Internal Control Weakness (ICW) on the Relation between Internal Information Asymmetry and Management Earnings Forecast Attributes and Error-Driven Restatement Probability

This table presents the cross-sectional variation of main results in the firms' internal control weakness (ICW). Panel A presents the evidence on the relation between the empirical measure of internal information asymmetry (IIA) and management forecast accuracy in Column (1), forecast bias in Column (2), forecast specificity in Column (3) and forecast frequency in Column (4). DV refers to the dependent variable in each column. The sample periods are from 1994 to 2011 in Panel A and from 1997 to 2011 in Panel B. Panel B presents the relation between IIA and error-driven restatement likelihood. All variables are defined in Appendix A. The t-values/z-values are based on the standard errors clustered by firm. *,**,*** denote significance at the 0.10, 0.05, and 0.01 levels, respectively.

Panel A: Management Earnings Forecast Attributes

	DV =**ACCURACY** (1)		DV = **BIAS** (2)		DV=**SPEC** (3)		DV=**FREQ** (4)	
	Est. Coeff.	t-Stat	Est. Coeff.	t-Stat	Est. Coeff.	t-Stat	Est. Coeff.	t-Stat
Intercept	-0.109***	-4.77	0.033	1.11	2.790***	15.52	0.877***	2.93
$DIFRET*ICW_{i,t}$	-0.026***	-2.17	-0.025*	-1.86	-0.098	-0.45	-0.228**	-2.04
$DIFRET_{i,t}$	-0.010*	-1.71	-0.016*	-1.79	-0.100*	-1.76	-0.014	-0.20
$ICW_{i,t}$	-0.018***	-3.08	0.019***	2.96	-0.016	-0.51	-0.070	-1.49
$SUR_{i,t}$	-0.124***	-2.98	-0.035	-0.65	-0.620*	-1.90	3.541***	3.69
$DISP_{i,t}$	0.003**	1.97	0.000	0.22	0.002	0.17	0.097***	3.61
$NUMANALYST_{i,t}$	-0.000	-1.18	0.001**	2.16	0.005**	2.11	0.004	1.01
$EARNVOL_{i,t}$	0.009	0.92	-0.017*	-1.79	-0.007	-0.31	-0.025	-0.66
$SIZE_{i,t-1}$	0.014***	4.84	-0.005	-1.56	0.027	1.24	0.114***	2.96
$NUMSEG_{i,t}$	0.001	0.40	0.000	-0.12	0.002	0.11	0.005	0.21
$NUMSEGGEO_{i,t}$	-0.001	-1.13	0.001	1.18	0.000	0.07	0.005	0.99
$RELATED_{i,t}$	-0.002	-0.46	0.000	0.15	0.009	0.40	0.002	0.08
$MTB_{i,t-1}$	0.001**	2.37	-0.001***	-3.04	-0.004	-0.75	0.006	1.01
$LOSS_{i,t}$	-0.013***	-3.58	0.011**	2.52	-0.037	-1.62	-0.097**	-2.02
$NEWS_{i,t}$	0.001	1.49	-0.002*	-1.83	-0.009	-1.03	0.022	0.56
$RD_{i,t}$	-0.107	-0.58	0.203	0.80	0.370	0.40	1.123	0.54
$HORIZON_{i,t}$	-0.000***	-8.13	0.000***	5.33	0.000	-1.06	--	--
$ANNUAL_{i,t}$	-0.009***	-4.66	0.008***	2.80	0.003	0.15	--	--
Firm fixed effects	YES		YES		YES		YES	
Year fixed effects	YES		YES		YES		YES	
$Adj.R^2$	0.435		0.644		0.336		0.569	
N	8,479		8,479		9,024		2,980	

Panel B: Error-Driven Accounting Restatements

	DV =**RES_ERR**	
	Est. Coeff.	z-Stat
Intercept	-1.995**	-2.57
*DIFRET*ICW*$_{i,t}$	1.401**	2.01
DIFRET$_{i,t}$	0.126	0.25
ICW$_{i,t}$	0.100	0.32
BIGN$_{i,t}$	-0.244	-0.73
SIZE$_{i,t}$	0.010	0.15
NUMSEG$_{i,t}$	0.160*	1.78
NUMSEGGEO$_{i,t}$	-0.021	-1.28
RELATED$_{i,t}$	-0.028	-0.32
LOSS$_{i,t}$	0.111	0.41
AUDITOP$_{i,t}$	-0.114	-0.53
SEO$_{i,t}$	0.423	1.43
ISSUANCE$_{i,t}$	0.093	0.28
MTB$_{i,t}$	-0.018	-0.55
ROA$_{i,t}$	-1.763**	-2.32
LEV$_{i,t}$	0.079	0.19
PRE_RES$_{i,t}$	3.421***	17.26
Industry fixed effects	YES	
Year fixed effects	YES	
Pseudo R^2	0.406	
N	3,218	

TABLE 12
Sample Partition based on Trading Volumes of Top Executives and Division Managers

This table presents the effect of internal information asymmetry (IIA) on the attributes of management earnings forecast attributes (in Panel A) and the likelihood of error-driven restatements (in Panel B). The sample is divided into two subsamples based on the relative trading volume per person (in dollars) between top executives and division managers, i.e., average trading volume of top executives minus that of division managers. HIGH (LOW) group refers to those firm-years where the relative trading volume of top managers relative to divisional managers is higher (lower) than the sample median. The average trading volume is calculated based on all insider trades in the prior three years. The sample periods are 1994-2011 in Panel A and 1997-2011 in Panel B. All variables are defined in Appendix A. The t-values/z-values are based on the standard errors clustered by firm. *,**,*** denote significance at the 0.10, 0.05, and 0.01 levels, respectively.

Panel A: Management Earnings Forecast Attributes

	DV =***ACCURACY*** (1)		DV = ***BIAS*** (2)		DV=***SPEC*** (3)		DV=***FREQ*** (4)	
	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW
$DIFRET_{i,t}$	-0.028**	-0.004	-0.038**	-0.013	-0.055**	-0.042*	-0.048*	-0.074*
	(-2.72)	(-0.44)	(-2.36)	(-1.04)	(-2.05)	(-1.66)	(-1.67)	(-1.80)
Control	YES	YES	YES	YES	YES	YES	YES	YES
Firm fixed effects	YES	YES	YES	YES	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES	YES	YES	YES	YES
Adj.R^2	0.413	0.501	0.678	0.620	0.309	0.334	0.575	0.563
N	5,156	5,156	5,156	5,156	5,727	5,727	1,831	1,831

Panel B: Error-Driven Restatement Likelihood

	DV =***RES_ERR***	
	HIGH	LOW
$DIFRET_{i,t}$	0.610*	0.900*
	(1.76)	(1.66)
Control	YES	YES
Industry fixed effects	YES	YES
Year fixed effects	YES	YES
Pseudo R^2	0.419	0.396
N	2,012	2,012