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An Analysis of Earnings Management: Evidence from Food & Allied Industry of Bangladesh

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Abstract

The objective of the study is to examine the existence of earnings management within listed companies in the food and allied industry of Bangladesh. The renowned Beneish Model has been used to test whether the firms are involved in any sort of earnings manipulation or not. In addition, the tendency of the companies to continuous practice of earnings manipulation has been examined. The study covers a span of 5 years from 2011 to 2015 where the financial figures are tested on the model to find the probability of the companies being a manipulator of earnings. According to Beneish model, companies with higher M-score (manipulation score) are more likely to be a manipulator. The result shows that twelve out of fourteen companies have significantly higher M-score at least for one year during five-year periods. A further study reveals that a major portion of the industry has the tendency of getting into earnings manipulation on a continuous basis. Though the Beneish Model is a probabilistic approach so it is not stoutly conclusive from the test that companies are manipulating earnings or a continuous manipulator within the observation period.

Keywords: Earnings management, M-score, Food & allied industry, Beneish model

1. Introduction

It is a long question of interest to investors, regulators, academicians and analysts to determine the extent of earnings alteration by business organizations. Earnings reflect the financial performance of an organization and influence the decision of the stakeholders.

Earnings Management (from hereby referred as EM) disguises the actual economic performance measurement of the organizations and did not disclose important information to the users, whose are oblige to know that information (Dechow and Skinner, 2000). Several attempts have been made to explain the concept of EM from several points of view. Schipper (1989) defines EM as "the purposeful intervention in the external financial reporting process with the intent of private gains". According to Healy and Wahlen (1999), "EM occurs when managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers." In other research, Mostafa (2017) said that the goal of EM is to misinform the parties concerned about the actual performance of the company by manipulating the declared profits.

This study investigates the existence of EM in the food and allied (from hereby referred as F&A) industry in Bangladesh by using the Beneish M-score model for the period of 2011 to 2015. Though many studies on earning management were conducted on developed economy but very few research is undertaken in the context of Bangladesh (Muttakin et al., 2017; Rahman et al., 2012; Razzaque et al., 2006). F&A industry is an important sector and a major contributor in the economy of Bangladesh. Past literary works for many other countries have shown that many well-doing organizations are involved in EM related activities, that too in the food industry (Anh & Linh, 2016; Paolone & Magazzino, 2014) but few attempts has been made regarding testing EM by the companies in F&A industry in Bangladesh. These motivate us to make an analysis that directed towards, first, identify the practice of EM by companies in F&A industries in Bangladesh and, then second, determine whether companies are involved in a continuous practice of EM or not.

Various model such as the specific – accrual Models (1988), the aggregated accruals Jones model (1991), the Modified Jones model (1995), and the Beneish M-score Model (1999) have been developed over the past decades in order to assess the presence of EM. Based on rich literature reviews, this study uses the Beneish model (1999) to detect earning management. Many researchers believe that M-score is an appropriate tool to support auditors by identifying financial fraud (Aris et al., 2013; Nwoye et al., (2013). In 1999, Beneish applied this model on a sample of 74 US companies during 10 years (1982-1992) in order to distinguish manipulated from non-manipulated reporting.

The result of this research will help the policy makers in formulating rules and regulations in order to protect the interest of the shareholders and other related parties. Other than them, individual potential investors can also get benefited from the result of this study as it will help them to know the companies better. With the knowledge of usage of EM in these companies,

they can easily make decisions regarding their investment in those companies, whether to invest or divest or continue.

The outline of the paper is as follows. Section 2 reviews prior study relevant to this study and presents hypotheses. The methodology and models used to examine the existence of EM are explained in section 3. Section 4 provides empirical results and finally, section 5 contains final comments.

2. Review of the Literature

Earnings are a key indicator of the performance of a business that indicate the value-added activities of an organization. According to Weil (2009), "EM occurs when firm management has the opportunity to make accounting decisions that change reported income and exploit those opportunities". He also mentioned the use of judgment and estimation in the accounting process. Managers and accountants prepare financial statements based on some generally accepted accounting principles (GAAP) but these rules allow managers some flexibility in choosing the accounting method and making judgment based on the nature of the business in order to enhance the relevance and reliability of the information. Thus, managers may choose those methods and make estimations that best reflect the financial performance of the organization rather than reflecting true economic position and this type of EM is described as accounting EM. Managers may also manipulate reported earnings by managing cash flow and Healy and Whalen described this as structuring of transactions it is also known as economic EM.

In a study Myers et al. (2007) found that companies with previous positive trend of earnings are more likely to manipulate profits to maintain a growth trend in consecutive gains. In a recent study, Masahiro et al. (2015) investigated the differences between accrual-based and real EM across 38 countries and it relationship to investor protection. They state that when earning are managed by changing the accrual process known as accrual-based EM (AEM) and when it is done by deviating regular operational activities is considered as real EM (REM). Their result depicts that strong investor protection protects AEM and the presence of analysts as investor protection is effective in monitoring REM.

Mulford & Chomsky (2002) explain the EM as the manipulation of earnings toward a goal that was established in advance by management or by analysts in order to maintain the existing profit trend of the business. Burgstahler and Dichev (1997) state that EM approaches by mangers are taken more frequently when they try to avoid a problem decrease in the income or loss of the company. In another study, Degeorger et al. (1999) said that mangers use accounting choices those help to reduce losses and increase profit. Beneish (2001) in his study had identified, among many other possibilities, debt contracts, compensation agreements, equity offerings and insider trading as four important incentives or motivator for income increasing EM. In other study, Rahman et al. (2012) have identified a few more motives like Political costs, personal incentives, regulatory motives as well as internal motives.

A study conducted by Ahmed and Azim (2015) on EM behavior of cement industry of Bangladesh by applying the Banish model found some companies as earning manipulators those have unstable revenue and operating profit. Another research was conducted by Razzaque et al. (2006) to evaluate EM of few of the textile companies of Bangladesh by using modified Jones model and they found significant number of discretionary accruals for five out of fourteen companies but they felt doubt regarding the true practice of EM.

The existence and impact of earnings management in the organization have been examined extensively in the literature in global contexts but Bangladesh has received little attention. Some studies focused on the existence of earnings managements in the textile and cement industry in Bangladesh (Razzaque et al., 2006; Ahmed & Azim, 2015) and other investigate the techniques, motives and control of EM (Rahman et al., 2012) but no focus has been made on Food & Allied industry in Bangladesh. Moreover, most of the previous studies are limited to only analyze the existence of EM. This paper also examines the continuation of EM over the period of time.

F&A industry is one of the most emerging sector of the country with daily increase in consumer demand. A recent study by Paolone & Magazzino (2014) on food industry of Italy with data available for 522 companies explored that the industry is the one with a higher percentage of "low probability of manipulation" (59%) compare to other four industries (Textile, Clothing, Automotive and Metallurgic Industry). Another study of a sample of 28 companies in the food and beverage industry in Vietnam showed that 36% of the sample is considered as manipulator which had higher M-score compare to benchmark (Anh & Linh, 2016). Keeping up with such records, it is also expected to have a similar scenario for F&A industry of Bangladesh. In this regard, we have developed our first hypothesis.

H1: Companies in Food & Allied Industry are likely to be associated with EM.

It is possible that managers or companies may get involved in a continuous process of EM just to have the earning stream. Some of the previous works on EM comprised of analysis for M-Score using one financial year. So, it creates a gap for further analysis that whether the managers perpetually manipulating the earnings of the business for private gain or not. The second hypothesis is developed from the idea of continuity of EM.

H2: Companies are likely to tend in continuous practice of EM.

These hypotheses are tested and tried to be proved using the Beneish Model discussed in later chapter.

3. Methodology

3.1 Sample Size

As mentioned earlier, the research study has been conducted on a single working industry of Bangladesh, the Food & Allied industry. The industry basically contains all the companies which are engaged in production of food, snacks, beverage and related products, like cigarette. Under Dhaka Stock Exchange (later on referred as DSE), there are 18 companies enlisted among which 12 are also enlisted in Chittagong Stock Exchange (CSE). Among these 18

companies enlisted in DSE, 14 companies have been worked with, covering the time period from 2011 to 2015 and due to data insufficiency 4 companies have been excluded. Thus, sample size represents more than 75% of the industry population.

3.2 Data Collection

The main source of data collection is the secondary source. For testing the companies regarding EM using the Beneish Model, all the necessary data are collected from the annual reports of the respective companies. So, for testing the presented figures of the companies, the annual reports are collected from either the respective websites of the companies or the library/archive of the DSE. Since one of the key intentions of the research is to test the level of practice of EM among these companies within a period of time to check whether the practice is a one-time thing or a regular practice, the financial data collected for analysis for past 5 years, which is 2011-2015 but for the requirement of the analysis, data of 2010 is also collected.

3.3 Data Analysis: Beneish Model

This research is the practical application of a conceptual model developed by Professor Messod D. Beneish in 1999. Beneish developed a model with eight (8) variables based on his research about areas giving scope to EM and statistical analysis. The model includes eight performance indicators which defining the profile of a "typical earnings manipulator". Each of these variables have a coefficient attached for judging them properly (which are statistically proven to be effective). Using required data in those variables gives a final result which is said to be the M-Score. M represents manipulator, since this score tells us whether the tested business is a possible manipulator of earnings or not. The variables of the model designed to incorporate the effects of manipulation or prerequisites that can encourage companies to participate in this activity. Using these variable and statistical calculations, Beneish develop the following equation to find M-score:

$$M = -4.84 + 0.92*DSRI + 0.528*GMI + 0.404*AQI + 0.892*SGI + 0.115*DEPI – 0.172*SGAI + 4.679*TATA – 0.327*LVGI$$

From the above equation, if M-Score is less than -2.22 (higher negative value) then it is unlikely for the company to be a manipulator. But if the M-Score is greater than -2.22 (less negative or positive value) then it is likely that the company is a manipulator. In this study, though the coefficients of the model are as same as determined by the Beneish in his original paper in 1999, the cutoff value suggested in the original study to classify companies as manipulators (i.e., M-scores exceeding -1.78) is not used, rather a cutoff value of -2.22 is used as it gives a higher probability of manipulators. Moreover, the structure of all variables in the model is as like as in the original study except the accruals variable which is based on statement of cash flow rather than a balance sheet estimation method.

The eight indicators of M-score model are listed below:

1) Days' Sales in Receivables Index (DSRI): The days' sales in receivable ratio/index represents distortion in receivables due to change in revenue inflation for two

consecutive years. Beneish assumed that increase in days' sales in receivables enhance the possibility of overstatement of revenues and profits.

$$\text{DSRI} = \frac{\frac{\text{Net Receivables}_t}{\text{Sales}_t}}{\frac{\text{Net Receivables}_{t-1}}{\text{Sales}_{t-1}}}$$

2) Gross Margin Index (GMI): GMI shows the growth ratio of gross margin between two consecutive years. When GMI is greater than 1, it indicates that gross margins have dropped. So, the deterioration of gross margin is a negative signal about a firm's prospect that can drive managers for possible manipulation of earning.

$$\text{GMI} = \frac{\frac{\text{Sales}_{t-1} - \text{COGS}_{t-1}}{\text{Sales}_{t-1}}}{\frac{\text{Sales}_t - \text{COGS}_t}{\text{Sales}_t}}$$

3) Asset Quality Index (AQI): Asset quality for a particular year is calculated by dividing the non-current assets other than property plant and equipment (PPE) by total assets. An increased AQI (when AQI>1) indicates the propensity to avoid expenses by capitalizing and deferring costs which provides a signal of possible earnings manipulation.

$$\text{AQI} = \frac{1 - \left(\frac{\text{Current Assets}_t + \text{PPE}_t + \text{Securities}_t}{\text{Total Assets}_t}\right)}{1 - \left(\frac{\text{Current Assets}_{t-1} + \text{PPE}_{t-1} + \text{Securities}_{t-1}}{\text{Total Assets}_{t-1}}\right)}$$

4) Sales Growth Index (SGI): SGI is the proportion of sales in year t to sales in year t-1. A radical change in the sales growth ratio may imply a possibility of manipulation. Although growth does not infer manipulation but Beneish assumed that growth creates pressure on managers for maintaining consistent earnings and achieving profit target which increases the probability of earnings manipulation.

$$\text{SGI} = \frac{\text{Sales}_t}{\text{Sales}_{t-1}}$$

5) Depreciation Index (DEPI): DEPI is the ratio of the rate of depreciation of two consecutive years. A DEPI greater than 1 represents the declining depreciation rate which increase the probability that the firm has tried to increase income either by adjusting the estimated useful life of assets or adopting new method of depreciation.

$$\text{DEPI} = \frac{\frac{\text{Depreciation}_{t-1}}{\text{PPE}_{t-1} + \text{Depreciation}_{t-1}}}{\frac{\text{Depreciation}_t}{\text{PPE}_t + \text{Depreciation}_t}}$$

6) Sales, General and Administrative Expenses Index (SGAI): This measures the ratio of SGA to sales in year t-1 compared to corresponding rate in year t. According to Lev and Thiagarajan's (1993) a non-proportionate increase in sale provides a negative signal about a company's prospects. Beneish assumed a positive relationship between SGAI and the possibility of EM.

$$\text{SGAI} = \frac{\frac{\text{SGA Expenses}_t}{\text{Sales}_t}}{\frac{\text{SGA Expenses}_{t-1}}{\text{Sales}_{t-1}}}$$

7) Total Accruals to Total Assets (TATA): TATA is the change in working capital accounts other than cash less depreciation in relation to total assets for year t. "Total accruals to total assets is used to proxy for the extent to which cash underlies reported earnings and expect higher positive accruals (less cash) to be associated with a higher likelihood of earnings manipulation" (Beneish, 1999). There are two methods available to find the TATA, but the following is more widely used as it provides a better result for businesses using the accrual basis accounting:

$$\text{TATA} = \frac{\text{Income from Operations}_t - \text{Cash Flow From Operations}_t}{\text{Total Assets}_t}$$

8) Leverage Index (LVGI): The LVGI measures the incentives in debt covenant that may lead to EM. It is the proportion of debt to asset ratio of current vs. previous year. A LVGI greater than 1 indicates the rise in leverage in current year compared to previous year.

$$\text{LVGI} = \frac{\frac{\text{Current Liabilities}_t + \text{Long Term Liabilities}_t}{\text{Total Assets}_t}}{\frac{\text{Current Liabilities}_{t-1} + \text{Long Term Liabilities}_{t-1}}{\text{Total Assets}_{t-1}}}$$

The M-Score assists investors to take decisions and verify the reliability of the accounting information in financial reports. The indicators (indices) capture financial statements distortions that result from earnings manipulation. Even with numerical figures and statistical approach, there remains a chance of error in the result. Beneish (1999) described that there is possibility of two types of error in the model. Firstly, a firm can be classified as a non-manipulator when it is a manipulator considered as Type I error and secondly, classify a firm as a manipulator when it does not manipulate earnings known as Type II error. So, the M-score does not guarantee that a company is a manipulator just because the M-score is a probabilistic value.

4. Empirical Results

Using the data for 6 years, the M-Score for the selected companies for 5 years from 2011 to 2015 has been calculated which are presented in Table 1. As discussed, the company that has M-score higher than -2.22 is likely to be a manipulator and the company with M-score less than -2.22 is unlikely to be a manipulator. As it is known, the Beneish Model is a probabilistic

approach and so it doesn't confirm or guarantee the existence of EM or earnings manipulation in a company even if the calculated M-score is positive or more than -2.22. The overall findings of the analysis can be seen in the Table 1 and also represented graphically in figure 1. A Separate Table 2 shows the possible concluding remarks about the percentage of possibility of a manipulator or non-manipulator.

Table 1. Summary of M-score of F&A industry from 2011-2015

Company	2011	2012	2013	2014	2015
Apex	3.988	-2.2723	-2.8887	-3.4962	-3.9267
Pran	-3.262	-3.3093	-3.118	-2.9113	-2.7336
Bangas	-3.8201	-1.2149	-2.1699	-2.3547	-1.9248
BAT	2.06945	-3.5734	-3.7448	0.47288	-3.1473
Beach	-1.1347	-1.5967	-2.0722	-2.2446	-0.1867
Fine	3.64725	-2.9152	-3.5382	-6.0028	-2.2573
Fu-Wang	-1.9822	-2.4491	-2.2111	-2.0305	-2.0851
Gemini	-1.6251	0.38866	-5.7066	-0.3812	-1.5767
Golden	-2.5415	2.28812	-2.904	-2.7696	-1.6049
National	-2.185	-2.4269	-2.0811	-2.7455	-3.1155
Olympic	-2.1214	-2.6091	-3.5907	-2.7636	2.67683
RD	0.47137	-1.9428	-2.5333	-2.7128	-2.6725
Shyampur	-5.2323	-5.1955	-7.2186	-4.9196	-7.054
Zeal	-0.9779	3.98013	-5.1287	-5.5919	-6.6742

If the whole industry is looked upon for just one year, say 2011, it can be seen from table 2 that the financial figures provided in financial statements of respective companies indicate the high probability of earnings manipulation where around 71% of the sample companies show a M-score that is bigger than -2.22 while 29% have low probability. The following 3 years show a positively progressive result for the overall industry where the possibility of EM had declined from 71% in 2011 to 21% in 2014. By the end of 2014, only 3 of the companies were found to be possible manipulators among the 14 companies. As opposed to that, in 2015, the percentage went up to 43% from 21%, from 3 companies to 6 companies. So, the findings indicate that over the period though the rate of possible earnings manipulators has been decreased but not disappeared.

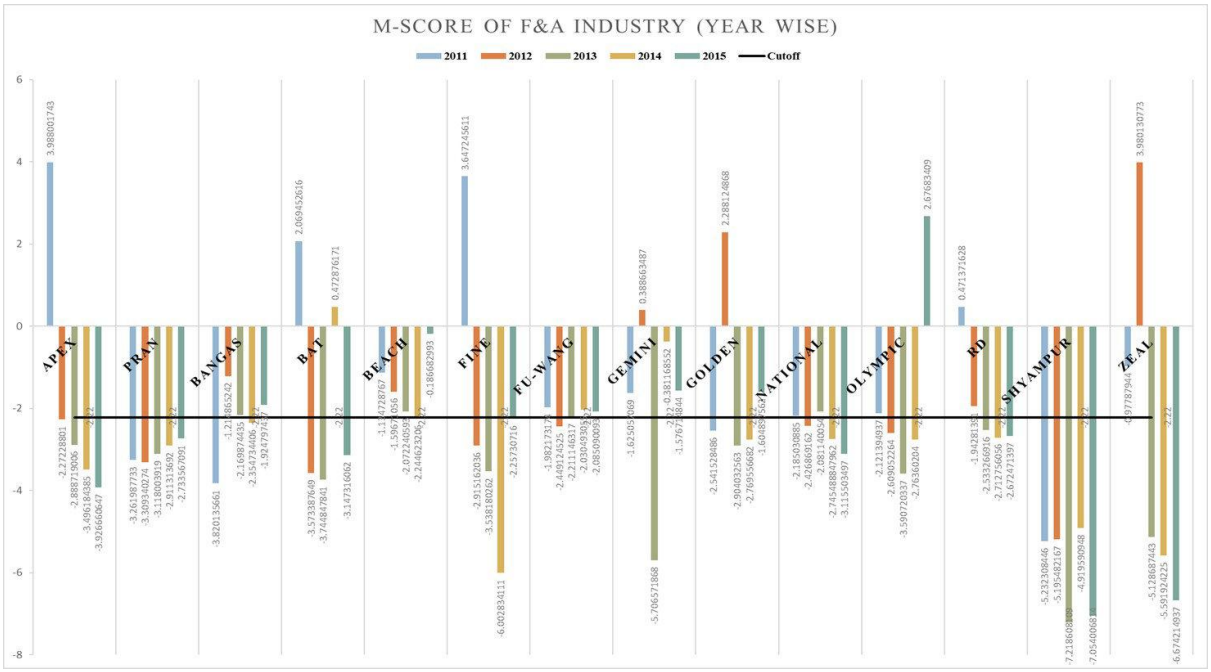

Figure 1. Summary of M-score of F&A industry from 2011-2015 (with Cutoff Line)

The extent of earnings manipulation in this industry obviously varies from year to year and company to company, but always there is a likelihood of EM. So, our H1 is not rejected.

Table 2. Percentage calculation of manipulation status

Status	2011	2012	2013	2014	2015
Possible Manipulator	71%	43%	29%	21%	43%
Possible Non-Manipulator	29%	57%	71%	79%	57%

Just like the scenario of the existence of EM in F&A industry, the situation about the continuity of companies engaging in EM has both a positive and a negative picture. Table 1 shows that the most positive result is formed by two companies, account for 14% of the sample, and do not exceed M-score -2.22 in any of the analyzed years (2011-2015).

There are two other companies which show a similar result. They are likely to be manipulators for only one year that too was on 2011. These 14% are unlikely to be a manipulator for later years from 2012 to 2015. In addition, 6 out of 14 companies (almost 43%) have their M score greater than -2.22 for two years, either consecutive or not, are found to be the most common scenario in the F&A industry. Among the rest of the 4 companies, one company exceeds M- score value for three years and the other 3 Companies are likely to be manipulators for consecutive 4 years. Remarkably, almost 71% of the sample exceeds M-score cutoff value in the year 2011.

Based on M-score, it is found that 72% of the sample exceed the benchmark for more than one year, so it can be said that H2 is also not rejected that the companies are likely to tend in continuous practice of EM.

5. Conclusion

This study deals with the F&A industry of Bangladesh where the level of EM is measured using the Beneish Model. Mainly two hypotheses are tried to prove with the result of the M-score. The financial data of publicly traded companies for consecutive five years are tested through Beneish model to find out whether the companies are likely to be involved in EM or not as well as the possibility of continuous EM over the period. After conducting the tests through Beneish model, it is found that overall the F&A industry have a tendency to get into earning manipulation except two companies because of significant lower M-score. As far as the continuity is concerned, it is concluded that majority of the companies are likely to manipulate the earning for more than one year. A must mention issue for the result is that M-score is a probabilistic approach to find manipulators, so the end result does not guarantee that the company is what the M-score suggests.

This study is not without its limitations. The study is not working with all the manufacturing companies of the country, rather the F&A industry was picked to represent the manufacturing companies of Bangladesh. Though there are some limitations but those should be suggestions for future researches such as making a cross –industry or cross-country analysis instead of single industry or country. Moreover, the further study can be done to reveal the reason behind EM and to search for factors that motivate the managers for earnings manipulation.

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Appendix

Appendix 1. The Calculation of M-Score of 14 Companies

The calculation of M-score has been done using 8 variables specified by Beneish. The following tables project the calculated value of each variable for each of the 14 companies for 5 years (2011-2015).

Table A-1. M-Score of 14 companies of 2011

Year	Company	DSRI	GMI	AQI	SGI	DEPI	SGAI	LVGI	TATA	M-Score
2011	Apex	7.1863	1.07048	3.14193	1.22637	1.03158	0.76413	0.89261	-0.087	3.988
	Pran	0.951	0.98344	1	1.12363	0.89483	0.9435	0.94827	-0.1823	-3.262
	Bangas	0.651	0.95963	1	1.32665	1.02275	0.7886	0.76834	-0.3	-3.8201
	BAT	6.8341	0.84566	1	1.1109	0.95614	1.29644	1.20031	-0.1526	2.06945
	Beach	2.0759	0.97128	1	0.87695	0.99466	1.03183	0.99578	0.10367	-1.1347
	Fine	1.5724	12.1794	0.97977	0.60104	1.13499	1.09513	0.31138	-0.0347	3.64725
	Fu-Wang	1.0877	1.05568	1	1.0695	0.96692	0.89635	0.96541	0.06421	-1.9822
	Gemini	3.7164	-0.7272	0.14395	1.12841	1.02936	0.75755	0.99132	-0.1173	-1.6251
	Golden	0.9333	1.15702	1.07035	1.07624	0.65277	1.33558	1.23017	-0.0014	-2.5415
	National	1.1832	1.59894	1.0293	0.74714	0.83529	1.1807	0.96878	0.01361	-2.185
	Olympic	1.065	1.13574	1.68714	1.58075	0.99627	0.93299	0.97961	-0.1253	-2.1214
	RD	1.4338	1.05274	7.32308	1.0457	0.97596	1.8895	0.88337	0.01	0.47137
	Shyampur	2.6747	0.47997	1.00974	0.65342	0.76049	1.6291	1.00283	-0.7644	-5.2323
	Zeal	2.5707	0.20629	1	0.20834	1.85359	4.73642	0.73279	0.35037	-0.9779

Table A-2. M-Score of 14 companies of 2012

Year	Company	DSRI	GMI	AQI	SGI	DEPI	SGAI	LVGI	TATA	M-Score
2012	Apex	1.4236	0.71378	0.72518	0.84043	1.36581	1.29218	1.08698	0.05538	-2.2723
	Pran	0.9289	0.99648	1	1.05095	1.00665	1.0159	0.95695	-0.1752	-3.3093
	Bangas	1.5753	0.77176	1	1.32911	4.25366	0.91643	0.38298	-0.0059	-1.2149
	BAT	0.6954	1.00525	1	1.18061	1.09022	0.86236	0.83156	-0.2279	-3.5734
	Beach	1.8683	1.07441	1	0.76232	1.14539	0.96974	0.94498	0.04643	-1.5967
	Fine	0.9348	0.37946	0.95481	0.9732	1.05143	0.93935	0.80518	-0.0183	-2.9152
	Fu-Wang	1.1203	1.04382	0.69337	1.03516	1.00196	1.03632	1.05093	0.00262	-2.4491
	Gemini	3.0301	1.64285	1	0.63058	1.01985	1.12949	1.08027	0.22169	0.38866
	Golden	1.2303	1.01758	11.8705	1.11954	0.70305	0.86054	0.66	-0.0112	2.28812
	National	0.9067	0.67416	1.04371	1.55472	0.86418	0.89519	0.85858	-0.0535	-2.4269
	Olympic	0.6157	1.02791	1.50695	1.54522	0.9883	0.85227	0.91925	-0.1137	-2.6091
	RD	1.1038	1.21109	0.19259	1.16027	1.10193	0.54987	0.3233	0.0434	-1.9428
	Shyampur	0.7154	1.49366	0.97046	1.5679	1.02312	0.88418	1.00391	-0.6904	-5.1955
	Zeal	1.7758	3.47771	1	4.39905	1.0893	0.25442	0.9206	0.26539	3.98013

Table A-3. M-Score of 14 companies of 2013

Year	Company	DSRI	GMI	AQI	SGI	DEPI	SGAI	LVGI	TATA	M-Score
2013	Apex	0.262	1.39534	1.27419	1.16304	1.02812	0.72449	0.94681	-0.0561	-2.8887
	Pran	1.1611	1.02688	1	1.11115	1.08741	1.21914	0.96695	-0.1887	-3.118
	Bangas	1.2554	0.95982	1	1.08734	0.89678	1.02821	1.16349	0.01895	-2.1699
	BAT	0.6627	0.95453	1	1.13665	1.21516	0.80487	0.97309	-0.2393	-3.7448
	Beach	1.0368	1.03107	1	1.17259	0.99689	1.02521	1.04469	0.04762	-2.0722
	Fine	1.2438	-0.4567	0.89824	0.67532	1.07205	1.36885	1.05705	-0.0233	-3.5382
	Fu-Wang	1.2163	1.0133	0.95147	1.01182	0.99604	1.023	1.05661	0.02026	-2.2111
	Gemini	0.2611	0.99805	1	1.24456	1.03069	0.91656	1.00076	-0.5945	-5.7066
	Golden	1.0479	0.94792	1.12692	1.04946	1.02396	1.7335	1.83011	-0.0302	-2.904
	National	1.3458	1.08857	1.05025	0.96059	1.09792	1.17263	0.99332	0.01391	-2.0811
	Olympic	0.6187	0.94734	0.44407	1.18154	1.01	0.98765	0.95784	-0.1467	-3.5907
	RD	1.0082	1.0269	0.64818	1.10004	0.8385	0.92754	0.7324	-0.0221	-2.5333
	Shyampur	0.0552	0.45836	1.03683	0.9234	1.01388	1.27021	1.00259	-0.7447	-7.2186
	Zeal	0.148	0.48567	1	2.02577	0.73362	0.56667	1.42236	-0.5159	-5.1287

Table A-4. M-Score of 14 companies of 2014

Year	Company	DSRI	GMI	AQI	SGI	DEPI	SGAI	LVGI	TATA	M-Score
2014	Apex	0	0.97075	0.83249	0.71574	0.91948	1.47422	0.97329	0.06894	-3.4962
	Pran	1.0155	1.04757	1	1.09222	1.25997	1.02922	1.18188	-0.1108	-2.9113
	Bangas	0.8977	0.92567	1	1.01156	0.88963	1.0686	1.0486	0.0617	-2.3547
	BAT	3.8244	0.96048	1	1.14144	1.1958	0.99139	1.11337	0.05604	0.47288
	Beach	1.209	1.0862	1	0.93028	1.10507	1.21616	1.0362	0.02066	-2.2446
	Fine	0.6958	-5.2252	1.05047	1.11206	1.07155	1.15746	0.9499	-0.0158	-6.0028
	Fu-Wang	1.3958	0.77122	0.8883	1.03203	0.99612	0.91321	1.00889	0.04513	-2.0305
	Gemini	1.0775	1.02987	1	0.94835	1.04226	0.89336	0.97318	0.43296	-0.3812
	Golden	0.8352	1.00716	0.56869	1.18281	1.13712	1.09408	1.14201	-0.0179	-2.7696
	National	0.651	1.57717	1.1252	0.97773	0.89929	0.91986	1.03267	-0.058	-2.7455
	Olympic	0.7581	0.89139	1.60839	1.1169	1.01252	1.10369	1.04574	-0.0689	-2.7636
	RD	0.9978	0.9493	0.93829	1.0818	0.976	0.976	1.20512	-0.0293	-2.7128
	Shyampur	1.8907	2.00573	-0.0284	1.75018	0.96386	0.63713	1.00112	-0.8766	-4.9196
	Zeal	1.4054	0.76614	1	0.8312	1.09877	1.18574	1.54173	-0.644	-5.5919

Table A-5. M-Score of 14 companies of 2015

Year	Company	DSRI	GMI	AQI	SGI	DEPI	SGAI	LVGI	TATA	M-Score
2015	Apex	0	0.84678	1.46514	0.73841	0.96579	0.91214	0.90124	-0.0949	-3.9267
	Pran	1.2829	1.06432	1	1.10869	0.54407	0.9811	0.95476	-0.1305	-2.7336
	Bangas	1.7039	1.57102	1	0.79907	1.07118	1.57088	0.97206	-0.0286	-1.9248
	BAT	0.6835	0.97717	1	1.11932	1.03682	1.02562	0.87804	-0.109	-3.1473
	Beach	4.6573	-1248.9	1	0.21387	0.84224	1.59205	1.14447	-0.0434	-0.1867
	Fine	1.1531	0.07665	0.91776	1.3384	1.07104	0.839	1.23004	0.07268	-2.2573
	Fu-Wang	1.2912	1.10444	0.91736	0.93567	1.19702	1.0511	1.02625	0.03363	-2.0851
	Gemini	2.045	1.0018	1	1.22856	1.27275	0.91999	0.93997	-0.07	-1.5767
	Golden	1.4722	1.02494	1.04189	1.83809	0.64351	0.77746	1.1499	-0.061	-1.6049
	National	0.6595	0.86587	1.02064	1.12201	0.97716	1.00419	0.95414	-0.0813	-3.1155
	Olympic	7.2495	0.97519	0.27818	1.13554	1.11053	0.9842	0.82594	-0.1028	2.67683
	RD	1.0963	1.07085	0.95442	1.0017	0.97938	1.00401	1.42826	-0.0339	-2.6725
	Shyampur	2.1595	0.23453	0.8936	0.21147	1.08206	5.36409	1.00219	-0.8011	-7.054
	Zeal	2.074	0.52393	1	0.52649	0.98675	2.32669	1.08536	-0.9085	-6.6742