The Association between Idiosyncratic Risk and Private Information Acquisition

By
A. Rashad Abdel-khalik
University of Illinois

This draft date: April 2008

rashad@uiuc.edu
515 E. Gregory
Champaign, IL 61820

Tel. 217-265-0539
Fax. 217-244-656

Acknowledgements

I would like to thank Sam Han, Keejae Hong, Patricia O'Brien, Rachel Schwartz; Theodore Sougiannis and Julia Swicki and an anonymous referee for their helpful comments. The financial support of the Zimmerman Center of International Accounting at the University of Illinois is gratefully acknowledged.

The Association between Idiosyncratic Risk and Private Information Acquisition

Abstract:

This study investigates earnings and forecast uncertainty as determinants of firm-specific idiosyncratic risk. Earnings uncertainty generated by the accounting process is distinguished from the earnings forecast uncertainty generated by the analysts' search and use of private information. The former is measured by volatility of earnings and operating cash flows, while the latter is measured by the component of forecast dispersion that is unexplainable by other publicly available information. The empirical tests for in- and out-of-sample predictions of forecast uncertainty show that both earnings volatility and forecast uncertainty explain significant proportions of variation in idiosyncratic risk. The results are consistent for each year during the test period of nine years.

JEL: M41

Key Words: Analysts forecast dispersion; earnings volatility, forecast uncertainty, nonsystematic risk

The Association between Idiosyncratic Risk and Private Information Acquisition

1. **Introduction**

Much of the empirical research on the value relevance of analyst's forecasts has concentrated on examining the association between unexpected earnings (i.e., earnings forecast errors) and unexpected market rates of return. At first, the association between the means of these variables was examined. This was followed by further work that investigated the association between the dispersion (second moment) of analysts' earnings forecast and the means (first moment) of unexpected return on different combinations of portfolios. Curiously enough, there has been no work that examines the interrelationships between dispersion of analysts' forecasts and the second moment of unexpected of market returns (i.e., nonsystematic risk). This omission is difficult to explain because both measures—dispersion of analysts'' earnings forecasts and non-systematic risk—are firm specific and, while they are formed differently, they could be viewed as alternative measures of firm-specific risk. How these two measures interrelate is the research question examined in this study.

The nature of the interrelationship between the dispersion of analysts' forecasts and market-based non-systematic risk is hypothesized to be driven by the unique ways in which each type of risk measure is developed. While the market-based non-systematic risk is the volatility of rates of return that could not be explained by market-wide factors, the dispersion of analysts' earnings forecasts arises from one of two factors: (a) differences in analysts' abilities and the forecasting models they use, and (b) the variation in different information sets that different analysts employ in forming their expectations. Without direct observation of analysts' effort, obtaining information about the former factor is infeasible. Therefore, the focus of analysis in this study is on the second factor—i.e., generating and using different information. With a large sample of thousands of observations, the empirical expectation is that the effect of variation in forecasting abilities would be randomized.

The sample employed in hypotheses testing started with all firms covered in I/B/E/S for which all the required data were available. Earnings information, number of analyst following, and dispersion of earnings forecasts are also obtained from I/B/E/S database. Other data required for the analysis are obtained from CRSP and COMPUSTAT tapes. The analysis covers the twelve-year period, 1994-2005.

The results of empirical tests are consistent with the hypotheses that (1) earnings volatility and related public information do not fully explain the observed earnings forecast dispersion; and (2) conditional on publically available information (firm size, profitability and growth), the proxy for private information, is significantly associated with idiosyncratic risk.

The remainder of the paper is organized as follows: The next section discusses the emerging relevance of non-systematic risk. In section 3, a method is provided for separating the public and private sources of the uncertainty about earnings. Data selection and descriptive statistics are in section 4. The empirical analysis and hypotheses testing are in section 5. Section 6 provides predictions and validation of the robustness of the findings using out-of-sample tests. Section 7 offers a summary and conclusions.

2. The Emerging Role of Non-Systematic Risk

The process by which financial analysts generate earnings forecasts have been the subject of hypotheses testing and speculations shaping the common understanding that analysts compete to establish comparative informational advantages. This competition is the primary basis for the search for and acquisition of private information. In this study I use the dispersion of analysts' earnings forecasts to develop a proxy for private information used in forecast formation and examine its association with idiosyncratic (nonsystematic) risk. Idiosyncratic (nonsystematic) risk is measured by the unexplained variation in market rates of return based either on a single factor or multiple-factor (i.e., Fama-French) models.

Early work on capital asset pricing has argued that idiosyncratic risk is diversifiable and is therefore irrelevant to investors. Departing from this conventional wisdom is the recent research that shows that idiosyncratic risk matters for several reasons. First, idiosyncratic risk has been shown to be the source of growth in total return risk (Campbell, Lettau, Malkiel and Xu, 2001; Goyal and Santa-Clara, 2003). Second, diversification of nonsystematic risk requires zero transaction cost and diversification would not be a viable strategy when transaction cost is relatively high (Mayshar 1981; Pontiff, 1996). Third, volatility of security prices is partially driven by the volatility in reported accounting earnings, which is an indicator of the firm's reported nonsystematic risk (RiskMetrics, 1999). Fourth, Pontiff (1996) shows that idiosyncratic risk of mispriced stocks is relevant to those arbitrageurs who hold few securities. Finally, Xu and Malkiel (2003, p. 614) argue that, either by design or wealth level, "many investors do not hold diversified portfolios" and these investors are therefore subject to the valuation effects of non-systematic risk.

Understanding the forces giving rise to idiosyncratic risk is of recent interest to researchers. For example Mashruwala, Rajgopal and Shevlin (2006) provide evidence linking accrual-trading strategies with high transaction-cost (relatively high nonsystematic risk) stocks lacking close substitutes. In this study I posit and test hypotheses concerning two other plausible determinants: (i) forecast uncertainty as measured by publicly known drivers of the volatility inherent in the earnings generating process; and (b) analysts acquisition of private information, which is related to forming expectations as conveyed by the portion of the dispersion of earnings forecasts that is unrelated to earnings volatility. Since analysts have equal access to publicly available information, it is plausible to argue that the discordance in their earnings' predictions is likely to arise from two sources: (a) the use of different prediction models, and (b) the use of privately acquired information that others could not access.[1]

There are two implications for acquiring private information. First, it increases the disparity of the knowledge among analysts, which leads them to generate different and more dispersed predictions. This dispersion increases with the increased ambiguity of the relationship between new information and firm value, which Zhang [2006] calls "information uncertainty." Second, placing private information in the hands of security traders creates more informed and less noise trading. Johnson (2004) offers this explanation as the reason for obtaining negative association between dispersion of analysts' earnings forecasts and unexpected return. This study adds to this literature by examining the relationship between the dispersion of analysts' earnings forecasts and idiosyncratic risk.

---

[1] For the purpose of this study and the inability to know the individual analysts' models, we will concentrate on the second aspect, private information, and assume the effect of model differences filter in the error term.

The competition among analysts to attain comparative advantages leads different analysts to search and acquire information not conveyed by publicly available accounting reports and not known to other market participants (Hakansson, 1977; Liu, Xu, and Yao, 2004). To estimate the proxy for private information as measured by an index of *forecast uncertainty*, I disaggregate the dispersion of analysts' earnings forecast into two components based on whether the source of discordance among analysts is attributable to known public information or to privately acquired information. Because *the proxy for private information* is the main focus, this study differs from prior research in two respects: (a) filtering the effects of publicly known information on analysts' dispersion such that the residual could be considered a proxy for private information acquisition; and (b) providing evidence on the association between this obtained index of privately acquired information and idiosyncratic risk as measured by the unexplained volatility in security prices.[2]

3. Public and Private Sources of Uncertainty about Earnings

3.1 Volatility of Firm Performance

In general, a common measure of the risk associated with a prospect or a phenomenon is the dispersion (variance) of the distribution of related outcomes.[3] Viewing the firm as a "prospect" implies that the riskiness of the firm could be estimated by the dispersion or volatility of the firm's expected earnings for which historical performance may be used as a proxy. Historical volatility of earnings would be relevant in security pricing to the extent that it is the best predictor of expected volatility of the stream of future cash flows. To be consistent with prior literature, the accounting-based risk measure used in this study is the standard deviation of actual quarterly earnings per share (EPS) and is denoted ${}_{AE}\sigma_t$. For the purpose of our analysis,

---

[2] As will be discussed below, earlier research has concentrated on the effect of such dispersion on average volume of trade (e.g., Karpoff, 1986) or unexpected market returns (e.g., Johnson, 2004).

[3] See Marrison (2002) and RiskMetrics (1999).

$_{AE}\sigma_t$ is calculated on the basis of rolling periods of twelve quarters each, except for the year 1994 for which the measure is based on eight quarters..

3.2 A Proxy for Privately Acquired Information

Investors and analysts obtain information about the companies they track from three primary sources: (a) the company's own disclosure and financial reports, (b) management's actions such as trading in the firm's stock or exercising options; and (c) analysts' own private information search (Hakansson, 1977; Liu, Xu, and Yao, 2004). Because using private information in forming expectations increases information asymmetry among analysts as well as between analysts and investors (Barron et al., 1998), the related dispersion of knowledge leads to a corresponding dispersion of predicted earnings. Furthermore, the role of private information becomes more salient when other financial disclosures are ambiguous (Liu, Xu and Yao, 2004; Hope, 2003).[4] Thus, analysts have the incentives to spend more effort on searching for and gathering private information in order to attain differentiating informational advantages. Indeed, Mohanram and Sunder (2006) find that analysts invest more effort in the discovery of firm-specific information following the adoption of Regulation FD and the forecasting accuracy of some analysts has suffered as a result.[5]

Barron et al. (1998) model the relevance of dispersion in analysts' forecasts to "show how empirical researchers can use observable forecast dispersion and error in the mean forecast

[4] An explicit source of guidance is the issuance of management earnings forecasts. See, for example, Waymire (1986); Baginski, Conrad and Hassell (1993) and Williams (1996).
[5] Prior to the issuance of Regulation FD (October 2000), exclusive meetings with management used to be one source of analysts' private knowledge. .

to understand important properties of analysts' information environment" (p. 429). Indeed, their model supports the earlier empirical findings that examine the association between forecast dispersion and the means of the volume and return series. For example, Karpoff (1986); Ziebart (1990); Ajinkya, Atiase and Gift (1991); Barron (1995) find a positive relationship between forecast dispersion and trading volume. In contrast, Park (2001), Diether et al. (2002); Thomas (2002) and Wu (2004) find negative association between the dispersion of analysts' earnings forecasts and unexpected market return. Motivated by the need to find an explanation for the latter finding, Johnson (2004) provides a model in which forecast dispersion is treated as a measure of information risk that would be negatively associated with security prices.[6]

This study departs from prior literature in two aspects. The first issue is the decomposition of analysts' forecast dispersion by source into two proxies: public and private information. The second issue is using the *second moment* (variance) of the distribution of returns. While prior research has concentrated on the *first moment* (average rates of return or volume of trade) in assessing the relevance of forecast dispersion, this paper evaluates the association between the second moment of returns and a unique component of analysts' forecast uncertainty—the surrogate for private information.

To address these two issues, I first assume that the forecast generating process is a linear combination of public and private information whereas differences in the forecasting models used by analysts are assumed to be randomized. This model takes the following form:

$$EF_{t+1,j} = a_0 + a_1 Pub_t + a_{2,j} \; {}_t\eta_{t+1,j} + \varepsilon_{t+1,j} \qquad [1]$$

where $EF_{t+1,j}$ is the earnings forecast for period $t+1$ formed by the j^{th} analyst in period t; a_0 is the unconditional persistent component of earnings; Pub_t is the set of information that is publicly

[6] In addition, there is some empirical evidence on the relationship between dispersion of analysts' forecasts and firm value by conditioning the information content of unexpected earnings (Imhoff and Lobo [1992]).

available to all analysts in period t; ${}_t\eta_{t+1,j}$ is the set of private information obtained by the j^{th} analyst in period t pertaining to earnings expectations in period $t + 1$; a_1 is the conditional parameter or index of earnings *persistence* (the proportion of current period's publicly known information that will carry over to the next period); $a_{2,j}$ is the weight the j^{th} analyst assigns to the private information he or she acquired; and ε_{t+1} is a random error term with zero expected value. Because publicly available information (Pub_t) is *firm* specific, while privately acquired information (${}_t\eta_{t+1,j}$) is *analyst* specific, the two sources Pub_t and ${}_t\eta_{t+1,j}$ are orthogonal and the interaction term $E(Pub_t,\ {}_t\eta_{t+1,j}) = 0$. Therefore, the interaction between these two variables is irrelevant. Furthermore, if ${}_t\eta_{t+1,j}$ is informative, then $E|a_2\ {}_t\eta_{t+1,j}| > 0$, while $E(\varepsilon_{t+1}) = 0$.

The linear combination in [1] is for describing and predicting the levels of expected earnings forecasts. Because the two explanatory variables are independent, the variance (variation) of EF_{t+1} on the left-hand side is the sum of the variances (variation) of the terms on the right hand side. That is,

$$vEF_{t+1} = (a_1)^2\, v(Pub_t) + (a_2)^2\ v({}_t\eta_{t+1,j}) + v(\varepsilon_{t+1,j}), \tag{2}$$

The left-hand side of the linear composition in [2] is the earnings forecast variation vEF_{t+1} {= $\sum_{j=1}^{NA} EF_{t+1} - \mu EF_{t+1}]^2$ } summed over the number of analyst following (NA) as the squared deviations from the mean of all forecasts (μEF_{t+1} for a given company) in a given quarter "t" predicting earnings in period "$t+1$;" the term $[(a_1)^2\, v(Pub_t)]$ is the weighted variance of publicly available information (assuming that a_1 does not vary by analyst); the term $[(a_2)^2\, v({}_t\eta_{t+1,j})]$ is the weighted variance of privately available information; and $v(\varepsilon_{t+1,j})$ is the unexplained volatility of earnings forecasts.

Three observations should be noted about the model in [2]: (i) to be consistent with analysts' forecasts, EPS (not net income) is the scale of earnings used; (ii) publicly available information consists of earnings volatility (Lang and Lundholm, 1996) and specific control variables that need to be explicitly considered; and (iii) while public information may be sufficiently identifiable to develop approximate measures, no such indicators are available for privately acquired information.

The control variables adopted in the extant literature (Bhushan, 1989; O'Brien and Bhushan, 1990; Brennan and Hughes, 1991; Brennan, Jegadeesh and Swaminathan, 1993; Lang and Lundholm, 1996; Roulstone, 2003; Liu, Xu and Yao, 2004) include the number of analyst following (*NA*), firm size (*Z*), growth rates (*GR*), profitability (*ROE*), and leverage (*LEV*).[7]

Thus, dispersion of analysts' earnings forecasts, ${}_F\sigma^E_{t+1}$, is the square root of vEF_{t+1} in [2], and the term Pub_t in model in [1] could be formulated as a linear combination of historical earnings volatility and control variables such that the dispersion of analyst's earnings forecast could be stated as follows:

$$\begin{aligned} {}_F\sigma^E_{t+1} &= \alpha_0 + \alpha_1\, {}_{AE}\sigma_t + \alpha_2\, \mathrm{NA} + \alpha_3\, ZA + \alpha_4\, ROE + \alpha_5\, LEV + \alpha_6\, GR + \phi_{t+1} + v(\varepsilon_{t+1,j}) \\ &= E({}_F\sigma^E_{t+1}) + \phi_{t+1} + v(\varepsilon_{t+1,j}) \qquad [3] \end{aligned}$$

where ${}_F\sigma^E_{t+1}$ is the disagreement among analysts as measured by the standard deviation of earnings forecasts; ${}_{AE}\sigma_t$ is the standard deviation of historical earnings (from continuing operations) calculated over the preceding twelve quarters[8] as a measure of the volatility inherent in the earnings series; *NA* is the number of analysts following the stock; *ZA* is firm size measured by log of total assets; *ROE* is net income divided by book equity as a measure of return on

[7] In addition, Basu (1997) index of conservatism has been considered in the analysis but was not a significant determinant of forecast dispersion.

[8] The actual EPS numbers used are those measured on the same accounting basis as the forecasted EPS.

equity; *LEV* is total debt to equity; *GR* is sales growth rate; and ϕ_{t+1} is an unexplained residual term. In this formulation, ϕ_{t+1} captures the combined effects of privately available information search (${}_t\eta_{t+1,j}$) and the random error ($\varepsilon_{t+1,j}$).

3.3 Hypotheses

The above discussion may be characterized by two research questions: (a) How much of earnings forecast uncertainty derives from privately acquired information? And, (b) how does the obtained proxy for forecast uncertainty relate to the firm-specific (idiosyncratic) risk (second moment) of the related securities? These research questions are formulated as two hypotheses to be tested in this study.

Hypothesis One

$H1_0$ (*Null*): the volatility inherent in the earnings series and other publicly available information fully explains earnings forecast uncertainty.

$H1_A$ (*Alternative*): Publicly available information, including earnings volatility, does not fully explain earnings forecast uncertainty.

Hypothesis Two

$H2_0$ (*Null*): Idiosyncratic risk is unrelated to the private information proxy generated from forecast uncertainty.

. **$H2_A$** (*Alternative*): Idiosyncratic risk is significantly correlated with the private information proxy generated from forecast uncertainty.

4. Data and Measurement of Variables

The initial sample used in this study consists of 58,994 firm/year observations, which encompasses all the firms included in the I/B/E/S database over the period 1994 – 2005 that also met the data requirements. This database is also the source of information on several variables: earnings forecasts, reported actual earnings, number of analyst following, and the dispersion of analysts' earnings forecasts. COMPUSTAT, CRSP and the Fama-French databases are used to obtain historical information on earnings, operating cash flows, security returns, the Fama-French three factors, sales volume and growth, total assets, leverage (debt/equity), and rates of return on equity.

Data editing led to omitting (for each year individually) firms with missing observations on variables required for analysis, and to excluding small firms (sales or assets < $100 million), or firms with negative equity. Also firms that reported consistent patterns of losses over twelve quarters are excluded.[9] Thus, the sample retained for analysis consists of firms having asset size greater than $100 million, book value of equity of at least $30 million, and non-negative *ROE* measured over any twelve consecutive quarters. The distribution of the final sample of 58,994 firm/quarter observations varies by year, ranging from 2,322 in 1994 to 4,443 in 2005. Finally, data analysis requires giving consideration to the structural dependency of observations arising from two sources: (a) repeated observations: large number of firms is repeatedly represented year after year, and (b) overlapping measurement: the measures of historical volatility of earnings per share are overlapping because these measures are based, for any year of analysis, on twelve rolling quarters. Consequently, the standard statistical method of correcting for serial correlations would not offer an adequate remedy for these overlapping measures. Instead, the data set is partition into two spaced categories: one for the odd-numbered years (from 1995, 1997, …2005) and the other

---

9

for even-numbered years (from 1994, 1996…2004). For each of the Odd/Even categories, the empirical estimation and hypotheses testing is carried out for each quarter separately.

4.1 Measurement of Variables

As noted above, to be consistent with analysts' predictions, the standard deviation of earning quarterly earnings per share, ${}_{AE}\sigma_t$, is the historical measure used for earnings uncertainty. The statistics generated for ${}_{AE}\sigma_t$ are based on a moving-twelve quarter periods preceding the year of analysis. It should be emphasized that this performance measure is publicly available and is known to analysts as well as to market participants prior to the period used for estimating the proxy for private information.

Firm size is measured by the logarithmic transformation of either sales volume *ZS*, or total assets *ZA*. The book, rather than market, values of either assets or sales were more relevant for this analysis in avoiding endogeneity because the dependent variable of interest, idiosyncratic risk, is based on the volatility of market valuation. In both cases, using market values would have induced an unmanageable endogeneity problem. For the same reason, growth in sales *SG* is used as an indicator of the firm's growth opportunities.

Idiosyncratic (firm-specific) risk is measured in two different ways for the purpose of comparison and validation: (a) the unexplained variation (root mean squared error) of a single-factor model (Capital Asset Pricing), and (b) the unexplained variation of returns based on the Fama-French three-factor model. The former is referred to as ${}_R\sigma_{CAPM}$, whereas the latter is referred to as ${}_R\sigma_{FF}$ with the pre-subscript "*R*" connoting market-based measure. Campbell et al, [2001] and Goyal and Santa-Clara. [2003] used measures of idiosyncratic risk similar to ${}_R\sigma_{CAPM}$.

4.2 Descriptive Statistics

Table 1 presents summary descriptive statistics for the variables used in the study. Data are presented for the first quarter of odd-numbered years (1995-2005) as an example of the data structure. The sample firms vary in size considerably—total assets average $7.2 billion with a standard deviation of about $1.5 billion. With logarithmic transformation, the distribution of log assets is much more symmetric: mean (median) is 7.23 (7.1) and standard deviation is 1.50. Average (median) rate of return on equity is 3% (2.6%) and average rate of growth in sales is about 0.8% but this variable has a large dispersion (standard deviation is 17%) and ranges between -0.07 and 0.062%.

Historical volatility of earnings averages about 30% (with a median of 15%) and standard deviation about twice the mean. In contrast, the discordance among analysts is much smaller as the dispersion of analysts' earnings forecasts averages 2.8% (median is 2%) and it is not widely dispersed--standard deviation is 3.8%. Idiosyncratic risk is about 11% on average, but it is distributed very tightly--standard deviation is 5%--whether the one-factor CAPM model ${}_R\sigma_{capm}$, or the Fama-French three-factor model ${}_R\sigma_{FF}$ is used.

<u>Insert Table 1 about here</u>

The Pearson correlation coefficients are reported in Table 2. Of interest is the size of the coefficient between the two measure of idiosyncratic risk (${}_R\sigma_{capm}$ and ${}_R\sigma_{FF}$). A coefficient of 99% indicates a complete substitutability of the two measures. Idiosyncratic risk is highly negatively correlated with firm size, but, for this unconditional correlation, idiosyncratic risk has low correlation coefficients with earnings forecast volatility and analysts' earnings forecast dispersion. The latter two variables, however, have a correlation of 41% suggesting that part of the disagreement among analysts could be the inherent volatility of earnings. As expected, the variable

NA for the number of analyst following is negatively correlated with firm size and idiosyncratic risk at about the same level of association (41%).[10]

5. Empirical Results of Decomposing Forecast Uncertainty

5.1 Estimation and Testing Hypothesis I

To test the hypotheses posited above, I first estimate the linear model in [3] to evaluate the extent to which forecast dispersion is driven by public versus private information. The model is estimated by Ordinary Least Squares (*OLS*) with robust standard errors (i.e., corrected for heteroschedasticy) for each quarter and for the odd-numbered and even-numbered years separately to avoid obtaining spurious relationships.[11] In addition, the estimation was repeated for each year separately (not reported here) and the results do not differ significantly from year to year. Accordingly, Table 3 presents the quarterly results for each of the odd-numbered years 1995-2005, and the even-numbered years, 1994 - 2004.

Insert Table 3 about here

For model specification, the results show statistically significant fit for each estimated regression (*F-statistics* range between 61 and 92, each is statistically significant at $p < 0.01$); adjusted R^2 values are either 13% or 14%; and a variance inflation index (*VIF*) not exceeding 1.23, indicating lack of a significant colinearity. In general, the estimation results are consistent over

[10] Including firm size and *NA* in one regression has created significant colinearity problem.
[11] Using panel regression methods (such as fixed or random effects) will not resolve the problem of serially correlated variables because the coefficients of variation of earnings (and firm performance measures) are estimated over overlapping periods of twelve quarters. Therefore, even with panel regression, the data will be serially correlated.

the four quarters for both the odd-numbered and even-numbered years. In summary, these results reveal several patterns.

1. Four variables are consistently significant at $p < 0.01$. These are ${}_{AE}\sigma_t$, historical quarterly earnings volatility; *NA*, number of analyst following; *ZA*, firm size as measured by the log of total assets; and *SG*, sales growth rate.
2. The coefficient α_5 on *LEV*, debt-to-equity ratio, is significant at $p < 0.01$ in five quarters, at $p < 0.05$ in one quarter and at $p< 0.10$ in one quarter.
3. The coefficient α_4 on profitability, *ROE*, is consistently not significant.
4. The sign of the coefficient α_3 on *ZA* (firm size) is consistently positive and significant at $p < 0.01$, suggesting that, conditional on other variables; larger firms have relatively higher earnings volatility.
5. The sign of the coefficient α_2 on number of analyst following, *NA*, is consistently negative and significant at $p < 0.01$. This result is consistent with prior literature (e.g., Lang and Lundholm, 1996; Hope, 2003) and could be an indicator of two different effects: (a) the larger the number of analysts who are seeking information, the more the agreement towards a particular prediction, or (b) structurally, the statistical estimation of the dispersion of analysts' earnings forecasts shrinks as the number of analysts increases.
6. The sign and significance of the coefficient α_2 on ${}_{AE}\sigma_t$, the accounting measure of performance volatility is consistent with expectations. In Table 3, this coefficient is consistently positive with *t-statistics* ranging between 5.2 and 10.5, each of which is statistically significant at $p < 0.01$.
7. Of more importance for the objectives of this study is the fact that about only 12% of the variation in analysts' earnings forecasts is explainable by the included publicly available

information. While the variables used may not capture all publicly available information, it is plausible that privately acquired information characterize most of the 88% remaining explanation.

Insert Figure One about here

These results collectively suggest that publicly available information partially give rise to analysts' discordance or disagreement. Two observations are of relevance at this stage. First, the most important variable in explaining the dispersion of analysts' earnings forecasts is ${}_{AE}\sigma_{t}$, historical quarterly earnings volatility. The standardized coefficient (the statistical *beta* coefficient or partial *R-squared*) on this variable is about 35%. The variables next in relevance are firm size, *ZA*, which has a *beta* coefficient of 13% and *NA*, the number of analyst following which has a *beta* coefficient of 11%. However, given the explanatory power of the models (about 13%), much of the disagreement among analysts' earnings forecasts seem to emanate from other sources. This result rejects the null form of Hypothesis I in favor of the alternative—publically available information do not fully explain dispersion of analysts' earnings forecasts. This residual is then used as a proxy for privately acquired information.

5.2. Empirical Test of Hypothesis 2

Given the results of estimating model [3], the proxy for private information, ϕ_{t+1}, can now be estimated. As shown in Table 1, the mean (median) of this proxy is 0.0029 (-0.24), but it has a large standard deviation of 0.704 and the distribution ranges from -0.53 to 0.44. Obtaining a negative sign for this variable means that private information increases the convergence on prices and the concordance among analysts, and vice versa. Given that the median is -0.24, it is evident that the majority of observations are of the type that increases agreement among analysts.

Testing the second hypothesis about the relationship between the proxy for private information, ϕ_{t+1}, and idiosyncratic risk, may begin by looking at a simple partial correlation of ${}_R\sigma_{FF}$ and ϕ_{t+1} conditional on firm size and other control variables. As shown in Table 4, the partial correlation between idiosyncratic risk and private information proxy (conditional on firm size) is -6%, which is larger than the (unconditional) Pearson correlation coefficient of -4% reported in Table 2. The magnitude of the partial correlation coefficient between ${}_R\sigma_{FF}$ and ϕ_{t+1} remained at about the same level of -6% after adding other control variables (as shown by the various iterations in Table 4) and all partial correlation coefficients reported in Table 4 are statistically significantly different from zero at $p < 0.01$.

<u>Insert Table 4 about here</u>

A more formal test of the relationship between ${}_R\sigma_{FF}$ and ϕ_{t+1} is performed by estimating the following linear regression...

$${}_R\sigma_{FF} = \lambda_0 + + \lambda_1\phi_{t+1} + \lambda_2\, ZS + \lambda_3\, ROE + \lambda_4\, GR + \lambda_5\, M/B + u_\sigma \qquad [4]$$

Where ${}_R\sigma_{FF}$ is idiosyncratic risk measured on the basis of Fama-French three-factor model; ϕ_{t+1} is the proxy for private information derived from estimating model [3]; *ZS* is firm size measured by the log of sales; *AROE* is average quarterly return on equity measured over the twelve quarters preceding the year of analysis; *GR* is sales growth rate; *M/B* market-to-book ratio denoting market expectations of economic opportunities; and u_σ is an error term. The regression model [4] is estimated for idiosyncratic risk using the Fama-French three-factor model and is also replicated using the single factor model.

<u>Insert Table 5 about here</u>

The regression results of estimating the linear model [4] are reported in Table 5 for each of the eight quarters representing odd-numbered and even-numbered years for the period 1994 –

2005. The results, using OLS and corrected for heteroskedasticity, may be summarized as follows:

1. For the estimated models as a whole, the *F-statistics* range from 318 to 375 which are statistically significant at $p < 0.01$; adjusted *R-squared* values range between 21% and 24%, suggesting a consistent pattern of relationship; and *VIF* does not exceed 1.30 on average, suggesting absence of significant colinearity.
2. Estimates of the coefficient λ_1 the private information proxy ϕ_{t+1} are consistently negative and significantly different from zero at $p < 0.01$.
3. The coefficient estimates for λ_2 on firm size *ZS* and λ_3 on profitability *AROE* are also negative and statistically significant at $p < 0.01$.
4. The coefficient estimates on growth variables—estimates of λ_4 on *GR* and λ_5 on *M/B*—are positive and, in 14 of the 16 cases, are significantly different from zero.

These same results are also obtained when the estimation is repeated using the single factor estimate of idiosyncratic risk, ${}_R\sigma_{CAPM}$. While the statistical results are straightforward and are consistent over time, their interpretation is not as simple. There are no formal hypotheses being tested for the control variables used in the regression model in [4]. Yet, making inferences on the basis of the estimated models will depend on the credibility of the obtained results. It is perhaps intuitive to argue that relatively high growth rates creates more diversity in investors valuation of the underlying expected cash flows streams and hence, the positive coefficients on growth variables. Similarly, larger firms are likely to have more diversification of supply chains, markets, and product lines. The lower risk with more diversification is likely to be the reason for the negative sign for the coefficient λ_2 on firm size *ZS*.

The sign of coefficient λ_1 on ϕ_{t+1} is more difficult to interpret. How is it, on the one hand, that more private information search by analysts increases the dispersion of their forecasts, as has been shown in the previous section, but it, on the other hand, reduces the idiosyncratic risk of the firm? Before answering this question, it is useful to note that the Pearson correlation coefficient between idiosyncratic risk and the dispersion of analysts' earnings forecasts, ${}_F\sigma^E_{t+1}$, before any disaggregation, is also negative and significantly different from zero. Thus, the decomposition of ${}_F\sigma^E_{t+1}$ to estimate a proxy for private information has not changed the sign of the relationship between these two variables. The only possible interpretation of the negative sign is that implied by Johnson (2004). In particular, with the acquisition of more private information, traders become more informed and reach higher levels of concordance or agreement that leads to more informed traders. Thus, the null form of hypothesis 2 is rejected in favor of the alternative hypothesis.

6. Testing H2 using Out-of-Sample Predictions

The test of Hypothesis 2 above is based on within sample predictions. That is, the sample used for estimating the models is also used for testing the hypothesis. While this approach is commonly used in empirical research in accounting, it is not what econometricians recommend. Instead, a more powerful test would be using observations that have not been included in the estimation sample—i.e., out-of-sample test.

To perform this test, the proxy for private information is estimated for each quarter using the even-numbered years. This proxy is labeled ${}_{EV}\phi_t$, where t stands for a quarter. For odd-numbered years, the proxy ${}_{EV}\phi_t$ is an out of sample because this proxy is estimated using even-numbered data. Thus using the variable ${}_{EV}\phi_t$ to test the association with idiosyncratic risk measured in odd-numbered years is indeed an out-of-sample test. The equation used for this test takes the following form.

$$_{ODD.R}\sigma_t = \beta_0 + \lambda_{1P}\, _{EV}\phi_t + \beta_1\, _{odd}ZS_t + \beta_2\, _{odd}ROE_t + \beta_3\, _{odd}GR_t$$

$$+ \beta_4\, _{odd}M/B_t + u_{\sigma.t} \qquad [5]$$

where:

$_{ODD.R}\sigma_t$ is the market measure of idiosyncratic risk for quarter t in *odd*-numbered years;

$_{EV}\phi_t$ is the private information proxy as estimated for quarter t in the *even*-numbered years;

$_{odd}ZS_t$ is log of sales for firm size for quarter t for *odd*-numbered years;

$_{odd}ROE_t$ is rate of return on equity for quarter t for *odd*-numbered years;

$_{odd}GR_t$ is the rate of growth in sales for quarter t for *odd*-numbered years; and

$_{odd}M/B_t$ is market to book ratio for quarter t for *odd*-numbered years; and

$u_{\sigma.t}$ is an error term.

The results of estimating [5] are in Table 6. Comparing these results against those reported in Table 5 suggests no change in the results of testing Hypothesis 2. In particular, as in the case of tests using the estimation sample, the out-of-sample prediction of the private information proxy is statistically significant (at $p < 0.01$) and negative. Furthermore, the overall results of the four quarters show the same level of fit for the out-of-sample and the in-sample predictions. As a result, the null form of Hypothesis 2 is rejected and there is a significant association between market-based measure of idiosyncratic risk and the proxy for private information developed from the dispersion of analysts' earnings forecasts.

7. Concluding Remarks

In this study I view the dispersion of analysts' earnings forecasts as one measure of firm-specific risk. This measure is an expectation generated based on publicly and privately available information. Since all analysts have equal access to publically available information, private acquisition and use of information remains to be a source of variation among analysts. I then investigate the relationship between dispersion of analysts' earnings forecasts and market-based measure of non-systematic risk. This examination is carried out by estimating: (1) the extent to which analysts' forecasts dispersion could be decomposed to proxy for private information acquisition by analysts, and (2) the significance of the association between the market-based idiosyncratic risk and the derived proxy for private information. The proxy for private information is estimated as a component of the dispersion of analysts' earnings forecast under the assumption that the discordance among analysts emanates from searching for and acquiring different private information in the process of forecast formation.

The analysis utilized I/B/E/S earnings forecasts for the period 1994 through 2005 for which other data required for the analysis are available from I/B/E/S, Compustat, or CRSP databases. To avoid issues arising from the lack of independent of observations, the analysis avoided pooling using consecutive years for estimation. This is accomplished first by separating odd-numbered years in one sub-sample and the even-numbered years for another sample. The empirical analysis is carried out for each quarter separately.

In the first process, the private information proxy is measured by the component of analysts' earnings forecast dispersion that is not explainable by publicly available information. At this stage, historical earnings forecast volatility, firm size, and growth rates were consistently significant determinants of forecast dispersion. Yet, publicly available information explains about 12% of the forecast dispersion and, thereby, leaving the majority of the variation unexplained and, in this analysis, attributable to acquired private information.

Two approaches were adopted in testing the second hypothesis about the association between private information proxy and market-based idiosyncratic risk: the first uses in-sample prediction, while the second uses out-of-sample prediction. The latter has more power as it does not test the hypothesis using the same data from which the coefficients were estimated.

Idiosyncratic risk is measured in two different formats as the mean-squared error of equity return models: the first is the single factor market model and the second is the Fama-French three-factor model. In each case, the market-based idiosyncratic risk is regressed on the proxy for private information and other control variables. The process is repeated for out-of-sample predictions with obtaining the same finding. In particular, the proxy for private information is significantly associated with idiosyncratic risk and that the obtained relationship is negative.

A possible interpretation of the negative sign is that analysts acquire more private information; they have relatively greater agreement on forecasted earnings (lower dispersion). The greater consensus among analysts leads to a corresponding greater consensus among traders, hence the lower the volatility of prices. While this interpretation is plausible, it raises more questions and opens the doors for other research to examine the mechanism by which this connection takes place.

Referencies

Ajinkya, Bipin; and Michael Gift. 1985. Dispersion of Financial Analysts' Earnings Forecasts and the (Option Model) Implied Standard Deviations of Stock Returns. *The Journal of Finance* (40): 1353 – 1365.

Ajinkya, Bipin; Rawland Atiase; and Michael Gift. 1991. Volume of Trading the Dispersion in Financial Analsyts' Earnings Forecasts. *The Accounting Review* (66): 389-401.

Amit, Raphael and Joshua Livnat. 1988. "Diversification and the Risk-Return Trade-Off." *The Academy of Management Journal* (31): 154 – 166.

Bginski, Stephen; and John Hassell. 1993. "The Effects of Management Forecast Precision on Equity Pricing and on the Assessment of Earnings Uncertainty." *The Accounting Review* (68): 913-927.

Barron, Orie. 1995. "Trading Volume and Belief Revisions that Differ among Individual analysts." *The Accounting Review* (70): 581-597.

Barron, Orie and Pamela S. Stuerke. 1998. "Dispersion in Analysts' Earnings Forecasts as a Measure of Uncertainty." J*ournal of Accounting, Auditing, and Finance*. 13, 245-270.

Barron, Orie E.; Oliver Kim; Steve C. Lim; Douglas E. Stevens. 1998. "Using analysts' Forecasts to Measure Properties of Analysts' Information Environment." *The Accounting Review* (73): 421 – 433.

Bhushan, Ravi 1989. "Firm Characteristics and Analyst Following*." Journal of Accounting and Economics* (11): 255 – 274.

Bowen, Robert M., Shivaram Rajgopal, and Mohan Venkatachalam. 2005. Accounting Discretion, Corporate Governance and Firm Performance. Working Paper. Duke University, Durham,

Brennan, Michael J. and Patricia J. Hughes. 1991. "Stock Prices and the Supply of Information." *The Journal of Finance* (46): 1665-1691.

Brennan, Michael J.; Narasimhan Jegadeesh; and Bhaskaran Swaminathan. 1993. "Investment Analysis and the Adjustment of Stock Prices to Common Information. *The Review of Financial Studies* (6): 799-924.

Campbell, John, M Lettau, B. Malkiel, and Y Su. 2001. "Have Individual Stocks Become More Volatile? An Empirical Exploration of Idiosyncratic Risk." *The Journal of Finance* 56, 1 – 43.

Conine, Thomas E., Oscar W. Jensen, and Maurry Tamakrin. 1989. "On Optimal Production and the Market to Book Ratio Given Limited Shareholder Diversification." Management Science 35, 1004-1013.

Clarkson, Pete; Jose Guedes; Rex Thompson. 1996. "On the Diversification, Observability, and Measurement of Estimation Risk. *The Journal of Financial and Quantitative Analysis.* 31, 69- 84.

Diether, Karl B, Christopher J. Malloy, and Anna Scherbina, 2002, Differences of Opinions and Cross-Section of Market Returns, *The Journal of Finance* (57): 2113-2141.

Goyal, Amit and Pedro Santa-Calara. 2003. Idiosyncratic Risk Matters!. *The Journal of Finance* 58, 975 – 1007.

Greene, William. 2003. *Econometric Analysis, Fifth Edition.* Macmillan, New York.

Hakansson, Nils. 1977. "Interim Disclosure and Public Forecasts: An Economic Analysis and a Framework for Choice." *The Accounting Review* 52, 396-426.

Hope, Ole-Kristian. 2003. "Accounting Policy Disclosures and Analysts' Forecasts." *Contemporary Accounting Research* (20): 295 – 323.

Imhoff, Eugene A., and Gerald J. Lobo (1992): "The Effect of Ex Ante Earnings Uncertainty on Earnings Response Coefficients." *The Accounting Review* 67, 427 -439.

Johnson, Timothy C 2004. "Forecast Dispersion and the Cross Section of Expected Returns.: *The Journal of Finance* (59): 1957-1978.

Karpoff, J. 1986. "A Theory of Trading volume." *The Journal of Finance* (41): 1060-88.

Lang, Mark and Russell J. Lundholm. 1996. Corporate Disclosure Policy and Analyst Behavior. *The Accounting Review* (71): 467-492.

Leuz, Christian, D. Nanda and P. Wysocki. 2003. Investor Protection and Earnings Management: An International Comparison. *Journal of Financial Economics* (69): 505-527.

Lintner, J. 1969. The Aggregation of Investors' diverse Judgments and Preferences in Purely competitive Security Markets. *Journal of Financial and Quantitative Analysis* (4): 347- 400.

Liu, Mark; Danielle Xu; and Tong Yao. 2004. Why Does Analysts' Forecast Dispersion Predict Stock Returns? A Corporate Guidance Perspective. Working Paper. Boston College.

Mashruwala, C., Rajgopal, S. and Shevlin, T. 2006. Why is the accrual anomaly not arbitraged away? The role of idiosyncratic risk and transaction costs. *Journal of Accounting and Economics* (42): 3- 33.

Minton, Bernadette A. and Catherine Schrand. 1999. The Impact of Cash Flow volatility on Discretionary Investment and the Costs of Debt and Equity Financing. *Journal of Financial Economics* (54): 423 - 460.

Minton, Bernadette A.; Catherine M. Schrand and Beverly Walther. 2002. The Role of Volatility in Forecasting. *Review of Accounting Studies* (7): 195- 215.

Mohanram, P. S. and Sunder, S. V. 2006. How has Regulation FD affected the operations of financial analysts? *Contemporary Accounting Research* (23): 491-525.

O'Brien, Patricia C. and Ravi Bhushan 1990. "Analyst Following and Institutional Ownership." *Journal of Accounting Research* 28, 55-76.

Park, C. 2001. Stock Returns and the Dispersion in Earnings Forecasts. Working Paper, The University of Michigan (October).

Pincus, Morton and Shivaram Rajgopal. 2002. The Interaction between Accrual Management and Hedging: Evidence from Oil and Gas Firms. *The Accounting Review* (77): 127-160.

Pontiff, J. 1996. Costly arbitrage: Evidence from closed-end funds. *The Quarterly Journal of Economics* (111): 1135-1152.

Pontiff, J. 2006. Costly arbitrage and the myth of idiosyncratic risk. *Journal of Accounting and Economics* (42): 35-52.

Rajgopal, Shiva, and Terry Shevlin. 2002. Empirical Evidence on the Relation between Stock

Option Compensation and Risk Taking. *Journal of Accounting and Economics* (33): 145-171.

Ramanathan, Ramu. 1989. *Introductory Econometrics with Applications*. Fourth Edition. Dryden, N. Y.

RiskMetrics (1999) *Corporate Metrics: The Benchmark for Corporate Risk Management*. RMG, NY.

Roulstone, Darren T. (2003). "Analyst Following and market Liquidity." *Contemporary Accounting Research* (20): 551 – 578.

Sharpe, William F. 1964. Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk. *The Journal of Finance* (19): 425-442.

Thomas, Shawn. 2002. Firm Diversification and Asymmetric Information: Evidence from Analysts' Forecasts and Earnings Announcements. *Journal of Financial Economics* (64): 373 – 396.

Thompson, II, Donald J. 1976. "Sou7rces of Systematic Risk in Common Stocks." *The Journal of Business* 49, 173 – 188.

Waymire, Gregory. 1986. "Additional Evidence on the Accuracy of Analyst Forecasts before and after Voluntary Management Earnings Forecasts." *The Accounting Review* (61): 129-142.

Williams, Patricia. 1996. The Relation between a Prior Earnings Forecast by Management and Analyst Response to a Current Management Forecast." *The Accounting Review* (71): 103-115.

Wu, Jin. 2004. Divergence of Opinion and the Cross Section of Stock Returns. Working Paper, University of Pennsylvania, October 2004.

Xu, Y. and Burton G. Malkiel. 2003. "Investigating the Behavior of Idiosyncratic Volatility." *The Journal of Business* 76, 613 – 644.

Zhang, X. F. 2006. Information uncertainty and stock returns. *The Journal of Finance* (61): 105-137.

Ziebart, David. 1990. "The Association between Consensus of Beliefs and Trading Activity Surrounding Earnings Announcements." *The Accounting Review* (65): 477-597.

Table 1 : Summary Descriptive Statistics.
. (For First Quarter for Odd-numbered Years, 1995-2005. n = 6,836)

Variables	Mean	St. Dev.	25% percentile	50% percentile	75% percentile
$_R\sigma_{FF}$::: Idiosyncratic Risk Three factor-model	0.106	0.05	0.07	0.095	0.13
$_R\sigma_{CAPM}$: Idiosyncratic Risk One factor-model	0.110	0.052	0.073	0.098	0.134
$_{EF}\sigma_t$: Analyst Forecast Dispersion	0.028	0.038	0.01	0.02	0.03
log $_{EF}\sigma_t$: Analyst Forecast Dispersion	-3.9	0.77	-4.6	-3.9	-3.5
$_{AE}\sigma_t$: St. deviation of Quarterly EPS	0.30	0.63	0.078	0.15	0.31
log $_A\sigma^E_t$: St. deviation of Quarterly EPS	0.22	0.24	0.074	0.14	0.27
ϕ Private Information Proxy	0.0029	0.704	-0.53	-0.24	0.44
NA : *Analyst Following*	8.46	5.31	4	7	11
Total Assets (in millions)	5445	20534	441	1144	3514
ZA: *log Total Assets*	7.22	1.50	6.1	7.1	8.2
Sales (in millions)	898	1940	111	270	784
ZS : Log sales	5.76	1.37	4.7	5.6	6.7
AROE: Average ROE	0.03	0.033	0.016	0.026	0.037
Lev: Debt to Equity	0.59	0.73	0.11	0.34	0.79
SGR: *Sales Growth*	0.0083	0.17	-0.07	-0.004	0.062
MtB : *Market to Book*	2.93	0.17	1.56	2.25	3.38

Table 2R: Pearson Correlation Coefficients for all Variables
(For First Quarter for Odd-numbered Years, 1995-2005. n = 6,836)

		V1	*V2*	*V3*	*V4*	*V5*	*V6*	*V7*	*V8*	*V9*	*V10*	*V11*	*V12*	*V13*	*V14*	*V15*
V1	$_R\sigma_{FF}$: Idiosyncratic Risk Three factor-model	1.0														
V2	$_R\sigma_{CAPM}$: Idiosyncratic Risk One factor-model	0.99	1.0													
V3	$_{EF}\sigma_t$:: Analyst Forecast Dispersion	-0.06	-0.06	1.0												
V4	*log* $_{EF}\sigma_t$: Analyst Forecast Dispersion	-0.1	-0.1	0.8	1.0											
V5	$_{AE}\sigma_t$: St. Dev of Quarterly EPS	0.007	0.007	0.38	0.30	1.0										
V6	*log* $_{AE}\sigma_t$: St. Dev. of Quarterly EPS	-0.005	0.007	0.41	0.41	0.87	1.0									
V7	Φ Private Information Proxy	-0.04	-0.04	-0.7	0.9	0.06	0.13	1.0								
V8	*NA* : *Analyst Following*	-0.1	-0.09	-0.02	-0.04	-0.01	-0.0	-0.01	1.0							
V9	Total Assets	-0.17	-0.16	0.05	0.08	0.05	0.09	0.001	0.25	1.0						
V10	*ZA*: *log Total Assets*	-0.43	-0.4	0.12	0.16	0.12	0.20	-0.002	0.5	0.5	1.0					
V11	*Sales*	-0.23	-0.22	0.07	0.08	0.05	0.09	0.003	0.39	0.5	0.6	1.0				
V12	*ZS* : Log sales	-0.41	-0.41	0.10	0.12	0.10	0.16	-0.006	0.52	0.4	0.87	0.69	1.0			
V13	AR*OE*: Average ROE	-0.2	-0.2	-0.01	-0.03	-0.01	-0.07	-0.003	0.10	0.01	0.10	0.07	0.15	1.0		
V14	*Lev*: Debt to Equity	-0.06	-0.06	0.07	0.11	0.10	0.15	-0.003	-0.04	0.14	0.23	0.08	0.15	0.12	1.0	
V15	*SGR*: *Sales Growth*	0.04	0.04	0.03	0.03	-0.01	-0.01	-0.0	-0.07	-0.04	-0.07	-0.04	-0.03	-0.04	0.01	1.0
V16	*MtB* : *Market to Book*	0.02	0.02	-0.1	-0.17	-0.05	-0.09	-0.13	0.21	-0.03	-0.01	0.04	0.04	0.5	0.10	0.01

Table 3R: Decomposing Analysts' Forecast Dispersion
(Dependent variable is the coefficient of variation of analysts' forecasts)

Model and variables	Odd Years				Even Years			
	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Number of observations	6,841	7,618	7,725	7,965	6,532	7,254	7,292	7,767
α_o *Intercept*	-4.57	-4.7	-4.6	-4.7	-4.5	-4.5	-4.6	-4.6
α_1 on *log* $_{AE}\sigma_t$ (log st. deviation of earnings)	0.82	0.80	0.82	0.82	0.99	0.87	0.85	0.83
(t)	(5.2)[a]	(5.9)[a]	(6.2)[a]	(7.0)[a]	(10.5)[a]	(8.44)[a]	(5.1)[a]	(5.7)[a]
α_2 on *NA Analyst Following*	-0.015	-0.017	-0.015	-0.018	-0.017	-0.015	-0.016	-0.018
(t)	(-6.8)[a]	(-8.8)[a]	(-8.1)[a]	(-10.2)[a]	(-0.9)[a]	(-8.5)[a]	(-8.11)[a]	(-9.6)[a]
α_3 on *ZA*: *log Total Assets*	0.075	0.09	0.08	0.10	0.073	0.065	0.07	0.08
(t)	(7.7)[a]	(9.7)[a]	(9.4)[a]	(12.2)[a]	(9.2)[a]	(8.4)[a]	(7.1)[a]	(9.2)[a]
α_4 on *ROE*	-0.55	-0.42	-0.52	-0.20	0.15	-0.077	-0.22	0.15
(t)	(-1.71)[c]	(-1.4)	(-1.2)	(-0.6)	(-0.5)	(-0.3)	(-0.7)	(0.4)
α_5 on *LEV Debt/Equity*	0.045	0.03	0.031	0.034	0.002	0.026	0.039	0.026
(t)	(3.0)[a]	(2.16)[a]	(2.4)[a]	(2.5)[a]	(0.12)	(1.96)[b]	(2.76)[a]	(1.78)[c]
α_5 on *SG Sales Growth*	0.123	0.15	0.13	0.21	0.14	0.14	0.17	0.32
(t)	(2.12)[a]	(2.9)[a]	(2.10)[b]	(4.2)[a]	(2.6)[a]	(2.56)[a]	(2.93)[a]	(6.5)[a]
F-Statistics	67[a]	88[a]	67[a]	92[a]	72[a]	70[a]	61[a]	82[a]
Adjusted R-Squared	13%	14%	13%	14%	14%	13%	13%	14%
Average VIF	1.20	1.21	1.22	1.24	1.20	1.22	1.23	1.23

Table 4: Partial Correlation of Idiosyncratic Risk and Private Information Proxy Conditional on other explanatory variables

(First Quarter for Odd-Numbered years, n = 6,830)

Variables	First Iteration	Second	Third Iteration	Fourth Iteration
Private Information Proxy	- 0.06	-0.06	-0.06	-0.04
log sales	- 0.41	-0.40	-0.40	-0.39
Profitability (AROE)		-0.17	-0.17	-0.22
Sales Growth Rate (SG)			0.03	0.02
Market-to-Book				0.15

Table 5: *OLS* Estimation of the Relationship between Idiosyncratic Risk and Proxy for Private Information
(Dependent variable is market based idiosyncratic risk based on Fama-French Three Factor Model**)**

Model and variables	Odd Years				Even Years			
	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Number of observations	6,811	7,580	7,690	7,954	6,508	7,218	7,263	7,761
δ_o *Intercept*	0.19[a]	0.18[a]	0.18[a]	0.17[a]	0.18[a]	0.18[a]	0.17[a]	0.17[a]
λ_1 on ϕ_t – *Privat Information Proxy* (*t*)	-0.0027 (-3.63)[a]	-0.0019 (-2.54)[a]	-0.002 (-2.8)[a]	-0.0017 (-2.55)[a]	-0.004 (-5.3)[a]	-0.003 (-4.8)[a]	-0.002 (-4.13)[a]	-0.0032 (-4.7)[a]
δ_1 on *ZS log sales* (*t*)	-0.014 (-35)[a]	-0.014 (-36)[a]	-0.013 (-27)[a]	-0.013 (-37)[a]	-0.014 (-33)[a]	-0.013 (-37)[a]	-0.013 (-36)[a]	-0.013 (-36)[a]
δ_2 on *ROE* (*t*)	-0.4 (-10.8)[a]	-0.31 (-6.3)[a]	-0.25 (-2.2)[a]	-0.37 (-9.5)[a]	-0.35 (-7.7)[a]	-0.33 (-7.6)[a]	-0.36 (3.0)[a]	-0.39 (-8.9)[a]
δ_3 on *GR Sales Growth Rate* (*t*)	0.005 (1.44)	0.004 (1.3)	0.021 (5.4)[a]	0.037 (7.9)[a]	0.013 (3.94)[a]	0.012 (3.7)[a]	-0.033 (9.3)[a]	-0.036 (8.6)[a]
δ_4 *Market-to-Book* (*t*)	0.003 (8.3)[a]	0.002 (4.9)[a]	0.0021 (2.98)[a]	0.0029 (7.0)[a]	0.0027 (6.98)[a]	0.0025 (7.92)[a]	0.0027 (9.3)[a]	0.0027 (8.8)[a]
F statistics	318[a]	334[a]	358[a]	375[a]	298[a]	334[a]	351[a]	338
Adjusted R-*squared*	21%	21%	21%	24%	24%	22%	23%	22%
Average VIF	1.30	1.16	1.13	1.20	1.20	1.23	1.13	1.21

Table 6: *OLS* Estimation of Idiosyncratic Risk and Out-of-Sample Prediction of Private Information Proxy

(Dependent variable is market-based idiosyncratic risk)

Model and variables	Odd Years Predictions			
	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Number of observations	6,511	7,220	7,265	7,762
β_o *Intercept*	0.18	0.18	0.18	0.17
${}_{P}\lambda_1$ on ${}_{EV}\phi_t$ – Predicted *Private Information Proxy based on Quarters in even-numbered years*	-0.0038	-0.003	-0.003	-0.003
(t)	(-5.1)[a]	(-3.97)[a]	(-3.9)[a]	(-4.5)[a]
β_2 on *log sales*	-0.014	-0.013	-0.013	-0.013
(t)	(-33.5)[a]	(-37)[a]	(-36)[a]	(-36)[a]
β_3 on *ROE*	-0.33	-0.33	-0.34	-0.39
(t)	(-7.2)[a]	(-7.6)[a]	(-7.7)[a]	(-9)[a]
β_4 on *Sales Growth Rate*	0.01	0.011	0.033	0.04
(t)	(4.0)[a]	(3.7)[a]	(9.4)[a]	(8.7)[a]
β_5 on *Market-to-Book*	0.003	0.0025	0.003	0.0027
(t)	(6.8)[a]	(8.0)[a]	(9.0)[a]	(8.9)[a]
F statistics	292[a]	333[a]	348[a]	337
Adjusted R-squared	23%	22%	22%	22%

Figure One

The Relationship between Idiosyncratic Risk, the Coefficient of Variation of the Dispersion of Analysts Forecasts and Earnings Performance Risk