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*). Numerous validation tests indicate that *DIFRET* indeed captures the information asymmetry between divisional managers and top managers. In our primary tests, we find that *DIFRET* is associated negatively with the accuracy, bias, specificity and frequency of management forecasts. Furthermore, the likelihood of error-driven accounting restatements increases with *DIFRET*. Our results thus suggest that external communication quality suffers when the information asymmetry between divisional managers and top managers is more severe.

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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 is dispersed 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.

We refer to the disparity in firm knowledge between corporate headquarters and divisional managers as internal information asymmetry (IIA). IIA arises when top managers possess significantly superior knowledge about their firms relative to divisional managers or divisional managers possess private information about firm value that top managers lack. The objective of this study is to develop a measure of IIA and examine its influence on a firm's external communication. External communication, particularly regarding earnings information (for example, voluntary earnings forecasts and mandatory 10-Ks), is cleared at the highest level within the firm before its release – the CFO, the CEO and the Board of Directors, who bear ultimate responsibility for its quality and veracity. 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.

Variation in internal information asymmetry between divisional managers and corporate managers (i.e., top executives) can arise for a number of reasons. Typically, top managers in conglomerate entities 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. However, division-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). The survey by Graham, Harvey and Rajgopal (2005) suggests that while top managers have more information about forthcoming corporate mergers and acquisitions, divisional managers have greater knowledge about internal investment opportunities. Finally, numerous factors can also hinder top managers' ability to extract, process and synthesize information from divisional managers. These factors include 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 2014).

Empirically, we require a measure that captures not just information uncertainty but the information asymmetry between divisional and corporate 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 signed 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. We focus on the signed IIA measure because we expect external communication quality to suffer more when top managers are at a greater informational disadvantage relative to divisional managers. Specifically, more positive *DIFRET,* that is, higher IIA according to our definition implies a weaker (stronger) relative information advantage for top (divisional) managers.[2]

The empirical exercise in our paper has three main parts. The first step consists of constructing *DIFRET* in a manner that faithfully captures the IIA between divisional and top managers. Second, we undertake multiple analyses to validate *DIFRET* as a measure of IIA. Third, we test for the influence of *DIFRET* on the properties of external communication.

In constructing *DIFRET*, we focus on insider trades that are more likely to be based on private information using the methodology in Cohen, Malloy and Pomorski (2012), and require that both divisional and top managers execute non-zero informed trades.[3] On average, top managers trade more profitably (4.4 percent) than divisional managers (3.6 percent), resulting in the average value of –1.1 percent for *DIFRET*. We next perform a number of tests, starting with division-level analyses and slowly progressing towards firm-level analyses, to validate and

[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.
[2] It is possible that unsigned IIA is relevant in some contexts. For example, firms with poor governance may exhibit larger magnitudes of IIA in either direction.
[3] We do not seek to imply that IIA is zero in firms in which either top or divisional managers (or both) do not execute informed insider trades. But we cannot measure IIA in such firms using *DIFRET*, since lack of trading does not necessarily imply lack of private information.

understand the determinants of *DIFRET*. Using division-level data, we find that *DIFRET* is higher for those divisions for which the IIA between divisional and top managers is likely to be higher. Specifically, *DIFRET* varies positively with the volatility of divisional ROA and negatively with the number of listed peer firms. Further, we expect IIA to be lower when top managers at corporate headquarters find it easier to physically travel to divisional locations (Giroud 2013). Consistent with this notion, we observe significant declines in *DIFRET* for divisions experiencing discrete reductions in the average flight time from corporate headquarters (*FLIGHT_TIME*) due to the addition of new flight routes. We expect that divisional managers' incentives to withhold information from top managers vary negatively with their outside career opportunities. As predicted, we observe that *DIFRET* decreases (increases) when there are discrete declines (increases) in the enforcement stringency of non-competition employment clauses, measured via the GARMAISE index. Among firms experiencing CEO turnovers, divisional managers are expected to be better informed relative to an incoming outsider CEO rather than an incoming insider CEO. We document that in the restricted sample of firms with CEO turnovers, *DIFRET* increases more for firms with new outsider CEOs, in contrast to firms with new insider CEOs. Finally, firm-year-level multivariate analyses reveal that *FLIGHT_TIME* and *GARMAISE* have positive effects on *DIFRET*, while market-to-book ratio and the number of geographical segments have a negative effect.

Turning to our primary analyses, we study the impact of *DIFRET* on properties of voluntary earnings forecasts and the restatement likelihood of financial reports. We observe that *DIFRET* is associated negatively with the accuracy, specificity, and frequency of management forecasts, implying poorer-quality voluntary disclosures when IIA is higher. In addition, firms characterized by higher *DIFRET* issue systematically more pessimistic forecasts, suggesting that corporate

managers unsure of the completeness and relative superiority of their information issue downwardly-biased forecasts. Turning to the second key aspect of external communication, we find that *DIFRET* is positively correlated with the probability of error-driven restatements of mandated financial statements. The results are consistent with financial statements being more prone to inaccuracies and errors when corporate managers lack access to information about the firm's constituent divisions. 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. The effect of *DIFRET* is economically significant. For example, a single standard deviation increase in *DIFRET* is associated with a decline of 0.33 percent points in forecast accuracy, which seems significant when one considers that mean accuracy has a magnitude of 1.60 percent. The marginal effect of *DIFRET* on error-driven restatements is 2.65 percent points, which seems significant relative to the unconditional frequency of error-related restatements of 10 percent.

We conduct a variety of robustness tests and additional analyses. 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*. In 2SLS estimation with *FLIGHT_TIME* and *GARMAISE* as instrumental variables, *DIFRET* continues to exhibit negative associations with external communication quality. *DIFRET*'s negative association with external communication quality is particularly pronounced when *DIFRET* is positive, that is, when divisional managers' private information about the firm exceeds that of the average top managers. Finally, upon partitioning the sample into two groups based on whether top managers execute more or fewer informed insider trades than divisional

managers, we find that the negative relation between *DIFRET* and external communication quality holds among both groups. Thus, our results cannot be explained by top managers trading less than divisional managers due to fear of litigation, regulatory intervention, etc.

The influence of information asymmetry between divisional and corporate managers on corporate policy has received considerable interest in the literature. A long line of analytical papers (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. (2014), present empirical evidence consistent with the relationship 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 contributes by highlighting that information asymmetry between divisional and top managers within a firm can induce information asymmetry between the firm and its external stakeholders.

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. Relatedly, Gallemore and Labro (2015) examine the relation between internal information quality and corporate tax avoidance, while Shroff (2017) finds that changes in GAAP affect the internal information environment and firm investment. Our paper contributes to this literature as well by focusing on the *relative* superiority of the information set of divisional versus top managers. Factors such as organizational complexity can contribute to higher *DIFRET*. However, the internal information asymmetry between divisional managers over top managers can

also vary dynamically, for example, with corporate events such as CEO turnovers.[4] The private information flows themselves may not be observable in all cases, but *DIFRET* captures its ex post revelation in the profitability of informed trades. Thus, *DIFRET* is a parsimonious measure summarizing the influence of many different sources into a signed and time-varying indicator of the internal information asymmetry between divisional and top managers.

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. (2014) 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 quality of external information environment in countries where subsidiaries operate is associated positively with investment responsiveness to growth opportunities. They conclude that high-quality external information environment ameliorates internal information asymmetry.

[4] 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.

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 et al. (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 in two important ways. First, we develop a measure that parsimoniously summarizes the influence of many different sources of information disparities across various managers into a time-varying indicator of IIA. Second, we test whether disclosure quality is adversely affected when internal information asymmetry is high. In this section and in all subsequent discussion, higher IIA refers in particular to the phenomenon of managers exercising the greatest control over disclosure policies and practices (i.e., top managers) being at

a greater informational disadvantage relative to divisional managers, on whom the top managers rely for information.

Management earnings forecasts

The properties of managers' voluntary disclosures arguably depend on the extent to which they 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. Moreover, when information flow from divisional managers is more restricted, top managers will experience greater difficulty estimating their firm's future earnings. To partially offset the increased probability of being inaccurate, we expect managers to issue less specific forecasts.[5]

Furthermore, the literature discusses managers' 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 low-balling (Skinner 1994; Soffer, Thiagarajan and Walther 2000; Matsumoto 2002; Richardson, Teoh and Wysocki 2004; Ke and Yu 2006). We expect that top managers will guide market expectations down to a greater extent when IIA is high, because they are less certain about the accuracy of their own forecasts and are particularly averse to appearing optimistic ex post. This implies that their earnings forecasts will be more pessimistic relative to eventually-realized earnings when IIA is high. Finally, given the costs of inaccuracy, top managers should be less willing to provide earnings guidance when they have difficulty in obtaining divisional information (Lennox and Park

[5] This is based on the assumption that managers care about accuracy in their voluntary disclosures. The assumption seems reasonable because the literature suggests that managers' human capital rises when their guidance is accurate (Zamora 2009), and suffers when it is inaccurate (Lee, Mastsunaga and Park 2012).

2006). This implies a lower frequency of management earnings forecasts in the presence of higher IIA. In summary, we predict that the accuracy, bias, specificity and frequency of management earnings forecasts are lower when IIA is higher.

Earnings restatements

We expect that internal information asymmetry influences the likelihood of accounting restatements. In its article titled "Lessons learned from our Review of Restatements", Ernst & Young AccountingLink (2012) points out with respect to revenue restatements: "…Companies increasingly made errors related to the allowance for doubtful accounts, including errors resulting from the use of an inappropriate reserve methodology (e.g., inappropriate aggregating receivables that are dissimilar in nature) or the use of flawed or incomplete facts." Specific knowledge about the behavior of receivables and payment patterns is likely to reside with divisions selling to their respective customers. Similarly, 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 top managers' access to divisional information can lead to estimations at the corporate level being based on information that is inaccurate, inappropriate or incomplete, generating errors in accounting statements that are eventually uncovered in future periods. To the extent that such errors are material, they will necessitate restatements.

Hennes, Leone and Miller (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).[6] Our arguments on the link between IIA and restatements apply primarily to error-related restatements. On the more egregious issue of restatements resulting from intentional misreporting by managers (that is, irregularities) the implications are more ambiguous. It is unclear whether high IIA has any bearing on top managers' incentives or ability to intentionally mislead stakeholders. Thus we leave this an open empirical question. In summary, we predict that IIA will be associated negatively with error-driven restatements, but refrain from forming an ex ante prediction on its association with irregularity-driven restatements.

III. Data, variables, and descriptive statistics

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 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

[6] The literature points to willful earnings misstatements motivated by executive incentives and capital market pressure. For example, Burns and Kedia (2006), Efendi, Srivastava and Swanson (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 pressure motivates companies to adopt more aggressive accounting policies leading to restatements.

asymmetry (denoted *DIFRET*), we further require at least three *opportunistic* insider trades by both headquarter managers and divisional managers in the previous three fiscal years, consistent with Cohen et al. (2012).[7] This 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 11,607 management earnings forecasts (including both quantitative and qualitative forecasts) for 2,248 firm-years and 711 unique firms. Among these management earnings forecasts, we use only quantitative earnings forecasts (10,924 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.[8] The sample for forecast frequency tests consists of 3,790 firm-year observations and 861 unique firms.

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.[9] 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 4,134 firm-year observations (918 unique firms), among which

[7] The identification of opportunistic trades is discussed in the next section as part of the construction of *DIFRET*.
[8] 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).
[9] Karpoff, Koester, Lee and Martin (2017) point out that the Audit Analytics database is useful for researchers who require a large dataset of restatement announcements. They also note that relatively few of the restatements covered by the Audit Analytics identify financial frauds. Thus, we acknowledge that the tests analyzing accounting irregularities may suffer from a lack of power.

409 firm-year observations (201 unique firms) have restatements due to accounting errors, 35 firm-year observations (20 unique firms) have accounting irregularities, and 3,690 firm-year observations (704 unique firms) 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*. We measure *DIFRET* using insider trading information for divisional managers and top managers. 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 et al. (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.[10,11] Similarly, $TOP\_RET_{i,t}$ represents the 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 titles: 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, IIA is higher and in particular, top managers' information advantage relative to divisional managers is weaker.

To construct *DIFRET*, we require that both divisional managers and top managers execute opportunistic or informed trades. This implies that the *DIFRET* sample excludes those firm-years for which there was no opportunistic trade by either divisional managers or top managers in the previous three years. While the lack of informed insider trades by any party does not necessarily imply a lack of private information, we omit these observations since we are unable to observe or quantifiably measure the private information.

[10] 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).
[11] We conduct robustness tests using 400 or 600 kilometers and the results are both quantitatively and qualitatively similar.

Measurement of voluntary disclosure properties

To test our prediction for management forecasts, 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 our prediction for accounting restatements, 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 0.036 and 0.044, respectively, for the management forecast sample. The average values are similar for the restatement sample (0.037 and 0.050 for *DIV_RET* and *TOP_RET*, respectively). 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 (-0.011 for both Panel A and Panel B).

Table 2 Panel C provides descriptive statistics for (a) the universe of conglomerate firm-years, (b) conglomerate firms that have at least one insider trade, (c) our sample of firm-years with positive *DIFRET* and (d) our sample of firm-years with negative *DIFRET*. This table illustrates how firm characteristics progressively change as we require more data on insider trades to arrive at our final sample of firms with *DIFRET*. Interestingly, the *DIFRET* sample firms (with both positive and negative *DIFRET*) have higher ROA, market-to-book, size, analyst following, and number of segments relative to both the larger samples. They also have lower earnings volatility, lower R&D relative to sales and lower loss frequency. The descriptive statistics indicate that firms with informed insider trading comprise larger, more established and "visible" firms that are also better-performing and have better growth opportunities. Within the *DIFRET* sample, firm-years with positive versus negative *DIFRET* have largely similar firm characteristics.

Table 3, Panel A reports correlations for the sample used to test the properties of management forecasts, while Panel B 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.

IV. Determinants and validation tests of the IIA measure−DIFRET

Before proceeding with hypothesis testing, we conduct four sets of analyses targeted at examining whether *DIFRET* exhibits variation consistent with it being a measure for IIA, as well as understanding the factors that contribute to this variation. The following analyses range progressively from those undertaken at the division level to those at the firm level.

Division level analysis

In the first analysis, we use division-level data to see how *DIFRET* for a specific division varies with that division's ROA volatility and industry information environment. Divisional *DIFRET* is measured as the difference between the insider trading profitability of managers of the specific division and the average insider trading profitability of top managers.

We expect that divisional managers have greater opportunities for withholding information from top managers when the division operates in a more volatile environment (Demsetz and Lehn 1985). Divisional *DIFRET* should thus exhibit a positive association with the division's ROA volatility. Further, Badertscher, Shroff and White (2013) argue that greater presence of publicly listed firms within an industry enriches the information environment and reduces uncertainty about all industry members, including those owned privately. Following their study, we measure the number of peers for a given division as the number of publicly traded firms from the same two-digit SIC industry as the division (*NUMPEER*). If publicly available industry information reduces the information advantage that divisional managers possess relative to top managers, we expect *DIFRET* to be associated negatively with *NUMPEER*.

We also examine a third variable, the size of the division relative to that of the firm. On the one hand, divisional managers' private information is likely to have a greater impact on firm value when their respective divisions are larger. This may lead to a positive (partial) effect on *DIFRET*, if divisional managers trade on private information that top managers do not possess. On the other hand, the more important a division is within a particular firm in terms of relative size, the more likely top managers are to invest in resources to access divisional managers' information. The (partial) effect of this would be to reduce *DIFRET*. Consequently, the sign of the association between *DIFRET* and the division's relative size is ambiguous and we leave it as an open empirical question.

Table 4 Panel A 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. Appendix C presents a detailed description of the data collection procedure at the divisional level. We include interacted firm-year fixed effects, implying that any significant coefficient we observe is identified from within-firm variation across divisions in a given year. Accordingly, we exclude control variables that would not vary across divisions within a specific firm-year, for example, firm characteristics such as size and market-to-book.

Columns (1) and (2) show that divisional ROA volatility (*STDROA*) is associated positively with *DIFRET* while *NUMPEER* is associated negatively with *DIFRET*, as expected. When *STDROA* and *NUMPEER* are both included in the regression (Column (3)), the results are similar. The evidence suggests that IIA is higher 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 IIA. We do not observe a significant

association between *DIFRET* and *Relative Size*, the relative size of the division, probably because of the potentially offsetting effects discussed above.

Shocks to flight distance and non-compete enforceability

Our second analysis is centered on two separate shocks to IIA. First, we examine whether *DIFRET* changes when flight times between headquarters and divisions exhibit discrete jumps due to the introduction of new airline routes or closure of existing ones. Flight time likely affects IIA because information acquisition costs generally vary positively with distance (Giroud 2013). Top managers can visit divisions more easily and more often when the flight time between headquarters and divisions is significantly shorter (Giroud 2013). On-site visits allow top managers to 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 with corporate headquarters when they are closer to it, because they believe that their efforts are more visible to top managers, and hence more likely to be rewarded (via promotions etc.). In contrast, 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. Therefore, we predict that *DIFRET* decreases (increases) after a discrete decrease (increase) in flight time.

In the second test, we examine whether *DIFRET* changes with changes in the enforceability of state-level non-competition employment contracts. 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. Thus, we predict that an increase (a decrease) in enforceability is associated with an increase (a decrease) in *DIFRET*. Non-compete contract enforceability is measured by the GARMAISE index (Garmaise 2011). *GARMAISE* is computed as the average GARMAISE index across the states where division managers are located.[12]

In computing *DIFRET*, we consider only those divisions that exist before and after the change in *FLIGHT_TIME* and *GARMAISE*. In each test, *DIFRET* is the difference in the mean insider trading profitability of managers of divisions existing both before and after the respective shock and that of top managers. Because firm-level characteristics such as size, book-to-market etc. tend to be "sticky", they are less likely to show any significant shift in the time-series across one year or be correlated with time-series exogenous variation in *FLIGHT_TIME* and *GARMAISE*. Hence we conduct univariate analysis to test the response of *DIFRET* to shocks to the above two variables.[13] Following Giroud (2013), we identify 92 significant flight time decreases and 54 significant flight time increases between a given division and headquarters since 1986, the first year when insider trading data became available.[14] These changes correspond to 132 and 71 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 38 and 34 division managers located in Texas and Florida, respectively.

[12] The index is an ordinal rank variable that ranges from 0 to 9, with 9 corresponding to highest enforceability. For division level analyses, *GARMAISE* refers to the GARMAISE index for the state where division managers are located. For firm level analyses, *GARMAISE* is computed as the average GARMAISE index across the states where division managers are located.

[13] Our results are robust to a multivariate regression analysis with all variables in Table 4 Panel D included.

[14] 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.

Table 4, Panel B presents the univariate results 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 (average decline = 193 minutes), mean *DIFRET* significantly declined from 0.024 to -0.068. The 0.09 decline in *DIFRET* represents 40 percent of the standard deviation of *DIFRET* in the sample. In the sample with flight time increases (average increase = 175 minutes), mean *DIFRET* increases significantly from -0.043 to 0.034. The 0.072 increase represents 28 percent of *DIFRET*'s standard deviation in that corresponding sample.

We also consider two separate samples partitioned on the sign of changes in *GARMAISE*. In the sample with a decline in the GARMAISE index from 5 to 3 (Texas), mean *DIFRET* decreases significantly from 0.004 to -0.077. The change represents 17.5 percent of the standard deviation of *DIFRET* in the sample. In the second sample, which experiences an increase in the GARMAISE index from 7 to 9 (Florida), mean *DIFRET* increases from -0.031 to 0.020. The change represents 15.7 percent of the standard deviation of *DIFRET* in the sample. In sum, geographical proximity between headquarters and divisions and non-compete enforceability both affect the internal information asymmetry measure.

CEO turnover analysis

Our third analysis focuses on CEO turnovers. We expect that relative to incumbent CEOs, new CEOs that are appointed from outside the firm (outsider CEO) possess less private information about the firm and its internal divisions, and even less so than new CEOs appointed from inside the firm (insider CEO). Thus, we predict that within the sample of firms experiencing CEO turnover, those with outsider CEOs exhibit a larger increase in *DIFRET* than those with insider CEOs.

Following Huson, Malatesta and Parrino (2004), we classify new CEOs who have been with their firms for one year or less at the time of their appointments as outsiders and the rest as insiders. Table 4 Panel C reports the results of univariate tests that compare *DIFRET* before the CEO turnover to that after.[15] 88 CEO turnovers involve incoming outsider CEOs, and 264 involve incoming insider CEOs. For the 88 CEO turnovers with incoming outsider CEOs, mean *DIFRET* increases from -0.047 to 0.026.[16] The 0.076 increase in *DIFRET* represents 28.9 percent of the standard deviation of *DIFRET* for the corresponding sample, and is statistically significant at the 5 percent level. In contrast, for the 264 turnovers with incoming insider CEOs, mean *DIFRET* declines from 0.018 to -0.021; the decline is significant at the 10 percent level. Overall, the evidence with CEO turnovers indicates that *DIFRET* rises when information asymmetry between divisional managers and incoming CEOs is likely to be high.

Firm level analysis

As the final exercise in Table 4, we conduct firm-level analysis to explore the economic determinants of *DIFRET* at the firm level. In this analysis, we include *FLIGHT_TIME*, *GARMAISE* and firm-level characteristics. The firm level characteristics include ROA, market-to-book ratio (*MTB*), size, number of analysts, earnings volatility, dispersion in analysts' forecasts, number of segments, relatedness of segments and R&D intensity. We do not include the division-level variables (divisional ROA volatility and the number of publicly listed firms in the industry), or the nature of the CEO turnover, as these would drastically reduce the sample size.

[15] Our results are robust to a multivariate regression analysis with all variables in Table 4 Panel D included.

[16] We also check the robustness of our results by calculating *DIFRET_CEO* by the trading profit between the CEO and divisional managers, as opposed to top managers and divisional managers. The results show a significant increase in *DIFRET_CEO* from -0.029 to 0.031 when the incoming CEO is an outsider, consistent with the results tabulated. In contrast, the change in *DIFRET_CEO* (from 0.009 to -0.016) is negative but statistically insignificant when the incoming CEO is an insider.

FLIGHT_TIME and *GARMAISE* exhibit significant cross-sectional variation but are relatively stable for a firm over time. Consequently, we estimate the regressions with industry and year fixed effects to control for cross-industry and cross-time variation in *DIFRET*, but refrain from including firm fixed effects.

Table 4 Panel D shows that *DIFRET* is positively associated with both *FLIGHT_TIME* and *GARMAISE*, consistent with the results from Table 4 Panel B. In addition, we find that *DIFRET* is associated negatively with MTB, suggesting that private information is more likely to reside with top managers in firms with higher growth opportunities. *DIFRET* is also associated negatively with the number of geographical segments. This is probably because correlated information across multiple segments allows top managers to synthesize the information from various divisions more efficiently. In the multivariate tests, we do not observe significant coefficients on any other explanatory variable.

In summary, the tests in Table 4 described above serve a dual purpose. They shed light on how *DIFRET* varies across divisions and across firms. Furthermore, to the extent that *DIFRET* varies with variables and events expected to alter the internal information environment of the firm, these tests provide some validation and credibility for *DIFRET* as an empirical measure of IIA.

V. Results

IIA and management forecasts

Table 5, Panel A, column (1) reports results with management forecast accuracy as the dependent variable. This regression is estimated with the inclusion of firm and year fixed effects. 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 surprise conveyed by management

forecasts (denoted *SUR*). Further, earnings volatility, the incidence of losses, 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 1 percent level. The results imply that a single standard deviation increase in *DIFRET* is associated with a decline in forecast accuracy of 0.33 percent points, which appears significant relative to the standard deviation of *ACCURACY* in the sample of 3.5 percent points.[17]

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 0.77 percent points, which seems significant relative to the standard deviation of bias of 6.4 percent points. *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 0.02, which seems economically meaningful relative to the standard deviation of specificity of 0.415.[18] Finally, we observe that *DIFRET* is associated negatively with the frequency of management forecasts (coefficient = -0.180 with t=-2.20). It implies that a single standard deviation increase in *DIFRET* is associated with a decline in forecast frequency by 0.04, which is economically meaningful relative to the standard deviation of forecast frequency of 0.963.

[17] To calibrate the economic effect of *DIFRET*, note that it is about one fifth that of earnings volatility (*EARNVOL*), the firm-level characteristic with the most statistically and economically significant effect on forecast accuracy in our results. A one standard deviation increase in *EARNVOL* is associated with a decline of 1.79 percentage points in forecast accuracy.

[18] 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 IIA is high. Conditional on issuance, top managers tend to be less specific and more pessimistically biased in their forecasts when IIA is high. Nevertheless, their forecast accuracy declines with *DIFRET*.

We repeat the analyses in Table 5 Panel A, 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 results, presented in Table 5, Panel B serve as a placebo check, 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 divisional 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.[19] We do not observe a significant association between *DIFRET_ROUTINE* and the properties of voluntary disclosure, which strengthens our inference from the results we obtain with *DIFRET*.

IIA and earnings restatements

In Table 6, Panel A we present results of testing the relation between IIA and the likelihood of earnings restatements following the model specification in DeHaan, Hodge and Shevlin (2013). We do not include firm fixed effects since there are a large number of firms that have never experienced a restatement in our sample period (704 out of 918 unique firms). Consequently, using firm fixed effects is highly detrimental to the power of the test and we estimate the logistic regressions including industry and year fixed effects.

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

Restatements are classified into two subsamples: restatements reflecting accounting errors (*RES_ERR*) and those reflecting irregularities suggestive of management frauds (*RES_IRR)*. Results with control variables reveal that prior-period restatements have very significant predictive power for both types of restatements in the current period. Further, error-driven restatements are more likely among firms with lower market-to-book, lower relatedness of segments, higher R&D intensity, higher leverage, and for firms that issue equity. Irregularity-driven restatements are more likely for firms with fewer segments and higher leverage.

Turning to our primary explanatory variable, the coefficient of *RES_ERR* on *DIFRET* is positive and statistically significant at the 5 percent level. Holding the control variables at the sample mean, the marginal effect of *DIFRET* on restatement probability is 2.65 percent points, which is economically meaningful given the 10.0 percent of the sample firm-years (409/4,099) 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, i.e. irregularities, captured by *RES_IRR*. One caveat worth bearing in mind is that Audit Analytics' coverage of financial frauds is less extensive than that of other restatements (Karpoff et al. 2017), implying that the tests analyzing irregularities potentially suffer from weaker power.

Table 6, Panel B repeats the exercise in Panel A after replacing *DIFRET* with *DIFRET_ROUTINE,* constructed using non-informed trades by divisional and top managers.

Similar to management forecasts in Table 5, Panel B, restatement likelihood does not vary significantly with *DIFRET_ROUTINE*.

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*, introduced in Section IV: *FLIGHT_TIME* and *GARMAISE*. 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. 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 influencing IIA.

Table 7 reports the results of estimation based on 2SLS. As we already discuss in Section IV, *FLIGHT_TIME* and *GARMAISE* exhibit significant cross-sectional variation but are relatively stable for a firm over time. Consequently, we estimate all regressions with the instrumental variables including industry and year fixed effects, but not firm fixed effects. Panel A of Table 7 reports results with forecast accuracy and forecast bias. Panel B of Table 7 reports results with forecast specificity and forecast frequency. Panel C of Table 7 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 4.[20] 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 IIA, 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 exhibits 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 0.502, implying that *DIFRET* is positive for approximately 50 percent of our sample observations. Table

[20] 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.

8 presents the results with forecast attributes and restatement likelihood respectively in Panels A and B.

The coefficient on *DIFRET* is statistically significant in column (1) in Panel A. 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 IIA and external communication quality.

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 9 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 presents 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 forecast bias and forecast specificity. In Panel B, with error-related restatement likelihood as the dependent variable, we observe a positive and statistically significant coefficient on *DIFRET* for both the HIGH group and the LOW group.

Overall, the results indicate that the relation between *IIA* and disclosure quality is similar or 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.

Data coverage issues

Chuk et al. (2013) point to the issue of incomplete data coverage by First Call. They suggest that data coverage is more complete and exhaustive in the post-1998 period and among firms with higher analyst following. We confirm that our results are robust to restricting our sample

to the post-1998 period, as well as to firms with above-median analyst following.[21] Thus our results are unlikely to be driven by the First Call data coverage issues.

VI. 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, even after controlling for firm fixed effects.

[21] The results are available upon request.

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 may 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.

Finally, it is possible that our empirical measure *DIFRET* captures top managers' ability to extract private information from divisional managers and this ability is correlated positively with their ability to provide higher-quality disclosures. For example, Goodman et al. (2014) argue that managers draw on similar skills when generating earnings forecasts and making investment

decisions. While acknowledging this caveat, it is also important to bear in mind that the greater capacity to extract information from divisional managers is probably one of the factors contributing to top managers' ability to issue better forecasts. Furthermore, it is unlikely that correlated top management abilities are the only factor driving our results, since we document predictable variation in divisional *DIFRET* with divisional characteristics in Table 4, after controlling for firm-year fixed effects. Those results suggest that the divisional information environment also contributes to variation in *DIFRET*.[22]

VII. Conclusion

Our paper uses a measure of information asymmetry that captures 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. Numerous validation tests serve to assure that our empirical measure does indeed capture variation in internal information asymmetry (IIA). Our primary results imply that when IIA is high, 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 error-driven restatements.

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,

[22] Consistent with this, we re-estimate the relationship between forecasts properties and *DIFRET* after including CEO fixed effects. The coefficients on *DIFRET* weaken in some instances but forecast accuracy, bias and specificity continue to be significantly negatively associated with *DIFRET* after including CEO fixed effects, suggesting at the very least that CEO ability is unlikely to be responsible for all the observed variation in *DIFRET*.

geographic dispersion, number of segments etc. While such characteristics can contribute to 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. 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 a firm is primarily determined by the internal information advantage of the parties in control of those decisions. Thus, when top managers are at an information disadvantage, the quality of external communication suffers. This does not necessarily imply that, divisional managers' private information advantage should be eliminated or mitigated in all cases. In particular, it may be natural and desirable for divisional managers' to possess greater private information than top managers in decentralized firms where divisions exercise control over corporate decisions such as internal investments. The influence of divisional managers' private information relative to that of top managers in other settings that are distinct from disclosure provides a fertile area of future research facilitated, in part, by our empirical measure of internal information asymmetry.

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Appendix A
Variable Definitions

This appendix describes the variable definitions in our empirical tests.

Panel A: Variables for the determinant model of DIFRET (Panel D, Table 4)

DIFRET	=	The difference between *DIV_RET* and *TOP_RET* for insiders' opportunistic trades as defined in Section III.
DIV_RET	=	The average cumulative size-adjusted abnormal return over the period of six months from the transaction date for all division managers' opportunistic open market insider trades during the recent three fiscal years (year t-2 to t). For open market sale transactions, we take the opposite sign when calculating the abnormal return. Insiders' opportunistic trades are as defined in Section III.
TOP_RET	=	The average cumulative size-adjusted abnormal return over the period of six months from the transaction date for all top executives' opportunistic open market insider trades during the recent three fiscal years (year t-2 to t). For open market sale transactions, we take the opposite sign when calculating the abnormal return. Insiders' opportunistic trades are as defined in Section III.
FLIGHT_TIME	=	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 the close areas without flight lines or when the fastest airline route is longer than the car driving time. Please also see Appendix B for the detailed procedures for this measure.
GARMAISE	=	Average Garmaise index (Garmaise 2011) of the states for division managers.
ROA	=	Return on assets ratio (COMPUSTAT items NI / AT). We use the average value over the recent three fiscal years (year t-2 to t).
MTB	=	The ratio of the market value to the book value of common equity at the end of the fiscal period. We use the average value over the recent three fiscal years (year t-2 to t).
SIZE	=	Natural logarithm of the market value of a firm's common equity at the end of the fiscal period. We use the average value over the recent three fiscal years (year t-2 to t).
NUMANALYST	=	The natural logarithm of one plus the number of analysts who issue earnings forecasts for the firm during the fiscal year. We use the average value over the recent three fiscal years (year t-2 to t).
EARNVOL	=	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.
ANNDISP	=	The standard deviation of analysts' forecasts for annual EPS, divided by the absolute value of the median analyst forecast. We use the average value over the recent three fiscal years (year t-2 to t).
NUMSEG	=	The number of business segments. We use the average value over the recent three fiscal years (year t-2 to t).
NUMSEGGEO	=	The number of geographical segments. We use the average value over the recent three fiscal years (year t-2 to t).
RELATED	=	The ratio based on the number of related business segments, divided by the total number of business segments. The number of related segments is the difference between the total number of segments reported for a firm and the number of segments

with different main two-digit SIC code. We use the average value of this ratio over the recent three fiscal years (year t-2 to t).

RD = The research and development expenditures (Compustat item XRD) divided by sales revenues (Compustat item SALE). We use the average value over the recent three fiscal years (year t-2 to t).

Panel B: Variables for the tests of management forecast attributes

ACCURACY = 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 = 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 = 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 = Natural logarithm of one plus the number of management earnings forecasts issued in the current year.

SUR = Absolute value of the difference between the management earnings forecast and the median analyst earnings forecast for the same fiscal period, made before the issuance of management earnings forecast. The absolute difference is then scaled by the stock price at the beginning of the fiscal period. For the test of management forecast frequency, it is the current year's earnings surprise measured as the absolute difference between the actual annual EPS and the median analyst earnings forecast for the current year, divided by the stock price at the beginning of the year. The median analyst earnings forecast is computed based on the most recent annual EPS forecast for all analysts who issued the forecasts in the current year.

DISP = The standard deviation of analysts' forecasts divided by the absolute value of the median analyst forecast for the fiscal period which the management earning forecast pertains to. For the test of management forecast frequency, it is the dispersion of analyst's annual earnings forecast for the current year.

LOSS = 1 if the firm reports losses for the fiscal period which the management earnings forecasts pertain to, and 0 otherwise. For the test of management forecast frequency, it is based on the current year's annual income.

NEWS = 1 if the EPS of the current fiscal period is greater than or equal to the EPS of the previous period, and 0 otherwise. For the test of management forecast frequency, it is based on the annual EPS.

HORIZON = The number of days between the forecast date and the ending date of the fiscal period which the management earnings forecast pertains to.

ANNUAL = 1 if the management forecast is an annual earnings forecast and 0 otherwise.

DIFRET_ROUTINE = The difference between *DIV_RET* and *TOP_RET* for insiders' routine trades as defined in Section III.

Panel C: Variables for the tests of the likelihood of accounting restatements

RES_ERR = 1 for firm-years for which a firm's earnings is restated due to accounting errors, and 0 otherwise, as per Audit Analytics database.

RES_IRR = 1 for firm-years for which a firm's earnings is restated due to financial fraud, and 0 otherwise, as per Audit Analytics database.

BIGN = 1 if the firm's auditor is one of the four (five) largest audit firms after (before) 2001, and 0 otherwise, as per Audit Analytics database.

AUDITOP	=	1 for auditor's opinions other than an unqualified audit opinion, and 0 otherwise, as per COMPUSTAT item AUOP.
SEO	=	1 if the firm had a seasoned equity offering during the year, as indicated by non-zero value for COMPUSTAT variable SCSTKC, and 0 otherwise.
ISSUANCE	=	1 if the firm issued new debt during the year, and 0 otherwise. Debt issuers are 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.
LEV	=	Firm leverage, measured as total debt divided by market value of assets for the current year (COMPUSTAT items (DLTT + DLC) / (PRCC_F * CSHO + DLTT).
PRE_RES	=	1 if the firm's financial statements for the previous two years have been restated due to accounting errors or financial frauds, 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 locations of headquarters and divisions and also the airports nearest 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).[23]
- 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.[24]
- 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.

[23] 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.

[24] 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 Divisional 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 the Compustat database, 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 divisions 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 S&P 1500 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 accounting 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.	2,248	711	11,607
Sub-sample of quantitative management earnings forecasts.	2,168	691	10,924
Sample of firm-years for which the firms are covered by the First Call database (for the forecast frequency analysis)	3,790	861	
(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.	4,134	918	
Sub-sample of firm-years without any restatements or with only accounting errors (i.e., excluding those with accounting frauds).	4,099	910	

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

TABLE 2
Descriptive Statistics

This table reports the descriptive statistics of the variables used for the test of management earnings forecast accuracy (and the statistics for forecast bias, specificity and frequency) in Panel A; the statistics of the variables used for the test of the likelihood of accounting errors (and the statistics for irregularities) in Panel B; the statistics of firm characteristics across four different samples in Panel C. In Panel C, the sample of "Universal multi-segment firm years" refers to those firms with more than one business segment according to the COMPUSTAT Segment database, combined with the data availability requirement for firms' characteristics; The sample of "Multi-segment firm years with insider trades" refers to the reduced sample of "Universal multi-segment firm-years" with further data requirement of at least one insider trade record in the TFN Insider Trading Database; The two samples of "*DIFRET>0*" and "*DIFRET<0*" refer to our final sample partitioned based on the positive/negative values of *DIFRET*. The sample period is from 1994 to 2011 in Panels A and C, and from 1997 to 2011 in Panel B. All variables are defined in Appendix A.

Panel A: Variables for Management Earnings Forecast Tests

	N	Mean	Median	Std Dev	Q1	Q3
ACCURACY	10,924	-0.016	-0.005	0.035	-0.014	-0.002
BIAS	10,924	0.003	-0.001	0.064	-0.006	0.007
SPEC	11,607	3.086	3.000	0.415	3.000	3.000
FREQ	3,790	1.056	1.098	0.963	0.000	1.945
DIV_RET	10,924	0.036	0.009	0.213	-0.074	0.102
TOP_RET	10,924	0.044	0.013	0.182	-0.064	0.097
DIFRET	10,924	-0.011	0.002	0.183	-0.084	0.078
ROA	10,924	0.053	0.054	0.057	0.031	0.082
MTB	10,924	3.109	2.496	2.982	1.773	3.718
SIZE	10,924	7.772	7.757	1.606	6.669	8.766
NUMANALYST	10,924	12.165	10.000	8.531	6.000	16.666
EARNVOL	10,924	0.353	0.223	0.412	0.129	0.395
ANNDISP	10,924	0.042	0.017	0.102	0.009	0.027
NUMSEG	10,924	4.286	4.000	1.897	3.000	5.333
NUMSEGGEO	10,924	8.597	6.666	6.161	3.000	12.000
RELATED	10,924	0.752	0.778	0.247	0.611	1.000
RD	10,924	0.034	0.008	0.056	0.000	0.044
SUR	10,924	0.016	0.010	0.017	0.002	0.026
DISP	10,924	0.041	0.042	0.037	0.000	0.069
LOSS	10,924	0.087	0.000	0.282	0.000	0.000
NEWS	10,924	0.523	1.000	0.499	0.000	1.000
HORIZON	10,924	142.303	80.000	104.516	62.000	243.000
ANNUAL	10,924	0.593	1.000	0.491	0.000	1.000

Panel B: Variables for Accounting Errors Tests

	N	Mean	Median	Std Dev	Q1	Q3
RES_ERR	4,099	0.100	0.000	0.299	0.000	0.000
RES_IRR	3,725	0.009	0.000	0.096	0.000	0.000
DIV_RET	4,099	0.037	0.032	0.275	-0.081	0.162
TOP_RET	4,099	0.050	0.037	0.250	-0.055	0.144
DIFRET	4,099	-0.011	0.000	0.249	-0.113	0.106
ROA	4,099	0.027	0.045	0.094	0.011	0.075
MTB	4,099	2.829	2.250	3.090	1.527	3.429
SIZE	4,099	6.862	6.855	1.858	5.583	8.121
NUMANALYST	4,099	9.468	7.000	8.693	3.000	13.333
EARNVOL	4,099	0.441	0.239	0.587	0.127	0.493
ANNDISP	4,099	0.067	0.024	0.179	0.015	0.034

NUMSEG	4,099	3.787	3.666	1.707	2.666	4.666
NUMSEGGEO	4,099	8.390	6.000	6.303	3.000	12.000
RELATED	4,099	0.742	0.756	0.265	0.556	1.000
RD	4,099	0.041	0.011	0.068	0.000	0.048
LEV	4,099	0.246	0.183	0.231	0.072	0.355
BIGN	4,099	0.915	1.000	0.278	1.000	1.000
LOSS	4,099	0.219	0.000	0.414	0.000	0.000
AUDITOP	4,099	0.532	1.000	0.499	0.000	1.000
SEO	4,099	0.070	0.000	0.255	0.000	0.000
ISSUANCE	4,099	0.099	0.000	0.299	0.000	0.000
PRE_RES	4,099	0.121	0.000	0.326	0.000	0.000

Panel C: Firm Characteristics for Four Different Samples

		Universal Multi-segment Firm-Years (N= 26,719)	Multi-segment Firm-Years with Insider Trades (N= 17,119)	Our Sample with *DIFRET* >0 (N= 5,482)	Our Sample with *DIFRET* <0 (N= 5,442)
ROA	Mean	0.013	0.012	0.052	0.056
	Median	0.034	0.036	0.055	0.055
MTB	Mean	2.756	2.717	3.107	3.112
	Median	2.036	2.072	2.484	2.502
SIZE	Mean	6.541	6.541	7.864	7.686
	Median	6.431	6.444	7.859	7.692
NUMANALYST	Mean	7.898	8.996	12.587	11.770
	Median	5.333	6.333	11.000	9.667
EARNVOL	Mean	0.455	0.424	0.373	0.335
	Median	0.240	0.235	0.238	0.205
ANNDISP	Mean	0.051	0.045	0.041	0.042
	Median	0.024	0.022	0.016	0.016
NUMSEG	Mean	3.660	3.665	4.280	4.292
	Median	3.333	3.333	4.000	4.000
NUMSEGGEO	Mean	6.058	6.072	8.756	8.449
	Median	3.333	3.667	7.667	6.000
RELATED	Mean	0.744	0.756	0.728	0.771
	Median	0.729	0.735	0.750	0.801
RD	Mean	0.047	0.041	0.032	0.037
	Median	0.000	0.001	0.008	0.009
SUR	Mean	0.082	0.068	0.016	0.017
	Median	0.039	0.036	0.010	0.011
DISP	Mean	0.031	0.031	0.038	0.042
	Median	0.027	0.030	0.041	0.040
LOSS	Mean	0.270	0.246	0.085	0.090
	Median	0.000	0.000	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 samples used in main empirical analyses. Panel A presents the correlation coefficients for the samples used for management forecast tests. Panel B presents the correlation coefficients for the sample used for accounting errors test. The sample period is from 1994 to 2011 in Panel A and from 1997 to 2011 in Panel B. 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)	(21)
ACCURACY(1)		**-0.164**	**0.036**	--	**-0.107**	**0.171**	**0.091**	**0.125**	**0.099**	**-0.415**	**-0.115**	0.005	**-0.062**	-0.011	-0.011	**-0.108**	**0.059**	**-0.215**	**0.033**	**-0.188**	**-0.177**
BIAS (2)	**-0.286**		**0.023**	--	**-0.109**	-0.003	-0.004	**0.030**	0.002	**0.128**	**0.037**	-0.004	0.002	0.011	**0.049**	-0.006	0.003	**0.075**	**-0.024**	**0.037**	0.012
SPEC (3)	0.005	**0.029**		--	**-0.054**	**0.044**	0.015	**0.049**	**0.069**	0.014	-0.008	**-0.027**	**-0.023**	**0.016**	-0.008	**-0.031**	-0.001	-0.015	-0.008	**-0.037**	**-0.033**
FREQ (4)	--	--	--		**-0.047**	**0.204**	**0.077**	**0.316**	**0.197**	**-0.096**	**-0.068**	**0.128**	**0.058**	**0.037**	**-0.039**	**-0.110**	-0.022	**-0.188**	0.007	--	--
DIFRET (5)	**-0.038**	**-0.028**	**-0.043**	**-0.030**		**-0.039**	**-0.028**	**0.083**	**0.045**	**0.053**	0.009	0.018	**0.039**	**-0.098**	**-0.035**	-0.009	**-0.047**	0.011	-0.003	**0.025**	**0.045**
ROA (6)	**0.219**	**-0.051**	**0.027**	**0.192**	**-0.050**		**0.320**	**0.272**	**0.127**	**-0.229**	**-0.288**	-0.002	**-0.028**	-0.009	**-0.222**	**0.029**	**0.099**	**-0.351**	**-0.040**	0.017	**0.031**
MTB (7)	**0.209**	0.008	**0.046**	**0.162**	**-0.055**	**0.543**		**0.280**	**0.264**	**-0.095**	-0.009	**-0.022**	0.006	**0.044**	**0.138**	**-0.037**	**0.064**	**-0.048**	-0.004	**-0.026**	**-0.048**
SIZE (8)	**0.166**	**0.049**	**0.050**	**0.317**	**0.044**	**0.264**	**0.411**		**0.700**	**0.054**	**-0.048**	**0.333**	**0.206**	**-0.093**	**0.040**	**0.071**	**0.170**	**-0.140**	0.010	0.014	**0.048**
NUMANALYST (9)	**0.141**	**0.030**	**0.046**	**0.268**	**0.054**	**0.188**	**0.405**	**0.746**		**0.022**	**0.086**	**0.112**	**0.117**	**0.024**	**0.258**	**0.022**	**0.112**	-0.003	**0.027**	**-0.058**	**-0.085**
EARNVOL (10)	**-0.284**	**0.034**	0.014	**-0.060**	**0.047**	**-0.229**	**-0.170**	**0.135**	**0.077**		**0.121**	**0.042**	**0.046**	**-0.022**	**-0.020**	**0.052**	**-0.040**	**0.201**	0.006	0.009	0.009
ANNDISP (11)	**-0.157**	**0.062**	**0.031**	**-0.225**	-0.018	**-0.315**	**-0.137**	**-0.102**	**0.065**	**0.170**		**-0.075**	**-0.055**	**0.045**	**0.075**	**-0.054**	**0.157**	**0.197**	**0.021**	**-0.025**	**-0.047**
NUMSEG (12)	**-0.030**	**-0.033**	**-0.034**	**0.123**	-0.001	**-0.063**	-0.009	**0.295**	**0.111**	**0.105**	0.000		**0.179**	**-0.082**	**-0.095**	**0.107**	**0.067**	**-0.041**	-0.009	**0.048**	**0.093**
NUMSEGGEO (13)	**-0.054**	**0.069**	**-0.041**	**0.095**	0.011	0.002	**0.091**	**0.214**	**0.133**	**0.022**	**0.037**	**0.173**		0.017	**0.266**	**0.064**	**0.081**	**0.047**	0.002	-0.002	-0.011
RELATED (14)	0.007	**0.051**	0.013	0.026	**-0.091**	**-0.021**	0.004	**-0.110**	-0.012	**-0.089**	**0.045**	**-0.132**	**0.052**		**0.108**	**-0.051**	**-0.027**	**0.065**	**0.023**	-0.016	**-0.047**
RD (15)	**-0.027**	**0.100**	**0.019**	0.006	**-0.040**	**0.021**	**0.272**	**0.109**	**0.219**	**-0.075**	**0.198**	**0.027**	**0.455**	**0.147**		**-0.082**	-0.010	**0.253**	**0.029**	**-0.080**	**-0.149**
SUR (16)	**-0.107**	-0.010	**-0.034**	-0.026	**-0.024**	**0.050**	**0.025**	**0.139**	**0.091**	**0.061**	0.008	**0.118**	**0.098**	**-0.054**	0.002		**0.371**	**-0.059**	0.005	**0.049**	**0.204**
DISP (17)	**0.088**	**0.028**	-0.013	0.029	**-0.054**	**0.109**	**0.147**	**0.197**	**0.171**	**-0.024**	**0.098**	**0.068**	**0.125**	**-0.041**	**0.076**	**0.567**		**-0.097**	-0.005	**-0.112**	-0.006
LOSS (18)	**-0.173**	**0.134**	0.004	**-0.188**	0.018	**-0.270**	**-0.089**	**-0.144**	-0.016	**0.195**	**0.221**	**-0.039**	**0.035**	**0.046**	**0.151**	**-0.072**	**-0.092**		-0.015	**-0.027**	**-0.092**
NEWS (19)	**0.035**	**-0.049**	-0.008	0.007	0.004	**-0.043**	-0.001	0.011	**0.030**	0.007	0.006	-0.005	-0.001	**0.021**	0.015	0.014	0.002	-0.015		**-0.038**	0.005
HORIZON (20)	**-0.344**	**0.053**	**-0.043**	--	0.012	0.013	-0.004	**0.036**	**-0.027**	0.005	**-0.041**	**0.052**	0.018	-0.015	**-0.032**	**0.024**	**-0.095**	**-0.033**	**-0.020**		**0.595**
ANNUAL (21)	**-0.365**	**0.025**	**-0.046**	--	**0.034**	**-0.021**	**-0.050**	**0.053**	**-0.065**	**0.019**	**0.093**	**0.105**	-0.006	**-0.149**	**-0.107**	**0.199**	**-0.020**	**-0.092**	0.005	**0.596**	

Panel B: 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)	(19)	(20)
RES_ERR(1)			**0.040**	**-0.077**	-0.024	-0.030	-0.010	0.019	0.014	0.015	0.002	**-0.048**	**0.072**	**0.046**	0.005	**0.075**	-0.017	0.027	0.011	**0.547**
RES_IRR (2)			-0.021	-0.026	-0.023	**0.033**	**0.050**	-0.010	-0.016	-0.017	-0.008	-0.017	0.016	-0.009	0.010	-0.002	-0.021	-0.015	0.014	**0.240**
DIFRET (3)	**0.024**	-0.020		**-0.037**	-0.029	0.011	0.022	0.014	0.013	0.011	0.001	**-0.061**	0.007	**0.060**	-0.001	**0.052**	0.006	**-0.032**	**-0.062**	0.006
ROA (4)	**-0.095**	-0.020	**-0.060**		**0.104**	**0.356**	**0.194**	**-0.220**	**-0.138**	**0.032**	0.022	0.025	**-0.395**	**-0.139**	**0.171**	**-0.405**	0.019	**-0.202**	0.014	**0.083**
MTB (5)	-0.028	0.007	**-0.031**	**0.396**		**0.254**	**0.240**	**-0.113**	0.010	**-0.054**	-0.005	**0.056**	**0.172**	**-0.182**	0.020	-0.017	0.012	0.002	**0.065**	**-0.037**
SIZE (6)	**-0.041**	0.026	-0.002	**0.373**	**0.429**		**0.761**	0.023	0.010	**0.306**	**0.274**	**-0.035**	0.026	**-0.147**	**0.357**	**-0.229**	**-0.144**	**-0.145**	**-0.055**	**-0.032**
NUMANALYST (7)	-0.001	**0.051**	0.019	**0.250**	**0.382**	**0.789**		0.011	**0.067**	**0.147**	**0.172**	0.015	**0.185**	**-0.139**	**0.228**	**-0.099**	**-0.072**	**-0.097**	**-0.032**	-0.010
EARNVOL (8)	0.040	-0.004	0.010	**-0.231**	**-0.196**	**0.123**	**0.078**		**0.096**	**0.084**	**0.043**	**-0.039**	-0.016	**0.333**	**0.038**	**0.290**	**-0.075**	**0.077**	**-0.065**	-0.006
ANNDISP (9)	0.025	-0.016	0.015	**-0.315**	**-0.154**	**-0.135**	**0.079**	**0.195**		**0.011**	0.017	**0.064**	**0.081**	**-0.006**	**-0.067**	**0.197**	-0.005	**0.040**	-0.005	**0.035**
NUMSEG (10)	0.024	-0.010	0.003	-0.007	**-0.033**	**0.273**	**0.137**	**0.130**	0.024		**0.295**	**-0.152**	**-0.106**	**0.031**	**0.073**	**-0.069**	**-0.197**	**-0.046**	**-0.087**	**0.099**
NUMSEGGEO (11)	0.013	-0.001	0.009	-0.014	**0.038**	**0.303**	**0.207**	**0.097**	**0.050**	**0.332**		0.024	**0.104**	**-0.065**	**0.102**	-0.009	**-0.219**	**-0.044**	**-0.036**	**0.045**
RELATED (12)	**-0.038**	-0.014	**-0.044**	-0.006	0.009	**-0.063**	0.002	**-0.063**	0.017	**-0.186**	0.021		**0.094**	**-0.109**	-0.017	**0.053**	**-0.032**	-0.024	0.013	-0.024
RD (13)	**0.032**	0.007	0.025	**-0.089**	**0.255**	**0.115**	**0.196**	**-0.038**	**0.091**	0.000	**0.309**	**0.091**		**-0.219**	0.004	**0.249**	-0.016	**0.074**	**0.053**	**0.053**
LEV (14)	**0.046**	0.005	**0.043**	**-0.280**	**-0.300**	**-0.066**	**-0.085**	**0.307**	**0.063**	**0.072**	**-0.053**	**-0.091**	**-0.286**		**-0.039**	**0.270**	**-0.053**	**0.086**	-0.028	0.016
BIGN (15)	0.005	0.010	0.001	**0.125**	**0.072**	**0.345**	**0.284**	**0.074**	**0.038**	**0.073**	**0.113**	-0.020	**0.032**	0.010		**-0.137**	**-0.096**	**-0.081**	-0.018	**-0.050**
LOSS (16)	**0.075**	-0.002	**0.047**	**-0.373**	**-0.103**	**-0.229**	**-0.111**	**0.277**	**0.289**	**-0.067**	-0.008	**0.036**	**0.145**	**0.183**	**-0.137**		**-0.044**	**0.129**	0.018	**0.072**
AUDITOP (17)	-0.017	-0.021	-0.001	**0.040**	-0.003	**-0.145**	**-0.091**	**-0.074**	**-0.075**	**-0.200**	**-0.258**	**-0.042**	-0.024	**-0.061**	**-0.096**	**-0.044**		-0.003	0.017	**-0.100**
SEO (18)	0.027	-0.015	-0.026	**-0.160**	-0.025	**-0.148**	**-0.110**	**0.036**	**0.076**	**-0.051**	**-0.052**	**-0.037**	0.017	**0.061**	**-0.081**	**0.129**	-0.003		**0.059**	-0.005
ISSUANCE (19)	0.011	0.014	**-0.054**	**0.082**	**0.084**	**-0.055**	**-0.031**	**-0.091**	**-0.064**	**-0.081**	**-0.047**	-0.003	**0.033**	-0.018	-0.018	0.018	0.017	**0.059**		-0.016
PRE_RES (20)	**0.547**	**0.240**	0.009	**-0.121**	**-0.048**	**-0.044**	-0.003	0.016	-0.005	**0.105**	**0.063**	-0.026	**0.036**	0.012	**-0.050**	**0.072**	**-0.100**	-0.005	-0.016	

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

Panel A: Relation between DIFRET and Proxies for Information Environment

Panel A presents the results of 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. The calculation of division-level *DIFRET* follows the procedures: (1) select the specific divisional managers who have at least three opportunistic trades over the recent three years (t=0, -1 and -2 years); and (2) the firm's top managers also have at least three opportunistic insider trades over the recent three years. Divisional *DIFRET* is the difference between the divisional managers' trading profitability and that of top managers. In Column (1), the proxy for information environment is the standard deviation of *divisional* return-on-assets for Division *j*, firm *i* ($STDROA_{i,j}$) measured over the recent three years; and in Column (2) 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* ($NUMPEER_{i,j}$) over the recent three years. *Relative Size* is the average ratio of specific division's assets divided by a firm's total assets over the recent three years. The division data are hand-collected for S&P1500 firms from 1994 to 2011 (see Appendix C for the procedure). The standard errors for t-values are two-way clustered by firm and year.

	DV = $DIFRET_{i,j,}$ (for Division *j* of firm *i*)					
	(1)		(2)		(3)	
	Est. Coeff.	t-Stat	Est. Coeff.	t-Stat	Est. Coeff.	t-Stat
Intercept	-0.028**	-2.33	0.114**	2.08	0.089	1.44
$STDROA_{i,j,}$	0.150***	3.23			0.129**	2.55
$NUMPEER_{i,j,}$			-0.023**	-2.27	-0.022*	-1.95
Relative Size$_{i,j}$	0.045	1.48	0.022	0.91	0.042	1.39
Firm x *Year fixed effects*	YES		YES		YES	
Adj. R^2	0.011		0.014		0.021	
N	1,229		1,527		1,229	

Panel B: Changes in Internal Information Asymmetry (IIA) surrounding the Changes in Instrumental Variables

Panel B presents the changes in *division-level DIFRET* surrounding the changes in flight time due to the addition (reduction) of new (old) flights between corporate headquarters and the location of this division, and the changes in *GARMAISE* index due to State laws changes. There are 92 (54) flight time decreases (increases), which correspond to 132 (71) division managers. A flight time change refers to a change with more than 100 flying minutes. Appendix B describes the measure of flight time. For *GARMAISE* index, two events are used: 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 38 and 34 division managers. *POST*=0 (1) refers to three years before (after) the events.

Variable=	Flight Time Decrease (n= 132 pairs)		Flight Time Increase (n= 71 pairs)		*GARMAISE* Index Decrease (n= 38 pairs)		*GARMAISE* Index Increase (n= 34 pairs)	
DIFRET	Mean	Median	Mean	Median	Mean	Median	Mean	Median
PRE-EVENT	0.024	0.017	-0.043	-0.022	0.004	0.023	-0.031	-0.045
POST-EVENT	-0.068	-0.018	0.034	0.024	-0.077	-0.042	0.020	0.015
POST - PRE	-0.090**	-0.032**	0.072**	0.039*	-0.079*	-0.057*	0.048*	0.056
(P-value)	(0.011)	(0.045)	(0.034)	(0.072)	(0.052)	(0.092)	(0.096)	(0.168)

Panel C: Changes in Internal Information Asymmetry (IIA) around CEO Turnovers

Panel C presents the changes in the measure of internal information asymmetry (*DIFRET*) around CEO turnovers. We identify the events of CEO successions based on CEO names in the Compustat Execucomp database. The successor CEOs are classified as either insiders or outsiders to their firms based on Huson, Malatesta and Parrino (2004). Specifically, the new CEOs who have been with their firms for one year or less at the time of their appointments are classified as outsiders. The CEO turnover sample consists of 88 CEO successions where new CEOs are outsiders and 264 CEO successions where new CEOs are insiders, for our sample of multi-segment firms from 1994 to 2011. The internal information asymmetry (IIA) measure, *DIFRET*, is measured at *firm level* and calculated as the difference in trading profit between divisional managers and top managers in the same firm over the three-year periods around the event year. POST= 0 (1) for the *DIFRET* measured over the three years before (after) the events.

	New CEOs are Outsiders (n= 88)		New CEOs are Insiders (n= 264)	
Variable=DIFRET	Mean	Median	Mean	Median
PRE-EVENT	-0.047	-0.024	0.018	0.006
POST-EVENT	0.026	0.020	-0.021	-0.002
POST - PRE	0.076**	0.040*	-0.043*	-0.005
(P-value)	(0.037)	(0.081)	(0.096)	(0.658)

Panel D: Determinants of the internal information asymmetry (IIA) measure

Panel D presents the regressions of firm-level *DIFRET* on the contemporary firm characteristics, and *FLIGHT_TIME* and *GARMAISE*. All variables are defined in Panel A of Appendix A. The standard errors are clustered by firm. *,**,*** denote significance at the 0.10, 0.05, and 0.01 levels, respectively.

	DV = *DIFRET*	
	Est. Coeff.	t-Stat
Intercept	-0.209***	-2.88
FLIGHT_TIME	0.004**	2.19
GARMAISE	0.005**	2.36
ROA	-0.086	-0.98
MTB	-0.003*	-1.75
SIZE	0.001	0.13
NUMANALYST	0.001	0.65
EARNVOL	-0.000	-0.10
ANNDISP	-0.005	-0.23
NUMSEG	-0.002	-0.70
NUMSEGGEO	-0.002*	-1.66
RELATED	-0.006	-0.26
RD	0.006	0.05
Industry fixed effects	YES	
Year fixed effects	YES	
Adj.R^2	0.045	
N	4,478	

TABLE 5
Internal Information Asymmetry and Management Forecast Attributes

This table presents the relation between the 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). Panel A (Panel B) reports the IIA based on insiders' opportunistic trades (routine trades). The sample period is from 1994 to 2011. Panel A of Appendix A provides the definitions of *DIFRET* and those control variables which are also used in the determinant analysis, and these variables are measured over the prior three years (t-3 to t-1); Panel B of Appendix A provides the definitions of the four attributes of forecasts and other control variables. The standard errors for t-values are clustered by firm. *,**,*** denote significance at the 0.10, 0.05, and 0.01 levels, respectively.

Panel A: IIA Measure based on Insiders' Opportunistic Trades

	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	-0.010	-0.49	-0.168**	-2.20	3.696***	17.34	-0.945***	-3.04
DIFRET	-0.018***	-3.05	-0.042**	-2.48	-0.102**	-2.47	-0.180**	-2.20
ROA	-0.057*	-1.76	0.144	1.46	0.859***	3.08	0.677	1.43
MTB	-0.000	-0.28	-0.001	-0.88	-0.002	-0.45	0.005	0.55
SIZE	0.000	0.00	0.023**	2.40	-0.039	-1.23	0.141***	2.59
NUMANALYST	-0.000	-0.58	-0.001*	-1.79	-0.002	-0.71	-0.006	-0.86
EARNVOL	-0.043***	-6.08	0.034*	1.93	-0.002	-0.13	-0.097**	-1.96
ANNDISP	0.010	0.77	0.018	0.85	-0.001	-0.03	-0.119	-0.86
NUMSEG	0.000	0.19	0.002	0.95	-0.001	-0.19	0.020	0.92
NUMSEGGEO	-0.001	-1.24	-0.001	-1.33	0.000	0.00	-0.004	-0.53
RELATED	0.006	0.90	0.005	0.35	-0.001	-0.01	-0.051	-0.34
RD	-0.002	-0.03	0.120	1.30	0.062	0.13	-0.138	-0.15
SUR	-0.124***	-3.93	0.010	0.16	-0.755**	-2.22	-0.173	-0.97
DISP	0.000	0.32	-0.001	-0.30	0.025*	1.71	0.100	1.38
LOSS	-0.007**	-2.23	0.006	1.15	-0.011	-0.49	-0.129***	-2.69
NEWS	0.001*	1.67	-0.001	-1.44	-0.002	-0.23	-0.054**	-2.16
HORIZON	-0.001***	-12.03	0.000***	4.17	-0.000**	-2.17	--	--
ANNUAL	-0.007***	-6.64	-0.005	-1.57	-0.001	-0.08	--	--
Firm fixed effects	YES		YES		YES		YES	
Year fixed effects	YES		YES		YES		YES	
Adj.R^2	0.508		0.269		0.275		0.697	
N	10,924		10,924		11,578		3,790	

Panel B: IIA Measure based on Insiders' Routine Trades

	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
DIFRET_ROUTINE	0.024	1.36	-0.018	-1.03	0.103	1.28	0.348	1.06
Control variables	YES		YES		YES		YES	
Firm fixed effects	YES		YES		YES		YES	
Year fixed effects	YES		YES		YES		YES	
Adj.R^2	0.553		0.628		0.383		0.832	
N	1,273		1,273		1,465		586	

TABLE 6
Internal Information Asymmetry and Accounting Restatement Probability

This table presents the relation between the internal information asymmetry and the likelihood of an accounting restatement due to errors in Column (1), or due to irregularities in Column (2). Panel A (Panel B) reports the IIA based on insiders' opportunistic trades (routine trades). The sample period is from 1997 to 2011. Panel A of Appendix A provides the definitions of the *DIFRET* and those control variables which are also used in the determinant analysis, and these variables are measured over the prior three years (t-3 to t-1); Panel C of Appendix A provides the definitions of restatement likelihood and other control variables. 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: IIA Measure based on Insiders' Opportunistic Trades

	DV = *RES_ERR* (1)			DV = *RES_IRR* (2)		
	Est. Coeff.	z-Stat	Marginal effects	Est. Coeff.	z-Stat	Marginal effects
DIFRET	0.638**	2.24	2.65%	-0.608	-0.52	-0.02%
ROA	0.320	0.33	1.33%	-4.438	-1.34	-0.14%
MTB	-0.043*	-1.76	-0.18%	-0.111	-1.18	-0.00%
SIZE	0.072	1.10	0.30%	0.178	0.77	0.01%
NUMANALYST	-0.018	-1.42	-0.07%	0.051	1.29	0.00%
EARNVOL	0.135	1.03	0.56%	-0.378	-0.76	-0.01%
ANNDISP	0.244	0.60	1.03%	-0.438	-0.20	-0.06%
NUMSEG	-0.069	-1.06	-0.29%	-0.500**	-2.28	-0.02%
NUMSEGGEO	-0.002	-0.18	-0.01%	-0.038	-0.75	-0.00%
RELATED	-0.437*	-1.66	-1.85%	0.382	0.50	0.05%
RD	2.938***	2.57	12.21%	-1.562	-0.46	-0.05%
LEV	0.702**	2.07	2.92%	1.878**	1.96	0.06%
BIGN	0.494	1.55	2.05%	0.639	0.38	0.02%
LOSS	0.058	0.31	0.24%	-0.754	-1.14	-0.02%
AUDITOP	0.211	1.27	0.87%	0.045	0.09	0.00%
SEO	0.311	1.43	1.29%	-0.338	-0.42	-0.01%
ISSUANCE	0.420*	1.81	1.75%	0.141	0.25	0.00%
PRE_RES	3.772***	20.89	15.68%	4.950***	6.89	0.16%
Industry fixed effects	YES			YES		
Year fixed effects	YES			YES		
Pseudo R^2	0.369			0.484		
N	4,099			3,725		

Panel B: IIA Measure based on Insiders' Routine Trades

	DV = *RES_ERR* (1)			DV = *RES_IRR* (2)		
	Est. Coeff.	z-Stat	Marginal effects	Est. Coeff.	z-Stat	Marginal effects
DIFRET_ROUTINE	0.117	0.14	1.22%	1.007	0.29	0.01%
Control variables	YES			YES		
Industry fixed effects	YES			YES		
Year fixed effects	YES			YES		
Pseudo R^2	0.710			0.635		
N	490			473		

TABLE 7

Two-stage Least Squares Estimation of the Effect of Internal Information Asymmetry on Management Earnings Forecast Attributes and Error-Driven Restatements

This table presents the 2SLS estimation of the relation between internal information asymmetry and management forecast accuracy and bias in Panel A; management forecast specificity and frequency in Panel B; error-driven restatement probability in Panel C. All estimation is based on OLS. In the first stage, *DIFRET* is modeled using two instrument variables (IVs): the average flight time (*FLIGHT_TIME*) and the average Garmaise index (*GARMAISE*) based on Garmaise (2011) for the division managers. Appendix A, Panel A provides the definitions of the *DIFRET* and those control variables which are also used in the determinant analysis, and these variables are measured over the prior three years (t-3 to t-1); Appendix A, Panel B provides the definitions of the four attributes of forecasts and other control variables; Appendix A, Panel C provides the definitions of restatement likelihood and other control variables in the regression of restatements. The sample periods are from 1994 to 2011 in Panels A and B; from 1997 to 2011 in Panel C. The t-values/z-values are based on Huber-White-Sandwich standard error. *,**,*** denote significance at the 0.10, 0.05, and 0.01 levels, respectively.

Panel A: Management 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
Intercept	-0.471***	-3.12	-0.068*	-1.94	-0.277*	-1.73
DIFRET			-0.149**	-2.22	-0.233*	-1.77
FLIGHT_TIME	0.002***	3.32				
GARMAISE	0.002**	2.11				
ROA	-0.170***	-4.15	-0.027	-1.59	-0.049	-1.42
MTB	0.001	1.08	0.001***	3.41	-0.000	-0.94
SIZE	0.006***	2.82	0.004***	6.07	0.003**	2.35
NUMANALYST	0.001	1.51	0.000	1.28	-0.000**	-2.10
EARNVOL	0.024***	7.28	-0.021***	-7.75	0.026***	4.92
ANNDISP	-0.031	-1.39	-0.005	-0.70	0.009	0.71
NUMSEG	0.002*	1.73	0.001**	2.34	-0.001***	-2.87
NUMSEGGEO	-0.001**	-2.17	-0.001***	-4.70	0.000	0.01
RELATED	-0.062***	-8.44	-0.007	-1.51	-0.011	-1.30
RD	-0.062	-1.38	-0.020	-1.44	0.008	0.31
SUR	-0.152	-1.44	-0.175***	-5.63	-0.188***	-3.10
DISP	-0.018***	-3.41	-0.001	-0.32	-0.001	-0.32
LOSS	0.036	5.21	-0.015***	-4.55	0.024***	3.80
NEWS	0.002	0.74	0.002***	2.64	-0.003**	-2.53
HORIZON	-0.000	-0.59	-0.000***	-9.33	0.000***	4.98

ANNUAL	0.010**	2.42	-0.006***	-4.97	0.007***	3.34
Industry fixed effects	YES		YES		YES	
Year fixed effects	YES		YES		YES	
First Stage Cragg and Donald Test (F-stat, p-value)			(11.81, 0.000)			
Over-Identification Test (Chi-Square, p-value)			(0.01, 0.957)		(2.01, 0.156)	
Adj.R^2	0.106		0.217		0.094	
N	10,544		10,544		10,544	

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	-0.059**	-2.34	3.197***	30.51	-0.135*	-1.90	-0.718*	-1.76
DIFRET			-1.550***	-2.99			-2.452*	-1.82
FLIGHT_TIME	0.002**	2.53			0.003*	1.84		
GARMAISE	0.003***	3.12			0.005***	2.79		
ROA	-0.367***	-7.60	-0.861**	-2.04	-0.039	-0.57	0.454*	1.81
MTB	-0.000	-0.09	-0.005	-1.42	-0.001	-0.80	-0.003	-0.38
SIZE	0.005**	2.53	0.033***	3.40	0.004	1.17	0.206***	11.10
NUMANALYST	0.001*	1.81	0.002	1.62	0.001	1.47	0.002	0.45
EARNVOL	0.010**	2.26	-0.060***	-3.11	0.005	0.80	-0.030	-1.00
ANNDISP	-0.014	-0.77	-0.168**	-1.96	-0.017	-0.65	-0.047	-0.36
NUMSEG	0.000	0.22	-0.007*	-1.93	-0.003	-1.29	0.004	0.40
NUMSEGGEO	-0.001	-1.59	-0.001	-0.98	-0.001	-1.46	-0.010***	-2.71
RELATED	-0.061***	-7.91	-0.047	-0.70	-0.050***	-3.49	0.060	0.64
RD	-0.065	-1.49	-0.447**	-2.39	-0.054	-0.65	-0.579*	-1.64
SUR	0.011	0.10	-0.994***	-2.60	0.024	0.49	-0.321*	-1.64
DISP	-0.028***	-5.60	-0.051	-1.52	0.005	0.28	0.055	0.75
LOSS	0.032	4.70	0.089**	2.23	0.020*	1.74	-0.145***	-2.65
NEWS	0.003	1.13	0.009	0.78	-0.014*	-1.89	-0.076**	-1.99
HORIZON	-0.000**	-2.44	-0.000***	-2.86	--	--	--	--

ANNUAL	0.006	1.61	0.015	0.93	--	--	--	--
Industry fixed effects	YES		YES		YES		YES	
Year fixed effects	YES		YES		YES		YES	
First Stage Cragg and Donald Test (F-stat, p-value)	(11.78, 0.000)				(7.26, 0.000)			
Over-Identification Test (Chi-Square, p-value)	(1.02, 0.313)				(1.54, 0.215)			
Adj.R^2	0.108		0.093		0.059		0.136	
N	11,131		11,131		3,596		3,596	

Panel C: Error-Driven Accounting Restatements

	First Stage (DV = *DIFRET*)		Second Stage (DV= *RES_ERR*)	
	Est. Coeff.	t-Stat	Est. Coeff.	z-Stat
Intercept	-0.084	-1.58	-0.118	-0.82
DIFRET			1.130**	2.29
FLIGHT_TIME	0.003*	1.91		
GARMAISE	0.006***	3.02		
ROA	0.010	0.13	-0.067	-0.60
MTB	-0.003	-1.61	0.000	-0.02
SIZE	0.002	0.46	0.015**	2.33
NUMANALYST	0.001	1.40	-0.003**	-2.05
EARNVOL	-0.010	-1.16	0.026*	1.70
ANNDISP	0.034	1.20	-0.041	-0.84
NUMSEG	0.001	0.31	-0.011**	-2.40
NUMSEGGEO	0.000	-0.20	0.000	-0.21
RELATED	-0.038**	-2.32	0.054	1.62
RD	0.042	0.43	0.174	1.10
LEV	0.062***	2.74	0.168***	3.62
BIGN	-0.018	-0.92	0.001	0.03
LOSS	0.021	1.63	-0.002	-0.10

AUDITOP	0.011	1.12	0.029*	1.85
SEO	-0.038**	-2.08	0.050	1.55
ISSUANCE	-0.050***	-3.53	-0.005	-0.15
PRE_RES	-0.013	-1.01	0.406***	14.97
Industry fixed effects	YES		YES	
Year fixed effects	YES		YES	
First Stage Cragg and Donald Test (F-stat, p-value)	(5.80, 0.003)			
Over-Identification Test (Chi-Square, p-value)	(1.40, 0.236)			
Adj.R^2	0.051		0.062	
N	3,743		3,743	

TABLE 8
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. The indicator variable, *POS*, is coded as one for positive *DIFRET* and zero otherwise. *POS*=1 for 50.18% of the sample for management forecast accuracy test in Panel A, and 50.06% 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. Appendix A, Panel A provides the definitions of the *DIFRET* and those control variables which are also used in the determinant analysis, and these variables are measured over the prior three years (t-3 to t-1); Appendix A, Panel B provides the definitions of the four attributes of forecasts and other control variables; Appendix A, Panel C provides the definitions of restatement likelihood and other control variables in the regression of restatements. 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	-0.016	-0.74	-0.162**	-2.32	3.720***	17.42	-0.926***	-2.97
*DIFRET*POS*	-0.036*	-1.91	-0.150***	-3.55	-0.252**	-2.04	-0.376*	-1.67
DIFRET	-0.020***	-2.98	0.021	1.46	0.031	0.47	-0.124	-0.89
POS	0.008***	3.86	-0.003	-0.46	-0.014	-0.71	0.062	1.60
ROA	-0.060*	-1.86	0.116	1.28	0.815***	2.93	0.622	1.30
MTB	0.000	-0.08	0.000	-0.40	-0.002	-0.34	0.006	0.67
SIZE	0.000	0.08	0.023**	2.48	-0.037	-1.20	0.140***	2.58
NUMANALYST	0.000	-0.57	-0.001**	-1.97	-0.002	-0.77	-0.006	-0.88
EARNVOL	-0.043***	-6.13	0.035**	1.99	-0.001	-0.05	-0.095*	-1.92
ANNDISP	0.010	0.81	0.018	0.83	-0.005	-0.08	-0.118	-0.87
NUMSEG	0.000	0.12	0.001	0.84	-0.002	-0.26	0.021	0.93
NUMSEGGEO	-0.001	-1.19	-0.001	-1.32	0.000	0.04	-0.004	-0.53
RELATED	0.005	0.71	0.002	0.13	-0.004	-0.05	-0.047	-0.31
RD	0.004	0.06	0.058	0.70	-0.032	-0.07	-0.098	-0.10
SUR	-0.123***	-3.89	0.007	0.12	-0.755**	-2.21	-0.168	-0.95
DISP	0.001	0.39	-0.001	-0.29	0.025*	1.72	0.093	1.30
LOSS	-0.007**	-2.28	0.005	0.95	-0.011	-0.50	-0.132***	-2.74
NEWS	0.001*	1.82	-0.001	-1.20	-0.001	-0.18	-0.054**	-2.13
HORIZON	-0.000***	-12.02	0.000***	4.34	-0.000**	-2.18	--	--
ANNUAL	-0.007***	-6.62	-0.004	-1.40	-0.000	-0.01	--	--
Firm fixed effects	YES		YES		YES		YES	
Year fixed effects	YES		YES		YES		YES	
Adj.R^2	0.512		0.278		0.266		0.697	
N	10,924		10,924		11,607		3,790	

Panel B: Error-Driven Accounting Restatements

	DV =RES_ERR		
	Est. Coeff.	z-Stat	Marginal effects
*DIFRET*POS*	1.491**	2.01	6.17%
DIFRET	0.096	0.20	0.40%
POS	-0.135	-0.67	-0.56%
ROA	0.401	0.42	1.66%
MTB	-0.048**	-1.97	-0.20%
SIZE	0.091	1.37	0.37%
NUMANALYST	-0.018	-1.45	-0.08%
EARNVOL	0.121	0.92	0.50%
ANNDISP	0.208	0.50	0.87%
NUMSEG	-0.065	-1.01	-0.27%
NUMSEGGEO	-0.002	-0.18	-0.01%
RELATED	-0.431	-1.64	-1.81%
RD	2.807**	2.43	11.61%
LEV	0.706**	2.07	2.92%
BIGN	0.513	1.61	2.12%
LOSS	0.053	0.28	0.22%
AUDITOP	0.216	1.32	0.89%
SEO	0.322	1.48	1.33%
ISSUANCE	0.399*	1.69	1.65%
PRE_RES	3.779***	20.78	15.63%
Industry fixed effects	YES		
Year fixed effects	YES		
Pseudo R^2	0.371		
N	4,099		

TABLE 9
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) which is measured as the difference between the average trading volume of top executives and that of division managers. *HIGH (LOW)* group refers to those firm-years for which top executives' average trading volume is higher (lower) than that of division managers. 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. Appendix A, Panel A provides the definitions of the *DIFRET* and those control variables which are also used in the determinant analysis, and these variables are measured over the prior three years (t-3 to t-1); Appendix A, Panel B provides the definitions of the four attributes of forecasts and other control variables; Appendix A, Panel C provides the definitions of restatement likelihood and other control variables in the regression of restatements. 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	-0.019***	-0.014	-0.039*	-0.044**	-0.098*	-0.158*	-0.214*	-0.070
	(-2.86)	(-0.94)	(-1.78)	(-2.29)	(-1.93)	(-1.69)	(-1.82)	(-0.39)
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	0.522	0.647	0.236	0.565	0.299	0.328	0.701	0.742
N	7,638	3,286	7,638	3,286	8,061	3,546	2,629	1,161

Panel B: Error-Driven Restatement Likelihood

	High Group			Low Group		
	Est. Coeff.	z-Stat	Marginal effects	Est. Coeff.	z-Stat	Marginal effects
DIFRET	0.744*	1.88	1.69%	1.509***	2.64	2.25%
Control variables	YES			YES		
Industry fixed effects	YES			YES		
Year fixed effects	YES			YES		
Pseudo R^2	0.367			0.635		
N	2,909			473		