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The Impact of Corporate Governance Mechanisms on Environmental Disclosure Practices: Evidence from Manufacturing Industry in Bangladesh

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Abstract: The current study identifies the impact of corporate governance mechanisms on environmental disclosure (ED) in Bangladesh. A total of 359 firm-year observations extracted from the annual reports of 86 listed manufacturing companies listed on the Dhaka Stock Exchange for the period from 2015 to 2019 were examined. Multiple linear regression analysis was performed to identify the driving forces of ED practices. This study found that foreign stockholdings, board size, and audit committee size significantly positively correlate with ED. However, surprisingly, more representation of independent directors in the boardroom and institutional ownership in share capital can actually reduce the extent of ED for our sample firms. These results provide a comprehensive understanding of the determinants of ED in an emerging country like Bangladesh and may prove useful for regulators, policymakers, and corporate managers. The data will assist other stakeholders in making relevant decisions. However, by providing the empirical facts of the underlying determinants of ED practices in developing countries' manufacturing sector settings, the study provides a novel contribution to the current ED literature. To the best of the authors' knowledge, this is the first study investigating the determinants of ED practices of the manufacturing industry based on the Global Reporting Initiative.

Keywords: Bangladesh, corporate governance, environmental disclosure, firm's characteristic.

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INTRODUCTION

Environmental pollution is the byproduct of the development of civilization and a price for progress. The protection of the environment has become a major issue around the globe for the well-being of the people and economic development. The understanding of the interaction between a business and its environment is very crucial for a business executive for identifying opportunities and threats, building image, and meeting competition to succeed in business. The business houses should have a moral commitment and ensure a sustainable environmental structure toward the community (Masud et al., 2019). However sustainable business environment improve financial performance and market value (Bose et al., 2020a and Bose et al., 2020b). So, sustainability reporting (SR) is an emerging concept incorporating social, financial and environmental dimensions in an integrated way. It is also referred to corporate social responsibility (CSR), triple bottom line (TBL), and integrated reporting (IR). A company not only focuses on generating profit but also includes the care about people and planet (Baral & Pokharel, 2017). System oriented theories like legitimacy theory, stakeholder theory, and political economy theory describe the pivotal role of information in making the relationship with stakeholders (Fernando & Lawrence, 2014). In legitimacy theory, the organization always seeks to run within the norms and bounds of society by establishing a social contract with the society. In the case of violating the contract, the consequences may be the legal restrictions on operations, difficulty in accessing constrained resources provided, and decreasing the demand for products. To be a corporate citizen or sustainable business response, organizations need to meet the expectation of the community. Information is vital for ensuring corporate legitimacy. However, disclosures in the environmental aspect are self-laudatory showing only positive aspects rather than negative (Deegan & Gordon, 1996). Managers always seek to meet the expectation of particular (powerful) stakeholders under stakeholder theory. Voluntary information plays a pivotal role employed by corporate managers to manage stakeholders. Moreover, the supporters of this theory argued that the high level of voluntary disclosure to raise more funds at a lesser cost (Choi, 1973). Investors are also interested in social and ED before making their investments. In political-economic theory, corporate managers disclose information not only to seek support but also to mitigate pressure from particular stakeholders (Deegan, 2009).

Agency theory, resource dependency theory, and signaling theory have also been used to provide the explanation of disclosing voluntary information. Under agency theory, the principal delegate the decision-making authority to the agent. The level of information is used by both parties to reduce the severity of the problem of information asymmetry which is one of the determinants of voluntary disclosure decisions (Healy & Palepu, 2001). However, disclosure of social information is a tool for increasing the welfare of management (Ness & Mirza, 1991). Signaling theory also describes the information asymmetry problem and reducing these problems by the party by disclosing more information (Levin, 2001). Debreceny et al. (2002) and Ettredge et al. (2002) also argued that a firm usually tries to differentiate itself from others by signaling its specific qualities to investors. In the resource dependency theory, a company always access to critical resources from the planet. As a result, every firm has to control influential stakeholders for accessing outside resources proving disclosures (Hillman et al., 2009). However, multinational firms use CSR disclosure to gain business benefits despite of the understanding of social expectations (Roy & Quazi, 2021). Several studies investigated CSR disclosure practices and identify the determinants especially corporate governance (CG). Bae et al. (2018) postulated that board size, independence, institutional and foreign shareholding were significantly positive with sustainability disclosure in context of south Asian countries for the period between 2009 and 2016. But, Rashid (2021) found institutional investors negatively influence on CSR based on only Bangladeshi companies. Oh et al. (2011) revealed both institution and foreign ownership have positive relationship with CSR rating using 118 Korean firms. In Gulf Cooperative Council countries, Mousa et al. (2018) investigated the association between CG and CSR disclosure. Only board size and non-executive directors were significantly affect CSR disclosure; conversely role duality, female directors and audit committee were not significant. In India, Fahad & Nidheesh (2020) also examined BSE-500 index companies and asserted that age, size, leverage, foreign, and promoter ownership having positive association based on a period of 10 years annual reports of 2007-2016. Giannarakis (2014) analyzed 366 companies from the Fortune 500 listed in USA incorporating both financial characteristics and corporate governance mechanism, namely, CEO duality, company's size, women on board, profitability, board's age, industry profile, board meetings of directors, board size and financial leverage but only company's size and board size having positive while CEO duality having negative determinants in social disclosures. Matuszak et al. (2019) investigated the link between corporate governance characteristics and found foreign ownership and size statistically significant in the level of CSR disclosures examining between 2008 and 2015 of commercial banks of Poland. Rao et al. (2012) scrutinized annual report of 2008 of the largest Australian listed companies and asserted that board size, institutional investors, independent directors, and female directors having positive relation with environmental reporting. In contrast, Önder & Baimurzin (2020) revealed only the presence of influential board member was positive, while board size, the presence of independent board members, and the existence of corporate social responsibility committees were negative with SR. In Nigeria, Odoemelam & Okafor (2018) found board meeting, board independence and the environmental committee were statistically significant while audit committee independence and board size were insignificant.

However, there is a paucity of study on corporate governance and total sustainability disclosure in developing, particularly in Asian Contexts (Bae et al., 2018; Masud et al., 2018a and Chang et al., 2015). Table 1 shows the summary of previous literature in determining the motivating forces of voluntary disclosure in the context of Bangladesh.

Table 1 A summary of Literature Review in Context of Bangladesh.

Study	Samples	Time period	Method	Results
Khan (2010)	30 listed banks	2007-2008	Multiple regressions	Independent directors and foreign nationals in board significantly impact on CSR reporting.
Rouf (2011)	120 listed non-financial firms	2007	OLS regression analysis	Board size, board leadership, and audit committee are positive, while the independent directors, ownership structure, and profitability were inverse association with voluntary disclosure.
Rouf & Al-Harun (2011)	94 listed firms	2007	Regression Model	Institutional ownership was positive but, managerial ownership was negative with voluntary disclosures.
Akhtaruddin & Rouf (2012)	94 listed firms	2006	Regression Model	Both board and audit committee sizes are positive with voluntary disclosure but independent directors in board not significant.
Khan et al. (2013)	116 manufacturing firms	2005-2009	Regression Model	Public stockholdings, foreign stockholdings, and the inclusion of audit committee were positive while managerial ownership was negative forces for CSR disclosures in annual reports.
Das & Das (2016)	141 listed firms	December 2013 to March 2014	Regression Model	Size, audit firm's international link, multinational parent, independent director in the board, and dual leadership structure are significantly positive while profitability and leverage are negative but board size, liquidity, age, and ownership having no significant association with voluntary disclosure.
Bhuyan (2018)	200 listed firms	2011 to 2013	Ordinary Least Square	Audit committee, profitability and foreign ownership were positive but director ownership and CEO duality were negative with voluntary disclosure.
Saha (2019)	29 listed banks	2012	OLS regression analysis	The profitability, age, government ownership and Islamic compliance were the main denominators in CSR disclosures.
Jahid et al. (2020)	30 listed banks	2013-2018	OLS regression analysis	Board size, independence, female and foreign directors have significant positive, while political and audit committee size have negative impact on CSR disclosure.

But, the social issues are more dominant than environmental issues in the umbrella of corporate social responsibility (CSR) in developing countries (Amos, 2018). Moreover, despite the significance of the relationship, there is a paucity of clear understanding of the motivating forces CG factors of ED. The inconsistent findings motivate us to investigate the motivating CG forces that drive the ED practices of the manufacturing industry in the context of Bangladesh. Moreover, the current study has several potential contributions. First, the present study is especially undertaken to find the associations between CG and ED individually as previous studies are considered SR incorporating three areas i.e economic, social and environmental issues. Second, most of the previous empirical studies were done on the service industry (see also, Masud et al., 2017; Uddin et al. 2018; Masud et al., 2019; Khan et al., 2020; Rashid et al., 2020 and Khan et al., 2021) but, the current study reveals the determinant of ED of the manufacturing industry as industrial wastage is derived from a manufacturing process. Third, our paper examined annual reports of 5 years in a row but most of the previous studies either one or two years. Last but not the least, our study can be used for a practical purpose by organizations and statutory bodies to pay attention to point out the corporate characteristics and governance mechanisms that will intensify ED since it had been shown in previous studies that environmental reporting in Bangladesh is generally low.

METHODS

For the purpose of the research, samples were taken from the manufacturing firms listed in Dhaka Stock Exchange (DSE) of Bangladesh as the sectorial share of GDP of Bangladesh 19.89% by manufacturing in the fiscal year 2018-2019 (BBS, 2020). We purposively selected three industries i.e Cement, Pharmaceutical & Chemical, and Textiles from the manufacturing sector in our study. These industries contribute to the country's 86.34% of exports earnings (EPB, 2020). All listed firms of sample industries are considered in our study. We collected annual reports from the website from the respective company and also using a financial portal if not available. Despite this effort, we are unable to collect the annual report of 5 textile and 4 pharmaceutical & chemical companies. Finally, 86 companies were examined in our study.

To make the experiment more up-to-date, our study was based on an annual report from 2015 to 2019. A total of 359 firm-year observations are used after considering the following two factors. First, due to missing voluntary information in the report, some firm years are excluded. Second, some sample firms do not keep their annual report of 5 years in a row from 2015 to 2019. Those missing firm years are also excluded. Published annual reports are primary sources of our data. This source is chosen as annual reports are readily accessible and popular means of communication to stakeholders (Belal, 2001). However, it is the major communication medium and public document utilized by researchers for identifying the drivers of voluntary information (Khan, 2010; Saha & Akter, 2012; Das & Das, 2016). It is a more reliable and widely accepted document published by companies (Shehata, 2014).

To measure the ED practices by a listed manufacturing firm in Bangladesh, we construct Environmental Disclosure Index (EDI) based on the content analysis. In social and environmental studies, content analysis is a widely accepted and effective tool (Guthrie & Abeysekera, 2006). In preparing the list of contents of the EDI, GRI (3.1) is documented as a yardstick. GRI stands for Global Reporting Initiatives is the most preferred global framework for 'Triple Bottom Line' reporting incorporating the pillars of economic, social, and environmental dimensions (Hohnen, 2012 and Masud et al., 2018b) and 82 % sustainability report of the topmost 250 corporations of the world are based on GRI (Haldar, 2015 and Mahmud et al., 2017). 17 core contents of environmental performance under 7 themes are considered in preparing the disclosure index. Both weighted and un-weighted techniques are available in scoring the content. However, these have made a little or no difference to the results

(Coombs & Tayib, 1998). We choose the un-weighted techniques as equal importance is given to all contents. We used a dichotomous technique scoring '1' if disclosure and '0' for non-disclosure of the content as espoused by Wallace et al. (1995), Khan (2010), Rouf (2011), Saha & Akter (2013) and Abu Qa'dan & Suwaidan (2019). The EDI is the ratio of the total score to the maximum possible score for every firm and each year.

Table 2 Independent Variables and Their Measurement

Variable Name	Symbol	Explanation	References
Independent variables			
Board Size	SBOD	The no. of the total members of board	Önder & Baimurzin (2020)
Independent Directors	RIND	Ratio of independent director to total directors	Das & Das (2016); Anazonwu et al. (2018); Abu Qa'dan & Suwaidan (2019);
Size of audit committee	SAC	No. of members in the audit committee	Akhtaruddin & Rouf (2012); Katmon et al. (2019)
Institutional stockholdings	IOWN	Ratio of institutional stockholding to the total stockholdings	Barako et al. (2006); Abu Qa'dan & Suwaidan (2019)
Foreign stockholdings	FOWN	Ratio of foreign stockholding to the total stockholdings	Barako et al. (2006); Khan (2010)
Control Variables			
Size	FSIZE	The log of the total assets	Muttakin & Khan (2014); Das & Das (2016); Abu Qa'dan & Suwaidan (2019);
Profitability	ROA	Return on Assets = (net profit after tax/ total asset)	Abu Qa'dan & Suwaidan (2019); Muttakin & Khan (2014)
Leverage	LEV	Debt to total assets = total debt / total assets.	Muttakin & Khan (2014); Abu Qa'dan & Suwaidan (2019); Al-Gamrh et al. (2020)

The following regression analysis is used to examine the determinants of EDI:

$$EDI_{it} = \beta_0 + \beta_1 SBOD_{it} + \beta_2 RIND_{it} + \beta_3 SAC_{it} + \beta_4 IOWN_{it} + \beta_5 FOWN_{it} + \beta_6 FSIZE_{it} + \beta_7 ROA_{it} + \beta_8 LEV_{it} + \varepsilon_{it}.$$

Where, EDI= Environmental Disclosure Index; β_0= Intercept; β_1- β_{10}= coefficients; ε= Error term; i= represent each observation; and t= represent the time.

RESULTS AND DISCUSSION

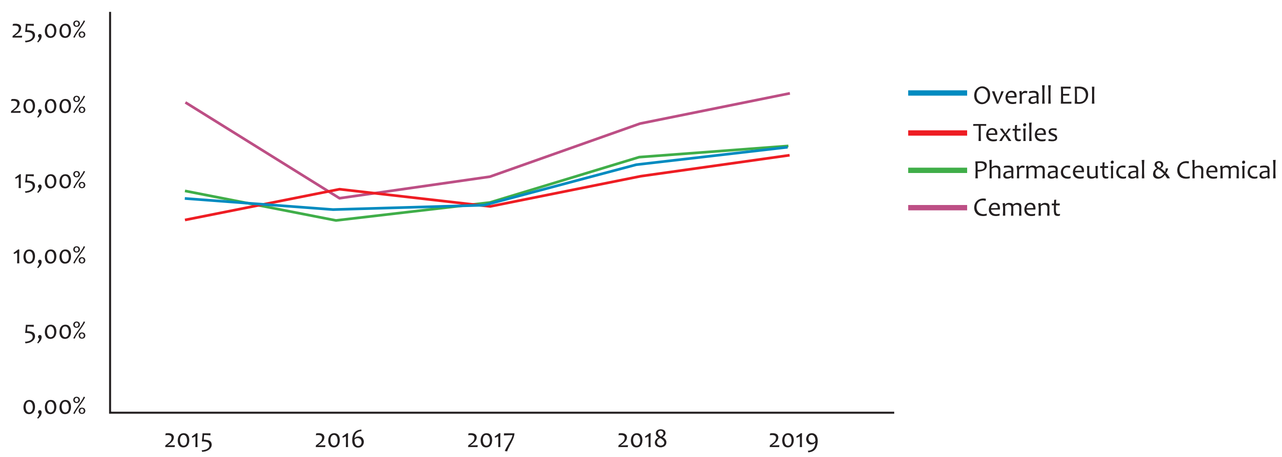

Figure 1 Overall and industry wise EDI

Figure 1 depicts the EDI in percentage over the period 2015-2019. It is clear that there is a paucity of ED practices by listed manufacturing companies in Bangladesh although there is an increasing trend. The growth of ED practices of cement industry is higher than textiles.

Table 3 represents descriptive statistics of all variables of our study. The mean score of EDI is 14.77% which indicates this average disclosure level is not satisfactory though the fact that ED is a relatively new phenomenon in our country. The maximum and minimum EDI is 41.76% and 0% respectively. The average size of the board is 7 persons with a range of 5 persons to 12 persons. The percentage of independent directors on the board is 26.73%. The size of the board (5 to 20) and the percentage of independent directors (at least 20% of total directors) are set by regulated by Bangladesh Securities Exchange Commission in code of corporate governance (CG) applicable for all enlisted firms in Bangladesh (BSEC, 2018). The audit committee size is 4 persons with the highest number of 5 people. The CG Code has also documented the size of the audit committee is at least 3 members (BSEC, 2018). The average institutional ownership and foreign ownership is 19.87% and 3.62% respectively. The size of the sample firms showed an average of log 9.55 is equal to Tk. 7,290 million. The minimum and maximum sizes in the sample are Tk. 129 million and Tk. 72146 million respectively. The size is scaled by the log of total assets due to a high standard deviation. The outcome of the descriptive results shows that the profitability variable scald by ROA has an average of 5.78% with a range from 44.21% to -21.20%. The leverage scaled by debt to total assets indicates on an average creditor's claim on assets is 53.63%.

Table 3 Descriptive Statistics

Variables	Mean	Std. Dev.	Min	Max	VIF
EDI	0.1477	0.0731	0	0.4176	-
SBOD	7.21	1.82	5	12	1.30
RIND	0.2673	0.0888	0.11	0.6	1.14
SAC	3.83	0.6414	3	5	1.14
FOWN	0.0362	0.1037	0	0.703	1.44
IOWN	0.1987	0.1289	0	0.7845	1.29
FSIZE	9.5541	0.5255	8.1094	10.8582	1.41
LEV	0.5363	0.2841	0.03	3.0534	1.23
ROA	0.0578	0.0726	-0.212	0.4421	1.41

Table 4 exhibits the pairwise correlation of all variables. This matrix is utilized for identifying the collinearity problem among the independent variables. Gujarati & Porter (2003) documented that the collinearity problem exists when values exceed more than +/- 0.80. The maximum positive correlation between ROA and FOWN is 0.465 and the negative correlation between SBOD and RIND is -0.255. So, there is no multicollinearity problem. However, we also calculate the variance inflation factor (VIF) for assessing multicollinearity among the variable. Table 3 states that the variance inflation factors (VIF) values were determined with the use of STATA and were found to be concurrently less than 10. These results further assure the nonexistence of collinearity among variables.

Table 4 Pearson's Correlation of Variables

Variables	EDI	SBOD	RIND	SAC	FOWN	IOWN	FSIZE	LEV	ROA
EDI	1.000								
SBOD	0.234***	1.000							
RIND	-0.153***	-0.255***	1.000						
SAC	0.285***	0.104**	-0.053	1.000					
FOWN	0.250***	-0.013	0.094*	0.199***	1.000				
IOWN	-0.055	0.184***	0.021	-0.074	0.021	1.000			
FSIZE	0.274***	0.267***	-0.031	0.113**	0.214***	0.406***	1.000		
LEV	0.106**	0.132**	0.111**	-0.164***	0.042	-0.182***	-0.175***	1.000	
ROA	0.206***	0.076	0.109**	0.212***	0.465***	0.080	0.053	-0.128**	1.000

*, **, and *** denoted at 10%, 5% and 1% significance level.

Table 5 abridges the regression result of EDI of both firm's specific attributes for control variables and corporate governance mechanisms. Model 1 exhibits the regression results for the gearing forces of ED and Model 2 is the extension of the results of our model using dummies both industry and year to control both year and industry variation. The robust standard error is also used to control for the heteroskedasticity of our model. The most significant determinant of ED is the size of the board. The estimates of SBOD are also shown a significant positive relationship with EDI at a significant 5% level. So, we accept the eight hypotheses (H1) and conclude that board size is significant determinant of ED. This finding is matching with Rouf (2011), Rao et al. (2012), Akhtaruddin & Rouf (2012), and Giannarakis (2014), Esa & Gazali (2012). With the larger board size having more collective experienced and expertise, a firm is likely to disclose more information related to the environment. In contrary to H2, we cannot accept our presumed relation rather there is a significant negative relationship between EDI and the independent directors. This finding matches the result of Eng & Mak (2003), Barako et al. (2006), Saha & Kabra (2019), and Abu Qa'dan & Suwaidan, (2019). Independent directors may be theoretically independent and their presence is the substitute of disclosures (Barako et al., 2006; Abu Qa'dan & Suwaidan, 2019). The estimates of SAC are also shown the significant positive relationship EDI at significant at a 1% level. So, we accept the third hypotheses (H3) and suggest that the size of audit committee is playing a pivotal role disclosure of information related to the environment. This result also keeps up with the finding of Rouf (2011). The coefficient estimates 0.0611 with RSE 0.0310 of FOWN construes the significant positive impact on EDI at the 5% significance level. Hence, we can accept the fourth hypothesis (H4) and implies that foreign shareholders having different values and expertise in contextual issues due to exposure to the foreign market are able to increase strategic decision regarding voluntary reporting. Further, companies having more foreign stakes try to please ethical foreign shareholders by ensuring and attaching their investment. This finding is also supported by Haniffa & Cooke (2005), Khan et al., (2013), Bae et al. (2018), Matuszak et al. (2019) and Al-Gamrh et al. (2020). In contrary to H5, we do not accept the proposed hypothesis and show the significant negative association between the EDI and institutional holdings. This unexpected result could be that institutional shareholders have limited control over the reporting firms as they have the lack of expertise needed to invest in the volatile market and due to some regulatory changes. This finding is consistent with Rao et al. (2012), Abu Qa'dan & Suwaidan (2019) and Rashid (2021).

Table 5 Regression Result

Variables	Expected sign	Model 1		Model 2	
		Coef.	RSE	Coef.	RSE
SBOD	+	0.0035	0.0019*	0.0038	0.0018**
RIND	+	-0.1251	0.0345***	-0.1135	0.0336***
SAC	+	0.0233	0.0071***	0.0211	0.0063***
FOWN	+	0.0625	0.0333*	0.0611	0.0310**
IOWN	+	-0.0853	0.0310 ***	-0.0798	0.0303***
FSIZE	+	0.0400	0.0084 ***	0.0400	0.0092***
LEV	+	0.0471	0.0108***	0.0517	0.0126***
ROA	+	0.1520	0.0552***	0.2180	0.0575***
Industry dummies?		No		Yes	
Year dummies?		No		Yes	
R-squared		26.23%		30.88%	
Adjusted R-squared		24.54%		28.06%	

Notes: RSE= Robust coefficient error; *, **, and *** denoted at 10%, 5% and 1% significance level.

The three control variables (FSIZE, LEV and ROA) indicate the positive impact on EDI at the 1% significance level. The larger firm discloses more information due to more agency costs, higher public scrutiny, and sustainability with a reputation in long run as per agency, political, and legitimacy theory. This finding is in line with the outcome of Ho & Taylor, 2007; Khan 2010; Rahman et al., 2011; Saha & Akter, 2013; Muttakin & Khan, 2014; Islam et al., 2015; Das & Das, 2016; Odoemelam & Okafor; Fahad & Nidheesh, 2020. The profitable firm discloses more information for justifying higher profit and distinguishing from the less profitable firms in congruence with political and signaling theory. This positive result is supported by Saha (2019) and Önder & Baimurzin (2020). The estimate of leverage propounds that the high levered firm disclosures more for the fulfillment of debt convents and lowering the cost of capital (Chandok & Sing, 2017; Fahad & Nidheesh, 2020).

The current studies have several potential implications. This is the first study examining the impact the CG mechanism on ED practices of the listed manufacturing industry over a period of 5 years incorporating a single model based on the GRI. These results give a comprehensive understanding of the determinants of ED in an emerging country like Bangladesh and may useful for regulators, policymakers, and corporate managers and will assist the others stakeholders in making relevant decisions. Particularly, this study may help the regulator of corporate sectors in framing policies regarding corporate governance. However, by providing the empirical facts of the determinants of ED practices in developing countries' manufacturing sector settings, the study provides a novel contribution to the current ED literature.

CONCLUSION

The study examines the motivating forces of ED practices of listed manufacturing firms in Bangladesh using 359 firm-year observations for the period of 2015 to 2019. Corporate governance mechanisms have been incorporated, namely, institutional stockholdings, foreign stockholdings, independent director, audit committee, and board size. Multiple linear regression models showed that firm with more members on board and audit committee discloses more ED due to the inclusion of more diversified knowledge and expertise in the boardroom. In ownership pattern, the foreign shareholdings is also significantly positive with ED. Foreign owners having different values and cultures in contextual issues due to exposure to the foreign market are able to increase strategic decisions regarding voluntary reporting. However, surprisingly more representation of independent directors in the boardroom and more institutional ownership in share capital reduce the ED for our sample firms. All firm-specific characteristics as control variables, namely, size, profitability, and leverage, are significantly positive with ED. A bigger firm with higher profitability discloses more ED in the published annual reports due to more agency cost, higher public scrutiny, justifying its position, distinguishing from others, and sustainability with a reputation in long run as per agency, political, signaling, and legitimacy theory. In addition, the more levered firm discloses more ED for not only the fulfillment of debt convents but also the attraction of creditors to raise funds at a lower cost. This study has some limitations. First, we examined the public annual report in constructing ED, although several other mass communication systems are used by management. Second, this study followed only the quantity of ED rather than the quality of it. Third, we extracted a sample from the listed manufacturing industry. These results may not extend to all other industries in Bangladesh. The current study has been only investigated for Bangladeshi manufacturing firms and can be extended further to have a cross-country analysis comparing among the developed and developing economic world. In the future, we can also work with this study by ensuring the quality of the disclosure context.

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