

Voluntary Disclosure, Analyst Following, Forecast Accuracy and Dispersion: Evidence From Korea*

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In this paper, we examined how the frequency of voluntary disclosure is associated with the number of analyst following and the analysts' earnings forecast characteristics. We find that analysts are more attracted to the firms that provide greater level of voluntary disclosure. We also find that negative association between the frequency of voluntary disclosure and analysts' forecasts error indicates that more frequent voluntary disclosures lowers analysts' forecast error by reducing the uncertainty in analysts' earnings forecast. Finally we find that the increased level of voluntary disclosure reduces dispersion of forecasted earnings. Our findings suggest that voluntary disclosure plays a role in reducing information asymmetry between firm and analysts as well as among analysts.

Key words: Voluntary Disclosure, Analyst Following, Forecast Accuracy, Forecast Dispersion

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1. Introduction

We focus on voluntary disclosure for two primary reasons. First, the importance of voluntary disclosure is increasing, as the pace of change in the business environment is accelerated. Many leading companies disclose voluntarily an extensive amount of business information. According to the

report by Korea Stock Exchange (KRX), the number of firms holding investor relation in 2004 is ten times larger than that in 2000. Second, the on-line Data Analysis, Retrieval and Transfer Wallace(DART) system operated by the Financial Supervisory Service(FSS) was fully utilized since 2001; public companies file all reports including voluntary disclosure with the FSS via the on-line DART system. Consequently, firms have more

chances to disseminate private information directly to the public in timely manner via the on-line DART system and, investors and financial analysts have real time access to information voluntarily disclosed by firms. Although the DART system contributes to a reduction in information asymmetry between firm and the market participants as well as among the various market participants, little empirical work studying voluntary disclosure has been conducted so far in using DART system.

Financial analysts, as one of primary users of accounting information, are widely recognized to add value in the capital market through their analysis of firms' financial reporting decisions, forecasts of future earnings, and buy/sell recommendations. Given that the mandated disclosure does not fully reflect the rapidly changing business environment and firms increase voluntary disclosure, modern view of analysts' role in informational function focuses on providing investors with interpretation and commentary not only on financial reporting but also on voluntary disclosure. Evidence on the content analysis of analysts' reports provided by Rogers and Grant (1997) presents that one quarter of information in the average analysts report comes from the basic financial statements.¹⁾ Therefore, the

frequency of voluntary disclosure can offer a great opportunity for understanding of the modern role of financial analysts in the capital market.

This study provides direct evidence on the effect of frequency of voluntary disclosure on analysts' decision to follow a firm and analysts' earnings forecast in aspect of accuracy and dispersion. We examine whether voluntary disclosure, measured as the number of investor relation and the frequency of information filed with DART, are associated with analyst following and the characteristics of analysts' earning forecast. If investors perceive analysts as information intermediaries, they are expected to demand for analysts' forecasting service whenever new information is disseminated by firms. Yet, careful notion is taken for potential simultaneous bias that frequency of voluntary disclosure is influenced contemporarily by analysts' request for higher level of information. Lang and Lundholm(1996) however found no evidence of the opposite direction of causality. If the information disclosed in manager's discretion is valuable to analysts, the accuracy of analyst forecasts will improve to the extent that voluntary disclosure reduces the uncertainty in predicting future events. Although we do not directly measure the quality of

1) They examine the annual reports covered by sell-side analysts to identify potential source of the information.

disclosure, we assume that the amount of information useful for forecasting earnings increases with increased frequency of voluntary disclosure.²⁾

Finally, as firms disseminate more private informations into the public, information asymmetry among analysts is also expected to be reduced. According to the findings of Barron et al. (1998), forecast dispersion reflects only idiosyncratic error that arises from error in the private information. This finding suggests that if they put greater weight on shared information than privately acquired information, the expected dispersion in forecasts decreases and the consensus that refers to the degree to which analysts share a common belief increases.

For our cross-sectional study, we measure the frequency of voluntary disclosure using the Investor's Network for Disclosure System (KIND), operated by KRX, equivalent to DART by the FSS.³⁾ We obtain data related to analyst following and analyst earnings forecast from FN-Guide that covers more Korean firms followed by analysts than IBES does.

We find strong cross-sectional evidence which supports that the frequency of voluntary disclosure is positively associated

with analyst following. This result suggests that firms can attract more analysts to study them when those firms have greater level of voluntary disclosure and hold more frequent investor relations.

We find that error in forecasted earnings decreases with more frequent voluntary disclosure. We measure analysts' earnings forecast error as a proxy for the level of information asymmetry and uncertainty about future earnings. Negative association between frequency of voluntary disclosure and error in forecasted earnings suggests that frequent voluntary disclosure increases the overall level of information that analysts can utilize and, hence, reduces uncertainty in analysts' prediction of future earnings. Analysts' forecast dispersion also decreases with the increased level of voluntary disclosure. The observed negative relation suggests that increased homogeneous belief in shared information leads to consensus among analysts.

The difference from our research in comparison to prior researches is as follows. First, as the pace of change in domestic disclosure policy and practice is accelerated, dynamic forms of disclosure policy became enforced. Especially, since November 2002

2) However, we use "frequency" of voluntary disclosure interchangeable with "level" of voluntary disclosure, both enhancing the timeliness and the content of the information disclosed above mandated.

3) Voluntary disclosure is contemporaneously up-loaded on DART and KIND, and therefore, using either of system makes no difference in measuring frequency of voluntary disclosure.

when the Fair Disclosure has been adopted, various researches related to fair disclosure have been actively progressed. But little empirical research related to voluntary disclosure has been conducted so far, so this study tries to examine the relations between voluntary disclosure and financial analyst activity intended for Korea capital market. Secondly, a prior research by Lang and Lundholm(1996) providing a positive relation between voluntary disclosure and analyst forecasts in US firms, limits the appearance of voluntary disclosure to investor relations (IR). This research addresses unique type of voluntary disclosure existing in capital market in Korea. Third, this paper investigates whether difference exists between the emerging market in Korea and developed market in US, and increased the knowledge of information environment in the emerging market. This paper contributes to the literature on disclosure by providing evidence on the effect of voluntary disclosure on analyst following, analysts' earnings forecast accuracy, and forecast dispersion. Using the DART system, which provides objective measure of the frequency of voluntary disclosure our findings provide evidence useful for future research on information content of voluntary disclosure and the effectiveness of the DART system. The section II provides background on the use of voluntary disclosure by firm and the related

literature. Section III outlines the hypotheses motivating our empirical analysis. Section IV discusses the sample and data description, and section V describes research design issues, providing the definition of research variables and specifying empirical models. In section VI, we present empirical analysis. Section VII concludes the paper.

II. Background and Literature Review

The information disseminated under voluntary disclosures is mostly about forward-looking information, including management's analysis of business data(e.g., high-level operating data), information about management and shareholders, background about the company(e.g., broad objective and strategies and scope of business) and its properties and intangible assets not been recognized in the financial statements. Voluntary disclosure should cover not only good news but also disappointments. The literature on voluntary disclosures stems from the theoretical frame of information asymmetry reduction. Prior research explores extensively how voluntary disclosure affects the capital market, investigates the determinants of voluntary disclosure, and searches for what makes voluntary disclosures more or less effective. Moreover, recent studies,

recognizing endogeneity of voluntary disclosure, attempt to explain voluntary disclosure in multiple decision settings. We first present the related researches to analyst following, followed by the effect of disclosure policy on accuracy and dispersion in analysts' forecasts, and lastly researches on the effect of voluntary disclosure using various types of voluntary disclosures.

2.1 Analyst Following

Several studies present evidence that firms with more forthcoming disclosures are likely to have higher analyst following.⁴⁾ Lang and Lundholm(1996) report that the informativeness of firms' disclosures using data from Financial Analysts Federation Corporate Information Committee(the FAF Report, hereafter) is positively associated with analyst coverage. Francis et al. (1998) suggests that there is an increase in analyst coverage for firms making conference calls. Botosan and Harris(2000) found evidence suggesting that firms experienced the increase of analyst following in the year quarterly segment disclosure was initiated.

On the other hand, Diamond(1985) suggests that the more a firm discloses information, the fewer analysts have incentive to collect information on that firm due to the reduced

benefit of following a firm. Tasker(1998) finds that firms with greater analyst following and greater institutional ownership are less likely to have conference calls that provide open access to all investors, consistent with the intuition that informed investors prefer less disclosure, but is also consistent with the notion that analysts and institutions produce information and reduce the need for conference calls.

2.2 Accuracy and Dispersion of Analysts' Forecasts

There is relatively few evidence on the effect of voluntary disclosure on forecasts accuracy and dispersion. Waymire(1984), examining the accuracy of analyst earning before and after voluntary management forecasts, suggests that analyst earnings forecasts is more accurate after the release of management earnings forecast. Kross (1990) measures the level of financial media coverage as the number of column inches reported on each firm in *the Wall Street Journal Index*, presenting evidence that analyst's forecast accuracy is improved as with the increase of the amount of coverage in the media. Lang and Lundholm(1996) report that firms with more forthcoming disclosure have more consensus among

4) Results from testing of the direction of causality are mixed. Our test results from time lead-lag analysis support the simultaneous decision setting.

analysts' earnings forecasts and more accurate forecasts. Botosan and Harris (2000) examine the impact of managerial decisions to increase segment disclosure frequency. They found that managers are more likely to provide quarterly segment data when consensus among analysts is low.

2.3 Voluntary Disclosure

Researchers have utilized a variety types of voluntary disclosure such as manager' earnings forecasts, MD&A on annual reports, segment disclosure, press release, Financial Analysts Federation(FAF) ratings report, quarterly report before mandated, conference call, and investor relations(IR). Several research document that the effect of information disclosure on analysts' following is dependent on the type and forms of disclosure and the pre-existing number of analysts(Botosan and Harris 2000; Botosan 1997). For instance, Hope(2003) finds that information on notes in annual reports is more relevant to analyst than basic financial statements. Piotroski(1999) using segment reports to examine, documents that firms with increasing segment reporting disclosures are associated with an increase in analysts' forecast accuracy and a decline in dispersion.

III. Development of Hypotheses

3.1 Analyst Following

The existing evidence(e.g., Barry and Brown, 1985; Merton,1987) suggests that the advantage of firms with a greater analyst following is driven by more investors' attention and eventually lower cost of capital. It implicates that firms have incentive to make voluntary disclosure. Although distinguished fundamental modeling used to explain analyst following is not well established, Bhushan(1989), using the demand and supply curve, attempts to describe how firm characteristics influence analyst following.⁵⁾ Applied to our study, voluntary disclosure is regarded as one of these firm-level factors. In terms of supply, voluntary disclosure is likely to increase the number of analysts to follow because it lowers the cost related to private information collection and drives analysts to less incentive to private information due to an abundant supply of free information. Therefore, analysts will be willing to supply more at lower cost, and this shifts the supply curve to the right-supply increase. In case of demand side, the effect of

5) Bhushan(1989) suggests that, when the number of analysts following is used for a proxy for the equilibrium total expenditure, the total expenditure on analyst service for a firm depends on the interaction between the aggregate supply and demand.

voluntary disclosure on the demand curve is more complicated because the direction of a shift depends on whether analyst reports is to be a substitute or a complement for voluntary disclosure. Increase in voluntary disclosure may decrease the demand for analysts, if investors view the two as substitutes in their preference structure. In this case, analyst reports consequently compete with voluntary disclosure. On the other hand, increase in voluntary disclosure may increase the demand for analyst services if voluntary disclosure is perceived as complements. In such a case, investors use information voluntarily disclosed to the public in conjunction with analyst reports. Collectively, it remains an open empirical issue on the effect of voluntary disclosure on analyst followings. We focus more on a demand side for analyst services due to unavailability of data related cost incurred to analysts. For the purpose of developing our first hypothesis, we assume that the demand for analyst services increases as the greater amount of free information comes out the market. Given that most ordinary investors(non-specialist) do not possess highly sophisticated technique or knowledge of analyzing enormous, often specialized information enough to execute trades without

analyst service, we believe it to be a reasonable assumption.

Thus, we suggest the first hypothesis:

H1: The frequency of voluntary disclosure is positively associated with the number of analyst following.

3.2 Forecast Accuracy

Financial analysts utilize various information sources to evaluate firm's prospects to arrive at their earning forecasts. The market assumes that analysts have better ability to do so than average investors.⁶⁾ Analysts' earnings forecast error is viewed as indicators of analysts' inaccuracy in forecasting earnings, depending not only on the inherent predictability of the construct being forecasted but also the amount and quality of information available.⁷⁾ This relation leads to develop hypothesis that a greater amount of voluntary disclosure reduces analysts' uncertainty in forecasting earnings. We use analysts' forecast error as a proxy for uncertainty in analysts' forecasting earnings. Although information disseminated by managers cannot fully avoid uncertainty about future performance, a reduction in information asymmetry

6) Research documents that analysts' role is more likely to be viewed as information intermediaries than information providers(Lang and Lundholm 1996).

7) See Atiase(1985)

between firm and analysts is expected to better equip analysts to evaluate future performance of a firm. Therefore, a reduction of information asymmetry by frequent voluntary disclosure reduces analysts' inaccuracy in predicting future earnings.

Our second hypothesis is stated as:

H2: The frequency of voluntary disclosures is positively associated with analysts' forecast accuracy.

3.3 Forecast Dispersion

In prior research, analysts' forecast dispersion has been used as a proxy for information asymmetry or disagreement among analysts as well as uncertainty in analysts' earnings forecast. Dispersion from the average estimation is attributed to how effectively analysts incorporate private and public information in their own models and how distinctly they design forecasting models. Analysts' forecasting models, if applied to vector analysis, are expressed by composite vector of public information and private information on infinite dimension and, hence, forecasted earnings across analysts hardly result in the same pre-

diction. For simplicity, analysts' forecasts dispersion is ideally expressed by a function of standard deviations of interpretations of private information and public information, contingent on a model under assumption of dichotomy of model.

Forecast Dispersion

$$= h \{SD \text{ of } f(\text{private information}), \\ SD \text{ of } g(\text{public information}) \mid \\ \Delta \text{Forecasting Model}\}^{8)}$$

*SD stands for standard deviation.

Since the regulatory enforces voluntary disclosure practice under the scope of fair disclosure, private information, assuming the enforcement is fully effective, is ideally set to be zero, leading the function $f(\text{private information})$ to zero.⁹⁾ With this ideal setting where no private information is available, observed negative association suggests homogeneous belief in increased shared information. Alternatively, the observed positive association between voluntary disclosures and forecast dispersion indicates heterogeneous interpretations of increased shared information. As done by Bhushan(1989), we further assume that analysts provide services of the same quality with reasoning that the

8) Analyst Forecasting Model is ideally set to be either same or different across analysts who follow the same firm. The model means that how analysts interpret and process information from all source of information to create new information.

9) In ideal setting where no private information is available, forecast dispersion is dependent on standard deviation of function of public information. If analysts have a common model, overall forecast dispersion is zero because no difference exists in public information under the homogeneous model.

market for analysts for each firm is competitive. With several assumptions, we expect that increased voluntary disclosure contributes a reduction of information asymmetry between analysts themselves.

Hence, our final hypothesis is:

H3: The frequency of voluntary disclosure is negatively related to the analysts' forecast dispersion.

IV. Data and Sample Selection

The initial criteria used for sampling the firms were: (i) analyst earnings forecasts must be available at the Fn-Guide Database and (ii) the firm has been listed on the Korean stock exchange for the entire period of the study 2002-2004.¹⁰⁾ For the 604 firm-years identified in the initial search, we scanned voluntary disclosure or IR, attributed to the firm or its officers, appearing on the KIND system during 2002-2004 to restrict firms to at least one voluntary disclosure or one IR each year.¹¹⁾ Of the initial sample, 276 firm-years observations are obtained for voluntary

disclosure and 169 are for IR. Analysts' earnings forecast, actual earnings per share and the firm-level financial data for control variables are from Fn-guide Database during the period January 2002-December 2004. We exclude observations with missing values on any of the control variables in Fn-Guide Database.

As mentioned above, voluntary disclosure and investor relation are taken from KIND system. On the verge of the dissemination of information that is not mandated, firms are required to first submit the information electrically to KRX(KIND) and the FSS (DART). The submitted information is then up-loaded to the web-site of the FSS and the KRX for public access, while it is allowed to be announced to the relevant press clubs and a securities finance corporation. Consequently, IR(Investor Relation) and VD(Voluntary Disclosure) are retrieved from on-going disclosures; IR and VD are briefly labeled with "announcement of IR" and "voluntary disclosure (called JaJin GongSi in Korean)" in KIND system, respectively.

10) For the test of time-lag effect(table 8), data from 2001 is included.

11) We should eliminate firms that have neither a voluntary disclosure nor an IR due to a potential problem with severe skewness. The final sample distributions close to normal distribution after the 55 percent and the 72 percent of the initial sample have been excluded for zero voluntary disclosure and zero IR, respectively.

V. Research Design

5.1 Empirical Research Models

Regression models testing the association between voluntary disclosure and analyst following are as follows:

Model for H1

$$\begin{aligned} \text{ANALYST}_t = & a + b1 \text{VD}_t(\text{or IR}_t) \\ & + b2 \text{FOREIGN}_t + b3 \text{GROWTH}_t \\ & + b4 \text{LEVERAGE}_t + b5 \text{SIZE}_t \\ & + \text{Year Dummies} \\ & + \text{Industry Dummies} + e \end{aligned}$$

Regression models testing the association between voluntary disclosure and forecast error are as follows:

Model for H2

$$\begin{aligned} \text{FORERR}_t = & a + b1 \text{VD}_t(\text{or IR}_t) \\ & + b2 \text{FOREIGN}_t + b3 \text{LEVERAGE}_t \\ & + b4 \text{VOLATILITY}_t + b5 \text{SIZE}_t \\ & + \text{Year Dummies} \\ & + \text{Industry Dummies} + e \end{aligned}$$

Regression models testing the association between voluntary disclosure and forecast dispersion are as follows:

Model for H3

$$\begin{aligned} \text{FORDISP}_t = & a + b1 \text{VD}_t(\text{or IR}_t) \\ & + b2 \text{FOREIGN}_t + b3 \text{LEVERAGE}_t \\ & + b4 \text{VOLATILITY}_t \\ & + b5 \text{SIZE}_t + \text{Year Dummies} \end{aligned}$$

$$+ \text{Industry Dummies} + e$$

5.2 Definition and Measurement of Key Variables

5.2.1 Dependent Variables

ANALYST: Analyst following is the number of sell-side analysts who report their earnings forecasts about a specific firm, measured on one month prior to its fiscal year-end.

FORERR: Analyst' forecast error is natural log of the absolute value of the difference between the most recent earnings forecast by an individual analyst before the fiscal year-end and actual reported EPS deflated by stock price at beginning of fiscal year. By using price deflation, we assume that the deviation of the actual earnings from forecasted earnings depends on the level of price per share and that price deflation reduces heteroskedasticity.

$$\ln\left(\frac{|\text{Actual ESP} - \text{Forecasted EPS}|}{\text{Beginning - of - fiscal - year stock price}}\right)$$

FORDISP: Analyst' forecast dispersion is the natural log of the standard deviation of analysts' earnings forecasts deflated by stock price.

$$\ln\left(\frac{\text{Standard deviation of forecasted EPS}}{\text{Beginning - of - fiscal - year stock price}}\right)$$

5.2.2 Independent Variables(VD, IR)

Lang and Lundholm(1996) suggest that firms' choice of disclosure media may affect the empirical results. Accordingly, we have two separate categories under voluntary disclosure because firm can utilize one of the categories depending on target audience. IR is mostly aimed at institutional investors and security analysts, while VD at the public. To test whether each category in voluntary disclosure has explanatory power, VD and IR are separately included in model 1 and model 2, for all of sets of regressions respectively.

VD is the number of Voluntary Disclosure available on the DART and KIND system. VD excludes the announcement of forthcoming IR to be held. IR is the frequency of Investor Relations held during a given year. A company planning to hold Investor Relations(IR) that provides presentation primarily to institutional investors and financial analysts is, in advance, required to disclose an announcement of forthcoming IR on KIND system and DART system.¹²⁾

To measure the level of disclosure, we utilize the DART system. Lang and Lundholm (1996) use FAF report that reflects analysts survey for rating a firm's overall disclosure

policy, and Botosan(1997) introduces a relative disclosure index that examines attributes of annual reports. Our measurement obtained from the FSS and KRX via publicly accessible on-line source provides an objective view of level of voluntary disclosure compared with corresponding ones used in those prior studies that the properties of voluntary disclosure are based on secondary, subjective measures. For example, the score in FAF data reflects all aspects of disclosure that analysts perceive as important across all types of disclosure rather than the voluntary disclosure policy itself. it inherently involves a bias from subjective view of individual analysts. We believe that utilizing the DART system eliminates such a bias associated with survey approach.

5.2.3 Control Variables

We control several firm-level factors evidenced by prior studies to have influence on analyst following, analysts' forecasts error and dispersion. For all three regressions, we include firm size, the percentage ownerships by foreign investors and leverage as control variables. SIZE is the natural log of the firm's total asset at the fiscal-year end. Trading on private information about a

12) Although the announcement of forthcoming IR implies that a company is committed to hold a presentation to the public, it is not verified whether the investor relations have been really held or not.

larger firm is found to generate higher profit (Bhushan 1989). Such investors' demand leads to increase of analyst following. Consequently, more information about a larger firms obtained by analysts would contribute to a reduction of analysts' uncertainty related to forecasting activities.

FOREIGN is the percentage ownerships held by registered foreign investors. Because foreign investors are not likely to be familiar with domestic firms and local economic environment such as country-specific regulation and other macro economic factors, we therefore expect the demand for analysts' service to increase as foreign investors own more stakes in a firm (Ahn et al. 2005; Kim et al. 2003). Also increase of information obtained by analysts, as evidence presented by Ahn et al. (2005) render forecasts accurate and convergent. LEVERAGE is the debt-to-asset ratio at the fiscal year end. High leverage may decrease analyst following, if the propensity of analysts' risk aversion leads to less interest in high risk firms (Jeong 2003). As the leverage of the firm increases, the possible range of reported income is expected to be greater due to the increased uncertainty about business risk and interest charge on the debt amount. High leverage consistent with the prior studies is expected to have a

positive relationship with analysts' forecast error and dispersion (Jeong 2003). In addition to those control variables described above, GROWTH as measured by firm's two-year sales growth rate is included for the analyst following regression. McNichols and O'Brien (1997) suggest that analysts have more incentive to cover firms when they view firms' information as favorable news. Given that sales to be the top line on income statement, increasing rate of sales draw attention from analysts as well as investors. Accordingly, we predict a positive relationship between sales growth and analysts following. For analyst forecasts accuracy and dispersion regressions, we add VOLATILITY measured by the standard deviation of the firm's daily stock return against market. This variable provides a proxy for short term measure of inherent uncertainty about future cash flow.¹³⁾ The more risky a stock is, the harder it is to predict with any certainty what the future price of the stock will be. This suggests that analyst forecasts error and dispersion increase with greater volatility in stock return (Jeong 2003). In addition, we control year effect and industry effect by including year dummies and industry dummies in each regression model.

13) See Bhushan (1989); Alford and Berger (1999)

VI. Empirical Results

6.1 Descriptive Statistics

〈Table 1〉 reports descriptive statistics on all the research variables and 〈Table 2〉 for the key research variables by year. For dependent variables, the mean (median) firm-year of analyst following is 15.14 (12) ranging from 1 to 38 analysts. The mean by year of analysts following is relatively stationary as seen in the table 2. The average (median) forecast error and forecast dispersion taken as a form of natural log are -3.45 (-3.51) and -3.65 (-3.71), respectively. For explanatory variables, the average (median) of VD firm-year is 6.5 (6) whereas the average (median) by year is 3.94 (4),

9.74 (8) and 5.95 (6) in 2002, 2003, and 2004, respectively. The mean (median) firm-year number of IR held by firms is 5.11 (4) and the figure for by-year IR ranges from 4.12 to 6.53 (from 3 to 5 for the median).

IR is the frequency of Investor Relations held in a given year. VD is the number of Voluntary Disclosure provided in a given year. ANALYST is the number of analysts providing earnings forecasts for the firm. FORERR is the natural log of the absolute value of the difference between mean forecast and actual EPS deflated by stock price. FORDISP is the natural log of the standard deviation of analysts' forecasts deflated by stock price. FOREIGN is the percentage ownerships held by registered foreign investors. GROWTH is the firm's

〈Table 1〉 Sample Descriptive Statistics

Variable	Number of Observations	Min	Q1 ^a (25%)	Median (50%)	Q3 ^a (75%)	Max	Mean	Standard Deviation
VD	276	1	3	6	10	19	6.54	2.23
IR	169	1	2	4	7	10	5.11	2.42
ANALYST	356	1	7	15	23	38	15.14	9.04
FORERR	348	-6.49	-4.25	-3.51	-2.75	-0.31	-3.45	1.06
FORDISP	320	-5.89	-4.27	-3.71	-3.08	-1.07	-3.65	0.86
FOREIGN	356	0	0	0	0	0.86	0.23	0.18
GROWTH	353	-0.92	0.01	0.09	0.21	2.38	0.15	0.42
LEVERAGE	355	0.09	0.35	0.49	0.63	0.97	0.51	0.21
VOLATILITY	356	0.46	0.61	0.67	0.73	1.12	0.69	0.09
SIZE	355	24.85	26.59	27.95	29.10	32.85	27.97	1.67

two-year sales growth. BETA is the estimated systematic risk of the stock from a market model regression with the monthly returns. LEVERAGE is the debt/asset ratio at the fiscal-year end. VOLATILITY is the standard deviation of the firm's daily stock return against market. SIZE is the natural log of the firm's total asset at the fiscal-year end. ^a Q1 and Q3 are the first and the third quartiles of the distribution, respectively.

〈Table 2〉 Summary Statistics of Key Research Variables by Year

Year 2002								
Variable	Number of Observations	Min	Q1 ^a (25%)	Median(50%)	Q3 ^a (75%)	Max	Mean	Standard Deviation
VD	91	1	2	4	5	6	3.94	1.27
IR	33	1	2	3	5	7	4.12	1.58
ANALYST	105	1	6	15	22	35	15.88	9.57
FORERR	100	-5.71	-3.93	-3.11	-2.45	-0.51	-3.12	1.11
FORDISP	92	-5.77	-4.02	-3.53	-2.81	-1.62	-3.45	0.84
Year 2003								
Variable	Number of Observations	Min	Q1 ^a (25%)	Median(50%)	Q3 ^a (75%)	Max	Mean	Standard Deviation
VD	86	1	4	8	13	19	9.74	3.03
IR	77	1	2	4	7	9	4.68	2.06
ANALYST	134	1	9	17	24	38	16.99	9.32
FORERR	133	-6.49	-4.24	-3.68	-2.93	-0.31	-3.55	1.02
FORDISP	119	-5.89	-4.27	-3.77	-3.06	-1.81	-3.68	0.83
Year 2004								
Variable	Number of Observations	Min	Q1 ^a (25%)	Median(50%)	Q3 ^a (75%)	Max	Mean	Standard Deviation
VD	99	1	3	6	9	11	5.95	2.48
IR	59	1	2	5	8	10	6.53	2.75
ANALYST	117	1	7	13	20	32	13.32	8.04
FORERR	115	-5.98	-4.32	-3.61	-2.89	-1.01	-3.61	1.01
FORDISP	109	-5.79	-4.39	-3.79	-3.28	-1.07	-3.78	0.91

^a Q1 and Q3 are the first and the third quartiles of the distribution, respectively.

6.2 Uni-variate Analysis

The correlation coefficients between the variables are reported in <Table 3>. We use these results to analyze the implicit bivariate relations between the explained and explanatory variables. Analyst following is positively correlated with VD, IR(0.025 and 0.449, respectively). Among control variables, foreign investors and firm size are

significantly positively correlated with analyst following. The correlation coefficient is positive between forecast error and dispersion of analysts' forecasts, consistent with intuition that two variables are indicators for analysts' uncertainty in predicting earnings. For forecast error and dispersion, each of them is significantly positively correlated with Firm' leverage and stock volatility, but significantly negatively

<Table 3> Pearson Correlation Coefficients among Variables

	2	3	4	5	6	7	8	9	10
VD 1	0.098* (0.0651)	0.025* (0.0743)	-0.013 (0.8105)	-0.020 (0.7159)	0.037*** (0.0049)	-0.003 (0.9624)	0.047 (0.3806)	0.015 (0.7829)	0.156*** (0.0035)
IR 2		0.449*** <.0001	-0.197*** <.0001	-0.193*** <.0001	0.386*** <.0001	0.045 (0.4043)	0.137*** (0.0099)	-0.207*** (0.0046)	0.263*** (0.0048)
ANALYST 3			-0.331*** <.0001	-0.327*** <<.0001	0.529*** <.0001	0.075 (0.1627)	0.028 (0.5985)	-0.034 (0.5199)	0.319*** <.0001
FORERR 4				0.726*** <.0001	-0.349*** <.0001	-0.017 (0.7416)	0.259*** <.0001	0.221*** <.0001	-0.032 (0.5459)
FORDISP 5					-0.352*** <.0001	-0.038 (0.5019)	0.232*** <.0001	0.227*** <.0001	-0.019 (0.7226)
FOREIGN 6						0.072 (0.1777)	-0.035 (0.5292)	-0.119** (0.0239)	0.489*** <.0001
GROWTH 7							-0.111** (0.0368)	0.032 (0.554)	0.023 (0.6676)
LEVERAGE 8								0.253*** <.0001	0.439*** <.0001
VOLATILITY 9									0.003 (0.9561)
SIZE 10									

The p-value is reported in parenthesis. Correlation Coefficients significantly different from zero at p-value less than 10% are shown in boldface type.

***, **, * denotes that the t-statistics is statistically significant at the 1, 5, 10 percent levels, respectively.

correlated with foreign investor.

In <Table 4>, we report the results from two group t-statistics by dividing the sample; company is classified as VD_High (IR_High) if firm's VD(IR) is above the average VD(IR) for all firms in a given year and, otherwise, as VD_Low(IR_Low). Average number of analyst following significantly differs between two groups for both VD and

IR at the 1% significance level. Difference in the average analyst following under IR category is particularly significant with t-value at 11.98, suggesting that firms often differentiate themselves from others in aspect of analyst following by scheduling greater number of investor relation than the average. Similarly, differences in average Forecast error and dispersion under IR

<Table 4> Uni-variate T-test Analysis of ANALYST, FORERR and FORDISP by Voluntary Disclosure Level

Panel A. Comparison of VD_High Company versus VD_Low Company

Variable	Group	Number of Observations	Mean	Difference	t-statistics
ANALYST	VD_High ¹	124	15.87	2.09	3.42***
	VD_Low ¹	152	13.78		
FORERR	VD_High	122	-3.78	-0.24	-2.06**
	VD_Low	147	-3.54		
FORDISP	VD_High	115	-3.93	-0.28	-1.67*
	VD_Low	129	-3.64		

Panel B. Comparison of IR_High Company versus IR_Low Company

Variable	Group	Number of Observations	Mean	Difference	t-statistics
ANALYST	IR_High ²	79	23.73	7.22	11.98***
	IR_Low ²	90	16.51		
FORERR	IR_High	75	-3.95	-0.33	-2.87***
	IR_Low	91	-3.62		
FORDISP	IR_High	72	-4.08	-0.37	-3.08***
	IR_Low	83	-3.71		

1: Company is classified as VD_High if firm's VD is above the mean VD for all firms in a given year and VD_Low otherwise.

2: Company is classified as IR_High if firm's IR is above the mean IR for all firms in a given year and IR_Low otherwise.

Statistically significant t-statistics less than 10% are in boldface type. For variable definitions, see Table 1.

***, **, * denotes that the t-statistics is statistically significant at the 1, 5, 10 percent levels, respectively.

category are significant at the 1% significance level and to lesser degree those under VD are also significantly different. The uni-variate analysis has some drawbacks specially when not analyzing all of the data simultaneously, often misleading in a multi-variate world. In the next section, we present results of multi-variate tests.

6.3 Multi-variate Regression Results

(Table 5) presents the results from testing

the hypothesis(H1) that the frequency of voluntary disclosure is positively associated with the number of analyst following. Voluntary disclosure variables, VD(model 1) and IR(model 2), are positively associated with analyst following at the 1% significance level. Consistent with prior studies(Lang and Lundholm 1996; Francis et al. 1998), our results suggest that firms with a greater level of informativeness attract more analysts to study them. This fact, as discussed in section 3, implies that voluntary

(Table 5) Effect of Voluntary Disclosure on the Number of Analysts Following

$$\text{Model 1: ANALYST}_t = a + b1 \text{VD}_t + b2 \text{FOREIGN}_t + b3 \text{GROWTH}_t + b4 \text{LEVERAGE}_t + b5 \text{SIZE}_t + \text{Year Dummies} + \text{Industry Dummies} + e$$

$$\text{Model 2: ANALYST}_t = a + b1 \text{IR}_t + b2 \text{FOREIGN}_t + b3 \text{GROWTH}_t + b4 \text{LEVERAGE}_t + b5 \text{SIZE}_t + \text{Year Dummies} + \text{Industry Dummies} + e$$

	ANALYST _t				
	Predicted Sign	Model 1		Model 2	
		Estimates	t-statistics	Estimates	t-statistics
Intercept		-67.96***	(-8.44)	-58.46***	(-7.27)
VD _t	+	0.17***	(2.73)		
IR _t	+			0.89***	(4.89)
FOREIGN _t	+	15.35***	(6.63)	13.97***	(6.19)
GROWTH _t	+	1.58**	(2.03)	1.57**	(1.98)
LEVERAGE _t	-	-3.64	(-1.31)	-3.59	(-1.57)
SIZE _t	+	2.78***	(8.97)	2.41***	(7.8)
Year Dummies			Yes		Yes
Industry Dummies			Yes		Yes
Adjusted R-Square			0.553		0.581
Number of Observations			276		169

Statistically significant parameter estimates are shown in boldface type.

***, **, * denotes that the t-statistics is statistically significant at the 1, 5, 10 percent levels, respectively.

disclosure is positively associated with the demand for analyst services that drives the number of analyst followings to increase, and is more complement of analyst reports, rather than substitute. As expected, the coefficients on foreign investors, firm size, and sales growth are positive and significant, providing evidence that analysts prefer to follow larger firms and firms with more foreign investors' stakes and growth potential.

〈Table 6〉 presents the results for whether voluntary disclosure reduces analysts' earnings forecasts error(H2). As expected, the estimated

coefficients on VD(model 1) and IR(model 2) are negatively significant with p-value at 10% and 5%, respectively. When the analyst forecast error is used for a proxy for uncertainty in forecasting earnings, the results suggest that voluntary disclosure is positively related with accuracy of analyst earnings forecasts. The problem of uncertainty in forecasting activities may arise either from inherent characteristics that even inside firm cannot avoid or information asymmetry that exists between firms and market. If limited to the later case, we suggest that voluntary

〈Table 6〉 Effect of Voluntary Disclosure on Analysts' Forecast Error

$$\text{Model 1: FORERR}_t = a + b1 \text{VD}_t + b2 \text{FOREIGN}_t + b3 \text{LEVERAGE}_t + b4 \text{VOLATILITY}_t + b5 \text{SIZE}_t + \text{Year Dummies} + \text{Industry Dummies} + e$$

$$\text{Model 2: FORERR}_t = a + b1 \text{IR}_t + b2 \text{FOREIGN}_t + b3 \text{LEVERAGE}_t + b4 \text{VOLATILITY}_t + b5 \text{SIZE}_t + \text{Year Dummies} + \text{Industry Dummies} + e$$

	FORERRt				
	Predicted Sign	Model 1		Model 2	
		Estimates	t-statistics	Estimates	t-statistics
Intercept		-3.27***	(-2.69)	-3.65***	(-2.70)
VDt	-	-0.07**	(-2.51)		
IRt	-			-0.04***	(-2.87)
FOREIGNt	-	-1.74***	(-4.88)	-1.68***	(-4.67)
LEVERAGEt	+	0.83*	(1.71)	0.91*	(1.87)
VOLATILITYt	+	0.89	(1.35)	0.84	(1.27)
SIZEt	-	-0.04	(-0.97)	-0.02	(-1.13)
Year Dummies			Yes		Yes
Industry Dummies			Yes		Yes
Adjusted R-Square			0.248		0.252
Number of Observations			269		166

Statistically significant parameter estimates are shown in boldface type.

***, **, * denotes that the t-statistics is statistically significant at the 1, 5, 10 percent levels, respectively.

disclosure contribute to a reduction in information asymmetry between firm and outside market participants.

Analysts' forecast error is significantly negatively related to the level of foreign investor ownership at the p-value less than 0.01 and is significantly and positively related to the leverage at the p-value less than 0.10. Consistent with a prior study, our results indicate that foreign investors generally play a role of monitoring for the analysts who cover the firm they invest in as well as the firm itself. Under the pressure of such as litigation threats, analysts devote themselves to accuracy of analyst forecasts. For the leverage, our result suggests that greater leverage heightens the uncertainty that exists in firm's future cash flow only to make analysts hard to forecast future earnings. However, neither stock volatility nor firm size is found to be significantly associated with analyst' forecast error, even though they both show strong correlation with forecast error in uni-variate analysis. This means that the explanatory variables other than those two included in the regression capture the effect on analysts' forecast errors. Overall, the results support our second hypothesis that analysts' forecast

error decreases with the frequency of IR held by firms and the level of VD.

〈Table 7〉 presents the evidence on H3 testing for the association between the frequency of voluntary disclosure and analysts' forecast dispersion. As hypothesis, the estimated coefficients on VD and IR in all models are negatively related to analysts' forecast dispersion at the p-value less than 0.05. The results suggest that voluntary disclosure is negatively related to the divergence of analysts' beliefs on information obtained either by publicly or privately. Homogeneous belief in public information means that information is more likely to be interpreted as intended by managers. Furthermore, it implies that analysts perceive additional information, in a same way across analysts, as precise and relevant to their forecasting. Among control variables, the coefficient only on foreign investors' ownership is significant with negative sign. Legal treats, analyst reputation or low ability to predict may be the factors to lead to a situation in which a group of analysts react coherently, namely, herding behavior among financial analysts.¹⁴⁾ However the issue on the factors to drive herding and herding behavior is beyond our research.

14) Herding behavior is applied in the field of finance to describe some kinds of human phenomena such as stock market bubble. Several researches attempt to empirically examine herding among analysts. Graham(1999) presents evidence concerning herding in that the analysts in high reputation and low ability groups are more likely to follow Value Line. Welch(2000) and Scharfstein & Stein(1990) suggest that analyst herding does not base on fundamental information.

〈Table 7〉 Effect of Voluntary Disclosure on Analysts' Forecast Dispersion

Model 1: $FORDISPt = a + b1 VD_t + b2 FOREIGN_t + b3 LEVERAGE_t + b4 VOLATILITY_t + b5 SIZE_t + \text{Year Dummies} + \text{Industry Dummies} + e$
 Model 2: $FORDISPt = a + b1 IR_t + b2 FOREIGN_t + b3 LEVERAGE_t + b4 VOLATILITY_t + b5 SIZE_t + \text{Year Dummies} + \text{Industry Dummies} + e$

	FORDISPt				
	Predicted Sign	Model 1		Model 2	
		Estimates	t-statistics	Estimates	t-statistics
Intercept		-4.09***	(-3.55)	-4.33***	(-3.71)
VDt	-	-0.01**	(-2.29)		
IRt	-			-0.03**	(-2.05)
FOREIGNt	-	-1.77***	(-5.79)	-1.73***	(-5.64)
LEVERAGEt	+	0.44	(1.49)	0.47	(1.58)
VOLATILITYt	+	0.56	(0.96)	0.47	(0.81)
SIZEt	-	-0.01	(-0.28)	0.02	(0.52)
Year Dummies			Yes		Yes
Industry Dummies			Yes		Yes
Adjusted R-Square			0.251		0.254
Number of Observations			244		155

Statistically significant parameter estimates are shown in boldface type.

***, **, * denotes that the t-statistics is statistically significant at the 1, 5, 10 percent levels, respectively.

6.4 Additional Test of Lead and Lag Effect between Analyst Following and Voluntary Disclosure

For the first hypothesis, our cross-sectional analysis bases on the assumption that the direction of causality is from voluntary disclosure to analyst following. In the situation where leading variable is correlated with the value of lading variable at later time, a simple cross-firm analysis may mislead the causal relations. Therefore, in

additional analysis, we examine the association between voluntary disclosure and number of analysts in the lead and lag analyst following. This approach provides limited evidence of the direction of causality.

Consistent with ones presented in table 6(H1), in 〈Table 8〉, panel A the results of regressions of the number of analysts at current year starting from 2002 on the voluntary disclosures during previous year starting from 2001 shows significant positive association between lagged level of voluntary

disclosure and lead analyst following.¹⁵⁾ This indicates that analysts are more likely to follow the firms that have been known to disseminate more information during previous year. Financial analysts perceive frequent

disseminating of information by a firm during the previous year as the signal of more forthcoming disclosure during current year. <Table 8>, panel B presents the results of regression of voluntary disclosure during

<Table 8> Causality Analysis: Time-lag Effect

Panel A. Effect of Voluntary Disclosure on the Number of Analysts

	ANALYST _t				
	Predicted Sign	Model 1		Model 2	
		Estimates	t-statistics	Estimates	t-statistics
Intercept		-60.95***	(-6.24)	-55.88***	(-5.77)
VD _{t-1}	+	0.26**	(2.14)		
IR _{t-1}	+			1.01***	(3.52)
FOREIGN _t	+	15.24***	(5.55)	13.57***	(4.96)
GROWTH _t	+	2.31***	(3.19)	2.41***	(2.86)
LEVERAGE _t	-	-2.47	(-0.98)	-2.61	(-1.03)
SIZE _t	+	2.48***	(6.59)	2.31***	(6.22)
Year Dummies			Yes		Yes
Industry Dummies			Yes		Yes
Adjusted R-Square			0.542		0.563
Number of Observations			268		162

Panel B. Effect of the Number of Analysts on Voluntary Disclosure

	Predicted Sign	VD _t		IR _t	
		Estimates	t-statistics	Estimates	t-statistics
	Intercept		-8.32**	(-2.02)	-5.27**
ANALYST _{t-1}	+	0.09***	(3.16)	0.12***	(3.44)
FOREIGN _t	+	0.42**	(2.09)	0.39***	(3.36)
SIZE _t	+	0.27***	(4.11)	0.24***	(3.75)
Year Dummies			Yes		Yes
Industry Dummies			Yes		Yes
Adjusted R-Square			0.183		0.312
Number of Observations			274		165

Statistically significant parameter estimates are shown in boldface type.

***, **, * denotes that the t-statistics is statistically significant at the 1, 5, 10 percent levels, respectively.

15) Firms with voluntary disclosure and analyst following for consecutive two years starting from 2001 to 2004 are included for the lead-lag regressions.

current year starting from 2002 on the lagged number of analysts at previous year from 2001. The coefficients on lagged analyst following are significantly positive in both lead VD and IR. From the standpoint of firms, this result implies that if firms observe the number of analysts less than what they expected, they take up a strategic position to increase voluntary disclosure to attract more analysts to study them in subsequent year based thereon. Therefore, firms may influence on the analyst following by utilizing the level of voluntary disclosure. Our results, on analyst part, provide limited evidence that analysts put pressure on firms to release inside information to the public. Overall, these results support the first hypothesis in that the level of voluntary disclosure has influence on analyst decision on which firms analysts follow. However we do not exclude the possibility that causality runs in the opposite direction. For further analysis, we investigate whether frequency for voluntary disclosure is endogenous by the pressure of analyst to release of firm's private information. The results from two-stage least-squares(2SLS) suggest that the multiple decision setting exists between analyst and manager in their decision

making process.¹⁶⁾

VII. Conclusion

This paper examines how voluntary disclosure is associated with the number of analyst following and analysts' earnings forecast characteristics. Given the explosive growth in the use of IR and voluntary disclosure, our findings suggest that the corporate disclosure policy influences the capital market though analysts' intermediary role in the capital market.

Our results indicate that analysts are more attracted to firms that provide greater level of voluntary disclosure. This implies that there is an increase in the demand for analyst services and voluntary disclosure is perceived as complement for analyst report, rather than substitute. Our finding complements prior research that, however, utilizes different measure of voluntary disclosure, such as analysts rating of disclosure policy and other information voluntarily disclosed in annual reports. Our results are robust to the lead and lag effect between analyst following and voluntary disclosure

16) Although not presented by table, we also test to find the causality relations between analyst following and voluntary disclosure using two-stage least-squares method(2SLS). In the analyst following equations, the 2SLS coefficients on VD and IR are significantly positive, consistent with significantly positive relation estimated by OLS. Likewise, in the voluntary disclosure equations, the 2SLS coefficients on analyst following are significantly positive. Collectively, our results indicate that analyst following and voluntary disclosures are determined simultaneously with positive direction.

in that the level of voluntary disclosure in previous year is positively related to analyst following in subsequent year.

Negative association between the frequency of voluntary disclosure and analysts' forecasts error indicates that more frequent voluntary disclosures lowers analysts' forecast error by reducing uncertainty in analysts' earnings forecast. Voluntary disclosure as communication tool of manager to the capital market is perceived as useful information by financial analysts, so that they improve the accuracy of forecasted earnings and, thus, become better information intermediary. Also, the finding that the increased level of voluntary disclosure reduces the dispersion of forecasted earnings suggests that voluntary disclosure plays a role in reducing information asymmetry among analysts. This indicates analyst behavior of homogeneous belief in increased shared information.

Although the content and quality of information under voluntary disclosure are beyond of scope of our research, the empirical result that voluntary disclosure reduces analysts' earnings forecasts error gives insight into the credibility and validity of information. Therefore, further research can examine the credibility and validity of voluntarily disclosed information.

References

- Ahn, Y. Y, H. H. Shin, and J. H. Chang. 2005. The relationship between the foreign investor and information asymmetry. *Korean Accounting Review* 30(4):109-131
- Alford A. W. and P.G. Berger. 1999. A simultaneous equations analysis of forecast accuracy, analyst following, and trading volume, *Journal of Accounting, Auditing, and Finance* 14: 219-240.
- Atiase, R. 1980. Predisclosure Informational Symmetries, Firm Capitalization, Financial Reports, and Security Price Behavior. *Ph.D. dissertation, University of California-Berkeley, June.*
- Barry, C., and S. Brown. 1985. Differential information and security market equilibrium. *Journal of Financial and Quantitative Analysis*(December): 407-422
- Barron, O.E., O. Kim, S. Lim, and E.S. Douglas. 1998. Using analysts' forecasts to measure properties of analysts' information environment. *The Accounting Review* 73: 421
- Bhusan, R. 1989. Firm Characteristics and analyst following. *Journal of Accounting and Economics* 11: 255-274.
- Botosan, C. A. 1997. Disclosure Level and the Cost of Equity Capital. *The Accounting Review* 72: 323-49.
- Botosan, C. and M. Harris. 2000. Motivations for a Change in Disclosure Frequency and Its Consequences: An Examination of Voluntary Quarterly Segment Disclosures. *Journal of Accounting Research* 38, No.2:329-353.

- Diamond Douglas W., 1985. Optimal Release of Information By Firms. *The Journal of Finance*, Vol. 40, No. 4.(September): 1071-1094.
- Francis, J., J. Hanna, and D. Philbrick. 1998. Management communications with securities analysts. *Journal of Accounting and Economics* 24: 363-394.
- Graham, J.R. 1999. Herding among investment newsletters: theory and evidence. *Journal of Finance* 54(1): 237-268.
- Hope, O. K. 2003 Accounting Policy Disclosures and Analysts' Forecasts. *Contemporary Accounting Research*, Vol. 20(2):295-321.
- Jeong, S. W. 2003. Factors Associated with Analyst Following and Forecast Characteristics. *Korean Accounting Review* 28(4): 61-84
- Kim, J. H, H. H. Shin, and J. H. Chang. 2003 Determinants of analysts following: Using the IBES database. *Korean Accounting Review*28(3): 31-54
- Kross, W., B. Ro, and D. Schroeder. 1990. Earnings Expectations: The Analysts' information Advantage. *The Accounting Review* 65, No. 2: 461-476
- Lang, M. and R. Lundholm. 1996. Corporate disclosure policy and analyst behavior. *The Accounting Review* 71: 467-492.
- McNichols, M. and P. C. O'Brien. 1997. Self Selection and Analyst Coverage, *Journal of Accounting Research* 35: 167-199.
- Merton, R. 1987. A simple model of capital market equilibrium with incomplete information. *Journal of Finance* 42: 483-510.
- O'Brien P. C. and R. Bhushan. 1990. Analyst following and institutional ownership, *Journal of Accounting Research* 28: 55-76.
- Piotroski, J. 2000. Value investing: the use of historical financial statement information to separate winners from losers. *Journal of Accounting Research* 38, Supplement:1-41.
- Rogers, R.K and J. Grant. 1997. Content analysis of information cited in reports of sell-side financial analysts. *Journal of financial Statement Analysis*, Vol. 3. No.1: 17-30.
- Scharfstein, D.S., and J.C. Stein.1990. Herd behavior and investment. *American Economic Review* 80(3): 465-479.
- Tasker, S., 1998. Bridging the information gap: quarterly conference calls as a medium for voluntary disclosure. *Review of Accounting Studies* 3: 137-167.
- Waymire, G. 1984. Additional evidence on the information content of management earnings forecasts. *Journal of Accounting Research* 22: 703-719.
- Welch, Ivo. 2000. Herding among security analysts. *Journal of financial Economics* Vol. 58(3): 369-396.

Voluntary Disclosure, Analyst Following, Forecast Accuracy and Dispersion: Evidence From Korea

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Abstract

Financial analysts are the most important information intermediaries between firms and investors. They collect enormous information from firms and disseminate this information to current and prospective investors and finally contribute to lessening information asymmetry between firms and investors. Representing their pivotal role in the financial market, many researches on financial analysts' forecast activity have been conducted so far. And there are two main streams of financial analyst related researches, first research is on the determinants of analyst following and second research is on the determinants of forecast accuracy. Most of the empirical research on the determinants of analyst following and forecast accuracy focuses on firm or analyst characteristics other than disclosure policy. We do focus on voluntary disclosure among various disclosure types for two primary reasons. First the importance of voluntary disclosure is increased as the pace of change in the business environment is accelerated. Many leading companies disclose voluntarily an extensive amount of business information recently. Second although voluntary disclosure is expected to change firm's information environment and contribute to a reduction in information asymmetry, few papers consider the relations between firm's voluntary disclosure and analysts' forecast behavior. So we linked the level of voluntary disclosure to analyst following and forecast accuracy and dispersion which representing the two main streams of the extant literature.

Using data from Fn-Guide Database, this paper is conducted to examine the relations between the disclosure practices of firms, the number of analyst following a firm and analysts' forecast activities: forecast accuracy and dispersion. In this paper, the definition of voluntary

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disclosure is comprised of two disclosure types. One is investor relations(IR) and the other is narrow voluntary disclosure(VD) called in Korean 'ja-jin gongsi'. So we separated two categories under the broad voluntary disclosure concept and IR and VD are separately included in regression models, respectively.

While the first focus of this study is to examine the effect of voluntary disclosure level on the number of analyst following, we also consider the simultaneous and endogenous relation between voluntary disclosure and analyst following. Although more voluntary disclosure causes analysts to follow a firm, it is also possible that the direction of causality is the opposite: that is larger analyst following can cause the firm to increase its disclosure level. We investigate the direction of causality whether there exists in the time-lag effect between the leading(current period) dependent variable and the lagging(prior period) independent variable. The likely relation between voluntary disclosure and forecast accuracy and dispersion is more clear than the relation between voluntary disclosure and analyst following. Based on prior research's general results, financial analysts' error and dispersion will decrease with the increase of firm's disclosure level. Because more frequent voluntary disclosure reduces analysts' uncertainty in forecasting earnings and contributes to lessening information asymmetry between firm and analysts. So the reduction of information asymmetry by frequent voluntary disclosure leads to decrease in analysts' forecast error and forecast dispersion.

We find several interesting results. First we provide evidence that firms with more frequent voluntary disclosure have a larger analyst following and concurrently larger analyst following causes the firm to increase the number of voluntary disclosure level. It means that firm's additional disclosure policy is not a substitute for analyst forecast services but a complement. And also this result indicates that there exist simultaneous relation between the number of voluntary disclosure and the number of analyst following.

Second we find that more frequent voluntary disclosure increase forecast accuracy: lower forecast error and decrease forecast dispersion. This result implies that increased level of voluntary disclosure contribute to lessening information asymmetry between firms and analysts. It can be inferred that investors can have more accurate beliefs about firm's future performance in forecasting firms with more frequent voluntary disclosure. The behavior of analysts captures that of investors, these results have implications for management, as it sets disclosure policy.

Taken as a whole, our findings suggest that the level of voluntary disclosure is an important determinant of analyst following and forecast accuracy and dispersion.

Key words: Voluntary Disclosure, Analyst Following, Forecast Accuracy, Forecast Dispersion