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## Article

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## **The effect of financial statement comparability on analysts' reliance on common information**

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### A B S T R A C T

This study investigates whether financial statement comparability affects analysts' reliance on common information. Prior research reported that analysts' earnings forecasts for firms with higher financial statement comparability were more accurate. We extend prior research by investigating whether analysts increase their reliance on common information when financial statement comparability is high. In addition, we examine whether analysts' increased reliance on common information could lead to more accurate forecasts for firms with higher comparability. The main findings of this study are as follows. First, the higher the financial statement comparability is, the greater the extent to which analysts use private information. High financial statement comparability prevents analysts from differentiating themselves from other analysts simply by interpreting the given common information. Thus, these analysts are incentivized to acquire additional private information. Second, as analysts' reliance on private information increases, the positive association between financial statement comparability and analysts' forecast accuracy weakens. This suggests that the use of common information could be effective in increasing analysts' forecast accuracy for firms with higher comparability. Overall, this study shows that analysts use private information in order to differentiate themselves when financial statement comparability is high. However, the use of private information could increase noise, and deteriorates analysts' forecast accuracy.

*Keywords: Financial statement comparability; Analysts' forecast accuracy; Private information; Common information*

## **I . Introduction**

This study investigates whether financial statement comparability affects analysts' reliance on common information. The information that analysts can use in earnings forecasts can be divided into common information and private information (Barron et al.

1998). Common information such as financial statements, which contain the most basic and important information, is easy to obtain. However, collecting private information requires additional time and effort. Analysts cannot differentiate themselves by using only common information; thus, they have to decide how much to rely on private information. In this context, we examine whether the extent to which analysts rely on common information differs in accordance with the property of common information. More specifically, we adopt financial statement comparability as a proxy for the property of common

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information.

Analysts can use the financial statements of industry peers as a benchmark. This has been shown to lead to an increase in the quantity and quality of the common information available to analysts (DeFranco et al. 2011). Analysts who have access to high-quality common information might have less incentive to collect and produce private information. If there is a substitutive relation between common and private information, the higher the financial statement comparability is, the greater the extent to which analysts will depend on common information. On the other hand, high financial statement comparability would not only be advantageous for analysts but investors could also benefit from this. Prior studies suggested that financial statement comparability is positively associated with analysts' forecast accuracy, but it also facilitates investors' ability to forecast future earnings (Campbell and Yeung 2012; Choi et al. 2014). If investors were able to produce earnings forecasts equally as accurate as those of analysts, the demand for analysts' forecasts would decrease. In other words, if the financial statement comparability is high, it would be difficult for analysts to maintain a competitive edge by using only common information. In this case, analysts would need to produce differential information by spending more time and effort to collect private information (Fischer and Stocken 2010). Thus, our prediction is that financial statement comparability could be expected to lower analysts' reliance on common information instead of increasing their reliance on private information. Our first hypothesis examines whether analysts depend on private information to a greater extent when the financial statement comparability is high.

Moreover, for analysts' earnings forecasts to be useful, they would need to be unbiased and accurate. The second hypothesis is to examine whether the reliance on common (relative to private) information affects the positive relation between financial statement comparability and analysts' forecast accuracy. Financial statements are the most typical common information. Higher comparability can improve decision making by lowering the cost of collecting

and analyzing common information (DeFranco et al. 2011; Campbell and Yeung 2012; Choi et al. 2014; Fang et al. 2012; Kim et al. 2013). From a cost-benefit point of view, it is more effective for analysts to use common information than private information. Furthermore, managers might offer private information in favor of their own economic incentive schemes (Houston et al. 2010; Chen et al. 2011), and this could result in analysts making inaccurate forecasts. Thus, in situations in which the quantity and quality of common information is sufficient, analysts would be expected to exhibit a greater reliance on common information to increase their forecast accuracy. From this perspective, we examine whether the positive effect of comparability on analysts' forecast accuracy varies with the extent to which analysts use common (relative to private) information.

We test these arguments by analyzing the relation between analysts' reliance on common information and financial statement comparability using 4,286 non-financial firm-years, listed on the Korean Stock Exchange between 2002 and 2014.

We expect our study to contribute to the literature in two ways. First, as far as we know, this is the first study to examine the effect of comparability on analysts' reliance on common information. Contrary to prior research, which focused on the effect of comparability on analysts' forecast properties such as accuracy or bias (DeFranco et al. 2011), we analyze whether comparability influences the type of information (i.e., common vs. private information) analysts use to produce earnings forecasts. We find that the higher the financial statement comparability is, the more analysts use private information. These findings support the view of Fischer and Stocken (2010), who analyzed theoretically that the extent to which analysts collect private information depends on the accuracy of common information. Second, we examine which type of information is more valuable to analysts for increasing their forecast accuracy for higher comparability firms. Our evidence suggests that an increased reliance on private information does not help analysts to improve their forecast accuracy. This result has policy implications

in that we need to motivate analysts to place a greater reliance on common information when they forecast earnings for higher comparability firms.

In spite of our contributions, however, our study is subject to the usual limitation of archival studies. First, the validity of our results depends on the appropriateness of the proxies for financial statement comparability and analysts' reliance on common information. Second, there may be a problem with omitted variables in setting the equation to determine analysts' reliance on common information.

The remainder of our paper is organized as follows. We discuss prior literature and develop the hypotheses in section 2. We present the research design in section 3, and report empirical results in section 4. We offer concluding remarks in section 5.

## II. Background and hypotheses development

### A. Background

Financial statement comparability, which is one of the important desirable attributes of accounting information (IASB 2010), is the qualitative property that shows that similar things look similar, and different things look different. High financial statement comparability can improve the quality of decision making because this enables the users of financial statements to easily differentiate between the similarities and differences among firms.

DeFranco et al.(2011) find that financial statement comparability to be positively associated with the number of analysts following and forecast accuracy, whereas it is negatively associated with forecast dispersion. In addition, Choi et al.(2014) suggested that the higher the financial statement comparability is, the larger the Future Earnings Response Coefficient (FERC), which shows the extent to which future earnings are reflected in the current stock price. This means that high financial statement comparability enables investors to more accurately forecast the

future; thus, the extent to which future earnings are reflected in the current stock price increases. Campbell and Yeung (2012) found that, at the time of a restatement announcement of a firm, the stock returns of a non-restating peer firm are negatively associated with financial statement comparability. Meanwhile, Fang et al.(2014) reported that U.S. institutional ownership is positively associated with subsequent changes in the accounting comparability of emerging market firms to their U.S. industry peers. These results indicate that foreign institutional investors affect the global convergence of financial reporting practices.

Studies that show the usefulness of financial statement comparability in the debt market have also been conducted. Fang et al.(2012) reported that since financial statement comparability lowers information asymmetry, creditors perceive a lower level of risk, which leads to lower interest rates. Similarly, Kim et al.(2013) found that, if the financial statement comparability is high, there is less disagreement over the credit rating because creditors are better equipped to understand and analyze the uncertainty of the target company. In combination, the above-mentioned results enable us to conclude that, the higher the financial statement comparability is, the more this promotes effective and efficient decisions for analysts, investors, and creditors.

Meanwhile, there is another stream to deal with analysts' information environment,<sup>1)</sup> which refers to all relevant available information that analysts can use in the process of forecasting earnings. It can be divided into common and private information. Barron et al.(2002) examined the effect of earnings announcements on analysts' reliance on common information. They showed that analysts' dependence on common information decreases at the time of earnings announcements, whereas analysts' use of private information in their earnings forecasts increases during this time. The authors interpreted these results to mean that earnings announcements play the role of triggering the production of private

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1) In prior literature, the term "analysts' information environment" means the degree to which analysts use common information relative to private information.

information by sophisticated users such as analysts. Barron et al.(2008) investigated the effect of large earnings surprises and negative earnings surprises on analysts' reliance on common information. Their analyses showed that after a large earnings surprise or a negative earnings surprise, analysts' forecast bias is substantially reduced and their reliance on private information increases. These results suggest that an egregious forecast failure motivates an individual analyst to depend more heavily on private information relative to common information. Lehavy et al.(2011) analyzed the impact of the readability of the annual report on analysts' reliance on common information. They found that the poorer the readability of Form 10-K for a company, the greater the number of analysts following the company, and the greater analysts' reliance on common information. It shows that the more difficult it is to understand corporate disclosure, the greater the demand for analysts' services is. Lobo et al.(2012) discovered that the lower the quality of a firm's accruals are, the more analysts are likely to show an interest in the firm, and the more they incorporate private information into their earnings forecasts. They interpret these results to mean that lower accruals quality causes serious information asymmetry, and that this triggers a greater use of analysts' services. On the other hand, Fischer and Stocken (2010) theoretically analyzed whether the extent to which analysts collect private information changes according to the accuracy of public information.<sup>2)</sup> Using a four-stage timeline of events with two players, i.e., the analyst and the decision maker, the analysis they performed showed that the more accurate corporate disclosure is, the greater the payoff for the decision maker to use private information. We expect our results to provide empirical evidence verifying the theory of Fischer and Stocken (2010).

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2) Fischer and Stocken (2010) cite audited financial statements or disclosures required by government regulators as an example of public (common) information. It provides strong support for the use of financial statement comparability as a proxy for the level of accuracy of public (common) information in this study.

## B. Development of hypotheses

Financial statements are the most typical common information available for anyone to use in the market. Prior literature shows that analysts adjust their earnings forecasts around earnings announcements, suggesting that financial statements are a useful resource for analysts on which to base their earnings forecasts (Imhoff 1992). However, it is difficult to accurately evaluate a firm's operating performance simply by looking through its financial statements. In order to make an accurate evaluation, it is necessary to compare the target firm's financial statements to those of industry peers. If the financial statement comparability is high, by using a peer firm as a benchmark, it is easier to grasp the firm's weak and strong points and industry trends, thereby allowing analysts to reduce the time and cost invested in company analysis. That is, if the financial statement comparability is high, the range of common information available to analysts is not restricted to the financial statement of the target firm, but expands to those of industry peers. In this case, the quantity and quality of common information available to analysts is higher overall. Accordingly, when making earnings forecasts for firms with higher financial statement comparability, increasing reliance on common information can improve the efficiency of their analysis.

Meanwhile, if analysts depend only on common information, there also exists the risk of losing their competitiveness. There is a difference in the information processing capability among financial statement users (Indjejikian 1991; Lehavy et al. 2011). Relatively unsophisticated users are burdened with high information processing costs, consequently relying on information intermediaries such as financial analysts or credit analysts in their decision making. In this aspect, the higher the cost of information processing is the higher investors' demand for analysts' earnings forecasts is.

As noted in prior literature, financial statement comparability improves decision making not only for analysts, but also investors, creditors, and auditors, or in fact almost any kind of users of financial

statements by lowering the cost of information processing (DeFranco et al. 2011; Campbell and Yeung 2012; Choi et al. 2014; Fang et al. 2012; Kim et al. 2013). In other words, if the financial statement comparability is high, the information processing costs become lower, so the ability of users of financial statements to forecast earnings improves overall. Therefore, analysts cannot meet investors' demand if they simply use common information as the basis for the earnings forecasts. In this case, analysts are willing to gather costly private information and incorporate it into their forecasts for differentiation (Fischer and Stocken 2010). If analysts attempt to differentiate themselves through private information for firms with higher comparability, the financial statement comparability may decrease the reliance on common (relative to private) information in making earnings forecasts. Hypothesis 1 in an alternative form is:

*Hypothesis 1:* Financial statement comparability decreases analysts' reliance on common information.

Prior literature suggests that the higher the financial statement comparability is, the higher the analysts' forecast accuracy is (DeFranco et al. 2011). The second hypothesis is to further extend these findings. We investigate the extent to which analysts' reliance on common information affects the relation between financial statement comparability and analysts' forecast accuracy. When the financial statement comparability is high, through the comparison with industry peers, analysts can assess the relative performance of the target firm more accurately (DeFranco et al. 2011). Thus, when financial statement comparability is high, by increasing the reliance on common information, analysts can improve their forecast accuracy. Furthermore, when analysts utilize private information for discrimination, their forecast accuracy can be affected by the reliability of that private information. In general, the private information received from management is likely to contain bias (Houston et al. 2010; Chen et al. 2011). If the private information is contaminated by managerial opportunism, the increased reliance

on private information may negatively affect forecast accuracy. Based on this reasoning, we expect that the greater the extent to which analysts use common information rather than private information, the more accurate analysts' forecasts become for firms with higher financial statement comparability. Hypothesis 2 in an alternative form is:

*Hypothesis 2:* Analysts' reliance on common information increases the positive relation between financial statement comparability and analysts' forecast accuracy.

### III. Research design

#### A. Sample selection

Our sample includes all firms listed on the Korean Stock Exchange (KSE) and Korea Securities Dealers Automated Quotations (KOSDAQ) between 2002 and 2014 meeting the following requirements:

- (1) December year-end firms
- (2) Non-financial firms
- (3) Data are available from the KIS-VALUE<sup>3)</sup> or DataGuide<sup>4)</sup>

Financial firms are excluded because financial statements and accounts are different from general manufacturing firms so it is difficult to analyze and compare among firms. To control the impact of different fiscal year ends, only December year-end firms are selected. To reduce the distortion due to outliers, we winsorize all continuous variables at the top and bottom 1%. In addition, we require at least 10 firms by industry in year  $t$  to estimate discretionary accruals. By using the above sample selection criteria, the final sample has 4,286 firm-year observations.

3) KIS is a professional credit rating agency in Korea. The KIS value database, which includes financial statement information, is provided by Korea Investors Service Inc., an affiliate of Moody's.

4) Dataguide is operated by FnGuide which professionally provides financial information in Korean stock market. Datauide provides various information of financial analysts and listed firms in Korean stock market.

**Table 1.** Sample distribution by year and industry

Panel A: Sample distribution by year

year	Frequency	%
2002	214	4.99
2003	249	5.81
2004	300	7.00
2005	304	7.09
2006	311	7.26
2007	381	8.89
2008	368	8.59
2009	424	9.89
2010	424	9.89
2011	200	4.67
2012	270	6.30
2013	393	9.17
2014	448	10.45
Total	4,286	100.00

Panel B: Sample distribution by year

Industry	Frequency	%
Agriculture, forestry and fishing	10	0.23
Manufacturing	2,761	64.42
Electricity, gas, steam and air conditioning supply	82	1.91
Water supply; sewerage, waste management and remediation activities	2	0.05
Construction	197	4.60
Wholesale and retail trade; repair of motor vehicles and motorcycles	265	6.18
Transportation and storage	49	1.14
Information and communication	401	9.36
Real estate activities	1	0.02
Professional, scientific and technical activities	416	9.71
Administrative and support service activities	43	1.00
Education	30	0.70
Arts, entertainment and recreation	29	0.68
Total	4,286	100.00

a) This industry classification is based on the one-digit Korea Standard Industry Code.

<Table 1> presents the sample’s distribution by industry and by year.<sup>5)</sup> Panel A shows the sample’s distribution by year, starting at 214 firms in 2002 with steady growth to 448 firms in 2014. There is a somewhat smaller number of samples in 2011 and 2012 compared with other years. This is due to analysts’ forecasts being temporarily reduced because of the changes in accounting standards from GAAP to IFRS. Panel B shows the sample’s distribution by industry.<sup>6)</sup> Manufacturing is the largest industry with 2,761 observations (64.42% of the sample), followed by professional, scientific and technical activities (416 observations) and information and communication (401 observations).

## B. Measurement of analysts' reliance on common information

We use BKLS (Barron, Kim, Lim, and Stevens 1998; Hereafter “BKLS”) consensus to measure the degree to which individual analyst incorporates common information in its earnings forecast. Analysts’ total information is composed of common and private information, and BKLS consensus also estimates the relative ratio of common-to-private information in analysts’ forecasts. It is impossible to observe directly how much weight analysts put on common information in their forecasts. BKLS use the analyst’s forecast error and dispersion in order to indirectly infer how much the analyst uses common and private information.

5) Our sample contain both pre and post IFRS adoption periods. Korea listed companies are required to adopt IFRS after 2011. To test the effect of mandatory IFRS adoption, we run our regression models separately on different subsamples (i.e., before and after IFRS implementation). Before IFRS implementation, analysts relied more on private information when forecasting firms with high comparability. However, this relation has been weakened by IFRS adoption. Similarly, the positive relation between comparability and forecast accuracy became weak in the post IFRS periods. It seems that the effect of comparability on analysts reduced because the overall comparability has improved by the mandatory adoption of IFRS.

6) Almost half of our sample is composed of manufacturing firms. As a robustness check, we conduct the same tests again only for the manufacturing firms. We find similar results using the 2,761 manufacturing firms.

A brief summary of the BKLS consensus is as follows. BKLS define total forecast error as the extent to which the individual analyst's earnings forecast deviates from the actual earnings. Total forecast error is composed of common forecast error and private forecast error. Common forecast error measures how far the mean of individual analyst's earnings forecasts deviate from actual earnings, while private forecast error measures how far individual analyst's earnings forecasts deviate from the mean of individual analyst's earnings forecasts. BKLS calculates:

$$\text{BKLS consensus} = \frac{\text{Common Forecast Error}}{\text{Average Total Error}} = \frac{\left( SE - \frac{D}{N} \right)}{\left( SE - \frac{D}{N} \right) + D} \quad \text{--- Eq. (1)}$$

where:

- SE = squared error in the mean forecast;
- D = dispersion in forecasts;
- N = number of forecasts;

The higher the BKLS consensus from equation (1) is, the higher the dependence on common information relative to private information is.

### C. Measurement of financial statement comparability

Financial statement comparability is measured using the relation between earnings and stock return as suggested in DeFranco et al.(2011). Following DeFranco et al.(2011) the comparability of firm i in year t is calculated in four steps. In the first step each firm's earnings and stock returns for the previous 16 quarters are used to estimate equation (2).<sup>7)</sup>

$$\text{Earnings}_{iq} = \alpha_i + \beta_i \text{Return}_{iq} + \epsilon_{iq} \quad \text{--- Eq. (2)}$$

In equation (2)  $\text{Earnings}_{iq}$  is obtained by dividing firm i's quarterly net income by the beginning of period market value.  $\text{Return}_{iq}$  is the firm i's stock price return during the quarter. In equation (2),  $\hat{\alpha}_i$  and  $\hat{\beta}_i$  represent the accounting function of firm i. Step 2 estimates the expected earnings of firm i and firm j in quarter q by using accounting functions for each firm estimated in the first step. Equation 3 calculates the expected earnings of firm i using  $\hat{\alpha}_i$  and  $\hat{\beta}_i$  estimated in equation (2). Assuming that firm i and j have the same economic events<sup>8)</sup>, equation (4) calculates the expected earnings of firm j using  $\hat{\alpha}_j$  and  $\hat{\beta}_j$  estimated in the first step.

$$E(\text{Earnings})_{iiq} = \hat{\alpha}_i + \hat{\beta}_i \text{Return}_{iq} \quad \text{--- Eq. (3)}$$

$$E(\text{Earnings})_{ijq} = \hat{\alpha}_j + \hat{\beta}_j \text{Return}_{iq} \quad \text{--- Eq. (4)}$$

Step 3 measures the financial statement comparability between firm i and firm j,  $\text{CompAcct}_{ijt}$ . The less the absolute value of the difference between the expected earnings of firm i and firm j indicates that both firms have a similar earnings function and this is what DeFranco et al.(2011) define as high financial statement comparability between two firms. The detailed calculation method is shown in equation (5). In equation (5), first calculate the absolute value of the difference in the expected earnings of firm i and firm j for 16 quarters. After that, take the average and multiply by (-1).

$$\text{CompAcct}_{ijt} = -\frac{1}{16} \times \sum_{q=15}^q |E(\text{Earnings}_{iiq}) - E(\text{Earnings}_{ijq})| \quad \text{--- Eq. (5)}$$

The fourth and final step measure the financial statement comparability,  $\text{CompAcct}_{it}$  of firm i in year t. Specifically, we produce 3 firm-year comparability measures -  $\text{CompAcct}_{A_{it}}$ ,  $\text{CompAcct}_{IndAvg}_{it}$ , and

7) We use 16 quarters of data to estimate equations (2)-(5). We use the measure of financial statement comparability developed by DeFranco et al.(2011). Their method requires 16 quarters of returns and earnings data to measure comparability.

8) In equation (3) and equation (4), regardless of whether it is firm i or firm j, the expected earnings in quarter t is calculated using the same stock price return, firm i's stock price return,  $\text{Return}_{iq}$ . It means that the same economic events occurs in both firms.



$CompAcctIndMed_{it}$ .

For example, when there are n firms in industry K, firm i has (n-1) industry peers. Therefore firm i has (n-1)  $CompAcct_{ijt}$  values, and the average and median of (n-1)  $CompAcct_{ijt}$  values are  $CompAcctIndAvg_{it}$  and  $CompAcctIndMed_{it}$ , respectively. After ranking the  $CompAcct_{ijt}$  values in size order,  $CompAcct4_{it}$  is the average of the top 4  $CompAcct_{ijt}$  values.<sup>9)</sup>

#### D. Empirical models

Hypothesis 1 examines whether analysts' reliance on common information is influenced by financial statement comparability. To test Hypothesis 1, we estimate the following OLS regression:

$$\rho = \alpha_0 + \alpha_1 CompAcct + \alpha_2 SIZE + \alpha_3 DA + \alpha_4 N + \sum YEAR + \sum IND + \epsilon \quad \text{--- Eq. (6)}$$

where:

$\rho$  = analyst's reliance on common information (=BKLS consensus)

$CompAcct$  = financial statement comparability for firm i at year t, following DeFranco et al.(2011).

It is among  $CompAcct4$ ,  $CompAcctIndAvg$  or  $CompAcctIndMed$ .

$CompAcct4$  = average value of largest 4 values of  $CompAcct_{ijt}$  in the industry for firm i at year t;

$CompAcctIndAvg$  = mean value of  $CompAcct_{ijt}$  in the industry for firm i at year t;

$CompAcctIndMed$  = median value of  $CompAcct_{ijt}$  in the industry for firm i at year t;

$SIZE$  = ln(market value in millions);

$DA$  = performance matched discretionary accruals for firm i at year t, following Kothari et al.

9) We use 3 comparability measures.  $CompAcctIndAvg_{it}$  assumes analysts consider all companies within the same industry when choosing peers of a target firm. But mean is liable to distortion by outliers, so we use median,  $CompAcctIndMed_{it}$ . Meanwhile,  $CompAcct4_{it}$  assumes that analysts consider only 4 companies with the closest properties when choosing industry peers of a target firm. It is not clear which criteria analysts actually use. It is another promising future research to investigate which one is superior among the two criteria for analysts to enhance their forecast accuracy.

(2005);

$N$  = ln(number of individual analysts who issue earnings forecasts on each firm);

$YEAR$  = year indicators;

$IND$  = industry indicators;

$\epsilon$  = error term.

Equation (6) is based on Barron et al.(2008). The dependent variable,  $\rho$ , refers to the analyst's reliance on common information.<sup>10)</sup>  $CompAcct$  is measured in three ways,  $CompAcct4$ ,  $CompAcctIndAvg$ , and  $CompAcctIndMed$ , and the bigger the values are, the higher the financial statement comparability is. If analysts increase their reliance on common information for the firms with higher financial statement comparability, then  $\alpha 1$  is expected to be positive. In contrast, if analysts reduce their reliance on common information for the firms with higher financial statement comparability, then  $\alpha 1$  is expected to be negative.

We control for the number of analysts following (N), firm size (SIZE) and accruals quality (DA) influencing analysts' reliance on common information. If the overall number of analysts following is high, analysts will reduce their reliance on common information since it is difficult to differentiate by using common information alone (Barron et al. 2008). Analysts are also likely to reduce their reliance on common information for the firms with larger size, because firm size is positively related to the investors' returns from private information based trading (Atiase 1985; Byard 1998; Barron et al. 2008). When accruals quality is high, investors can be provided with common information of high quality, then analysts are likely to decrease their dependence on common

10) In equation 6, we use BKLS consensus as a dependent variable. BKLS consensus is also used as an independent variable in equation 7. This model specification may lead to multicollinearity or omitted variable bias. Since maximum VIF does not exceed 10, multicollinearity seems not serious. Because size may surrogate for numerous omitted variables, we also include the log of market value as a control variable (Becker et al. 1998). However, even though we include all the determinants of BKLS consensus identified in the prior literature, omitted variable bias may still exist in equation 6. It is one of the limitations for our empirical analyses.

information for differentiation (Lobo et al. 2012). We also include industry and year fixed effects.

Hypothesis 2 investigates the effect of analysts' reliance on common information on the relation between financial statement comparability and analysts' forecast accuracy. To test Hypothesis 2, we estimate the following OLS regression<sup>11)</sup>:

$$\begin{aligned}
 ACCURACY = & \beta_0 + \beta_1\rho + \beta_2CompAcct + \beta_3\rho \\
 & \times CompAcct + \beta_4SIZE \\
 & + \beta_5LEV + \beta_6DISP + \beta_7N \\
 & + \beta_8VOL + \beta_9ROA + \beta_{10}LOSS \\
 & + \sum YEAR + \sum IND + \epsilon
 \end{aligned}
 \tag{7}$$

where:

$$ACCURACY = \text{analysts' forecast accuracy} \\
 (= \frac{|Actual\ EPS - Consensus\ EPS\ forecast|}{stock\ price} \times -1);$$

$\rho$  = analyst's reliance on common information  
(=BKLS consensus)

*CompAcct* = financial statement comparability for firm *i* at year *t*, following DeFranco et al.(2011).

*SIZE* = ln(market value in millions);

*LEV* = leverage ratio (=total liabilities/total equity);

*DISP* = analysts' earnings forecasts dispersion;

*N* = ln(number of individual analysts who issue earnings forecasts on each firm);

*VOL* = stock price volatility (standard deviation of daily stock returns);

*ROA* = return on assets (=net income/total assets);

*LOSS* = 1 if net income is negative, otherwise 0;

*YEAR* = year indicators;

*IND* = industry indicators;

$\epsilon$  = error term.

In equation (7), the dependent variable is the analysts' forecast accuracy (ACCURACY). It is calculated by dividing the analysts' forecast error

by the stock price and multiplying by (-1). As suggested by DeFranco et al.(2011), when financial statement comparability is high, if analysts' forecast accuracy becomes higher, it is expected that  $\beta_2$  will be positive. The main variables are *CompAcct* and the interactions between *CompAcct* and  $\rho$  ( $\rho *CompAcct$ ). If the benefits of financial statement comparability increases as analysts utilize common information more, then it is expected that  $\beta_3$  will be positive. Conversely, if the benefits of financial statement comparability increases as analysts utilize private information more, then it is expected that  $\beta_3$  will be negative.

Other control variables are set on the basis of previous literatures. The larger the firm size is, the higher analysts' forecast accuracy is since analysts pay more attention and analyze more frequently the firm (Bhushan 1989; O'Brien and Bhushan 1990). The higher the debt-to-equity ratio (LEV) is, and the higher managerial incentives for earnings management are, the more difficult it is for analysts to make accurate earnings forecasts (Eddy and Seifert 1992).

A high DISP indicates greater uncertainty that analysts feel about the firm's earnings. Thus DISP is expected to have a negative relation with analysts' forecast accuracy. N, the number of analysts following, is expected to improve analysts' forecast accuracy because the higher the number of analysts analyzing a target firm is, the higher the quantity of information available about the firm will be (Lang and Lundholm 1996).

For firms with high stock price volatility (VOL), it will be difficult for analysts to forecast earnings accurately since there are large inherent uncertainties. Both ROA and LOSS are profitability variables. The more profitable the firm is, the easier it is to predict future earnings because there is a tendency for the current profitability to persist for several years (McNichols and O'Brien 1997). We also include year and industry fixed effects.

11) Generally, OLS requires the normality of data. Since normality tests show that our data do not meet the requirement, we winsorized all continuous variables (including dependent variables) at the top and bottom 1% in order to reduce the distortion due to outliers. In addition, we reconducted the same analyses using truncated variables. The results using truncated variables are qualitatively unchanged.

## IV. Empirical results

Following <Figure 1> summarizes our research. For hypothesis 1, we use financial statement comparability as the explanatory variable and analysts' reliance on common information as the dependent variable. It is expected that they have neagative association. For hypothesis 2, we use analysts' forecast accuracy as the dependent variable. It is expected that the interaction of financial statement comparability and analysts' reliance on common information is positively associated with analysts' forecast accuracy. Our empirical results were as predicted.

## A. Descriptive statistics and correlation matrix

<Table 2> shows the descriptive statistics of the variables used in this study. The mean  $\rho$  is 0.667, indicating that the ratio of common-to-total information in the average analysts' forecast is 66.7%. The mean ACCURACY is -0.038, suggesting that the absolute value of the difference between the analyst earning forecast and the actual earnings per share (EPS) is 3.85% of the firm's stock price. The mean CompAcctIndAvg is -4.899. It shows that the average difference between the quarterly earnings of firm *i* and other firms within the same industry is approximately 4.899% of the market value. The average SIZE is 12.6, indicating that the market capitalization of the sample firms

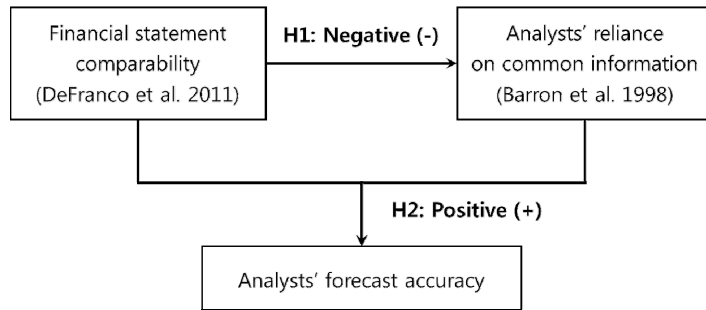


Figure 1. Research summary

Table 2. Descriptive statistics

Variables	Classification	Mean	Standard deviation	Median
$\rho$	Dependent (H1)	0.667	0.435	0.918
ACCURACY	Dependent (H2)	-0.038	0.090	-0.011
CompAcct4	Explanatory	-1.042	1.278	-0.600
CompAcctInd	Explanatory	-4.899	2.380	-4.390
SIZE	Control	12.600	1.663	12.297
DA	Control	-0.009	0.082	-0.010
N	Control	1.139	1.074	1.099
VOL	Control	0.486	0.150	0.463
LEV	Control	0.937	0.834	0.715
DISP	Control	0.008	0.018	0.003
ROA	Control	0.054	0.069	0.054
LOSS	Control	0.118	0.322	0.000

a) See Appendix A for variable definitions.

**Table 3.** Correlation matrix

Variable	$\rho$	ACCU RACY	Comp Acct4	SIZE	DA	N	VOL	LEV	DISP	ROA
ACCU RACY	-0.21 (0.00)									
Comp Acct4	-0.03 (0.04)	0.22 (0.00)								
SIZE	-0.28 (0.00)	0.23 (0.00)	0.09 (0.00)							
DA	0.03 (0.03)	0.02 (0.17)	0.00 (0.92)	-0.08 (0.00)						
N	-0.47 (0.00)	0.19 (0.00)	0.09 (0.00)	0.74 (0.00)	-0.10 (0.00)					
VOL	0.10 (0.00)	-0.16 (0.00)	-0.13 (0.00)	-0.33 (0.00)	0.03 (0.03)	-0.20 (0.00)				
LEV	-0.00 (0.95)	-0.27 (0.00)	-0.27 (0.00)	0.05 (0.00)	-0.02 (0.11)	0.05 (0.00)	0.17 (0.00)			
DISP	-0.33 (0.00)	-0.24 (0.00)	-0.15 (0.00)	0.03 (0.02)	-0.03 (0.06)	0.23 (0.00)	0.04 (0.01)	0.17 (0.00)		
ROA	-0.12 (0.00)	0.37 (0.00)	0.15 (0.00)	0.12 (0.00)	0.01 (0.37)	0.15 (0.00)	-0.12 (0.00)	-0.39 (0.00)	-0.15 (0.00)	
LOSS	0.12 (0.00)	-0.38 (0.00)	-0.17 (0.00)	-0.11 (0.00)	-0.04 (0.01)	-0.09 (0.00)	0.17 (0.00)	0.26 (0.00)	0.15 (0.00)	-0.66 (0.00)

- a) Above table reports the Pearson correlations.  
b) p-values (two-tailed) are reported in parentheses.  
c) See Appendix A for variable definitions.

is on average 296,559 million won. The average discretionary accruals (DA) is -0.009. Since the mean DA has a negative value, it could be interpreted that sample firms have lower earnings management incentives than average listed companies. The mean ROA and LOSS are 0.054 and 0.118, respectively. Sample firms report net income equivalent to 5.4% of total assets, and 11.8% of sample firms report losses.

<Table 3> presents the Pearson correlation among the variables used in this study.  $\rho$  shows a significant negative relation with ACCURACY, suggesting that analysts' forecast accuracy decreases if analysts rely more on common information.<sup>12)</sup> Also, the association

between  $\rho$  and CompAcct is negative, indicating analysts' reliance on common information decreases with financial statement comparability.  $\rho$  has negative relations with SIZE, N, DISP, and ROA, suggesting analysts' reliance on common information decreases with the firm size, number of analysts following, earnings uncertainty, and profitability. In contrast,  $\rho$  has positive relations with DA, VOL, and LOSS, indicating that analysts' reliance on common information increases if accruals quality is low, inherent uncertainties are high, and the firm reports a loss.

Since these results do not control for other variables that influence analysts' forecast accuracy, we need to check the relation between the two variables again

12)  $\rho$  shows a significant negative relation between ACCURACY. In hypothesis 2, we examine the relation between  $\rho$  and ACCURACY when financial statement comparability is high. Even though the simple correlation between  $\rho$  and ACCURACY is negative, the sign may vary if the particular situation is given.

Thus, it calls for caution in making inferences based on the simple correlation. We conduct a multivariate analysis to allow the interactions among the explanatory variables.

using multiple regression analysis.

### B. Test of Hypothesis 1

<Table 4> presents regression results for Hypothesis 1. Models 1, 2, and 3 use CompAcct4, CompAcctIndAvg, and CompAcctIndMed as a comparability measure, respectively. In <Table 4> all the comparability measures (CompAcct4, CompAcctIndAvg, and CompAcctIndMed) are negatively associated with BKLS consensus, suggesting that analysts' reliance on common information decreases with financial statement comparability. It means that analysts are likely to rely more on private information to differentiate their forecasts because investors can interpret common information well by themselves when financial statement comparability is high. For the other control variables, the coefficient of SIZE is significantly positive, while N is significantly negative. These results suggest since voluntary disclosure is positively related to the firm size,

analysts' reliance on common information increases with the firm size. Meanwhile, when a large number of analysts follow the firm, analysts are likely to increase their reliance on private information for the sake of differentiation.

### C. Test of Hypothesis 2

<Table 5> presents the regression results for Hypothesis 2. Models 1 and 2 use CompAcct4, models 3 and 4 use CompAcctIndAvg, and models 5 and 6 use CompAcctIndMed as a comparability measure. In model 1, the coefficient of CompAcct is 0.006 and statistically significant at the 1% level. It is consistent with DeFranco et al.(2010) in that analysts' forecast accuracy increases with financial statement comparability. Next, the interest variable, CompAcct\* ρ is significantly positive, indicating that the positive relation with financial statement comparability and analysts' forecast accuracy increases with analysts' reliance on common information. We interpret these

**Table 4.** The effect of financial statement comparability on BKLS consensus

Variables	Model 1 (CompAcct=CompAcct4)	Model 2 (CompAcct=CompIndAvg)	Model 3 (CompAcct=CompIndMed)
Intercept	0.600*** (9.340)	0.563*** (9.266)	0.575*** (9.345)
CompAcct	-0.007* (-1.797)	-0.007*** (-3.285)	-0.008** (-2.551)
SIZE	0.028*** (4.860)	0.029*** (5.314)	0.028*** (5.132)
DA	-0.079 (-0.960)	-0.085 (-1.018)	-0.084 (-0.996)
N	-0.217*** (-15.340)	-0.218*** (-15.487)	-0.216*** (-15.462)
Year dummy	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes
Max VIF	2.86	2.87	2.86
N	4,286	4,286	4,286
Adj. R <sup>2</sup>	0.242	0.243	0.243
F-value	49.96***	50.10***	50.12***

a) \*, \*\*, \*\*\* represent significant at the 10%, 5%, 1% levels, respectively.

b) See Appendix A for variable definitions.

c) T-statistics are obtained from a two-way clustering by firm and year.

results since financial statements are typical common information, the benefits of financial statement comparability is bigger when analysts use common information more in their earnings forecasts than private information.

The results of the other control variables are as follows. The coefficients of SIZE, N, and ROA are significantly positive, while the coefficients of LEV,

DISP, and LOSS are significantly negative. These results are consistent with prior literature, suggesting that analysts' forecast accuracy increases with the firm size the number of analysts following, and the profitability. In contrast, in the case where the firm has a high debt ratio and earnings uncertainty is high, then analysts' forecast accuracy falls. Meanwhile, no matter which comparability measure is used in

**Table 5.** The effect of BKLS consensus on the relationship between analysts' forecast accuracy and financial statement comparability

Variables	CompAcct=CompAcct4		CompAcct=CompAcctIndAvg		CompAcct=CompAcctIndMed	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	-0.063*** (-3.532)	-0.039** (-2.528)	-0.048*** (-2.831)	-0.049*** (-2.693)	-0.053*** (-3.112)	-0.048*** (-2.936)
$\rho$		-0.027*** (-6.884)		0.003 (0.390)		-0.002 (-0.450)
CompAcct	0.006*** (4.556)	-0.007*** (-4.838)	0.003*** (3.907)	-0.004*** (-3.397)	0.004*** (4.884)	-0.005*** (-3.615)
$\rho \times \text{CompAcct}$		0.018*** (5.241)		0.010*** (4.361)		0.012*** (5.010)
SIZE	0.003*** (2.637)	0.003*** (3.048)	0.002** (2.058)	0.003*** (2.820)	0.002** (2.254)	0.003*** (2.848)
LEV	-0.014*** (-3.173)	-0.013*** (-3.165)	-0.015*** (-3.367)	-0.013*** (-3.225)	-0.014*** (-3.128)	-0.013*** (-3.077)
DISP	-0.840*** (-4.792)	-1.184*** (-6.805)	-0.851*** (-4.930)	-1.207*** (-7.238)	-0.834*** (-4.878)	-1.224*** (-7.250)
N	0.013*** (5.263)	0.006*** (3.888)	0.015*** (5.295)	0.007*** (4.495)	0.014*** (5.139)	0.007*** (4.281)
VOL	0.020 (1.213)	0.020 (1.321)	0.021 (1.248)	0.021 (1.398)	0.024 (1.437)	0.023 (1.554)
ROA	0.147*** (3.741)	0.136*** (4.036)	0.151*** (3.705)	0.140*** (3.975)	0.151*** (3.736)	0.137*** (3.911)
LOSS	-0.059*** (-4.093)	-0.053*** (-3.909)	-0.060*** (-3.995)	-0.054*** (-3.882)	-0.059*** (-3.955)	-0.052*** (-3.793)
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes	Yes	Yes	Yes
Max VIF	3.01	4.61	3.01	7.81	3.00	7.29
N	4,286	4,286	4,286	4,286	4,286	4,286
Adj. R <sup>2</sup>	0.280	0.322	0.278	0.321	0.280	0.324
F-value	53.02***	60.75***	52.5***	60.49***	53.12***	61.46***

a) \*, \*\*, \*\*\* represent significant at the 10%, 5%, 1% levels, respectively.

b) See Appendix A for variable definitions.

c) T-statistics are obtained from a two-way clustering by firm and year.

models 3-6, the same results are observed. The explanatory power of the models are relatively high with 28-32%.

#### D. Sensitivity tests

In <Table 5> we examine the effect of analysts'

reliance on common information on the relation between financial statement comparability and analysts' forecast accuracy. <Table 6> reexamines <Table 5> using analysts' forecast bias instead of analysts' forecast accuracy as the dependent variable. Analysts' forecast bias is calculated by subtracting the actual EPS from the analyst EPS forecast, and then dividing by the stock price. Models 1 and 2 use

**Table 6.** The effect of BKLS consensus on the relationship between analyst earnings forecast bias and financial statement comparability

Variables	CompAcct=CompAcct4		CompAcct=CompAcctIndAvg		CompAcct=CompAcctIndMed	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	0.033*** (2.670)	0.021* (1.700)	0.026** (2.032)	0.028** (2.178)	0.028** (2.249)	0.028** (2.388)
$\rho$		0.012** (2.487)		-0.004 (-0.602)		-0.003 (-0.506)
CompAcct	-0.003** (-2.373)	0.006*** (4.875)	-0.001 (-1.265)	0.003*** (3.440)	-0.002** (-2.185)	0.004*** (4.361)
$\rho \times$ CompAcct		-0.011*** (-6.021)		-0.006*** (-6.402)		-0.008*** (-5.912)
SIZE	-0.001 (-1.466)	-0.001* (-1.679)	-0.001 (-1.042)	-0.001 (-1.405)	-0.001 (-1.184)	-0.001 (-1.444)
LEV	0.007** (2.247)	0.007** (2.234)	0.008** (2.352)	0.007** (2.223)	0.007** (2.158)	0.007** (2.078)
DISP	0.412*** (3.048)	0.605*** (4.257)	0.418*** (3.145)	0.613*** (4.293)	0.408*** (3.061)	0.629*** (4.360)
N	-0.006*** (-3.340)	-0.002 (-1.604)	-0.007*** (-3.704)	-0.003** (-2.079)	-0.006*** (-3.413)	-0.003* (-1.897)
VOL	-0.005 (-0.429)	-0.005 (-0.423)	-0.005 (-0.430)	-0.006 (-0.490)	-0.007 (-0.578)	-0.007 (-0.595)
ROA	-0.250*** (-8.114)	-0.245*** (-8.572)	-0.252*** (-7.705)	-0.246*** (-7.942)	-0.253*** (-7.868)	-0.245*** (-8.304)
LOSS	0.053*** (3.636)	0.049*** (3.463)	0.053*** (3.565)	0.050*** (3.423)	0.052*** (3.529)	0.049*** (3.367)
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes	Yes	Yes	Yes
Max VIF	3.01	4.61	3.01	7.81	3.00	7.29
N	4,286	4,286	4,286	4,286	4,286	4,286
Adj. R <sup>2</sup>	0.251	0.268	0.251	0.267	0.252	0.270
F-value	45.94***	47.20***	45.78***	46.89***	46.03***	47.57***

a) \*, \*\*, \*\*\* represent significant at the 10%, 5%, 1% levels, respectively.

b) See Appendix A for variable definitions.

c) T-statistics are obtained from a two-way clustering by firm and year.

**Table 7.** Analysis using dummy variable for BKLS consensus

	Model 1 (CompAcct=CompAcct4)	Model 2 (CompAcct=CompAcctIndAvg)	Model 3 (CompAcct=CompAcctIndMed)
High_ρ	-0.025*** (-5.754)	0.006 (0.595)	-0.001 (-0.141)
CompAcct	-0.005*** (-4.768)	-0.003*** (-3.055)	-0.004*** (-3.345)
High_ρ*CompAcct	0.017*** (6.373)	0.010*** (4.631)	0.012*** (5.356)
Controls	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes
Max VIF	4.02	7.15	6.15
N	4,286	4,286	4,286
Adj. R <sup>2</sup>	0.318	0.318	0.321
F-value	59.84***	59.76***	60.63***

a) \*, \*\*, \*\*\* represent significant at the 10%, 5%, 1% levels, respectively.

b) See Appendix A for variable definitions.

c) T-statistics are obtained from a two-way clustering by firm and year.

CompAcct4, models 3 and 4 use CompAcctIndAvg, and models 5 and 6 use CompAcctIndMed as a comparability measure.

In Model 1 of <Table 6> the coefficient of CompAcct is significantly negative. In addition in Model 2, the coefficient of ρ\*CompAcct is significantly negative. These results show analysts' forecast bias decreases with financial statement comparability, suggesting the benefits of financial statement comparability increases with analysts' reliance on common.

<Table 7> reexamines <Table 5> measuring the analysts' reliance on common information using a dummy variable rather than a continuous variable. In <Table 5> CompAcct and ρ are measured in the form of a continuous variable. However, using interaction variable consisting of two continuous variables, can cause problems in interpreting regression results. Therefore, in <Table 7> after converting ρ to a dummy variable, we reexamine whether hypothesis 2 is supported. High\_ρ is a dummy variable, 1 if analysts' reliance on common information is above the median, and otherwise 0. The results show that the coefficient of High\_ρ\*CompAcct has a significantly

positive value. It means that even if one of the interaction variables is replaced by a dummy variable, there are no qualitative changes.

## V. Conclusion

This study analyzes analysts' information usage patterns by examining how financial statement comparability influences analysts' reliance on common and private information. In addition, it analyzes whether analysts can improve their accuracy by using more common information for firms with higher comparability. Analysts' reliance on common information relative to private information is measured using BKLS consensus, as suggested by Barron et al.(1998). BKLS consensus is defined as the common forecast error divided by the average total error and gives an indication of the extent to which common information is used.

The main findings of this study are as follows. First, analysts' reliance on common information



decreases and the relative importance of private information increases with financial statement comparability. For firms with higher comparability investors would be able to access a large amount of high quality information; thus, analysts find it difficult to meet the needs of investors by simply providing common information. Therefore, when financial statement comparability is high, in order to increase the value of their service, analysts will increase their reliance on private information. Second, the positive association between financial statement comparability and analysts' forecast accuracy is reinforced when analysts use more common information than private information. It shows that, when financial comparability is high, it is more effective for analysts to use common information to increase their forecast accuracy than to spend time and money on collecting private information.

This study contributes to the literature in that it confirms that analysts' forecast accuracy depends on their reliance on common information. We show when financial statement comparability is high, analysts lower the relative importance of common information. However, from the point of view of analysts' forecast accuracy, this practice might not be efficient. Specifically, our results show that when financial statement comparability is high, for analysts to use more common information than private information helps to improve forecast accuracy. Accurate forecasts are associated with favorable career outcomes (Hong and Kubik 2003). Analysts who understand our results will spend less time on gathering useless private information when the financial statement comparability is high. Guidance from financial regulatory authorities is necessary. However, it is much more important for analysts to recognize clearly that using more common information can contribute to their forecast accuracy, ultimately to promote their career development when forecasting firms with higher comparability. In this respect, our study is expected to serve to call analysts' attention to the ideal information resources. In terms of future research we aim to further explore how private information negatively impacts on analysts'

forecast accuracy and why it happens.

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## Appendix

### Variable definitions

$\rho$	= analyst's reliance on common information (=BKLS consensus)
<i>High_</i> $\rho$	= 1 if the firm's $\rho$ is above the median of the sample, otherwise 0.
<i>ACCURACY</i>	= analysts' forecast accuracy $\left( = \frac{ Actual\ EPS - Consensus\ EPS\ forecast }{stock\ price} \times -1 \right);$
<i>BIAS</i>	= analysts' forecast bias $\left( = \frac{Actual\ EPS - Consensus\ EPS\ forecast}{stock\ price} \right);$
<i>CompAcct</i>	= financial statement comparability for firm <i>i</i> at year <i>t</i> , following DeFranco et al.(2011). It is among <i>CompAcct4</i> , <i>CompAcctIndAvg</i> or <i>CompAcctIndMed</i> .
<i>CompAcct4</i>	= average value of largest 4 values of <i>CompAcct<sub>ijt</sub></i> in the industry for firm <i>i</i> at year <i>t</i> ;
<i>CompAcctIndAvg</i>	= mean value of <i>CompAcct<sub>ijt</sub></i> in the industry for firm <i>i</i> at year <i>t</i> ;
<i>CompAcctIndMed</i>	= median value of <i>CompAcct<sub>ijt</sub></i> in the industry for firm <i>i</i> at year <i>t</i> ;
<i>SIZE</i>	= ln(market value in millions);
<i>DA</i>	= performance matched discretionary accruals for firm <i>i</i> at year <i>t</i> , following Kothari et al.(2005);
<i>N</i>	= ln(number of individual analysts who issue earnings forecasts on each firm);
<i>LEV</i>	= leverage ratio(=total liabilities/total equity);
<i>DISP</i>	= analysts' earnings forecasts dispersion;
<i>VOL</i>	= stock price volatility (standard deviation of daily stock returns);
<i>ROA</i>	= return on assets(=net income/total assets);
<i>LOSS</i>	= 1 if net income is negative, otherwise 0;
<i>YEAR</i>	= year indicators;
<i>IND</i>	= industry indicators;