

## **NEXUS BETWEEN POSSIBILITY OF FRAUDULENT FINANCIAL REPORTING AND CORPORATE GOVERNANCE: EVIDENCE FROM BANGLADESH**

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### **Abstract**

*This paper intends to test the nexus between the possibility of fraudulent financial reporting and the corporate governance in Bangladesh. The content analysis of annual reports has been performed for 125 Bangladeshi listed manufacturing companies. In this study, we apply more than one fraud indicator models such as Altman Z-score and Beneish M-score models to determine more accurately the chance of fraudulent financial reporting. The chance of fraudulent financial reporting is determined based on whether either one or both of Altman Z-score and Beneish M-score models show red flags of potential fraud. This study found that board members with finance or accounting backgrounds are less likely to practice in misleading financial reporting since they may have the knowledge essential to understand fraudulent financial reporting strategies. This result implies that qualified directors may supervise financial reporting practices better, hence improving the quality of financial reports. Alternatively, some other components of corporate governance, such as board size, board independence, director ownership, gender diversity, and auditors' independence, have insignificant impacts on fraudulent financial reporting practices. This outcome indicates that these Bangladeshi corporate governance components may not be as strong in improving financial reporting credibility. In the context of Bangladesh, this is the first empirical study with management and policy implications. To the best of the writers' knowledge, no article yet has been worked on the possibility of fraudulent financial reporting which calculated by multiple models and its relationship with the corporate governance in the context of Bangladesh.*

**Keywords:** Altman Z-score Model, Beneish M-score Model, Corporate Governance, Earnings Management, Financial Statements, Fraudulent Financial Reporting

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## **1 Introduction**

The fraudulent reporting of financial information is a contemporary and concerning issue among a wide range of stakeholders and users of financial information. A Financial Statement (FS) that is materially deceptive due to an intentional or careless act or omission is referred to as Fraudulent Financial Reporting (FFR) (Brief et al., 1996). FFR is an intentional endeavor by enterprises to deceive FS user, particularly shareholder and creditor, by preparing materially misstated financial reports (Rezaee, 2005). Grant and Visconti (2006) explained that there is an intention among managers to manipulate financial information to protect their own personal gain. The responsible factors of FFR are considered as moral failure, incentive, failure strategic management and monitors' lack of freedom. The massive accounting scandals at Enron, Tyco, Global Crossing, WorldCom, and other companies demonstrate the negative effects of FFR on the industry and economies. Prior research provides substantial proof regarding the association of the Corporate Governance (CG) with accounting fraud in different countries. However, with the exception of a few studies (Martins & Junior, 2019; Razali & Arshad, 2014), the majority of studies adopt a single fraud indicator model. According to Mahama (2015), the fraud indicator model alone will not reveal FS fraud perfectly. They urge that multiple models are complemented by an overall review of the financial reporting for better detection of fraud. Bhavan and Amponsah (2017) and Kukreja et al. (2020) also encourage the usage of multiple fraud detector models since every model has weaknesses and limitations in terms of generating correct results.

In Bangladesh, some of the recent corporate scandals like Destiny 2000 Ltd., Unipay2u, Jubok, Hallmark- Sonali Bank Loan Scandal and the stock market debacle (2011) have also raised concerns about the authenticity of FS. These incidents damage public trust in the accounting profession, financial markets and financial information. Not only investor confidence in FS is decreased by FFR but also FFR has a negative influence on the dependability, quality and integrity of audited FS (Rezaee, 2005). Some prior research articles' conclusions show that some Bangladeshi enterprises are practicing Earnings Management (EM) (Ahmed & Azim, 2015; Khan & Akter, 2017 ; Parvin, 2020 ; Razzaque et al., 2006). Accounting scandals and prior research clearly reveal that accounting fraud is common in Bangladesh. However, as far as we know, no specific research has examined the connection between CG and the potential for FFR for Bangladeshi companies, focusing on

more than one fraud indicator model. These practical circumstances and literature gaps motivated us to investigate the following research question: Is there a significant negative nexus between Bangladeshi corporate governance and the possibility of fraudulent financial reporting?

The research has several theoretical and practical contributions. This is the first empirical study to illustrate the nexus between the possibility of FFR and CG by analyzing multiple fraud indicator models in the setting of a developing country like Bangladesh. The findings of this study contribute to the body of proof pointing to Bangladeshi CG's potential role in organizations' FFR reduction. Furthermore, the nexus between CG and FFR depends on whether regulators in their own country strengthened their CG. This paper's conclusion demonstrates which components of Bangladeshi CG are strong and which are weak. So, this research may help policymakers and regulators in determining which components of CG need to be strengthened in order to curtail the practice of FS fraud, increase the earning quality as well as protect the investors' confidence. On the other hand, the outcomes of this paper will also direct the strategic behavior of the organization to understand how CG plays role in minimizing FFR.

The study's outline is structured as follows. Section 2 evaluates pertinent prior research and formulates hypotheses. The research paradigm, data and sample selection, and measurement variables are all explained in section 3. In section 4, the findings are examined and discussed. The closing section includes conclusions, limitations, and suggestions for additional research.

## **2 Literature Review**

### **2.1 Fraudulent Financial Reporting**

FFR is referred as intentional misrepresentation of financial information such as forgery, alteration supporting documentation, manipulation, omission transactions, misstatements transaction, intentionally misuse of accounting principles, fictitious, concealment, advances or delays in recognition of transactions etc. (Vlad et al., 2011). Sometimes, aggressive accounting treatments will degenerate into FFR (Carcello & Nagy, 2004). According to Koornhof and Plessis (2000), creative accounting and improper use of the flexibility of Generally Accepted Accounting Principles (GAAP) led to FFR. Perols and Lougee (2011) investigate the relationship between FS fraud and EM. They found that in prior years, fraud

firms probably more practice EM. According to Uwuigbe et al. (2017), EM can occur in different ways, such as rearranging revenue and expenditures by the management of accruals, using different accounting choices and applying different judgments and estimations in accounting. EM mainly modify the financial disclosure so that manager gain their own interest, or the organization misguides its stakeholder by showing a more favorable financial status (Klann & Beuren, 2018).

## **2.2 Corporate Governance**

CG is a set of principles that should be followed throughout the entire organization to ensure accountability and responsibility (Moudud, 2015). CG is characterized as the institutional framework that has the potential to influence corporate decision-making (Ball & Brown, 1968). CG refers to management practices and frameworks and involves a set of relationship among the company's Board of Directors (BOD), its management and shareholder (Samak et al., 2014). Osemeke and Osemeke (2017) explained that when CG is weak, board members take advantage by committing fraud, overriding controls or gaining their own interest. Several scholars agree that strong CG is related to greater transparency and trustworthy disclosure (Ajinkya et al., 2005; Cormier et al., 2010 ; Gul & Leung, 2004). Good CG practices may be expected to decrease agency costs, increase performance, gain greater accounting performance (Arora & Sharma, 2016). Bangladesh replaced its previous notification issued on February 20, 2006 in this regard with the reformed notification on July 3, 2012, adopting a "comply" approach to the CG guideline (Biswas, 2012). The listed companies in Bangladesh comply with all conditions of CG guideline 2012. The majority of Bangladesh's listed companies share some common characteristics (Biswas, 2012, 2013). For example, controlled by either family or substantial shareholders, corporate insiders expropriate interests of minority shareholders, weak investor protection, lack of insider trading legislation and less-developed capital market. The CG mechanism in corporate FR serves to ensure GAAP conformity and maintain the legitimacy of FS. Because it effectively monitors management during the company FR process, a proper CG structure reduces EM (Lin & Hwang, 2010). According to Royae and Dehkordi (2013), effective CG is essential for upholding the rights of stakeholders boosting the effectiveness of the BOD and internal control systems.

### **2.3 Possibility of Fraudulent Financial Reporting and Corporate Governance**

Numerous literatures examined the nexus between CG variables and FFR because CG structure is one of the primary responsibilities for assuring the accuracy of corporate FR (Rezaee, 2004). Although the outcomes of earlier research on this relationship were mixed, the majority of them suggested that an appropriate CG structure has a beneficial influence on lowering FFR incidences (Beasley, 1996; Davidson et al. , 2005 ; Dechow et al., 1996; McMullen, 1996). Table 1 summarizes the prior research on FFR and CG. Table 1 shows that most of the previous research used one model to detect fraud in different countries. However, according to Kukreja et al. (2020), every model has constraints that affect its accuracy in identifying financial misstatements. They recommend using multiple fraud indicator models to detect fraud accurately. Only a few studies have tested the connection between CG and the possibility of FFR by applying multiple fraud indicators (Martins & Junior, 2019 ; Razali & Arshad , 2014 ) but none have been conducted especially in Bangladesh.

Table 1. A summary of previous studies of corporate governance and the fraudulent financial reporting

Study	Sample	Methodology	Dependent variable (Measurement)	Independent and Control variables	Findings
Ibadin and Ehigie (2019)	65 listed companies from agriculture, conglomerates, construction, financial services, food products, health care, ICT, industrial goods, insurance, natural resources, oil and gas, services sectors in Niger (2009-2014)	Logistic Regression	FS Manipulation (Beneish Model)	Board Composition Gender Composition Audit Committee Composition Board Dominance	Insignificant(+) Insignificant(+) Insignificant(-) Insignificant(-)
Fathi (2015)	10 listed banks in Tehran (2009-2013)	Multiple Regression	EM (Modified Jones model)	Institutional ownership % share ownership % of the members outside	Insignificant (+) Insignificant (+) Insignificant (+)
Anichebe et al., (2019)	Listed Nigerian companies from agricultural sector (2013-2017)	Binary Logit Regression	Likelihood of FFR (Beneish M-score model)	Board size Audit committee Board independence Board members financial expertise Firm size	Insignificant Significant Significant Significant Significant
Abed et al. (2012)	329 listed non-financial companies in Jordan (2006-2009)	Multiple OLS Regression	EM (Jones models)	Independent directors Board size Role Duality Concentrated ownership Company size	Insignificant (+) Significant (-) Insignificant (+) Insignificant (+) Insignificant (+)

Razali and Arshad (2014)	227 listed Malaysian companies from construction, finance, consumer product, IPC, industrial product, properties, plantation, trading and technology industries (2010-2011)	Linear Multiple Regression	Likelihood of FFR (Altman's Z-score and Beneish M-score models)	Financial leverage	Insignificant (+)				
				Industry	Significant (-)				
				Board Size	Insignificant (-)				
				International experience	Insignificant (-)				
				Independent directors	Significant (-)				
				Effective audit committee	Significant (+)				
				Effective internal audit	Significant (-)				
				Firm Size	Significant (-)				
Leverage	Significant (+)								
Uwuigbe et al. (2019)	122 non-financial companies (2012-2016)	Panel Regression	FS Fraud (Beneish M-score model)	Audit committee independence	Insignificant (-)				
				Board composition	Insignificant (+)				
				Firm size	Insignificant (-)				
				Leverage	Insignificant (+)				
				Disclosure quality	Significant (-)				
Uwuigbe et al. (2017)	11 banks in Nigeria (2009-2014)	OLS Regression	EM (Modified Jones model)	Firm size	Significant (+)				
				Profitability	Insignificant(-)				
				Board size	Insignificant(-)				
				Board independence	Insignificant (+)				
				Board meetings	Insignificant (-)				
				Charfeddine et al. (2013)	19 listed companies (excluding insurance and banking industries) in Tunisia (2003 – 2009)	Multivariate Regression	EM (Modified Jones model)	Indebtedness	Insignificant (+)
								Firm Size	Significant (-)
Stock market returns	Significant (-)								
Board size	Insignificant (-)								
CEO and Chairman	Significant (+)								
Managerial ownership	Significant (-)								
Majority ownership	Insignificant (-)								
External audit quality	Insignificant (-)								
Dividend policy	Insignificant (-)								

			EM (Kothari et al. model)	Indebtedness Firm Size Stock market returns Board size CEO and Chairman Managerial ownership Majority ownership External audit quality Dividend policy	Insignificant (+) Significant (+) Significant (-) Insignificant (-) Significant (+) Significant (+) Insignificant (+) Insignificant (-) Insignificant (+)
			EM (Raman and Shahrur model)	Indebtedness Firm Size Stock market returns Board size CEO and Chairman Managerial ownership Majority ownership External audit quality Dividend policy	Significant (+) Significant (+) Significant (-) Insignificant (-) Insignificant (-) Significant (+) Insignificant (-) Insignificant (-) Significant (-)
Johari et al. (2008)	224 listed Malaysian companies from consumer product, construction, industrial product, technology, property, infrastructure, plantation, hotel, services and trading industries	Cross-Sectional Regression	EM (Original Jones model )	Directors' independence CEO duality Directors' competency Director's experience Managerial ownership Return on assets Size Operating cash flows Leverage Audit quality	Significant (-) Insignificant (+) Insignificant (-) Insignificant (+) Significant (+) Significant (+) Insignificant (+) Significant (-) Significant (-) Insignificant (+)
Pourali and	138 companies	Stepwise	Profit smoothing	Institutional ownership	Significance (-)



Dadashi (2014)	( excluding investment companies and financial mediator ) in Tehran, Iran (2000 – 2008)	Regression.	(Profit fluctuation in comparison to cash flow variation)	Outside board directors Internal Audit	Significance (+) Significance (-)
Riahi and Mounira (2011)	19 listed non-financial companies in Tunisian (1999 to 2008)	Linear Regression	EM (Kothari et al. model)	Disclosure frequency Quality of disclosure Net PPE Performance Institutional investment Audit quality Cash flows Size Debt Managerial ownership Block ownership	Significance (-) Insignificance(+) Significance (+) Significance (+) Significance (+) Significance (-) Significance (-) Significance (+) Significance (-) Significance(+) Insignificance(+)
Bassiouny et al. (2016)	60 firms (excluding banks and insurance firms) in Egypt (2007-2011)	Generalized Least Square Regression	EM (Modified Jones model)	Leverage Firm size Firm age Audit quality Survival	Significance (+) Insignificance (-) Insignificance (-) Insignificance (-) Significance (+)
Martins and Junior (2019)	314 companies (excluding financial sector) in Brazil (2010 - 2015)	Regression Analysis	Likelihood of FFR (Altman's Z-score and Beneish M-score models)	Board Size Board independency Board Compensation Non-duality of CEO & Chairman Women on the board Audit committee size External Audit Compensation New Market Listing	Significant (-) Significant (-) Significant (-) Significant (-) Significant (-) Significant (-) Insignificant (+) Significant (-)

A set of hypotheses are created for six crucial CG attributes— board size, board independence, director qualification, director ownership, gender diversity, and board audit independence—in order to assess whether a strong CG lowers the chance of FFR. In this part, we examine how to develop hypotheses.

### ***2.3.1 Board Size and Possibility of Fraudulent Financial Reporting***

The term "board size" refers to the no. of directors who actively participate in evaluating the performance of the board (Rao et al., 2012). According to the CG guidelines 2012 in Bangladesh, board size will not be less than 5 and more than 20 (Biswas, 2012). BOD have the power to make decisions and control the company (Fama & Jensen, 1983). Larger boards with a greater depth of expertise and diverse backgrounds improve company performance and decision-making (Arora & Sharma, 2016). Board size should consist of diverse experience and expertise, while too many directors could be unproductive (Alam & Akhter, 2017). Management's actions monitoring are more effective and easy by smaller sized boards (Lakhal, 2005). Greater number of board size is more powerful than lower number of board size, but this concept is not always practical as sometimes greater number of board size may go beyond control (Hasnan et al., 2014). They also suggest that it should be wiser decision to maintain a reasonable number of board members. Finding mixed results from different previous studies. Board size has a considerable inverse relationship with EM, according to certain studies (Abed et al., 2012). Other studies argued that board size has a negligible impact, which means it has no ability to impact on the possibility of FFR (Charfeddine et al., 2013; Mokarami & Motefares, 2013; Razali & Arshad, 2014; Uwuigbe et al., 2017). Nonetheless, this study anticipates that numerous legislative measures to improve the efficacy of CG will have a favorable impact on the trustworthiness of financial reporting. As a result, the hypothesis that follows is developed:

H<sub>1</sub>. Board size has a significant negative nexus with the possibility of fraudulent financial reporting

### ***2.3.2 Board Independence and Possibility of Fraudulent Financial Reporting***

Board independence, which is indicated by the no. of independent or outside directors, can enhance the quality of FR (Lin & Hwang, 2010). The SEC's 2012 CG guidelines state that at least one-fifth of the board members must be independent (Biswas, 2012). Outside

directors can more effectively oversee management because they hold an unofficial status within the organization (Donnelly & Mulcahy, 2008). Alam and Akhter (2017) argue that independent directors make neutral decisions and reduce agency problems. A study found that the independent director is one of the strongest elements of CG which able to send a valuable signal about the organization values and all stakeholder interest (Brooks et al., 2009). Several studies found different results on independent directors and the probability of FFR. When independent directors have easy access to information, a study indicated, boosting board independence can reduce EM (Chen et al., 2015). Board independence has a substantial positive link with EM for Nigerian banks (Uwuigbe et al., 2017). According to Klein (2002), abnormal accruals significantly rise when there are fewer external board members. One-third of independent directors are not adequate to oversee Malaysia's EM practices. According to another report, the board's independence is negatively correlated with EM practice when it comprises more than 50 per cent of the board (Johari et al., 2008). EM is less probably practised in organizations whose boards member include both directors with corporate experience and more independent board members (Xie et al., 2003). Pourali and Dadashi (2014) found that non-executive board percentage and profit smoothing are highly positively correlated. According to Abed et al. (2012), there is not much of a connection between EM and independent directors. Independent directors can minimize the agency problem, improve the FR's quality and have a substantial detrimental impact on FFR (Beasley, 1996; Razali & Arshad, 2014). Following these debates, it is hypothesized that:

H<sub>2</sub>. Board independence has a significant negative nexus with the possibility of fraudulent financial reporting

### ***2.3.3 Qualification of Director and Possibility of Fraudulent Financial Reporting***

More independent director can control EM only when they have a proper background (financial expertise) because they may have greater knowledge of how to manage earnings and take necessary steps to control EM (Lin & Hwang, 2010; Xie et al., 2003). The credentials of an independent director having a background in economics, business, or law, as well as experts such as chartered accountants, cost & management accountants, and chartered secretaries, are as follows, according to the CG guidelines 2012 in Bangladesh (Biswas, 2012). According to a study, a director's experience and understanding in the accounting or finance fields have little bearing on the practice of EM (Johari et al., 2008).

Another research paper evidence showed that BOD who are knowledgeable in finance or

accounting have less engagement in discretionary accruals. Because qualified board members are expected to aid in the promotion and implementation of more proactive fraud prevention (Agrawal & Chadha, 2005 ; Xie et al., 2003 ). We posit that:

H<sub>3</sub>. Qualification of directors has a significant negative nexus with the possibility of fraudulent financial reporting

#### ***2.3.4 Directors Ownership and Possibility of Fraudulent Financial Reporting***

In general, corporate ownership structure influences management decisions and changes corporate behavior to promote profit management (Pourali & Dadashi, 2014). Calculating insider ownership (administration, director, and general manager) is based on the percentage of shares held by insiders as well as their participation in management and decision-making (Riahi & Mounira, 2011). According to the CG guidelines 2012, the independent director either keeps no shares in the organization or keeps not more than one percentage of the organization's total paid-up shares (Biswas, 2012). Bhagat and Bolton (2013) stated that director ownership is a strong proxy for good governance. Some studies found that managerial ownership significantly positively influences EM ( Hashima & Devib, 2012; Riahi & Mounira, 2011). If a manager has excessive shareholding beyond 25 per cent, it may encourage the manager to exercise EM in Malaysian firms (Johari et al., 2008). Lin and Hwang (2010) found that director ownership has an insignificant influence on EM, in either the US or other countries. In Tunisian enterprises, managerial ownership has a substantial positive link with EM, according to Charfeddine et al. (2013). Following these debates, we hypothesized that:

H<sub>4</sub>. Director ownership has a significant negative nexus with the possibility of fraudulent financial reporting

#### ***2.3.5 Gender Diversity and Possibility of Fraudulent Financial Reporting***

Females are viewed as crucial CG's device for their having more ethical behavior and monitoring role comparatively with men (Lakhal et al., 2015). Female members are more moral than male members on the board in corporate contexts, and they are also less inclined to engage in unethical behavior in an effort to profit financially (Betz et al., 1989). Women BOD are more involved, committed, active, and prepared to make a better environment in the boardroom (Huse & Solberg, 2006). Females may be inherently more likely to detect

EM to avoid loss of reputation and litigation risk as it is difficult to access such position. A study found an opposite link between the use of EM and the proportion of female board members (Gavious et al., 2012). Peni and Vahamaa (2010) explain that there may be significant consequences for CG and FR due to gender-based disparities in managerial opportunism, risk aversion and conservatism. Discretionary accruals that lower income are associated with female CFOs. Their result also shows that female CFOs have an insignificant relation with income-reducing discretionary accruals, as the sample for this data is extremely low. Female directors have a good relationship with EM for low-debt organizations but have no impact on it in high-debt organizations (Arun et al., 2015). Following these debates, it is hypothesized that:

H<sub>5</sub>. Gender diversity has a significant negative nexus with the possibility of fraudulent financial reporting

### ***2.3.6 Board Audit Independence and Possibility of Fraudulent Financial Reporting***

Board audit independence was described by Klein (2002) in three ways. The proportion of external directors on the audit committee board is the first indicator of audit independence. The second is to only consider audit independence if all board members are outside directors. And the third is for a majority of the board to be independent. In compliance with the CG guidelines 2012 in Bangladesh, BOD will nominate audit committee members who will be directors and will include at least one independent director (Biswas, 2012). By using a CG index that they self-created, the effective audit committee was determined to have decreased the chance of FFR (Razali & Arshad, 2014). In a different research (Garcia et al., 2010), it was discovered that board audit committee independence has a favorable but negligible link with EM. A study suggests that audit committee independence is favorably linked with board audit independence in terms of monitoring the quality of FS and profits (Kamarudin et al., 2012). According to several studies, independent audit committees and FS fraud have a reverse association because independent auditors can give neutral evaluation and judgment while also successfully monitoring management (George & Nashwa, 2012 ; Klein, 2002; Soliman & Ragab, 2014 ). Following these debates, this is hypothesized that:

H<sub>6</sub>. Board audit independence has a significant negative nexus with the possibility of fraudulent financial reporting

### 3 Methodology

#### 3.1 Sample and Data Collection

Based on the data that was available, the 125 manufacturing companies that were listed on the DSE in 2017 were selected as the sample for this study.

Table 2. Sample Size

Name of the industry (DSE)	No. of total Company	No. of sample Company	% of sample company
Cement	7	5	71
Ceramics	5	3	60
Engineering	36	22	61
Food & Allied	18	13	72
Jute	3	1	33
Paper & Printing	2	1	50
Pharmaceuticals & Chemicals	29	17	59
Tannery	6	3	50
Textile & Clothing	50	40	80
Fuel & Power	18	13	72
Miscellaneous	12	7	58
Total	186	125	67

There are total of 186 manufacturing companies enlisted in DSE (as on 7 May, 2018). Table 2 presents sample size is 125 listed manufacturing companies representing 67 per cent of the population. The research includes both quantitative and content analysis of the annual reports.

#### 3.2 Measurement of Variables

##### 3.2.1 Possibility of Fraudulent Financial Reporting

The possibility of FFR is a dependent variable in this study that is computed by merging two models. They are the Altman Z score and the Beneish M-score models. Beneish (1999) created the Beneish M-score for measuring warning signs that suggest possible EM. If the M-Score is higher than -2.22, it indicates that a company is likely a manipulator. The M-Score indicates whether a corporation is likely to be non-manipulative if it is less than -2.22. 8 variables are used to compute the M score. In contrast, Edward I. Altman created the Altman's Z-Score in 1968. Altman's Z-Score represents bankruptcy risk or financial distress risk, which could be red flags for impending collapse. This will result in manipulation or the

use of FFR. Three distinct zones are used to categorize different levels of financial difficulty. The company is regarded to be in the "Safe Zone" when the Z score is more than 2.99. That indicates that the organization is secure based solely on financial data. A company's Z score is said to be in the "Grey Zone" if it is between 1.81 and 2.99. The company has a significant risk of filing for bankruptcy within the next two years of operation. The term "distress zone" refers to a corporation whose Z-score is less than 1.81. That means company has a high possibility of distress within this time. The probability of a company bankruptcy is high. In this study, both the grey zone and distress zone are considered for red flags of the possibility of FFR. Z score is measured by 5 ratios. Therefore, by considering the measurement of the possibility of FFR by integrating the two models. It can be assumed that if any model indicates red flags for the possibility of FFR, then the score is 1, otherwise 0. The study uses variables from past research. Table 3 represents variables acronym, definition, and measurement of each variable used and previous studies reference.

Table 3. Definition and Measurement of Variables

Variable Acronym	Definition	Measurement	Previous studies
<i>Dependent Variables</i>			
FFR	Fraudulent Financial Reporting	Beneish M-score (1999) and Altman Z score (1968).	Aris et al. (2015); Bhavani and Amponsah (2017); Charfeddine et al. (2013) ; MacCarthy (2017) ; Martins and Junior, (2019) ; Siskos (2014); Razali and Arshad (2014)
<i>Independent Variables</i>			
BSIZE	Board Size	Logarithm of number of directors in the board	Abed et al. (2012) ; Charfeddine et al. (2013) ; Mokarami and Motefares (2013) ; Razali and Arshad (2014); Uwuigbe et al. (2017)
BINDE	Board Independence	% of independent directors in the BOD	Abed et al. (2012) ; Beasley (1996); Chen et al. (2015) ; Johari et al. (2008); Klein (2002); Pourali and Dadashi (2014); Razali and Arshad (2014); Uwuigbe et al. (2017) ; Xie et al. (2003)
QUALD	Qualification of Director	% of directors with accounting or finance knowledge	Anichebe et al., (2019) ; Agrawal and Chadha (2005); Johari et al. (2008) ; Xie et al. (2003)
DIOWN	Director Ownership	% of shareholding by directors	Charfeddine et al. (2013) ; Hashim and Devib (2012) ; Johari et al. (2008); Lin and Hwang (2010); Riahi and Mounira (2011);

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GENDI	Gender Diversity	% of female directors in the board	Arun et al. (2015) ; Gaviouis et al. (2012); Peni and Vahamaa (2010 )
AINDE	Board audit independence	% of independent members in the audit committee	Garcia et al. (2010); George and Nashwa (2012); Kamarudin et al. (2012) ; Klein (2002); Razali and Arshad (2014) ; Soliman and Ragab (2014)
<i>Control variable</i>			
FSIZE	Firm Size	Natural log of total assets	Abed et al. (2012) ; Bassiouny et al. (2016); Johari et al. (2008); Mokaram and Motefares (2013); Razali and Arshad (2014); Riahi and Mounira (2011); Uwuigbe et al. (2017)
LEV	Leverage	Total debt / Total assets	Abed et al. (2012); Bassiouny et al. (2016); Johari et al. (2008); Razali and Arshad (2014); Riahi and Mounira (2011)
AGE	Age	Logarithm of firm age	Bassiouny et al. (2016)

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### **3.2.2 Corporate Governance Variables**

The hypothesis development resulted in the six CG elements as independent variables listed below. Board Size (BSIZE) can be expressed as the logarithm of the number of directors in the board. Board Independence (BINDE) is represented as the % of independent directors in the BOD. Qualification of Director (QUALD) is indicated as the % of directors with accounting or finance knowledge. Director Ownership (DIOWN) is stated as the % of shareholding by directors. Gender Diversity (GENDI) appears as the % of female directors on the board. Board audit independence (AINDE) is quantified as the % of independent members in the audit committee.

### **3.2.3 Control Variable**

This study considers three control variables. Firm size (FSIZE) is calculated by the natural log of total assets. Prior paper shows a negligible negative correlation between EM practice and firm size (Bassiouny et al., 2016; Johari et al., 2008). Research on Nigerian banks discovered a significant positive nexus between EM and business size (Uwuigbe et al., 2017). Another study discovered a negligible positive correlation between the size of business and EM ( Abed et al., 2012; Mokaram & Motefares, 2013 ; Riahi & Mounira, 2011). Leverage (LEV) is measured by total debt divided by total assets. Previous research



discovered that leverage has a major impact on the probability of FFR (Razali & Arshad, 2014). Age is determined by the logarithm of firm age. A research found that age has insignificant relationship with EM (Bassiouny et al., 2016).

### 3.3 Regression Model

The development of the linear multiple regression model to evaluate the nexus between the possibility of FFR and CG is described below:

$$FFR = \beta_0 + \beta_1 BSIZE + \beta_2 BINDE + \beta_3 QUALD + \beta_4 DIOWN + \beta_5 GENDI + \beta_6 AINDE + \beta_7 FSIZE + \beta_8 LEV + \beta_9 AGE + \varepsilon$$

Here, FFR, a proxy for potential FS distortion and bankruptcy, serves as the dependent variable. Six independent variables (BSIZE, BINDE, QUALD, DIOWN, GENDI, AINDE) and three control variables (FSIZE, LEV, AGE) have been defined earlier section. In the above multiple regression model is used for testing H1 to H6.

## 4 Results and Analysis

This study takes both the M score and the Z score into account to calculate the chance of FFR. If any of the company get red flags based on any method, that company will be considered as a possible manipulator. Table 4 presents the details for the possibility of FFR as per M score and Z score. Out of total 125 companies, 70 companies (56 percent) receive red flags for possible manipulator based on Z score, which is much higher than the M score (36.8 percent).

Table 4. Red Flags for the possibility of Fraudulent Financial reporting based on M and Z score

Company	Score	Red Flags for the possibility of FFR	No Red Flags for the possibility of FFR	Total
Number of Company	M Score	46	79	125
	Z Score	70	55	125
% of Company	M Score	36.8	63.2	100
	Z Score	56	44	100

The descriptive statistics for all variables of the sample companies are shown in Table 5. The minimum, maximum, mean, and standard deviation of the values are shown. Results in Table 5 demonstrate that the mean value for the possibility of FFR is 0.696, indicating a high possibility of fraud by sample companies, whereas the minimum value is 0.

Table 5. Descriptive Statistics for Variables

Variable	Mean	Std. Dev.	Min	Max
FFR	0.696	0.461834	0	1
BSIZE	7.16	2.021657	4	14
BINDE	25.54649	10.60984	0	71.42857
QUALD	41.69328	20.81735	7.142857	100
DIOWN	27.92401	20.57244	0	74.56
GENDI	16.60606	15.26634	0	60
AINDE	34.70667	15.1871	0	100
FSIZE	21.87707	1.501572	17.32789	25.78629
LEV	47.07917	25.7557	1.925267	163.7344
AGE	1.342377	0.239885	0.845098	2.017033

A high variation in board size is depicted in Table 5, ranging from 4 to 14, with an average value of 7.16, indicating that, on average, every company follows CG standards for the average no. of board directors. The average per cent of independent directors is 25.55 per cent, with a minimum of 0 percent, meaning that companies with no independent director. The mean value for the percentage of qualified directors is 41.69 per cent, ranging from 7.14 per cent to 100 per cent, indicating that, on average, below 50 per cent of members have accounting or finance knowledge. Table 5 also reported the mean value for the percentage of director ownership, gender diversity and independent auditors, indicating that though most of the companies are following the CG guideline. Control variables like firm size value ranges from 17.33 per cent to 25.79 per cent, the sample companies' sizes vary greatly. The range value of other control variables, such as leverage (163.73-1.92) and age (2.01-0.85), indicates a high variation in the sample companies.

#### 4.1 Correlation Analysis

Table 6. Pearson's correlation coefficient(r) matrix

	fradul~g	Logbs	boardi~y	qualif~r	direct~p	gender~y	board~ce	firmsize	leverage	age
fradulentf~g	1									
Logbs	0.0382	1								
boardindep~y	-0.0285	-.1536	1							
qualificat~r	-0.185*	-.0006	0.12	1						
directorow~p	-0.0228	-.2146*	-0.0427	0.0727	1					
genderdive~y	-0.0978	-.1857*	0.0097	-0.0384	0.2628*	1				
boardaudi~ce	0.0389	0.0732	0.5158*	0.1248	-0.2802*	-0.0482	1			
Firmsize	0.1917*	0.4864*	-0.1834*	0.0764	-0.2795*	-0.143	-0.0193	1		
Leverage	0.2756*	0.044	-0.1864*	-0.0991	0.0579	-0.1673	-0.043	-0.037	1	
Age	0.2049*	0.058	-0.1132	-0.0296	-0.0761	0.0527	0.1239	0.0547	0.1587	1

Note (s): \*represents p-value for statistical significance # 0.05

Table 6 displays Pearson's correlation coefficients for the dependent and independent variables. Initial research points to a lack of significant multicollinearity between variables. There is a multicollinearity issue if the correlation coefficient is greater than .80 or .90 (Akhtaruddin et al., 2009). The size of the business and board have the highest correlation coefficient (.4864) in Table 6, indicating that there is no multicollinear relationship between these variables. As would be expected, there is a significant and negative correlation between directors' qualifications and FFR (0.1850, p-value 0.0389). However, the correlation of FFR with board independence, director ownership and the proportion of female directors is negative but insignificant, whereas board size (logbs) and auditor's independence have an insignificant positive relation with FFR. As correlations alone are not sufficient to make inferences, multivariate regression models have been examined for further conclusion.

#### **4.2 Regression Analysis**

In this study, testing H1 to H6 is done using linear multiple regression as the analytical framework. In order to estimate the ordinary least squares regression function, we conduct several diagnostic tests, such as homoscedasticity, multicollinearity and autocorrelation, which indicate no modelling problems. We used white's test method to identify the heteroskedasticity problem, but the test revealed no indication of it (White's test p-value 0.0583). Multicollinearity with the residuals is not evident, according to variance inflation factor (VIF) tests (mean VIF=1.31, highest VIF=1.62). When the Durbin-Watson test is used to check for autocorrelation in the regression's residuals, the result is 1.9845, indicating that there is no indication of autocorrelation in the residuals. The Adjusted R<sup>2</sup> score for the model's explanatory power is 0.1312, which means that 13.12 per cent of the variance in the dependent variables is explained by the variation in the independent variables. The adjusted R<sup>2</sup> value of this research is pretty consistent with other comparable studies, such as Razali and Arshad (2014) obtained a value of 0.136 conducting a study on Malaysia, Juhmani (2017) got 0.086 for a sample in Bahrain, and in another study on Malaysia, Rahman and Ali (2006) obtained 0.128 adjusted R<sup>2</sup> value. It, therefore, follows that there are other factors besides CG that strongly interpreted the variation in the FFR as the corrected R<sup>2</sup> is low. The summary of the regression analysis's findings is now presented in Table 7 and analyzed in terms of each of the hypotheses.

Table 7. Regression model result

	Coef.	Std. Err.	T	P>t
Boardindependency	0.0032392	0.0045625	0.71	0.479
Qualificationofdirector	-0.0044812	0.0019166	-2.34	0.021
Directorownership	0.0018692	0.0021511	0.87	0.387
Genderdiversity	-0.0022001	0.0027251	-0.81	0.421
Boardauditindependence	0.0015039	0.0032361	0.46	0.643
Logbs	-0.4326297	0.3857624	-1.12	0.264
Firmsize	0.2042918	0.0710342	2.88	0.005
Leverage	0.0043797	0.0015945	2.75	0.007
Age	0.3143188	0.1685881	1.86	0.065
_cons	-1.474033	0.6957423	-2.12	0.036

Note (s): Significant at the 5 per cent level; Number of observations= 125 ; R<sup>2</sup>=0.1942 ; Adjusted R<sup>2</sup>=0.1312 ; F (9,115)=3.08 ; Probability>F=.0024

The first hypothesis (H1)'s insignificant negative nexus between board size and the possibility of FFR is shown in Table 7 ( $P > 0.05$ ). This result is in line with earlier research (Charfeddine et al., 2013; Mokarami & Motefares, 2013; Razali & Arshad, 2014 ; Uwuigbe et al., 2017). Board size has no impact on the possibility of FFR, therefore, H1 is not justified. The association of the FFR possibility is significant and negative with board independence, according to the second hypothesis (H2). The results reveal that board independence and FFR have a statistically negligible positive connection, in contrast to H2 ( $p > 0.05$ ). This finding contrasts with those made by Klein (2002), Peasnell et al. (2005), Razali and Arshad (2014), Xie et al. (2003) who discovered a negative nexus between independent directors and discretionary accruals. However, the findings are consistent with those made by Choi et al. (2004) and Park and Shin (2004), who found no meaningful association between independent directors and discretionary accruals.

Regarding hypothesis H3, the chance of FFR is significantly negatively correlated with the qualifications of the directors, as shown by the result in Table 7 ( $P = 0.021$ ). So H3 is supported, the more qualified the directors the less chance of FFR. The possible explanation may be that the board members with accounting or finance knowledge have important roles to perform and duties to fulfil in adding the caliber of FR. In contrast to a previous study, this outcome (e.g. Johari et al., 2008). The fourth and fifth hypotheses are not sufficiently supported by the available evidence. FFR and director ownership and gender diversity on the board have a negligible association. The result is not inconsistent with earlier papers (Peni & Vahamaa, 2010; Charfeddine et al., 2013; Arun et al., 2015). Finally, for H6, a negative nexus between auditors' independence and FFR, Table 7 shows an insignificant

positive effect on the possibility of FFR ( $P > 0.05$ ). The statistical value fails to support H6, and is not inconsistent with previous papers (e.g. Garcia et al., 2010 ; Rahman & Ali, 2006). The fact is that the independent auditors' role is insignificant to improve the quality of FR. Leverage and firm size significantly increase the possibility of FFR for the control variables . The results, however, show that there is no link between firm age and the possibility of FFR ( $P > 0.05$ ).

## **5 Conclusion and Limitations**

This study's goal is to look into the nexus between the possibility of FFR and CG for Bangladeshi manufacturing companies that are listed. Firstly, this study applies two fraud indicator models, such as Altman Z-score and Beneish M-score models to measure red flags for the possibility of FFR because one financial indicator is insufficient to reveal fraud or FS falsification (Mahama, 2015). We have discovered red flags for possible manipulation based on Z score, which is much higher than the M score. 56 % of companies represent bankruptcy risk or financial distress risk, which could be red flags for impending collapse based on Z score. 36.8 % of companies represent warning signs that suggest possible EM based on M score. Mahama (2015) explained that the discrepancy between the Z-Score and M-Score may not be incomprehensible. Using different fraud indicators produces varying results in the forecast of business collapse, insolvency, or manipulated FS. Then using regression analysis to investigate the nexus between possibility of FFR and CG. The research found a substantial inverse nexus between director's qualification and the chance of FFR, proving that board members with expertise of accounting or finance can lessen the possibility of FFR and raise the caliber of FR. The most likely explanation for this findings, as explained by previous research (Agrawal & Chadha, 2005; Xie et al., 2003), is that directors having expertise in accounting or finance would be better able to comprehend the implications of FS fraud than management without that knowledge. Managers without the proper competency in the field of finance or accounting may be competent to monitor business operations effectively, although they may not be properly capable of grasping FS fraud methods. This outcome indicates that director qualification is the effective component of CG, which can decrease the chance of FFR. Alternatively, the board size, board independence, director ownership, gender diversity, and auditors' independence has insignificant influence on the practice of FFR. This outcome indicates that these components of Bangladeshi CG may be weak. Because earlier research (Beasley et al.,

2000; Martins & Junior, 2019; Razali & Arshad, 2014) suggest that the strong CG component has an impact on the potential of FFR. So, this relationship depends on whether or not regulators strengthen their own country's CG. These outcomes may also give a signal to regulators undertaking more effective steps to inspire company effectively practicing CG.

This paper has some limitations. The only two fraud indicator models used in this paper to determine the possibility of FFR. This study focuses on non-financial sector. Moreover, this study considers one year, which unable to be compared over years. Further research may use more than two fraud indicator models for measuring better results and consider the financial sector and several years. Despite these drawbacks, this article offers important and useful insights into understanding the nexus between the possibility of FFR and CG in the context of Bangladesh.

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