

Detection of Earnings Manipulation Practices in Bangladesh

Ishtiaq Ahmed Sakib¹

Department of Accounting & Information Systems, University of Dhaka, Dhaka,
Bangladesh

Abstract

This study is conducted to detect earnings manipulation practices in selected textile companies of Bangladesh. It investigates whether the textile companies of Bangladesh are engaged in earnings manipulation or not. For testing this hypothesis, Beneish M-Score is being used collecting data of 13 textile companies from financial year 2012-2018. This study indicates a great number of earnings manipulation practices conducted in textile industries. This paper, based on Beneish M-Score, finds evidences regarding manipulation of earnings through disproportionate rise in receivables, cost deferral, less cash behind reported income, etc. by listed companies. This paper finds that the textile companies are manipulating earnings. While this model can be easily used to detect earnings manipulations using annual reports provided by listed companies, further investigations are needed to identify the reasons behind distortions in reported numbers are actually earnings manipulation or any other organizational origin. Being a cost effective tool in detecting frauds through manipulating earnings, this model can be a great tool for auditors and other respective regulatory authorities.

Keywords: Earnings Manipulation, Beneish M-Score, Cost Deferral.

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¹ Corresponding author's email: ahmedsakib294@gmail.com

Introduction

Having around 7.86% increase in GDP in FY2017-18, Bangladesh is one of the growing economies of the world. The huge success in the industrial sectors is one of the main drivers behind this kind of growth. And being the second largest RMG (Ready Made Garments) manufacturers in the world, the textile sector has given a boost to this kind of development. The publicly listed textile firms are doing a very marvelous performance in keeping pace with the growth of the economy of Bangladesh, but a question still remains—are the companies monitored well enough? As managers are managing the operations of the company, investors need to know if their investment is being used efficiently or not. Or their investment is just used for the personal economic interest of the agents known as managers. The reported income seems to be very promising. But are the earnings authentic or manipulated? Several studies have been done to identify manipulation practices in companies. But there has been a dearth of research regarding earnings manipulation in our country. That's why this study will try to identify earnings manipulation practices in publicly listed textile companies of Bangladesh using Beneish M-Score.

The study shows that there have been cases where managers manipulated earnings in selected publicly listed firms of Bangladesh textile industry.

Objectives of this study

Earnings manipulation is investigated using Beneish M-Score which uses financial variables from financial reports provided to stakeholders by listed companies. This experiment will aim to-

- To explore earnings manipulation behavior based on revenues and expenses.
- To identify if any firm has engaged in earnings manipulation through calculation of Beneish M-Score.

Motivations for Future Research

This study is mainly concentrated on whether there has been any cases of manipulation of earnings in publicly listed textile companies with a relatively small number of samples as many companies have been listed in recent years and there is a lack of availability of annual reports of existing companies. And also Beneish M-Score is a probabilistic model. This is very difficult to comment on earnings manipulation at national level with this small number of data using this probabilistic model. Further researches can be done to identify its relation with relevant variables.

Literature Review

Numerous researchers have undergone a great number of studies to detect earnings management and tried to find out motivations behind manipulating earnings. Financial reports help us to detect manipulation practices in a cost effective way using Beneish M-Score. Jensen and Meckling (Jensen & Meckling, 1976) provided agency

theory to explain motivations behind managing earnings. M. D. Beneish provided a statistical model to identify if a company is managing earnings or not. Beneish M-Score is one of his most famous creations. Jones and Modified Jones model are also famous for detecting manipulation practices by managers. This study will focus on Beneish M-Score and will try to detect any manipulation of earnings in textile companies of Bangladesh.

Jenson and Meckling (Jensen & Meckling, 1976) described agency theory as the principal-agent relationship between shareholders and the management team in a firm. And as Salvato and Moores (Salvato & Moores, 2010) stated, “There are two types of agency problems: conflict between shareholders and managers (Type I agency problem) and conflict between controlling shareholders and non-controlling interests (Type II agency problem).” This paper will be mainly focused on Type I agency problem. Due to this agency conflict managers have been the originators of earnings manipulation.

Thiruvadi and Huang (Thiruvadi & Huang, 2011). Beneish (Beneish, 1999) also attempted to explain the motive for managing earnings through the “agency theory”.

Beneish (Beneish, 1999) stated earnings manipulation as an instance where management violates Generally Accepted Accounting Principles (GAAP) in order to beneficially represent the firm’s financial performance.

Flexibilities in accounting standards are given so that the accountants can cope up with the changing circumstances. But do they really use it for good. Flexibility in accounting can also be used to manipulate data for personal economic interest. The importance of flexibility in accounting treatment can be found in the following speech of Arthur Levitt (1998), former Chairman, U.S. Securities & Exchange Commission:

“Our accounting principles weren’t meant to be straightjacket. Accountants are wise enough to know they cannot anticipate every business structure, or every new and innovative transaction, so they develop principles that allow for flexibility to adapt to changing circumstances.....Flexibility in accounting allows it to keep pace with business innovations.....” (Levitt, 1998)

Fung(2015) told about manipulation that reporting of a firm to the public is performed in a fraudulent manner to improve the financial condition of the firm is risky which was revealed in Enron Corp. in United States (U.S.) bankruptcy. (Fung, 2015)

Jung et al. (2014) tried to describe about the reasons behind manipulation that there are loopholes in financial reporting standards worldwide which contribute to fraudulent financial reporting. And thus it raised concerns about the financial reporting standards’ quality, the role of auditors of a firm and regulators of the financial market. (Jung, Lee , & Weber, 2014)

There are some indicators to check for earnings manipulation practices by companies. Beneish described about evidence which indicated that the probability of manipulations increases with: (i) unusual increases in receivables, (ii) deteriorating gross margins, (iii) decreasing asset quality (as defined later), (iv) sales growth, and (v) increasing accruals. (Beneish, 1999)

And also earnings manipulation should be checked otherwise it might create a bad image for the whole industry. As Eng et al. (2014) provides insights about frauds in organizations financial reporting which cause many organizations business to collapse and impact negatively on the reputations, brands and image of many existing organizations. (Eng, Sun, & Vichitsarawong, 2014)

In another research Mulford and Comiskey (2002) explained the earnings management as the active manipulation of earnings toward a predetermined target, which may be set by management, a forecast made by analyst, or amount that is consistent with a smoother, more sustainable earnings stream. (Mulford & Comiskey, 2002)

Earnings Manipulation and Beneish M-Score

Beneish (1999) found that the model only required two years of data (one year annual report) to evaluate the likelihood of manipulation and could be inexpensively applied by the SEC, auditors, and investors to screen a large number of firms and identify potential manipulators for further investigation. (Beneish, 1999)

The M-Score is used to estimate the extent of earnings manipulation reported by companies (Nwoye, Obiorah, & Chukwunonso, 2015). Beneish M-Score was developed using samples from SEC, United States. The estimation samples spans the period 1982-1988 and evaluated the model's performance on a holdout sample in the period 1989-1992. It consisted of 50 manipulators and 1708 controls (Beneish, The Detection of Earnings Manipulation, 1999). It is also applicable for publicly listed companies worldwide.

Beneish M-Score detected Enron's scandal before the authority revealed it. But it was not so popular then. But it is a very popular and cost effective tool in detecting earnings manipulation practices in listed companies worldwide. The results of a paper published by (Tarjo & Herawati, 2015) showed that overall Beneish M-score model was capable to detect financial fraud according to the fraud Database of Sanctions of Issuer Cases Public Companies that was released by the Financial Services Authority (Indonesia in the period of 2001-2014. Again Omar et al. (Omar, Koya, & Sanusi, 2014) was able to detect financial frauds done by Megan Media Holding Berhad (a Malaysian company) done in 2006. Another financial fraud done by a Spanish family business, Pescanova, was also detected using Beneish M-Score (Orellana, Romero, & Garrido, 2017). Beneish M-Score was also applied in Greece and in some papers using samples from annual reports of Bangladeshi companies.

There also had been a great number of studies in detecting earnings manipulation practices worldwide using Beneish M-Score. That's why Beneish M-Score is applied in this paper to detect manipulation of earnings.

As per Beneish (1999) the M-Score model included eight variables. The variables were measured using data from the fiscal year of the first reporting violation, e.g. the first year for which the firm is subsequently required to restate. The unweighted probit model described in that paper is used for calculation of M-Score. (Beneish, The Detection of Earnings Manipulation, 1999)

$$M\text{-Score} = -4.84 + 0.92 \times \text{DSRI} + 0.528 \times \text{GMI} + 0.404 \times \text{AQI} + 0.892 \times \text{SGI} + 0.115 \times \text{DEPI} - 0.172 \times \text{SGAI} + 4.679 \times \text{TATA} - 0.327 \times \text{LVGI}$$

Here,

DSRI stands for Days Sales in Receivables Index

GMI stands for Gross Margin Index

AQI stands for Assets Quality Index

SGI stands for Sales Growth Index

DEPI stands for Depreciation Index

SGAI stands for Sales General and Administrative Expense Index

LVGI stands for Leverage Index

TATA stands for Total Accruals to Total Assets Index

DSRI has a positive coefficient of .920 and is consistent with unreasonable raises in receivables signaling a firm having inflated revenues. GMI has a positive coefficient of .528 and is consistent with firms facing financial crisis have more encouragement for manipulating earnings. Having a positive coefficient of .404, the AQI concludes of the possibility of earnings manipulation rising when firms' engage in cost deferral. The SGI (positive co-efficient of .892) indicates firms' having consistently increasing growths being motivated engaged in manipulation when growths start to decelerate. TATA, having a positive coefficient of 4.679 which indicates less cash is behind reported income for manipulators.

The coefficients on the leverage, depreciation and SGA are not significant because of the likelihood of being associated with earnings management, not manipulation. These ratios indicate being used for managing earnings while the model calculates earnings manipulation. (Suppose for depreciation by changing accelerated depreciation to straight line lengthens useful lives, would get higher values for DEPI and it is an instance of earnings management.). (Beneish, The Detection of Earnings Manipulation, 1999)

Formation of Hypothesis

Nwoye et al.(2015) said that if the M-Score derived from the eight variables is greater than -2.22 then, the company might be a manipulator of their financial records whilst when M-Score is less than 2.22 it suggests that the company would not manipulate its financial records. (Nwoye, Obiorah, & Chukwunonso, 2015)

Based on this statement, the study is conducted on the following hypothesis:

The null hypothesis of this study is that the companies are not engaged in earnings manipulation which implies

$$H_0: M \leq -2.22$$

The alternative hypothesis of this study is that the companies are engaged in earnings manipulation which implies

$$H_1: M > -2.22$$

Data Source and Descriptive Statistics

Data Source

Data has been collected from secondary sources to conduct the study. Data collection and calculations are based on secondary data sources. Yearly financial reports of 2012 to 2018 provided by the textile companies are the main sources as the M-Score uses variables found in financial statements. The variables used in M-Score- DSRI, GMI, AQI, SGI, DEPI, SGAI, LVGI and TATA are calculated using data from annual reports. The description of these abbreviations and their measurement are shown in the methodology chapter later on. As a good number of textile firms have been listed in Dhaka Stock Exchange recently and unavailability of financial reports by some firms, this study has managed to calculate M-Score of 13 textile companies from 2013 to 2018.

The names of the companies along with their abbreviations used for this study are as given:

Table 1: Abbreviations of Firms

No.	Name of the Firm	Abbreviation
1	Mozaffar Hossain Spinning Mills ltd	MozafTex
2	Paramount Textiles Limited	ParamTex
3	Saiham Textile Mills Ltd	SaihamTex
4	Al-Haj Textile Mills Limited	Al-HajTex
5	Anlima Yarn Dyeing Limited	AnlimaTex
6	Desh Garmants Ltd.	DeshTex
7	Generation Next Fashions Limited	GenTex
8	Maksons Spinning mills Limited	MaksTex
9	MalekS pinning Mills Ltd	MalekTex
10	Apex Spinning & Knitting Mills Ltd	ApexTex
11	Envoy Textiles Ltd	EnvoyTex
12	Simtex Industries Ltd	SimTex
13	Rahim Textile Mills Ltd	RahimTex

Descriptive Statistics

Table 2: Descriptive Statistics

	N	Maximum	Minimum	Mean	Standard Dev.
DSRI	78	2.8785	0.5487	1.100909	0.3864417
GMI	78	5.2319	0.5375	1.178541	0.6495016
AQI	78	13.0609	-2.9674	1.461304	1.9312139
SGI	78	3.7317	0.5878	1.118250	0.3495347
DEPI	78	5.2580	.0431	1.151823	.7928307
SAGI	78	2.1481	0.0863	0.840477	.2826666
LVGI	78	4.4842	.0994	1.067041	0.5396275
TATA	78	0.4579	-0.3795	0.009335	0.1001343
M-Score	78	3.3188	-3.7378	-1.236548	1.1120943

The study concludes on observations about 78 firm years.

For DSRI, the maximum limit is 2.8785 and the minimum limit .5487 with the mean and standard deviation of 1.100909 and .3864417 respectively. For GMI, the maximum limit is 5.2319 and the minimum limit .5375 with the mean and standard deviation of 1.178541 and .6495016 respectively. AQI lies between 13.0609 to -2.9674 with the mean and standard deviation of 1.461304 and 1.9312139 respectively. SGI lies between 3.7317 to .5878 with the mean and standard deviation of 1.118250 and .3495347 respectively. DEPI lies between 5.2580 to .0431 with the mean and standard deviation of 1.151823 and .7928307 respectively. SAGI lies between 2.1481 to .0863 with the mean and standard deviation of .840477 and .2826666 respectively. LVGI lies between 4.4842 to .0994 with the mean and standard deviation of 1.067041 and .5396275 respectively. TATA lies between .4579 to -.3795 with the mean and standard deviation of .009335 and .1001343 respectively.

For M-Score, the range lies between the range of 3.3188 to -3.7378 with the mean and standard deviation of -1.236548 and 1.1120943 respectively.

Methodology

As discussed earlier to find out the manipulation score, Beneish M-Score model has been used in this study which is as below:

$$\text{M-Score} = -4.84 + 0.92 \times \text{DSRI} + 0.528 \times \text{GMI} + 0.404 \times \text{AQI} + 0.892 \times \text{SGI} + 0.115 \times \text{DEPI} - 0.172 \times \text{SAGI} + 4.679 \times \text{TATA} - 0.327 \times \text{LVGI}$$

The dependent variable M-Score is calculated by measuring the independent variables- DSRI, GMI, AQI, SGI, DEPI, SAGI, LVGI and TATA and their respective weights.

Days Sales in Receivables Index (DSRI)

DSRI measures the ratio of the receivables to sales in manipulation year with the previous year. A large increase in DSRI signals a higher possibility of revenues and earnings being overstated.

$$DSRI = (\text{Net Receivables}_t / \text{Sales}_t) / (\text{Net Receivables}_{t-1} / \text{Sales}_{t-1})$$

Gross Margin Index (GMI)

GMI compares the ratio of gross margin to sales of a year before earnings manipulation to the gross margin of the year when manipulation took place. (Lev & Thiagarajan, 1993) suggest that gross margin deterioration is a negative signal about firms' prospects.

$$GMI = ((\text{Sales}_{t-1} - \text{COGS}_{t-1}) / \text{Sales}_{t-1}) / ((\text{Sales}_t - \text{COGS}_t) / \text{Sales}_t)$$

Asset Quality Index (AQI)

AQI measures the change in the asset realization risk analysis suggested by (Siegel, 1991) If AQI is greater than 1, it simply signals about the firm's practice of potentially increasing its involvement in cost deferral.

$$AQI = (1 - (\text{Current Assets}_t + \text{PPT}_t + \text{Securities}_t) / \text{Total Assets}_t) / (1 - (\text{Current Assets}_{t-1} + \text{PPT}_{t-1} + \text{Securities}_{t-1}) / \text{Total Assets}_{t-1})$$

Sales Growth Index (SGI)

Being a ratio of sales in the manipulation year comparing with the previous one this ratio doesn't imply manipulation but growth firms are more likely to engage in financial frauds because of their financial position and capital needs. As Firdson states: "Almost invariably, companies try to dispel the impression that their growth is decelerating, since that perception can be costly to them." (Fridson, 1993) That's why there's a positive relation between SGI and the probability of earnings manipulation.

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

Depreciation Index (DEPI)

This ratio compares the rate of depreciation to PPE (Property, Plant and Equipment) in year t-1 to with the corresponding rate in year t. If DEPI is greater than 1 it signals the assets' depreciation rate has slowed down- increasing the possibility of the firm's revising the estimates of assets' useful lives upwards or adopted a new technique for increasing income.

$$DEPI = (\text{Depreciation}_{t-1} / (\text{PPE}_{t-1} + \text{Depreciation}_{t-1})) / (\text{Depreciation}_t / (\text{PPE}_t + \text{Depreciation}_t))$$

Sales General and Administrative Expenses Index (SGAI)

This ratio calculates the ratio of Sales and administrative expenses to sales in year t with that of year t-1. Lev and Thiagarajan suggested a disproportionate increase in sales as a negative signal about the firm's future prospects. (Lev & Thiagarajan, 1993)

$$SGAI = (SGA \text{ Expenses}_t / Sales_t) / (SGA \text{ Expenses}_{t-1} / Sales_{t-1})$$

Leverage Index (LVGI)

This ratio compares total debt to total assets in manipulation year with that of previous year. LVGI score being greater than 1 signals an increase in leverage position. To identify debt covenant incentives for earnings management LVGI variable is used. Beneish and Press suggest that changes in leverage positions are associated with the stock market effect of default. (Beneish & Press, Costs of Technical Violation of Accounting-Based Debt Covenants, 1993)

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

Total Accruals to Total Assets (TATA)

This ratio is calculated measuring the change in working capitals. Prior studies like Healy (1985), Jones (1991) tried to find out the extent to which managers make discretionary accounting choices to alter earnings using either total accrual or a partition thereof. TATA is taken as a proxy for the extent to which cash represents reported earnings.

$$TATA = (Income \text{ from Operations}_t - Cash \text{ Flow from Operations}_t) / Total \text{ Assets}_t$$

Results and Interpretations

Summary of the findings using Beneish M-Score

As discussed before M-Score equal to or less -2.22 indicates non-manipulation behavior of a firm. But if M-Score is greater than -2.22, it signals that the company is doing earnings manipulation. The results of sample observations using Beneish M-Score model are shown in the table 3:

Table 3: M-Score of Companies (Year wise)

Company	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
MozafTex	-0.97887	-1.38113	-0.56337	-1.5462	-1.26249	-0.27605
ParamTex	-1.30734	-2.20667	-0.00416	-1.23657	-1.74048	-1.42255
SaihamTex	0.280645	0.531755	-1.65101	-1.47394	-1.4444	-1.1477
AlhajText	-2.35303	-3.21607	-1.55388	-2.15828	-1.71594	-0.87177

Company	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
AnlimaTex	-2.44159	-2.54576	-1.61139	-1.2449	-1.84359	-1.44121
DeshTex	-2.05075	-1.68464	-1.57111	-1.63895	0.774987	-0.84585
GenTex	-0.26741	-1.41419	-1.16652	-1.67118	-2.13813	-2.62887
MaksTex	-1.98169	-1.6187	3.318792	-0.27842	-0.86189	-0.93671
MalekTex	2.191195	-1.72368	-1.1728	-1.65277	-0.34546	-3.73775
ApexTex	-2.36638	-1.60085	-0.9361	-2.16235	-1.97964	1.612412
EnvoyTex	-1.21367	-1.40376	-1.63837	0.62297	-1.41386	-1.47476
SimTex	0.429852	-0.39632	-1.34553	-1.20527	-1.83294	-1.89937
RahimTex	-1.93819	-0.92733	-2.39078	-2.6022	-0.18406	-1.27383

The table depicts the companies with their respective financial reporting years the M-Scores which implies the earnings manipulation practices when the companies engaged in manipulation. Almost all the companies seem to be engaged in earnings manipulation on a continuous basis. Some firms don't engage in manipulation for some years. But 7 out of 13 firms have been engaged in earnings manipulation all the 6 financial years. They are doing it on a continuous basis. DSRI scores in Appendices (Table A1) shows that manipulation is being done by increasing practices by inflating revenues. Increasing Asset Quality Index indicates cost deferral practices being another tool for manipulation. Besides these other indexes show more tools behind manipulation.

To depict the picture year wise, suppose for financial year 2012-13 around 10 out of 13 companies probably engaged themselves in earnings manipulation. So, only 3 companies didn't commit financial frauds in that year. But it is found from the table below that the practices are getting much worse year by year. The calculations are shown in percentage form.

Table 4: Manipulation Status (Year-wise)

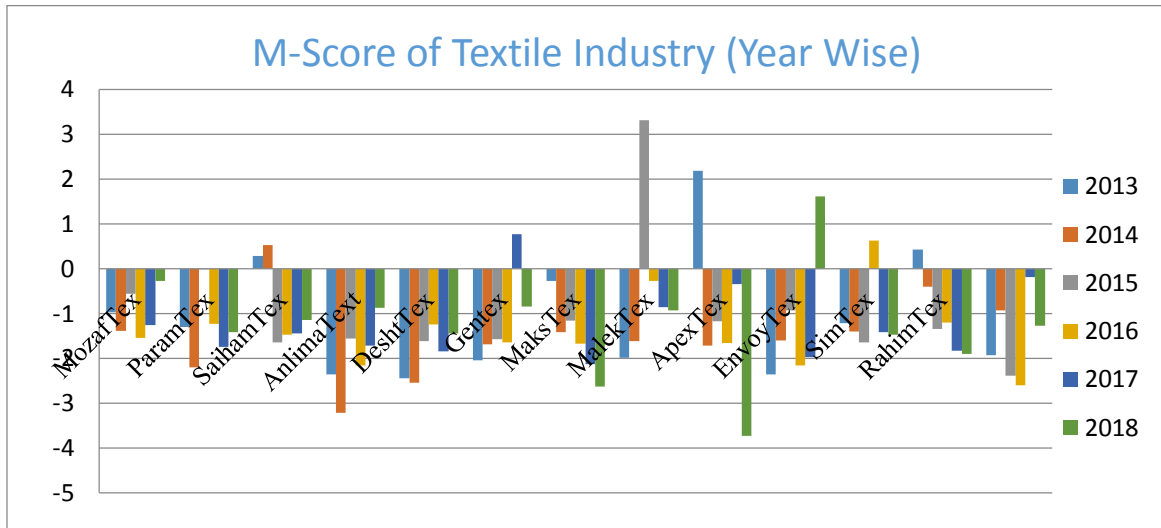
Manipulation Status	2013	2014	2015	2016	2017	2018
Possible Manipulators	76.92%	84.62%	92.31%	92.31%	100%	84.62%
Possible Non-Manipulators	23.08%	15.38%	7.69%	7.69%	0%	15.38%

The percentage of manipulators show increasing trend whereas non-manipulators are decreasing only exception is the year 2018 where manipulators decrease from 100% to 84.62%. Thus manipulation practices in this country seem to be in an increasing status but Ahmed and Naima (2016) found it to be in a decreasing status. (Ahmed & Naima,

2016) That study was based on 2010-2013 financial data. So based on my study it can be said that manipulation status is now on an increasing state.

The summarized picture of the textile industry (year wise) is depicted in the graph below which will show us a good picture of possible earnings manipulation practices done by companies.

Chart 1: M-Score Pattern



Test of Significance for M-Score

Using SPSS, the calculated t value is 7.810 and the critical t with 77 degrees of freedom, $\alpha=0.05$ and one tailed is -1.665. So, the critical value of t is less than the calculated t value ($-1.665 < 7.810$). So, the null hypothesis is rejected. A t-test revealed a statistically reliable difference between the mean number of M-Score that the textile companies have (Mean = -1.236548 and Standard Deviation = 1.1120943) and -2.22.

So the hypothesis of the firms not being engaged in earnings manipulation ($H_0: M \leq -2.22$) is rejected. So, our alternative hypothesis of firms' being engaged in earnings manipulation is accepted ($H_1: M > -2.22$).

Conclusion

This study has found that, the textile industries of Bangladesh are probably engaged in earnings manipulation as per the research concerned. Beneish M-Score being a probabilistic model can't detect earnings manipulation with 100% accuracy but still if it's not manipulated there still goes a question behind the volatility of reported numbers as shown in the index ratios. Hence, the auditors and regulators should look for the discrepancies and volatilities in the annual reports and the probable reasons behind those. As my research suggests, the firms are actively engaged in manipulation of reported earnings. If this practice goes unchecked, the development trend in textile sector will somehow face a serious trouble in the coming years. There has been share market collapse in Dhaka Stock Exchange in July 2019 losing almost Tk.27500 crore. So if this practice

of manipulation goes on like this, there will be a collapse in regular business activities and financial operations of companies in textile industry as well. This paper also finds that most of the firms are manipulating revenues on a continuous basis. It is consistent with the findings of Khan et al. that majority of the companies are likely to manipulate earning for more than one year. (Khan & Akter, 2017).

The investors as well as the stakeholders should be aware of the consequences. This paper will be useful to the stakeholders and regulators in detecting earnings manipulation behavior.

The financial statements being helpful for detecting earnings manipulation remind us of the quote, “Accounting does not make corporate earnings volatile. Accounting just increases the transparency of volatility in earnings.”- Diane Garnick.

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Appendices

Table A1: Indexes and M-Score (Detailed)

Company	Year	DSRI	GMI	AQI	SGI	DEPI	SAGI	LVGI	TATA	M-Score
MozafTex	2013	1.445	0.999	1.000	1.152	1.055	0.891	1.029	0.057	-0.979
MozafTex	2014	1.041	0.998	1.000	1.155	1.059	0.633	0.460	0.080	-1.381
MozafTex	2015	0.983	0.999	3.354	1.155	1.010	0.976	0.943	0.043	-0.563
MozafTex	2016	1.284	1.035	0.991	0.935	1.074	0.791	0.822	0.016	-1.546
MozafTex	2017	1.126	1.113	1.196	1.082	1.136	0.907	0.942	0.048	-1.262
MozafTex	2018	1.653	1.241	4.216	0.588	1.147	1.272	1.417	-0.046	-0.276
Paramtex	2013	1.136	1.026	1.085	1.043	0.977	0.916	0.983	0.064	-1.307
Paramtex	2014	0.791	1.393	0.775	0.903	0.964	0.674	0.575	-0.028	-2.207
Paramtex	2015	0.903	0.752	5.697	1.093	0.985	0.821	1.049	0.004	-0.004
Paramtex	2016	1.546	2.293	0.137	0.782	0.043	1.269	1.184	0.009	-1.237
Paramtex	2017	0.941	1.117	1.000	1.087	0.969	0.899	1.099	-0.010	-1.740
Paramtex	2018	1.182	1.000	0.950	1.229	0.873	0.763	0.800	0.019	-1.423
SaihamTex	2013	1.000	1.010	6.014	1.127	0.977	0.769	3.108	-0.163	0.281
SaihamTex	2014	1.000	2.448	1.000	3.732	0.429	0.198	1.127	-0.205	0.532
SaihamTex	2015	1.000	1.820	1.000	1.099	0.966	0.727	1.043	-0.086	-1.651
SaihamTex	2016	0.737	0.787	1.000	0.942	3.421	0.470	0.881	0.092	-1.474
SaihamTex	2017	1.673	0.793	1.000	0.933	0.988	2.148	1.086	0.022	-1.444
SaihamTex	2018	1.017	1.260	1.000	1.424	1.158	0.602	1.157	0.002	-1.148
AlhajTex	2013	0.721	0.538	0.902	0.999	1.094	1.028	0.965	0.004	-2.353
AlhajTex	2014	0.641	1.228	0.784	0.860	0.939	0.978	1.085	-0.212	-3.216
AlhajTex	2015	1.082	1.043	0.674	0.924	0.961	1.100	0.955	0.088	-1.554
AlhajTex	2016	0.919	1.130	1.000	1.395	0.980	0.654	0.972	-0.155	-2.158
AlhajTex	2017	1.424	0.779	1.000	0.789	1.162	1.324	0.972	0.015	-1.716
AlhajTex	2018	0.965	2.144	1.000	0.886	0.962	1.102	1.036	0.106	-0.872
AnlimaTex	2013	0.755	0.982	1.000	1.011	0.884	0.899	0.890	-0.077	-2.442
AnlimaTex	2014	0.691	1.028	1.000	0.947	0.519	1.201	0.927	-0.062	-2.546
AnlimaTex	2015	1.436	1.061	1.000	0.995	0.897	1.116	0.954	-0.036	-1.611
AnlimaTex	2016	1.779	0.959	1.000	0.950	1.454	1.079	0.955	-0.02	-1.245
AnlimaTex	2017	0.968	1.155	1.000	0.835	1.062	1.234	0.987	0.025	-1.844
AnlimaTex	2018	1.285	1.002	1.000	1.009	1.052	0.921	0.973	0.022	-1.441
DeshTex	2013	1.000	0.889	0.700	1.069	1.022	0.805	1.039	-0.033	-2.051
DeshTex	2014	1.000	0.881	1.000	1.011	1.031	0.894	1.051	0.033	-1.685
DeshTex	2015	1.000	1.008	1.000	1.676	4.721	0.665	1.002	-0.179	-1.571
DeshTex	2016	1.000	0.551	1.000	0.938	1.019	0.807	0.862	0.105	-1.639
DeshTex	2017	1.000	0.872	1.000	0.915	1.170	1.185	2.878	0.458	0.775
DeshTex	2018	1.000	1.115	1.000	1.426	0.962	0.412	1.069	0.090	-0.846
GenTex	2013	0.968	2.990	0.866	1.275	0.966	0.748	0.975	0.068	-0.267
GenTex	2014	1.041	1.116	0.886	1.221	1.021	0.748	0.471	0.062	-1.414

GenTex	2015	1.234	1.309	0.945	1.014	1.003	0.921	1.015	0.058	-1.167
GenTex	2016	0.777	1.421	0.624	1.136	0.853	0.503	1.105	0.014	-1.671
GenTex	2017	0.926	0.767	0.408	1.093	0.942	0.642	1.024	-0.006	-2.138
GenTex	2018	1.081	0.885	-2.967	1.227	1.176	0.645	1.284	0.088	-2.629
MaksTex	2013	1.104	0.702	1.000	0.969	0.787	1.008	1.059	-0.013	-1.982
MaksTex	2014	0.866	0.956	1.000	1.181	1.152	0.761	0.979	0.030	-1.619
MaksTex	2015	1.124	1.027	13.061	0.867	1.178	1.173	1.106	0.051	3.319
MaksTex	2016	1.096	3.348	1.000	1.247	0.630	0.574	1.161	-0.018	-0.278
MaksTex	2017	0.734	1.179	1.000	1.706	1.290	0.364	1.058	0.069	-0.862
MaksTex	2018	0.912	1.009	1.840	1.161	1.195	0.746	1.055	0.085	-0.937
MalekTex	2013	2.599	5.232	1.000	1.111	0.299	0.086	0.798	0.043	2.191
MalekTex	2014	0.804	1.233	1.000	1.065	0.964	0.802	0.957	0.018	-1.724
MalekTex	2015	0.887	1.085	0.643	1.179	5.258	0.577	1.032	0.027	-1.173
MalekTex	2016	0.887	1.085	0.643	1.179	1.084	0.577	1.032	0.027	-1.653
MalekTex	2017	0.864	1.066	4.925	0.999	1.129	0.896	0.965	-0.008	-0.345
MalekTex	2018	0.909	0.802	1.000	1.073	1.024	1.116	1.012	-0.38	-3.738
ApexTex	2013	0.958	0.932	1.000	0.969	1.026	1.020	1.071	-0.09	-2.366
ApexTex	2014	1.167	0.965	1.000	1.027	0.944	0.909	0.974	0.014	-1.601
ApexTex	2015	1.488	1.083	1.000	1.190	0.909	0.733	1.098	0.034	-0.936
ApexTex	2016	0.648	1.017	1.000	1.133	1.113	0.826	1.013	-0.04	-2.162
ApexTex	2017	0.930	1.006	1.718	0.947	0.884	1.129	0.947	-0.06	-1.980
ApexTex	2018	1.322	0.960	7.224	1.134	1.118	0.767	1.029	0.100	1.612
EnvoyTex	2013	0.794	0.960	3.593	1.060	0.897	0.658	0.930	-0.06	-1.214
EnvoyTex	2014	1.202	1.107	0.545	1.102	0.862	0.870	1.178	0.045	-1.404
EnvoyTex	2015	0.903	0.929	0.339	1.248	1.281	0.713	1.066	0.055	-1.638
EnvoyTex	2016	1.678	1.134	4.344	0.868	3.917	1.226	1.159	0.037	0.623
EnvoyTex	2017	0.904	1.056	0.503	1.279	1.050	0.605	1.067	0.070	-1.414
EnvoyTex	2018	0.957	1.123	0.811	1.243	0.144	0.773	1.028	0.050	-1.475
SimTex	2013	1.683	0.982	0.002	1.153	0.934	0.794	4.484	0.157	0.430
SimTex	2014	0.989	1.002	2.556	1.201	0.950	0.751	0.944	0.131	-0.396
SimTex	2015	1.013	1.010	1.000	1.004	1.081	0.904	0.935	0.097	-1.346
SimTex	2016	1.239	0.988	1.000	1.012	1.137	0.554	0.485	0.101	-1.205
SimTex	2017	1.044	1.045	1.000	1.001	1.026	0.989	0.934	-0.012	-1.833
SimTex	2018	1.144	1.000	1.000	1.015	1.262	0.862	0.099	0.005	-1.899
RahimTex	2013	0.549	0.999	1.000	1.217	1.131	0.765	0.944	0.016	-1.938
RahimTex	2014	1.891	1.189	1.000	1.005	0.970	0.883	1.029	-0.011	-0.927
RahimTex	2015	0.668	0.791	1.000	1.041	1.115	0.819	0.928	-0.044	-2.391
RahimTex	2016	0.783	0.895	1.000	1.053	1.035	0.796	0.926	-0.125	-2.602
RahimTex	2017	2.879	1.043	1.000	1.138	0.955	0.666	0.696	-0.040	-0.184
RahimTex	2018	1.104	1.046	1.000	1.388	1.030	0.526	0.903	0.007	-1.274

Table A2: Descriptive Statistics of the Variables (Detailed)

	N	Minimum	Maximum	Sum	Mean	Std. Deviation	Variance	Skewness		Kurtosis	
								Statistic	Std. Error	Statistic	Std. Error
DSRI	78	.55	2.88	85.87	1.1009	.38644	.149	2.271	.272	7.294	.538
GMI	78	.54	5.23	91.93	1.1785	.64950	.422	4.182	.272	21.231	.538
AQI	78	-2.97	13.06	113.98	1.4613	1.93121	3.730	3.556	.272	17.737	.538
SGI	78	.59	3.73	87.22	1.1182	.34953	.122	5.602	.272	41.124	.538
DEPI	78	.04	5.26	89.84	1.1518	.79283	.629	3.836	.272	15.900	.538
SGAI	78	.09	2.15	65.56	.8405	.28267	.080	1.018	.272	5.305	.538
LVGI	78	.10	4.48	83.23	1.0670	.53963	.291	4.460	.272	24.338	.538
TATA	78	-.38	.46	.73	.0093	.10013	.010	.011	.272	7.048	.538
MScore	78	-3.74	3.32	-96.45	-1.2365	1.11209	1.237	1.453	.272	3.949	.538