Empirical Study on the Difference in Analyst' Tendency for earning forecast and Impact on Stock Price by Industry Types

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Abstract

When analysts forecast the future earnings of a firm, the method used in analyzing and forecasting such a firm differs according to the industry that it participates in due to the various characteristics each industry possesses. This study is motivated by this point. Firstly this study investigates whether the overestimating tendency and forecast accuracy of an analyst are different among industries, as well as running a cross-sectional regression using dummy variables to test the effect of the industry to forecast errors. In addition, this study examines whether there exists difference in stock price impact of analysts according to industry types using CAR for 20 days before and after changing the recommendations.

It turned out that there exists a significant difference in the tendency for over-forecast and the accuracy of forecasts of analysts according to each industry. In addition, a tendency for the under-prediction has been identified especially for the Bank Industry. Interestingly even in the same industry, analysts are more likely to overestimate earnings about net income compared to sales and operating profit. Furthermore, in regards to the difference in the influence on the stock price in cases where an analyst changes its target price/investment recommendation, the study has observed a significant difference depending on the industry that an analyst is participating in. At the end of the study, by comparing the results of the influence on stock prices and the accuracy of forecasts of an analyst in the earlier section of this research, it has identified that the industry where an analyst had lower forecasting accuracy showed a lower influence towards the stock price of an analyst. It seems that investors tend not to trust analysts' who have already presented a relatively less accurate forecast.

Ⅰ. Introduction

According to a recent KOFIA (Korea Financial Investment Association) report, currently there are 63 securities companies in South Korea where a total of 1575 analysts are actively participating in the industry. It has been identified that these analysts are putting their best efforts in order to minimize the agency problem as well as the asymmetric information problem within the equity market as to provide market participants various investment opportunities.

Generally, the main tasks of these analysts are to estimate the performance of a firm and to calculate the targeted stock price in order to compare the projected price with the market price to further suggest a buy or a sell signal. However, it is not easy to forecast the performance of such firms due to the various characteristics that differ from one industry to another. For example, forecasting earnings of a steel industry is difficult in that it is likely sensitive to prices of commodities and exchange rates because most companies in the steel industry obtain almost all of the raw materials from abroad. Consequently, it is very difficult to accurately forecast a firm's (as per the steel industry example) future inflows. As for the construction industry that is sensitive to the state of an economy, it is even more difficult for analysts to project a firm's future performance due to the changes in the inside and the outside factors of the market, such as interest rates or the real estate market since it will suddenly change a firm's profit.

Likewise, it is certain that each industry has its own characteristics and thus techniques or models used in forecasting a firm's performance are inevitably different from one another. In this sense, the accuracy of forecasting, which is the forecast error rate, cannot be same among industries.

In addition, the IR data provided from a firm to an analyst may also be over-calculated, which will significantly influence the forecast of an analyst. This in return will definitely create an error regarding the forecast provided by an analyst. As a result, the error rate for each industry will clearly be different from the others making the effects of such errors on the accuracy and information to a firm's performance dissimilar as well. Consequently, it can be assumed that the roles of analysts that provide accurate forecasts for investors cannot possess equal importance and influence.

Various empirical evidence have been suggested by existing advance research regarding the over-prediction provided by analysts2. For this reason, whether or not the accuracy of a forecast or over-prediction, according to the industry than a firm under an analysis, are different is verified based on the advance research, which in case the result shows a significant mismatch, the magnitude of the largest difference for each industry should be identified. Furthermore, this study will focus on the

analysis of the difference on strengths of effects made by analysts according to the industry in which they are participating based on the changes in target price and investment recommendation projected by each analyst. At the end of this research, correlation between the influence of each analyst and stocks with high prediction accuracy will be discussed based on the extracted results.

The majority of previously published research tends to focus on the accuracy and profitability of performance forecast according to the characteristics of each analyst. For example, such research discussed the difference in the predictive power of analysts by distinguishing them according to the size of securities companies, large-cap securities companies and mid-small cap securities companies, in which the analyst was participating in.[1] Also, such research concentrated on the comparison of the predictive power of analysts who were chosen as the best analysts with those analysts who have not been chosen as the best analysts.[2]

However, the purpose of this research is to carry out a an empirical analysis regarding how strong the effect of an analyst towards a stock price is and how big the over-forecast, forecast error are created according to the given characteristics of each industry that the firm of an analyst's interest lies in but not the characteristics of various analysts.

Among all the research either from foreign or domestic academia, this research is the first study that discusses the forecast error of analysts according to each industry, thus there is meaningfulness in carrying out this research. In addition, the study uses three accounting notions such as sales, operating profit, and net income in order to analyze each forecast error unlike other previous studies. For this reason, this study will suggest better empirical results that are more subdivided compared to other studies that focus on forecast errors using fragmentary indices such as EPS or sales.

Generally, when the participants of an equity market makes an investment decision, sales, operating profit, and net income forecasts provided by an analyst are often referred to. In this sense, taking the forecast error for each industry into account will allow investors to make more sound investment decisions. In addition, based on the previously carried out research that suggests a possibility of conflict of interests regarding the negative correlation between the accuracy of forecasts and the rate of return, it will make it easier for the supervisory country to decide the industries in which the probability of conflict of interests is relatively higher and at the same time it will provide implications for compliance officers of securities companies.

This research is composed in the following manner. Chapter 2 will cover the empirical implications by studying the previous research, whereas chapter 3 will organize and define the related data. In

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[1] The effect of changes in Analyst' investment recommendation ranking on stock return and trading volume, Won Heum Lee, Su Mi Choi, Korean Securities Association, 2003

[2] Do Best Analysts Have Better Earnings Forecasting Ability and Stronger Stock Price Impact Than the Other Analysts? Kim dong-sun, Korean Journal of Business Administration , 2009

chapter 4, the research hypothesis and research method will be suggested. Continuing with chapter 5, it will present and interpret the results from the empirical analysis, and finally in chapter 6, the summary as well as the conclusion will be presented.

Ⅱ. *Literature Reviews*

Recently, studies regarding the accuracy of forecasts and the abnormal return of analyst' recommendations have been actively conducted in the field of finance. Especially, a study on the information reliability and conflict of interest of analysts have gained interests of those in the field of finance.

For instance, according to Park and Jo (2004), it suggested that analysts within either a conglomerate affiliated securities companies or a affiliated securities companies both tend to suggest limited and negative investment recommendation in case a clear decrease in abnormally exceeding rate of return is expected regarding conglomerate affiliated companies. In this sense, it has been identified, at least regarding to the negative investment recommendation, that analysts from both conglomerate affiliated securities companies and non-conglomerate affiliated securities companies possess problems related to fairness and reliability.

According to Park and Youn (2009), it is true that the higher probability of positive bias may exist for securities companies in which the analyst is included forms special relationship with the firm under an analysis. However, considering the overall correlation including the magnitude of bias, it is hard to consider that a special relationship between securities companies and the target of evaluation will create a significant bias and at the same time it is hard to conclude that the accuracy also shows a significant difference.

There have also been researches that focus on the accuracy and the difference in the influence on the stock price according to the characteristic of a firm under an analyst's review. Especially in regards to the estimation of the accounting profit of a firm, studies on the effect of an analyst's geographical proximity towards the estimation have been closely paid attention and have resulted in significant findings by the academia both in Korea as well as in foreign countries. According to Malloy (2003), based on the analysis of profit estimation of firms in United States from 1983 to 2002, those analysts who were geographically close to the a firm of the accounting profit estimation showed significantly more accurate forecast than those analysts who were not close to the firm under review and at the same time analysts who were close to the firm even provided more estimation to the market as well. Such a phenomenon is explained by the fact that analysts who are closely located with the firm under a review possess informational advantage and such an advantage is bringing about better

performance of estimation.

On the other hand, regarding the management of a mutual fund, Coval and Moskowits (2001) showed that fund managers are investing more to the companies who are geographically closer by analyzing the roles of geographical proximity of an investment company to describe the negative correlation between the information acquisition cost and geographical proximity.

In a similar perspective, Kim and Eum (2009) carried out an empirical analysis of the difference in between the accuracy of prediction and the influence on the stock price of analysts according to the location of a firm's main office under the analysis. As a result, it has been identified that the analysts tend to over-forecast the sales, operating profit, and net income and in case company's main office is located in countryside, it turned out that analysts' level of over-prediction was bigger than the analysis of those companies located within Seoul. The accuracy of earnings forecast of analysts was more accurate for companies within Seoul than the companies in countryside.

In this very research, it will focus on the differences in the tendencies for prediction projected by analysts according to the characteristics of a firm under review. In other words, an empirical analysis will be carried out by comparing the differences in influence on the stock price and the accuracy of forecasts of analysts as well as to investigate the causes of the results.

Ⅲ. DATA

1. Classification of Industries

Recently, leading industries has been a frequently used term in the stock market along with expressions like "coping strategies by industry" and "sector rotation rise by industry." This indicates that the characteristics of the industry play a crucial role on the stock market.

In this research, the characteristics of each industry are focused on in order to investigate the tendencies for predictions of analysts according to the industry that such analysts are participating in. In order for the execution of the analysis of this research, it has utilized the categories of industrial index created by KRX, which was made to understand the trend of stock prices for each industry based on the unique characteristics that each industry possess. The performance of an individual stock is closely related to the performance of the industry it lies in. At the same time, general business fluctuations do not influence all industries in a similar manner. Therefore since the 1980's KRX has divided all growth stocks into corresponding industries as well as computing the stock index for each industry in which all

stocks included in this very industry are grouped together. Currently there are 22 different industries according to the Korean Standard Industrial Classification presented by the KRX and its usage in everyday life as a performance indices or even investment indices for each industry is very demanding.

In this research, the reason for borrowing the industrial categorization provided by KRX is because the majority of research centers on securities companies, which are also dividing the roles of each analyst according to such a categorization and at the same time it is the most widely used index that presents characteristics on a industry within the field of securities business. In addition, specialists both in South Korea and foreign countries are making use of this very index in understanding the trend of each industry as well as to support the execution of investment and it is suitable for this very research as well.

The only thing is that there are repetitions in these categories of 22 industries such as the manufacturing industry, which includes the Electrical & Electronic Equipment industry, the construction industry, the machinery industry, and the Textile & Apparel industry. In addition, the number of companies that are included are 448 and this breaches the very premises of this research, which is to empirically analyze the tendency of prediction of specific industries. As well as for financial businesses, it redundantly includes companies that are included in securities industry, bank industry, and insurance industry, which would disturb the main purpose of the study. Consequently, in this research the manufacturing industry and the financial industry will be ruled out among the 22 industry categories, thus only 20 industries will be included as the subjects for analysis.

2. Sample Population

(1) Analysts

An analyst report in this research refers to those that belong within a securities company at the time of publication of the research analysis data and at the same time it is a report that includes target prices and investment recommendation as well as profit prediction of a firm from April 1st 2007 to June 30th 2010 created by those who are registered as analysts by the Korean Financial Investment Association. In this sense, the expression performance prediction (prediction of accounting profit) refers to the three elements of sales, operating profit, and net income.

The subjects of this research are the listed companies offered in the marketable securities market of

KRX dealt by analysts of domestic securities companies and it is limited to firms in which analysts have previously reviewed and were continuously listed on the market from March 1st 2007 to July 31st 2010. The uniqueness of this very research is the fact that it collects the forecasts of analysts from all securities companies in order to personally figure out the errors to execute a statistical analysis but not to make use of the aggregated consensus of analysts.

Data Standards

1) An analysis report of a company that does not have information regarding sales, operating profit, and net income are ruled out.
2) An analysis report provided by a unidentified analyst is ruled out.
3) In order to remove the outliers regarding earnings forecast, a value that exceeds the absolute value of stock price when the report was first issued by 25% or a value that exceeds the absolute value of EPS by 200% are ruled out.[3]
4) In order to select the analysis report for the accounting year t, reports that are published in between April of year t to March of year t+1 are selected.[4]
5) However, reports that are published in between July of year t and June of year t+1 regarding financial business and companies that have settled the accounts in March are selected.[5]

Standards in (3) are generally used in previous researches such as Loh and Mian (2006), Koh and Kim (2007), thus this very standard is applied in order to rule out the outliers of earnings forecast. In case of companies that have settled accounts in December, since the earnings performance of year t is presented around late March of year t+1, the reports of analysts from April of year t up to late March of year t+1 tend to include the earnings forecast for year t. Consequently, in order to analyze the data of an analysis report for the corresponding accounting year, standards stated in (4) are applied. However, for financial businesses and several other companies that have settled accounts in March tend to present the performance of year t around June of year t+1, for this reason, this research has selected the accounting earnings forecast published from July of year t to June of year t+1 as the research subject according to the standard (5).

The earnings forecast information of analysts is collected through the Dataguide, and the subject securities companies are the 38 securities companies in South Korea. According to such a standard,

[3] Have followed the frequently used tool in order to rule out the outliers of earnings forecasts as previously commenced studies such as Loh and Mian(2006) and etc. The same standards are used.
[4] Bong-Chan Koh (2007).
[5] Bong-Chan Koh (2007).

samples of the subject have been selected which totaled the number of forecasts of 57,868. The following <Table 1> describes the forecast according to categories of each year and each industry.

(2) Stocks

All companies included within the indices for each industry provided by the exchange of KRX. Such stocks are limited to KOSPI stocks and the KOSDAQ stocks are ruled out from the subjects of this research. Data related to stock prices are collected from the Yon-Hap Infomax data. <Table 1> shows the number of constituent stocks of each industry and <Table 2> indicates the market capitalization of each industry.

<Table1> Descriptive statistics on analyst forecast: May 2007~June 2010

This table presents, by year, the number of stock constituent to each industry and the number of the covered firms with

	No. constituent stocks	2007		2008		2009	
		No. Firms	No. Reports	No. Firms	No. Reports	No. Firms	No. Reports
Construction	36	20	1250	19	1318	16	1284
Machinery	40	11	297	9	357	11	425
Insurance	13	5	784	6	793	6	463
Non-Metalic Mineral Products	22	5	52	4	53	4	46
Service	87	39	2473	35	2254	35	3185
Textile & Wearing Apparel	30	6	383	7	349	7	374
Transportation Equip.	47	22	2115	20	1976	20	2040
Transport & Storage	20	9	647	8	550	10	700
Distribution	53	16	710	19	1205	19	1333
Bank	5	4	316	4	181	4	293
Food & Beverage	37	12	504	13	852	16	841
Medical Precision Machines	5	1	68	1	64	1	41
Medical supplies	39	15	986	12	1557	12	1012
Electricity & Gas	12	7	418	8	372	9	491
Electrical &	59	19	2479	20	2421	24	2259

Electronic Equip.							
Paper & Wood	24	8	216	6	252	6	243
Securities	22	9	705	9	433	9	389
Iron & Metal Product	45	16	1391	15	1223	16	1364
Communication	3	3	603	3	690	3	760
Chemicals	88	30	2318	31	3015	24	1695
total	687	257	18,715	249	19,915	252	19,238

<Table2> Market capitalization of each industry
and ratio of each industry to total market capitalization

Billion Won, %

Industry	Market Cap	Ratio	Industry	Market Cap	Ratio
Construction	35,567,816	0.3	Food & Beverage	21,416,089	1.9
Machinery	22,177,262	2.0	Medical Precision Machines	572,301	0.1
Insurance	52,020,354	4.7	Medical supplies	11,052,514	1.0
Non-Metalic Mineral Products	3,701,350	0.3	Electricity & Gas	23,103,951	2.1
Service	129,309,342	11.6	Electrical & Electronic Equip.	204,636,192	18.4
Textile & Wearing Apparel	5,418,605	0.5	Paper & Wood	2,071,910	0.2
Transportation Equip.	206,863,213	18.6	Securities	22,738,161	2.0
Transport & Storage	25,554,295	2.3	Iron & Metal Product	77,955,696	7.0
Distribution	69,242,882	6.2	Communication	24,665,460	2.2
Bank	16,280,038	1.5	Chemicals	159,952,351	14.4

Date: 29th Dec. 2009

IV. Hypotheses and Methodology

Hypothesis 1-1. There is a significant difference in the accuracy of forecasts or over-prediction level according to the industry that the particular company analyzed by analyst is participating in when an analyst carries out a performance prediction.

The ultimate purpose of this very research is to identify the tendency of prediction difference and

influence on the stock price differences of an analyst according to the industry. For this reason, the very first task is to verify if there exists a significant difference regarding the over-prediction tendency of an analyst according to each industry. In doing so, the possibility of significant difference in earnings forecast for each industry is observed by dividing them into sales, operating profit, and net income.

In order to calculate the magnitude of over-prediction, the relative forecast error is used as the value for the forecast error. (Measurement of over-prediction)

$$FE_{i,t,f} = \frac{A_{i,t} - F_{i,t,f}}{|A_{i,t}|}$$

In this formula, $FE_{i,t,f}$ refers to the forecast error of year t of the firm i by the analyst f, whereas $A_{i,t}$ refers to the actual values of accounting profit of the firm I, and lastly, $F_{i,t,f}$ refers to the accounting earnings forecast of year t of the firm *i* by the analyst *f*. (The accuracy of earnings forecast verified by hypothesis 3 should be measured by the forecast error that does not consider the sign. In other words, the absolute value of a forecast error, which is the absolute value of a relative error, is used as the yardstick of accuracy.)

In addition, the absolute value of the previously used value of forecast error is used for the accuracy of forecast. In other words, this is the absolute value of difference in prediction and it shows the absolute difference of forecast error. For this reason, it will allow the estimation of the accuracy of forecast. (Measurement of the accuracy of forecasts)

To begin with, an ANOVA test is executed by considering the sign regarding the relative forecast error in order to verify whether or not the difference of the level of over-prediction between each industry exists and at the same time an ANOVA test is executed again by utilizing the absolute value of relative forecast error that did not consider the sign in order to verify the difference in forecast accuracy according to each industry. Such ANOVA tests are executed for each value of sales, operating profit, and net income.

Hypothesis 1-2. There exist industries where over-prediction of analyst does not industry regarding sales, operating profit, and net income.

The majority of foreign research in which the predictive power of analysts is evaluated based on the accuracy of earnings forecast suggested that there exists a tendency where forecasts of analysts systematically exceed the actual earnings. In other words, analysts tend to over-forecast rather than

the actual earnings since firms tend to exaggerate their future performance estimation.

In addition, these are the results where the tendencies for over-prediction of analysts are reflected. However, this is just a general result but it cannot be concluded that such a phenomenon of over-prediction is something that occurs in all industries. Consequently, based on this very hypothesis, it is subdivided into 20 different industries in order to empirically verify if the over-prediction may occur towards the accounting performance forecast of firms included in all industries. In other words, the tendency of over-prediction of analysts in relation to the existing general result will be observed by dividing them into subdivided industries. Some industries have shown potential to rather under-predict than to over-predict. For this reason, this very hypothesis will divide tendencies of over-prediction into sales, operating profit, and net income according to each industry.

The reason for distinguishing the forecasts of sales, operating profit, and net income is because of the characteristics that each industry possess, which may affect the accuracy when forecasting the accounting performance. For example, in case of a raw material processing business, sales are formed according to prearranged contracts and in fact this allows for a clear estimation of sales, but it may be difficult to forecast accurately the operating profit and net income due to the effects of changes in the cost of raw materials and exchange rate. In this sense, this research will observe such a phenomenon by dividing each forecast error regarding sales, operating profit, and net income.

Hypothesis1-3. The industry in which a company participates in significantly affects the performance forecast of analysts.

Currently in the research centers of a securities company, companies under analysis are divided into each industry and analysts with professionalism in each field of an industry are assigned to the corresponding industry in order for them to provide a more professional company analysis. Therefore, firms in all of the industries are not analyzed according to the same standards and also the unique characteristics of an industry are applied when forecasting the accounting profit and performance. Consequently, it is considered that characteristics of prediction may be identified by forecasting the accounting profit and analyzing companies according to each industry with different characteristics. In other words, there is a relatively strong tendency of over-prediction for some industries whereas other industries may lack the tendency for over-prediction due to the characteristics possessed by the industry. In the end, this very hypothesis regarding the tendencies of each industry will be verified and at the same time the level of accuracy of prediction for each industry will also be verified.

As it was mentioned above, the accuracy of earnings forecast must be measured by the forecast error that does not consider the sign. In other words, the absolute value of a relative error, which is the absolute value of a forecast error, must be used as the yardstick of accuracy. The reason for

additionally verification of this very hypothesis in addition to previous hypotheses is to figure out the relationship between the industry in which a firm is participating in and the forecast error or the accuracy of forecasts through a cross-sectional regression analysis.

Firstly, in order to verify the hypothesis projected in this research, a simple cross-sectional regression analysis is executed. The forecast error is selected for the dependent variable and the dummy variable (INDUSTRY) is selected as the independent variable.

$$FE_f = \beta_0 + \beta_1 INDUSTRY_f + \varepsilon_f \quad . \qquad (M1)$$

$$FE_f = \beta 0 + \beta_1 log(Size_f) + \beta_2 FHR_f + \beta_3 ROE_f + \beta_4 LEV_f + \beta_4 log(HORIZON) + \varepsilon_f \qquad (M2)$$

$$FE_f = \beta 0 + \beta_1 log(Size_f) + \beta_2 FHR_f + \beta_3 ROE_f + \beta_4 LEV_f + \beta_4 log(HORIZON) + \beta_5 INDUSTRY_f + \varepsilon_f \quad (M3)$$

Additionally, the absolute value of a forecast error is selected for the dependent variable, as for the independent variable, a percentage of shareholding by foreigners, market capitalization, debt ratio, ROE, the difference in number of days between actual performance publication date and estimated publication date of analysts, are chosen for the characteristic variable of a firm. The reason for choosing a percentage of shareholding by foreigners and market capitalization as independent variables is because, as it was disclosed by Leun, Lins, and Warnock (2008), foreign investors tend to invest in firms with excellent corporate governance and major companies in which the information asymmetry is at its lowest level, which means these firms may have transparency regarding information related to earnings forecast. In addition, the bigger the market capitalization and percentage of shareholding by foreigners, the more active will the monitoring of executives be. Accordingly, it is expected that the quality of information such as a business plan or IR data will be higher and will create a more accurate earnings forecast.

The reason for selecting the number of reports of analyst as an independent variable is because of the fact that more reports can mean that there is a lot of information being interchanged in the market and at the same time it means that firms are considered active regarding IR activities, which will result in an increased accuracy of prediction.

John and Litov(2008) suggested that firms with a strong protection of shareholder's rights and with excellent corporate governance tend to have a low level of debt ratio, which will allow executives to operate the firm in a more transparent way. In addition, in case the profitability and financial structure are sound, executives will tend to show less of an exaggeration of future performance such as unreasonable management target rates.

According to O'Brien(1988) which as the day of the earnings forecast come close to the day of actual earnings, analysts can forecast earnings more accurate, I employ the forecast horizon as explanatory variable

In case a firm executes IR by exaggerating the performance target rates and by providing analysts with company information, the error will be larger for forecasts of analysts, thus the explanatory variable such as debt ratio, and ROE are selected.

The formula of a cross-sectional regression analysis used in this research will be as follows.

$$|FEf| = \beta_0 + \beta_1 INDUSTRY_f + \varepsilon_{ff} \quad (M4)$$

$$|FEf| = \beta_0 + \beta_1 log(Size_f) + \beta_2 FHR_f + \beta_3 ROE_f + \beta_4 LEV_f + \beta_4 log(HORIZON) + \varepsilon_f \quad (M5)$$

$$|FEf| = \beta_0 + \beta_1 log(Size_f) + \beta_2 FHR_f + \beta_3 ROE_f + \beta_4 LEV_f + \beta_4 log(HORIZON) + \beta_5 INDUSTRY_f + \varepsilon_f \quad (M6)$$

In the formula above, size refers to the market capitalization, and FHR refers to the percentage of shareholding by foreigners. Data for market capitalization and the percentage of shareholding by foreigners are extracted from the end-of-the-year reports for each year. ROE and LEV also refer to profitability and debt ratio, thus ROE and debt ratio from the end-of-the-year report will be used. INDUSTRY is a dummy variable which refers to the industry. The reason for selecting the absolute value of forecast error for the dependent variable is to confirm the accuracy of prediction rather than to see if the forecast of analysts are over-valued or under-valued than the actual values.

Hypothesis 2-1. There is a significant difference in influence on the stock price for each industry when the target price or the investment recommendation of analysts is changed.

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If there is a significant difference between the accuracy of forecasts and the tendency of prediction of each industry, then there must be a difference in the level of dependency of market participants on the information provided by analysts. In other words, investors will trust more of the analysts who have shown in the past that they have made relatively accurate predictions. For this reason, if there are differences in the accuracy of forecasts of analysts according to each industry, it is expected that the confidence of investors will also differ. Consequently, if an analyst who used to provide relatively accurate predictions changes his/her target price or investment recommendation, then the market participants will put more credits towards such changes and will agree to act along with such a movement. On the other hand, when an analyst who used to make inaccurate predictions changes his/her target price or investment recommendation, market participants will put less credits towards such changes.

Even according to the efficient market hypotheses, past information is already well known to market participants and such information is already applied in the stock price. Empirically, investors

are already aware of the tendencies of over-prediction and the accuracy of forecasts of corresponding analysts, therefore it can be concluded that when analysts change target prices and investment recommendation, investors will react to the changes.

For this reason, in hypothesis 2, the existence of a difference in the level of confidence of market participants towards analysts for each industry will be discussed as well as the difference in the strength of effects of analysts toward stock price in perspective to the analysts themselves. In the end, such a difference will be interpreted in regards to the tendency of a prediction made by analysts.

Before anything else, this very hypothesis will examine the influence on the stock price of analysts for each industry using CAR for 20 days before and after of the date in which the target price or investment recommendation of an analyst is changed as for the event study. In other words, this very research will consider the CAR for 20 days before and after the date of a change in target price or investment recommendation as an analyst's influence.

Considering the CAR for 20 days before and after the date of change in target price or investment recommendation is suitable for such a study as it was suggested by , Dong-Soon Kim (2006). In order to measure the CAR value, the Case Study Research Method is used by utilizing the market adjusted return model. By applying this model, it will be possible to extract the results that take into account the difference in up-phase and down-phase of the price index of stocks. 6.

Depending on the securities companies, there are investment points where the system is divided into 3 grades and even 4 and 5 grades. Unlike previous research in which such a system is standardized, this research will apply all investment grades for securities companies.

The categories of the actual investment grade of each securities company applied in this research is described in the <Table 3>.

The formula used to calculate CAR is as following.

Equation 1)

$R_{i,t}$ *: Return on stock i at date*

$P_{i,\,t}$ *: Price on stock i at date t*

$P_{i,\,t-1}$ *: Price on stock i at date t*

Equation 2)

$$AR_{i,\,t} = R_{i,\,t} - R_{m,\,t}$$

$AR_{i,t}$: *abnormal return stock i at date t*

$R_{i,\,t}$: : *return on stock i at date t*

$R_{m,\,t}$: *market return at date t*

Equation 3)

$$CAR\ (t_1, t_2) = \sum_{t=t_1}^{t_2} AR_t$$

As it was executed in both the hypothesis 1 and 2, an ANOVA test towards CAR is commenced in order to verify the influence on the stock price of analysts in each industry. If it turns out that there exists a significant difference in CAR for each industry, independent samples T-Test will be executed to compare the size of CAR.

<Table3> Investment recommendation Grade by securities' firm

Firm	**Investment Recommendation**			
Woori	Reduce	hold	buy	strong buy
Daeshin	Underperform	marketperform		buy
Kyobo	Hold	trading buy		strong buy
Daewoo	Reduce	Neutral	trading buy	buy
Golden bridge	Sell	Neutral	buy	strong buy
Dongbu	Underperform	hold	buy	
Tongyang	Sell	hold	buy	
Leading	Sell	hold	buy	strong buy
Meritz	Reduce	hold	buy	strong buy
Mirae	Reduce	hold	buy	
Bookuk	Reduce	hold	buy	strong buy
Samsung	Sell	hold	buy	strong buy

Solomon	Sell	hold	buy	
Shinyoung	Sell	hold	buy	
Shinhan	Reduce	Neutral	buy	
Eugene	Reduce	hold	buy	strong buy
Yuhwa	Marketperform	Trading buy		strong buy
Etragde	Sell	Neutral	buy	
Kiwoom	Underperform	marketperform	outperform	buy
Torus	Sell	hold	buy	strong buy
Hana	Reduce	neutral	buy	
Hi	Sell	hold	buy	
Hankuk	Reduce	neutral	buy	
Hanmaek	Sell	hold	buy	
Hanyang	Reduce	hold	buy	
Hanhwa	Underperform	marketperform	outperform	buy
Hyndae	Underperform	marketperform	buy	strong buy
Heungkuk	Reduce	buy		strong buy
HMC	Sell	hold	buy	
IBK	Reduce		buy	strong buy
KTB	Reduce	hold	buy	strong buy
NH	Sell	marketperform	buy	strong buy
SK	Sell	neutral	buy	strong buy
LIG	Reduce	hold	buy	
Prudential	market underperformer	market performer	buy	strong buy

Hypothesis 2-2. The industry with the lowest over-forecast or the highest forecast accuracy level in hypothesis1-2 shows that analysts have the biggest influence on stock prices and vice versa.

The more accurate the earning forecast by the analyst is, the more participants in the market would trust the analyst and the target price and investment recommendation by him or her. On the other hand, when the analyst's forecast is overly optimistic and inaccurate, the investors would not trust such forecasts nor the target price or investment recommendation by the analyst. The tendency to over-forecast and the forecast accuracy by the analyst have been expected to be the factors which affected the stock prices. Such hypothesis is highly associated with a conflict of interest.

There is already previous research, in which the profitability and the tendency for over-prediction/the accuracy of forecasts are focused. In case there exists a problem conflict of interests, Ertimur et al(2007) suggested that there will be a negative correlation or a weakening of the relationship between profitability and accuracy and a similar result has been published in research carried out in South Korea. Based on such a result, this very research will observe which industry has the highest potential for such conflicts of interest. By comparing the results of hypothesis 3 and hypothesis 4, the industry with a high level of profitability and forecasts will also be discussed.

Ⅴ. Results of Analysis

1. Results of analysis on the difference in forecast error and the accuracy among industries.

As it can be observed in <Table 4>, after comparing the sales, operating profit, and the level of over-prediction of net income for 20 different industries, it turned out that there is a significant difference. In addition, <Table 5> suggests that there is also a significant difference between industries regarding sales, operating profit, and the level of over-prediction of net income when a second test was carried out by utilizing the absolute value of a forecast error.

Such a result is suitable for explaining the general hypothesis of this very research which exerts the fact that there may be a difference in analysts' tendency for over-forecast and accuracy of earnings forecast due to unique characteristics possessed by each industry.

<Table4> ANOVA test on FE

	FE of Sales	FE of operating profit	FE of net income
F-value	54.404***	13.856***	33.085***

***, ** and * indicate the corresponding estimated coefficient is statistically significant at 1%, 5% and 10% critical levels

<Table5> ANOVA test on AFE

	AFE of Sales	AFE of operating profit	AFE of net income
F-value	51.406***	15.460***	40.701***

***, ** and * indicate the corresponding estimated coefficient is statistically significant at 1%, 5% and 10% critical levels

2. Magnitude of tendency for over-forcast and accuracy of earnings forecast by industry types

Previously, it has been found that there exists a significant difference regarding earnings forecast or the accuracy of forecasts for each industry. In this hypothesis, sales, operating profit, and the

tendencies of prediction for net income are verified based on the above-mentioned significance.
Firstly, the tendency to over-forecast and the accuracy of earnings forecast in sales, operating profit, and net income are extracted for all industries without any type of categorization. As the results shown in <Table 5>, the tendencies for over-forecast grew bigger in following order of sales, operating profit, and net income, respectively and reversely the accuracy of earnings forecast got smaller in following order of sales, operating profit, and net income. In other words, the sales figure is relatively accurately predicted whereas operating profit, and even worse for net income, where the tendency for over-prediction got bigger and bigger. This is explained by the fact that the errors may be produced during the process of forecasting the cost of goods sold, or sales expenses.

By observing the tendency of prediction for each industry in a detailed manner, over-prediction was found the most when analysts forecast the sales for industries such as in the securities industry, service industry, and transportation & storage industry as is shown in <Table 8>. The securities industry, one of the cyclical industries which are sensitive to market conditions, is likely to be influenced by the macro-economic variables and financial variables. For example, as the key interest rate goes down, it causes the market flooded with liquidity and it makes the market bearish. Finally, it results in sales of securities companies increasing.

In the transportation & storage industry, sales tend to be very volatile depending on the economical condition such as in the airline industry or passenger industry, therefore it is possible that the forecast error can be very big. The transportation & storage industry is a representative industry, which is affected by the rapidly changing exchange rate.

The reason for the tendency of over-forecasting in the service industry is because of the large cap mother companies include, where the mother company's performance is largely dependent on the performance of subsidiaries that are included in them, causing the forecast error to be very big.
Like this, analysts are likely to overestimate the earnings of some industries whose sales fluctuated according to market conditions.

In operating profits, the most overestimated industry is the construction, insurance, and chemical industries. A common denominator of these industries is that the general and administrative expense and cost of goods sold are very sensitive to economic ups and downs in real time.
In regards to net income, the most overestimated industry is transportation & storage, food & beverages, as well as paper & wood.

It has been observed that the forecast error regarding industries such as construction, nonferrous metals, steel and transport equipment industries were relatively lower than other industries. This very result is due to the fact that sales for companies in these industries tend to be set according to prearranged contracts, which allows for a better prediction of the sales figures than in other industries. In addition, the communications industry also showed a very small forecast error, which is contributed

by the fact that both wired and wireless communication services have become a necessity for living and thus consumers, the buyers, are stable as well as the cost of these services, which tend to stay at a certain level, allowing analysts to accurately forecast sales.

<Table6>Tendency for over-forecast

This analysis considers sign of *FE* to examine analyst' tendency for overestimation

	Average	t-value	σ
FE on sales	-0.058	-14.911***	0.890
FE on operating profit	-0.330	-16.915***	4.443
FE on net income	-0.700	-25.544***	6.240

***, ** and * indicate the corresponding estimated coefficient is statistically significant at 1%, 5% and 10% critical levels

<Table7> Accuracy of forecast

This analysis doesn't consider sign of FE to examine analyst' tendency for overestimation

	average	t-value	σ
AFE on sales	0.112	28.931***	0.885
AFE on operating profit	0.510	26.284***	4.425
AFE on net income	0..901	33.026***	6.214

***, ** and * indicate the corresponding estimated coefficient is statistically significant at 1%, 5% and 10% critical levels

On the other hand, it turned out that the biggest forecast error regarding operating profit was observed in the chemical industry, the paper and wood industry, and transport storage industry. In addition, the smallest forecast error regarding net income was observed for the steel and metal industries, the retail industry, and banking industry where it showed the highest accuracy in prediction. This is explained by the fact that the costs, marketing prices are very volatile and sensitive to changes in the exchange rate as well as oil prices since the majority of these companies are either petro chemical companies or petroleum companies whom are subject to the performance forecast report of analysts within the chemical industry.

However, the steel and metal industry in which the majority of resources are dependent on the imports, the accuracy of net earnings forecast was relatively accurate compared to other industries. Whether such a difference is caused by the structural difference of two different industries, is caused by IR or if it is caused by the bias of analysts of different industries, then they must be discussed in further studies.

3. Result of the regression analysis to test whether industry affects analyst' forecast

To test hypothesis1-3 I ran a cross-sectional regression, employing the dummy variable denoting industry types. As a result of that, it was found that there exists a significant difference in forecast accuracy by industry types. In this test, the constant of regression is the bank industry

Next, as a result of the regression test employing independent variables related to a firm's characteristics such as ROE, or debt ratio these factors affect analysts' earnings forecast. So to test this hypothesis controlling the firm's characteristics, in Model 3 and Model 6 I ran a regression using variables such as a dummy variable and a firm's characteristics variable.

As a result of the multiple regressions employing both dummy variables indicating industry types and other variables related to a firm's characteristics shows that industry type is one of the important factors in being able to affect an analysts' forecast error.

Therefore, hypothesis1-3 is supported because many dummy variables indicating industry are significant.[6]

[6] When constant is bank industry, the industry not being affected by industry types is discovered. However, this result is the meaning that when the industries are compared to bank industry, there is no difference between bank industry and the industries, not the meaning that the industry doesn't affect analyst' forecast error. Note that if constant would be another industry, t-value of dummy variable's beta from regression may be significant. This is kind of limitation of the methodology, cross-sectional regression using a lot of dummy variables. But considering that main purpose of this hypothesis focuses on the difference forecast error among industries and that another hypothesis already calculated mean and t-value by industry types, this problem doesn't matter.

<Table8> Analyst' tendency for over-forecast in each industry

	FE on Sales			FE on Operating profit			FE on Net income		
	average	t-value	σ	average	t-value	σ	average	t-value	σ
Construction	0.003	3.731***	0.049	-0.655	-3.278***	11.920	-0.500	-25.527***	1.165
Machinery	-0.031	-10.529***	0.094	-0.143	-4.743***	0.948	-1.101	-13.164***	2.639
Insurance	0.183	72.355***	0.096	-1.638	-19.288***	3.228	-1.168	-15.807***	2.808
Non-Metalic Mineral Products	0.000	-0.095	0.040	-0.743	-10.038***	0.885	-0.256	-6.204***	0.493
Service	-0.301	-12.264***	2.082	-0.384	-21.564***	1.509	-0.395	-20.071***	1.669
Textile & Wearing Apparel	-0.010	-5.069***	0.065	-0.085	-8.825***	0.308	-0.178	-6.676***	0.851
Transportation Equip.	-0.008	-3.866***	0.154	-0.110	-16.313***	0.502	-0.600	-20.414***	2.184
Transport & Storage	-0.113	-4.007***	1.175	-0.038	-0.417***	3.823	-2.361	-13.003***	7.538
Distribution	-0.014	-6.593***	0.122	-0.049	-13.511***	0.204	-0.125	-8.709***	0.808
Bank	0.034	3.166***	0.276	0.042	5.128***	0.212	0.017	1.815*	0.247
Food & Beverage	-0.047	-8.636***	0.247	-0.157	-18.412***	0.389	-1.355	-16.494***	3.743
Medical Precision Machines	-0.011	-1.519	0.088	-0.013	-1.123***	0.145	-0.253	-6.125***	0.511
Medical supplies	-0.013	-11.953***	0.062	-0.063	-16.242***	0.217	-0.168	-20.437***	0.462
Electricity & Gas	0.033	17.057***	0.065	-0.387	-8.858***	1.476	-0.261	-2.138***	4.121
Electrical & Electronic Equip.	-0.045	-3.842***	0.932	-0.148	-9.590***	1.237	-0.405	-28.960***	1.118
Paper & Wood	0.020	12.876***	0.039	-0.152	-7.008***	0.552	-2.140	-14.802***	3.678
Securities	-0.480	-19.809***	0.774	-0.491	-17.788***	0.883	-0.280	-11.302***	0.792
Iron & Metal Product	0.000	0.077	0.161	-0.336	-4.743***	4.236	-0.047	-3.587***	0.783
Communication	0.004	2.927***	0.059	-0.217	-21.172***	0.449	-0.172	-21.525***	0.350
Chemicals	0.005	4.025	0.094	-0.693	-7.145	7.724	-1.969	-9.421	16.642

***, ** and * indicate the corresponding estimated coefficient is statistically significant at 1%, 5% and 10% critical levels, respectively

<Table9> Analyst' accuracy of forecast error in each industry

	AFE on Sales			AFE on Operating profit			AFE on Net income		
	average	t-value	σ	average	t-value	σ	average	t-value	σ
Construction	0.032	52.276***	0.037	0.710	3.546***	11.917	0.587	31.074***	1.124
Machinery	0.053	20.055***	0.083	0.205	6.917***	0.937	1.172	14.183***	2.608
Insurance	0.191	92.146***	0.079	1.774	21.367***	3.156	1.357	18.952***	2.721
Non-Metalic Mineral Products	0.029	12.449***	0.027	0.797	11.399***	0.836	0.396	12.202***	0.388
Service	0.338	13.796***	2.076	0.481	27.583***	1.481	0.508	26.304***	1.638
Textile & Wearing Apparel	0.040	24.781***	0.052	0.126	13.717***	0.294	0.261	10.066***	0.829
Transportation Equip.	0.056	28.739***	0.144	0.255	42.538***	0.446	0.744	25.850***	2.139
Transport & Storage	0.210	7.522***	1.162	1.060	11.980***	3.674	3.166	18.161***	7.237
Distribution	0.042	20.489***	0.115	0.105	32.564***	0.181	0.191	13.536***	0.795
Bank	0.194	25.349***	0.200	0.143	22.979***	0.162	0.162	22.536***	0.187
Food & Beverage	0.069	12.942***	0.242	0.192	23.431***	0.373	1.476	18.182***	3.697
Medical Precision Machines	0.038	5.917***	0.080	0.078	7.799***	0.123	0.398	12.068***	0.408
Medical supplies	0.035	38.047***	0.052	0.129	38.765***	0.186	0.236	30.725***	0.432
Electricity & Gas	0.041	23.545***	0.059	0.700	17.434***	1.356	1.596	14.148***	3.808
Electrical & Electronic Equip.	0.087	7.533***	0.929	0.622	46.030***	1.080	0.658	53.239***	0.989
Paper & Wood	0.029	22.506***	0.033	0.240	11.720***	0.520	2.375	17.113***	3.530
Securities	0.551	24.316***	0.725	0.768	37.409***	0.656	0.653	39.568***	0.528
Iron & Metal Product	0.041	15.861***	0.156	0.556	7.902***	4.213	0.344	29.254***	0.705
Communication	0.022	17.893***	0.055	0.228	22.503***	0.444	0.209	27.683***	0.330
Chemicals	0.054	54.936***	0.078	0.769	7.935***	7.717	2.135	10.227***	16.622

***, ** and * indicate the corresponding estimated coefficient is statistically significant at 1%, 5% and 10% critical levels, respective

<Table10> Cross-sectional regression to analyze analyst tendency for over-forecast and accuracy of earnings forecast on sales in each industry

Sales	Model Ⅰ		Model Ⅱ		Model Ⅲ		Model Ⅳ		Model Ⅴ		Model Ⅵ	
	ß	t-value	ß	t-value	ß	t-value	ß	t-value	ß	t-value	ß	t-value
Constant	0.034	0.993	-1.332	-15.325***	-1.628	-14.085***	0.194	5.769***	1.163	13.461	1.646	14.324***
Construction	-0.030	-0.826			0.160	2.762***	-0.162	-4.402***			-0.340	-5.909***
Machinery	-0.065	-1.478			0.133	2.094**	-0.141	-3.232***			-0.321	-5.092***
Electrical & Electronic Equip.	-0.078	-2.202**			0.055	.922	-0.107	-3.012***			-0.224	-3.762***
Chemicals	-0.029	-0.810			0.170	2.892***	-0.141	-3.971***			-0.327	-5.587***
Communication	-0.030	-0.752			0.094	1.567	-0.172	-4.383***			-0.279	-4.659***
Insurance	0.149	3.639***			0.252	5.560***	-0.003	-0.078***			-0.107	-2.369**
Service	-0.334	-9.456***			-0.099	-1.662	0.144	4.080***			-0.080	-1.357
Electricity & Gas	-0.001	-0.022			0.138	2.209**	-0.153	-3.592***			-0.281	-4.515***
Paper & Wood	-0.014	-0.283			0.303	4.452***	-0.165	-3.424***			-0.466	-6.898***
Food & Beverage	-0.080	-2.065**			0.154	2.527**	-0.125	-3.231***			-0.342	-5.646***
Textile & Wearing Apparel	-0.044	-1.004			0.272	4.113***	-0.154	-3.545***			-0.454	-6.911 ***
Medical supplies	-0.047	-1.251			0.217	3.542***	-0.159	-4.280***			-0.409	-6.728***
Medical Precision Machines	-0.044	-0.563			0.333	3.544***	-0.156	-1.983**			-0.518	-5.546***
Iron & Metal Product	-0.033	-0.904			0.146	2.434**	-0.153	-4.165***			-0.322	-5.393***
Non-Metalic Mineral Products	-0.034	-0.418			0.276	2.944***	-0.165	-2.050**			-0.455	-4.886***
Transportation Equip.	-0.042	-1.160			0.105	1.868*	-0.138	-3.884***			-0.275	-4.937**
Transport & Storage	-0.147	-3.681***			0.028	.471	0.016	0.414			-0.141	-2.422***
Securities	-0.513	-11.762***			-0.355	-6.147***	0.357	8.232***			0.201	3.498 ***
Distribution	-0.048	-1.284			0.132	2.211**	-0.152	-4.105***			-0.320	-5.370***
ROE			-0.001	-3.921***	-0.001	-2.831***			0.002	6.294***	0.001	4.568***
LEV			0.000	8.180***	0.000	4.070***			0.000	3.424***	0.000	-3.727***
CAP			0.112	16.093***	0.127	15.590***			-0.108	-15.672***	-0.123	-15.104***
FHR			0.000	1.441	0.000	.978			0.000	-1.514	-0.001	-1.889*
HORIZON			-0.061	-5.561***	-0.058	-5.256***			0.127	11.578***	0.121	11.149***
adj.R^2	0.019		0.009		0.026		0.018		0.010		0.027	
F-statistics	54.404***		93.922***		59.166***		51.406***		82.056***		61.016***	

***, ** and * indicate the corresponding estimated coefficient is statistically significant at 1%, 5% and 10% critical levels, respectively.

<Table11> Cross-sectional regression to analyze analyst tendency for over-forecast and accuracy of earnings forecast on operating profits in each industry

Operating Profits	Model Ⅰ		Model Ⅱ		Model Ⅲ		Model Ⅳ		Model Ⅴ		Model Ⅵ	
	ß	t-value	ß	t-value	ß	t-value	ß	t-value	ß	t-value	ß	t-value
Constant	0.042	0.246	-2.636	-6.074	-3.875	-6.671***	0.143	0.845	1.809	4.183	4.264	7.372***
Construction	-0.697	-3.757***			-0.452	-1.553	0.567	3.070***			0.351	1.212
Machinery	-0.184	-0.836			0.042	0.131	0.062	0.284			-0.136	-0.428
Electrical & Electronic Equip.	-0.190	-1.064			-0.222	-0.735	0.478	2.688***			0.549	1.829*
Chemicals	-0.735	-4.109***			-0.459	-1.555	0.626	3.514***			0.383	1.301
Communication	-0.259	-1.310			-0.464	-1.531	0.085	0.432			0.316	1.047
Insurance	-1.680	-8.150***			-1.337	-5.878***	1.631	7.945***			1.308	5.776***
Service	-0.425	-2.392**			-0.013	-0.044	0.338	1.911			-0.044	-0.148
Electricity & Gas	-0.429	-1.998**			-0.275	-0.875	0.557	2.605***			0.448	1.429
Paper & Wood	-0.194	-0.797			0.519	1.517	0.097	0.398			-0.600	-1.762*
Food & Beverage	-0.199	-1.016			0.112	0.367	0.049	0.251			-0.241	-0.791
Textile & Wearing Apparel	-0.127	-0.579			0.567	1.708*	-0.017	-0.077			-0.690	-2.085**
Medical supplies	-0.105	-0.558			0.461	1.499	-0.015	-0.078			-0.549	-1.792*
Medical Precision Machines	-0.055	-0.139			0.944	1.999**	-0.065	-0.165			-1.044	-2.221**
Iron & Metal Product	-0.377	-2.036**			-0.145	-0.480	0.413	2.237**			0.218	0.727
Non-Metalic Mineral Products	-0.785	-1.924*			-0.255	-0.541	0.654	1.610			0.128	0.272
Transportation Equip.	-0.152	-0.844			0.050	0.176	0.112	0.625			-0.048	-0.170
Transport & Storage	-0.080	-0.399			0.126	0.427	0.917	4.587***			0.738	2.518**
Securities	-0.533	-2.430**			-0.094	-0.324	0.625	2.861***			0.226	0.781
Distribution	-0.091	-0.483			0.117	0.388	-0.038	-0.206			-0.211	-0.703
ROE			-0.013	-10.979***	-0.013	-10.408***			0.009	7.739***	0.013	9.886**
LEV			0.000	-5.719***	0.000	-0.079			0.000	6.497***	0.000	0.137
CAP			0.270	7.796***	0.366	8.920***			-0.187	-5.396***	-0.392	-9.589***
FHR			0.012	7.795***	0.014	8.461***			-0.014	-9.464***	-0.013	-7.856***
HORIZON	0.042	0.246	-2.636	-6.074***	-3.875	-6.671***	0.143	0.845	1.809	4.183***	4.264	7.372***
adj.R^2	0.005		0.008		0.013		0.050		0.007		0.014	
F-statistics	13.856***		86.559***		29.392***		15.460***		78.171***		30.914***	

***, ** and * indicate the corresponding estimated coefficient is statistically significant at 1%, 5% and 10% critical levels, respectively

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<Table12> Cross-sectional regression to analyze analyst tendency for over-forecast and accuracy of earnings forecast on net income in each industry

Net Incomes	Model Ⅰ		Model Ⅱ		Model Ⅲ		Model Ⅳ		Model Ⅴ		Model Ⅵ	
	ß	t-value	ß	t-value	ß	t-value	ß	t-value	ß	t-value	ß	t-value
Constant	0.017	0.072	-6.540	-10.755***	-6.650	-8.191***	0.162	0.684	5.562	9.189***	7.018	8.694***
Construction	-0.517	-1.992**			-0.889	-2.185**	0.425	1.647*			0.467	1.155
Machinery	-1.118	-3.622***			-1.295	-2.908***	1.010	3.292***			0.870	1.965**
Electrical & Electronic Equip.	-0.422	-1.686*			-1.048	-2.487**	0.497	1.996**			0.782	1.866*
Chemicals	-1.986	-7.934***			-2.361	-5.718***	1.973	7.925***			2.009	4.894***
Communication	-0.189	-0.684			-1.029	-2.432**	0.047	0.170			0.520	1.236
Insurance	-1.185	-4.107***			-1.287	-4.050***	1.195	4.165***			1.168	3.698***
Service	-0.412	-1.655*			-0.756	-1.811**	0.346	1.398			0.335	0.806
Electricity & Gas	-0.278	-0.926			-0.767	-1.745**	1.435	4.799***			1.619	3.703***
Paper & Wood	-2.157	-6.333***			-1.683	-3.522***	2.213	6.533***			1.412	2.972***
Food & Beverage	-1.373	-5.007***			-1.500	-3.505***	1.314	4.820***			1.099	2.582***
Textile & Wearing Apparel	-0.195	-0.635			-0.052	-0.112	0.099	0.326			-0.398	-0.861
Medical supplies	-0.186	-0.708			-0.306	-0.712	0.075	0.286			-0.146	-0.342
Medical Precision Machines	-0.270	-0.487			0.289	0.438	0.236	0.428			-0.664	-1.012
Iron & Metal Product	-0.064	-0.247			-0.612	-1.451	0.183	0.708			0.385	0.919
Non-Metalic Mineral Products	-0.273	-0.478			0.340	0.517	0.235	0.413			-0.713	-1.089
Transportation Equip.	-0.617	-2.448**			-1.237	-3.138***	0.582	2.323**			0.899	2.293**
Transport & Storage	-2.378	-8.465***			-2.294	-5.573***	3.004	10.752***			2.649	6.473***
Securities	-0.297	-0.968			-0.548	-1.349	0.492	1.610			0.494	1.225
Distribution	-0.142	-0.541			-0.616	-1.465	0.029	0.111			0.165	0.395
ROE			0.022	13.386***	0.018	9.875***			-0.025	-14.694***	-0.018	-9.894***
LEV			0.000	-2.545**	0.000	-1.578			0.000	2.651***	0.000	0.405
CAP			0.615	12.647***	0.724	12.615***			-0.535	-11.062***	-0.733	-12.841***
FHR			0.005	2.382**	0.002	0.947			-0.007	-3.361***	-0.001	-0.314
HORIZON			-0.954	-12.349***	-0.963	-12.504***			1.073	13.954***	1.077	14.074***
adj.R^2	0.012		0.013		0.023		0.014		0.014		0.026	
F-statistics	33.085***		136.648***		51.051***		40.701***		147.135***		58.274***	

***, ** and * indicate the corresponding estimated coefficient is statistically significant at 1%, 5% and 10% critical levels, respectively

4. Analyst' stock price impact by industry types

I calculated the CAR (cumulative abnormal return) for 20 days before and after an investment rating and target price change to analyze the analysts' stock price impact as an event study.

To test this hypothesis I classified the change of investment recommendations and target prices by industry. The following <Table12> reports the number of changing investment recommendations and target prices by industry during the period from April 2007 to July 2010.

<Table13> The number of samples

	Target Price		Investment Grade	
	UP	DOWN	UP	DOWN
Construction	596	446	75	84
Machinery	146	125	22	20
Insurance	395	239	52	49
Non-Metalic Mineral Products	14	20	3	5
Service	1139	637	151	150
Textile & Wearing Apparel	139	127	12	11
Transportation Equip.	908	696	115	118
Transport & Storage	259	175	51	51
Distribution	474	317	70	79
Bank	131	94	22	21
Food & Beverage	230	237	36	38
Medical Precision Machines	20	14	3	5
Medical supplies	333	255	65	73
Electricity & Gas	138	90	28	20
Electrical & Electronic Equip.	1057	834	175	170
Paper & Wood	105	63	16	12
Securities	285	242	54	57
Iron & Metal Product	686	401	69	84
Communication	210	202	70	65
Chemicals	1106	741	203	195
Total	8371	5955	1292	1307

Firstly I calculated the basic statistics such as mean and t-value for all industries, regardless of industry, in the case that analysts' upgrade their target price and investment recommendation. In consequence, when an investment recommendation and target price are upgraded, CAR has a significantly negative value. On the contrary when an investment recommendation and target price are downgrades, CAR has a significantly positive value.

To examine it more specifically, I use a one-way ANOVA test on CAR classified by industry types. As a result, when the target price was upward and the investment recommendation upward, a significant difference was found in CAR by industry. However, when the target price was downward and investment recommendation downward, there was no significant difference in CAR by industr. Therefore, the hypothesis 2-1 which states that in the event of changes in target price or the investment recommendation, a significant difference would be observed in the influence on the stock prices amongst the industries is partially supported.

<Table14> CAR in the case of change in target price or investment recommendation & ANOVA test among the industries

	No.	CAR			ANOVA
		mean	t-value	σ	F-value
Target price up	8371	-0.0369	-16.1101***	0.2042	5.7950***
Target price down	5955	0.0201	2.9986***	0.5177	1.9350***
Recommendation up	1292	-0.0164	-2.4666**	0.2389	0.9090
Recommendation down	1307	0.0276	1.9479*	0.5115	0.2780

To examine the differences in CAR by each industry, the average and t-value were calculated by industry. The findings, as shown in <Table 14>, showed that CAR was interestingly the opposite of the forecasted (recommended) direction by the analyst in the food and beverage and paper & wood industries, which had the highest tendency to over-forecast in regards to net income. That is in these two industries, when the analyst gave an upward forecast on the target price or investment recommendation, CAR came up with a significantly negative (-) value. When the forecast was downward for the target price or investment recommendation, CAR came up with a significantly positive (+) value. The findings showed that market participants do not acknowledge the analyst's buy signals and sell signals as the truth because of the analyst's tendency to over-forecast.

Also, in the transportation and storage industry which had the highest tendency to be over-

forecasted in terms of net income showed no significant value for CAR of the market, indicating that the impact of these analysts on the market is minor. Also, the transportation & storage industry with the lowest forecast accuracy also showed the CAR conflicting with the analyst's forecast direction (investment recommendations), but such t-value was not significant. Thus, it is difficult to say that the investors took a position in a certain direction, which differed from the movements in the market. The chemical industry which was low in forecast accuracy, also showed a CAR of -2.8% when the target price was upward. It showed that when the target price was upward, the market participants took a different position from the movements in the market. However, in other cases, the significant value was not found to indicate they took different positions from the market, which showed that the influence on stock prices is minor.

Also, it was found that in sales, operating profit and the net income, the influence on the stock market in the industries with a relatively high tendency to over-forecast and low forecast accuracy, no apparent differences were observed compared to other industries. In this light, it appears that the hypothesis, 2-2 is partially supported.

<Table15> CAR of 20days before and after when the target price or investment recommendation are changed

	Target Price				Investment Recommendation			
	UP		DOWN		UP		DOWN	
	mean	t-value	mean	t-value	mean	t-value	mean	t-value
Construction	0.0004	0.0545	0.0193	1.3454	0.0039	0.1479	0.0031	0.0975
Machinery	-0.0233	-1.3505	0.0060	0.2247	-0.0280	-0.6122	0.0357	0.5183
Insurance	-0.0628	-6.5139***	-0.0289	-1.2830	-0.0513	-1.2316	-0.0747	-2.0049
Non-Metalic Mineral Products	0.0123	0.2172	0.0239	0.3756	-0.1264	-1.1521	-0.0167	-0.1846
Service	-0.0236	-3.3465***	0.0674	1.5917	-0.0073	-0.3598	0.0332	0.4432
Textile & Wearing Apparel	-0.0228	-1.3835	0.1227	2.0590	0.0681	0.9587	0.0422	0.5693
Transportation Equip.	-0.0373	-5.3893***	0.0416	3.3412***	-0.0104	-0.4000	0.0318	1.2391
Transport & Storage	-0.0123	-1.1096	0.0127	0.5316	0.0318	0.8816	0.0430	1.2139
Distribution	-0.0028	-0.1783	-0.0443	-2.7287***	-0.0169	-0.7955	0.0229	0.8003
Bank	-0.0213	-2.5870**	0.0187	0.5066	0.0221	0.6644	-0.0032	-0.0485
Food & Beverage	-0.0529	-3.4371***	0.0715	3.9577***	-0.0859	-1.7453*	0.0770	1.8737*
Medical Precision Machines	0.0440	1.2272	-0.1242	-1.9139*	0.1213	0.8652	-0.0524	-0.8502
Medical supplies	-0.0821	-6.4903***	-0.0505	-2.5699**	0.0210	0.7682	0.0497	1.5815
Electricity & Gas	-0.0477	-2.4712**	0.0353	1.0738	-0.0002	-0.0054	0.0718	2.3124**
Electrical & Electronic Equip.	-0.0552	-9.5278***	0.0139	1.3082	-0.0125	-0.7834	0.0558	3.0336***
Paper & Wood	-0.0606	0.0099**	0.0739	2.3106**	0.0127	0.2128	0.1292	2.5978**
Securities	-0.0423	-3.5353***	-0.0344	-1.9096*	-0.0690	-2.3229**	-0.0472	-1.6934*
Iron & Metal Product	-0.0341	-3.8087***	0.0568	2.4849**	-0.0207	-0.6504	0.0297	0.8232
Communication	-0.1215	-6.8228***	-0.0513	-2.3597**	-0.0117	-0.3765	0.0211	0.6571
Chemicals	-0.0280	-4.7365***	0.0156	0.7192	-0.0390	-2.4781	0.0293	0.4667

***, ** and * indicate the corresponding estimated coefficient is statistically significant at 1%, 5% and 10% critical levels, respectively

VI. Conclusion and Limitation

This study intends to focus on analyzing the differences in the forecast error by the analysts and their influence on the stock market by industry, which contributes to the resolution of agency problem and asymmetric information in the market. The study has significance in that by comparing the size of a forecast error by industry, it provides the basis for assessing the relative quality of the information to the investors who are the consumers. Furthermore, it was affirmed that in certain industries, the changes in the target price or investment recommendation by the analyst could become the factor for providing distorted information. Thus the study was significant in that it gives the implication from the perspective of the financial regulation.

To summarize the results from the analysis, first, depending on the business operated by the company, differences in the tendency to over-forecast and forecast accuracy were found. Also, even among the same industries, sales, operating profit and net income the tendency to over-forecast increases, and the forecast accuracy gradually decreased. In terms of sales, the industries with the highest tendency to over-forecast were securities, food and beverage, electrical and electronic equipment and for operating profit, they were insurance, non-metallic mineral products and chemicals. In addition, the industries with the highest tendency to over-forecast in terms of net income were transportation & storage paper & wood, and food and beverage industries. In addition, in terms of sales, the industries with the lowest forecast accuracy were electrical and electronic equipment, food and beverage and securities. In terms of operating profit, the industries with the lowest forecast accuracy were insurance, non-metallic mineral products and chemical industries. In addition, the industries with the lowest accuracy in terms of net income were transportation & storage, paper & wood and chemicals. For a more in-depth analysis, the results of multiple regression analysis which controlled the characteristics variable of the company showed the industry the company came from had a significant effect on the forecast error.

Second, the change in target price or investment recommendation by the analyst in regards to the event day, the analyst's influence on the stock market was analyzed through CAR(-20, +20) . The findings showed that when the target price was changed, a significant difference was found between the industries but when the investment recommendation was changed, no

significant difference was observed between the industries.

Lastly, the comparison between the analyst's forecast trends and the CAR (-20, +20) results based on the changes in the target price or investment recommendation which were the two factors for analysis aforementioned showed that the industries that analysts tend to over-forecast more compared to other industries showed CAR which was opposite of the investment recommendation. Consequently the investors in these industries take the position which contradicts the investment recommendation by the analyst. It has been speculated that in these industries, the analyst's changes in the target price or investment recommendationhave been acknowledged by the investors as distorted information. It resulted from the investors relatively distrusting the analysts who produced the over-forecast based on their experiences. However in the absence of more a empirical basis, future studies on this would be required.

This study was conducted on KOSPI categories which are being traded in the securities market. Thus, it is unreasonable to presume that the difference in forecast trends based on the industry is universal for the stock market around the world. In order to generalize the tendency to over-forecast and the forecast error among industries, an empirical analysis on the market with more diversity as in the case of the U.S. would be required. Also, in order to find out whether or not the difference in the forecast trends amongst the industries is an inherent problem due to the industrial structure, other factors besides the relevant industries which could affect the forecast of the analyst would need to be controlled. For instance, the analyst who belongs to a certain industry may over-forecast due to his or her positive forecast bias, but this fact was not considered in the study. The research to be conducted later would require the analysis in consideration of the variable, and the forecast bias of the analyst. Moreover, from the beginning, relevant companies could distribute IR information overstated by inflating the earnings which affected the forecasting by the analyst. However, this was not taken into consideration in the study and this detail must be considered for future studies.

Considering that the studies on the forecast trends of the analyst in the past focused mainly on the characteristics of the analyst, this research could be thought of as the experimental approach. The future direction for the research would require the analysis of the forecast error in consideration of various factors which can affect the forecast trends of the analyst and examine the causes for the significant differences in forecast errors by industry empirically.

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