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ANALYSTS' FORECASTS ON EARNINGS PER SHARE

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Abstract

Analysts' forecasts of firms' earnings and the related forecast errors is an interesting issue in the economic literature. Analysts forecast companies' earnings (per share), and the forecast error is the difference between actual earnings and these forecasts of earnings. Analysts do not make forecasts in isolation. Other analysts are making forecasts as well, and the existence of other forecasts can affect an analyst's forecasts in many ways. More generally, any analysts' forecast will depend on what he or she thinks other people will forecast or what others have already forecasted. So far the literature focuses on the deviations between the earnings and the forecasts, which makes it easy to lose sight of how informative the forecasts are about actual earnings. Analysts' earnings forecasts are quite informative about actual earnings. Forecast errors across firms and analysts are likely to differ for a variety of reasons, one being the likelihood that earnings are more predictable for some industries than others. It is plausible that earnings forecasts in less-volatile industries are smaller.

Analysts' forecasts of firms' earnings and the related forecast errors are issues widely discussed over the huge economic literature. Analysts' forecast are considered as a proxy of rational expectation (RE) therefore they are expected to be much more useful than traditional time series forecasts.

Timeliness of the forecasts and forecast accuracy is an interesting trade-off for those that issue forecasts. They need to choose between release forecasts with respect to

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new information or wait in order to produce more accurate forecasts in the future using additional information.

Information about earning per share can be gained starting from different sources such as proxy statements, quarterly and annual reports, conference calls and other management communications.

These information produced by the analysts are used, among the others, by investors in their trading decisions that affect market prices. If capital markets and the analyst forecasting process are efficient therefore market prices and analysts' forecasts fully and immediately reflect the processed information. A forecast produced this way is denoted as follows:

$$f_{j,t,\tau} = E\left[A_{j,t} \middle| \phi_{t,\tau}\right] \tag{1}$$

Where $\phi_{t,\tau}$ represents the information available at P_{T-1}^{i} a horizon prior to the realization, and $E[\ |\ ]$ is the conditional expectation operator. Nevertheless, in the span between the forecast and the realization date new information may arrive in the market producing inefficiencies that lead to forecast errors. The forecast error is therefore the difference between actual earnings and forecast companies' earnings (per share) and it is defined as:

$$e_{T,t}^{i,j} = \frac{a_{T}^{i} - f_{T,t}^{i,j}}{P_{T-1}^{i}} \tag{2}$$

Where $e_{T,t}^{i,j}$ is the computed relative forecast error for the company *i* made t months before the release date by analyst *j* for year T, a_{T}^{i} is the actual earning per share for company *i* in year T, $f_{T,t}^{i,j}$ is the forecasted earning per share for company *i* by analyst *j* made for year T with the forecast being made *t* months before the release date and P_{T-1}^{i} is the stock price for company *i* at the end of the previous year, T-1. Technically there is a scale problem in measuring analysts' forecasts and forecast

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errors when data at level are used. This problem can persist across firms and over time.

So a firm with the same total earnings as another but half as many shares outstanding will have earnings per share that are twice as large. To adjust for differences in the magnitude of earnings (per share) and forecast errors across firms is to divide the forecast error by the stock price. Dividing by the stock price assumes that errors in forecasting earnings per share relative to the stock price are relatively homogeneous across firms.

So far the literature focuses on the deviations between the earnings and the forecasts, which makes it easy to lose sight of how informative the forecasts are about actual earnings. Analysts' earnings forecasts are quite informative about actual earnings.

Over time in can happened that large number of positive/negative forecast errors can reflect analysts' are too low/high; it also can occur for other reasons. For instance, firms with actual earnings less than forecasted earnings may provide analysts with information before the announcement and forecasts are revised accordingly.

Forecast errors across firms and analysts are likely to differ for a variety of reasons, one being the likelihood that earnings are more predictable for some industries than others. It is plausible that earnings forecasts in less-volatile industries are smaller. For example energy prices are subject to large unpredictable price swings, which obviously affect earnings. Although health care prices have risen substantially in recent years, the increases have been relatively persistent and therefore predictable. Health care can be virtually unaffected by recessions, while the demand for energy falls in recessions. Some other industries show low earnings around recessions as well, such as materials and consumer discretionary goods. If recessions are not predicted, there is little reason to think that these earnings decreases are predictable either.

More information becomes available as time goes on, and this information is substantial: eleven-twelfths of the year is past when the 1-month-ahead forecast is

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made. Firms announce earnings quarterly; when the 1- month- ahead forecast is made, earnings for the first three quarters of the year have been announced and are known. Besides this relatively mechanical effect, as time passes other information becomes known about earnings and the magnitudes of forecast errors can be expected to decrease. From this perspective the evidence indicates that analysts' forecasts of earnings, far away from the release date, are higher on average than actual earnings. So ruffling speaking whatever earnings an analyst forecasts for a firm, a better prediction is a somewhat lower level of earnings. This predictable difference is called biased forecast.

At first glance, it seems obvious that unbiased forecasts are the best forecasts because a biased forecast is high or low on average. Such a bias suggests that the forecast can be improved by adjusting the forecast by the bias. There are many conditions in which an unbiased forecast is the best one. A common criterion for forecast errors is mean squared error. If a forecaster wants to minimize the expected mean squared error of a forecast, then an unbiased forecast is the best one. The expected squared forecast error applies an increasing penalty to forecasts farther from the average - a forecast twice as far from zero is four times as bad. The unbiased forecast - the mean - is not necessarily the best forecast in all circumstances. Suppose that someone is trying to forecast the value shown when a fair die is thrown. The mean forecast is the average of 1, 2, 3, 4, 5, and 6, which is 3.5. If the forecaster's earnings depend on how close the forecast is to the actual value, the best forecast in fact is 3.5. On the other hand, if the forecaster gets paid only when the value shown is the same as the value forecasted, this unbiased forecast guarantees that the forecaster always loses.

The die will never have the value 3.5. If the forecaster is paid when the forecast is the same as the value thrown and values from 1 to 6 are equally likely, any integer forecast from 1 to 6 is equally good and 3.5 never is predicted. While this is a simple example, the point is more general. The value forecasted depends on the forecaster's incentives and on the distribution of the data. An unbiased forecast may not be the "best" forecast. There also are objectives similar to minimizing the

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expected squared error that lead to forecasts being "biased." If a forecaster wants to minimize the expected absolute deviation of the forecast error, then the median is the best forecast.

The absolute forecast error applies an increasing penalty to forecast errors farther from zero - a forecast error twice as far from zero is twice as bad. The cost of forecast errors increases linearly with the size of the error.

The forecast that minimizes the expected absolute forecast error is the median, not the mean (or more precisely, the arithmetic average). If the mean and the median are the same, this is a distinction that does not matter. On the other hand, if the distribution is not symmetric, as the earnings distribution is not, the median is a better forecast than the mean if a forecast error's cost increases linearly with the forecast error.

The median is the middle forecast, the forecast that divides the forecasts into two parts, with half the observations above the median and half below the median. If the median forecast error is noticeably closer to zero than the average forecast error this indicates that the typical negative (positive) forecast error is larger in magnitude than the typical positive (negative) forecast error. In other words the distribution of forecast errors is not symmetric. So the consistently negative/positive values of skewness indicate that negative forecast errors are larger in magnitude than the positive/negative errors. The measure of skewness indicates that forecast errors are skewed toward negative/positive values. Finally Kurtosis measures how concentrated a distribution is around the mean compared with the number of observations in the tails of the distribution. The positive values for kurtosis indicate that the tails of the distribution have more observations than would be suggested by a normal distribution.

The evidence on the distribution of analysts' forecasts and forecast errors using data for US firms from 1990 to 2004 indicates substantial asymmetry of earnings, earning forecasts, and forecast errors. There is strong support for average and median earning forecasts being higher than actual earnings a year before the earnings announcement. Such differences between earnings and forecasts also exist across

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time periods and industries. A month before the earnings announcement, the mean and median differences are small. One question can be rise: Are there predictable differences between analysts' earnings forecasts and actual earnings? On the other side it also suggest that analysts' forecasts close to the earnings announcement decline to less than the actual earnings. The rationale for this reverse bias is a suggestion that earnings greater than recent forecasts are interpreted as a positive earnings surprise and the firm's stock price increases. Almost all of the existing economic literature on analysts' forecasts examines whether their forecasts are biased finding that analysts overestimate earnings. This overestimation falls as the earnings announcement approaches. Moreover some evidence and analysis suggests that analysts' forecasts change from overestimates to underestimates just before the earnings announcement. Such near-term forecasts are intended to be helpful to a firm's management because the announcement of higher-than-forecasted earnings generates favorable publicity and a higher stock price after the announcement. Asking for forecasts that are neither too high nor low on average seems like a relatively simple request, especially compared with asking that forecasts be accurate. Even so, it is possible that analysts process the information available to them as best as possible, but some or all analysts do not have an incentive to produce forecasts that are correct on average. On average the mean forecast errors decline as the announcement of earnings for the year approaches.

The theme of the analysts' incentive is deeply analyzed in the literature and in particular it is highlighted the fact that analysts do not make forecasts in isolation. Other analysts are making forecasts as well, and the existence of other forecasts can affect an analyst's forecasts in many ways. Furthermore the analyst's ability may change over time by doing forecasts and consequently gaining new experience beside the fact that analysts posses differing abilities in forecasting that affect the evolution of their forecasting error.

Rather than isolated forecasts, analysts' situations may be considered closer to a forecasting game in which the smallest forecast error wins (and receive a prize),

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while everyone else receive nothing. Such forecasting game illustrates that an unbiased forecast may not be an analyst's best forecast and the incentive is to be the closest. If you are not the closest, then it matters not at all whether your forecast error is almost as good as the best or is far away. More generally, any analyst's forecast will depend on what he or she thinks other people will forecast or what others have already forecasted. A simple example is one in which two people guess someone else's pick of a number between 0 and 10. The unbiased forecast is 5. Suppose that the first person picks 5. If the second person picks 5, then he or she cannot win, only tie. A pick of either 4 or 6 can increase the expected winnings of the second person if there is no payoff from tying. Neither 4 nor 6 is unbiased, but that doesn't matter. Either number maximizes expected winnings, and it is winnings that matter. This suggests that, even if analysts' forecasts are biased, it is important to consider analysts' incentives before denouncing them as "irrational" or "ignoring information readily available to them". A lot of factors can explain a nonzero predictable forecast error (i.e. an analyst who performs poorly and is at risk of being fired is more likely to make a "bold" forecast that is unlikely to be correct but will save the analyst's job if it is correct).

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