A Research on Deviation of Analysts Forecast
----Based on Chinese Stock Market

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Abstract - This Study extends prior research on analyst forecast and market price discovery. Based on data of Chinese stock market, I found that security analysts' accuracy of earnings forecasts shows a weak maintenance and their accuracy increases with the boldness of their forecasts. Chinese analysts appear more cautious and show much more herding behavior than their counterparts of the developed markets. Positively biased forecasts are also observed in Chinese market and I proved that this can't be explained by the skewness theory, which then leads to the fact that analysts don't behave according to mean absolute error loss functions. However bold forecast do provide more information than herding forecasts after we control for firm, analyst and the other revision characteristics.

Index Terms - analyst forecast, consistent prediction, rational forecast, bold forecast

1. Introduction

In the overseas mature markets, the predictive value of the analysts on the company's profitability is higher than the final listing of the company's actual disclosure indicators. We called it the positive deviation phenomenon. Is it the same to the Chinese stock market?

Clayman and Schwartz (1994) explained that there was always an irrational optimism to the analysts on their own tracking stock, resulting in the average predicted value was higher than the actual value. The analysis of Lim (2001) showed the fact that the analyst's behavior was rational. Their forecast was higher than the actual value because they wanted to get good relationship between the listed companies, which is to make the best choice of utility maximization for them. Gu and Wu (2003) constructed another model to illustrate analysts' predictions bias is a rational choice. I will determine whether the analysts in Chinese stock market is rational based on the Chinese A-stock market data. The prediction bias error is because of the analysts' personal ability and market environment influence or just their making the best choice?

2. Sample selection and research methods

My sample time is ranged from 2008 to 2012, which includes four complete financial years. I get the EPS estimates data of analysts and actual EPS index of the listed company on the Chinese market from the Genius Finance.

I used the division method to the adjustment of the profit forecast by Gleason and Lee (2003). In that paper, every analyst's profit forecast adjustment was divided into High innovation adjustment or Low-innovation adjustment. There were three possibilities of analysts making new profit forecast. The first was that the new predicted profit was more close to the market consistent expectation, and this kind of forecast to the profit was similar to the typical herding effect. The second kind was that the new predicted profit was further away than his last time from the market consistent expectation. The third one was that the new prediction tended to be same with but beyond the new consistent expectations, while below or above his prediction last time and the market consistent expectation at the same time. The second and third kinds both showed deviation with the market consistent expectation. That was to say analysts' point of view were different from the market, so I called it the bold expectation.

I wanted to research about whether the analysts' bold prediction or similar herding effect prediction would be a rational behavior to themselves? Analysts' forecast information of earnings was the first link of transmission and digestion to the market information. If analysts made irrational decision, the link of the market information would be failure. Lim (2001) constructed an analyst objective function and in this function the deviation between analysts profit forecast and the actual value led to be a rational behavior. Gu and Wu (2003) trying to join the non-normal character of company profit distribution to explain the deviation. Their conclusion all point to that analysts released information was rational behavior. I would use the Chinese market data to demonstrate whether the analysts were rational. In the past, numerous researches had found the phenomenon that the analysts' forecast would be often higher than the actual profit of the company. The earlier profit forecast data was issued, the more obvious this kind of phenomenon was. Even in few days before the company's annual report was released, the analysts forecast could be 10% higher of average than the actual value (Clayman and Schwartz (1979)). So I tried to test that whether the interpretation of Gu and Wu (2003) to the rational analysts behavior was still stand in the special environment-Chinese market.

We assumed that the analysts' utility function was minimized mean absolute error, namely MAFE = E [ForError], then the analysts would forecast the median value of the distribution to the profits of the company. So if the company's profits distribution was negative deviation, namely Mean-Median < 0, it would cause the actual market profit to be higher than analysts' profit forecast. Same from the analysts' utility function, Lim (1999) mentioned that analysts needed to maintain a good relationship with listed companies' management to get exclusive information. This also indirectly prompted them to tend to give higher profit forecast.

Because the number of analysts tracking and the market value of companies had significantly positive correlation, simplicity, I would consider the market value as factor variable. Then I would analyze the deviations between the actual value and consistent expectation of EPS. For the sake of simplicity, I would choose the market value of companies and discrete degree of the company profit forecast as the factors to examine the influence of analysts' prediction.

I divided every year cycle into four intervals: part 1:1-1 ~ 4-30; part 2:5-1 ~ 6-30; part 3:7-1 ~ 9-30; part 4:10-1~12-30. Because the annual report was released nearly from the time interval part 4, we set it the time distance position 0, and part 1,2,3 were set in the distance position 3,2,1. At the same time I used analysts' predicted EPS values to one stock in every time parts as sample values to calculate the discrete degree of market for stock earnings.

Similar to the Gu and Wu (2003) model, I used the two variables MNMD and SKEW to describe the partial degrees of companies' profit. And I would use the data in Chinese market to test the following equation:

$$ForBias = a0 + a1*MNMD + a2*MV + a3*DISP + a4*ForHoriz + \varepsilon$$

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Among them, ForBias was the deviation ratio of analysts' earnings forecast, ForBias = (AcutalEps –ForeEps)/ |ActualEps|.

MNMD was the difference between mean and median of company profits, which had been mean adjustment measured. MNMD = (Mean – Median)/|Mean|

Skew was the partial degree of the distribution of the company quarterly profits, Skew= n*∑((EPS-avg(EPS))/s)^3/(n-1)(n-2)

DISP was the standard deviation of analysts' forecast profit in a time intervals.

MV was the stock market value, the unit was ten billion RMB yuan.

ForHoriz was the distance between each time interval and the annual report announcement day.

Based on the existing research results, the coefficient a1 should be positive. There was a positive relation between partial degree of company profits and deviation of forecast value. As the company profits had a negative partial degree, analysts tend to give the profit forecast higher than the actual value. I got the market consistent expectation EPS year data to each stock in 2008 to 2012 from the Genius Finance. The sample number was 8950. After lost values were removed, I got 8341 records. Because in my definition to the ForBias, the actual EPS value of the company was the denominator, the too small EPS would cause a too big ForBias. Then I made Winsorize processing to ForBias, eliminate the minimum and maximum 2.5% of the data. After deleting the 5% outliers, the final sample number was 7924. My sample time is ranged from 2008 to 2012, which includes four complete financial years. I get the EPS estimates data of analysts and actual EPS index of the listed company on the Chinese market from the Genius Finance.

3. The empirical results

We could see that more than 75% of the prediction action occurs in the first two time intervals. The closer from the time annual report released, the more frequently analysts forecast. From the mean value of the sample, we could find there was an average 0.32 partial degree to the Chinese stock quarterly profits. That was opposite to the mature market which had an average negative deviation. In fact, when I chose every Chinese listed companies' quarterly profits partial degree to do arithmetic average, SKEW = 0.24. So it showed that selectivity deviation of the sample does not influence the fact that the company profit is positive bias in Chinese stock market. Note that the median value of SKEW was 0.07. And the average of the MNMD was a weak negative, but the mean value of MNMD was greater than 0. While there was no accident for Chinese analysts to forecast stocks higher in average than the actual value.

Table1. The descriptive statistics of stock forecast and characteristics

stats	ForBias	MNMD	SKEW	DISP	MV	ForHoriz
mean	-0.3669	-0.06169	0.316408	0.110562	3.441448	1.426805
p50	-0.13239	0.045332	0.380368	0.078047	0.891846	1
sd	0.679041	1.717516	1.333985	0.116215	13.67313	1.096076
p25	-0.47046	-0.06046	-0.33544	0.045032	0.466925	0
p75	0.012514	0.190808	1.101756	0.132154	2.032314	2

Table 2. Linear regression model about analysts rational forecast

	-1	-2	-3	-4
VARIABLES	ForBias	ForBias	ForBias	ForBias
MNMD	-0.00131		-0.00246	
	-0.00429		-0.0044	
SKEW		-0.00757		-0.0085
		-0.00552		-0.00566
DISP	-0.676***	-0.674***	-0.844***	-0.842***
	-0.0639	-0.0639	-0.065	-0.065
MV	8.31E-05	9.56E-05	0.000199	0.000213
	-0.000538	-0.000538	-0.000552	-0.000552
ForHoriz	-0.137***	-0.137***		
	-0.00678	-0.00677		
Constant	-0.0966***	-0.0944***	-0.274***	-0.272***
	-0.0136	-0.0136	-0.106	-
Observations	7,924	7,924	7,924	7,924
R-squared	0.069	0.069	0.021	0.021

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 2 gave the results of linear regression analysis, we could see from the table, whether a standardized measure of SKEW, or MNMD which may affect ForBias more, there did not exist such significant positive coefficient as Gu and Wu (2003)said. It was mentioned above, the profit of Chinese listed companies showed weak positive partial distribution, while Chinese analysts' average forecast was positive bias as well. I supposed only when the profit showed negative bias, partial degree would have positive correlation with ForBias. At least in the market data research of China, we could not improve that an increasing partial degree would influence analysts to lower the prediction value of the company. Thus, my conclusion was that Gu and Wu (2003) provided an ideal model. In reality, we did not use MAFE to simulate the utility function of analysts. In other words, the phenomenon found in the empirical study of analysts' forecasts on the high side, in fact, could not be explained by the rational behavior of the analysts. At least, it was not reasonable to use the interpretation that Median is greater than the Mean.

Analysts predict that the degree of dispersion DISP has significant negative correlation with ForBias in the models above, showing that the more uncertain influences of the market to the company, the more likely those analysts give earnings predictive value on the high side. It can be known from Table 2 that the size of the market value of listed companies could not significantly affect whether analysts give optimistic estimation of companies, which is also the conclusion of Gu and Wu(2003): for the degree of optimism, the size of the company and the number of analysts have opposite effect, leading to an unobvious separate variable coefficient of company size. As same as the conclusion of descriptive statistic analysis, the sooner they predict, the greater positive deviation prediction may be given by analysts. This confirms the empirical results of Clayman and Schwartz (1994). It is showed through cross-variable regression analysis that at different time, there is no significant impact between the dispersion of analysts' forecast to the deviation degree of the forecast.

4. Conclusions

In Chinese market, the company profit distribution showed a weak positive partial shape, which was opposite with the negative partial pattern for the mature market. This may indicate that the current domestic equity incentive mechanism is not so widespread like mature market, so company executives had not too much power to do such Big Bath accountant processing. I found there was no significant negative correlation between the forecast deviation degree and analyst forecast bias. The study also found that, in the 90% confidence level, forecast deviation degree and analyst forecast bias had a positive relation. This showed that it was not reducing average absolute error for analysts as their forecast target. That is, analysts' behavior could not be explained by the Gu and Wu (2003)'s rational decision model. I also proved that when the company's profits fluctuated more fiercely, the analysts tended to make higher profit forecast.

There are several directions worth to study in the future, the first thing we need to do is to prove more rigorously whether analysts have kept parts of the information when they do information disclosure, meaning whether they give fully completed profit forecast adjustments . On this point Clement and Tse (2005) gave a simple explanation which was only to be valid under specific assumptions. The other thing we need to do is to find out the real reason for analysts' forecasts deviate from the actual value. In this article, the interpretation of the MAFE utility function by Gu and wu (2003) has been denied, it needs to be more prudent for us to simulate analysts' decision-making model.

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