Analysts' long-term earnings growth forecasts and past firm growth

Abstract

Several previous studies show that consensus analysts' long-term earnings growth forecasts are excessively influenced by past firm performance and they have little informational value in terms of predicting future high-growth firms. In this paper, we analyze additional informational value and the forecast bias in two extreme non-consensus forecasts, i.e. the most aggressive forecast and the most conservative forecast for each firm. The result reveals that the most aggressive forecast is the least influenced by past firm performance and the most informative in terms of predicting future high-growth firms; on the other hand, the most conservative forecast is the most influenced by past firm performance and the least informative. Our findings indicate that the aggressive forecast is made with considerable information or detailed analysis that lowers the forecast bias and increases their informational value.

1. Introduction

Expectations about long-term earnings growth are crucial to stock price valuations. Many valuation models rely on long-term growth forecasts for estimating the intrinsic value of a firm's stock (e.g., Frankel and Lee, 1998; Gebhardt et al., 2001). In light of this demand, a competitive market would induce financial analysts to issue accurate forecasts of firms' long-term earnings growth. However, analysts' long-term growth forecasts are criticized not only for large difference between estimated and actual growth rates but for failing to predict relative earnings growth across firms, i.e. failing to predict future high-growth firms (La Porta, 1996). As the reason of poor informational value of their forecast, several studies point out analyst tendency toward extrapolating past firm performance into future. Chan et al. (2003) report that analysts are overly optimistic about firms with high past growth and overly pessimistic about firms with low past growth, although there is no persistence in earnings growth beyond chance. Billings and Morton (2001) also report a positive relation between past stock return and analyst' long-term growth forecast errors; analysts are overly optimistic for past winners and overly pessimistic for past losers.

The influence of past performance on analysts' long-term profit forecasts could be explained by findings in psychology studies that individuals' forecasts are susceptible to cognitive biases (Kahnemann and Riepe, 1998; Fisher and Statman, 2000). For instance, by the confirmation bias, individuals tend to refer to only evidences that support their beliefs. Because of this behavior, their forecasts will be bullish for firms with good past performance and bearish for firms with poor past performance.

In this way, long-term growth forecasts are considered to be biased and have little informational value to predict future high-growth firms. However, these studies examine analysts' consensus forecast for each firm's long-term earning growth, i.e. median or average of analysts' forecasts. Needless to say, each firm receives several long-term earnings growth forecasts which vary from aggressive to conservative. There is possibility that forecasts which diverge from consensus are less biased and contain more information in terms of predicting future high-growth firms than the consensus forecast. Therefore, it is necessary to examine whether informational value and the bias in these non-consensus forecasts differ from those of the consensus forecast; this analysis could help further understanding of information contents of analysts' long-term earnings growth forecasts.

Our discussion about incremental information of non-consensus forecasts suggests the following null hypothesis and four alternative hypotheses.

H0: There is no significant difference in the bias and informational value between the forecasts.

H1a: Analyst's long-term earnings growth forecast is less biased and more informative for predicting future high-growth firms as aggressiveness of the forecast for firm growth increases[1].

H1b: Analyst's long-term earnings growth forecast is more biased and less informative as aggressiveness of the forecast increases

H1c: Analyst's long-term earnings growth forecast is less biased and more informative as the forecast diverges from consensus[2].

H1d: Analyst's long-term earnings growth forecast is more biased and less informative as the forecast diverges from consensus.

In this paper, to test these hypotheses, we investigate informational value for predicting future high-growth firms and the bias, i.e. the influence of past firm performance, in the most aggressive (highest) as well as the most conservative (lowest) forecast, which are representatives of non-consensus forecasts which diverge from consensus. We examine whether the bias and the informational value of these non-consensus forecast could differ from those of the consensus forecast, as follows.

First, we analyze difference in the bias between the forecasts. For that, we calculate the adjusted

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[1] In other word, the most aggressive forecast are the least biased and the most informative while the most conservative forecast are the most biased and the least informative.

[2] In other word, the extreme forecast, i.e. the most aggressive forecast and the most conservative forecast, are less biased and more informative than the consensus forecast.

most aggressive forecast and conservative forecast, which can be considered as incremental information of those forecasts over the consensus forecast; then, we examine the influence of past firm performance on these adjusted forecasts. The result reveals that the adjusted most aggressive forecast has a strong positive relationship and the adjusted most aggressive forecast has a certain negative relationship with past firm performance. This result indicates that long-term earnings growth forecast becomes less biased as aggressiveness of the forecast increases

Second, we examine difference in informational value between the forecasts; we examine whether the adjusted most aggressive forecast and conservative forecast are informative for predicting future high-growth firms. The result shows informational value is the highest for the most aggressive forecast, and the lowest for the most conservative forecast. Furthermore, we find that, even after we control for past firm performance, the most aggressive forecast is still the most informative and the most conservative forecast is the least informative.

These results deny the null hypothesis and support the hypothesis H1a that analyst's long-term earnings growth forecast becomes less biased and more informative for predicting future high-growth firms, as aggressiveness of the forecast for firm growth increases. Considering our finding that superiority of the aggressive forecast in informational value cannot be explained only by difference in influence of past firm performance, it is likely that the aggressive forecast is made with more considerable information or detailed analysis that lowers the forecast bias and increases informational value of the forecast. Of course, since the consensus forecast is averagely optimistic, in terms of forecast error, difference between estimated and actual growth rate, the aggressive forecast is obviously more upward biased than consensus. However, in terms of accuracy in relative earnings growth across firms, i.e. predictive power for future high-growth firm, our result shows that the most aggressive forecast are the most informative and the most conservative forecast is the least informative.

The paper proceeds as follows. Section 2 analyzes the influence of past performance on the most aggressive and the most conservative forecasts. Section 3 examines informational value of these forecasts. Section 4 documents consistency with previous studies and robustness tests for our results. Section 5 discusses interpretation of our result. We summarize our findings in Section 6.

2. Influence of past firm performance

2.1 Methodology

In this section, we try to evaluate the influence of past firm performance on the most aggressive and the most conservative forecasts relative to the consensus forecast. For this purpose, we first

calculate the adjusted value of the most aggressive and conservative forecasts. These can be regarded as incremental information of the most aggressive/conservative forecast over the consensus forecast. Then, we evaluate the influence of past firm performance, represented by several indicators, on these adjusted forecasts. In this section, we first explain the data and the definitions of the adjusted forecasts and several indicators of past performance; we then explain the methodology.

2.1.1 Data

Our sample of analysts' earnings forecasts is obtained from the Institutional Brokers Estimate System (IBES) Summary unadjusted file. Our data come from the stocks listed on the New York Stock Exchange (NYSE), American Stock Exchange (Amex), or NASDAQ; each stock receives at least three long-term earnings growth forecast. We exclude shares of non-US firms, and low-grade stocks[3].

2.1.2 Definition of adjusted forecasts

The most aggressive (highest) long-term earnings growth forecast for firm *i* at time *t* is denoted as $hLTG_{i,t}$; the most conservative (lowest) long-term earnings growth forecast is denoted as $lLTG_{i,t}$; and the consensus forecast, which is a median value of the analysts' forecasts, is denoted as $mLTG_{i,t}$. the adjusted $hLTG_{i,t}$ and the adjusted $lLTG_{i,t}$ as additional information of $hLTG_{i,t}$ and $lLTG_{i,t}$ apart from the consensus forecast $mLTG_{i,t}$ are calculated as follows: (i) we first divide all the firms into ten groups based on $mLTG_{i,t}$; (ii) we then normalize $hLTG_{i,t}$ - $mLTG_{i,t}$ (the difference between the most aggressive and the consensus forecasts) and $lLTG_{i,t}$ - $mLTG_{i,t}$ within each group[4]. The reason why we re-adjust $hLTG_{i,t}$ - $mLTG_{i,t}$ and $lLTG_{i,t}$ - $mLTG_{i,t}$ by $mLTG_{i,t}$ is that there is a positive relationship between these values and the consensus forecast[5].

2.1.3 Firm's performance indicators

As candidates for past firm performance, we list the following normalized indicators.

Profit growth - We include the geometric average of yearly growth rates of profit for over 3 (or 5) years; Following Chan et al.'s (2003) argument, profit is defined by the past four quarters' earnings per share (EPS) and dividend per share (DPS) because an evaluation of profit growth should be

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3 Defined as stocks whose share price is less than one dollar (i.e., penny stocks).

4 All the normalized value in this study is outlier-adjusted as follows: (i) all data higher than 3 are set at 3; (ii) all data lower than -3 are set at -3 to reduce excessive influence of outlier of each variable on our result.

5 Because the relationships between $hLTG_{i,t}$ - $mLTG_{i,t}$ and $mLTG_{i,t}$ as well as between $lLTG_{i,t}$ - $mLTG_{i,t}$ and $mLTG_{i,t}$ are non-linear, we do not apply liner adjustment on the forecasts.

irrelevant to dividend payout policies[6]. Then, we normalize the geometric average of the yearly growth rate. In addition, because the growth rate cannot be calculated when profits are negative, we handle such cases as follows. We scale the yearly change in profit by the stock price as of the base year *t* for firm *i* as $(EPS_{i,t+1}+DPS_{i,t+1}-EPS_{i,t}-DPS_{i,t})/P_{i,t}$, and normalize the 3- or 5-year average of the changes. This normalized value of the profit change relative to price is assigned to the firm with negative profit.

Stock return - Past firm performance could be caught by a stock return. Analysis of Billings and Morton (2001) indicates that high past stock return induces strong optimism in long-term earnings growth forecast. Thus, we include logged stock total returns for over 36 or 60 months.

Sales growth - We also include the geometric average of yearly growth rates of sales per share for over 3 or 5 years.

Valuation indicators - We also include the valuation indicators, book value to price ratio, cash flow to price ratio, and earnings to price ratio. To calculate these indicators, we use the most recent reported book value per share and the EPS and cash flow per share for the past four quarters. Lakonishok et al. (1994) argue that the existence of glamour stocks, which can be identified by these valuation indicators, could be due to investors' extrapolation of past performance into the future. Thus, these valuation indicators could become reverse indicators of past firm performance.

However, we should note that one of the purpose of our study is to compare analysts' irrational preference for firms with good-performance firms which deteriorates the informational value of their forecasts. Thus, we should test the possibility that their preference for good-performance firms identified by each past firm performance indicator could lower the informational value of their forecasts.

To test the possibility, we examine whether normalized profit growth over next 3 or 5 years (definition of normalized profit growth is same as that of the above-mentioned profit growth indicator[7]) is lower for firms with higher past profit growth, higher past sales growth, higher stock return, and more overvalued (glamour) stocks. On the basis of each past-performance indicator, at the end of each month, the firms are assigned to one of five groups, from Q1 (the highest) to Q5 (the

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[6] Two firms can offer the same expected return, but have different earnings growth rates because of their dividend payout policies. From an investor's standpoint these two stocks would be considered equivalent. Thus, we use the realized growth of EPS and DPS, instead of using the realized earnings growth.

7 For minimizing the survivorship bias in evaluating the realized profit growth, we consider the normalized value of the average profit change relative to price over the maximum available period as the non-surviving firm's normalized realized profit growth.

lowest)[8]. When using the indicators of profit growth, stock return, and sales growth, we examine whether the normalized realized profit growth is significantly lower for Q1 than Q5. When using valuation indicators, we examine whether the realized profit growth is significantly lower for Q5 than Q1[9]. In addition to the above-mentioned quintile analysis, the normalized realized profit growth is regressed on each past performance indicator. For non-valuation indicators (past profit growth, past sales growth, and stock return), we examine whether the coefficient of each indicator becomes negative; for valuation indicators, we examine whether the coefficient of each indicator becomes positive.

The result, shown in Table I, reveals that normalized realized profit growth over 3 or 5 years is significantly lower for firms with high past profit growth and average coefficients of past profit growth are significantly negative. It means strong negative relation between past firm profit growth and future profit growth; in other words, preference to firms with high past profit growth is highly likely to deteriorate informational value of their long-term growth forecast. In terms of past stock return (36-month stock return and 60-month stock return), there is not strong negative relation between past stock return and future firm profit growth. However, some result, e.g. result of regressing realized 3-year profit growth on 36-month return or 60-month return, shows certain negative relation between past stock return and future firm profit growth. Thus, we can not deny the possibility that preference to past winners lowers informational value of the forecast. On the other hand, there is no result which supports the possibility that preference to high sales growth firms or overvalued firm lowers informational value of their long-term growth forecast. Therefore, we utilize 3- and 5-year profit growth and 36- and 60-month stock return as the past-performance indicator.

[Table I]

2.1.4 Evaluating influence of past performance on the forecast

We compare the influence of past firm performance on the two non-consensus forecasts (the most aggressive and the most conservative) relative to the consensus forecast. For this purpose, the following procedures are performed. First, at the end of each month from January 1987 to December 2006 (20 years), all the firms are divided into five portfolios from Q1 (the highest) to Q5 (the

[8] The period investigated for the 3-year realized profit growth is January 1987 to December 2005 and 5-year realized profit growth is January 1987 to December 2003.

[9] All significance tests in our study are performed on the basis of autocorrelation-consistent t-statistics, also used by Jegadeesh et al. (2004). How to calculate the t-statistic is described in the appendix to their work. The parameter setting with regard to the number of non-zero serial covariance for calculating the t-statistics is described in each table as a footnote.

lowest) on the basis of 3- and 5-year profit growth and 36- and 60-month stock returns; Q1 includes firms with good past performance and Q5, firms with poor past performance. Then, the averages of the adjusted most aggressive and most conservative long-term earnings growth forecasts, are calculated for each group. In particular, we compare the Q1 value with the Q5. If the adjusted most aggressive/conservative forecast is significantly higher for Q1 than Q5, we can say that the most aggressive/conservative forecast is more influenced by the past firm performance than the consensus forecast. On the other hand, if the adjusted most aggressive/conservative forecast is significantly lower for Q1 than Q5, it is likely that the most aggressive/conservative forecast is less influenced by past performance. In addition to this quintile analysis, for robustness check, at the end of each month, the adjusted most aggressive/conservative forecast is regressed on each past performance indicator; we examine whether the average coefficient of each indicator becomes significantly positive or negative. If the coefficient of each indicator becomes significantly positive, the adjusted most aggressive/conservative forecast is likely to be more influenced by past firm performance than the consensus forecast; if the coefficient of each indicator becomes significantly negative, the adjusted most aggressive/conservative forecast is likely to be less influenced by past performance.

2.2 Results

Table II shows the influence of past firm performance on the most aggressive and the most conservative forecasts relative to the consensus forecast. The result reveals that the adjusted most conservative forecast is significantly higher for Q1 than for Q5, and the coefficient of past performance indicator is significantly positive, whichever past-performance indicator is used. These results indicate that the influence of past firm performance is higher on the most conservative forecast than on the consensus forecast.

On the other hand, the adjusted most aggressive forecast is significantly lower for Q1 than for Q5 and the coefficient of past performance indicator becomes significantly negative when we use the 36- or 60-month return or the 5-year profit growth as past-performance indicator. Thus, it is likely that there is certain negative relation between the adjusted most aggressive forecast and past firm performance; the most aggressive is less biased than the consensus forecast. However, there is no significant difference between Q1 and Q5 in the adjusted most aggressive forecast when the 3-year profit growth is used; the average coefficient for the 3 year profit growth is also insignificant. Therefore, there is not so large difference in the influence between the aggressive forecast and the consensus forecast like difference in the influence between the conservative forecast and the consensus forecast.

These results, at least, indicate that the influence of past performance is especially strong on the most conservative forecast; in other words, the extrapolation of past performance into the future

decreases informational value of the long-term growth forecast in such a way that good past firm performance decreases conservative forecasts with regard to firm long-term earnings growth.

[Table II]

3. Informational value of the non-consensus forecasts

In this section, we examine difference in informational value with regard to forecasting high-profit-growth firms between the most conservative forecast, the most conservative forecast, and the consensus forecast.

3.1 Methodology

For evaluating informational value of the most aggressive/conservative forecast relative to the consensus forecast, we examine whether the realized profit growth is higher for firms with the higher adjusted most aggressive/conservative forecast[10]. At the end of each month, all the firms are assigned to one of five groups from H1 (the highest) to H5 (the lowest) on the basis of the adjusted most aggressive forecast, and from L1 (the highest) to L5 (the lowest) on the basis of the adjusted most conservative forecast. We compare the average of the realized 3- and 5-year profit growth rates between H1 and H5 and between L1 and L5[11]. Furthermore, for robustness check, at the end of each month, we regress the realized 3- and 5-year profit growth rates on the adjusted most aggressive/conservative forecast; examine whether the average coefficient of the adjusted most aggressive/conservative forecast becomes significantly positive or significantly negative.

3.2 Results

The result, shown in Table III, reveals that the 3-year and 5-year realized growth are significantly higher for H1 than for H5, and the coefficient of the adjusted most aggressive forecast is significantly positive; this result indicates that the informational value for predicting future high-growth firms is higher for the most aggressive forecast than the consensus forecast. On the other hand, both the normalized 3-year and 5-year realized growth are significantly lower for L1 than for L5, and the coefficient of the adjusted most conservative forecast is significantly negative; this result indicates that the informational value is lower for the most conservative forecast than the

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[10] We can evaluate the informational value of the forecasts by their return predictability. However, return predictability is determined by not only accuracy of its growth forecast but also the investor's response to the forecast. Thus, it is much better and much more straightforward to evaluate the informational value of the forecast by whether it can forecast high-profit-growth firms.

[11] The period investigated for the 3-year realized profit growth is January 1987 to December 2005 and for the 5-year realized profit growth is January 1987 to December 2003.

consensus forecast. Therefore, it is likely that analyst's long-term earnings growth forecast is more informative as aggressiveness of the forecast increases.

[Table III]

3.3 Incremental value of the extreme forecast

Since influence of past firm performance on the forecast dampens its informational value, it is necessary to examine whether, even after we control for the influence of past firm performance, the most aggressive forecast is still the most informative and the most conservative forecast is the least informative. If so, it is likely that difference in informational value between the forecasts cannot be explained only by difference in preference to past winner and/or high-growth firms; we can infer that the superiority in informational value comes from considerable information and/or detailed analysis for making the forecast. For this purpose, we run following multiple regression; a dependent variable is the realized 3- or 5-year profit growth rates; independent variables are the adjusted most aggressive/conservative forecasts, 3- and 5-year profit growth and 36- and 60-month stock returns.

The result shown in Table IV reveals that the coefficient of the adjusted most aggressive forecast still becomes significantly positive and the adjusted most conservative forecast is significantly negative. This result indicates that difference in informational value between the forecasts cannot be explained only by difference in influence of past firm performance; that is, superiority of the aggressive forecast comes from not only lower preference to past winner or past high-growth firms but considerable information and/or analyst's detailed analysis; poor informational value of the conservative forecast is attributed to insufficient information and/or analyst's poor analysis.

In addition, this result provides us further understanding of the reason why the more aggressive forecast is less biased. Analysts' cognitive biases (e.g., confirmation bias and representativeness heuristics) could become one of the reasons why analysts extrapolate past performance into the future. Furthermore, Tversky and Kahneman (1974) argue that information uncertainty strengthen these cognitive biases. Thus, the result indicates that the reason for the weaker influence of past firm performance on the aggressive forecast is that the aggressive forecast is made with considerable information or detailed analysis[12].

[Table IV]

[12] The possible reason why the aggressive forecast is made with considerable information or detailed analysis is discussed in Section 5.

4. Robustness tests and consistency with previous studies

4.1 Analyst coverage

The strong bias in the conservative long-term earnings growth forecasts could indicate that dispersion in analysts' opinions with regard to firm's long-term earnings growth is lower for firms with good past performance. On the other hand, the number of analysts following the firms (analyst coverage for the firm) could influence the dispersion in forecasts. Thus, we should examine whether our finding of the strong influence of past performance on the most conservative forecast is driven by differences in analyst coverage.

For this purpose, we adjust the most aggressive and the most conservative forecasts by both the consensus forecast and analyst coverage as follows: (i) we first divide all the firms into five groups on the basis of analyst coverage of the firms; (ii) we then divide all the firms into ten groups based on $mLTG_{i,t}$ (the consensus forecast); (iii) finally, within each group, we normalize $hLTG_{i,t}$ - $mLTG_{i,t}$ (difference between the most aggressive forecast and the consensus forecast) and $lLTG_{i,t}$ - $mLTG_{i,t}$ (difference between the most conservative forecast and the consensus forecast) within each group. On the basis of these adjusted forecasts, we examine the influence of past firm performance on the non-consensus forecasts by applying the methodology explained in Section 2.

This result, shown in Table V, reveals that the adjusted most conservative forecast is still higher for Q1 (firms with good past performance) than for Q5 (firms with poor past performance), and the coefficient of past performance indicator is significantly positive, whichever past-performance indicator is used. The adjusted most aggressive forecast is also significantly lower for Q1 than for Q5 and the coefficient of past performance indicator is significantly negative when we use the 36- or 60-month return or the 5-year profit growth as past-performance indicator. Therefore, even after we control for analyst coverage, the influence of past firm performance is still the highest on the most conservative forecast. The result indicates that the strong influence on the conservative forecast is not driven by difference in analyst coverage.

[Table V]

4.2 Difference in analyst opinion

In this section, we examine the consistency of our findings with previous studies about the differences in analyst opinion (analyst forecast dispersion).

4.2.1 Negative relation between difference in analyst opinion and past performance

One of the reason for the strong influence of past firm performance on conservative long-term earnings growth forecasts could be that analysts' opinions with regard to firm's long-term earnings

growth differ less for firms with good past performance. On the other hand, Diether et al. (2002) show that analyst opinion on future earnings differs less for past winners than for losers. Thus, there is the possibility that our finding is subsumed by this negative relationship between the difference in analyst opinion and price momentum. However, in their study, the difference in analyst opinion is evaluated by the dispersion in short-term earnings forecasts, defined by the standard deviation of analysts' short-term earnings forecasts denominated by the absolute value of the mean forecast. Thus, to test this possibility, we should examine whether there is also a negative relationship between the differences in analyst opinion with regard to long-term earnings growth and past firm performance.

For this analysis, at the end of each month, we divide the firms into five groups on the basis of 3- and 5-year profit growth and 36- and 60-month stock returns. Then, as a proxy for the differences in analyst opinion on long-term earnings growth, the average of dispersion in analysts' long-term earnings growth forecasts (defined by the standard deviation of analysts' long-term earnings growth forecasts for the firm) is calculated for each group. Then, we examine whether the dispersion in analysts' long-term earnings growth forecasts is lower for Q1 than for Q5.

The result, shown in Table VI, does not support a negative relationship between a dispersion in long-term earnings growth forecasts and past firm performance. Further, when the 3-year profit growth is used as a past-performance indicator, the dispersion in long-term earnings growth forecasts is significantly higher for Q1 than for Q5, indicating a positive relationship between the dispersion and the 3-year profit growth. At least, it can be denied that there is a significant negative relationship between the differences in opinion with regard to the firm's long-term earnings growth and past performance. Therefore, it can be said that a strong influence of the past firm performance on the most conservative forecast cannot be subsumed by the findings of Diether et al. (2002).

[Table VI]

4.2.2 Negative relationship between difference in analyst opinion and future stock return

Diether et al. (2002) also show a negative relationship between the differences in analyst opinion and future stock return. Following argument of Miller (1977), they argue that stocks with high differences in analyst opinion are overpriced because the limitation of short sales prevents the conservative opinions from being incorporated into stock prices. Their argument is based on the assumption of additional value for conservative forecasts. Thus, our finding of poor informational value for the most conservative forecast seems to be inconsistent with their argument. However, we should again note that they define the differences in analyst opinion by the dispersion in short-term earnings forecasts. Therefore, we should examine whether higher differences in analyst opinion with regard to firms' long-term earnings growth also predicts lower future stock return.

For that purpose, at the end of each month, all the firms are assigned to one of five groups from Q1 to Q5 on the basis of the dispersion in analysts' long-term earnings growth forecasts. The average stock return over the following month is calculated for each group. Also, we utilize returns that are risk-adjusted by the Fama-French three-factor model with Carhart's (1997) momentum factor to evaluate the return predictability of dispersion in long-term earnings growth forecasts. Then, we examine whether the stock return is lower for Q1 than Q5.

The result, shown in Table VII, provides no support for the negative relationship between differences in analyst opinion with regard to firms' long-term earnings growth and future stock return. The risk-adjusted return is significantly higher for Q1 than for Q5. This could mean poor informational value of the most conservative forecast (because of their poor informational value, the limitation of incorporating conservative forecasts into stock prices does not result in lower future return). Otherwise, this result could counter Diether et al.'s (2002) argument of the negative relationship between differences in analyst opinion and future stock return which is also criticized by several studies (e.g., Johnson, 2004; Cen et al., 2007)[13]. Whatever the indication of this results, at least, it can be said that there is no negative relationship between future stock return and differences in analyst opinion with regard to firms' long-term earnings growth. Thus, there is no inconsistency between poor informational value of the conservative forecast and the negative relationship between dispersion in analysts' short-term earnings forecasts and future return.

[Table VII]

5. Discussion

Our findings deny the null hypothesis and support the hypothesis that analyst's long-term earnings growth forecast becomes less biased and more informative for predicting future high-growth firms as aggressiveness of the forecast increases. Additional test indicates that the reason for difference in the bias and informational value is that the aggressive forecasts are made with considerable information or detailed analysis, while the conservative forecasts are not.

Because, as Chan et al. (2003) pointing out, the long-term earnings growth, on average, is optimistic compared with the actual growth rate, it could be natural to infer that the most aggressive forecast is also more biased and less informative in terms of predicting high-growth firms. However, our finding, superiority of the aggressive forecast, can be understood and explained by the analysts'

[13] Johnson (2004) argues that forecast dispersion is not an appropriate proxy for the difference in analysts' opinion. In addition, Cen et al. (2007) show that the negative relationship between future return and the difference in analysts' opinion (standard deviation of short-term earnings divided by absolute value of the mean forecast) is mainly due to the effect of its denominator (absolute value of the mean forecast).

incentive structure argument.

Analysts earn a percentage on commissions from stock sales (Kim and Lustgarten, 1998) and get rewarded whenever their employer wins investment banking deals (Dugar and Nathan, 1995; Hunton and McEwen, 1997; Dechow et al., 2000). This incentive structure induces analysts to follow stocks for which they have an optimistic outlook; on the other hand, it discourages their careful analysis for firms for which they have a poor outlook (McNichols and O'Brien, 1997). Actually, analysts rarely issue sell or strong-sell recommendations (Jegadeesh et al. (2004)); this distribution bias in analyst stock recommendation also indicates that analysts focus on analysis of firms for which they have an optimistic outlook.

It is obvious that the most aggressive long-term growth forecast is issued by an analyst who has a more optimistic outlook for firm's growth than other analysts. Therefore, we can infer that the aggressive forecast tend to be made with considerable analysis induced by analyst incentive structure. On the other hand, the most conservative long-term growth forecast is issued by an analyst who has a more pessimistic outlook for firm's growth; thus, analyst incentive structure problem results in insufficient analysis for the conservative forecast. Accordingly, the aggressive forecast is less biased and more informative in terms of predicting future high-growth firms.

6. Conclusions

In this paper, for further understanding of information contents of analysts' long-term growth forecast, we try to examine whether informational value and influence of past firm performance could differ between the long-term earnings growth forecasts for each firm. For this purpose, we especially compare the most aggressive as well as the most conservative forecasts with the consensus forecast, in terms of their informational value for predicting future high-growth firms and the influence of past firm performance. Our findings are as follows.

First, we find that the influence of past firm performance is the strongest on the most conservative forecast. This result indicates that long-term earnings growth forecast becomes less biased as aggressiveness of the forecast increases.

Second, we find that the most conservative forecast is much less informative than the consensus forecast in terms of predicting future high-growth firms, while the most aggressive forecast is much more informative; furthermore, an additional analysis shows that difference in informational value between the forecasts cannot be fully explained by difference in influence of past firm performance.

These findings clearly support the hypothesis that analyst's long-term earnings growth forecast becomes less biased and more informative for predicting future high-growth firms as aggressiveness of the forecast increases. In addition, the result indicates that the aggressive forecast is made with

more considerable information or detailed analysis that lowers the forecast bias and increases informational value of the forecast. Although analysts' long-term earnings growth forecast are averagely biased and contains little information for firm's growth, we should not ignore relative aggressiveness of the most aggressive forecast; in reverse, we should regard relative conservativeness of the most conservative forecast as reverse indicators.

Our finding could be understood in line with the analysts' incentive structure. The incentive structure encourages analysts from focusing on firms with an optimistic view. The strong incentive to voice aggressive or optimistic views could make aggressive forecasts more informative, weakening the influence of past performance on the forecasts.

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Table I

Relationship between past performance indicators and future growth

To construct the table, we sort all firms into quintiles by each past performance indicator. In each table, we show the normalized realized 5- and 3-year profit growth rates. Q1–Q5 represents the difference in mean value of the realized growth between Q1 and Q5. In addition, we regress realized profit growth on each performance indicator; Average coefficient represents the average coefficient of each past performance indicator. The figures in parentheses are autocorrelation-consistent t-statistics. The non-zero serial covariance is set at 11 for valuation indicators and at 35 for the others.

(a) 3-year profit growth

	3-year past profit growth						
	Q1(High)	Q2	Q3	Q4	Q5(Low)	Q1-Q5	Average Coefficient
Normalized 5-year growth	-0.115	-0.079	-0.081	-0.141	0.266	-0.382 (-9.50)	-0.165 (-8.51)
Normalized 3-year growth	-0.166	-0.108	-0.092	-0.142	0.295	-0.461 (-10.68)	-0.201 (-13.34)

(b) 5-year profit growth

	5-year past profit growth						
	Q1(High)	Q2	Q3	Q4	Q5(Low)	Q1-Q5	Average Coefficient
Normalized 5-year growth	-0.100	-0.104	-0.033	-0.109	0.193	-0.293 (-4.93)	-0.150 (-6.32)
Normalized 3-year growth	-0.143	-0.134	-0.056	-0.087	0.204	-0.347 (-5.31)	-0.174 (-7.65)

(c) 36-month stock return

	36-month past stock return						
	Q1(High)	Q2	Q3	Q4	Q5(Low)	Q1-Q5	Average Coefficient
Normalized 5-year growth	0.026	-0.072	-0.122	-0.089	0.067	-0.042 (-0.72)	-0.019 (-0.86)
Normalized 3-year growth	0.001	-0.081	-0.116	-0.101	0.056	-0.055 (-1.44)	-0.024 (-1.74)

(d) 60-month stock return

	60-month past stock return						
	Q1(High)	Q2	Q3	Q4	Q5(Low)	Q1-Q5	Average Coefficient
Normalized 5-year growth	0.009	-0.098	-0.151	-0.098	0.074	-0.065 (-1.52)	-0.028 (-1.54)
Normalized 3-year growth	-0.016	-0.104	-0.140	-0.097	0.052	-0.068 (-1.77)	-0.027 (-1.89)

(e) 3-year sales growth

	3-year past sales growth						
	Q1(High)	Q2	Q3	Q4	Q5(Low)	Q1-Q5	Average Coefficient
Normalized 5-year growth	0.019	-0.037	-0.111	-0.098	0.022	-0.003 (-0.07)	0.027 (1.89)
Normalized 3-year growth	-0.029	-0.062	-0.101	-0.090	0.028	-0.057 (-1.04)	-0.005 (-0.22)

(f) 5-year sales growth

	5-year past sales growth						
	Q1(High)	Q2	Q3	Q4	Q5(Low)	Q1-Q5	Average Coefficient
Normalized 5-year growth	0.025	-0.061	-0.093	-0.101	-0.031	0.056 (1.42)	0.030 (2.36)
Normalized 3-year growth	-0.016	-0.087	-0.093	-0.096	-0.012	-0.004 (-0.12)	0.007 (0.78)

(g) Book to price ratio

	Book to Price Ratio						
	Q5(Low)	Q4	Q3	Q2	Q1(High)	Q5-Q1	Average Coefficient
Normalized 5-year growth	-0.018	-0.097	-0.075	-0.045	0.090	-0.108 (-1.77)	-0.007 (-0.28)
Normalized 3-year growth	-0.044	-0.097	-0.093	-0.059	0.083	-0.126 (-2.17)	-0.017 (-0.71)

(h) Earnings to price ratio

	Earnings to Price Ratio						
	Q5(Low)	Q4	Q3	Q2	Q1(High)	Q5-Q1	Average Coefficient
Normalized 5-year growth	-0.335	-0.227	-0.121	-0.013	0.324	-0.658 (-13.61)	-0.340 (-5.12)
Normalized 3-year growth	-0.387	-0.241	-0.155	-0.040	0.332	-0.719 (-12.80)	-0.390 (-4.55)

(i) Cash flow to price ratio

	Cash Flow to Price Ratio						
	Q5(Low)	Q4	Q3	Q2	Q1(High)	Q5-Q1	Average Coefficient
Normalized 5-year growth	-0.090	-0.154	-0.093	-0.008	0.149	-0.238 (-7.80)	-0.271 (-1.63)
Normalized 3-year growth	-0.120	-0.161	-0.102	-0.026	0.138	-0.258 (-7.54)	-0.280 (-1.86)

Table II

The influence of past firm performance on extreme forecasts

To construct the table, we sort all firms into quintiles by 36-month and 60-month past stock returns, and 3-year and 5-year past profit growth. The values in Table II (a) represent the averages of normalized adjusted most aggressive forecasts and the values in Table II (b) represent normalized adjusted most conservative forecasts for each quintile across 240 months. Q1–Q5 represents the difference between Q1 and Q5 mean values. In addition, to construct the table, the most aggressive/conservative forecast is regressed on each performance indicator; Average coefficient represents the average coefficient of each past performance indicator. The figures in parentheses are autocorrelation-consistent t-statistics. The non-zero serial covariance is set at 11.

(a) The most aggressive forecast

Sorted by	Q1(High)	Q2	Q3	Q4	Q5(Low)	Q1-Q5	Average Coefficient
36-month past stock return	0.002	-0.106	-0.101	-0.034	0.119	-0.118 (-2.53)	-0.042 (-2.31)
60-month past stock return	-0.033	-0.119	-0.094	-0.011	0.152	-0.185 (-6.21)	-0.063 (-5.41)
3-year past profit growth	0.060	-0.071	-0.089	-0.134	0.096	-0.036 (-0.84)	0.017 (0.97)
5-year past profit growth	-0.011	-0.090	-0.052	-0.088	0.106	-0.117 (-3.06)	-0.035 (-2.66)

(b) The most conservative forecast

Sorted by	Q1(High)	Q2	Q3	Q4	Q5(Low)	Q1-Q5	Average Coefficient
36-month past stock return	0.075	0.082	0.041	-0.064	-0.236	0.311 (8.41)	0.110 (5.79)
60-month past stock return	0.072	0.092	0.058	-0.050	-0.243	0.315 (6.24)	0.110 (7.56)
3-year past profit growth	-0.013	0.085	0.062	0.036	-0.167	0.154 (3.87)	0.039 (2.60)
5-year past profit growth	0.017	0.091	0.038	-0.004	-0.141	0.158 (5.88)	0.055 (5.34)

Table III

Informational value of the non-consensus forecasts

To construct the table, we sort all firms into quintiles in each month by the adjusted most aggressive and adjusted most conservative forecasts. In each table, we show the realized normalized 5-year (Realized 5 year growth) and 3-year (Realized 3 year growth) profit growth rates. Table III (a) shows the result for the most aggressive and Table III (b) for the most conservative forecast. H1–H5 represents the difference between the mean realized profit growth rate for H1 and H5. L1–L5 represents the difference between the mean realized profit growth rate for L1 and L5. In addition, to construct the table, Realized growth is regressed on the most aggressive/conservative forecast; Average coefficient represents the average coefficient of the most aggressive/conservative forecast. The figures in parentheses are autocorrelation-consistent t-statistics. The non-zero serial covariance is set at 11.

(a) The most aggressive forecast

	The most aggressive forecast						
	H1(High)	H2	H3	H4	H5(Low)	H1-H5	Average Coefficient
Realized 5 year growh	0.062	-0.037	-0.051	-0.056	-0.049	0.110 (3.78)	0.052 (4.53)
Realized 3 year growh	0.047	-0.038	-0.057	-0.071	-0.071	0.118 (3.79)	0.060 (4.17)

(b) The most conservative forecast

	The most conservative forecast						
	L1(High)	L2	L3	L4	L5(Low)	L1-L5	Average Coefficient
Realized 5 year growh	-0.025	-0.055	-0.056	-0.016	0.021	-0.046 (-1.92)	-0.022 (-2.11)
Realized 3 year growh	-0.043	-0.058	-0.067	-0.042	0.023	-0.066 (-2.21)	-0.026 (-1.95)

Table IV

Incremental informational value of the non-consensus forecasts

To construct the table, we run following multiple regression; a dependent variable is the realized 3- or 5-year profit growth rates ; independent variables are the adjusted most aggressive/conservative forecasts, 3- and 5-year profit growth and 36- and 60-month stock returns. Panel A. shows result of regression analysis for the most aggressive forecast; Panel B. shows result of regression analysis for the most conservative forecast. The values in the table represent average coefficients of each independent variable. The figures in parentheses are autocorrelation-consistent t-statistics. The non-zero serial covariance is set at 11.

Variables	5-year growth	3-year growth
Panel A: Regression analysis for the most conservative forecast		
The adjusted most conservative forecast	-0.023	-0.022
	(-3.33)	(-2.11)
36-month past stock return	0.013	0.024
	(0.69)	(1.04)
60-month past stock return	0.016	0.010
	(1.31)	(0.45)
3-year past profit growth	-0.082	-0.083
	(-6.96)	(-5.65)
5-year past profit growth	-0.069	-0.081
	(-3.82)	(-3.87)
Panel B: Regression analysis for the most aggressive forecast		
The adjusted most aggressive forecast	0.051	0.052
	(5.21)	(4.32)
36-month past stock return	0.013	0.024
	(0.70)	(1.07)
60-month past stock return	0.017	0.011
	(1.41)	(0.51)
3-year past profit growth	-0.083	-0.084
	(-7.11)	(-5.71)
5-year past profit growth	-0.068	-0.080
	(-3.83)	(-3.86)

Table V

Influence of past firm performance on forecasts after considering analyst coverage

To construct the table, we sort all firms into quintiles by 36-month and 60-month past stock returns, and 3-year and 5-year past profit growth. The values in Table V (a) represent the averages of normalized adjusted most aggressive forecasts (analyst coverage adjusted) and the values in Table V (b) represent normalized adjusted most conservative forecasts (analyst coverage adjusted) for each quintile across 240 months. Q1–Q5 represents the difference between Q1 and Q5 mean values. In addition, to construct the table, we regress the most aggressive/conservative forecast on each performance indicator; Average coefficient represents the average coefficient of each past performance indicator. The figures in parentheses are autocorrelation-consistent t-statistics. The non-zero serial covariance is set at 11

(a) The most aggressive forecast

Sorted by	Q1(High)	Q2	Q3	Q4	Q5(Low)	Q1-Q5	Average Coefficient
36-month past stock return	0.002	-0.119	-0.119	-0.038	0.161	-0.160 (-3.25)	-0.081 (-2.94)
60-month past stock return	-0.059	-0.144	-0.113	-0.017	0.196	-0.255 (-7.25)	-0.127 (-6.42)
3-year past profit growth	0.062	-0.076	-0.095	-0.143	0.126	-0.064 (-1.39)	0.067 (0.58)
5-year past profit growth	-0.031	-0.096	-0.041	-0.089	0.131	-0.162 (-3.72)	-0.007 (-3.41)

(b)The most conservative forecast

Sorted by	Q1(High)	Q2	Q3	Q4	Q5(Low)	Q1-Q5	Average Coefficient
36-month past stock return	0.075	0.116	0.086	-0.028	-0.275	0.350 (8.34)	0.144 (7.48)
60-month past stock return	0.112	0.119	0.075	-0.042	-0.273	0.385 (9.63)	0.161 (8.85)
3-year past profit growth	-0.009	0.094	0.076	0.060	-0.184	0.175 (4.87)	0.034 (3.00)
5-year past profit growth	0.049	0.100	0.030	0.007	-0.151	0.199 (7.57)	0.093 (7.24)

Table VI

Relationship between dispersion in long-term growth forecast and past performance

To construct the table, we sort all firms into quintiles by 36- and 60-month past stock returns and 3- and 5-year past profit growth. The table shows mean values of dispersion among long-term growth forecasts of analysts covering the firm (i.e., the standard deviation of the long-term earning growth forecasts). Q1–Q5 represents the difference between the mean dispersions for Q1 and Q5. The figures in parentheses are autocorrelation-consistent t-statistics. The non-zero serial covariance is set at 11.

Divided by	Q1(High)	Q2	Q3	Q4	Q5(Low)	Q1-Q5
36-month past stock return	0.045	0.034	0.032	0.035	0.046	-0.001 (-0.23)
60-month past stock return	0.042	0.033	0.031	0.035	0.044	-0.003 (-1.20)
3-year past profit growth	0.045	0.041	0.040	0.031	0.042	0.004 (1.98)
5-year past profit growth	0.040	0.040	0.045	0.034	0.040	0.001 (0.51)

Table VII

Relationship between dispersion in long-term growth forecast and future return

To construct the table, we sort all firms into quintiles by dispersion among long-term growth forecasts of analysts covering the firm (i.e., the standard deviation of the long-term earning growth forecasts for the firm). Raw return represents the average stock return over the following month across 240 months. The four-factor adjusted return represents the average risk-adjusted return by the Fama-French three-factor model along with Carhart's momentum factor. Q1–Q5 represents the difference between Q1 and Q5 mean values. The figures in parentheses are t-statistics.

	Q1(High)	Q2	Q3	Q4	Q5(Low)	Q1-Q5
Raw return	1.39%	1.27%	1.29%	1.26%	1.18%	0.22% (0.33)
Four-factor adjusted return	0.88%	0.68%	0.60%	0.54%	0.51%	0.37% (1.97)