Internal Information Asymmetry, Internal Capital Markets, and Firm Value

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November 2013

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Abstract

Efficient resource allocation depends on the flow of information from firms' divisions to corporate headquarters. In this paper, we examine the effects of internal information asymmetry between corporate headquarters and divisional managers on internal capital market efficiency and firm value. Using the difference between the insider trading profits of division managers and top executives to measure internal information asymmetry, we find a negative relation between internal information asymmetry and both internal capital market efficiency and firm value. These negative relations are more pronounced for firms with a more complex information environment, for firms with weak corporate governance, and for firms in more concentrated product markets. Moreover, our results are robust to using 2SLS procedure to address the endogeneity issue between diversification efficiency and differential insider trading profit. Last, higher internal information asymmetry associates with both a greater probability of refocus and with higher shareholder wealth effects from refocusing events. We also document significantly reduced internal information asymmetry following refocusing events.

Keywords: Internal information asymmetry, external information asymmetry, internal capital market, firm excess value

JEL: G30, G31, G34, M4

1. Introduction

Corporate finance has long studied the influence of asymmetric information between insiders and outsiders on firm policies and outcomes. Less well understood, however, is how the information channels between a company's top executives and lower-level managers influence these same policies and outcomes. We empirically investigate whether *internal* information asymmetry within a multi-segment firm affects investment efficiency and firm value. Using a novel measure of information asymmetry between divisional managers and headquarters managers based on their insider trades, we find that internal information asymmetry relates negatively to investment efficiency and firm value (excess value) and relates positively to both the probability of and the wealth effects from focus-enhancing restructurings.

Differences between the information sets and motives of divisional managers and top executives stem from private information about divisional investment opportunities and agency conflicts due to private interests, such as career concerns. Theoretical work exploring the operations of internal capital markets highlights the dark side of divisional managers' information advantage over headquarters managers, showing that internal information asymmetry may result in suboptimal allocation of internal capital and value destruction (Harris, Kriebel and Raviv 1982; Milgrom 1988; Harris and Raviv 1996; Harris and Raviv 1998; Rajan, Sevaes and Zingales 2000; Scharfstein and Stein 2000; Bernardo, Cai and Luo 2001 and 2004; Wulf 2009).[1] While recent survey evidence from Graham, Harvey and Puri (2010) illustrates that

[1] There is also a literature that suggests the bright side of diversification. Williamson (1975) shows that the internal capital market of diversified firms may allocate capital more efficiently than the external capital market because top management of a diversified firm is better informed about investment opportunities than external investors. Gertner, Scharfstein and Stein (1994) and Stein (1997) suggest that under certain circumstances internal capital markets might lead to more efficient investment decisions. Thakor (1991) develops a model showing that capital rationing is shareholder welfare enhancing due to external information asymmetry and the resulting moral hazard. Empirically, recent papers demonstrate that conglomeration enables segments to avoid financial constraints during industry distress (Gopalan and Xie 2011) and enables divisions to shift resources in response to shocks to the financial sector (Matvos and Seru 2011).

divisional managers play an important role in the internal capital allocation process, little empirical evidence exists on how internal information asymmetry ultimately influences firm investment and firm value. Our study attempts to fill this void.

We turn to the literature on insider trading to construct our measure of internal information asymmetry. Prior studies argue that the difference between the market-adjusted returns to the trades of two insiders captures the differences in their information sets. For example, Ravina and Sapienza (2010) compare private information between independent directors and top executives using the difference in the profitability of their insider trades. Wang, Shin and Francis (2012) find that CFOs' trades are more profitable than CEOs' trades, and that CFOs' trades seem to take advantage of better information about future earnings. We adopt a similar approach and use the difference in the profitability of insider trades by divisional managers and headquarters managers to capture divisional managers' information advantage relative to corporate headquarters. If divisional managers trade on information that headquarters' managers lack, then a higher differential insider trading profit implies a higher level of internal information asymmetry.[2]

Our main tests explore how this internal information asymmetry measure relates to firm value, to the efficiency of investment, and to both the probability and wealth effects of divesting unrelated divisions. We relate our internal information asymmetry proxy to firm excess value following Berger and Ofek (1995) and to the efficiency of internal capital allocation following

[2] Information asymmetry between divisional mangers and top managers may be attributable to either top managers' information advantages or divisional managers' information advantages. The distinction is important given much of the theoretical work focuses on the transference of divisional managers' information to top managers' decision making. Below, we discuss this distinction and conduct tests designed to better isolate this effect. We conduct a number of tests that suggest our differential insider trading profit measure is positively correlated with internal information asymmetry. First, we find that the accuracy of top managers' management earnings forecasts decreases in our internal information asymmetry measure. Second, we explore the fact that divisional managers' buy decisions and sell decisions may not be symmetrically informative. Discussed in detail below, these tests also suggest our measure captures internal information asymmetry.

Rajan et al. (2000), Billett and Mauer (2003) and Duchin and Sosyura (2013). Using a sample of multi-segment firms obtained from the intersection of COMPUSTAT and Thomson Reuters Insider Trading Database for the firm years of 1987–2011, we document three key findings.[3] First, we find that both firm excess value and the efficiency of internal capital market allocation decrease in the differential insider trading profit between divisional managers and top managers. The results of internal capital allocation efficiency hold for both firm-level analysis and division-level analysis. These findings support the aforementioned studies theoretical predictions that internal information asymmetry impedes efficient internal capital allocation and results in value destruction. We also find stronger negative relations between our internal information asymmetry proxy and firm value and the internal capital market efficiency when the firm's segments are located farther away from company headquarters in terms of flight distance and when the firm's segments are less related (more diversified).

We also explore the interaction between corporate governance and internal information asymmetry. Harris and Raviv (1996) demonstrate that agency conflicts between division managers and top executives exacerbate the influence of internal information asymmetry. Consistent with this notion, we find that the negative relation between differential insider trading profit and both firm excess value and internal investment efficiency is more pronounced for firms with weak corporate governance as measured by higher G-Index, by an indicator for CEO-Chairman duality, and by industry competition (greater product market concentration).

Last, we find that multi-segment firms with greater internal information asymmetry in the current period are more likely to refocus through either divestiture or reorganization in the future. Moreover, we find that stock market reaction to the refocusing event increases in

[3] Identifying divisional managers requires hand-collected information to map an individual manager to a specific division within the firm. We describe this procedure in detail in the data section and in Appendix A.

differential insider trading profits, and that this measure of internal information asymmetry declines following the refocusing events.

We carry out various analyses to validate our internal information asymmetry measure. First, we find that management forecast accuracy declines in differential trading profit, our measure of internal information asymmetry. Second, differential trading profit is higher for division managers' sell transactions than that for their purchase transactions, suggesting that internal information asymmetry mainly resides in bad news, where moral hazard likely prevails. We also conduct numerous robustness checks, including a 2SLS-estimation procedure where in the first stage we explicitly model the determinants of differential insider trading profit. We also compute differential trading profit by requiring non-zero average trading profit for both top executives and division managers (i.e., actual insider trades for both insider groups over the three-year rolling window) and find similar results. Our results are robust to using Driscoll and Kraay (1998) robust standard errors in all empirical estimations, and the results hold for both pre- and post-SFAS 131 subsample periods.

This study makes several contributions to the literature. First, theory papers (Harris et al. 1982; Harris and Raviv 1996; Harris and Raviv 1998; and Wulf 2009) predict a negative association between internal information asymmetry enjoyed by divisional managers and the efficiency of internal capital allocation. However, few papers empirically test this prediction. A closely related paper by Bens and Monahan (2004) finds that firm excess value negatively associates with firm disclosure quality, suggesting that firm value decreases in the degree of information asymmetry between corporate insiders and outside investors. Our study complements theirs by exploring internal rather than external information asymmetry.

Our study relates to Duchin and Sosyura (2013) who show that division managers with a closer social tie to their CEOs receive greater resource allocation than other division managers. They further document that the ultimate influence of these social ties on investment efficiency and firm value is negative when corporate governance is weak and positive when internal information asymmetry is likely high. They illustrate the benefits of social ties in facilitating information transfers from divisional managers to corporate headquarters (i.e., reduced internal information asymmetry). However, they do not directly test the relation between internal information asymmetry and capital allocation efficiency (firm value). In fact, Datta, D'Mello and Iskandar-Datta (2009) do not find any significant relation between two of the three empirical measures of internal information asymmetry employed by Duchin and Sysyura (2013) and internal capital allocation efficiency. Instead, using a direct measure of internal information asymmetry – given that trading profits reflect the insider's actual information set – our study consistently finds a significantly negative association between internal information asymmetry and firm excess value and internal capital market efficiency. Furthermore, our direct measure allows us to quantify the economic magnitude of the effect of internal information asymmetry on firm excess value and the efficiency of internal capital allocation.

Second, our cross-sectional results provide insights into how corporate governance affects the relation between internal information asymmetry and diversification efficiency. Hoechle, Schmid, Walter and Yermark (2012) show that corporate governance partially determines the diversification discount (i.e., firm excess value) of multi-segment firms. Our study extends their work by showing one mechanism through which internal information asymmetry affects firm excess value of multi-segment companies. Our evidence suggests that stronger corporate governance, which likely reduces agency conflicts between division managers and top executives, mitigates the adverse effect of internal information asymmetry. This result highlights how internal information asymmetry and governance interact, leading to diversification inefficiency as argued in Harris et al. (1982) and Harris and Raviv (1996).

Third, we add to the literature on corporate decision-making by mid-level managers. Graham et al. (2010) provide survey evidence that the CEO's opinion of a division manager is the second most important factor in internal capital allocation after the NPV rule. In addition, Acharya, Myers and Rajan (2011) theoretically show that mid-tier managers play an important role in internal governance by limiting the self-serving actions of top management thus mitigating agency problems and improving firm value. Our findings highlight the importance of mid-tier managers' private information in efficiently allocating internal capital. Lastly, this study adds to the literature documenting the factors for corporate restructuring. Our findings suggest that the level of internal information asymmetry relates to future corporate diversification decisions such as corporate divestiture (i.e., refocusing the business lines).

2. Background and hypothesis development

2.1 The relation between internal information asymmetry and internal capital markets

A large theoretical and empirical literature explores the internal capital markets of diversified firms where top management allocates capital across the firm's divisions. The efficiency of the internal capital market depends on the scarcity of capital and on how capital is allocated across divisions with varying investment opportunities. Rajan et al. (2000) develop a theoretical model where division managers exhibit rent-seeking behavior and engage in internal power struggles. The problem intensifies as the firm's degree of diversification increases and results in overinvestment in divisions with relatively poor investment opportunities, with a commensurate destruction of firm value. Scharfstein and Stein (2000) construct a two-tier agency model where both the CEO and division managers enjoy private benefits of control. When agency problems between the CEO and outside shareholders are pervasive, the CEO prefers to compensate rent-seeking division managers with a more generous capital allocation than would be allocated in a first-best setting (with no CEO-shareholder conflict).[4]

Investment distortions resulting from agency conflicts between division managers and top management may be exacerbated by internal information asymmetry. Bernardo et al. (2004) show the misallocation of internal resources increases in the information asymmetry between division managers and corporate headquarters. Even among focused firms where corporate headquarters maximize shareholder value, studies show that deviations from first-best capital budgeting occur when project-level managers have both private information and a preference for greater capital investment. These arguments lead to our first two hypotheses:

H1a: There exists a negative relation between firm value and the degree of internal information asymmetry between division managers and corporate headquarters.

H1b: There exists a negative relation between the efficiency of internal capital market allocation and the degree of internal information asymmetry between division managers and corporate headquarters.

These conjectures are also motivated by Wulf (2009). She models a conglomerate where the headquarters allocate capital to a subsidiary based on a public noisy signal of investment opportunity (i.e., industry q) and on a private signal from the division manager. The noisy public signal is unbiased, while the private signal may be distorted by the division manager due to agency problems. As the noise in the public signal increases, headquarters increase their reliance on the division manager's signal, which decreases the sensitivity of investment to industry q (the

[4] Empirical studies validate these theoretical predictions and generally find evidence that multi-segment firms tend to allocate more capital to those divisions with low growth than to those with high growth (Shin and Stulz 1998; Rajan et al. 2000; Campello 2002; Billett and Mauer 2003; Ozbas and Scharfstein 2010). In other words, the internal capital allocation is often inefficient within conglomerates. Such a suboptimal manner of capital allocation destroys firm value and leads to diversification discount for multi-segment firms (Berger and Ofek 1995;Rajan et al. 2000), especially for those conglomerates whose segments are financially constrained (Billett and Mauer 2003).

public signal) and simultaneously increases headquarters' reliance on the divisional manager's private signal; thereby increasing the potential for investment distortion. Given internal capital market "efficiency" measures use industry q to gauge segment investment opportunity, we expect to see that lower values of such measures associate with greater internal information asymmetry. We also expect internal information asymmetry to associate with greater agency costs leading to lower firm value, ceteris paribus. Both predictions are consistent with the *H1a* and *H1b*.

2.2 The influence of corporate governance and internal information asymmetry

Good corporate governance may better align the interests of headquarters with those of divisional managers. Harris and Raviv (1996) model such a setting where headquarter managers have less information about the division's investment opportunity than division managers and divisional managers have a preference for overinvestment. They allow top executives to undertake a costly audit that reveals division managers' information. By choosing an optimal audit strategy along with the investment allocation and salary decisions, top executives can entice division managers to reveal their private information. Thus, the internal governance of the firm, in establishing investment and compensation policies, helps overcome the adverse effects of internal information asymmetry. In a related study, Ozbas (2005) shows that restricting the CEO's discretionary investment decision improves internal communication; and hence, reduces the intensity of internal competition for resources among division managers. Both studies suggest that better corporate governance, whether in setting compensation structure within the firm or by restricting CEO power, can alleviate the negative effects of internal information asymmetry. This leads to the following hypothesis:

H2: The negative relation between internal capital market efficiency and internal information asymmetry is more pronounced for weakly governed conglomerates.

2.3 Internal information asymmetry and corporate refocusing transactions

Existing studies suggest that focus-enhancing restructurings can enhance firm value by eliminating agency conflicts between headquarters and division managers (Gertner, Powers and Scharfstein 2002; Inderst and Laux 2005). Given such agency conflicts likely increase in the degree of internal information asymmetry, we would expect focus-enhancing divestitures to be more likely taken by conglomerates when internal information disparity is high. This leads to our last hypothesis:

H3: The internal information asymmetry between division managers and top corporate officials is positively associated with a greater likelihood of future corporate refocusing transactions.

3. Measures of key variables, research design and sample selection

3.1 Internal information asymmetry: differential insider trading profit

Prior research shows insiders buy before stock price rises and sell before stock price falls and conclude that insider trading contains private information (Jaffe 1974; Finnerty 1976; Baesel and Stein 1979; Givoly and Palmon 1985; Seyhun 1986; Rozeff and Zaman 1988; Seyhun 1998; Beneish and Vargus 2002; and Ke, Huddart and Petroni 2003). Recent studies investigate the relative information advantage among different types of corporate insiders by comparing the profitability of their insider trades. Ravina and Sapienza (2010) examine whether independent directors are less informed than top executives by comparing the returns to these directors' insider transactions to those of the CEO. Similarly, Wang, Shin and Francis (2012) find that CFOs earn higher abnormal returns from their purchases than CEOs, and that the CFOs' superior performance may be driven by their superior ability to predict future earnings. Following the same rationale, we utilize insider trading profitability to measure the private information of division managers and top executives and use the difference in their trading profits to proxy for internal information asymmetry.

Specifically, to calculate internal information asymmetry for year t, we use individual insider transactions in the prior three years (t-3, t-2 and t-1) and compute the profitability of these transactions as the cumulative size-adjusted returns over six months after the trading day. For insider sales, we add a negative sign to the stock returns so that a lower stock return following insider sales suggests a higher level of trading profitability. We then take the average stock returns to all insider trades conducted by division managers as the trading profitability for this group of insiders (*DIV_RET*); and similarly, the average stock returns to all trades by top executives as the trading profitability for top executives (*TOP_RET*). The differential insider trading profit is measured as the difference between the trading profitability of these two groups:

$$DIFRET = DIV\_RET - TOP\_RET \tag{1}$$

This differential insider trading profit should reflect any information disparity between division managers and top executives. Note, *DIFRET* may often be negative if top executives generally have an information advantage over divisional managers. However, we are more interested in the variation in *DIFRET*, which will also be driven by variation in divisional managers' information. We explore a number of properties of this measure below to help ensure this is indeed the case. We also want to make sure *DIFRET* is not simply capturing information asymmetry between insiders and outside investors; so, we include the average trading profitability of *all* corporate insiders' trades as a control variable in our multivariate analysis.

3.2 Measures of diversification efficiency

3.2.1 Firm excess value

We follow Berger and Ofek (1995) to measure the excess value of a firm by comparing the actual value of the conglomerate firm relative to the implied firm value calculated based on a portfolio of single-segment firms from the same industries as the segments of this conglomerate firm. Specifically, firm excess value is the natural logarithm of the ratio of actual firm value to the implied firm value at the fiscal year-end for year t. Actual firm value is defined as the sum of the market value of equity and the book value of total debt. Implied firm value is the sum of each segment's implied value which is obtained by multiplying the segment's assets (sales) by the median ratio of firm value divided by assets (sales) for all single-segment firms in the same industry as the segment. For each firm-year we compute two excess value measures using implied firm values based on either the median asset multiplier (*EXVAL_AT*) or the median sales multiplier (*EXVAL_SALE*). Following Berger and Ofek (1995), we require the deviation of the sum of segment sales from the firm total net sales to be within 1% of the total firm net sales for *EXVAL_SALAE* and the deviation of the sum of segment assets from the firm total assets to be within 25% of the firm total assets for *EXVAL_AT*.

3.2.2 Efficiency of the internal capital market

As discussed previously, numerous studies find diversified firm value depends on the efficiency of the firm's internal capital market. We use empirical measures of the efficiency of internal capital allocation adapted from Rajan et al. (2000). The first measure of investment efficiency is the relative value added from internal capital allocation (*RVA*) which incorporates both firm and industry adjustments:

$$RVA = \sum_{i=1}^{n} \omega_i (q_i - \overline{q}) \left\{ \frac{Capex_i}{BA_i} - \left(\frac{Capex}{BA}\right)_{iAvg} - \sum_{i=1}^{n} \omega_i \left[\frac{Capex_i}{BA_i} - \left(\frac{Capex}{BA}\right)_{iAvg} \right] \right\} \qquad (2)$$

where ω_i is the proportion of segment i's book value of assets to firm assets, BA_i is the book value of segment i's assets, $Capex_i$ is the capital expenditure of segment i, q_i is segment i's q proxied by the mean asset-weighted Tobin's q of all single-segment firms operating in the same three-digit SIC industry as that of segment i. $\overline{q}$ is the mean asset-weighted q_is of the multi-segment firm. A higher value of *RVA* represents more efficient internal capital allocation.

The second measure of internal capital market efficiency is the absolute value added (AVA) which uses a value of 1 as the benchmark q for value added investment rather than the $\overline{q}$ benchmark in *RVA*:

$$AVA = \sum_{i=1}^{n} \omega_i (q_i - 1)\left\{ \frac{Capex_i}{BA_i} - \left(\frac{Capex}{BA}\right)_{iAvg} - \sum_{i=1}^{n} \omega_i \left[\frac{Capex_i}{BA_i} - \left(\frac{Capex}{BA}\right)_{iAvg} \right] \right\} \tag{3}$$

For both efficiency measures, the variables q_i and ω_i are measured as of the beginning of the period. Therefore, we require sample firms to have the same segments in t-1 and t in computing the two internal capital market efficiency variables.[5]

3.3 Sample selection and data sources

Our main sources of data are the TFN Insider Filing Data for insider trading information, COMPUSTAT Segment file for segment financial information, COMPUSTAT for multi-segment firm financial data, CRSP monthly file for stock return, IRRC database for corporate governance, and First Call database for management earnings guidance. The TFN Insider Filing Data contains information on all corporate insider trading activities reported on SEC Forms, 3, 4, and 5 from 1986 to 2011.[6] The Exchange Act of 1934 requires all individuals that have access to

[5] Our all results are robust when we further require firms to have non-missing firm excess value measures for the sample firms used in the tests of internal capital allocation efficiency.

[6] More specifically, Form 3 contains an initial statement of beneficial ownership for all individuals required to file with the SEC. Form 4 contains changes in ownership positions, including stock purchases, sales, options grants, option exercises, and gifts. Form 5 contains the annual statement of change in beneficial ownership, and any exempt transactions not reported on Form 4.

non-public, material, insider information to report sales or acquisitions of the company's securities to the SEC, and includes the company's officers at headquarters, subsidiaries, and divisions, as well as directors and beneficial owners of more than 10% of the company stock. The dataset contains the name of each filer, the various positions she holds in the firm (i.e., president, chairman, CEO, division officer), the date of the transaction, the number of shares transacted, the price paid/received, and the filer's reported state of residence and zip code.

We focus on open market purchases and open market sales by corporate insiders. We identify headquarters managers' trading activities using transactions by top officers: chairman, vice chairman, CEO, CFO and COO.[7] We identify divisional managers' transactions 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.[8]

We use the following procedure to determine the managers' specific division within the multi-segment firms. Our sample begins in 1986, the first year TFN Insider Filing Data reports transactions. We match insider trading records to the COMPUSTAT Annual files and require firms be covered by the COMPUSTAT Segments database.

We obtain 6,936 unique multi-segment firms (33,656 firm-years) from the COMPUSTAT which reduces to 5,514 firms (29,531 firm-years) after merging with the TFN Insider Trading database.. We require firms to have stock return data available from the CRSP,

[7] In case chairman is an independent director, which should not be classified as top executives, we perform robustness check by excluding chairman's trading activities from calculating top executives' trading profit. Untabulated results indicate our results are unaltered.
[8] We identify other non-top executives mainly based on relationship code "rolecode1" (role code = AV, EVP, O, OP, OT, S, SVP, VP, GP, LP, M, MD, OE, TR), which represents the primary role of insiders.

have at least one insider trading transaction by division managers, and have at least one transaction by top executives over our entire sample period (1986-2011). The final sample consists of 2,915 firms that correspond to 22,154 firm-year observations.

We exclude firm-years lacking insider trades by both division managers and top executives in the three years leading up to the current year (i.e., when we cannot compute *DIFRET*).[9] This procedure yields 2,178 unique firms and 16,077 firm-year observations where 13,058 firm-years have non-zero trading profit for top executives and 7,603 firm-years have non-zero trading profit for division managers. Finally, we exclude financial and utility firms and require control variables be available resulting in our final sample, consisting of 13,032 firm-year observations for 1,951 multi-segment firms during the period 1987-2011.[10] The sample size is significantly reduced to 8,247 firm-years (1,435 multi-segment firms) for the test of internal capital allocation efficiency due to the additional data requirements to compute the investment efficiency measures (*RVA* and *AVA*). All of our variable definitions are contained in Appendix A.

We also create a division-level (as opposed to the above described firm-level) sample. For S&P 1500 firms, we hand-collect division manager information from 10-K filings and map the insider trading data for division managers to the specific divisions from the segment file. We describe this process in detail in Appendix B. We use this sample to conduct a number of divisional tests and robustness checks.

[9] For those firm years with trading records for one group of insiders (i.e., division managers or top executives), we set the insider trading profit as zero for the other group. In the robustness analysis in Section 4.6, we further constrain our sample as firm years with insider trades for both groups for the calculation of differential insider trading profit. Although the sample size is much smaller, we still find similar results for our main conclusions (untabulated).

[10] We lose year 1986 due to the one-year lag requirement for calculating differential trading profitability between division managers and top executives.

4. Empirical results

4.1 Descriptive statistics

Our first set of tests explore the relation between our internal information asymmetry measure, *DIFRET*, and management earnings forecasts. We expect greater internal information asymmetry to associate with less accurate forecasts. The other three sets of tests focus on testing H1, H2, and H3 which explore the relation between *DIFRET* and firm excess value, internal capital allocation efficiency, and firms' divestiture activities, respectively. Table 1 provides summary statistics for all the variables used in these tests.

Panel A reports descriptive statistics for the variables used in our tests relating management earnings forecast errors and, *DIFRET*, which we discuss in detail below. Panel B reports the descriptive statistics of the variables used in testing H1a and H2 for our full sample Where we see in the mean excess value for our sample of conglomerates is -0.011 (*EXVAL_AT*) and -0.094 (*EXVAL_SALE*), comparable to prior studies when we use a comparable sample period.[11]

In Panel B, we see the mean of top executives' trading profit (*TOP_RET*) is 0.045, and the mean of division managers' trading profit (*DIV_RET*) is lower, 0.022. Both are statistically different from zero at the 0.01 level suggesting that both parties possess significant private information. The difference between the trading profits of division and top managers (*DIFRET*) has a mean of -0.023 and a median of -0.013, both statistically different from zero at the 0.05

[11] Using the sample of conglomerates for the period 1990-1998, Billett and Mauer (2003) report a mean value of -0.080 for *EXVAL_AT* and -0.112 for *EXVAL_SALE*. For our firm-year samples in 1990-1998, we find a mean value of -0.071 and -0.104, respectively, for *EXVAL_AT* and *EXVAL_SALE*. Moreover, Hoechle et al. (2012) use a relatively more recent sample of multi-segment firms in 1996-2005 and find an average value of -0.023 for *EXVAL_AT* and -0.053 for *EXVAL_SALE*. For our firm-year samples in 1996-2005, the mean value is -0.018 and -0.077, respectively, for *EXVAL_AT* and *EXVAL_SALE*.

level. This negative mean value is consistent with top executives possessing greater private information than division managers on average.

We also use other measures of diversification complexity based on segment industries and on segment proximity to headquarters. Panel B reports that 56 percent of segments within a conglomerate are in unrelated industries and that the average flight time between divisions and headquarters is about 60.7 minutes (Appendix C describes how we compute flight time). Panel B also reports corporate governance characteristics. We see CEOs play a dual role, acting as both CEO and Chair, in 40 percent of our sample.

Panel C presents the descriptive statistics of the variables used in testing H1b and H2. Consistent with Rajan et al. (2002), we see the two measures of internal capital allocation efficiency (*RVA* and *AVA*) have negative mean values of -0.0018 and -0.0004.[12] Panel D reports the descriptive statistics of variables used in testing H3. On average 1.8 percent of our sample undertake focus enhancing restructurings.

Table 2 presents correlation coefficients among the variables for the tests of firm excess value and internal capital allocation efficiency. In Panel A, we find a negative correlation between differential insider trading profit (*DIFRET*) and firm excess value (*EXVAL_AT* and *EXVAL_SALE*), consistent with the notion that higher internal information asymmetry associates with a higher diversification discount. We also find that firm excess value negatively correlates with the average insider trading profit of all insiders (*ALL_RET*), top executives' trading profit (*TOP_RET*) and division managers' trading profit (*DIV_RET*). These findings suggest that insider trading profits may reflect general information asymmetry between insiders and outsiders

[12] Based on sample firms in 1980-1993, Rajan et al. (2000) report a mean value of -0.0012 for *RVA* and -0.0006 for *AVA*.

and highlights the need to include the general insider trading profitability (*ALL_RET*) to control for external information asymmetry in our multivariate tests.

The correlations between these insider trading profit measures and traditional measures of external information asymmetry are also noteworthy. The Pearson correlation coefficients between *DIFRET* and proxies for the firms' external information asymmetry are generally small, while the insider trading profit of all insiders (*ALL_RET*) is highly correlated with measures of external information asymmetry. Specifically, *DIFRET* is not significantly correlated with the number of segments (coefficient= -0.007) or with the number of analysts following (*NUMANALY*) (coefficient= 0.005), while *ALL_RET* is significantly negatively correlated with both (coefficient= -0.024 and -0.080, respectively). Moreover, *DIFRET* is not significantly correlated with either the standard deviation of *ROE* (*STDROE*) or the magnitude of earnings surprise (*SUR*), both of which proxy for investors' uncertainty about firm performance. In contrast, all three measures of insider trading profits *ALL_RET*, *TOP_RET* and *DIV_RET* have a statistically significant correlation with *STDROE* and *SUR*. These results suggest that unlike pure insider trading profit measures, our measure of differential insider trading profit (*DIFRET*) does not appear to reflect the firms' external information asymmetry. Below, we further explore the validity of *DIFRET* as a proxy for the internal information asymmetry.

In Panel B of Table 2, we find a negative correlation between *DIFRET* and the two alternative measures of internal capital efficiency (The Pearson coefficients are -0.039 and -0.052 for *RVA* and *AVA*, respectively). These results are consistent with higher internal information asymmetry leading to a less efficient internal capital market. In contrast, these internal capital allocation efficiency measures are not significantly correlated with the average insider trading profit (*ALL_RET*) (coefficient= 0.025 and 0.022, respectively).

Overall the results imply that differential insider trading profit, *DIFRET*, tends to capture internal information environment while the raw measures of insider trading profit based on the insider trades by all insiders (*ALL_RET*), top executives (*TOP_RET*) or division managers (*DIV_RET*) seem to associate more with the external information environment. We next examine properties of *DIFRET* to shed further light on whether this measure indeed captures internal information asymmetry.

4.2 DIFRET as a measure of internal information asymmetry

To investigate the validity of our measure of internal information asymmetry we test whether *DIFRET* associates with the accuracy of top managers' earnings forecasts. When internal information asymmetry is high we would expect less accurate management earnings forecasts. To see if this is the case we regress the absolute value of management forecast errors on *DIFRET* and control variables. The results of this test are reported in Table 3 with columns (1) and (2) based on quarterly and annual earnings forecasts. The dependent variable is the absolute value of forecast errors, measured as the absolute difference between management earnings forecasts and actual earnings per share, scaled by stock price at the beginning of the year. For both regressions, the coefficient on *DIFRET* is positive and statistically significant at the 5% level (coefficient = 0.004 and 0.005; t= 2.23 and 2.06; respectively), consistent with the notion that *DIFRET* indeed captures internal information asymmetry.

We explore how *DIFRET* varies with indirect measures of the internal information environment used in Duchin and Sosyura (2013) and by whether division managers' trades are predominantly buys or sells. The three measures that likely increase the potential for internal information asymmetry are the flight distance from the headquarters to the division, and the two measures for the degree of industry diversification within the firm based on relatedness and on the concentration of sales among the segments (*Unrelatedness* and *FirmHH)*. We expect *DIFRET* to be larger when divisions are located farther away from headquarters and when there is greater industry diversification within a firm. We also posit that division managers' information advantage likely exhibits asymmetry because they are primarily concerned about revealing bad news to headquarters which would likely result in smaller budget allocation. This potential asymmetry of divisional manager trades suggests we would see higher values of *DIFRET* when division managers engage in abnormal selling.

We test to see if *DIFRET* differs when stratified along these dimensions and report the results in Table 4. We define good-versus-bad news based on whether division managers' trades are buys or sells. Specifically, we compare division managers' net selling in dollar amount (sell trades – buy trades) in the current year with the average prior three years' net selling dollar amount. If the former exceeds the latter, then division managers' net trading is classified as abnormal sell, thus bad news. We similarly classify abnormal buys.[13] As news is defined annually, we measure *DIFRET* on an annual basis rather than take three years average for the tests reported in Table 4.[14] In Panel A we report the mean of *DIFRET* stratified by divisional managers' trading direction (i.e., buy or sell) and by whether the firms' divisions are on average within a relatively long versus short flight distance from headquarters based on above and below the median flight time for our sample firms.[15] We develop the measure of flight distance following Giroud (2013) (see Appendix C for details). First, we see the mean and median *DIFRET* takes on higher values (i.e., less negative) when the divisions are farther apart and when

[13] This procedure leads to a smaller sample because we exclude firm-years for which division managers don't trade for the current and previous three years.
[14] All results in Table 4 hold if we take the average of three-year trading profit for computing *DIFRET*. While doing this, we also extend the period for computing abnormal sell or buy of division managers accordingly.
[15] For firm-years with zero *DIV_RET*, where division managers did not trade in the prior three years, we go back to identify the most recent non-zero trades by division managers and apply their distances for the current year.

the division manager trades are abnormal sells. The differences are statistically significant at the 5% level or better, suggesting that the information advantage of division managers is larger when the potential for internal information asymmetry is greater. We see this same pattern of *DIFRET* in Panels B and C when we stratify the sample based on the other two industry-based measures of firm diversification (*Unrelatedness* and *FirmHH* – see Appendix A for precise definitions) Overall, these results support the notion that *DIFRET* captures the information asymmetry between division managers and top executives and this information asymmetry mainly resides in bad news.

4.3 Internal information asymmetry, firm value, and investment efficiency

We next explore the relation between internal information asymmetry and firm value. We regress the two excess value measures on *DIFRET*, control variables and both firm and year fixed effects. We report the results in Table 5. In columns (1) and (3) of Panel A, the coefficient on *DIFRET* is negative and statistically significant at the .05 level for both assets-based and sales-based measures (-0.056 and -0.049; with t-value = -2.48 and -2.18; respectively). These results suggest that higher internal information asymmetry associates with lower firm excess value. From an economic perspective, a one standard deviation increase in differential insider trading profit is associated with a decrease in firm excess value of 1.5% for assets-based measure (*EXVAL_AT*) and 1.3% for sales-based measure (*EXVAL_SALE*).

The coefficient estimates on the control variables are generally consistent with prior literature (e.g., Bens and Monahan 2004). Notably, the coefficient on the average insider trading profit (*ALL_RET*) is negative and statistically significant, suggesting external information asymmetry reduces firm excess value, and also consistent with Bens and Monahan (2004).

In columns (2) and (4), we control for corporate governance following Hoechle et al. (2012) by including *GINDEX*. We continue to find a negative and significant coefficient on *DIFRET*, suggesting that internal information asymmetry affects firm value over and above corporate governance.

In Panel B of Table 5, we present results from regressions of internal capital allocation efficiency measures on *DIFRET*. The coefficient on differential insider trading profit is negative across both regressions for *RVA* and *AVA* at a significance level of 0.05 (coefficient = -0.002 and -0.003; t = -2.11 and -2.16; in columns (1) and (3), respectively). These results suggest greater internal information asymmetry leads to a less efficient internal capital market. Results are similar after including *GINDEX* in the regressions as shown in columns (2) and (4).

We also conduct these tests using hand-collected division-level data. As described in Appendix B, we use divisions among S&P 1500 firms for which we are able to map division managers' trading information to the Compustat segment file. For this sample, we find broadly similar results as reported in Panels A and B of Table 5, where *DIFRET* for a firm is computed as either equally-weighted or value-weighted *DIFRET* across all division managers (where the weight is the divisions' book value of assets. Furthermore, we estimate pooled regressions at division level, in which the dependent variable is divisional capital investment and the independent variable of interest is the two-way interaction between divisional *DIFRET* and Tobin's Q following Duchin and Sosyura (2013). We employ three estimation techniques alternatively to address measurement errors in Tobin's Q: OLS, the higher-order moment estimator proposed by Erickson and Whited (Erickson and Whited, 2000; 2002; 2013), and the Arellano and Bond (1991) instrumental variable estimator (Almeida, Campello and Galvao 2010). Regardless of the estimation technique used, we obtain consistent results that Tobin's Q is positively associated with divisional capital investment and this positive relation reduces in divisional *DIFRET*, suggesting internal information asymmetry reduces investment efficiency.

Table 6 reports results where we see if the influence of *DIFRET* on firm value and investment efficiency is more pronounced when the internal information environment is particularly challenging. We use the same three proxies for such an environment as that in Section 4.2 interacted with *DIFRET* in regressions.

Panel A reports the results from the regressions of *EXVAL_AT*.[16] The first column of Panel A reports the results using the logarithm of the mean flight time between the divisions and corporate headquarters to measure internal information environment (See Appendix C for the detailed computation of flight distance). We expect *DIFRET* to better capture internal information asymmetry when divisions are more distant from headquarters. The variable *IA,* where *IA* stands for the information asymmetry proxy, has a negative coefficient that is significant at the 10% level, suggesting that in the absence of internal information asymmetry, flight distance might also influence diversification efficiency. Moreover, the interaction between flight distance and differential insider trading profit (*DIFRET*IA*) is negatively correlated with firm excess firm value (coefficient= -0.025; t= -2.05). This finding is consistent with the notion that *DIFRET* captures internal information asymmetry more precisely when the flight distance between corporate headquarters and divisions is longer.

In the second column we report the results using *Unrelatedness* for *IA* which presumes greater potential internal information problems when a firm has more unrelated divisions.[17] In the third column we use the negative of a Herfindahl index of divisional sales (*FirmHH*)*,* ranging

[16] Results are similar when *EXVAL_SALE* serves as the measure of firm excess value. For brevity, we only tabulate the results based on *EXVAL_AT*.

[17] To be consistent with the prior literature, we keep the two variables (*Related* and *Unrelatedness*) separately though they both are measured similarly. Not surprisingly, the results are both quantitatively and qualitatively similar if we use one or the other.

from -1 to 0, to measure the concentration of a firm's sales across its segments (where a single-segment firm would have a value of -1). For both measures, we predict a negative coefficient on their interaction with the internal information asymmetry measure. We see the coefficient on the interaction term of *DIFRET*IA* is negative and significant at the 5% level for both measures of firm diversification in columns (2) and (3). These results suggest that the influence of *DIFFRET* on firm excess value increases as the firm's internal information environment becomes more challenging.

We conduct parallel tests using internal capital market efficiency (*RVA*) as the dependent variable and report results in Panel B.[18] We see a negative and significant coefficient on the interactive terms in all three specifications using our *IA* proxies. This finding conveys a similar message that flight distance strengthens the negative relation between differential insider trading profit and diversification efficiency for multi-segment firms.

Overall, the results in Table 6 not only add credence to our more direct measure of internal information asymmetry, but they also suggest our measure captures the element beyond what is captured by less direct proxies for the internal information environment. In summary, our findings support the hypotheses that higher differential insider trading profit associates with lower firm excess value and a less efficient internal capital allocation. We next turn to the predictions that better corporate governance can mitigate the negative effects of internal information asymmetry.

4.4 Internal information asymmetry and corporate governance

Theory predicts that strong corporate governance can mitigate the effect of internal information asymmetry on diversification efficiency. If good governance improves the

[18] Results are similar when *AVA* serves as the measure of internal capital market efficiency. For brevity, we only tabulate the results based on *RVA*.

information flow between division managers and top executives, we would expect the negative influence of *DIFRET* on firm value and the efficiency of internal capital allocation to be less pronounced in well governed firms. Table 7 reports results from regressions where we interact *DIFRET* with governance measures. In Panel A, we focus on firm excess value. In column (1) we use *GINDEX* to measure corporate governance and the sample size decreases to 6,705 firm-years due to the data requirement for *GINDEX*. A higher *GINDEX* value implies worse corporate governance. As shown in Panel A, the coefficient on the interaction between *GINDEX* and differential insider trading profit is negative and statistically significant at the .05 level for the regression of asset-based firm excess value (coefficient= -0.032 with t= -2.24). When a firm moves from a dictatorship regime to a democratic regime (i.e., *GINDEX* decreases from 14 to 5), the sensitivity of asset-based firm excess value to differential insider trading profit decreases from 0.554 to 0.266. In addition, the coefficient on *GINDEX* itself is negative and statistically significant at the 0.05 level, implying that corporate governance affects diversification efficiency above and beyond the channel of internal information asymmetry. The coefficient estimates on other control variables are largely consistent with those reported in Table 5.

In column (2) of Panel A, we measure corporate governance as an indicator for a firm's CEO being also the chairman of the board (*DUALITY*). When the CEO plays a dual role, the corporate governance is deemed to be worse. The results show a negative coefficient on the indicator of CEO duality (coefficient= -0.049; t= -1.79), suggesting a lower firm excess value for firms with worse corporate governance. The variable of interest, differential insider trading profit (*DIFRET*), is still negatively correlated with firm excess value (coefficient= -0.069; t= -1.65). The effect of *DIFRET* on firm excess value is much stronger when the CEO is also the chairman of the board as evidenced by the negative coefficient on the interaction item *DIFRET*CG* in column (2) (coefficient= -0.074; t= -2.07). Results based on *EXVAL_SALE* are shown in columns (3) and (4) and are similar to those discussed. Overall, the results in Panel A show that internal information asymmetry, as measured by differential insider trading profit, has a stronger negative effect on firm excess values for firms with weaker corporate governance.

In Panel B of Table 7, we capture the efficiency of internal capital allocation using the *RVA* and *AVA*. In the first regression specification for which *GINDEX* serves as the measure of corporate governance, the interaction between differential insider trading profit and *GINDEX* is negative and statistically significant at the .05 level, consistent with a lower level of efficiency in internal capital allocation for firms with weak corporate governance (coefficient= -0.001; t= -2.14). In terms of the economic magnitude, these results imply that when a firm moves from a dictatorship to democratic regime (i.e., *GINDEX* decreases from 14 to 5), the sensitivity of internal capital market efficiency (measured as *RVA*) to differential insider trading profit decreases from 0.020 to 0.011, suggesting the influence of internal information asymmetry is smaller when firms have better corporate governance. We draw similar conclusions for the second regression specification for which we use a CEO's dual role to serve as the alternative measure of corporate governance and when we use *AVA* as the proxy for internal capital allocation efficiency in columns (3) and (4). In sum, the findings from Table 7 suggest that good corporate governance mitigates the negative effects of internal information asymmetry on the efficiency of internal capital allocation and firm excess value.

Giroud and Mueller (2010) show that industry competition can discipline managers much in the same way that corporate governance does and that high industry competition may substitute for good governance. If a higher level of industry competition is more likely to mitigate the negative consequences of internal information asymmetry, then we would expect the negative influence of *DIFRET* to be diminished with intense industry competition. To see if this is the case we compute the Herfindahl index of sales for each of the 2-digit SIC industries that correspond to the firm's divisions, take the average across all divisions, and label it *IndustryHH*. A higher value of *IndustryHH* implies a lower degree of industry competition, predicting a negative coefficient on the interaction of *IndustryHH* and *DIFRET*. In Panel A of Table 8, we see this prediction is confirmed. *IndustryHH* carries a negative and significant coefficient in the excess value regressions, suggesting that industry concentration has a direct adverse effect on firm excess value. More importantly, the coefficient on the interaction of differential insider trading profit with the *IndustryHH* is negative and statistically significant at the .05 level in both asset-based firm excess value regression (coefficient= -0.191; t= -2.37) and sales-based firm excess value regression (coefficient= -0.181; t= -2.09). In Panel B, we use *RVA* and *AVA* as the dependent variables in the regressions and find a negative coefficient on the interaction item *DIFRET*IndustryHH* for both *RVA* regression (coefficient= -0.009; t= -2.30) and *AVA* regression (coefficient= -0.009; t= -2.12).

4.5 Two-stage estimation of DIFFRET and diversification efficiency measures

One concern for our study is that firm's diversification decision and its internal information asymmetry may be endogenous. To this point we have included firm fixed effects to control for time-invariant firm characteristics and we control for other time-variant firm characteristics that have been previously documented to have an effect on firm diversification efficiency. Further, we use the prior years' (lagged) differential insider trading profit in the regressions to alleviate the concern of joint determination of internal information asymmetry and the contemporaneous internal capital market efficiency.[19]

We still may have unresolved endogeneity issues; however, so wenext turn to two-stage least square estimation (2SLS). Specifically, we employ two instrumental variables for the first stage regression of *DIFRET*: flight distance (*FLIGHT_TIME*) and local Garmiase index (*GARMAISE*). To see whether *FLIGHT_TIME* influences *DIFRET* we conduct an event study using the division level data. We investigate changes in *DIFRET* when a direct flight between the division and headquarters is added or is cut. We find that *DIFRET* decreases significantly from -0.0018 to -0.0255 (the difference is statistically significant at .01 level) when a new airline route is introduced – we only include events that reduce the air time by at least 50% and where the time saving exceeds two hours. When a direct flight between the division and corporate headquarter is cut and increases air time by at least 100% and adds more than two hours, we find that *DIFRET* increases and the increase is significant at .10 level. This evidence suggests that indeed internal information asymmetry is directly affected by flight distance and should serve as a good instrument for *DIFRET*.

Our second instrument, *GARMAISE*, is computed as the average Garmaise index (Garmaise 2011) across the states where division managers are located.[20] Garmise (2010) finds that tougher non-competition enforcement promotes executive stability. If so, we expect division managers to be more entrenched in tougher enforcement regimes, resulting in a greater information

[19] Recall we calculate *DIFRET* in t using insider trades that occur in the prior three years. In the 2SLS framework, we calculate DIFRET in t using insider trades that occur in t-2, t-1, and t to align insider trades with firm excess value and internal capital allocation efficiency contemporaneously.

[20] Similar to the calculation of flight distance between divisions and corporate headquarters, for firm-yeas without division manager trades in previous three years, we go back to identify trades by division managers in an extended period of nine years and apply their locations to the calculation of *GARMAISE*. If we still cannot find any division manager trades, we extend this search to the entire sample period.

advantage (Harris 1998).[21] *GARMAISE* likely satisfies the exogeneity assumption required for a valid instrument variable, because firm internal capital allocation efficiency is firm specific and will unlikely be affected by state-wide law enforcement except via the information channel. The Garmaise index measures the enforceability of anti-competition agreements (Garmaise 2011) for all states of the U.S. ranging from 0 to 9, where higher values indicate greater enforceability. Flight distance (*FLIGHT_TIME*) affects internal information asymmetry directly because information acquisition costs vary with flight distance (Giroud 2013).

Panel A of Table 9 presents the 2SLS regression results for firm excess value test. Consistent with our expectation, in the first stage regression the coefficients on both *FLIGHT_TIME* and *GARMAISE* are positive, and both are statistically significant at the 0.05 level or better, suggesting that differential insider trading profit is lower when division managers are located in states with lower enforceability of non-competition agreements or when divisions are close to corporate headquarters. In the second stage regression, the coefficient on differential trading profitability continues to be negative and statistically significant at the .05 level, for both asset-based firm excess value (coefficient= -0.071; t= -2.07) and sales-based firm excess value (coefficient= -0.093; t= -2.16). Admittedly, it is always possible that unobservable factors drive our results. The magnitude of the coefficient estimate from the 2SLS is larger than that from OLS, however, suggesting bias in the OLS appears to go against our prediction. Our 2SLS also satisfies over-identification concerns (test fails to reject the over-identification null), suggesting that the two instruments satisfy the exogeneity assumption. The two instruments also pass the weak instrument test with F-statistic of 13.762 and 12.738, respectively.

[21] The enforceability of non-compete agreements is determined by where the employee works rather than where corporate headquarters locate or a choice of law provision (Wyse Kadish LLP 2011).

Panel B of Table 9 reports similar results when internal capital efficiency measures, *RVA* and *AVA*, are used to proxy for internal capital market efficiency. In the first stage regression, the two instrumental variables (*FLIGHT_TIME* and *GARMAISE*) continue to load positively. More importantly, the second stage regressions show a negative and statistically significant coefficient on differential insider trading profit. In sum, correlated omitted variable or joint determination between differential insider trading profit and diversification efficiency is less likely to be a concern for inferences.

4.5 Internal information asymmetry and focus-enhancing divestitures

So far our results show that internal information asymmetry associates negatively with firm excess value and the efficiency of the internal capital market. This suggests that greater internal information asymmetry may create a greater incentive to divest segments to mitigate the adverse consequences of internal information asymmetry.

To test this prediction, we first search for decreases in the number of segments from one year to the next. We find 249 such changes involving 177 sample firms. Following Dennis, Dennis and Sarin (1997), we verify each reported decrease in the number of segments by searching annual reports and *Factiva* for any information related to the change. Some cases of decreasing segments are simply due changes in the way the firm reports the results of its operating units or due to the firm reconfiguring its existing lines of business. We exclude such cases and only include cases associated with divestitures, discontinued operations and spinoffs – which we define as refocusing events. Of the final sample of 224 refocusing cases, 160 cases are associated with divestitures of operating units, 19 cases are associated with discontinuing operations and 45 cases are associated with spinoffs.

Table 10 presents the results of firm refocus analysis. Panel A reports the results testing the relation between internal information asymmetry and the likelihood of future refocusing events. We follow the specification in Berger and Ofek (1999) for both the firm-level sample and the division-level sample. For the firm-level sample, the dependent variable, *REFOCUS*, is coded as 1 if a multi-segment firm takes on refocusing events in the subsequent two years; and zero otherwise. The division-level sample consists of only multi-segment firms that take on refocusing events. For the division-level sample, *REFOCUS* is coded as 1 for divisions that are divested in the subsequent one year; and zero for divisions that remain with the multi-segment firm. Therefore, in conducting the analysis based on the division-level sample, we essentially use the remaining segments as the controls for the divested segments within the same firm. Moreover, *DIFRET* and other control variables (e.g., segment *ROA*, sales growth etc.) are calculated at the division-level for the division-level sample.

As shown in column (1), based on firm-level sample after controlling for firm excess value, the coefficient on differential insider trading profit (*DIFRET*) is positive and statistically significant at the .05 level, consistent with the prediction in H3 (coefficient = 0.189; chi-square = 6.44). The average marginal effect of *DIFRET* is 0.63 percent, which is about 17.3 percent of the sample unconditional mean of 3.65 percent. We also find both return-on-asset and sales growth are negatively associated with the likelihood of refocus, consistent with Berger and Ofek (1999). The results are similar when we use the division-level sample, as shown by the positive coefficient on *DIFRET* (coefficient=0.575, chi-square =2.79) in column (2). For the division-level sample, the average marginal effect of *DIFRET* is 3.09 percent, which is about 16.9 percent of the sample unconditional mean of 18.2 percent (among 1,356 firm-division observations, 247 divisions are divested).

To provide further evidence that refocusing program is motivated by reducing internal information asymmetry, we compute the change in DIFFRET surrounding the refocusing events. Specifically, we compare *DIFRET* computed based on insider trades that occur in the three years preceding the event with *DIFRET* computed based on insider trades that occur in the three years following the event. The result is reported in Panel B of Table 10. Based on the 224 refocusing transactions, the mean differential insider trading profit in the period preceding refocusing transactions is -0.003 and the median is -0.007, both of which are statistically indistinguishable from zero. In the period following refocusing transactions, the mean (median) decreases to -0.042 (-0.017) at a statistical significance level of 0.01, implying that division managers possess less private information than top managers. More importantly, the t-test of the difference in mean between the pre- and post-refocusing transaction period is statistically significant at the .01 level, and the Wilcoxon rank test of the difference in median is also statistically significant at the .01 level. Overall, this univariate analysis provides evidence consistent with the notion that corporate refocusing transactions significantly reduce internal information asymmetry.

To corroborate the findings in panels A and B, we conduct an additional analysis of the correlation between *DIFRET* and three-day abnormal return of refocus event announcements and the results are reported in Panel C. In column (1), we find a positive coefficient on *DIFRET* (coefficient=0.225; t=2.27). We also use the differential insider trading profit measured based solely on the managers of those divested divisions, again using our hand-collected division-level sample. The results are reported in column (2). As evidenced by the positive and significant coefficient on *DIFRET* (coefficient=0.158; t=1.79), we find similar results for the firm-level sample and the division-level sample. In sum, these results suggest that stock market understands the negative consequence of internal information asymmetry, and thus responds positively to the announcements of refocusing events.

4.6 Additional analysis, discussion, and robustness tests

We conduct one additional analysis exploring the non-linearity relation between *DIFRET* and firm excess value. A positive value of *DIFRET* unambiguously indicates that division managers have more private information than top executives while a negative value of *DIFRET* can occur in at least two scenarios: 1) when division managers have different information than top executives but overall top executives have more valuable information than division managers; and 2) when division managers' information is purely a subset of top executives'. In the latter case, since top executives have all information that division managers have, *DIFRET* merely reflects the degree of information advantage by top management over division managers, and hence, should not affect the efficiency of internal capital market allocation due to division managers' information advantage. The possibility of the second scenario suggests that our results will be stronger when *DIFRET* is positive. The results reported in column (1), Panel A of Table 11 show that the coefficient of the interaction term between *DIFRET* and the indicator for positive *DIFRET* is negative and statistically significant (coefficient= -0.055; t= -1.76). In addition, the effect of *DIFRET* on firm value almost doubles in the positive region of *DIFRET* compared with the negative region, consistent with our prediction. We find similar results for sales-based firm excess value measure. As evidenced in Panel B of Table 11, we also find a stronger effect for the efficiency of internal capital market analysis when *DIFRET* is positive.

We conduct a number of additional robustness checks. Ownership structure may also alleviate internal agency conflicts and mitigate the effect of *DIFRET* on firm value and internal capital market efficiency. In untabulated tests, we find that the interaction of *DIFRET* and institutional ownership, measured as the percentage of shares owned by institutions, carries a positive and significant coefficient in regressions. Similarly, we find the coefficient on the interaction of *DIFRET* and the percentage of shares owned by top managers is positive and significant in regressions.

When we compute trading profit for top executives, we include the chairman position. However, many times the chairman is an independent director. Therefore, this chairman is not an employee of the firm for which he serves as the chairman, and this type of chairmen should not be included in the top executive group. We exclude all chairman positions from top executives and re-calculate *DIFRET*. All results remain qualitatively unaltered. We also conduct a sensitivity test based on a smaller sample containing only firm years with non-zero trading profits for both top executives and division managers. The sample size is significantly reduced to 4,236 from 13,032. Again our results are robust to this smaller sample.

We estimate regressions for both the pre and post FAS131 periods. For fiscal years beginning after December 15, 1997, FAS131 changed the reporting requirements for multi-segment firms to allow firms more flexibility to break out division information. We find our relations between firm value, internal capital market efficiency, and *DIFRET* to be similar both in the pre- and post-FAS131 periods.

Last, Driscoll and Kraay (1998) demonstrate that ignoring cross-sectional dependence in the estimation of linear panel models can lead to biased statistical inference. In this study, cross-sectional correlation may arise when the decision to diversify or the internal information problem in one multi-segment firm coincides with the decisions of other firms. To address this issue, we use Driscoll and Kraay (1998) standard errors, which are heteroskedastic-consistent and robust to general forms of cross-sectional and serial dependence, to re-estimate our models based on which the results from Table 5 are produced. Untabulated results show that the statistical significance is comparable to those reported in Table 5.

5. Conclusion

In this study we investigate whether internal information asymmetry within a multi-segment firm affects firm value and the efficiency of internal capital allocation. Using a novel measure of information asymmetry between division managers and headquarter managers based on their insider trades, we find that internal information asymmetry relates negatively with firm excess value and internal capital allocation efficiency. Our results are robust to the 2SLS estimation procedure. We also find stronger relations between our internal information asymmetry proxy and firm excess value and the efficiency of internal capital allocation when the firm's segments are located farther away from company headquarters and when the firm's segments are more diversified. In addition, we find that the effect of internal information asymmetry is stronger when conglomerates have weaker corporate governance as measured by higher G-Index and CEO-chairman duality and when firms are operating in more concentrated industries. Last, we document that conglomerates with higher current internal information asymmetry are more likely to refocus through either divestiture or reorganization in the future. Internal information asymmetry declines significantly after these refocusing transactions and positively associates with the stock market reaction to the announcements of refocusing events. To show the validity of our measure of differential insider trading profit being the proxy for internal information asymmetry, we examine whether differential insider trading profit affects the accuracy of top executives' earnings forecasts. Consistent with our expectation, differential insider trading profit is positively correlated with contemporary management forecast errors, suggesting that higher internal information asymmetry hinders top managers' ability to provide accurate earnings forecasts.

A large body of empirical research has focused on the agency issues in multi-segment firms. Our evidence indicates that internal information asymmetry between division managers and corporate headquarters plays an important role in a conglomerate's internal capital allocation efficiency and firm value.

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Appendix A: Variable Definition

This appendix describes the variable definitions in our empirical tests.

Panel A: Management Forecast Test

$ERROR\_YEAR_{i,t}$	=	The absolute value [(management forecast of earnings per share (EPS) − actual EPS)/price at the beginning of the fiscal year].
$ERROR\_QUAT_{i,t}$	=	The absolute value [(management forecast of earnings per share (EPS) − actual EPS)/price at the beginning of the fiscal quarter].
$DISP_{i,t}$	=	The standard deviation of analysts' forecasts divided by the median forecast.
$EARNVOL_{i,t}$	=	The standard deviation of quarterly earnings over 12 quarters ending in the current fiscal year, divided by median asset value for the period.
$EMV_{i,t}$	=	Log of the market value of a firm's common equity at the beginning of the fiscal period.
$MTB_{i,t}$	=	The ratio of market value to book value of common equity at the beginning of the fiscal period.
$LOSS_{i,t}$	=	1 if the firm reported losses in the current period, and 0 otherwise.
$NEWS_{i,t}$	=	1 if the current-period EPS is greater than or equal to the previous period EPS, and 0 otherwise.
$HORIZON_{i,t}$	=	Number of days between the forecast date and the fiscal period-end date.
$LITIGATION_{i,t}$	=	1 for all firms in the biotechnology (2833–2836 and 8731–8734), computers (3570–3577 and 7370–7374), electronics (3600–3674), and retail (5200–5961) industries, and 0 otherwise.
$RD_{i,t}$	=	The research and development expenditures (Compustat data item XRD) divided by sales revenues (Compustat data item SALE).

Panel B: Firm Excess Value Test

$EXVAL\_AT_{i,t}$	=	Excess values using industry asset multiplier valuation approaches calculated as follows. Each firm segment is assigned to an industry based on its Standard Industrial Classification (SIC) code; for all single-segment firms in that industry the median multiple of firm value to either sales or assets is calculated and then multiplied by the segment's sales or assets to arrive at an implied value for the segment. Firm value (V) equals the sum of the market value of equity (the product of Compustat items CSHO and PRCC_F) and the book value of debt (the sum of Compustat items DLTT and DLC). Implied values are summed across segments for an estimate of implied firm value. Excess value equals the natural logarithm of the ratio of actual to implied firm value. Observations with extreme excess values (greater than 1.386 or less than -1.386) are removed. The detailed calculation is shown in Berger and Ofek (1995).
$EXVAL\_SALE_{i,t}$	=	Excess values using industry sales multiplier valuation approaches calculated as follows. Each firm segment is assigned to an industry based on its Standard Industrial Classification (SIC) code; for all single-segment firms in that industry the median multiple of firm value to either sales or assets is calculated and then multiplied by the segment's sales or assets to arrive at an implied value for the segment. Firm value (V) equals the sum of the market value of equity (the

product of Compustat items CSHO and PRCC_F) and the book value of debt (the sum of Compustat items DLTT and DLC). Implied values are summed across segments for an estimate of implied firm value. Excess value equals the natural logarithm of the ratio of actual to implied firm value. Observations with extreme excess values (greater than 1.386 or less than -1.386) are removed. The detailed calculation is shown in Berger and Ofek (1995).

$DIV\_RET_{i,t}$ = The average cumulative market-adjusted abnormal return within 180 trading days per transaction during the prior three fiscal years for the division managers defined as above. For open market sale transactions, we take the opposite sign when calculating the abnormal return.

$TOP\_RET_{i,t}$ = The average cumulative market-adjusted abnormal return within 180 trading days per transaction during the prior three fiscal years for the top managers defined as above. For open market sale transactions, we take the opposite sign when calculating the abnormal return.

$ALL\_RET_{i,t}$ = The average cumulative market-adjusted abnormal return within 180 trading days per transaction during the prior three fiscal years for all the insiders. For open market sale transactions, we take the opposite sign when calculating the abnormal return.

$DIFRET_{i,t}$ = The difference between $DIV\_RET_{i,t}$ and $TOP\_RET_{i,t}$.

$NUMSEG_{i,t}$ = The total number of business segments reported by the firm on the CIS database.

$NUMANALY_{i,t}$ = The average monthly analyst following per IBES during the fiscal year.

$RELATED_{i,t}$ = The total number of reported segments minus the number of segments with different two-digit SIC codes.

$ASSET_{i,t}$ = The log of total assets.

$ROA_{i,t}$ = EBIT deflated by current period assets (Compustat AT).

$LEV_{i,t}$ = Book value of long-term debt plus short-term debt deflated by total assets (assets multiple regressions) or sales (sales multiple regressions).

$INVEST_{i,}$ = The ratio of capital expenditures to assets (sales) when EXVAL_AT (EXVAL_SALE) is the used.

$SG_{i,t}$ = Current-years sales deflated by prior year sales.

$RET_{i,t}$ = The market-adjusted stock return for the fiscal year.

$STDROE_{i,t}$ = Historical standard deviation of return on equity computed over the preceding 10 years.

$SUR_{i,t}$ = Absolute value of the difference between current-year earnings per share and previous-year earnings per share, divided by the stock price at the beginning of the fiscal year.

$GINDEX_{i,t}$ = from Gompers, Ishii, and Metrick (2003), who measure shareholder rights by counting the number of governance provisions a firm has. More governance provisions indicate more restricted shareholder rights.

Panel C: Internal Capital Allocation Efficiency Test

$RVA_{i,t}$ = Our first measure of internal capital market efficiency, the industry and firm adjusted value added. The detailed calculation is discussed in Rajan et al. (2000).

$AVA_{i,t}$ = Our second measure of internal capital market efficiency, the absolute value added. The detailed calculation is discussed in Rajan et al. (2000).

$Q_{i,t}$ = The market-to-book asset ratio, where market value is the sum of the market value of common equity (the product of Compustat items CSHO and PRCC_F) and book value of assets (Compustat item AT) minus book value of common equity (Compustat item CEQ).

Panel D: Internal Information Environment Test

$Unrelatedness_{i,t}$ = The percentage of a firm's divisions that operate in industries with non-overlapping two-digit SIC codes.

$FirmHH_{i,t}$ = The Herfindahl index of the fraction of divisional sales in a firm's total sales.

$FLIGHT\_TIME_{i,t}$ = Average flight time for individual division managers of a firm. We first identify the nearest airports to headquarters and division managers' address. Then we determine the fastest airline route between any two airports by using the itinerary information from the T-100 Domestic Segment Database. The flight time is the ramp-to-ramp time of the flight between two airports. We use car driving time between the locations of headquarters and division managers when locations are in close areas without flight lines or when the fastest airline route is still longer than the car driving time. Please also see Appendix A for the detailed procedures for this flight distance measure.

Panel E: Corporate Governance Test

$DUALITY_{i,t}$ = 1 if the CEO also serves as the chairman of the board and 0 otherwise.

Panel F:Industry Competition Test

$IndustryHH_{i,t}$ = The average of the Herfindahl indices in the 2 digit SIC industry where the division operates in across all divisions of a firm.

Panel G: 2SLS Test

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

Panel H: Refocusing Events Test

$REFOCUS_{i,t}$ = 1 if a firm reduces the number of reported segments through divestiture, discontinued operations and spinoffs in the subsequent two years, and 0 otherwise.

$ASSETS\_PER_{i,t}$ = The percentage of each segment's assets over the entire multi-segment firms' assets

$CAR_{i,t}$ = Cumulative Abnormal Return over the 3-day window when the refocusing events are announced.

$DVDCUT_{i,t}$ = 1 if a firm reduces its dividend payments and 0 otherwise.

$NUM\_ANN_{i,t}$ = The number of sale-related announcements reported by the firm in the same year.

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

The appendix describes the procedure of hand-collecting division-level sample of division managers. 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 with firm's divisions, we search companies' annual reports.

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

In some cases, there is no one-to-one correspondence between divisional managers in the annual report and the segment data in Compustat. These differences arise when a firm's segment reporting on Compustat is done at a more aggregate level compared to its divisional structure (e.g., by combining several divisions into one reporting unit). For example, Crane Company reports financial data for five segments in 2008, including a segment called Aerospace and Electronics. By reading the sections on executive management and segment reporting in Crane's annual report, we find that the Aerospace unit and the Electronics unit, while combined in financial reporting, are each overseen by their own divisional president: David Bender, Group President, Electronics; and Gregory Ward, Group President, Aerospace. In this case, we assign both group presidents to the Aerospace and Electronics division. We manually reconcile each of such differences to ensure accurate matching and to avoid the loss of observations.

If two or more managers are assigned to a segment reported on Compustat, our empirical tests use the average level of differential trading profit (*DIFRET*) for divisional managers in a particular segment. Our results are also similar if we use the maximum of *DIFRET* across multiple division managers assigned to a segment.

Last, some firms use a functional organization structure to define the responsibilities of their executives. For these companies, 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 the executive and the business segment, we exclude these firms from our sample. We also eliminate companies for which we are unable to identify division managers based on our data sources or for which division managers don't show up in the TFN insider Trading Database, as discussed above. In the end, our hand-collected sample holds 22,382 firm-year-division observations for 593 unique multi-segment firms.

Appendix C: The Measure of Flight Distance between Divisions and Corporate Headquarters

This appendix describes the measure of flight distance between divisions and corporate headquarters. First, we identify the respective locations of headquarters and divisions and also the nearest airports to these locations. Second, we determine the fastest airline route between any two airports using the itinerary information from the T-100 Domestic Segment Database (for the period 1990 to 2011). The T-100 contains monthly data for each airline and route ("segment") in the U.S. The data include the origin and destination airports, flight duration, scheduled departures, departures performed, passengers enplaned, and aircraft type. These data are compiled from Form 41 of the U.S. Department of Transportation and provided by the Bureau of Transportation Statistics. For the pre-1990 sample period (1987-1989) we use the 1990 flight itinerary information. The flight time (in minutes) is the ramp-to-ramp time of the flight between two airports. However, some division managers are located within driving distance, rather than flight distance, 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).[22] Last, 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.[23]

The summary statistics of flight time between divisions and corporate headquarters (Table1 Panel B) have a mean value of 60 minutes and median value of 37 minutes. When we exclude divisions within car driving distance from headquarters, the mean (median) flight time increases to 162 minutes (135 minutes) (untabulated).

[22] 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.

[23] 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. For those firm-years without division managers' trades in the previous three years, we continue to identify division managers based on trades over an extended prior period with a maximum of nine years. For firm-years without trades by division managers in prior nine years, we further extend the search to the entire sample period.

TABLE 1
Descriptive Statistics

This table reports summary statistics for the four samples used in four sets of tests, respectively. Panel A is for the test of the relation between internal information asymmetry, *DIFRET*, and the forecast errors of management earnings guidance. Panel B and Panel C are for the tests of the relation between internal information asymmetry and firm excess value and internal capital allocation efficiency, respectively. Panel B also reports the variables for the cross-sectional analysis of internal information environment and corporate governance and also for the two-stage least square (2SLS) analysis. Panel D is for the test of the relation between internal information asymmetry and firm's refocusing events. The sample period is from 1987 to 2011. All variable definitions are given in Appendix A.

Panel A: Descriptive Statistics for Management Earnings Forecast Test

	N	Mean	Median	Std Dev	Q1	Q3
$ERROR\_YEAR_{i,t}$	7,203	0.029	0.009	0.072	0.004	0.026
$ERROR\_QUAT_{i,t}$	10,677	0.015	0.003	0.041	0.001	0.017
$DIFRET_{i,t}$	10,677	-0.025	-0.016	0.225	-0.109	0.085
$DISP_{i,t}$	10,677	0.007	0.001	0.071	0.000	0.003
$EARNVOL_{i,t}$	10,677	0.037	0.027	0.099	0.011	0.038
$EMV_{i,t}$	10,677	6.436	6.128	2.756	5.042	7.197
$MTB_{i,t}$	10,677	3.885	3.339	5.715	1.925	4.338
$LOSS_{i,t}$	10,677	0.144	0.000	0.284	0.000	0.000
$NEWS_{i,t}$	10,677	1.210	1.000	1.161	0.000	2.000
$HORIZON_{i,t}$	10,677	113.2	108.4	58.6	48.0	121.0
$LITIGATION_{i,t}$	10,677	0.188	0.000	0.291	0.000	0.000
$RD_{i,t}$	10,677	0.028	0.000	0.052	0.000	0.031

Panel B: Descriptive Statistics for Firm Excess Value Test

	N	Mean	Median	Std Dev	Q1	Q3
$EXVAL\_AT_{i,t}$	13,032	-0.011	0.005	0.494	-0.270	0.264
$EXVAL\_SALE_{i,t}$	9,623	-0.094	-0.091	0.557	-0.477	0.281
$DIFRET_{i,t}$	13,032	-0.023	-0.013	0.261	-0.116	0.077
$TOP\_RET_{i,t}$	13,032	0.045	0.029	0.228	-0.048	0.134
$DIV\_RET_{i,t}$	13,032	0.022	0.00	0.194	-0.006	0.063
$ALL\_RET_{i,t}$	13,032	0.036	0.028	0.189	-0.042	0.105
$NUMSEG_{i,t}$	13,032	3.700	3.000	1.437	3.000	4.000
$NUMANALY_{i,t}$	13,032	11.084	8.000	10.542	3.000	16.000
$RELATED_{i,t}$	13,032	1.210	1.000	1.161	0.000	2.000
$ASSET_{i,t}$ *(Mil USD)*	13,032	4,022	839	11,511	251	2,939
$ROA_{i,t}$	13,032	-0.005	0.000	0.249	-0.023	0.014
$LEV_{i,t}$	13,032	0.347	0.222	0.587	0.094	0.443
$INVEST_{i,t}$	13,032	0.071	0.039	0.179	0.021	0.076
$SG_{i,t}$	13,032	0.110	0.073	0.591	-0.008	0.176
$RET_{i,t}$	13,032	0.164	0.095	0.689	-0.162	0.374
$STDROE_{i,t}$	13,032	0.536	0.097	2.002	0.049	0.226
$SUR_{i,t}$	13,032	0.089	0.024	0.248	0.009	0.070
$GINDEX_{i,t}$	6,705	9.795	10.000	2.526	8.000	12.000
$Unrelatedness_{i,t}$	13,032	0.563	0.500	0.254	0.333	0.667

TABLE 1 (Cont'd)

Negative FirmHH$_{i,t}$	12,455	-0.559	-0.527	0.199	-0.405	-0.697
FLIGHT_TIME$_{i,t}$ *(minutes)*	13,032	60.702	37.819	73.389	1.000	94.000
DUALITY$_{i,t}$	6,705	0.398	0.000	0.488	0.000	1.000
IndustryHH$_{i,t}$	11,402	0.538	0.521	0.191	0.414	0.677

Panel C: Descriptive Statistics for Internal Capital Market Efficiency Test

	N	Mean	Median	Std Dev	Q1	Q3
RVA$_{i,t}$	8,247	-0.0018	0.0000	0.0175	-0.0024	0.0005
AVA$_{i,t}$	8,247	-0.0004	0.0000	0.0188	-0.0026	0.0016
DIFRET$_{i,t}$	8,247	-0.024	-0.012	0.215	-0.122	0.082
ALL_RET$_{i,t}$	8,247	0.033	0.025	0.197	-0.049	0.106
CAPEX$_{i,t}$	8,247	0.053	0.041	0.045	0.023	0.068
SIZE$_{i,t}$	8,247	6.593	6.603	1.828	5.311	7.856
RD$_{i,t}$	8,247	0.026	0.005	0.051	0.000	0.029
Q$_{i,t}$	8,247	1.660	1.417	0.839	1.128	1.898
NUMSEG$_{i,t}$	8,247	3.501	3.000	1.375	3.000	4.000

Panel D: Descriptive Statistics for Future Refocusing Events Test

	N	Mean	Median	Std Dev	Q1	Q3
REFOCUS$_{i,t+2}$	12,268	0.018	0.000	0.639	0.000	0.000
DIFRET$_{i,t}$	12,268	-0.023	-0.011	0.212	-0.117	0.079
EXVAL_AT$_{i,t}$	12,268	-0.013	0.012	0.479	-0.268	0.346
LEV$_{i,t}$	12,268	0.221	0.209	0.171	0.083	0.320
ROA$_{i,t}$	12,268	0.079	0.084	0.080	0.049	0.122
SG$_{i,t}$	12,268	0.131	0.079	0.294	-0.004	0.195

TABLE 2
The Correlation Coefficients among Variables

This table reports Pearson and Spearman correlations below and above diagonal, respectively, for the two samples used in two main empirical analyses. Panels A and B are for the tests of firm excess value and internal capital allocation efficiency, respectively. The sample period is from 1987 to 2011. All variable definitions are given in Appendix A. Bold number is for a significance level of 0.05 or above.

Panel A: Pearson and Spearman Correlation Coefficients for Variables in Firm Excess Value Test

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
$EXVAL\_AT_{i,t}$ *(1)*		**0.627**	**-0.035**	**-0.034**	**-0.068**	**-0.100**	**0.195**	**0.172**	-0.005	**0.073**	**0.204**	**-0.059**	0.002	0.096	**0.116**	-0.008	**-0.126**
$EXVAL\_SALE_{i,t}$ *(2)*	**0.621**		**-0.043**	**-0.023**	**-0.065**	**-0.091**	**0.248**	**0.219**	-0.018	**0.067**	**0.223**	**0.221**	**0.016**	**0.091**	**0.060**	-0.010	**-0.134**
$DIFRET_{i,t}$ *(3)*	**-0.037**	**-0.044**		**-0.678**	**0.528**	**-0.150**	0.009	-0.008	**-0.012**	**0.052**	**0.024**	**0.029**	0.011	-0.013	**-0.051**	-0.008	0.004
$TOP\_RET_{i,t}$ *(4)*	**-0.047**	**-0.028**	**-0.667**		**0.273**	**0.732**	**-0.056**	**-0.068**	**0.021**	**-0.111**	**-0.098**	-0.016	-0.018	**-0.037**	0.013	**0.026**	**0.065**
$DIV\_RET_{i,t}$ *(5)*	**-0.071**	**-0.067**	**0.430**	**0.256**		**0.621**	-0.008	**-0.028**	0.006	**-0.052**	**-0.081**	0.018	-0.004	**-0.063**	**-0.059**	**0.028**	**0.074**
$ALL\_RET_{i,t}$ *(6)*	**-0.113**	**-0.096**	**-0.113**	**0.739**	**0.622**		**-0.075**	**-0.074**	0.006	**-0.110**	**-0.119**	-0.014	**-0.028**	**-0.045**	**-0.029**	**0.048**	**0.092**
$NUMSEG_{i,t}$ *(7)*	**-0.036**	**-0.024**	-0.007	-0.008	-0.018	**-0.024**		**0.115**	**0.651**	**0.631**	**0.046**	**0.046**	**-0.025**	**-0.023**	0.000	**-0.032**	**-0.028**
$NUMANALY_{i,t}$ *(8)*	**0.181**	**0.228**	0.005	**-0.075**	**-0.035**	**-0.080**	**0.129**		**0.118**	**0.202**	**0.259**	**0.139**	**0.185**	-0.008	**-0.022**	**-0.092**	**-0.135**
$RELATED_{i,t}$ *(9)*	-0.003	**-0.031**	-0.009	0.011	0.003	0.002	**0.118**	**0.136**		**0.312**	**0.049**	**0.064**	**0.028**	0.002	-0.008	0.006	-0.008
$ASSET_{i,t}$ *(10)*	**0.085**	**0.072**	**0.059**	**-0.112**	**-0.052**	**-0.119**	**0.647**	**0.202**	**0.202**		**0.295**	**0.058**	**-0.025**	**-0.052**	**-0.026**	**-0.138**	**-0.143**
$ROA_{i,t}$ *(11)*	**0.222**	**0.240**	**0.033**	**-0.116**	**-0.071**	**-0.134**	**0.323**	**0.049**	**0.049**	**0.233**		**0.155**	**0.168**	**0.099**	**0.058**	**-0.166**	**-0.255**
$LEV_{i,t}$ *(12)*	**-0.062**	**0.252**	**0.042**	**-0.029**	0.017	**-0.024**	**0.189**	**0.064**	**0.064**	**0.169**	**0.292**		**0.503**	**0.029**	**-0.024**	**0.080**	**0.084**
$INVEST_{i,t}$ *(13)*	0.006	**0.021**	0.016	**-0.025**	-0.008	**-0.037**	**0.276**	**0.028**	**0.028**	**-0.065**	**0.353**	**0.429**		**0.085**	**-0.043**	**-0.030**	**-0.068**
$SG_{i,t}$ *(14)*	**0.120**	**0.107**	-0.018	**-0.067**	**-0.073**	**-0.085**	**0.026**	0.002	0.002	**-0.031**	**0.192**	**-0.030**	**0.063**		**0.034**	**0.033**	**-0.100**
$RET_{i,t}$ *(15)*	**0.137**	**0.069**	**-0.056**	**-0.064**	**-0.098**	**-0.109**	**0.028**	-0.008	-0.008	**-0.041**	**0.121**	**-0.045**	**-0.048**	**0.084**		0.012	**0.162**
$STDROE_{i,t}$ *(16)*	-0.014	-0.019	-0.001	**0.104**	**0.062**	**0.111**	**-0.155**	0.006	0.006	**-0.258**	**-0.260**	**-0.022**	**-0.147**	-0.011	-0.027		**0.206**
$SUR_{i,t}$ *(17)*	**-0.131**	**-0.145**	0.007	**0.105**	**0.069**	**0.116**	**-0.213**	-0.008	-0.008	**-0.202**	**-0.386**	0.006	**-0.153**	**-0.146**	**0.033**	**0.374**	

TABLE 2 (Cont'd)

Panel B: Pearson and Spearman Correlation Coefficients for Variables in Internal Capital Allocation Efficiency Test

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$RVA_{i,t}$ (1)		**0.877**	**-0.025**	0.020	0.010	**-0.021**	-0.015	-0.018	**-0.033**
$AVA_{i,t}$ (2)	**0.841**		**-0.031**	0.017	**0.026**	**-0.033**	0.017	0.012	**-0.027**
$DIFRET_{i,t}$ (3)	**-0.039**	**-0.052**		**-0.334**	-0.000	**0.072**	-0.000	0.024	0.010
$ALL\_RET_{i,t}$ (4)	0.025	0.022	**-0.311**		**-0.050**	**-0.129**	-0.009	**-0.166**	**-0.049**
$CAPEX_{i,t}$ (5)	**-0.032**	**-0.041**	-0.006	**-0.034**		**0.036**	**-0.099**	**0.095**	**-0.138**
$SIZE_{i,t}$ (6)	-0.006	**-0.039**	**0.068**	**-0.101**	0.004		0.012	**0.117**	**0.332**
$RD_{i,t}$ (7)	-0.002	**0.043**	-0.016	0.021	**-0.083**	**-0.102**		**0.236**	**0.076**
$Q_{i,t}$ (8)	0.011	**0.057**	0.011	**-0.105**	**-0.059**	0.024	**0.277**		0.012
$NUMSEG_{i,t}$ (9)	**-0.014**	-0.004	0.007	**-0.031**	**-0.117**	**0.354**	0.000	0.012	

TABLE 3
Management Forecast Errors and Internal Information Asymmetry

This table presents evidence on the relation between the empirical measure of internal information asymmetry and the errors of management earnings forecasts. The dependent variable, management earnings forecast error, is calculated based on quarterly earnings guidance (ERROR_QUAT) in the first column and annual earnings guidance (ERROR_YEAR) in the second column. The sample period is from 1987 to 2011. All variable definitions are given in Appendix A. The t-values are based on the standard errors clustered by firm. *,**,*** denote significance at the 0.10, 0.05, and 0.01 levels, respectively.

	DEV = ERROR_QUAT (1)		DEV = ERROR_YEAR (2)	
	Est. Coeff.	t-Stat	Est. Coeff.	t-Stat
Intercept	0.004	1.30	0.021	2.50
$DIFRET_{i,t}$	0.004**	2.23	0.005**	2.06
$ALL\_RET_{i,t}$	0.008***	2.86	0.025***	2.68
$SUR_{i,t}$	0.303***	6.18	0.139	0.92
$DISP_{i,t}$	0.002**	2.07	0.004	0.87
$NUMANALYST_{i,t}$	0.000**	2.57	0.000	1.29
$EARNVOL_{i,t}$	0.007***	2.97	0.016***	3.83
$EMV_{i,t}$	-0.001***	-3.02	-0.003***	-3.42
$MTB_{i,t}$	-0.000***	-3.76	-0.001	-1.23
$LOSS_{i,t}$	0.011***	7.31	0.031***	5.36
$NEWS_{i,t}$	-0.003***	-3.65	-0.003*	-1.87
$RD_{i,t}$	0.304***	5.29	0.517***	3.34
$HORIZON_{i,t}$	0.000***	5.06	0.000***	6.57
$LITIGATION_{i,t}$	0.000	0.47	0.003	1.18
Industry fixed effects	YES		YES	
Year fixed effects	YES		YES	
$Adj.R^2$	0.118		0.141	
N	10,677		7,203	

TABLE 4
Statistics of *DIFRET* Partitioned by Indirect Measures of Internal Asymmetric Information and Division Managers' Trading Direction

This table presents the mean and median of *DIFRET* for the subsamples of firm-years. The sample partitions are based on the interaction between the three indirect measures of internal information asymmetry and the trading behavior of division managers. For this test, *DIFRET* is computed on an annual basis using the current years' insider trades by top executives and division managers. The three indirect measures of internal information asymmetry are the distance from the headquarters to the division manager's address as proxied for by the flight time, the unrelatedness among individual segments of a multi-segment firm, and the concentration of segment businesses as measured by Herfindahl Index of a firm's segment sales (Duchin and Sosyura 2013). As for division managers' trading direction, we compare division managers' net selling in dollar amount (sell trades – buy trades) in the current year with the average prior three years' net selling amount. If the former is higher (lower) than the latter, it is classified as abnormal sell (buy), thus "Sell" ("Buy") direction. The sample period is from 1987 to 2011. The number of firm-years is shown in the parentheses. All variable definitions are given in Appendix A.

Panel A: Long vs. Short Flight Distance

Variable	Trading Direction	*Long Flight Distance*		*Short Flight Distance*		p-values for differences	
		Mean	Median	Mean	Median	Mean	Median
$DIFRET_{i,t}$	Buy	-0.013 (2,554)	-0.014 (2,554)	-0.027 (2,572)	-0.029 (2,572)	0.04	0.05
$DIFRET_{i,t}$	Sell	-0.004 (2,699)	0.003 (2,699)	-0.011 (2,697)	-0.012 (2,697)	0.02	0.02
p-values for differences		0.03	0.02	0.03	0.01		

Panel B: High vs. Low Unrelatedness

Variable	Trading Direction	*High Unrelatedness*		*Low Unrelatedness*		p-values for differences	
		Mean	Median	Mean	Median	Mean	Median
$DIFRET_{i,t}$	Buy	-0.013 (1,515)	-0.011 (1,515)	-0.025 (2,073)	-0.023 (2,073)	0.05	0.08
$DIFRET_{i,t}$	Sell	-0.001 (1,964)	0.006 (1,964)	-0.011 (1,733)	-0.008 (1,733)	0.04	0.03
p-values for differences		0.02	0.04	0.05	0.03		

Panel C: Low vs. High FirmHH

Variable	Trading Direction	*Low FirmHH*		*High FirmHH*		p-values for differences	
		Mean	Median	Mean	Median	Mean	Median
$DIFRET_{i,t}$	Buy	-0.022 (1,519)	-0.015 (1,519)	-0.036 (1,877)	-0.030 (1,877)	0.04	0.05
$DIFRET_{i,t}$	Sell	-0.003 (1,911)	0.005 (1,911)	-0.015 (1,751)	-0.011 (1,751)	0.04	0.02
p-values for differences		0.00	0.07	0.05	0.05		

TABLE 5
The Effect of Internal Information Asymmetry on Firm Excess Value and Internal Capital Allocation Efficiency

This table presents evidence on the effect of internal information asymmetry on firm excess value (Panel A) and internal capital allocation efficiency (Panel B). The sample period is from 1987 to 2011. All variable definitions are given in Appendix A. All regressions control for firm and year fixed effects. The t-values are based on standard errors clustered by firm. *,**,*** denote significance at the 0.10, 0.05, and 0.01 levels, respectively.

Panel A: Firm Excess Value Test

	DEV= EXVAL_AT		*DEV=EXVAL_SALE*	
	(1) Est. Coeff. (t-Stat)	(2) Est. Coeff. (t-Stat)	(3) Est. Coeff. (t-Stat)	(4) Est. Coeff. (t-Stat)
Intercept	-0.223	-0.156	0.188	-0.131
	(-0.75)	(-0.34)	(0.37)	(-0.19)
$DIFRET_{i,t}$	-0.056**	-0.070**	-0.049**	-0.062**
	(-2.48)	(-2.11)	(-2.18)	(-2.09)
$ALL\_RET_{i,t}$	-0.145***	-0.315***	-0.082***	-0.217**
	(-3.51)	(-7.79)	(-3.18)	(-2.66)
$NUMSEG_{i,t}$	-0.055***	-0.030***	-0.019*	-0.019
	(-5.04)	(-3.36)	(-1.89)	(-1.50)
$NUMANALY_{i,t}$	0.009***	0.013***	0.005***	0.007***
	(7.76)	(13.29)	(4.80)	(4.16)
$RELATED_{i,t}$	-0.057***	-0.034**	-0.004	0.021
	(-3.90)	(-2.64)	(-0.28)	(1.51)
$SIZE_{i,t}$	-0.124***	-0.227***	0.048***	0.032
	(-7.11)	(-8.21)	(4.52)	(0.98)
$ROA_{i,t}$	0.863***	-0.002	0.201***	-0.044
	(10.85)	(-0.04)	(4.00)	(-0.96)
$LEV_{i,t}$	0.043	-0.178**	0.039	0.095
	(0.74)	(-2.49)	(0.96)	(1.12)
$INVEST_{i,t}$	0.843***	0.848***	0.396***	-0.411
	(6.63)	(3.27)	(3.16)	(-1.15)
$SG_{i,t}$	0.000***	0.095***	-0.000	-0.033
	(2.70)	(4.41)	(-0.22)	(-1.28)
$RET_{i,t}$	0.083***	0.119***	0.032***	0.129***
	(10.52)	(5.17)	(5.30)	(5.18)
$STDROE_{i,t}$	-0.000***	0.001	0.000**	0.000
	(-7.02)	(1.31)	(1.98)	(0.51)
$SUR_{i,t}$	-0.003	-0.138**	-0.013***	-0.172***
	(-1.07)	(-2.64)	(-2.64)	(-4.22)
$GINDEX_{i,t}$		-0.015**		-0.016*
		(-2.61)		(-1.85)
Firm fixed effects	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES
$Adj.R^2$	0.454	0.625	0.496	0.607
N	13,032	6,705	9,623	4,883

TABLE 5 (Cont'd)

Panel B: Internal Capital Allocation Efficiency Test

	DEV=RVA		*DEV=AVA*	
	(1) Est.Coeff (t-Stat)	(2) Est. Coeff. (t-Stat)	(3) Est.Coeff (t-Stat)	(4) Est.Coeff (t-Stat)
Intercept	0.011 (0.43)	-0.008 (-0.92)	0.005 (0.15)	-0.022 (-0.19)
$DIFRET_{i,t}$	-0.002^{**} (-2.11)	-0.007^{**} (-2.06)	-0.003^{**} (-2.16)	-0.006^{**} (-2.29)
$ALL\_RET_{i,t}$	0.001 (0.63)	-0.001 (-0.25)	0.000 (0.04)	0.001 (0.12)
$NUMSEG_{i,t}$	0.004 (1.18)	0.000 (0.29)	0.001^{**} (2.76)	0.000 (0.72)
$CAPEX_{i,t}$	-0.017 (-1.14)	-0.001 (-0.05)	0.017 (1.00)	0.011 (0.46)
$SIZE_{i,t}$	-0.000 (-0.70)	-0.001 (-0.57)	0.000 (0.21)	0.000 (0.18)
$RD_{i,t}$	-0.029 (-2.03)	-0.018 (-0.46)	-0.015 (-1.18)	-0.038 (-0.89)
$Q_{i,t}$	0.001 (1.61)	0.000 (0.14)	0.002^{***} (3.32)	0.001 (1.61)
$GINDEX_{i,t}$		-0.000 (-0.25)		-0.000 (-0.44)
Firm fixed effects	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES
$Adj.R^2$	0.140	0.211	0.141	0.208
N	8,247	3,523	8,247	3,523

TABLE 6

The Effect of Internal Information Asymmetry and the Structure of Divisions on Firm Excess Value and Internal Capital Allocation Efficiency

This table presents how internal information environment proxies affect the relation between our measure of internal information asymmetry (*DIFRET*) and firm excess value (in Panel A) and internal capital allocation efficiency (in Panel B), respectively. For simplicity, the dependent variable is asset-based firm excess value (*EXVAL_AT*) in Panel A and the internal capital allocation efficiency measure of *RVA* in Panel B. The sample period is from 1987 to 2011. The three indirect measures of internal information environment are the distance from the headquarters to the division manager's address as proxied for by the flight time in minutes (logged value); the unrelatedness among individual segments of a multi-segment firm; and the concentration of segment businesses as measured by Herfindahl Index of a firm's segment sales (Duchin and Sosyura 2013). All variable definitions are given in Appendix A. All regressions control for firm and year fixed effects. The t-values are based on standard errors clustered by firm. *,**,*** denote significance at the 0.10, 0.05, and 0.01 levels, respectively.

Panel A: Firm Excess Value Test (DEV = EXVAL_AT)

	(1) *IA=Flight_Time*		(2) *IA= Unrelatedness*		(3) *IA= Negative FirmHH*	
	Est.Coef.	t-Stat	Est.Coef.	t-Stat	Est.Coef.	t-Stat
Intercept	-0.114	-0.42	0.013	0.27	0.009	0.06
$DIFRET_{i,t}*IA_{i,t}$	-0.023**	-2.03	-0.128**	-2.41	-0.103**	-2.32
$IA_{i,t}$	-0.008*	-1.76	-0.211	-1.34	-0.078**	-2.49
$DIFRET_{i,t}$	-0.031	-0.55	-0.075*	-1.80	-0.074*	-1.75
$ALL\_RET_{i,t}$	-0.165***	-3.18	-0.315***	-6.27	-0.314***	-6.26
$NUMSEG_{i,t}$	0.005	0.61	-0.033***	-3.44	-0.031**	-2.54
$NUMANALY_{i,t}$	0.010***	6.58	0.009***	6.26	0.009***	6.10
$RELATED_{i,t}$	0.128*	1.72	-0.033*	-1.71	-0.052***	-2.98
$SIZE_{i,t}$	-0.121***	-5.62	-0.141***	-7.54	-0.106***	-6.17
$ROA_{i,t}$	1.186	10.07	0.050	0.96	0.051	0.95
$LEV_{i,t}$	-0.133***	-3.54	-0.089	-1.17	-0.081	-1.27
$INVEST_{i,t}$	0.330***	2.67	0.615***	3.65	0.615***	3.18
$SG_{i,t}$	0.099**	4.08	0.030***	2.78	0.031***	2.85
$RET_{i,t}$	0.124***	11.91	0.074***	3.16	0.082***	4.16
$STDROE_{i,t}$	0.007	0.96	-0.000	-1.06	-0.000	-1.18
$SUR_{i,t}$	-0.104***	-3.73	-0.003	-1.44	-0.003	-1.55
Firm fixed effects	YES		YES		YES	
Year fixed effects	YES		YES		YES	
R^2	0.467		0.457		0.510	
N	13,032		13,032		12,455	

TABLE 6 (Cont'd)

Panel B: Internal Capital Market Efficiency Test (DEV= RVA)

	(1) IA= *Flight_Time*		(2) IA= *Unrelatedness*		(3) IA= *Negative FirmHH*	
	Est.Coef.	t-Stat	Est.Coef.	t-Stat	Est.Coef.	t-Stat
Intercept	0.010	0.81	-0.024	-0.19	0.007	1.05
$DIFRET_{i,t}*IA_{i,t}$	-0.001**	-2.03	-0.008*	-1.94	-0.009**	-2.36
$DIFRET_{i,t}$	-0.002	-0.77	-0.004	-1.14	-0.000	-0.07
$IA_{i,t}$	-0.000*	-1.90	-0.002	-0.64	-0.002	-0.61
$ALL\_RET_{i,t-1}$	0.001	0.52	0.001	0.53	0.001	0.49
$NUMSEG_{i,t}$	0.000	0.81	0.000	0.54	0.001	0.97
$CAPEX_{i,t}$	-0.017	-1.03	-0.017	-1.08	-0.017	-1.08
$SIZE_{i,t}$	-0.000	-0.41	-0.001	-0.53	-0.000	-0.47
$RD_{i,t}$	-0.035	-1.36	-0.031	-1.36	-0.029	-1.31
$Q_{i,t}$	0.001	1.35	0.001	1.37	0.001	1.31
Firm fixed effects	YES		YES		YES	
Year fixed effects	YES		YES		YES	
$Adj.R^2$	0.146		0.141		0.141	
N	8,247		8,247		8,247	

TABLE 7
The Effect of Corporate Governance and Internal Information Asymmetry on Firm Excess Value and Internal Capital Allocation Efficiency

This table presents the effects of corporate governance on the relation between internal information asymmetry and firm excess value (in Panel A), and internal capital allocation efficiency (in Panel B). Corporate governance is measured by *GINDEX* used in Gompers, Ishii and Metrick (2003) and the dual role of CEOs as board chairman (*DUALITY*). The dependent variable is asset- and sales-based firm excess value in Panel A and internal capital allocation efficiency, *RVA* and *AVA*, in Panel B. The sample period is from 1987 to 2011. All variable definitions are given in Appendix A. All regressions control for firm and year fixed effects. The t-values are based on standard errors clustered by firm. *,**,*** denote significance at the 0.10, 0.05, and 0.01 levels, respectively.

Panel A: Firm Excess Value Test

	DEV=EXVAL_AT				*DEV=EXVAL_SALE*			
	(1) *CG=GINDEX*		(2) *CG=DUALLITY*		(3) *CG=GINDEX*		(4) *CG=DUALLITY*	
	Est.Coef.	t-Stat	Est.Coef.	t-Stat	Est.Coeff.	t-Stat	Est.Coeff.	t-Stat
Intercept	0.007^{**}	2.41	0.006^{**}	2.18	0.005^{**}	2.51	0.005^{**}	2.19
$DIFRET_{i,t}*CG_{i,t}$	-0.032^{**}	-2.24	-0.074^{**}	-2.07	-0.047^{**}	-2.15	-0.063^{**}	-2.10
$DIFRET_{i,t}$	-0.106	-0.54	-0.069^{*}	-1.65	-0.062	-0.20	0.029	0.42
$CG_{i,t}$	-0.015^{**}	-2.62	-0.049^{*}	-1.79	-0.015^{*}	-1.82	-0.043	-1.49
$ALL\_RET_{i,t-1}$	-0.325^{***}	-8.04	-0.363^{***}	-5.93	-0.221^{**}	-2.68	-0.198^{**}	-2.81
$NUMSEG_{i,t}$	-0.029^{***}	-3.44	-0.025^{***}	-3.26	-0.019	-1.54	-0.043^{**}	-2.37
$NUMANALY_{i,t}$	0.014^{***}	14.17	0.009^{***}	6.35	0.007^{***}	4.26	0.007^{***}	4.60
$RELATED_{i,t}$	-0.032^{**}	-2.72	-0.042^{***}	-5.48	0.024	1.57	0.041^{**}	2.10
$SIZE_{i,t}$	-0.232^{***}	-8.33	-0.173^{***}	-5.69	0.034	1.01	0.083^{**}	2.11
$ROA_{i,t}$	-0.002	-0.07	0.003	0.17	-0.043	-1.08	-0.023	-0.62
$LEV_{i,t}$	-0.188^{**}	-2.49	-0.168^{*}	-1.90	0.098	1.04	0.215^{**}	2.47
$INVEST_{i,t}$	0.853^{***}	3.37	0.865^{***}	5.05	-0.439	-1.30	-0.099	-0.30
$SG_{i,t}$	0.092^{***}	4.48	0.075^{***}	3.23	-0.037	-1.34	-0.064^{**}	-2.56
$RET_{i,t}$	0.126^{***}	5.33	0.112^{***}	4.45	0.141^{***}	5.37	0.125^{***}	3.52
$STDROE_{i,t}$	0.001	1.44	0.001	0.74	0.000	0.53	0.001	0.81
$SUR_{i,t}$	-0.143^{**}	-2.68	-0.143^{***}	-4.13	-0.175^{***}	-4.34	-0.237^{***}	-4.66
Firm fixed effects	YES		YES		YES		YES	
Year fixed effects	YES		YES		YES		YES	
$Adj.R^2$	0.629		0.627		0.615		0.613	
N	6,705		6,705		4,883		4,883	

TABLE 7 (Cont'd)

Panel B: Internal Capital Allocation Efficiency Test

	DEV=RVA				DEV=AVA			
	(1) CG=GINDEX		(2) CG=DUALLITY		(3) CG=GINDEX		(4) CG=DUALLITY	
	Est.Coef.	t-Stat	Est.Coef.	t-Stat	Est.Coeff.	t-Stat	Est.Coeff.	t-Stat
Intercept	0.004	1.01	0.003	0.59	-0.002	-0.72	0.005	1.41
$DIFRET_{i,t}*CG_{i,t}$	-0.001^{**}	-2.14	-0.011^{*}	-2.41	-0.001^{**}	-2.22	-0.009^{**}	-2.19
$DIFRET_{i,t}$	-0.006	-0.57	-0.001	-0.56	-0.009	-0.82	-0.002	-0.64
$CG_{i,t}$	-0.000	-0.27	-0.001^{*}	-1.70	-0.000	-0.47	-0.002^{*}	-1.76
$ALL\_RET_{i,t-1}$	0.007^{**}	2.06	0.002	0.76	0.006	1.37	0.002	0.63
$NUMSEG_{i,t}$	0.000	0.29	-0.000	-0.89	0.000	0.72	-0.000	-0.27
$CAPEX_{i,t}$	-0.001	-0.07	-0.004	-0.22	0.010	0.43	0.005	0.23
$SIZE_{i,t}$	-0.001	-0.59	-0.001	-0.79	0.000	0.16	0.002	1.16
$RD_{i,t}$	-0.018	-0.45	-0.019	-0.82	-0.038	-0.87	-0.008	-0.24
$Q_{i,t}$	0.000	0.14	0.000	0.31	0.001	1.61	0.001^{*}	1.68
Firm fixed effects	YES		YES		YES		YES	
Year fixed effects	YES		YES		YES		YES	
$Adj.R^2$	0.207		0.174		0.123		0.170	
N	3,523		4,391		3,523		4,391	

TABLE 8

The Effects of Industry Competition and Internal Information Asymmetry on Firm Excess Value and Internal Capital Allocation Efficiency

This table presents the effects of product market competition on the relation between internal information asymmetry and firm excess value (in Panel A), and internal capital allocation efficiency (in Panel B). Product market competition is measured as the Herfindahl index of industry sales. The dependent variables asset- and sales-based firm excess values in Panel A, and the two measures of internal capital allocation efficiency (*RVA* and *AVA*) in Panel B. The sample period is from 1987 to 2011. All variable definitions are given in Appendix A. All regressions control for firm and year fixed effects. The t-values are based on standard errors clustered by firm. *,**,*** denote significance at the 0.10, 0.05, and 0.01 levels, respectively.

Panel A: Firm Excess Value Test

	DEV=EXVAL_AT		*DEV=EXVAL_SALE*	
	Est. Coeff.	t-Stat	Est. Coeff.	t-Stat
Intercept	-0.155	-0.38	0.227	0.29
$DIFRET_{i,t}*IndustryHH_{i,t}$	-0.191**	-2.37	-0.181**	-2.09
$DIFRET_{i,t}$	-0.051	-0.82	-0.074	-0.93
$IndustryHH_{i,t}$	-0.063**	-2.10	-0.065*	-1.98
$ALL\_RET_{i,t-1}$	-0.306***	-10.74	-0.242***	-5.05
$NUMSEG_{i,t}$	0.002	0.37	-0.039***	-3.47
$NUMANALY_{i,t}$	0.011***	8.67	0.008***	4.91
$RELATED_{i,t}$	-0.010	-1.28	0.037**	2.54
$SIZE_{i,t}$	-0.117***	-6.65	0.082***	4.42
$ROA_{i,t}$	-0.008	-0.35	-0.016	-0.39
$LEV_{i,t}$	-0.094*	-1.82	0.117**	2.40
$INVEST_{i,t}$	0.785***	5.27	0.323	1.47
$SG_{i,t}$	0.055***	3.68	0.037***	3.91
$RET_{i,t}$	0.085***	4.43	0.089***	4.51
$STDROE_{i,t}$	-0.000***	-2.84	0.000	1.29
$SUR_{i,t}$	-0.004	-1.43	-0.025*	-1.75
Firm fixed effects	YES		YES	
Year fixed effects	YES		YES	
$Adj.R^2$	0.531		0.512	
N	11,402		8,319	

TABLE 8 (Cont'd)

Panel B: Internal Capital Allocation Efficiency Test

	DEV=RVA		*DEV=AVA*	
	Est. Coeff.	t-Stat	Est. Coeff.	t-Stat
Intercept	-0.000	-0.31	0.004	0.79
$DIFRET_{i,t}$*$IndustryHH_{i,t}$	-0.009**	-2.30	-0.009**	-2.12
$DIFRET_{i,t}$	-0.000	-0.07	-0.002	-0.29
$IndustryHH_{i,t}$	-0.002	-0.61	-0.005	-1.13
$ALL\_RET_{i,t-1}$	0.001	0.49	0.000	0.00
$NUMSEG_{i,t}$	0.001	0.97	0.001*	1.95
$CAPEX_{i,t}$	-0.017	-1.08	0.017	0.91
$SIZE_{i,t}$	-0.000	-0.47	0.000	0.21
$RD_{i,t}$	-0.029	-1.31	-0.015	-0.64
$Q_{i,t}$	0.001	1.31	0.002**	2.45
Firm fixed effects	YES		YES	
Year fixed effects	YES		YES	
Adj.R^2	0.141		0.160	
N	8,247		8,247	

TABLE 9

Two-stage Least Square Estimation of the Effect of Internal Information Asymmetry on Firm Excess Value and Internal Capital Allocation Efficiency

This table presents the 2SLS estimation of the relation between internal information asymmetry and firm excess value (in Panel A) and internal capital allocation efficiency (in Panel B). In the first stage, *DIFRET* is modeled using mean flight distance (*FLIGHT_TIME*) (logged value) and mean Garmaise index based on Garmaise (2011) (*GARMAISE*) for division managers as the instrument variables. The sample period is 1987-2011. All variable definitions are given in Appendix A. The t-values are based on Huber-White-Sandwich standard error. *,**,*** denote significance at the 0.10, 0.05, and 0.01 levels, respectively.

Panel A: Firm Excess Value Test-2sls

	First Stage (DEV = ***DIFRET***)		Second Stage (DEV= ***EXVAL_AT***)		First Stage (DEV = ***DIFRET***)		Second Stage (DEV= ***EXVAL_SALE***)	
	Est. Coeff.	t-Stat	Est. Coeff.	t-Stat	Est. Coeff.	t-Stat	Est. Coeff.	t-Stat
Intercept	0.162***	2.99	-0.108	-0.44	0.185***	2.91	-0.074	-0.24
$DIFRET_{i,t}$			-0.071**	-2.07			-0.093**	-2.16
$FLIGHT\_TIME_{i,t}$	0.004**	2.28			0.004**	1.99		
$GARMAISE_{i,t}$	0.005***	3.31			0.005***	3.59		
$ALL\_RET_{i,t}$	-0.215***	-8.05	-0.136	-1.09	-0.215***	-5.98	-0.148	-0.88
$NUMSEG_{i,t}$	-0.000	-0.11	0.018**	3.68	-0.000	-0.07	0.014**	2.03
$NUMANALY_{i,t}$	-0.000	-0.43	0.017***	21.13	0.000	0.56	0.021***	19.94
$RELATED_{i,t}$	0.064***	2.85	0.216***	3.68	0.083***	3.09	0.209**	2.54
$SIZE_{i,t}$	0.006**	2.11	-0.080***	-12.19	0.004	1.00	-0.094***	-12.03
$ROA_{i,t}$	-0.083**	-1.97	0.976***	9.47	-0.084*	-1.70	0.956***	6.83
$LEV_{i,t}$	0.023**	2.14	-0.124***	-4.71	0.037***	3.12	0.355***	9.03
$INVEST_{i,t}$	-0.013	-0.29	0.026	0.30	-0.015	-0.31	0.451***	3.51
$SG_{i,t}$	-0.027*	-1.92	0.159***	4.99	-0.042**	-2.59	0.147***	3.06
$RET_{i,t}$	-0.003	-0.42	0.163***	11.53	-0.006	-0.73	0.121***	6.42
$STDROE_{i,t}$	-0.004*	-1.89	0.023***	5.22	-0.002	-0.70	0.017**	3.10
$SUR_{i,t}$	0.014	0.59	-0.329***	-8.34	0.001	0.02	-0.410***	-8.02
Industry fixed effects	YES		YES		YES		YES	
Year fixed effects	YES		YES		YES		YES	
First Stage Cragg and Donald Test (F-stat, p-value)		(13.762,0.000)				(12.738,0.000)		
Over-Identification Test (Chi-Square, p-value)		(0.168, 0.682)				(1.796, 0.180)		
Adj.R^2	0.061		0.234		0.067		0.277	
N	13,032		13,032		9,623		9,623	

TABLE 9 (Cont'd)

Panel B: Internal Capital Allocation Efficiency Test-2sls

	First Stage (DEV = ***DIFRET***)		Second Stage (DEV= ***RVA***)		First Stage (DEV = ***DIFRET***)		Second Stage (DEV= ***AVA***)	
	Est. Coeff.	t-Stat	Est. Coeff.	t-Stat	Est. Coeff.	t-Stat	Est. Coeff.	t-Stat
Intercept	-0.000	-0.00	0.012***	3.25	-0.000	-0.00	0.009**	2.49
$DIFRET_{i,t}$			-0.009*	-1.86			-0.009**	-2.32
$FLIGHT\_TIME_{i,t}$	0.004**	2.22			0.004**	2.22		
$GARMAISE_{i,t}$	0.004**	2.18			0.004**	2.18		
$ALL\_RET_{i,t}$	-0.163***	-4.08	-0.001	-0.14	-0.163***	-4.08	0.005	0.52
$NUMSEG_{i,t}$	-0.004	-1.27	-0.000	-1.22	-0.004	-1.27	0.000	0.03
$SIZE_{i,t}$	0.003	1.34	0.000	1.56	0.003	1.34	0.000	0.17
$RD_{i,t}$	0.109	0.98	-0.001	-0.07	0.109	0.98	-0.004	-0.40
$Q_{i,t}$	-0.003	-0.50	-0.000	-0.11	-0.003	-0.50	0.001	1.29
$CAPEX_{i,t}$	-0.072	-0.58	-0.019	-1.43	-0.072	-0.58	0.008	0.58
Industry fixed effects	YES		YES		YES		YES	
Year fixed effects	YES		YES		YES		YES	
First Stage Cragg and Donald Test (F-stat, p-value)	(9.015, 0.000)				(9.015, 0.000)			
Over-Identification Test (Chi-Square, p-value)	(2.430, 0.119)				(0.262, 0.609)			
$Adj.R^2$	0.051		0.027		0.051		0.026	
N	8,247		8,247		8,247		8,247	

TABLE 10

Refocusing Events and Internal Information Asymmetry

This table presents the analysis of corporate refocusing transactions. Panel A reports the relation between internal information asymmetry and the likelihood of future refocusing events, based on both firm-level sample and division-level sample. For the regressions using the division-level sample, the control variables are measured at the division-level. The logistic regression is estimated with standard errors clustered by firm. Panel B reports the change in internal information asymmetry between the period of three years before and the period of three years after corporate refocusing events using the firm-level sample. Panel C reports the OLS results of the relation between internal information asymmetry and the three-day cumulative abnormal returns surrounding refocusing event announcements, where *DIFRET* is measured at the firm level for the firm-level sample. For the division-level sample, *DIFRET* is measured at the division-level as the differential trading profit between the divested division manager's trading profit and top executives' trading profit. The t-value is based on the standard errors clustered by firm. The sample period is from 1987 to 2011. All variable definitions are given in Appendix A. *,**,*** denote significance at the 0.10, 0.05, and 0.01 levels, respectively.

Panel A: The Likelihood of Future Refocusing Events (Dependent variable = REFOCUS)

	(1) Firm-Level Sample		(2) Division-Level Sample	
	Est. Coeff.	Chi-Square	Est. Coeff.	Chi-Square
Intercept	-1.109***	1372.20	0.252	2.46
$DIFRET_{i,t}$	0.189**	6.44	0.575*	2.79
$EXVAL\_AT_{i,t}$	0.015	0.29		
$LEV_{i,t}$	-0.049	0.34		
$ROA_{i,t}$	-0.696***	13.66	-1.612***	9.26
$SG_{i,t}$	-0.135**	4.72	-0.144	0.80
$ASSETS\_PER_{i,t}$			0.115	0.06
Industry fixed effects	YES		YES	
Year fixed effects	YES		YES	
$Pseudo\_R^2$	0.368		0.211	
N	12,268		1,356	

TABLE 10 (Cont'd)

Panel B: Comparison between Pre- and Post-Refocusing Events

	Pre-Refocusing		Post-Refocusing		P-values for differences	
	Mean	Median	Mean	Median	Mean	Median
DIFRET	-0.003	-0.007	-0.042	-0.017	0.006	0.002
# of obs.	224		224			

Panel C: Internal Information Asymmetry and Refocusing Event CAR Regression(Dependent variable= CAR)

	(1) **Firm-Level Measures**		(2) **Division-Level Measures**	
	Est. Coeff.	t-Stat	Est. Coeff.	t-Stat
Intercept	0.031	1.20	0.009	0.75
$DIFRET_{i,t-1}$	0.225**	2.27	0.158*	1.79
$EXVAL\_AT_{i,t-1}$	-0.162***	-2.98	-0.116***	-2.80
$LEV_{i,t-1}$	0.009	0.43	0.007	0.50
$ROA_{i,t-1}$	-0.115**	-2.12	-0.102***	-2.74
$SG_{i,t-1}$	0.042	1.28	0.018	1.07
$HH_{i,t-1}$	0.051	0.68	0.028	0.81
$DVDCUT_{i,t-1}$	0.094***	3.42	0.068***	3.19
$NUM\_ANN_{i,t}$	0.002	0.24	0.003	0.31
$Adj\text{-}R^2$	0.092		0.101	
N	224		155	

TABLE 11

The Non-linearity Relation between *DIFRET* and Firm Excess Value and Internal Capital Allocation Efficiency

This table presents the results of whether differential insider trading profit has a stronger effect, when it is positive (i.e., *DIFRET*>0), on firm excess value (in Panel A) and internal capital allocation efficiency (in Panel B). The indicator, *POSITIVE*, is equal to 1 when *DIFRET* >0; and 0 otherwise. The sample period is from 1987 to 2011. All variable definitions are given in Appendix A. All regressions control for firm and year fixed effects. The t-values are based on standard errors clustered by firm. *,**,*** denote significance at the 0.10, 0.05, and 0.01 levels, respectively.

Panel A: Firm Excess Value Test

	DEV=EXVAL_AT		*DEV=EXVAL_SALE*	
	Est.Coef.	t-Stat	Est.Coeff.	t-Stat
Intercept	0.011*	1.69	0.009*	1.91
$DIFRET_{i,t}*POSITIVE_{i,t}$	-0.055*	-1.76	-0.058*	-1.72
$DIFRET_{i,t}$	-0.042*	-1.78	-0.034*	-1.89
$POSITIVE_{i,t}$	-0.022*	-1.71	-0.032*	-1.83
$ALL\_RET_{i,t}$	-0.177***	-4.15	-0.173***	-3.82
$NUMSEG_{i,t}$	-0.001	-0.07	-0.019	-1.11
$NUMANALY_{i,t}$	0.010***	6.85	0.010***	5.86
$RELATED_{i,t}$	-0.008	-0.49	0.027	1.25
$SIZE_{i,t}$	-0.085***	-3.89	-0.098***	-3.54
$ROA_{i,t}$	-0.032	-0.16	0.060	0.23
$LEV_{i,t}$	-0.106***	-3.08	0.323***	7.28
$INVEST_{i,t}$	0.240**	2.33	0.526***	3.71
$SG_{i,t}$	0.169***	7.21	0.148***	5.30
$RET_{i,t}$	0.137***	12.98	0.120***	8.94
$STDROE_{i,t}$	0.009*	1.66	0.004	0.59
$SUR_{i,t}$	-0.118***	-4.50	-0.189***	-5.31
Firm fixed effects	YES		YES	
Year fixed effects	YES		YES	
$Adj.R^2$	0.460		0.502	
N	13,032		9,623	

TABLE 11 (Cont'd)

Panel B: Internal Capital Allocation Efficiency Test

	DEV=RVA		*DEV=AVA*	
	Est.Coef.	t-Stat	Est.Coeff.	t-Stat
Intercept	0.001	0.78	-0.000	-0.36
$DIFRET_{i,t}*POSITIVE_{i,t}$	-0.003^{**}	-2.14	-0.004^{**}	-2.09
$DIFRET_{i,t}$	-0.001	-1.06	-0.002	-0.72
$POSITIVE_{i,t}$	-0.000	-0.22	-0.001	-0.91
$ALL\_RET_{i,t}$	0.001	0.72	0.000	0.13
$NUMSEG_{i,t}$	0.000	1.18	0.001^{*}	2.76
$CAPEX_{i,t}$	-0.017	-1.14	0.017	1.01
$SIZE_{i,t}$	-0.001	-0.73	0.000	0.20
$RD_{i,t}$	-0.030^{*}	-2.04	-0.016	-1.22
$Q_{i,t}$	0.001	1.67	0.002^{***}	3.42
Firm fixed effects	YES		YES	
Year fixed effects	YES		YES	
$Adj.R^2$	0.160		0.141	
N	8,247		8,247	