How Do Quarterly Earnings Announcements Affect Analyst Forecasts?*

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This paper examines the effect of quarterly earnings announcements on analysts' forecast revisions and their accuracy. In 2000, new regulation of the financial markets in Korea began requiring firms to disclosure quarterly accounting reports. If quarterly earnings announcements provide additional information and analysts use those information to form their new forecast, there should be difference in forecast properties around earnings announcements. Empirical results show a significant increase in the number of analyst forecast revisions following the earnings announcements. Results also show that forecasts issued immediately after the earnings announcement are revised by large magnitude and are more accurate. However, revisions issued relatively long after earnings announcements have indifferent forecast accuracy from forecast revisions immediately after the announcements. These results suggest that quarterly announcements provide predictive information about future earnings, and new information contained in earnings announcements are more likely reflected by those forecast issued immediately after earnings announcements.

Key words: analyst forecast, forecast revision, forecast accuracy, forecast timing, earnings predictability, information content, quarterly earnings announcement, quarterly earnings

Ⅰ. Introduction

As prominent information intermediaries in capital markets, analysts engage in private information search, perform prospective analysis aimed at forecasting a firm's future earnings and cash flows, and conduct retrospective analysis that interprets past events (Schipper 1991; Beaver 1998; Lee 1999). Especially, analyst forecast revisions are important mechanism to disseminate firm information to the market (Healy and Palepu 2001). Regulators and other market participants view analysts' activities as enhancing the informational efficiency of security prices. The purpose of this study is to better understand the role of Korean analysts as information intermediaries in Korean capital market by investigating how analysts react

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to firm quarterly firm financial reporting.

The objective of this study is to investigate the role of analysts as information intermediaries in Korean capital market with recent regulation change on firm disclosures in Korea. Effective from 2000, the new regulation of quarterly and semi-annual financial disclosure imposed by the Korean Securities and Exchange Commission (KSEC) requires firms to provide quarterly financial statements to investors. Analysts are sophisticated investors and dominant accounting information users (Schipper 1991). They are skilled at analyzing and interpreting firm accounting information (Kandel and Pearson 1995; Barron et al. 2002a; Barron, Byard, and Kim 2002b). Analysts' forecast revisions are important mechanism that analysts interpret firm disclosures and disseminate new information to capital market (Brown 1985; Lee 1999). Understanding the role of analysts in capital is important issue for better understanding of complicated market process to form price, and for this reason, researchers show great interest to the effect of earnings announcement on analyst forecast revisions (Stickel 1989; Brown and Han 1992; Barron et al. 2002b; Ivković and Jegadeesh 2004). Surprisingly, however, there is little empirical evidence whether and how Korean analysts use firm disclosures and incorporate them into their forecasts. This study attempts to fill these research gaps by examining how quarterly accounting earnings affect analyst forecast revision frequency and forecast accuracy.

This study investigates whether and how quarterly firm disclosures affect analyst forecasts by examining analyst forecast revisions around earnings announcements. If quarterly financial reports provide useful information about future event of interest such as firm value, future cash flows, and future earnings, and if analysts will use those disclosures in forming their new beliefs and incorporate new information into their new forecasts, it is expected that analysts are more likely to revise their forecasts immediately after earnings announcements, and their forecasts should have higher forecast accuracy than forecasts issued prior to the announcements.

This study first examines the frequency of analyst forecasts around quarterly earnings announcements, using 17,256 firm-analyst observations obtained listed in *FnGuide* Consensus tape from 2002 to 2006. Quarterly earnings announcement dates are hand-collected from Korean Exchange Electronic Disclosure System. I divide analyst forecasts timing into three periods: pre-announcement (days -45 to -1 relative to a quarterly earnings announcement day), announcement (days 0 to 3), and post-announcement (days 4 to 45). Analysts can select forecast timing after earnings announcement either during announcement period or during post-announcement

period. Some theories like herding predict that analysts select forecast timing for certain purpose (Trueman 1994; Graham 1999), which could lead to different properties of analysts' forecasts. This research design is different from previous studies as those studies compare forecasts between pre- and post-announcement periods only with assumption that analyst forecasts are homogenous in post-announcement period (Brown and Han 1992; Barron 1995; Barron et al. 2002b). Thus, I empirically examine whether properties of analyst forecasts are different across with forecast timing.

The empirical results in this study show a significant increase in analyst forecast frequency immediately following the announcement. In my empirical results, about 20% of analyst forecasts are issued within the four days after quarterly earnings announcement date, while about 1% of analyst forecasts are issued on other days. This high peak of forecast issuance immediately after earnings announcement dates suggests that analysts heavily use firm disclosures to revise their forecasts. This implies that interim accounting reports are important information sources to analysts and trigger revision activities.

Then, I examine how quarterly earnings announcements affects properties of analyst forecasts such as the magnitude of forecast revisions and the forecast errors. Analyst forecasts issued prior to earnings announcements do not include information from earnings announcement, while forecasts issued after earnings announcements are more likely affected by new information contained in the announcements (Schipper 1991; Ivković and Jegadeesh 2004). Post-announcement forecasts are further divided into two: forecasts issued immediately after (announcement period) and relatively long after earnings announcements (post-announcement period). I find a larger magnitude of forecast revisions and higher forecast accuracy in the announcement period than in the pre-announcement period. These results suggest that earnings announcements significantly change analysts' beliefs about future earnings and improve their forecast precision, confirming the information content of quarterly earnings announcements. On the other hand, there is little difference in forecast accuracy between announcement and post-announcement periods, implying that incremental information from forecasts in post-announcement periods is small relative to those in announcement periods. In other words, new information from quarterly earnings announcements are more likely to be disseminated by forecast revisions in announcement periods rather than forecasts in post-announcements.

This study contributes to prior literature in several ways. First, my study provides evidence on analysts' role information intermediaries in Korean capital market. My evidence shows

that analysts' forecast revisions are concentrated on days of earnings announcements. This implies that analysts actively use firm disclosure information to revise their forecast, suggesting analysts play the role of information intermediaries. My findings also have implications for studies documenting greater accuracy of analyst forecast over the accuracy of time-series earnings forecast (Youn and Huh 1991; Lee and Jang 1992; Sohn 1995; Kim 1998; Park 2004; Lee and Li 2006). Kim (1998) insists that the greater accuracy of analyst forecasts over that of the random walk model is mainly due to timing advantage. There is no evidence about analysts' timing advantage in Korea. The strong association between announcements and revisions implies that analysts incorporate new information from announcements, which imparts an informational advantage to analysts that is not incorporated or utilized in the time-series model.

Second, my results provide evidence on effectiveness of quarterly financial disclosures. Up to my knowledge, my study is the first to use event study research design to examine directly whether quarterly earnings announcements have information content in Korean capital market. Only since 2000 have Korean companies been required to disclose quarterly earnings reports, so only a few studies regarding quarterly announcement information content exist. Using daily stock return volatility and trading volume turnover in 1999 and 2000, Cho and Jo (2006) find a decrease in stock volatility and an increase in trading volume turnover after implementation of the new regulation requiring quarterly disclosure. Cho and Jo conclude that quarterly reports reduce information asymmetry. Kim and Sohn (2006) examine whether auditor review of quarterly financial reports affect value relevance of quarterly earnings and find higher value relevance of quarterly earnings that are reviewed by auditors. My study provides more direct evidence whether quarterly financial reports are used by investors and provide incremental information to the market. Using disclosure date from Korea Investor Network for Disclosure System, I collect earnings announcement event day. My empirical evidence clearly shows a significant change in forecast frequency, implying that event days are well controlled, and can provide more direct evidence on information content of quarterly earnings reports.

Third, my empirical evidence provides deeper insights to empirical results found by prior studies. Regarding analyst forecast revisions after earnings announcements, prior studies implicitly assume that post-announcement forecast revisions have homogeneous properties regardless forecast timing (Barron 1995; Bamber, Barron, and Stober 1997; Bamber, Barron, and Stober 1999;

Barron et al. 2002b). My empirical study shows that this assumption is not necessarily hold. The uniqueness of this study is to divide post-announcement period into two: announcement and post-announcement period. Analysts who want to revise their forecast after observing earnings announcement can issue forecast either in announcement period or post-announcement period. Different analysts' forecast timing can be attributed to various reasons such as analysts' personal reasons (laziness, vacation) or analysts opportunistic behaviors such as herding (Trueman 1994; Graham 1999) or information cascade (Bikhchandani and Sharma 2001). I conjecture that different motivation regarding forecast timing will results in different properties of analyst forecasts. My evidence confirms my conjecture that a significant improvement in forecast revisions is made by forecasts issued with four days following earnings announcements, and following forecasts has little incremental information. I do not attempt to explain the reasons for this smaller information content of forecast revisions in post-announcement. Instead, I provide potential explanation such as information cascade that start from information shock from the announcement (Welch 1992; Bikhchandani and Sharma 2001). Further investigation of this possibility will be meaningful future research works.

Finally, my empirical evidence helps future studies that use analyst forecast as proxy for market expectation in their research design. Data on analyst forecast revision timing suggest that using forecasts issued prior to earnings announcements can lead to the stale forecast problem. I find a statistically significant increase in forecast accuracy after quarterly earnings announcements, implying that analyst forecasts produced following firm disclosure are better proxies for market expectations.

The remainder of this paper is organized as follows. Section 2 develops the hypotheses, and Section 3 specifies the regression models I use to test them. In Section 4, I describe the data and sample firms, with Section 5 presenting the findings. Section 6 provides a summary and conclusions.

Ⅱ. Literature Review and Hypothesis Development

Researchers show great interest to analysts because analysts are important and dominant information intermediaries in the capital market. Analysts collect and process information from firms and generate new information to the capital market. Analysts are in frequent contact with the management of corporations in an effort to confirm information or obtain new information. Such

analysts' activities are believed to improve richness of information environment surrounding a firm by speeding up the dissemination of firm disclosure to market (Stickel 1989; Hong, Lim, and Stein 2000; Elgers, Lo, and Pfeiffer 2001) or improving market liquidity (Givoly and Lakonishok 1979, 1980; Lang and Lundholm 1996; Irvine 2000).

Analyst forecast revisions are an important mechanism for disseminating new information from corporate management to investors (Healy and Palepu 2001). Especially, analyst forecast revision around earnings announcements are important to researchers and practitioners because such forecast revision behaviors can show unobservable individual's belief change and the mechanism that public information is disseminated to the market (Schipper 1991). Prior evidence suggests that quarterly firm disclosures are important information sources for predicting future earnings (Brown and Rozeff 1979a; 1979b; Hopwood and Newbold 1982) and analysts actively incorporate new information from firm disclosures into their forecasts (Stickel 1989; Ivković and Jegadeesh 2004). Brown and Han (1992) examine how earnings announcements affect forecast convergence using a measure of the change in analyst forecast dispersion. Using empirical proxies of information precision developed by Barron et al. (1998), Barron et al. (2002b) find that the precision of analysts' private information increases more quickly than the increase in the precision of analysts' public information.

Surprisingly, there is little evidence on how public firm disclosures affect analysts' forecasts in Korea. Especially, there is no evidence how analysts disseminate firm disclosures to the market as information intermediaries, even though analysts are believed to improve information efficiency in the capital market. The lack of research on this issue arise from lack of database for analyst forecast, unclear earnings announcement date, and different disclosure requirements in Korea. Recently, Korean regulators required companies listed in Korean capital market to disclose quarterly financial statements since 2000. The purpose of this new regulation is to help investors and other information users make better economic decisions through provision of timely and increased disclosure. In addition, firms are required to report any material disclosures such as quarterly earnings to Korean Exchange Electronic Disclosure System. These new requirements of quarterly financial disclosures and announcement date enable me to test more directly the information flow from firms to analysts and to capital market.

In the test of the effect of quarterly firm disclosures on analyst forecasts, the information content of quarterly disclosures is important condition for analyst to react to interim reports. However, research regarding

information content of quarterly firm disclosures is in early stage and evidence is very limited. Cho and Jo (2006) compare daily stock return volatility and trading volume turnover prior to and following implementation of the regulations pertaining to quarterly disclosure that were implemented in 2000. They find a decrease in stock volatility and an increase in trading volume turnover following regulation implementation and conclude that quarterly reports reduce information asymmetry. As further evidence of the information content of the quarterly announcements, Lee and Yook (2004) find that market reaction to semi-annual earnings announcements decreases following implementation of the regulation. These studies, however, do not provide direct evidence whether quarterly earnings announcements have information content and how they are used by investors.

This study attempts to fill these research gaps by using event study of the effect of quarterly earnings announcement on analyst forecasts. Because there is no prior study about information content of quarterly firm disclosure, my study is a joint test of the information content of quarterly earnings announcements and the role of analysts as information intermediaries in capital market. This study address two research questions: do analysts react to firm disclosures, and how properties of analyst forecasts are affected by quarterly firm disclosures.

The first my research question is about analysts' forecast timing decision around quarterly firm disclosures. There are several reasons for analysts to issue forecast after observing firm disclosures. First, as information intermediaries, analysts have incentive to revise their forecast in order to interpret firm disclosures (Barron 1995; Barron et al. 2002b). If quarterly accounting reports send noisy signal about future cash flows or earnings, there will be higher demand for the interpretation of firm disclosures by investors. This will gives analysts incentives to issue forecast for the interpretation of firm disclosures. Second, analysts also have incentives to revise their forecast to improve their forecast accuracy as forecast accuracy is an important determinant in analyst career success. Hong et al. (2000) show that analysts with low forecast accuracy are more likely to experience job termination. Stickel (1992) finds that analysts with higher forecast accuracy are more likely to be selected as *All-Star* analysts by *Institutional Investors*. Consequently, analysts have strong incentives to improve their forecast accuracy. Therefore, if quarterly earnings provide useful new information about future earnings, it will lead analysts to revise their forecast in order to improve their forecast accuracy by incorporating new information from the firm disclosures. This will lead analysts to issue

forecast after observing quarterly earnings announcements, as a result, higher analyst forecast activities are expected immediately after earnings announcement.

It is important to note that this research question is important and necessary although the empirical results may not be surprising. Without evidence of analysts' reaction to firm disclosures, it is very difficulty whether changes in properties of analyst forecasts are attributed to firm disclosures or analysts' private information production. My study more carefully controls for the effect of earnings announcement on analyst by adopting event study design (will be explained in the next section). In addition, as there is no study about analyst forecast revision behaviors around earnings announcements in Korea. The evidence of analyst forecast revision behaviors is meaningful for the better understand of Korean analysts as well as for future research works.

The second research question is related to how quarterly earnings announcements affect properties of analyst forecasts. If quarterly earnings announcements contain significant information and if analysts incorporate the new information into their revised forecasts, then new information from earnings announcements will be incorporated into the revised forecasts. Analysts' incorporation of new information will result in different properties of forecasts in forecasts during announcement such as magnitude of revision and the forecast accuracy. However, the magnitude of forecast revision and accuracy relative to non-announcement period depends on informativeness of the quarterly earnings announcement relative to that of private information obtained by the analyst in non-announcement period. Barron et al. (1998) suggests that precise public information will cause analysts to rely more (less) on public (private) information, so the magnitude of forecast revision will be positively associated with the amount of new information contained in the earnings announcement. Therefore, if the information content of public information is greater than that of the analyst's private information collected during non-announcement periods, then magnitude of analyst forecast revision and forecast accuracy during the announcement period is larger than those during non-announcement periods. On the other hand, if the information content of public information is less than the analyst's private information, then the magnitude of forecast revision and forecast accuracy during the announcement period will be smaller than that of non-announcement periods. Thus, comparing the properties of analyst forecasts between announcement and non-announcement periods will shed light on the importance of quarterly firm disclosures as information sources relative to analysts' private information production.

I further investigate whether properties in analyst forecast in post-announcement periods are affected by forecast timing. Prior empirical evidence (and my empirical evidence in the next section) shows a significant portion of analysts revises their forecasts immediately after earnings announcements (Stickel 1989; Ivković and Jegadeesh 2004). Prior studies, however, do not consider why some analysts delay issuing forecasts even though they revise their forecast after observing forecasts. There are some theories that explain timing decision of analysts' forecasts (Scharfstein and Stein 1990; Trueman 1994; Graham 1999; Bikhchandani and Sharma 2001). There could be other reasons such as analysts' personal characteristics or vacation or moving to other brokerage firms. In this study, I don't investigate the reason for analysts to delays their forecast issuance. Instead, I focus on how information contained analyst forecast affected by forecast timing, which helps us better understand the information process in capital market.

In summary, if quarterly earnings announcements provide incremental information about future earnings, and analysts incorporate new information into their forecast, there will be higher forecast frequency following earnings announcements. However, the properties of forecast revisions during the announcement period depends on the magnitude of information content of quarterly earnings announcements. If quarterly earnings announcements provide greater information content than analyst's private information during non-announcement period, the forecasts during announcement period will have larger magnitude of revisions and higher forecast accuracy than those during non-announcement, *vice versa*.

Ⅲ. Sample Selection and Research Design

3.1 Sample Selection

Individual analyst forecasts of annual earnings per share (EPS) are obtained from FnGuide Consensus Data Tape for firms in 2003-2006 inclusive. The sample firms I include in this study meet the following criteria:

1) are followed by a minimum of three individual analysts who issue one-year-ahead annual EPS forecasts in 2003 - 2006;
2) are followed by of individual analysts whose identities are traceable;
3) have quarterly earnings announcement data that are available from the Korea Investor Network for Disclosure System; and

4) have quarterly financial data that are available from the FnGuide Pro Tape.

The FnGuide collects analyst earnings forecasts with analyst name (or identification code) and forecast dates from brokerage firms on a weekly basis. If an analyst did not provide a name or identification, then the given forecast is removed from the sample. Sometimes, an analyst simply reiterates a forecast so that revised forecast has the same value as his/her prior forecast. Because this forecast revision does not provide information about future earnings, it is excluded from my sample. Thus, my sample is composed of analysts' initial forecast and their revised forecasts. Using revised forecasts only is common practice in prior literature (Stickel 1995; Womack 1996; Clement and Tse 2005).

3.2 Timeline of forecast revisions

I use hand-collected event days of quarterly earnings announcements from the Korean Exchange Electronic Disclosure System (KRXDS). After new regulation of fair disclosure in 2002, firms should report material disclosures including quarterly earnings announcements to all investors by reporting the disclosures to KRXDS. KRXDS provides the report date of firms' quarterly earnings announcement. I use the disclosure date reported in KRSDS as event day 0 for the quarterly earnings announcement.

In my final sample, there are 985 firm-announcement observations and 24,902 firm-analyst-forecast observations during my sample period. The number of sample firms ranges from 83 in 2003 to 116 in 2006 (Table 1, Panel A). The average number of analysts following a firm is 13.68, while the average number of individual analyst forecasts issued in a fiscal year for a firm is 4.3. The number of earnings announcements for the first quarter is the most (321, 32.59%) and that for the fourth quarter the least (112, 11.37%) (Table 1, Panel C).

I use analysts' one-year-ahead annual earnings per share (EPS) forecasts around quarterly announcement days to determine how these announcements affect forecast revision timing and characteristics. For a quarter q earnings announcement, I compute the number of days between the individual analysts' forecast date and the quarterly announcement date. Figure 1 illustrates the timeline of events, which captures the entire three-month period within a typical fiscal quarter. All forecasts revisions issued on calendar days -45 through -1 pertain to the fiscal quarter q period for which earnings are announced on day 0. All forecasts issued on day 0 through 45 also pertain to the fiscal quarter q period. This pre- and post-announcement periods based on earnings announcement is common

〈Table 1〉 Sample summary statistics

Panel A. Summary of sample firms and analysts

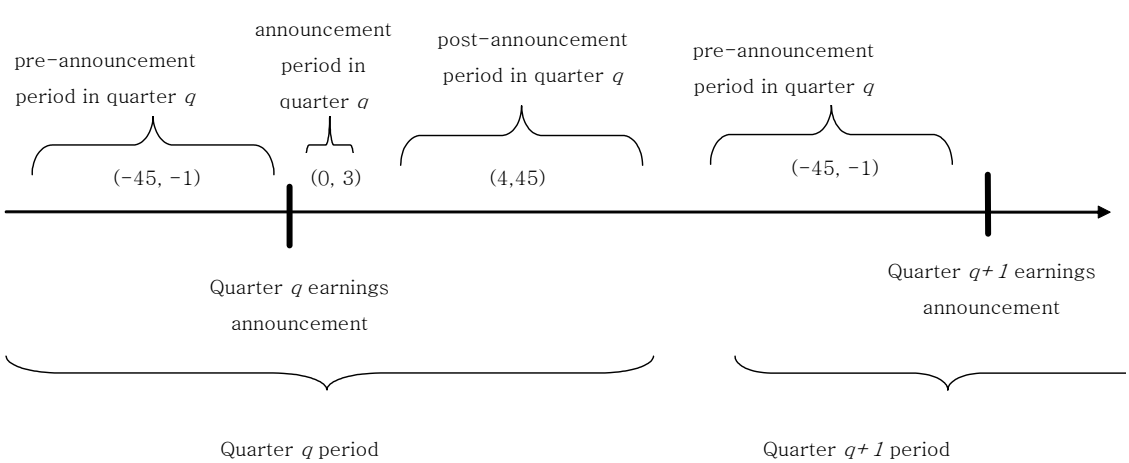
Year	Number of Firms Covered by Analysts	Average Number of Analysts Following a Firm	Total Number of Forecast Revisions	Average Number of Forecast Revisions by an Analyst
2003	83	15.36	4,026	3.16
2004	103	15.02	5,557	3.59
2005	102	14.58	7,468	5.02
2006	116	12.73	7,851	5.32
Total	155	13.68	7,522	4.3

Panel B: Summary of earnings announcements for 2003 - 2006

Quarter	Q1	Q2	Q3	Q4
Number of Observations	321	237	315	112
(Percentage of total)	(32.59)	(24.06)	(31.98)	(11.37)

Panel C: Summary of forecasts following quarterly earnings announcements for 2003 - 2006

Quarter	Q1	Q2	Q3	Q4
Number of Forecasts	8,540	6,144	8,436	1,782
(Percentage of total)	(34.29)	(24.67)	(33.88)	(7.16)



〈Figure 1〉 Event timeline

practice in prior studies (Barron 1995; Bamber et al. 1997; Barron et al. 2002b).

I divide analyst forecasts data into three groups based on forecast timing relative to quarterly earnings announcements: pre-announcement (*Pre*), announcement (*Ann*), and post-announcement (*PostAnn*). For a quarter *q*, the pre-announcement period is from -45 days to -1 (-45, -1) relative to the quarter *q* earnings announcement date. Similarly, the announcement period is from 0 to 3 days (0, 3), and the post-announcement periods is from 4 to 45 days (4, 45).[1)]

I divide analyst forecast timing into three for following reason. Regarding analyst forecast revisions after earnings announcements, prior studies implicitly assume that post-announcement forecast revisions have homogeneous properties regardless forecast timing (Barron 1995; Bamber et al. 1997; Bamber et al. 1999; Barron et al. 2002b). However, analysts who issue forecasts during announcement period can have different characteristics, resulting in different properties of forecasts. Ivković and Jegadeesh (2004) shows that more than 40% of revisions are issued within this period. My empirical results presented in next section also show significantly large percentage of forecast revisions in this period. The delayed analyst forecasts issuance can be attributed to various reasons such as analysts' personal reasons (laziness, vacation) or analysts opportunistic behaviors such as herding (Trueman 1994; Graham 1999) or information cascade (Bikhchandani and Sharma 2001). These properties can be resulted in different properties of analyst forecasts between announcement period and post-announcement period.

3.2 Change in forecast and forecast error

For pre-announcement, announcement, and post-announcement period, I measure the magnitude of forecast revisions and absolute value of forecast error to examine information content of the quarterly earnings announcement. I measure the magnitude of analyst forecast revisions as the absolute value of the difference between the analyst's forecast and his/her prior forecast, scaled by the absolute value of the actual annual EPS. The forecast error is measured by the absolute value of the difference between analysts' annual EPS forecast and actual EPS. In the robustness test, I examine whether the change in analyst forecast accuracy varies with forecast timing. The change in analyst forecast error used in the test is measured by the difference in absolute forecast errors between the analysts'

1) When there are fewer than 90 days between successive earnings announcements, some event dates can be fewer than 45 days from the first and next earnings announcement date. To avoid double-counting revisions on these event dates, I select event dates that are closer to either first or next earnings announcement.

forecast and prior forecast. Following Agrawal, Chadha, and Chen (2006), I remove the observations of which absolute values are greater than two to mitigate nuisance effect due to small value of deflator. More formally, for analysts' year t EPS around quarter q earnings announcement (for the simplicity, I will omit the notation of t and q), these dependent variables are measured as follows:

$$Revision_{i,j,d} = \frac{|F_{i,j,d} - F_{i,j,d-v}|}{|EPS_j|}$$

$$FE_{i,j,d} = \frac{|F_{i,j,d} - EPS_j|}{|EPS_j|}$$

$$Accuarcy\ Change_{i,j,d} = FE_{i,j,d} - FE_{i,j,d-v}$$

where,

$Revision_{i,j,d}$ = the absolute value of difference in analyst i's year t annual EPS forecast for firm j issued on day d-v and on day d;

$F_{i,j,d}$ = analyst i's year t annual EPS forecast for firm j issued on day d;

$F_{i,j,d-v}$ = analyst i's prior year t annual EPS forecast for firm j issued on day d-v;

EPS_j = firm j's year t actual EPS;

$FE_{j,q,d}$ = analyst i's forecast error measured by the absolute value of difference between the analyst's forecast and actual year t EPS; and

$AccuracyChange_{i,j,d}$ = change in absolute forecast error (FE) in analyst i's year t annual forecast issued on day d-v and on day d.

3.3 Regression model

Using the magnitude of analyst forecast revision and forecast error as dependent variables, I regress these variables using the following regression model:

$$Dependent\ Variable_{i,j,q,d} = b_0 + b_1 Ann_{i,j,q,d} + b_2 PostAnn_{i,j,q,d} + b_3 lnMV_{j,q} + b_4 ChgEPS_{j,q} + b_5 Coverage_j + b_6 Age_{i,j,q,d} + b_7 Horizon_{i,j,q,d} + \Sigma\ QuarterDummy + \Sigma\ FirmDummy + e_{i,j,q,d}$$

where,

$Ann_{i,j,q,d}$ = 1 if analyst i issues an annual EPS forecast for firm j in the announcement period (days from 0 to 3 relative to quarter q earnings announcement day), zero otherwise;

$PostAnn_{i,j,q,d}$ = 1 if analyst i issues an annual EPS forecast for firm j in the post-announcement period (days from 4 to 45 relative to quarter q earnings announcement day), zero otherwise;

$lnMV_{j,q}$ = log of the market value of the firm j's equity at the end of fiscal quarter q;

$ChgEPS_{j,q}$ = absolute change in firm j's quarterly EPS measured by $|EPS_{j,q} - EPS_{j,q-4}|/|EPS_j|$, where $EPS_{j,q}$ is firm j's actual quarter q EPS, and EPS_j is the actual annual year t EPS.

$Coverage_j$ = log of the number of analysts following firm j in year t;

$Age_{i,j,q,d}$ = number of days between analyst i's annual EPS forecast for firm j on day d and

his/her prior forecast on day d-v;

$Horizon_{i,j,q,d}$ = number of days between analyst i's annual EPS forecast for firm j on day d and fiscal year end;

QuarterDummy=1 if the analyst's forecast is issued in fiscal quarter is q, zero otherwise; and

FirmDummy=1 if the analyst issue forecast for the firm j, zero otherwise.

Following Bowen, Davis, and Matsumoto (2002), the model permits the intercept to vary across announcement periods while also controlling for factors related to forecast revisions identified in prior research. It facilitates testing for differences in dependent variables among pre-announcement, announcement, and post-announcement periods. For example, the coefficients b_0 and $(b_0 + b_1)$ represent the mean absolute magnitude or forecast error in the pre-announcement and announcement periods, respectively, after controlling for the other factors. Tests for equality of corresponding coefficients between pre-announcement and announcement periods ($b_0 = b_0 + b_1$) or between announcement and post-announcement periods ($b_0 + b_1 = b_0 + b_2$) or between pre-announcement and post-announcement periods ($b_0 + b_1 = b_0 + b_2$) allow me to investigate whether analyst forecast characteristics vary with forecast timing after controlling for other factors.

My tests of the relationship between quarterly earnings announcements and the forecast revision and forecast errors, control for firm size, earnings surprise, and the forecast horizon, and the number of days elapsed since the analysts' current outstanding forecast. The market value of firm (*lnMV*) proxies for the richness of the firm's information environment (Atiase 1985). Although a firm's information environment affects the levels of forecast error (Lang and Lundholm 1996), it is unclear how it affects the magnitude of forecast revisions and the change in forecast error and forecast magnitude. I control for earnings surprise as information shock may affect analysts' forecast revision behaviors (Morse, Stephan, and Earl 1991; Brown and Han 1992). Following Lang and Lundholm (1996), I measure earnings surprise by the absolute value of the change in quarterly EPS.[2] Competition among analysts may affect analysts' private information production activities (Abarbanell, Lanen, and Verrecchia 1995; Lang and Lundholm 1996) and may affect forecast characteristics. I include the number of analysts following a firm (*Coverage*). Longer time gaps between the date of the current outstanding forecast and the revision date allow analysts more time to observe additional information, an artifact that may

2) I also remove observations of which value is greater than two due to small value of deflator.

affect the magnitude of forecast revision and the change in forecast errors. Thus, I control for this potential effect by including the number days since the issuance of the current outstanding forecast (*Age*). Since forecast timing is one of the most important factors in analyst forecast accuracy (Brown 2001), I include forecast horizon (*Horizon*). In addition to these variables, I also include dummy variables of fiscal quarter (*Quarter Dummy)* in order to control for any fixed quarter effect. In addition, I control for firm fixed effect by including dummy variables for each firm (*Firm Dummy*).

Ⅳ. Empirical Results

4.1 Descriptive Statistics

Table 2 presents descriptive statistics on variables used as dependent and independent variables used in my study. The mean (median) value of the absolute magnitude of analyst EPS forecast revisions in my sample is 0.0885 (0.0323) and that of absolute forecast error is 0.2472 (0.1617) (Table 2). On average, the *AccuracyChange* has negative mean (median) value, suggesting that analyst forecast revisions improve forecast accuracy by -0.0314 (-0.0001). Regarding control variables, it is not surprising my requirements of analyst following and quarterly earnings announcements lead to sample selection of large firms. The mean (median) value of the market value of sample firms is about 6.5 (1.9) billion wons. Therefore, caution is needed to generalize my empirical results to small firms. The absolute value of the change in quarterly EPS is about 0.1944 (0.1028), with the mean number of analysts following at 18.40 (19). Finally, the mean (median) of forecast age is 39.40 (28) days; the forecast horizon is 144.70 (149) days prior to fiscal year end.

4.2 Forecast Revision Timing

I first examine analyst forecast timing following quarterly earnings announcements. Figure 2 clearly shows a significant increase in analyst forecast revisions around the earnings announcements, while there is flat percentage of forecast revisions A relatively flat percentage of forecasts in non-announcement periods and sharp increase in forecasts in announcement periods suggest the validity of event days of quarterly earnings announcements. Table 3 shows the number and the percentage of analyst forecast revisions on each event days.[3] A sharp increase in

3) For presentation purposes, I report event days between -35 to 35 relative to earnings announcement date.

〈Table 2〉 Analyst forecast and control variable descriptive statistics (n = 17,256)

Variable	Mean	Median	Std Dev	25th Pctl	75th Pctl
Revision	0.0885	0.0323	0.1587	0.0008	0.1061
Forecast Error	0.2472	0.1617	0.2841	0.0730	0.3113
Accuracy Change	-0.0314	-0.0001	0.1589	-0.0519	0.0085
MV (million Won)	6,560	1,937	14,049	759	6,668
ChgEPS	0.1944	0.1028	0.4953	0.0463	0.1954
Coverage	18.93	19	7.82	14	25
Age	39.40	28	40.02	12	56
Horizon	144.70	149	90.30	63	234

Note:

Revision = absolute value of the change in analyst i's year t annual EPS forecast for firm j since the prior forecast issuance;

Forecast Error = analyst i's forecast error measured by the absolute value of difference in analyst's forecast and actual EPS in year t; and

Accuracy Change = change in absolute forecast error in analyst i's year t annual forecast between analysts' prior forecast and revised forecast;

MV = market value of the firm j's equity at the end of fiscal quarter q;

$ChgEPS_{i,q}$ = absolute change in firm j's quarterly EPS measured by the change in quarterly actual EPS between current year and prior year, divided by the actual annual year t EPS;

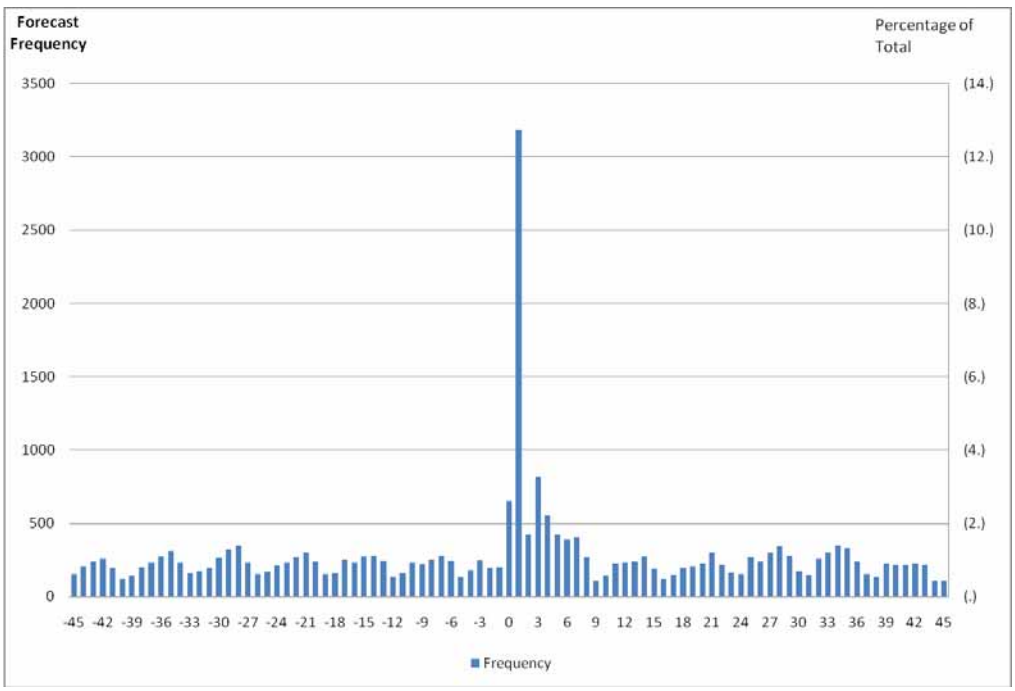
Coverage = log of the number of analysts following firm j in year t;

Age = number of days between analyst i's prior forecast issuance date and revise forecast date;

Horizon = number of days between analyst i's annual EPS forecast for firm j on day d and fiscal year end.

number and percentage of forecasts is also found on days immediately after earnings announcement. In particular, total 2,378 (12.23%) and 606 (3.12%) out of 24,902 analyst forecasts are issued on days 1 and 3, respectively. In general, about 20% of forecasts are issued within four days after quarterly earnings announcements.

In order to test whether higher percentage of forecast revisions around days earnings announcement is statistically meaningful, I compute the abnormal percentage of forecast revisions (*APR*). *APR* is the firm-quarter specific abnormal percentage of forecasts on each event days. Following Stickel (1989), *APR* is computed as follows. First, I first compute the percentage of forecasts on each event day (*PR*) for each firm quarterly announcement. Then, I compute the average percentage of forecasts in non-announcement period (*NPR*) by simply averaging the percentage of forecasts issued at non-announcement days (days -45 to -1 and days 4 to 45 relative to event day 0). The abnormal



〈Figure 2〉 Forecast frequency around quarterly earnings announcements

percentage of forecast revisions is the percentage of forecasts on event day subtracted by the average non-announcement period percentage of forecast revisions (*APR* = *PR* - *NPR*).

If we assume that the quarterly earnings announcement is the only public information event during the quarter, analyst forecasts in announcement period are more likely triggered by quarterly earnings, while analyst forecasts in non-announcement periods are more likely caused by analysts' private information production. Thus, *APR* highlights whether a quarterly earnings announcements trigger analysts' forecasting activities greater or less than analysts' average forecasting activities in non-announcement period.

Table 3 reports the average percentage of *PR* and *APR* in fourth and fifth column. I find positive abnormal percentage of revisions (*APR*) values between days 0 and 8 that are also statistically different from zero from student t-test. In particular, note that *APR* was 11.34% and 5.55% on days 1 and 3, respectively. In addition, high values of percentage of forecast revisions (*PR*) are concentrated around event day 0. On the other hand, for most of days other than those

〈Table 3〉 Number of forecast revisions following quarterly earnings announcements

Event Day	Freq.	% of total	*PR*	*APR*	Event Day	Freq.	% of total	*PR*	*APR*
					0	502	(2.58)	5.91	0.62***
-35	249	(1.28)	6.41	-0.06	1	2378	(12.23)	18.05	11.34***
-34	191	(0.98)	5.26	-0.13	2	324	(1.67)	6.96	1.15***
-33	147	(0.76)	4.72	-0.50**	3	606	(3.12)	12.04	5.55***
-32	132	(0.68)	5.36	-0.49***	4	453	(2.33)	7.35	1.62***
-31	158	(0.81)	5.13	-0.28	5	324	(1.67)	7.07	1.08***
-30	207	(1.06)	5.41	-0.13	6	310	(1.59)	6.39	0.52***
-29	256	(1.32)	6.17	0.29	7	321	(1.65)	6.41	0.69***
-28	275	(1.41)	5.37	-0.09	8	202	(1.04)	6.76	0.65***
-27	177	(0.91)	5.54	-0.34**	9	86	(0.44)	5.62	-0.50***
-26	114	(0.59)	4.96	-0.26	1	106	(0.55)	6.19	-0.22
-25	128	(0.66)	5.10	-0.20	11	177	(0.91)	5.57	-0.04
-24	172	(0.88)	5.21	-0.17	12	190	(0.98)	6.04	-0.25*
-23	172	(0.88)	5.82	-0.28*	13	175	(0.9)	5.38	-0.14
-22	203	(1.04)	5.63	-0.01	14	210	(1.08)	5.56	0.02
-21	211	(1.09)	5.83	-0.19	15	158	(0.81)	6.27	-0.28*
-20	182	(0.94)	6.90	-0.09	16	99	(0.51)	5.01	-0.27
-19	120	(0.62)	5.00	-0.23	17	115	(0.59)	6.23	-0.19
-18	117	(0.6)	5.10	-0.60***	18	150	(0.77)	5.41	0.12
-17	182	(0.94)	5.43	0.06	19	168	(0.86)	5.42	0.12
-16	168	(0.86)	5.73	0.05	2	188	(0.97)	5.29	0.01
-15	193	(0.99)	5.78	-0.08	21	260	(1.34)	5.52	-0.09
-14	215	(1.11)	5.35	-0.07	22	186	(0.96)	5.17	-0.18
-13	178	(0.92)	4.94	-0.13	23	122	(0.63)	5.81	-0.01
-12	99	(0.51)	4.26	-0.75***	24	129	(0.66)	4.84	-0.31*
-11	120	(0.62)	5.50	-0.12	25	227	(1.17)	5.63	0.14
-10	163	(0.84)	5.78	-0.04	26	199	(1.02)	5.26	-0.31***
-9	163	(0.84)	5.13	-0.62***	27	249	(1.28)	6.16	0.25
-8	182	(0.94)	5.01	0.10	28	290	(1.49)	5.70	0.17
-7	224	(1.15)	4.91	-0.45***	29	230	(1.18)	5.78	0.29
-6	194	(1.)	5.12	-0.04	30	129	(0.66)	5.53	-0.16
-5	100	(0.51)	5.54	-0.19	31	120	(0.62)	5.46	0.22
-4	134	(0.69)	4.83	-0.19	32	216	(1.11)	6.53	0.58**
-3	187	(0.96)	4.64	-0.03	33	243	(1.25)	6.36	0.74***
-2	138	(0.71)	4.94	-0.25	34	282	(1.45)	5.49	0.49***
-1	152	(0.78)	5.17	-0.38**	35	276	(1.42)	5.17	0.09

Note:
PR = percentage of analyst forecasts for firm *j*'s annual EPS on event day in quarter *q*;
APR = abnormal percentage of analyst forecast revisions for firm *j* on day in quarter *q*.

between 0 and 8, the average value of *APR* is not statistically different from zero. A significantly large value of *APR* around quarterly earnings announcement dates suggest that a large fraction of forecasts is driven by the public announcement of earnings. It implies that analysts actively form their expectations of future earnings on the basis of the public information revealed at quarterly announcement of earnings.

The fraction of forecast revisions following earnings announcements in my sample is smaller than that documented in previous studies in the U.S. Ivković and Jegadeesh (2004) observe that about 40% of earnings forecast revisions are concentrated on days 0 and 3, while my results show only about 18% during that two-day period; thus I observe less than half of the revision activity previously documented in studies of the U.S. markets.[4] Even though the percentage of analyst forecast revision frequency after quarterly earnings announcement is smaller than that of the U.S. market, a large percentage of analyst forecast revisions immediately after earnings announcements provides important implication: like U.S. market, Korean analysts are important accounting information users and their revision behaviors can be used to investigate unobservable market participants' belief changes affected by accounting reports (e.g., Barron 1995; Kandel and Pearson 1995; Bamber et al. 1997; Bamber et al. 1999).

As sensitivity tests, I repeat the above test for each quarter separately and find the similar results (unreported). I also repeat the test with forecast observations including reiterated forecasts of which value is the same as the analyst's prior forecast. I also find the significantly large percentage of abnormal percentage of forecast revisions immediately after earnings announcement.

4.2 Tests for cross-sectional differences in the magnitude of forecast revision

Because I am interested in the effect of earnings announcement on the change in analyst forecast revisions, I compare mean (median) value of absolute values of the forecast changes between pre-announcement and announcement period and between announcement and post-announcement periods (Table 4, Panel A). The statistical significance in difference of mean (median) values is tested by student t-test (signed rank test).

In general, the average magnitude of forecast revision in announcement periods is larger than those in pre- and post-announcement

4) It is difficult to find out what derives this difference. It could be due to short history of quarterly disclosure in Korea or Korean analysts are less likely to use quarterly earnings information to revise their forecasts, or there is difference in the quality of disclosures. These are interesting topics and it is worth of future research.

I〈Table 4〉 Effect of quarterly earnings announcements on the magnitude of analyst forecast revisions

Panel A. Average magnitude of analyst forecast revisions around quarterly earnings announcements for the three forecast periods

Quarter	Period [a]	Mean		Median	
Q1	Pre-Announcement	0.091	***	0.033	***
	Announcement	0.107		0.055	
	Post-Announcement	0.080	***	0.023	***
Q2	Pre-Announcement	0.097	***	0.030	***
	Announcement	0.133		0.068	
	Post-Announcement	0.082	***	0.018	***
Q3	Pre-Announcement	0.086	***	0.031	***
	Announcement	0.115		0.059	
	Post-Announcement	0.081	***	0.019	***
Q4	Pre-Announcement	0.072	***	0.029	***
	Announcement	0.117		0.056	
	Post-Announcement	0.083	***	0.026	***

***, **, * different from mean (median) value of variable in announcement period from student t-test (median signed-rank test) at 1%, 5%, and 10% level, respectively.

Panel B. Regression of forecast revision magnitude of analyst forecast revisions on forecast timing

Variable	Coeff.	t Value	
Intercept	0.3653	8.04	***
Ann	0.0265	7.55	***
PostAnn	0.0081	1.95	*
lnMV	-0.0282	-9.44	***
ChgEPS	0.0185	7.34	***
Coverage	-0.0020	-7.75	***
Age	0.0011	37.98	***
Horizon	0.0002	2.97	***
Adj R-Sq	0.1873		
N	17,256		

***, **, * significant at 1% , 5%, and 10% level, respectively

〈Table 4〉 Effect of quarterly earnings announcements on the magnitude of analyst forecast revisions

Panel C. Comparison of forecast revision magnitude between periods

Periods Tested	Test	Values	F-statistic	
Pre-Announcement vs. Announcement	$b_0 = b_0 + b_1$	0.3653 vs. 0.3918	56.93	***
Announcement vs. Post-Announcement	$b_0 + b_1 = b_0 + b_2$	0.3919 vs. 0.3734	30.54	***
Pre-Announcement vs. Post-Announcement	$b_0 = b_0 + b_2$	0.3653 vs. 0.3734	3.80	*

***, **, * significant at 1% , 5%, and 10% level, respectively

[a] The pre-announcement period is from -45 to -1 days (-45, -1), the announcement period includes days 0 to 3 (0, 3), and the post-announcement period encompasses days 4 to 45 (4, 45) relative to the quarter q earnings announcement date.

Note:

Revision = absolute value of the change in analyst i's year t annual EPS forecast for firm j since the prior forecast issuance;

$Ann_{i,j,q,d}$ = 1 if analyst i issues an annual EPS forecast for firm j in the announcement period, zero otherwise;

$PostAnn_{i,j,q,d}$ = 1 if analyst i issues an annual EPS forecast for firm j in the post-announcement period, zero otherwise;

lnMV = log of the market value of the firm j's equity at the end of fiscal quarter q;

$ChgEPS_{i,q}$ = absolute change in firm j's quarterly EPS measured by the change in quarterly actual EPS between current year and prior year, divided by the actual annual year t EPS;

Coverage = log of the number of analysts following firm j in year t;

Age = number of days between analyst i's prior forecast issuance date and revise forecast date;

Horizon = number of days between analyst i's annual EPS forecast for firm j on day d and fiscal year end.

periods. For example, in the first quarter (Q1), the mean (median) value of revision magnitude in the announcement period is 0.107 (0.055), while magnitudes in pre-and post-announcement periods are 0.091 (0.033) and 0.080 (0.023), respectively. The differences in mean (median) value of absolute forecast revisions between the announcement periods and both the pre- and post-announcement periods are statistically significantly different from zero at the 1% level.

Because the univariate analysis does not control for other potential factors that affect the magnitude of forecast revisions, I regress the magnitude of forecast revisions against forecast timing after controlling for other

factors (Table 4, Panel B). Note that the intercept represents the average magnitude of forecast revisions in pre-announcement period. The intercept has a significantly positive value (0.3653) after controlling for other factors. Coefficients of *Ann* and *PostAnn* are also positive (0.0265 and 0.0081, respectively), but the coefficient on *PostAnn* is significant at only the 10% level.

The *F*-test results for differences in coefficients of three periods dummy variables show that the magnitude of forecast revision during announcement periods is significantly larger than that during pre-announcement and post-announcement periods (Table 4, Panel C). While tests for equal magnitude of revisions between pre-announcement and announcement periods ($b_0 = b_0 + b_1$, 0.3653 vs. 0.39180) and between announcement and post-announcement periods ($b_0 + b_1 = b_0 + b_2$, 0.3919 vs. 0.3734) are rejected at the 1% level, the test for equality between pre- and post-announcement periods ($b_0 = b_0 + b_2$, 0.3653 vs. 0.3734) is rejected at the 10% level. These results confirm that the magnitude of forecast revision in announcement periods is significantly larger than that in pre- and post-announcement periods. In addition, the F-statistics for $b_0 = b_0 + b_2$ is marginally significant at 10%, suggesting that the larger magnitude of forecast revisions in post-announcements than that in pre-announcements is not statistically strong. These results suggest that new information from earnings announcements is disseminated by analysts who issue forecasts during announcement period. In addition, the larger magnitude of forecast revisions suggests that earnings announcements are important information sources to analysts relative to other information sources in non-announcement period.

Regarding control variables, the coefficient on *ChgEPS* is significantly positive (0.0185), suggesting that the larger magnitude of EPS change cause larger magnitude of forecast revision. In addition, the significant coefficient on *Age* (0.0011) suggests that the greater the number of days since the analyst's prior forecast issuance, the greater the magnitude of forecast revision. The magnitude of forecast revisions is negatively associated with the *Coverage* (-0.002) and positively associated with *Horizon* (0.0002). The negative *Coverage* coefficient suggests that potential competition among analysts leads to more frequent forecast revision and smaller revision magnitude.[5] In addition, the positive *Horizon* coefficient implies that revision magnitude decreases as revision issuance nears fiscal year end. These results are intuitive and consistent with prior study

5) The correlation between *Coverage* and *Age* (data not shown) is negative and statistically significant (p = -0.0458).

empirical results, suggesting these variables well control for other economic factors.

4.3 Cross-sectional differences in analyst forecast error

Results of the change in absolute analyst forecast error show that on average, analyst forecast errors decrease over time (Table 5, Panel A). The mean (median) forecast error decreases from 1.6564 (0.2605) in the Q1 pre-announcement period to 0.0827 (0.0574) in the Q4 announcement period. This result is intuitive because as analysts acquire more information over time, the analysts' forecast precision should increase.

There is a significant difference in forecast errors between pre-announcement and announcement periods. Significantly smaller forecast errors in announcement periods than pre-announcement periods suggest that earnings announcements assist analysts in improving their forecast accuracy. However, there is little difference between announcement and post-announcement periods. Only in Q3 and Q4 are the mean (median) value of forecast errors significantly different at a 10% level, and mean values of forecast error in Q2 are

〈Table 5〉 Effect of quarterly earnings announcements on the magnitude of absolute analyst forecast error

Panel A. Average analyst forecast errors around quarterly earnings announcements

Quarter	Period	Mean		Median	
Q1	Pre-Announcement	1.6564	**	0.2605	**
	Announcement	1.9998		0.2375	
	Post-Announcement	2.2075		0.2339	
Q2	Pre-Announcement	2.1410	***	0.2104	***
	Announcement	1.3327		0.1583	
	Post-Announcement	2.3290	**	0.1605	
Q3	Pre-Announcement	0.5403	***	0.1575	***
	Announcement	0.2958		0.1375	
	Post-Announcement	0.3474	*	0.1298	*
Q4	Pre-Announcement	0.1638	***	0.0987	***
	Announcement	0.0827		0.0574	
	Post-Announcement	0.1371	*	0.0779	*

***, **, * different from mean (median) value of variable in announcement period from student t-test (median signed-rank test) at 1%, 5%, and 10% level, respectively.

〈Table 5〉 Effect of quarterly earnings announcements on the magnitude of absolute analyst forecast error

Panel B. Regression of revision magnitude against forecast timing

Variable	Coeff.	t-Statistic	
Intercept	1.6021	22.45	***
Ann	-0.0239	-4.30	***
PostAnn	-0.0166	-2.54	**
MV	-0.1019	-21.62	***
ChgEPS	0.0066	1.51	
Coverage	-0.0017	-4.31	***
Age	0.0000	-0.33	
Horizon	0.0005	4.39	***
Adj R-Sq	0.3614		
N	17,256		

***, **, * significant at 1%, 5%, and 10% level, respectively

Panel C. Comparison of absolute forecast error between periods

Periods Tested	Test	Value	F-statistic	
Pre-Announcement vs. Announcement	$b_0 = b_0 + b_1$	1.6021 vs. 1.5782	18.45	***
Announcement vs. Post-Announcement	$b_0 + b_1 = b_0 + b_2$	1.5782 vs. 1.5855	1.91	
Pre-Announcement vs. Post-Announcement	$b_0 = b_0 + b_2$	1.6021 vs. 1.5855	6.43	**

***, **, * significant at 1%, 5%, and 10% level, respectively

Note:

Accuracy Change = change in absolute forecast error in analyst i's year t annual forecast between analysts' prior forecast and revised forecast;

$Ann_{i,j,q,d}$ = 1 if analyst i issues an annual EPS forecast for firm j in the announcement period, zero otherwise;

$PostAnn_{i,j,q,d}$ = 1 if analyst i issues an annual EPS forecast for firm j in the post-announcement period, zero otherwise;

lnMV = log of the market value of the firm j's equity at the end of fiscal quarter q;

$ChgEPS_{i,q}$ = absolute change in firm j's quarterly EPS measured by the change in quarterly actual EPS between current year and prior year, divided by the actual annual year t EPS;

Coverage = log of the number of analysts following firm j in year t;

Age = number of days between analyst i's prior forecast issuance date and revise forecast date;

Horizon = number of days between analyst i's annual EPS forecast for firm j on day d and fiscal year end.

different at 5% of significance level. The lack of difference in forecast errors between announcement and post-announcement periods suggests that post-announcement analyst forecasts assimilate incremental information about future earnings relative to announcement forecasts.

In the regression of analyst forecast magnitude against forecast timing (Table 5, Panel B), the intercept has a significantly positive value (1.6021), while the coefficients on *Ann* and *PostAnn* have significantly negative values (-0.0239 and -0.0166, respectively). Negative coefficients suggest that forecasts in announcement and post-announcement periods are of higher accuracy than those in pre-announcement periods. While F-statistics for equality of forecast errors between pre-announcement and announcement periods ($b_0 = b_0 + b_1$, 1.6021 vs. 1.5782) and between pre-announcement and post-announcements periods ($b_0 = b_0 + b_2$, 1.6021 vs. 1.5855) are statistically different from zero at the 5% level, there is little difference between announcement and post-announcement periods ($b_0 + b_1 = b_0 + b_2$, 1.5782 vs. 1.5855) (Table 5, Panel C). This confirms the univariate test results that that post-announcement analyst forecasts provide little incremental information about future earnings relative to announcement forecasts. Regarding control variables, the analyst forecast error decreases with firm size (*lnMV*), analyst coverage (*Coverage*), and forecast horizon (*Horizon*). The coefficient on *ChgEPS* (1.3327) is positive but not statistically different from zero.

My finding of little difference between announcement and post-announcement period forecasts are interesting. In the U.S., Ivković and Jegadeesh (2004) find that individual analyst' forecast error relative to consensus forecast error is smallest in post-announcement periods, suggesting that there is little incremental information content from forecasts in post-announcement period. My finding is also similar to that of Ivković and Jegadeesh. Similar magnitude of forecast error between announcement and post-announcement period implies that there is little information production in post-announcement period relative to announcement period in Korea.

In summary, empirical results in this study strongly support that earnings announcements triggers analyst forecasting activities. Analysts significantly revise their forecasts after observing earnings announcements and these revised forecasts have higher forecast accuracy than forecasts issued prior to earnings announcements. In addition, while analysts significantly revise their forecasts in both announcement and post-announcement periods, there is relatively small difference in forecast error between two periods. If we assume that analysts issue forecasts after observing earnings announcements in order to interpret earnings reports, the post-

announcement forecasts have small incremental information relative to announcement forecasts.

4.3 Change in forecast accuracy

While previous empirical tests for magnitude of forecast revisions and forecast accuracy show the overall level changes in forecast error around quarterly earnings announcements, they do not provide information about whether the announcements improve analysts' forecast precision. Ivković and Jegadeesh (2004) assume that while forecasts prior to earnings announcements are more likely to convey analysts' own private information, forecasts immediately following earnings announcements likely assimilate analysts' interpretation of public disclosures. The authors find stronger stock price reactions to analyst forecast revisions prior to earnings announcements than to revisions issued posterior to announcements. If motives for analysts to revise forecast vary with forecast timing, then differences in forecast precision changes should be evident. To test robustness, I examine the effect of quarterly earnings announcements on the change in analyst forecast precision.

I measure the change in an analyst's

〈Table 6〉 Effect of quarterly earnings announcements on the change in analyst forecast error

Panel A. Average change in analyst forecast errors around quarterly earnings announcements

Quarter	Period	Mean		Median	
Q1	Pre-Announcement	-0.0996	**	-0.0001	***
	Announcement	-0.3221		-0.0044	
	Post-Announcement	-0.4034	**	0.0000	***
Q2	Pre-Announcement	-0.4786	***	0.0000	***
	Announcement	-0.4502		-0.0253	
	Post-Announcement	-0.2183	***	0.0000	***
Q3	Pre-Announcement	-0.1299	**	-0.0001	***
	Announcement	-0.1864		-0.0140	
	Post-Announcement	-0.1097	***	-0.0001	***
Q4	Pre-Announcement	-0.0475	***	0.0000	***
	Announcement	-0.0766		-0.0282	
	Post-Announcement	-0.1073	*	-0.0016	***

***, **, * different from mean (median) value of variable in announcement period from student t-test (median signed-rank test) at 1%, 5%, and 10% level, respectively.

〈Table 6〉 Effect of quarterly earnings announcements on the change in analyst forecast error

Panel B. Regression of forecast revision magnitude against timing

Variable	Coeff.	t Value	
Intercept	-0.0885	-2.09	**
Ann	-0.0069	-2.08	**
PostAnn	-0.0025	-0.65	
Revision	0.0068	2.44	**
lnMV	-0.4985	-69.48	***
ChgEPS	-0.0112	-4.29	***
Coverage	0.0009	3.61	***
Age	-0.0001	-4.75	***
Horizon	0.0001	1.03	
Adj R-Sq	0.2857		
N	17,256		

***, **, * significant at 1%, 5%, and 10% level, respectively

Panel C. Comparison of the change in forecast error between periods

Periods Tested	Test	Value	F-statistic	
Pre-Announcement vs. Announcement	$b_0 = b_0 + b_1$	-0.0885 vs. -0.0954	4.33	**
Announcement vs. Post-Announcement	$b_0 + b_1 = b_0 + b_2$	-0.0954 vs. -0.0910	1.91	
Pre-Announcement vs. Post-Announcement	$b_0 = b_0 + b_2$	-0.0885 vs. -0.0910	0.43	

***, **, * significant at 1%, 5%, and 10% level, respectively

Note:

Forecast Error = analyst i's forecast error measured by the absolute value of difference in analyst's forecast and actual EPS in year t;

$Ann_{i,j,q,d}$ = 1 if analyst i issues an annual EPS forecast for firm j in the announcement period, zero otherwise;

$PostAnn_{i,j,q,d}$ = 1 if analyst i issues an annual EPS forecast for firm j in the post-announcement period, zero otherwise;

lnMV = log of the market value of the firm j's equity at the end of fiscal quarter q;

$ChgEPS_{i,q}$ = absolute change in firm j's quarterly EPS measured by the change in quarterly actual EPS between current year and prior year, divided by the actual annual year t EPS.

Coverage = log of the number of analysts following firm j in year t;

Age = number of days between analyst i's prior forecast issuance date and revise forecast date;

Horizon = number of days between analyst i's annual EPS forecast for firm j on day d and fiscal year end.

forecast precision as the change in absolute forecast error as defined in Section 3.3. Trueman (1990) suggests that analysts are reluctant to revise their forecast because simply issuing a revision sends a signal that the analyst's prior forecast was inaccurate. Analysts tend to revise their forecasts only when they observe new information that is significant enough to change their beliefs. Thus, the change in absolute analyst forecast error indicates the degree to which analysts' forecast precision improves relative to prior forecast.

In the univariate comparison of the change in forecast accuracy (Table 6, Panel A), the mean (median) values of the change in forecast errors are negative, suggesting that revised forecasts are of higher forecast accuracy than prior forecasts. While mean value show inconsistent order of magnitudes for announcement, pre- and post-announcement periods, the median values for announcement periods are larger in all quarters. In addition, the larger median values are significantly different from zero, suggesting that analysts who revise their forecasts immediately after earnings announcement issuance are more likely to improve their forecasts significantly.

However, the multivariate analysis (Table 6, Panels B and C) indicates that there is little difference in the change in forecast error between pre- and post-announcement periods. The coefficient on *PostAnn* is negative, but the result is not statistically significant (-0.0025). Comparisons of coefficients between pre-announcement and post-announcement periods ($b_0 = b_0 + b_2$, -0.0885 vs. -0.0910) and between announcement and post-announcement periods ($b_0 + b_1 = b_0 + b_2$, -0.0954 vs. -0.0910) show insignificant results. Given that forecasts in pre- and post-announcement periods are less likely affected by earnings announcement and more likely affected by their private information, larger magnitude in the change in forecast accuracy during announcement periods than other periods suggests earnings announcements significantly improve their forecast accuracy. These results confirm that quarterly earnings announcements are significant information sources to individual analysts. It also suggests that analysts' motive for revision could be different between announcement and non-announcement periods.

4.4 Earnings volatility and change in analyst forecasts and forecast errors

In this section, I examine whether there is difference in the effect of earnings announcements on analyst forecast revisions across firms with different earnings volatility. A firms may have higher volatility of earnings because of either high business uncertainty or high uncertainty in earnings or both (Verrecchia 2001). In either case, firms with

high earnings volatility have higher uncertainty, and analysts will experience greater difficulty in forecasting earnings. Given higher uncertainty in information environment, the effect of quarterly firm disclosures will be greater for firms with higher uncertainty (e.g., Kim and Verrecchia 1991; Verrecchia 2001 among others). This may lead to different effect of quarterly earnings announcements from firms with high earnings volatility on analysts.

I examine potential different effect of earnings announcement on analyst forecast error and revisions by including dummy variable of high earnings volatility (*HVol*) in the regression models used in previous tests. I also examine the interaction effect of high earnings volatility with period dummy variables (*Ann* and *PostAnn*). The dummy variable of *HVol* indicates the difference in forecast properties between firms with high and low earnings volatility. The interaction terms indicates the forecast properties different across forecast timing.

For this, I measure the volatility of earnings by the standard deviation of net income divided by average assets for past 10 years. I require a minimum of eight observations to be included in sample. Dummy variable *HVol* has a value of one if the firm's earnings volatility is greater than sample median value in each year in the original data. Unreported descriptive statistics show 10,631 forecasts are made for firms with high earnings volatility and 4,034 observations for firms with low volatility earnings. Unequal observations in two groups are understandable as larger firms are more likely followed by more analysts, and those are more likely to have stable earnings process.

The empirical results are presented in Table 7. I regress the absolute magnitude of forecast revision on *HVol* in the first regression and the absolute forecast error on *HVol* in the second regression. The coefficient on *HVol* in the first regression has value of 0.0370 (t-value = 2.76) and that in the second regression is 0.2708 (t-value = 12.15). These results suggest that analysts who cover firms with high earnings volatility are more likely to issue large magnitude of forecast revisions and forecast errors. These results are intuitive as those analysts confront high uncertainty and their forecast revisions are more likely to reflect high uncertainty. Regarding interaction effect with forecast timing, the magnitude of forecast revision during the announcements is greater than other period (00.0152, t-value = 2.16). This suggests that magnitude of forecast revision is greater for firms with high earnings uncertainty during the announcement period. However, I do not find any significant interaction effect in the second other regression model. In general, these empirical results suggest that quarterly earnings announcement

〈Table 7〉 Comparison of the effect of quarterly earnings announcements on analyst forecast revision, absolute forecast error, and change in analyst forecast error based on volatility of earnings.

Variable	Absolute magnitude of individual analyst forecast error (*Revision*)			Absolute value of individual analyst forecast error (*Forecast Error*)		
	Coeff.	t Value		Coeff.	t Value	
Intercept	0.3142	6.6	***	1.2630	15.91	***
Ann	0.0238	5.73	***	-0.0257	-3.72	***
PostAnn	0.0089	1.94	*	-0.0231	-3.01	***
HVol	0.0370	2.76	***	0.2708	12.15	***
*Ann*HVol*	0.0152	2.16	**	-0.0018	-0.16	
*PostAnn*HVol*	-0.0040	-0.7		0.0052	0.55	
Revision						
lnMV	-0.0253	-8.14	***	-0.0789	-15.26	***
ChgEPS	-0.0140	-4.21	***	0.0025	0.45	
Coverage	-0.0020	-7.69	***	-0.0026	-5.84	***
Age	0.0010	35.25	***	-0.0001	-1.07	
Horizon	0.0002	3.12	***	0.0005	3.58	***
Adj R-Sq		0.2019			0.3572	
N		14665			14665	

***, **, * significant at 1%, 5%, and 10% level, respectively

Note:

Revision = absolute value of the change in analyst i's year t annual EPS forecast for firm j since the prior forecast issuance;

Forecast Error = analyst i's forecast error measured by the absolute value of difference in analyst's forecast and actual EPS in year t;

$Ann_{i,j,q,d}$ = 1 if analyst i issues an annual EPS forecast for firm j in the announcement period, zero otherwise;

$PostAnn_{i,j,q,d}$ = 1 if analyst i issues an annual EPS forecast for firm j in the post-announcement period, zero otherwise;

$HVol_j$ = 1 if the standard deviation of firm j's earnings scaled by average for past 10 years is greater than median value of standard deviation of earnings in each year;

lnMV = log of the market value of the firm j's equity at the end of fiscal quarter q;

$ChgEPS_{i,q}$ = absolute change in firm j's quarterly EPS measured by the change in quarterly actual EPS between current year and prior year, divided by the actual annual year t EPS.

Coverage = log of the number of analysts following firm j in year t;

Age = number of days between analyst i's prior forecast issuance date and revise forecast date;

Horizon = number of days between analyst i's annual EPS forecast for firm j on day d and fiscal year end.

from firms with high earnings volatility has greater effect on analyst forecast revisions and help analysts have higher forecast accuracy.

Ⅴ. Conclusion

The relatively recent regulation in Korea requiring issuance of quarterly earnings reports is expected to provide important information for investors. My evidence suggests that quarterly earnings announcements do trigger analyst forecast revision activities. I find a significant increase in analyst forecast frequency immediately following earnings announcement issuance, and positive abnormal percentage of forecasts are concentrated on days around the quarterly earnings announcement. My results suggest that analysts use quarterly earnings announcements as important information sources on which to base their forecasts.

I also find evidence that quarterly earnings announcements significantly affect analyst forecast revisions and improve forecast accuracy. In my tests, I find a larger magnitude of forecast revision during announcement periods than during pre- and post-announcement periods. Forecast errors are lower during announcement periods than during pre-announcement periods; however, there is little difference in forecast error between announcement and post-announcement periods.

The objective of accounting is to examine the role of analysts as information intermediaries in Korean capital market by examining forecast revision around quarterly earnings announcements. Because analyst forecasts are often used as proxy for market expectation and because quarterly earnings announcement is new disclosure requirement to Korean companies, how analysts use quarterly earnings announcement to revise their forecasts is interesting topic to researchers and regulators. Overall, my results suggest that quarterly earnings announcements provide predictive information about future earnings, implying that the disclosures do provide useful information. The quarterly disclosures also aid analysts in improving forecast precision. These results suggest that information environment surrounding a firm becomes richer after new regulation. In addition, my empirical results suggests that analysts actively use firm disclosure to form their forecasts, implying they serve as information intermediaries in Korean capital market.

It is difficult to compare my empirical results with those based on U.S. analyst data. However, my findings can give some clues about similarity and difference in analyst behaviors between Korea and the U.S. market. Overall, Korean analysts' forecast behaviors are similar to those of the

U.S. analysts. I find a significant increase of forecast revision (18% of analyst forecasts) within four days following quarterly earnings announcements. This result implies that Korean analysts heavily rely on to revise their forecasts. This suggests that researchers can use analyst forecast revisions around earnings announcement as proxy for unobservable individual market participants' belief changes. This can improve our understanding about complicated capital market mechanism of information dissemination and stock price formation (Schipper 1991). I also find that small information content of analyst forecasts in post-announcement relative to forecasts in announce period. These similarities of Korea analyst behaviors to the U.S. analysts' behaviors suggests that Korean analyst data can be useful to test theories based on U.S. market such as information cascade from external information shock (Welch 1992; Bikhchandani and Sharma 2001) or stock drift after earnings announcements (Bernard and Thomas 1989; Stickel 1991; Brown 1993; Womack 1996; Gleason and Lee 2003).

References

Abarbanell, J. S., W. N. Lanen, and R. E. Verrecchia. 1995. Analysts' forecasts as proxies for investor beliefs in empirical research. *Journal of Accounting and Economics* 20 (1): 31-60

Agrawal, A., S. Chadha, and M. A. Chen. 2006. Who is afraid of reg fd? The behavior and performance of sell-side analysts following the sec's fair disclosure rules. *Journal of Business* 79 (6): 2811-2834

Atiase, R. 1985. Predisclosure information, firm capitalization and security price behavior around earnings announcements. *Journal of Accounting Research* 23 (1): 21-36

Bamber, L. S., O. E. Barron, and T. L. Stober. 1997. Trading volume and different aspects of disagreement coincident with earnings announcements. *Accounting Review* 72 (4): 575-597

_____. 1999. Differential interpretations and trading volume. *Journal of Financial & Quantitative Analysis* 34 (3): 369-386

Barron, O. E. 1995. Trading volume and belief revisions that differ among individual analysts. *Accounting Review* 70 (4): 581-597

Barron, O. E., O. Kim, S. C. Lim, and D. E. Stevens. 1998. Using analysts′ forecasts to measure properties of analysts′ information environment. *Accounting Review* 73 (4): 421

Barron, O. E., D. Byard, C. Kile, and E. J. Riedl. 2002a. High-technology intangibles and analysts′ forecasts. *Journal of Accounting Research* 40 (2): 289-312

Barron, O. E., D. Byard, and O. Kim. 2002b. Changes in analysts′ information around earnings announcements. *Accounting Review* 77 (4): 821-846

Beaver, W. 1998. *Financial reporting: An accounting revolution* Englewood Cliffs, NJ:

Prentice-Hall.

Bernard, V. L., and J. K. Thomas. 1989. Post-earnings-announcement drift: Delayed price response or risk premium? *Journal of Accounting Research* 27 (3): 1-36

Bikhchandani, S., and S. Sharma. 2001. Herd behavior in financial markets. *IMF Staff Papers* 48 (3): 279-310

Bowen, R. M., A. K. Davis, and D. A. Matsumoto. 2002. Do conference calls affect analysts' forecasts? *Accounting Review* 77 (2): 285-316

Brown, L. D., and M. S. Rozeff. 1979a. The predictive value of interim reports for improving forecasts of future quarterly earnings. *The Accounting Review* 54: 585-591

_____. 1979b. Univariate time-series models of quarterly accounting earnings per share: A proposed model. *Journal of Accounting Research* 17: 179-189

Brown, L. D. 1985. Review of forecasts: Scaling & analysis of expert judgements regarding cross-impacts of assumptions on business forecasts & accounting measures. *International Journal of Forecasting* 1 (3): 320-321

Brown, L. D., and J. C. Y. Han. 1992. The impact of annual earnings announcements on convergence of beliefs. *Accounting Review* 67 (4): 862-875

Brown, L. D. 1993. Earnings forecasting research: Its implications for capital markets research. *International Journal of Forecasting* 9 (3): 295-320

_____. 2001. A temporal analysis of earnings surprises: Profits versus losses. *Journal of Accounting Research* 39 (2): 221-241

Cho, J.-S., and M.-H. Jo. 2006. The relation between quarterly reports and informaiton asymmetry. *Journal of Accounting* 15 (2): 59-72.(written in Korean)

Clement, M. B., and S. Y. Tse. 2005. Financial analyst characteristics and herding behavior in forecasting. *Journal of Finance* 60 (1): 307-341

Elgers, P. T., M. H. Lo, and J. R. J. Pfeiffer. 2001. Delayed security price adjustments to financial analysts' forecasts of annual earnings. *Accounting Review* 76 (4): 613

Givoly, D., and J. Lakonishok. 1979. The information content of financial analysts' forecasts of earnings: Some evidence on semi-strong inefficiency. *Journal of Accounting and Economics* 1:165-185

_____. 1980. Financial analysts' forecasts of earnings. *Journal of Banking & Finance* 4 (Issue 3): 221-233

Gleason, C. A., and C. M. C. Lee. 2003. Analyst forecast revisions and market price discovery. *Accounting Review* 78 (1): 193-225

Graham, J. R. 1999. Herding among investment newsletters: Theory and evidence. *Journal of Finance* 54: 237-268

Healy, P. M., and K. G. Palepu. 2001. Information asymmetry, corporate disclosure, and the capital markets: A review of the empirical disclosure literature. *Journal of Accounting & Economics* 31 (1-3): 405-440

Hong, H., J. D. Kubik, and A. Solomon. 2000. Security analysts' career concerns and herding of earnings forecasts. *RAND Journal of Economics* 31 (1): 121-144

Hong, H., T. Lim, and J. Stein. 2000. Bad news travels slowly: Size, analyst coverage, and

the profitability of momentum strategies. In *Journal of Finance*, 265-295.

Hopwood, W. S., and P. Newbold. 1982. The additional information content of quarterly earnings, reports intertemporal disaggregation. In *Journal of Accounting Research*, 343-349.

Irvine, P. 2000. Do analysts generate trades for their firms? Evidence from the toronto stock exchange. In *Journal of Accounting & Economics*, 209-226.

Ivković, Z., and N. Jegadeesh. 2004. The timing and value of forecast and recommendation revisions. *Journal of Financial Economics* 73 (3): 433-463

Kandel, E., and N. D. Pearson. 1995. Differential interpretation of public signals and trade in speculative markets. *Journal of Political Economy* 103 (4): 831-872

Kim, K. 1998. Re-examination of analyst forecast ability. *Korean Accounting Review* 23: 157-181.(written in Korean)

Kim, O., and R. Verrecchia. 1991. Market reaction to anticipated announcements. In *Journal of Financial Economics*, 273-310.

Kim, T.-D., and S. Sohn. 2006. A study on the effect of the continuous audit system on the usefulness of financial statements - focusing on quarterly review *KOREAN MANAGEMENT REVIEW* 35 (4): 989-1014. (written in Korean)

Lang, M. H., and R. J. Lundholm. 1996. Corporate disclosure policy and analyst behavior. *Accounting Review* 71 (4): 467-492

Lee, C. M. C. 1999. Accounting-based valuation: Impact on business practices and research. *Accounting Horizons* 13 (4): 413-425

Lee, E., and W. Li. 2006. Which is the better proxy for the market expectation of earnings between random-walk model and analyst forecast model in korean stock market? *Korean Journal of Business* 19 (3): 909-932.(written in Korean)

Lee, H. D., and G. G. Yook. 2004. Information content of semi-annual earnings announcement after regulation of quarterly financial statement disclosure. *Journal of Business Research* 19 (3): 241-266.(written in Korean)

Lee, K., and J. Jang. 1992. Analyst earnings forecast ability. *Korean Accounting Review* 14: 193-219.(written in Korean)

Morse, D., J. Stephan, and K. S. Earl. 1991. Earnings announcements and the convertgence (or divergence) of beliefs. *Accounting Review* 66 (2): 376-388

Park, C. 2004. Comparison of analyst forecast accuracy. *Korean Accounting Studies* 9:1-224.(written in Korean)

Scharfstein, D. S., and J. C. Stein. 1990. Herd behavior and investment. *American Economic Review* 80 (3):465-479

Schipper, K. 1991. Commentary: Analysts' forecasts. *Accounting Horizon* 5:105-121

Sohn, S. 1995. Comparison of analyst forecasts. *Korean Accounting Review* 20: 73-105. (written in Korean)

Stickel, S. E. 1989. The timing of and incentives for annual earnings forecasts near interim earnings announcements. *Journal of Accounting & Economics* 11 (2/3): 275-292

_____. 1991. Common stock returns surrounding earnings forecast revisions: More puzzling evidence. *Accounting Review* 66 (2): 402-

416

_____. 1992. Reputation and performance among security analysts. *Journal of Finance* 47 (5): 1811-1836

_____. 1995. The anatomy of the performance of buy and sell recommendations. *Financial Analysts Journal* 51 (5): 25

Trueman, B. 1990. On the incentives for security analysts to revise their earnings forecasts. *Contemporary Accounting Research* 7 (1): 203-222

_____. 1994. Analyst forecasts and herding behavior. *Review of Financial Studies* 7 (1): 97-124

Verrecchia, R. E. 2001. Essays on disclosure. *Journal of Accounting and Economics* 32 (1-3): 97-180

Welch, I. 1992. Sequential sales, learning, and cascades. *Journal of Finance* 47 (2): 695-732

Womack, K. L. 1996. Do brokerage analysts' recommendations have investment value? *Journal of Finance* 51 (1): 137-167

Youn, S., and S. Huh. 1991. Comparision of time-series earnings forecasts and analyst earnings forecasts. *Korean Accounting Review* 13: 49-60.(written in Korean)

기업의 분기이익보고가 애널리스트의 이익 예측치에 미치는 영향에 관한 연구

송민섭*

요 약

본 연구는 분기이익공시가 재무분석가의 이익 예측치 수정과 예측 오차에 어떠한 영향을 미치는 가에 대해 연구한다. 2000년부터 국내 상장기업들에게 이익 보고가 요구되고 있다. 만약 분기별 이익 공시가 투자자들에게 유용한 정보를 제공하고 재무분석가들이 분기이익보고를 이익예측하는 데 사용한다면, 이익 공시를 전후로 재무분석가의 이익예측치에 다른 속성이 나타날 것으로 기대된다. 연구 결과는 재무분석가의 이익예측치의 발표 빈도가 분기이익보고일 직후에 급격히 증가하는 것을 발견하였다. 분기이익 공시 사건일을 전후로 발표한 재무분석가의 이익예측치의 수정치의 절대값은 다른 비사건일 기간에 발표한 예측수정치의 절대값에 비해서 유의적으로 컸다. 또한 분기별 사건일 이후에 발표한 수정치의 예측 정확성은 분기이익 공시 이전에 보고한 이익예측치보다 높았다. 하지만, 분기이익보고 후 4일 이내에 보고한 재무분석가의 이익예측치와 4일 이후에 보고한 이익예측치간의 예측오차는 별다른 차이가 없었다. 이러한 결과는 재무분석가는 분기별 이익보고를 이익예측에 사용하고 있으며, 분기이익보고 직후의 재무분석가의 이익예측치의 정보효과가 가장 크다는 것을 의미한다.

주제어: 재무분석가, 이익예측치, 애널리스트, 이익 수정, 이익예측오차, 이익예측시기, 이익의 예측가능성, 정보효과, 분기이익보고, 분기이익

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