

How Useful is Stock Investment Information? The Information Value of Stock Price Ratings and Earnings Estimates

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1. The Need for Investment Information

When online trading began in the U.S. and Europe, trading commissions had already been deregulated, and full-service brokers, who charged high commissions in return for research and consulting services, existed alongside discount brokers offering low commissions. Thus both types of brokers had time to prepare their business strategies for Internet trading, and could better withstand its relentless competitive pressures on costs and prices. By comparison, in Japan the deregulation of stock trading commissions occurred almost simultaneously with the advent of online trading. As a result, securities firms were thrown into a competitive environment without having had any time to prepare business strategies or to target customers.

Faced with this situation, Japan's securities firms are reconsidering the rationale of trading commissions. In general, trading commissions are regarded as compensation for executing trades and providing research or other services in the process.

Of course, requirements for trade executions and investment information differ greatly between institutional investors and individual investors. Institutional investors cannot afford to ignore transaction costs including the market impact of their trading. In particular, only some of the major securities firms domestic or foreign have the advanced capabilities needed to execute basket trading, where many stocks are traded at the same time. Moreover, some institutional investors demand high quality research, and evaluate the research services provided by securities firms based on their own high standards before issuing trade orders. As a result, institutional investors are now selecting their securities firms more carefully than when commissions were fixed, causing the second-tier securities firms to put greater emphasis on their retail business.

However, the market for individual investors is no less competitive, and specialized online brokers are offering deep discounts in a war of attrition. In this situation, to attract individual investors without being drawn into price competition, brokers need to enhance non-price factors such as research and

consulting capabilities.

Amid the growing strategic implications of investment research, this paper examines the usefulness of investment information that is provided to investors. Obviously, information that does not facilitate investment decisions is of no value. Moreover, while a vast amount of data is available, we cannot accurately evaluate data that is indirectly useful or useful only to specific investors. Thus we focus on information that is directly related to investing in individual stocks, and that is generally available — specifically, stock price ratings and earnings estimates.

Securities analysts provide predictions of future stock returns and corporate earnings to aid investors in making decisions. Individual investors seem to be particularly interested in stock price ratings, which claim to predict a stock's future return on investment. However, little is known about the prediction accuracy or information value of these ratings and estimates. Below we examine the information value of the two types of data.

2. Information Value of Stock Price Ratings

(1) Description of Stock Price Ratings

Stock price ratings, also called stock ratings, are recommendations (such as to buy, hold, or sell stocks) issued by securities analysts on individual stocks based on predicted future returns. While definitions vary by securities firm, a typical rating system assumes a six-month time horizon and rates stocks as follows: stocks expected to exceed a benchmark return by over 10 percent are rated “A”; stocks expected to rise or fall less than 10 percent are rated “B”; and stocks expected to decline by over 10 percent are rated “C”.

These definitions need some clarification. To see why, consider the instructions on a medicine bottle to “take 30 minutes after meal.” Apparently this means to take the medicine within 30 minutes, and not exactly 30 minutes after the meal. If so, one wonders why the instructions do not clearly state this. The same can be said of stock rating definitions — they are vague and subject to several interpretations:

1. The stock will meet the predicted performance exactly six months later.
2. For A and C ratings, the predicted performance need be met at least one day during the six-month period.
3. For A and C ratings, the predicted performance need be met at least one day during the six-month period; moreover, A-rated stocks must never underperform by over 10 percent, nor C-rated stocks outperform by over 10 percent.
4. The stock will meet the predicted performance many times during the period.

While other interpretations are possible, the four listed above seem to be reasonable. Indeed, several empirical analyses have already been made (see references), all pertaining to the correct interpretation of ratings. The question then arises, if this information is being provided to aid investors, what value does it really have in light of the ambiguity in its interpretation?

(2) Verification Method for Stock Ratings

In examining stock price ratings, the next matter to be addressed is the method used to verify their accuracy. The studies mentioned above examine the prediction accuracy of ratings. However, two problems arise with this approach.

First, there is difficulty in clarifying the relationship between the accuracy of ratings and the intrinsic value of ratings information. For investors, the value of predictions lies in their accuracy, which depends on the analyst's skill in interpreting fundamentals. However, since securities firms tend to use ratings to generate business, stock prices can fluctuate without regard to fundamentals. Thus, even when ratings appear to be on target to investors, it does not necessarily imply that mis-priced stocks are correcting in line with fundamentals. Unfortunately, an assessment of prediction accuracy cannot separate out extraneous factors such as the sales capability of securities firms and anticipatory behavior of investors. This impedes our purpose to assess the skill of analysts.

The second problem is that verification results do not necessarily have a constructive meaning. Studies have concluded that stock ratings are not always highly accurate and do not have much information value. The obvious implication of this conclusion is that accuracy can be improved in the future. But can analysts actually become more accurate by refining their methods and gaining more experience? Moreover, what are the limits of improvement? These questions cannot be answered with conventional verification methods, since generalizations on the limits of the intrinsic information value of ratings cannot be made from case studies of ratings accuracy.

In this paper, rather than focusing on prediction accuracy per se, we examine stock price ratings in terms of their intrinsic information value. Using the four ratings definitions above, we verify the performance of stocks relative to a benchmark, and then assess the information value of ratings *that prove to be accurate*. While benchmarks differ among securities firms, the Nikkei 225 index or TOPIX is generally used. However, considering the volatility of the Nikkei index associated with its reconstitution in April 2000 — a factor which lies outside the ken of analysts — we chose to use TOPIX.

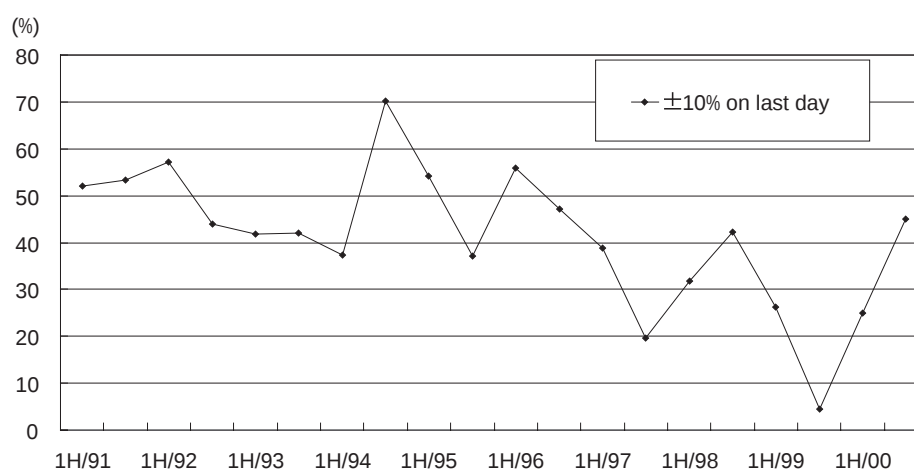
We first consider the B rating (neutral or hold), followed by the A rating (buy) and B rating (sell).

(3) The B Rating (Hold Recommendation)

The B rating predicts that a stock will perform within 10 percent of TOPIX in the next six months. Considering that many stocks cluster around TOPIX, ratings would be rendered meaningless if too many stocks are rated neutral. Thus we first examine how many stocks actually perform in line with the TOPIX.

For the performance verification method, we examined the distribution of cumulative percentage change in stock prices, which was calculated from daily closing prices on the last trading day in June and December. The percentage change in stock price is expressed relative to the TOPIX benchmark. The tracked stocks are those listed in the First Section throughout the period in question, and for which prices are available. For every six-month period from December 1990 to June 2000, we noted the proportion of stocks whose price changed by less than 10 percent six months later (Figure 1).

Figure 1 Percentage of Stocks Within 10% of TOPIX Return on Last Day



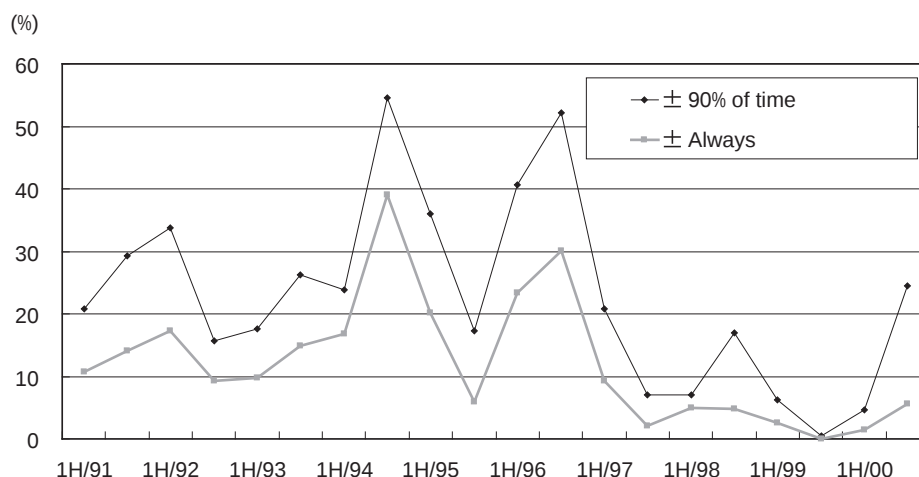
Source: Compiled from Nikkei NEEDS.

As Figure 1 shows, the percentage of stocks performing within 10 percent of TOPIX after six months fluctuates greatly, and the total number of stocks is not necessarily large. The reason is that since TOPIX is weighted by market capitalization and hence heavily influenced by large caps, the far more numerous small caps will not necessarily have returns near TOPIX. Particularly in the two-tiered market in 1999, when large cap growth stocks performed spectacularly while small caps and value stocks floundered, less than one in ten stocks performed within 10 percent of TOPIX. In sum, the number of stocks with a neutral return relative to the benchmark is not always large.

Such is the case when ratings are verified on the last day of the period. We next consider two stricter conditions: to always be within 10 percent during the period, and to be within 10 percent at least 90

percent of the time (Figure 2). The first condition is stricter than the second, and both are stricter than the one above.

Figure 2 Percentage of Stocks Within 10% of TOPIX Always or at Least 90% of the Time



As Figure 2 shows, the percentage of stocks consistently performing alongside TOPIX is below 20 percent most of the time. While a slightly higher percentage of stocks performs alongside TOPIX 90 percent of the time, the percentage tops 50 percent only twice. This suggests that most of the stocks that come within 10 percent of TOPIX on the last day have exceeded the threshold at least once during the period. In other words, with volatile assets such as stocks, the number of stocks that post a 10 percent return on the last day varies greatly in each period, and most stocks are not likely to remain within the threshold most of the time.

Thus if we judge the neutral rating on the last day of the six-month period, the accuracy of the rating will depend on the market trend, while a stricter definition that includes price movements during the period reduces the accuracy of the rating. The infrequency of accurate ratings could be interpreted as enhancing the information value of accurate ratings; but we could also say that these were just lucky calls. Thus if prediction accuracy determines the value of stock ratings, that value will fluctuate over time, and become practically worthless if the rating definition is tightened.

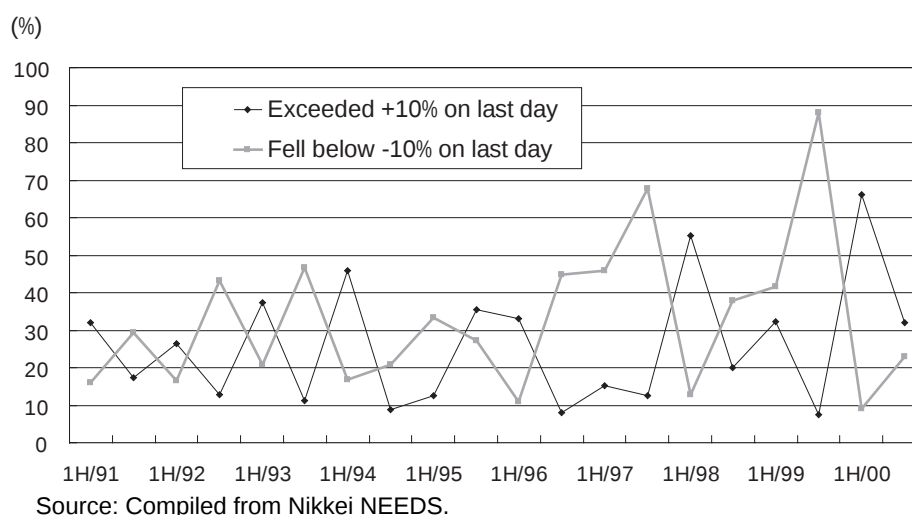
(4) A and C Ratings (Buy and Sell Recommendations)

We next consider stock ratings A (to outperform TOPIX by over 10 percent in the next six months) and C (to underperform TOPIX by over 10 percent in the next six months). The verification method is the same as above.

First we calculated the percentage of stocks that have cumulatively outperformed or underperformed

TOPIX by over 10 percent as of the last day of the six-month period, out of all stocks continuously listed in the First Section and whose prices have been consistently available. (Figure 3).

Figure 3 Percentage of Stocks That Outperform or Underperform TOPIX as of the Last Day

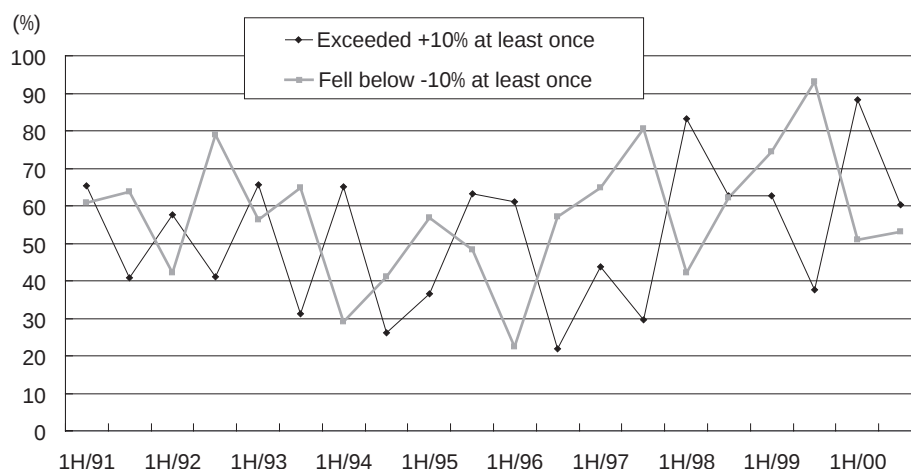


As seen in Figure 3, the percentages of outperformers and underperformers are quite volatile, and moreover, tend to diverge from each other. In particular, they moved almost symmetrically opposite during the volatile two-tiered market and subsequent correction in the late 1990s. For example, underperformers increased when returns were high for large cap growth stocks, while outperformers increased when small cap value stocks posted high returns.

One criticism of stock price ratings is that buy recommendations tend to outnumber sell recommendations. Of course, if this tendency always exists, the criticism that predictions are biased would be justified. However, as seen in Figure 3, having an even balance between buy and sell recommendations would also be incompatible with the fact that the number of outperformers or underperformers constantly changes due to market trends. Stated differently, since relative returns fluctuate depending on market trends, so too does the accuracy of stock ratings.

We next ease the ratings conditions so that stock prices need to outperform or underperform TOPIX for only one day during the six-month period. Thus ratings are fulfilled if any opportunity at all exists to earn trading gains that outperform TOPIX by over 10 percent. The results are shown in Figure 4.

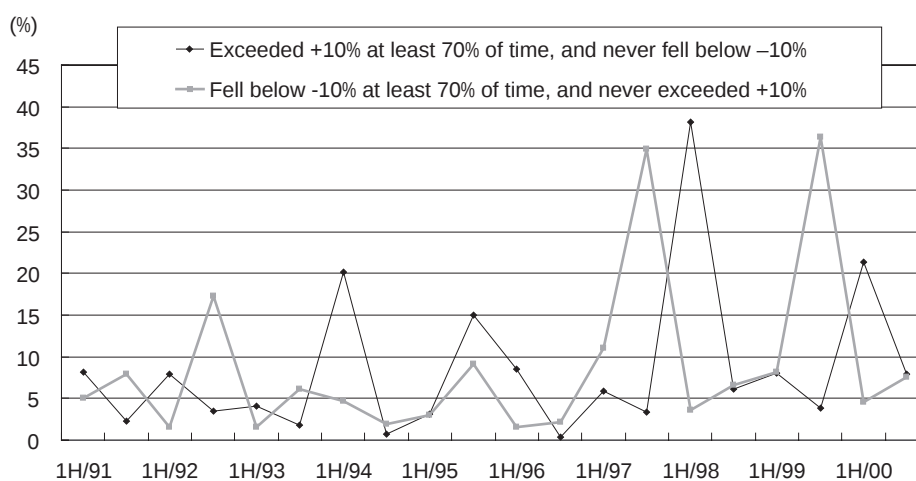
Figure 4 Percentage of Stocks that Outperform or Underperform TOPIX at Least One Day in Six Months



As expected, the number of stocks that comply with the relaxed conditions increases greatly; at times, over 90 percent of the stocks meet the criteria. In this case, however, ratings would be accurate but would not have much information value.

Some more sensible conditions are as follows: for an A rating, outperformance of over 10 percent at least 70 percent of the time, and not a single day of underperformance of over 10 percent; and similarly for a C rating, underperformance of over 10 percent at least 70 percent of the time, and not a single day of outperformance of over 10 percent. This ensures that the conditions are satisfied most of the time during the period, and that a sharp reversal does not occur. The results are shown in Figure 5.

Figure 5 Percentage of Stocks that Outperform 70% of the Time and Never Underperform, and that Underperform 70% of the Time and Never Outperform



Source: Compiled from Nikkei NEEDS.

In Figure 5, outperformers and underperformers comprise less than 10 percent of stocks in 80 percent of the cases. Thus buy or sell recommendations would apply to only a small number of stocks. In other words, if there are an equal number of buy, neutral, and sell recommendations, a large proportion of buy and sell recommendations are bound to err from the start because stock prices tend to fluctuate by more than plus or minus 10 percent.

(5) Conclusion

We have considered a typical stock rating scheme — one that predicts whether a particular stock in the next six months will outperform TOPIX by over 10 percent, perform alongside TOPIX, or underperform TOPIX by over 10 percent — and examined the percentage of stocks that would have fulfilled the conditions. We tested various interpretations of the six-month time horizon, and found that if conditions need be met only once during the period, too many stocks would comply, while requiring that conditions be met constantly would eliminate practically all stocks from complying. In other words, depending on how large we make the bull's eye, either too many or too few ratings will prove to be accurate. This simply reflects the fact that stocks are volatile and risky assets.

In addition, if conditions need to be met only on the last day of the six-month period, the number of stocks that comply will vary widely in time series fashion. This causes the accuracy rate to fluctuate as well.

Thus it is difficult to set up a ratings scheme with an appropriately steady accuracy rate. The accuracy rate changes because stocks are not like the Jumbo lottery with a fixed number of winning tickets, but more like the Toto sports lottery in which the number of winning tickets changes each week. Like Toto, where the prize money depends on the number of winning tickets, the number of correct stock ratings determines their value. In other words, the intrinsic information value of stock ratings is variable.

The stock rating definitions considered here are used as examples; actual ratings issued by securities firms are quite varied. To generalize the discussion, below we consider the effect of changing three key aspects of the definitions: the six-month time horizon, the plus or minus 10 percent neutral range, and the TOPIX benchmark.

With regard to extending the six-month period or narrowing the 10 percent neutral range, a rigorous definition of ratings will cause the accuracy of predictions to decline, while a looser definition will improve accuracy but make the predictions less valuable. The opposite will occur if the period is shortened or the neutral range is widened. Thus altering the duration and neutral range will affect the percentage of stocks that comply. However, in any case, the information value of ratings will change depending on the definition used and market trends.

We next consider the choice of benchmark and rating universe of stocks. Even when securities firms use the TOPIX benchmark, the rating universe tends to center around several hundred large caps, and fewer small caps are contained than in TOPIX. However, this still creates an imbalance in which small caps are superior in number but inferior in composition. Since the performance of the rating universe is affected by size, industry, and style factors, the number of stocks that comply with the stock rating format will vary depending on market trends and timing.

Although the Nikkei index is often used instead of TOPIX as a benchmark for stock rating, this does not affect the point of our argument. The Nikkei index is heavily influenced by high-priced stocks, and as with small caps and TOPIX, the distribution of returns of low-priced stocks is likely to be scattered. Another problem is that if stocks other than the Nikkei 225 stocks are included in the rating universe, the distribution of their returns relative to the Nikkei Average is uncertain.

With regard to predicting performance relative to a benchmark, a more basic problem is that analysts, who focus on particular industries, predict returns relative to a broad market index. It would be understandable for them to predict absolute returns or relative returns within an industry. But determining the relationship between an industry and the benchmark amounts to sector weighting, which is the realm of strategists. To use strategists' decisions in a consistent manner, strategists will need to provide accurate quantitative predictions on sector returns, and even in this case, there remains the problem that the analyst's prediction process is no longer a direct one. Moreover, if analysts start making sector predictions independently, consistency can no longer be assured across industries.

3. Accuracy of Earnings Estimates

Here we briefly examine the accuracy of analysts' earnings estimates, another important piece of investment information that predates stock ratings. In Japan, where companies have a custom of announcing earnings estimates, compiling estimates is not the exclusive domain of analysts. Moreover, even individual investors have ready access to earnings estimates such as in Toyo Keizai's *Kaisha Shikiho* and Nikkei's *Kaisha Joho*. Given this situation, let us consider the role played by analysts' estimates.

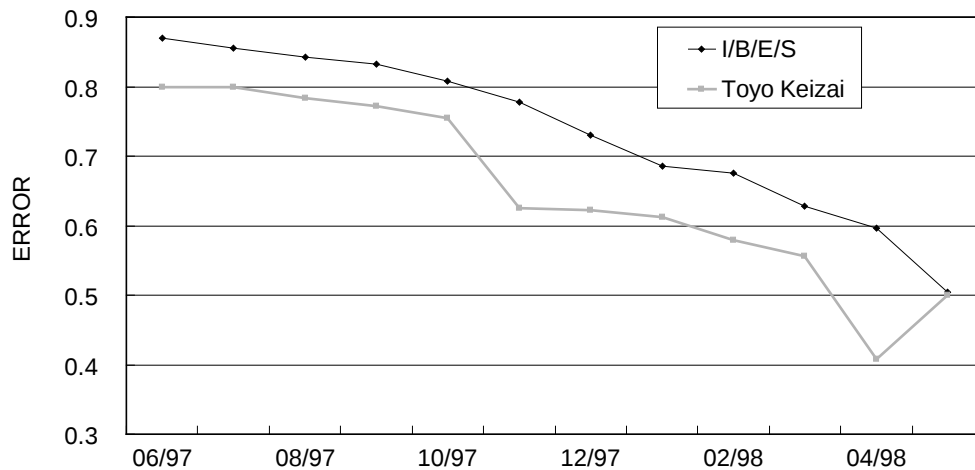
Specifically, we look at the analysts' consensus EPS estimate for the current quarter, provided by I/B/E/S (Institutional Brokers Estimate System). In the U.S., this data is regarded as the market's consensus estimate. Let us compare the accuracy of the analysts' consensus estimate to that provided by Toyo Keizai.

Error is defined as follows.

$$\text{Error} = \frac{|\text{Estimate} - \text{Actual}|}{(|\text{Estimate} + \text{Actual}|) \div 2}$$

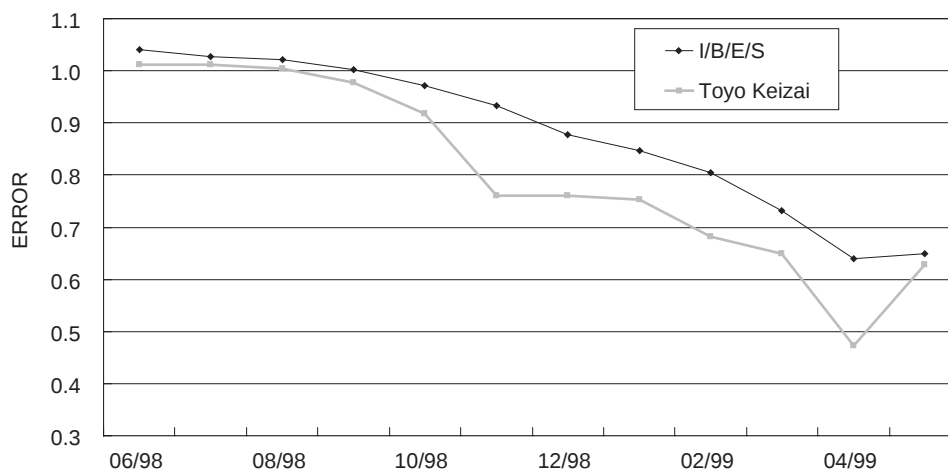
The average prediction error is calculated monthly for TSE First Section companies whose fiscal year ends in March. Three years of calculations are shown in Figures 6, 7, and 8 (for March 1998, March 1999, and March 2000 financial results).

Figure 6 Estimate Error (March 1998)



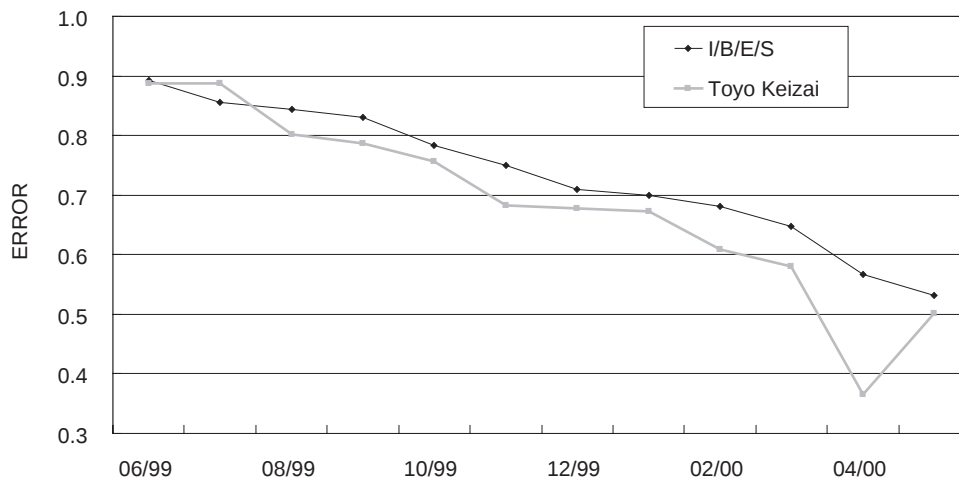
Sources: Compiled from Nikkei NEEDS, I/B/E/S, Toyo Keizai.

Figure 7 Estimate Error (March 1999)



Sources: Compiled from Nikkei NEEDS, I/B/E/S, Toyo Keizai.

Figure 8 Estimate Error (March 2000)



Sources: Compiled from Nikkei NEEDS, I/B/E/S, Toyo Keizai.

In all years, and at most times, Toyo Keizai's estimates tend to have smaller errors than I/B/E/S. In other words, the simple average of analysts' estimates is generally less accurate than Toyo Keizai's. Toyo Keizai's estimates are believed to be highly sensitive to estimates announced by companies. The fact that the consensus estimate is less accurate raises the question of what additional value analysts provide. However, this does not mean that analysts' estimates have no information value; it means that investors need to choose their analysts carefully, and scrupulously study the information. In other words, they need to find analysts who add value to the estimates readily available from companies.

In the U.S., analysts claim that providing estimates is their role and not that of companies. However, according to studies comparing the accuracy of Toyo Keizai's estimates and that of U.S. analysts, estimate errors are smaller in Japan, where companies release earnings estimates. Several reasons come to mind. First, either companies in the U.S. are not disclosing enough information for analysts to prepare accurate estimates (estimates as accurate as those released by companies in Japan), or else the analytical ability of analysts is poor. Second, it is likely that Japanese companies have been using unrealized gains to adjust financial results. If the latter is true, since the earnings power of Japanese companies will become clearer once Japan adopts mark to market accounting, the true added value provided by analysts' estimates will come under close scrutiny.

4. Conclusion

We have examined investment information provided by analysts — specifically, stock ratings and earnings estimates — primarily from the perspective of their information value rather than accuracy rate. As predictions, the information value of this data resides in their accuracy. But since high accuracy cannot

be maintained, their information value is unstable.

Since individual investors now have ready access to information through the Internet, the role of analysts as conveyers of information will decrease. In addition, as we have shown, predictions do not necessarily provide added value to investors. Thus analysts need not only to convey information and predictions, but other useful information for making investment decisions, while investors also need to be selective in where they obtain information and how they use it.

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