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A Study on an Automatical BKLS Measurement By Programming Technology

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Abstract

This study focuses on presenting the IT program module provided by BKLS measure in order to solve the problem of capital cost due to information asymmetry of external investors and corporate executives. Barron at al(1998) set up a BKLS measure to guide the market by intermediate analysts. The BKLS measure was measured by using the changes in the analyst forecast dispersion and analyst mean forecast error squared. This study suggests a model of the algorithm that the BKLS measure can be provided to all investors immediately by IT program in order to deliver the meaningful value in the domestic capital market as measured. This is a method of generating and analyzing real-time or non-real-time prediction models by transferring the predicted estimates delivered to the Big Data Log Analysis System through the statistical DB to the statistical forecasting engine.

Because BKLS measure is not carried out in a concrete method, it is practically very difficult to estimate the BKLS measure. It is expected that the BKLS measure of Barron at al(1998) introduced in this study and the model of IT module provided in real time will be the starting point for the follow-up study for the introduction and realization of IT technology in the future.

Keywords*: BKLS measure, standardized analyst forecast dispersion, standardized analyst mean forecast error squared*

1. Introduction

This study shows how the combination of automatical IT programming methods and BKLS measures affect on the accuracy of analysts' earnings forecasts. Barron et al.(1998) reveal about the properties of analysts' information environments, developing BKLS consensus, which is the measure of information commonality individual analysts possess at the time they announce earnings forecasts[1]. BKLS consensus assumes analysts' information can be represented as either common to all analysts or idiosyncratic to some individual analysts. Thus, by using BKLS consensus, we can measure the degree to which analysts base their forecasts on common information relative to idiosyncratic information. Frankel et al.(2005) suggest that accruals quality is a proxy for the information risk associated with earnings because this measure tells investors about the mapping of accrual-based accounting earnings into cash flows[2]. Relatively poor

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accruals quality weakens this mapping and, therefore, increases information risk.

First, we introduce a study of Kim et al.(2007) and they show that accruals quality is associated with BKLS consensus, the ratio of common-to-total information in the average analysts' forecasts[3]. Second, we also comments that analysts' behavior to change the degree of information commonality depending on accruals quality contributes to improve the accuracy of earnings forecasts.

We finally show that higher accruals quality decreases BKLS consensus, which shows lower information risk decreases investors' demands on common information which is publicly available to all investors. Accordingly, such investors' demands enable analysts to generate more idiosyncratic information rather than common information. Indjeijikian(1991) find that higher level of disclosures afford analysts more opportunity to develop and convey more uniquely private information in their individual forecasts[4]. Further, we provide evidence that the accuracy of analysts' earnings forecasts decreases as BKLS consensus increases, which suggests that high ratio of common-to-total information in the average analysts' forecasts decreases analysts' earnings forecast accuracy. However, the increased reliance on common information as for firms with high accruals quality contributes to increase analysts' earnings forecast accuracy. Therefore, these findings suggest that, as for firms with high accruals quality, analysts do not have to spend their time and economic resources to acquire or develop idiosyncratic information because using common information is helpful to increase earnings forecast accuracy. In sum, while analysts tend to place more reliance on idiosyncratic information rather than common information as for firms with high accruals quality, we find that their efforts on generating idiosyncratic information do not contribute to increase the accuracy of earnings forecasts. Our study suggests that it is cost effective for analysts to evaluate firms' accruals quality before they work harder to exploit more idiosyncratic information to increase the accuracy of earnings forecasts. Our results are consistent with Lobo et al.(2006) which find that low accruals quality are followed by a great number of analysts in response to greater demand on analyst services and more effort by analysts when firms have high information risk[5]. Prior studies find that corporate disclosures are important source for analysts in forming their earnings forecasts. Byard and Shaw.(2003) find that analysts rely more heavily on publicly available financial data rather than privileged communication with management[6]. Evidence on how analysts use accounting information is still one of the main issues among those interested in understanding analysts' role as information intermediaries. Our study contributes to better understand how analysts react to market participants by analyzing that earnings forecast accuracy differs according to not only information environments but also its interaction effect with the quality of accounting information.

2. Prior Researches and The Purpose of This Paper

Empirical accounting research frequently relies on analyst forecasts to construct proxies for variables of interest. For example, the error in the mean forecast is used as a proxy for earnings surprise[7, 8, 9]. In addition, forecast dispersion (that is, cross-sectional variance) and error in the mean forecast is used to proxy for the uncertainty or the degree of consensus among analysts or market participants[10, 11, 12, 13, 14]. However, the relation between these commonly used empirical proxies and such theoretical properties of the information environment as uncertainty and consensus has yet to be rigorously specified. This article investigates, from an analytical perspective, what the forecasts of analysts reveal about the properties of their information environment. We base our analysis on a model of expectations in which each analyst observes two signals about future earnings, one public (common across all analysts) and one private (idiosyncratic). The model demonstrates how these two different types of information result in forecast errors and dispersion and how the underlying unobservable characteristics of the analysts' information environment are revealed by expressions involving observable constructs.

The intuition underlying our main results stems from the fact that forecast dispersion and error relate in different ways to the common and idiosyncratic components of error in analysts' forecasts. The common error component arises from error in the public information analysts rely upon and the idiosyncratic error component arises from error in the private information analysts rely upon. We find that forecast dispersion reflects only idiosyncratic error information analysts rely upon. We find that forecast dispersion reflects only idiosyncratic error. By contrast, error in individual forecasts reflects both common and idiosyncratic error and error in the mean forecast reflects primarily common error but may also reflect idiosyncratic error that is incompletely diversified away when only a limited number of forecasts exist.

The fact that errors in common vs. private information influence forecast dispersion and error differently yields insights into how certain theoretical properties of the analysts' information environment are reflected in empirical forecast measures on average. One can understand these insights best by referring to two theoretical constructs: uncertainty and consensus. "Uncertainty" refers to the expected squared error in individual forecasts aggregated(or averaged) across analysts. "Consensus" refers to the degree to which analysts share a common belief.' As we demonstrate, the expected dispersion in forecasts is an increasing function of uncertainty but a decreasing function of consensus, while the expected squared error in the mean forecast is an increasing function of both uncertainty and consensus. These findings provide guidance on how to construct valid measures of uncertainty and consensus from widely available earnings forecast (and realization) data. First of all, we demonstrate that BKLS measure may be useful as information for the fair investments. Finally, we will roughly show the mechanism how BKLS measure is automatically produced.

3. BKLS Measure

BKLS measures distinguish between public information and private information available to financial analysts. And that BKLS measures are finally estimated to share of common information among total information. BKLS measures is indirectly inferred to financial analysts' forecast error and forecast dispersion. The following figure shows the estimation mechanism of BKLS measures.

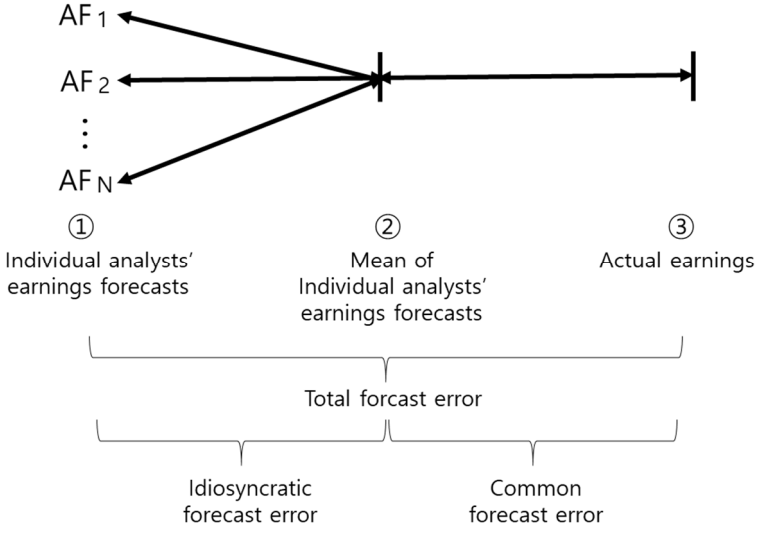

Figure 1. The Estimation Concepts of BKLS measure

As the analysts' total earnings forecast error is composed of the common forecast error and the private forecast error, so the above figure shows how the BKLS measures is derived using this concept. The overall forecast error represents the extent to which the earnings estimates of individual analysts deviate from actual earnings. The common forecast error on the above figure represents the degree to which an earnings forecasts mean of individual analysts deviates from the actual earnings. The private forecast error means the degree to which the earnings forecasts of individual analysts deviate from the analyst forecast average.

4. Automatical Estimation of BKLS Measure By Programming Technology

This study presents an outline of the program that real time measurement by IT programming of BKLS Measure is shown in Figure 2. The analytical tool uses the well-known 'R', which is the most commonly used tool for data analysis in 2015, as investigated by KDnuggets(www.kdnuggets.com). However, if 'R' is applied to a real-time log analysis system, the module size is too large and separate program capability is required.

Therefore, in this study, only the most used algorithms are selected to be lightweight and easy to use. As shown in Figure 2, the statistical prediction engine is designed based on a mathematical standard library. The statistical prediction engine is integrated with the log analysis system, and is a model that performs prediction based on the values stored in the statistical database rather than the direct prediction using the original log.

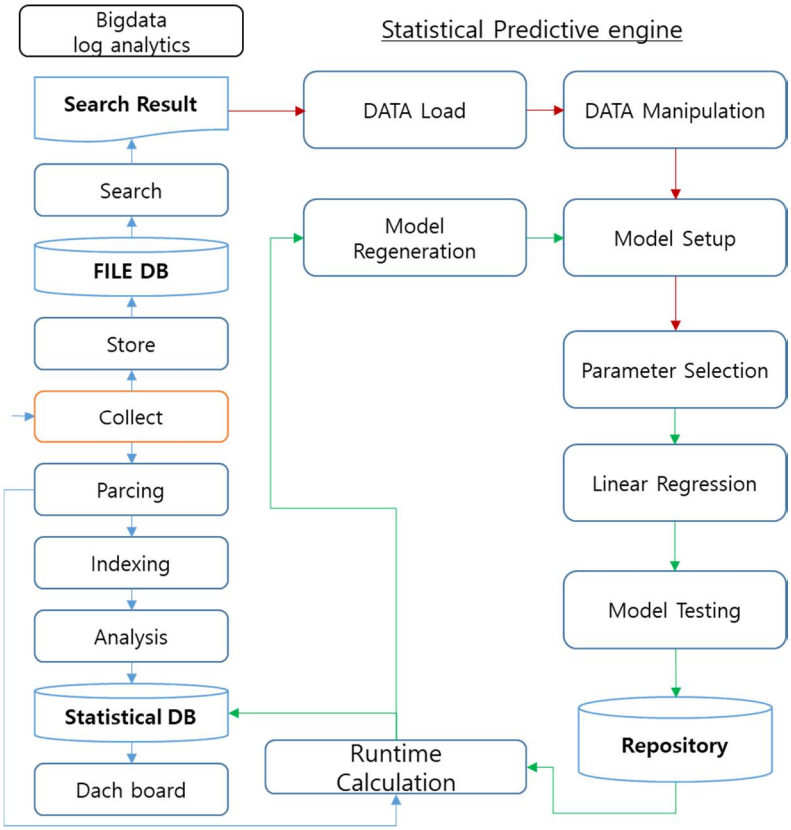

Figure 2. Detailed module configuration

In Figure 1, the total earnings forecast error of the financial analyst is composed of the common forecast error and the intrinsic forecast error. Therefore, the BKLS Consensus is derived by using this concept. Figure 2 shows the estimated real- Show. The predictive analysis via the statistical database is transmitted to the big data log analysis system through the statistical DB together with the result of predictive analysis by searching & extracting the big data source log. "Runtime Calculation" is the most important factor in real-time forecasting analysis. It calculates predicted estimates for all logs in real-time using a prediction model generated from big data log and returns the result. When the module is provided to a third party, the statistical prediction engine has a structure capable of operating independently of the big data log analysis system. The "Data Load" extracts the log from the repository of the Big Data Log Analysis System and transfers it to the statistical forecasting engine. The statistical forecasting engine generates and analyzes the predictive model using the log. The statistical prediction engine operates in a batch mode and generates a predictive model by extracting necessary data from the original log stored in the big data log analysis system. Then, the generated model is used to calculate real-time prediction estimates through the 'Runtime Calculation' module, and periodic non-real-time analysis is performed together. Statistics and prediction algorithms use the most commonly used linear regression.

5. Conclusion

The public information that is equally collected by financial analysts are frequently converted private information. Even if the information collected through the private route, the contemporary information obtained by different financial analysts is likely to be common information. In this paper, BKLS measures are defined with the share of common information among total information. The higher the share of common information utilization, the more likely the financial analyst will use the same information as the other financial analysts. The lower the share of common information utilization, the more financial analysts use their own information. The results of this study can be summarized as the fact that the accuracy of earnings forecasting of financial analysts is different according to the share of common information and proprietary information. Financial analysts have lowered the use of common information as the quality of accounting information increases. This means that if the quality of accounting information is high, investors will also obtain high quality information, which will increase the demand for financial analysts. In terms of prediction accuracy, such an attempt is not efficient. In general, if financial analysts increase the use of private information, earnings forecasting accuracy increases, but as the quality of accounting information increases, the use of common information will help to improve the earnings forecasting accuracy. This study implies financial analysts considered the quality of the accounting information, it is reasonable to determine the share of common information utilization.

It is not easy to measure the analysts' behavior. That is the limitation of this study. The results of this study are based on the BKLS measure, which indirectly indicate analysts' information environments. Also, since the specific IT technology for implementing the proposed module is not specified in this study, it is expected that the content will be the starting point of the follow-up study.

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