Asian Economic and Financial Review
ISSN(e): 2222-6737
ISSN(p): 2305-2147
DOI: 10.18488/journal.aefr.2018.84.525.536
Vol. 8, No. 4, 525-536

URL: www.aessweb.com

A STUDY OF DETERMINANTS OF PREDICTIVE ACCURACY OF ANALYSTS' ESTIMATES OF EARNINGS IN INDIAN MARKETS

Shweta Sharma[1+]
Anand[2]

[1]*FPM Scholar (Finance) Indian Institute of Management, Ranchi, India*
Email: shweta.sharma18fpm@iimranchi.ac.in Tel: 91-651-2280039
[2]*Assistant Professor, Indian Institute of Management, Ranchi, India*
Email: anand@iimranchi.ac.in Tel: 91-651-2280113

(+ Corresponding author)

Article History
Received: 8 March 2018
Revised: 2 April 2018
Accepted: 4 April 2018
Published: 6 April 2018

Keywords
Financial analysts
Earnings estimates
Predictive accuracy
Demographic
Financial
Ownership.

JEL Classification:
J10, G00, G32

ABSTRACT

Researchers in the past have tried to explain the predictive accuracy of analysts' estimates of earnings (EPS) by analyzing variables like size, age, disclosures and number of analysts' following the firm. In this study, we examine 54 variables from three broad categories: financial, ownership and demographic, with an objective to explain the predictive accuracy of analysts' estimates of earnings. To achieve this objective we use a regression model with percentage in prediction error as the dependent variable and the categorized variables as the explanatory variables. The initial sample for this study consist of analysts' estimates of quarterly earnings for firms listed in CNX 200 Index (NSE India) for quarterly results arriving during 2008-15 (28 quarters). The final sample comprises of 1148 firm quarters over the stated period. Results suggest that out of the three broad categories, variables belonging to the Financial and Ownership category have a significant impact on the predictive accuracy of analysts' estimates. A significant implication of the study is that by giving more importance to the variables in the Financial and Ownership categories analysts' are likely to improve the predictive accuracy of their estimates. Our results may further improve the market efficiency by limiting the market surprises at the time of the announcement of EPS estimates.

Contribution/ Originality: This study attempt to test the predictive accuracy of analysts estimated in emerging markets. The present study focuses on variables from three broad categories: financial, ownership and demographic and identify the critical variables which influence the analysts' recommendations for the Indian markets.

1. INTRODUCTION

Analysts provide informational services by generating firm specific information and using the same for making investment recommendations to their clients. Information required by analysts' to generate such recommendations comes in the form of, announcements by the firm, publically available information and private information sources (Irani and Oesch, 2016). Firms follow discretionary disclosure policies for the supplementary information they have to disseminate in the market, but for the regulatory purpose, they have to adhere to the minimum disclosure norms prescribed by the regulator. Even for compulsory disclosures, such as those found in the annual financial

statements, firms have substantial discretion in deciding on the in formativeness of the disclosures and the amount of detail to be furnished (Merkley *et al*., 2017). Discretion in disclosure is even more pronounced for press releases and direct contact with analysts (Lang and Lundholm, 1996; Huang *et al*., 2015). It has been widely documented that, if a firm decides not to disclose information, the risk of losing analyst following aggravates (Bhushan, 1989; Lang and Lundholm, 1996; Francis and Soffer, 1997; Healy and Wahlen, 1999).

Morck *et al*. (2000) discuss in there study that stock prices move together more in developing markets than in developed markets, which advocates that less firm-specific information is available in emerging markets. According to them, weak property rights were discouraging informed trading in emerging economies and as a consequence, it prevents the firm-specific information from being incorporated into stock prices. Moreover, the markets of Asia and developing economies which have faced a financial crisis show that there is inadequate dissemination of firm-specific information to the public investors. This lack of firm-specific information in emerging markets attributes to factors like, limited regulations and little enforcement of information disclosure in the emerging markets; low degree of voluntary disclosure and corporate transparency. Many companies in emerging markets are affiliated to a business group or owned by a family, and it is difficult to collect reliable information on such companies. According to Yu (2008) analyst coverage is often alleged accountable for creating extreme pressure on managers to manage earnings. In capital markets, increased analysts coverage is usually highly correlated with increased pressure on managers to perform. Firms usually suffer substantial drops in their stock price if they miss analyst forecasts. In practice, managers try to achieve the analysts' forecast consensus as a primary earnings target (De George *et al*., 1999).

In this paper, we investigate the variables that affect the predictive accuracy of the earnings estimates given by the analysts. This study examines a range of variables categorized under financial, ownership and demographic, with an objective to understand their role in generating quality estimates. Various prior studies have examined variables like size, age, disclosures and number of analysts' following a firm and found size and age as significant in explaining the predictive accuracy of earnings estimates. In this study, we take a comprehensive view by capturing variables from three broad categories: financial, ownership and demographics. We identify 54 variables and examine the relationship between these variables and predictive accuracy of analysts' estimates.

The result of our study, suggests that amongst the three broad categories variables belonging to the financial and ownership categories have a significant impact on the predictive accuracy of earnings estimates. This study concentrates on the Indian markets which is one of the fastest growing emerging markets.

This paper is organized as follows. Section 2 discusses the review of literature. Section 3 discusses construction of variables. In Section 4 and 5 we discuss hypothesis and model. Section 6 discusses the sample; section 7 discusses the variable filtration. Section 8 discusses the result and analysis, which is followed by concluding remarks in Section 9.

2. REVIEW OF LITERATURE

The buy (sell) recommendations and earning's forecasts of brokerage houses are of interest to individual investors, fund managers, and academic researchers. Financial analysts constitute a large segment of the financial services sector and as such, command attention. Influence of analysts' recommendations on stock prices is a very well researched area from the past four decades. The study of financial analysts is a sweltering topic in finance, according to Ramnath *et al*. (2008) since 1992 at least 250 papers related to financial analysts have appeared in nine major research journals. Investors depend on the recommendations of analysts' because in their view analysts' are likely to have the greater market expertise and specific knowledge about the companies they follow and by following the analysts' they would accumulate better returns on future forecasts. On the other side, many authors have challenged the accuracy and the value of analysts' forecasts and stock recommendations, based on studies of their performance over varying periods and in various markets.

Researchers have focused on market reaction to columnist's stock recommendations for several decades. In fact, research on columnist recommendations dates back to Cowles (1933). Initial work in this area examined the value that analysts' recommendation is expected to create for investors (Ball and Brown, 1968) where the found recommendations do contain valuable information. Davies and Canes (1978) examined the performance of second-hand information published in the Wall Street Journal (Heard on the Street) for the period, 1970–1971. Lloyd-Davies and Canes' findings, although for a limited sample, provided evidence against the strong-form efficient market hypothesis. Later Groth *et al.* (1979) and Beneish (1991) found confirming results using data from 1982–1985 and 1978–1979, respectively (Barber and Loeffler, 1993) conducted their study on the security returns and trading volumes based on the analysts' recommendations published monthly in the "Dart Board Column" of the Wall Street Journal. The above studies relied on the information hypothesis to explain recommended stocks return behaviour surrounding the publication day. The information hypothesis claimed that the column's publication revealed new information to the public and this yielded an abnormal return on publication day.

Based on the voluminous literature, we realize the importance of analysts' estimates in the capital market. Roll (1988) explains the extent to which stocks move together depends on the relative amounts of firm-level and market-level information capitalized into stock prices. How the analysts' incorporate this information into their estimation tools, determines their predictive accuracy. Several researchers (Baldwin, 1984; Baginski and Hassell, 1990) used predictive accuracy as a measure to determine the quality of analysts' estimates. Subsequent researchers examined variables that determine the short and long run changes in the recommended stock prices. Bhushan (1989) emphasized on size and number of analysts' following; Lang and Lundholm (1996) on discretionary disclosure; Johnson *et al.* (2000); Porras *et al.* (2016) on corporate ownership structure as variables that affect the quality of analyst estimates.

On the similar lines of thought, a growing body of literature provides evidence that is consistent with this information-based explanation of stock price synchronicity or firm-specific return deviation. Morck *et al.* (2000) examine worldwide synchronicity at the country level and find that stock price movements are more synchronous in emerging markets with higher barriers to informed trading than in developed markets with fewer obstacles. Following sources explain the cause of greater stock price synchronicity or inferior firm-specific return deviations in emerging markets. First, although the quality of disclosure norms in many evolving markets may be the same as to those in developed markets, although the regulations for their enforcement are weak (Ball, 2001; Chan and Hameed, 2006). Second, corporate ownership structure in developing markets is well characterized by concentrated ownership by establishing family members or government. This ownership structure is conducive to managerial entrenchment and offers entrenched controlling owners with incentives and opportunities to extract private control benefits at the expenses of outside investors (Johnson *et al.*, 2000; Bova *et al.*, 2015). In this environment, the owners have incentives to withhold (or selectively disclose) value-relevant, private information to outside investors to conceal the valuation implication of their self-serving behaviour (Fan and Wong, 2005; Kim and Yi, 2006; Chen *et al.*, 2017). Based on the above arguments, we consider ownership could be one parameter which may affect analysts' predictive accuracy.

Many previous papers examine how various firm characteristics influence either the aggregate demand or supply of analyst services. On the supply side, Bhushan (1989) finds that the number of analysts following a firm is increasing in firm size, institutional ownership, and return variability argues that larger companies tend to attract a more substantial number of analysts, presumably because there are significant fixed costs in following a company, and the payoff from following a company is related to its size. Furthermore, analysts have an incentive to follow firms with high trading volumes (Alford and Berger, 1999) as such firms are associated with more brokerage commissions. The correlation between firm returns and market returns is also likely to affect the supply of analyst services (Bhushan, 1989). On the demand side, analyst activity is related to the corporate ownership structure. The demand for analyst services is likely to be greater in firms in which the ownership structure is widely dispersed.

When there is an increase in the concentration of ownership, the acquisition of analyst services is not cost useful for small investors. As Porras *et al.* (2016) posit, when ownership is concentrated, information is likely to be communicated through private channels, thus decreasing the role of financial analysts. O'Brien and Bhushan (1990) find that analyst following increases when a firms return volatility has declined, increases more for firms with smaller prior analyst following, and increases more for firms in industries with more stringent disclosure requirements and increasing numbers of firms. They believe that concentrated ownership by institutional investors such as pension funds and money managers may increase the demand for analyst services because institutional investors who perform fiduciary roles use analyst reports as evidence of their due diligence.

Most of the empirical research on the determinants of analyst following focuses on firm characteristics either balance sheet or off balance sheet parameters. These studies are incorporating the impact of financial variables as they are easy to capture and are found to be significantly important. To increase the purview of the study, we tried to incorporate a new demographic variable which may affect the analysts' estimates. In our study, we try to classify all the recorded variables in the three broad categories: Financial, Ownership and Demographic and then try to find out their individual implications on the analyst predictive accuracy.

In this study, we take a comprehensive approach by examining a range of variables categorized under financial, ownership and demographic categories with an objective to understand their role in generating quality estimates.

3. CONSTRUCTION OF VARIABLES

Before giving estimates, analysts' conduct fundamental and technical analysis based on information available either in public domain or sourced through private channels. This study aims to understand the importance of these variables in determining the analysts' estimates predictive accuracy. For this purpose, we identify 54 variables based on literature survey and theoretical construction. Then we classify them into three broad segments: financial, ownership and demographics. We first propose a general model in which Analysts' estimates' predictive error is taken as the dependent variable with all variables classified under the three broad categories taken as explanatory variables. For a selection of appropriate independent variable, we use the Pearson's correlation and identify variables which are significantly correlated with the independent variable but are uncorrelated with the other explanatory variables. Based on the correlation examination we identify Market Capitalization, Net Current Assets and Encumbered Percentage of share capital as explanatory variables in the model which is used to test the hypothesis.

3.1. Equation and Variables

We construct the OLS general regression model based on three classified segments Demographic (D); Financial (F) and Ownership (O). Our dependent variable is Analysts Predictive accuracy which is measured as the percentage prediction error. The general form of Percentage Prediction errors used in this study for firm i for year t, PPE_{it} is defined as:

$$PPE_{it} = (EEPS_{it} - EPS_{it})/ EPS_{it} \quad \ldots (1)$$

Where EPSit is the realized annual earnings per share for firm i in year t. $EEPS_{it}$ is the analyst estimates for earnings per share for firm i in year t.

The equation and variables for the complete model is:

$$PPE_{it} = \alpha + \beta_1 Demographic_{it} + \beta_2 Financial_{it} + \beta_3 Ownership_{it} + \ldots.. + \beta_n X_{nit} \quad \ldots.(2)$$

Where PPE_{it} is the Percentage prediction error of the EPS estimates given by the analysts for company i at time t, α is the Intercept. Variables in each segment is calculated for company i at time t. We believe that apart from the variables captured in the above three categories there could be n number of variables which could determine the prediction error which is denoted by X_{nit}. β_1 to β_n is the Least Square Coefficients for n independent variables.

4. HYPOTHESIS

Based on the correlation examination we identify Market Capitalization, Net Current Assets and Encumbered Percentage of share capital as explanatory variables in the model which is used to test the hypothesis:

H_0: Percentage prediction error of Analysts' EPS estimates is independent of the three identified explanatory variables Market Capitalization, Net Current Assets and Encumbered Percentage of share capital.

We construct our testable model based on the three variables as the explanatory variables and PPE_{it} as the dependent variable. The first significant variable is Market Capitalization which is classified under financial segment and denotes the size of the company. It is the aggregate valuation of the firm based on its current share price and the total number of outstanding stocks. It is calculated by multiplying the current market price of the company's share with the total outstanding shares of the company. According to Bhushan (1989) the aggregate demand for analysts' service is likely to be an increasing function of firm size. A piece of information about a firm with high market capitalization would be more valuable for an investor as compared to the same piece of information with a smaller market capitalization firm. It is because the investor can generate higher returns on large market cap firms based on the information as compared to the small cap firms. For companies which have high market capitalization should have high percentage prediction error as these companies are showing consistently good performance, they are highly followed by the analysts and they need not follow a high disclosure policy to gain the confidence of investors and shareholders. However, whatever estimates are being given by the analysts are based on the limited information. Therefore according to our view, there should be a positive relationship between percentage prediction error and market capitalization.

Our second variable is Net current assets which are classified under financial segment. It is measured as current assets minus current liabilities. This amount indicates how much capital is being generated or used up by day-to-day activities. If net current assets are negative, the company may have difficulty financing its day-to-day operations which may portray a wrong image of the company amongst investors. So in order to gain the confidence of the investors and just to give proper signals to the market that there is nothing wrong in the company and everything is in control the company would adopt a high disclosure policy. The inverse would be valid for a firm with high net current assets it would disclose less information. Arya and Mittendorf (2007) provide evidence consistent with this line of thought, documenting that how industry-wide coordination of disclosure can be stimulated by following of persistent analysts. Though firms are hesitant to unveil their proprietary information to rivals, the aspiration to retain analyst following can be an appropriate stimulus to sustain disclosures. A joint disclosure practice by contending firms help them to cultivate their competitive responses to the particular environment. Healy and Wahlen (1999) documented that the positive relationship between stock price and analyst following can reasonably be attributed to the fact that disclosure policy has a positive association with both variables. Based on the above discussion and previous literature we believe that there should be a positive relationship between net current assets and percentage prediction error.

The third variable which we consider is Encumbered Percentage of share capital which is classified under Ownership segment. Encumbered capital means Securities that are owned by one entity, but subject to a legal claim by another (Individual or Institution). As per earlier studies, Ownership pattern is a key determinant of corporate governance (Shleifer and Vishny, 1997; La Porta *et al.*, 2000). In principle, concentrated ownership could have two contrasting effects on synchronicity, depending on whether the administrative entrenchment effect or the incentive alignment effect is dominant. Under the managerial entrenchment standpoint, concentrated ownership offers controlling shareholders with an incentive to divert firm resources at the expense of outside shareholders (Morck *et al.*, 2000; Claessens *et al.*, 2002; Fan and Wong, 2002). Entrenched controlling shareholders can utilize their effective control over the firm to engage in self-dealing transactions which allow them to extract private control benefits (Shleifer and Vishny, 1989; Morck and Nakamura, 1999). For example, Shleifer and Vishny model managerial entrenchment, and establish that entrenched managers can exploit relationship-specific investments to

make it difficult for outside investors to substitute them. We use the variable Encumbered Percentage of share capital, as a measure of the concentration of holding pattern. If the concentration is high the firm will disclose less, less of firm specific information will be generated for analysts' estimates. Financial analysts have limited information and less of firm specific information for generation of estimates. We believe that there should be a direct relationship between the Percentage prediction error and Encumbered Percentage of share capital.

5. MODEL

We construct our testable model using OLS regression from the three significant variables; Market Capitalization (MC_{it}), Net Current Assets (NCA_{it}) and Encumbered Percentage of Share Capital (ESC_{it}) as the independent variable and the Percentage Prediction Error (PPE_{it}) of analysts' EPS estimates as the dependent variable.

The model based on the three significant explanatory variables is:

$$PPE_{it} = \alpha + \beta 1\ MC_{it} + \beta 2\ NCA_{it} + \beta 3\ ESC_{it} + €_{it} \quad \ldots.(3)$$

Where, PPE_{it} (Percentage Prediction errors) is defined as $(EEPS_{it} - EPS_{it})/ EPS_{it}$ for estimates given by the analysts for company i at time t; EPS_{it} (Realized Annual Earnings per Share) for firm i in year t; $EEPS_{it}$ (Analyst estimates for Earnings Per Share) for firm i in year t; MC_{it} (Market capitalization) for the firm i at time t; NCA_{it} (Net Current Assets) for the firm i at time t; ESC_{it} (Encumbered Percentage of Share Capital) for firm i at time t; $€_{it}$ (Error term) for firm i at time t.

6. SAMPLE

Our sample consists of analysts' estimates of quarterly earnings (EPS) for firms listed in CNX 200. Initial sample recorded 9422 analyst estimates on 200 companies given by 987 analysts' representing 132 brokerage houses. Quarterly earnings estimates by analysts' are recorded over a period of 7 years (28 quarters), starting from the first quarter of FY 2008 up to the last quarter of FY 2015 ending on 31st March 2015. The realized EPS, declared by the company are also recorded in the sample. The financial data for 20 companies of CNX 200 is not available; the final sample represents 180 companies. For few companies, only the annual estimates were available, so those companies were also dropped from the sample. The final sample consisted of 7730 analysts' estimates on 159 companies for 28 quarters making it to 1148 company quarter under analysis. We use Bloomberg Professional services for collecting data on analysts' estimates of earnings in the form of Earnings per share (EPS) and the realized results (EPS) on a quarterly basis. For capturing the 54 variables belonging to the three categories demographic, financial and ownership we use data from Ace Equity database.

The data series has to be normally distributed for using OLS regression. So we checked for Skewness and kurtosis of each variable, based on the results we found some variables were not following the normal distribution. Following Bai and Ng (2005) we take Skewness 1.96 (two tailed) and kurtosis K-3=0 signifying normality). For variables which were not found around these values of Skewness and Kurtosis, we use appropriate transformation procedures to bring them close to normal distribution. Table 1 describes the Descriptive statistics of different variables. It shows the variable description, minimum and maximum value, mean and standard deviation of variables along with their Skewness and Kurtosis. TR is used as a prefix for the transformed variables.

Table-1. Description of various variables

No.	Variable	Min.	Max.	Mean	S. Dev.	Skew.	Kurt.	Seg.
1	PPE*	-9.07	6.55	-2.03	1.61	0.19	0.00	-
2	Gross Sales	0.10	1824.07	3850.00	33.56	0.92	-0.25	F
3	Net Sales	0.10	16297.13	3788.24	32.55	0.86	-0.44	F
4	Other operating income*	-6.91	7.89	2.70	1.88	-0.53	0.00	F
5	Net Sales	0.10	16390.72	3809.76	39.60	0.87	-0.43	F
6	Expenditure	-64.4	14904.45	2884.07	23.68	1.04	-0.38	F
7	Interest Expended	338.6	1304.98	582.03	13.41	0.27	-0.98	F
8	Operating Expenses	129.4	784.00	609.31	99.81	1.10	-0.47	F
9	Operating Profit*	0.25	9.46	6.33	1.34	-0.48	-0.31	F
10	TR Interest*	-6.91	8.19	3.19	2.52	-1.07	-0.37	F
11	PBDT	-2578.7	9714.15	993.19	18.07	1.62	0.00	F
12	Depreciation	0.01	1814.70	202.81	39.39	0.91	-0.94	F
13	PBT	-2710.32	9712.77	791.05	15.39	1.96	-0.10	F
14	Profit after tax	-2710.32	9597.77	619.30	85.57	1.65	-0.58	F
15	Net Profit After Extra ordinary items*	-0.38	9.49	5.79	1.33	-0.15	-0.47	F
16	Net Profit After EI and MI	-2710.32	9597.77	619.30	85.57	1.65	0.00	F
17	Equity Capital	7.01	6316.36	606.34	10.52	1.43	-0.37	F
18	Percentage of Public Share Holding	0.01	100.00	46.97	17.29	0.15	-0.54	O
19	Encumbered Percentage of Promoter Holdings	0.00	96.24	6.88	14.56	1.87	-0.93	O
20	Encumbered Percentage of Share Capital	-2.42	42.89	7.52	7.60	0.19	-0.80	O
21	Non Encumbered Percentage of Promoter Holdings	0.00	100.00	93.04	15.33	-1.62	-0.23	O
22	Non Encumbered of Share Capital	1.40	320.00	47.36	24.04	1.53	-0.18	O
23	Age of Company	9.00	112.00	41.36	159.00	0.15	-0.54	D
24	TR No of Employees*	5.16	12.86	9.48	1.52	0.07	0.00	D
25	Total Income	255.23	189608	21762	23839	1.01	-0.14	F
26	Total Expenditure	169.96	164196	16250	19389	1.64	-0.10	F
27	Net Worth	212.25	59790.20	14489	14466	1.16	0.00	F
28	Total Debt	0.00	81786.70	7837.77	14419	0.90	0.00	F
29	TR Deposits*	9.99	10.95	10.37	0.23	0.80	-0.47	F
30	TR Borrowings*	9.54	10.28	10.11	0.21	-1.38	-0.61	F
31	Capital Employed	276.76	141542	22404	23527	1.97	-0.45	F
32	Investments	0.00	38791.05	2080.22	32.26	1.40	-0.56	F
33	Net Current Assets	-34419.3	55791.67	3966.18	19.83	0.67	-0.07	F
34	Current Liabilities	101.00	86545.66	8993.69	10.50	0.17	0.03	F
35	Debt to Equity	0.00	5.38	0.65	0.92	0.55	-0.05	F
36	Current Ratio	0.29	9.49	1.98	1.46	1.37	-0.83	F
37	ROCE	-1.95	74.98	24.94	13.22	0.51	-0.03	F
38	Market Capitalization	0.00	216714	52057	51.73	1.34	-0.45	F
39	Price Book Value	0.00	16.58	4.25	2.82	1.20	-0.86	F
40	DPS Rs*	-2.30	5.60	1.82	1.47	0.00	-0.33	F
41	Book Value Rs*	1.60	8.09	4.89	1.12	-0.15	-0.04	F
42	ROA	-8.78	43.96	12.74	8.42	0.12	-0.01	F
43	ROE	-29.26	73.47	24.62	14.86	-0.21	-0.05	F
44	ROCE	-16.72	102.26	25.45	15.12	0.52	-0.90	F
45	Asset Turnover	0.00	2.76	0.97	0.52	0.88	-0.01	F
46	Inventory Turnover	0.07	678.49	102.41	142.07	1.47	-0.53	F
47	Debtors Turnover*	-1.60	5.81	2.59	0.97	-0.20	0.03	F
48	Fixed Asset Turnover*	-6.50	3.99	0.27	1.07	-1.31	-0.90	F

49	Sales/Working Capital*	-4.27	6.63	1.49	1.37	-0.94	-0.06	F
50	Fixed Capital/ Sales*	-3.99	6.50	-0.27	1.07	1.31	-0.90	F
51	Total Debt/ Equity*	-11.06	1.95	-0.62	1.43	-1.68	-0.58	F
52	Current Ratio*	-1.25	2.68	0.23	0.66	0.84	-0.44	F
53	Quick Ratio*	-1.34	2.73	0.03	0.69	1.04	-0.31	F
54	Interest Cover*	-1.46	8.58	2.28	1.48	0.90	-0.53	F
55	Total Debt/Mak.cap*	-12.42	2.27	-1.75	1.76	-0.79	-0.09	F

Note: This table reports the descriptive statistics for the variables in the sample. It contains 159 company observations over a period of 7 years (28 quarters) – from the first quarter of 2008 until the last quarter of 2015 ending on 31st March 2015.Analyst forecasts and reported company financials are obtained from Bloomberg Professional Service and Ace Equity Database. The table shows the mean of the given variable, Min. and Max. denotes the minimum and maximum value respectively for the given variable. Std. Dev. denotes the standard deviation of the variables. The abbreviations have following notations: Seg.- Segment of classification; D-Demographic Variables; F-Financial Variables and O-Ownership Variable. Quarterly values for each variable from number 2 to 22 are recorded. For variables from 23 to 55 financial year wise values are recorded. * Denotes the Transformed variables.

For the rest of 54 variables, we use data from Ace Equity database. For segmentation, we classify the 54 explanatory variables into three broad segments Demographic (D); Financial (F) and Ownership (O). Variables like sales, total income and expenses are categorized under financial segment. Variables like the age of company and number of employees are classified under the Demographic segment and variables capturing the shareholding pattern and promoters or government share held are classified under Ownership segment. The range of Percentage prediction error lies between -9.07 to 6.55, i.e., the estimates are deviating both for the positive announcements as well as the negative announcements.

7. VARIABLE FILTRATION

The sample consists of 16408 estimates on 159 companies given by 987 analysts'. As discussed earlier for the selection of appropriate independent variable we find their correlation with the PPE_{it}. An examination of correlations revealed that only three variables belonging to two segments F and O have significantly correlation with PPE_{it}. Our objective of correlation analysis is to find the most appropriate independent variable amongst the 54 independent variables. All significant correlations between a set of segmented independent variables and PPE_{it} are further compared using a test of significance of the difference between two independent correlation coefficients using the following test statistic (Brandner, 1933).

$$Z = \frac{(Z1 - Z2)}{SQRT((1/(n1-3) + n2 - 3))}$$

where,

$Z_1 = 0.5 \log_e ((1+r_1)/(1-r_1))$; $Z_2 = 0.5 \log_e ((1+r_2)/(1-r_2))$; r_1 and r_2= Pearson's r, the bivariate correlation coefficients. Following this test statistic, a Z value of 1.96 or above would imply a significant difference between correlations under consideration (at one percentage level of significance). Results of this test suggest that there is no significant difference between the selected variables. For concise presentation, we do not report the results. These results infer that choosing any variable of the set of considered variables which are found to be significantly correlated with PPE_{it} as the independent variable would not have any significant impact on the efficiency of the regression model. We report the correlation results for only three variables which were found significant. Based on the Pearson's Correlation Coefficient only three parameters are found to be significant – Market Capitalization (MC_{it}), Net Current Assets (NCA_{it}) belonging to the financial segment and Encumbered Percentage of Share Capital (ESC_{it}) is belonging to the ownership segment. To check for multicollinearity amongst independent variables, we found the correlation between them as shown in table 2. As, none of the Pearson correlation coefficients was found to be significant between independent variables, so there was no problem of multicollinearity.

Table-2. Correlations

Variable	Statistics	PPE	MC	NCA	ESC
PPE	Pearson Correlation	1	-.388**	-.397**	.151**
MC	Pearson Correlation		1	0.02	0.021
NCA	Pearson Correlation			1	0.013
ESC	Pearson Correlation				1

Note: The correlations are based on 7730 observations, it shows the Pearson correlation coefficient and its significance in matrix form. N denotes the number of observations of the variable. ** Correlation is significant at the 0.01 level (2-tailed). PPE is the percentage prediction error. MC (Market capitalization), NCA (Net Current Assets), ESC (Encumbered Percentage of Share Capital)

As, none of the Pearson's correlation coefficient is found significant between the three independent variables, so there is no problem of multicollinearity. We construct our testable model from these three significant variables; MC_{it} (Market capitalization), NCA_{it} (Net Current Assets), ESC_{it} (Encumbered Percentage of Share Capital). The later sections discuss the results and conclusion.

8. RESULTS

In this section, we discuss the regression results and then try to analyze them. We construct our regression model from the three variables which are found significant from the correlation analysis. In our regression model, PPE_{it} is the dependent variable and the three explanatory variables are Market capitalization, Net Current Assets and Encumbered Percentage of Share Capital. Table 3 gives the regression results for the model. R- square for the model is .209, i.e., the model explains around 21% of the variability in the percentage prediction error. The standard error of an estimate is 1.43, which is within the acceptable limit. By examining Analysis of Variance (ANOVA), we reject the null hypothesis as P value < α=.05 for F statistics. Hence our regression model is significant.

Table-3. Coefficients of Regression results for Percentage Prediction Error for the whole sample :$PPE_{it} = \alpha + \beta 1\ MC_{it} + \beta 2\ NCA_{it} + \beta 3\ ESC_{it} + €_{it}$

Independent Variables	Beta Coefficient	Adjusted t statistics	Sig.
(Constant)		-65.422	.000
MC	-.223	-16.128	.000
NCA	-.247	-17.844	.000
ESC	.159	15.664	.000
R – square	.209		

Note: The table shows the standardized coefficients of the model. t stands for the value of t-statistics and Sig. gives the corresponding p-value. PPE is the dependent variable. MC (Market capitalization), NCA (Net Current Assets), ESC (Encumbered Percentage of Share Capital).

The results show that all the three parameters Market capitalization, Net Current Assets and Encumbered Percentage of Share Capital are significant and play a significant role in determining the predictive accuracy of the Analysts estimates. The results for market capitalization and net current assets show an inverse relationship with the PPE which are contradictory to our assumptions. The inverse relationship between variables market cap and net current assets gave surprising results and the reasons for that has to be a matter of further study. Encumbered Percentage of Share Capital shows a direct relationship with PPE which is similar to our assumption. The results support the argument that, if the firm is consistently performing well it will adopt a low disclosure policy and the analysts have to rely on the limited information. Similarly, the ownership argument also showed similar results as per our discussion. Higher is the ownership concentration lesser are the disclosure norms which results in high prediction error.

9. CONCLUSION

This paper examines the relationship between various variables that influence the quality of EPS estimates given by different analysts' in emerging markets. We first did a correlation analysis on 54 identified variables categorized into three broad categories. Then variables having a significant correlation with the dependent variable

(and uncorrelated with other explanatory variables) were used as explanatory variables in a regression equation. Market capitalization and Net current assets show an inverse relationship with the PPE. Encumbered Percentage of Share Capital shows a direct relationship with Percentage Prediction Error. Our findings suggest that more concentration of shareholding leading to lesser disclosure norms affects the quality of estimates negatively. The study supports the argument build as per earlier studies - ownership pattern is a key determinant of corporate governance and analysts' estimates (Shleifer and Vishny, 1997; La Porta *et al*., 2000; Porras *et al*., 2016). However though the outcome is similar, the insights presented here are different to findings of Piotroski and Roulstone (2004). They report that although the presence of insiders and large institutional owners in the U.S. have the net effect of increasing the amount of firm-specific information in stock prices, security analysts' decrease the amount of firm-specific information. Therefore, analysts' do not have any advantage over insiders and institutional investors in producing firm-specific information.

In furtherance of our findings, one could also examine whether firms with poor transparency with limited information disclosure norms even in the developed markets results in the poor availability of firm-specific information to analysts. Moyer *et al.* (1989) provide evidence that the number of analysts' who follow a given firm is inversely related to the proportion of the firm that is held by insiders and is positively related to measures of institutional shareholdings. Another variable that affects the analysts' prediction error is return volatility. Assuming that the public information flow is constant, there is more private information when the return volatility is higher. Consequently, the number and accuracy of analysts' following a given firm are positively related to its return volatility (Bhushan, 1989). Our findings also suggest that by giving more importance to the variables Market Capitalization, Net Current Assets and Encumbered Percentage of share capital at the time of analysis, the analysts can improve their predictive accuracy. Our results may further improve the market efficiency by limiting the market surprises at the time of the announcement of EPS estimates.

Funding: This study received no specific financial support.
Competing Interests: The authors declare that they have no competing interests.
Contributors/Acknowledgement: Both authors contributed equally to the conception and design of the study.

REFERENCES

Alford, A.W. and P.G. Berger, 1999. A simultaneous equations analysis of forecast accuracy, analyst following, and trading volume. Journal of Accounting, Auditing & Finance, 14(3): 219-240. *View at Google Scholar | View at Publisher*

Arya, A. and B. Mittendorf, 2007. The interaction among disclosure, competition between firms, and analyst following. Journal of Accounting and Economics, 43(2): 321-339. *View at Google Scholar | View at Publisher*

Baginski, S.P. and J.M. Hassell, 1990. The market interpretation of management earnings forecasts as a predictor of subsequent financial analyst forecast revision. Accounting Review, 65(1): 175-190. *View at Google Scholar*

Bai, J. and S. Ng, 2005. Tests for skewness, kurtosis, and normality for time series data. Journal of Business and Economic Statistics, 23(1): 49-60. *View at Google Scholar | View at Publisher*

Baldwin, B.A., 1984. Segment earnings disclosure and the ability of security analysts to forecast earnings per share. Accounting Review, 59(3): 376-389. *View at Google Scholar*

Ball, R., 2001. Infrastructure requirements for an economically efficient system of public financial reporting and disclosure. Brookings-Wharton Papers on Financial Services, 2001(1): 127-169. *View at Google Scholar | View at Publisher*

Ball, R. and P. Brown, 1968. An empirical evaluation of accounting income numbers. Journal of Accounting Research, 6(2): 159-178. *View at Google Scholar | View at Publisher*

Barber, B.M. and D. Loeffler, 1993. The "dartboard" column: Second-hand information and price pressure. Journal of Financial and Quantitative Analysis, 28(02): 273-284. *View at Google Scholar | View at Publisher*

Beneish, M.D., 1991. Stock prices and the dissemination of analysts' recommendation. Journal of Business and Economic Statistics, 64(3): 393-416. View at Google Scholar | View at Publisher

Bhushan, R., 1989. Firm characteristics and analyst following. Journal of Accounting and Economics, 11(2-3): 255-274. View at Google Scholar | View at Publisher

Bova, F., Y. Dou and O.K. Hope, 2015. Employee ownership and firm disclosure. Contemporary Accounting Research, 32(2): 639-673. View at Google Scholar | View at Publisher

Brandner, F.A., 1933. A test of the significance of the difference of the correlation coefficients in normal bivariate samples. Biometrika, 25(1/2): 102-109. View at Google Scholar | View at Publisher

Chan, K. and A. Hameed, 2006. Stock price synchronicity and analyst coverage in emerging markets. Journal of Financial Economics, 80(1): 115-147. View at Google Scholar | View at Publisher

Chen, R., S. El Ghoul, O. Guedhami and H. Wang, 2017. Do state and foreign ownership affect investment efficiency? Evidence from privatizations. Journal of Corporate Finance, 42(C): 408-421. View at Google Scholar | View at Publisher

Claessens, S., S. Djankov, J.P. Fan and L.H. Lang, 2002. Disentangling the incentive and entrenchment effects of large shareholdings. Journal of Finance, 57(6): 2741-2771. View at Google Scholar | View at Publisher

Cowles, A., 1933. Can stock market forecasters forecast? Econometrica: Journal of the Econometric Society, 1(3): 309-324. View at Google Scholar | View at Publisher

Davies, P.L. and M. Canes, 1978. Stock prices and the publication of second-hand information. Journal of Business and Economic Statistics, 51(1): 43-56. View at Google Scholar | View at Publisher

De George, F., J. Patel and R. Zeckhauser, 1999. Earnings management to exceed thresholds. Journal of Business, 72(1): 1-33. View at Google Scholar | View at Publisher

Fan, J.P. and T.J. Wong, 2002. Corporate ownership structure and the informativeness of accounting earnings in East Asia. Journal of Accounting and Economics, 33(3): 401-425. View at Google Scholar | View at Publisher

Fan, J.P. and T.J. Wong, 2005. Do external auditors perform a corporate governance role in emerging markets? Evidence from East Asia. Journal of Accounting Research, 43(1): 35-72. View at Publisher

Francis, J. and L. Soffer, 1997. The relative informativeness of analysts' stock recommendations and earnings forecast revisions. Journal of Accounting Research, 35(2): 193-211. View at Google Scholar | View at Publisher

Groth, J.C., W.G. Lewellen, G.G. Schlarbaum and R.C. Lease, 1979. An analysis of brokerage house securities recommendations. Financial Analysts Journal, 35(1): 32-40. View at Publisher

Healy, P.M. and J.M. Wahlen, 1999. A review of the earnings management literature and its implications for standard setting. Accounting Horizons, 13(4): 365-383. View at Google Scholar | View at Publisher

Huang, T.L., T. Wang and J.L. Seng, 2015. Voluntary accounting changes and analyst following. International Journal of Accounting & Information Management, 23(1): 2-15. View at Google Scholar | View at Publisher

Irani, R.M. and D. Oesch, 2016. Analyst coverage and real earnings management: Quasi-experimental evidence. Journal of Financial and Quantitative Analysis, 51(2): 589-627. View at Google Scholar | View at Publisher

Johnson, S., P. Boone, A. Breach and E. Friedman, 2000. Corporate governance in the Asian financial crisis. Journal of Financial Economics, 58(1-2): 141-186. View at Google Scholar

Kim, J.B. and C.H. Yi, 2006. Ownership structure, business group affiliation, listing status, and earnings management: Evidence from Korea. Contemporary Accounting Research, 23(2): 427-464. View at Google Scholar | View at Publisher

La Porta, R., F. Lopez-de-Silanes, A. Shleifer and R. Vishny, 2000. Investor protection and corporate governance. Journal of Financial Economics, 58(1): 3-27. View at Google Scholar

Lang, M.H. and R.J. Lundholm, 1996. Corporate disclosure policy and analyst behavior. Accounting Review, 71(4): 467-492. View at Google Scholar

Merkley, K., R. Michaely and J. Pacelli, 2017. Does the scope of the sell-side analyst industry matter? An examination of bias, accuracy, and information content of analyst reports. Journal of Finance, 72(3): 1285-1334. View at Google Scholar | View at Publisher

Morck, R. and M. Nakamura, 1999. Banks and corporate control in Japan. Journal of Finance, 54(1): 319-339. View at Google Scholar | View at Publisher

Morck, R., B. Yeung and W. Yu, 2000. The information content of stock markets: Why do emerging markets have synchronous stock price movements? Journal of Financial Economics, 58(1): 215-260. View at Google Scholar | View at Publisher

Moyer, R.C., R.E. Chatfield and P.M. Sisneros, 1989. Security analyst monitoring activity: Agency costs and information demands. Journal of Financial and Quantitative Analysis, 24(4): 503-512. View at Google Scholar | View at Publisher

O'Brien, P.C. and R. Bhushan, 1990. Analyst following and institutional ownership. Journal of Accounting Research, 28: 55-76. View at Google Scholar | View at Publisher

Piotroski, J.D. and D.T. Roulstone, 2004. The influence of analysts, institutional investors, and insiders on the incorporation of market, industry, and firm-specific information into stock prices. Accounting Review, 79(4): 1119-1151. View at Google Scholar | View at Publisher

Porras, P.M., P.A. Saffi and J. Sturgess, 2016. Ownership structure, limits to arbitrage, and stock returns: Evidence from equity lending markets. Review of Financial Studies, 29(12): 3211-3244. View at Google Scholar | View at Publisher

Ramnath, S., S. Rock and P. Shane, 2008. The financial analyst forecasting literature: A taxonomy with suggestions for further research. International Journal of Forecasting, 24(1): 34-75. View at Google Scholar | View at Publisher

Roll, R., 1988. The stochastic dependence of security price changes and transaction volumes: Implications for the mixture-of-distributions hypothesis. Journal of Finance, 43(3): 541-545. View at Google Scholar

Shleifer, A. and R.W. Vishny, 1989. Management entrenchment: The case of manager-specific investments. Journal of Financial Economics, 25(1): 123-139. View at Google Scholar

Shleifer, A. and R.W. Vishny, 1997. A survey of corporate governance. Journal of Finance, 52(2): 737-783. View at Google Scholar

Yu, F.F., 2008. Analyst coverage and earnings management. Journal of Financial Economics, 88(2): 245-271. View at Google Scholar | View at Publisher