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Environmental Accounting and Reporting Practices for Sustainable Wellbeing: Evidence from the Textile Industry of Bangladesh

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Abstract

This study investigates the environmental accounting and reporting practices of the listed textile companies of the Dhaka Stock Exchange (DSE) during 2023-2024 focusing their role in promoting sustainable wellbeing. This study developed a conceptual framework, Environmental Accounting and Reporting Practices Index for the Textile Industry, containing 72 items to evaluate the quality and extent environmental disclosures. Among 58 companies examined, only 18 out reported their environmental practice in the annual reports, indicating a low level of transparency and commitment to environmental accountability. To identify the determinants of the environmental reporting, the study applies the Ordinary Least Square (OLS) model. It finds that the firms' performance, liquidity, leverage, firm size, CEO duality, profitability and the presence of environmental audits significantly influence the environmental reporting practice. Additionally, the study used Propensity Score Matching (PSM) to assess the financial impact of these practices. Result reveals that the firms engaged in environmental accounting and reporting experienced better financial performance-1.70 time's higher return on equity and 1.41 times higher return on asset- than non-reporting firms. The findings highlight the need for mandatory environmental reporting regulation and implementation mechanisms to enhance corporate accountability, improve financial outcome and support broader goals of environmental sustainability and long-term well-being.

Keywords: Environmental Accounting, Environmental Governance, Environmental Reporting, Environmental Sustainability, Financial Performance.

Introduction

Environmental accounting and reporting regulations globally help raise awareness and empower various stakeholders, such as nearby communities, employees, shareholders, financial institutions, local governments, and the general public, by making the disclosures accessible to those who are interested. This approach serves as an effective and efficient means of encouraging polluters to internalize the potential damages. Organizations are very concerned regarding stakeholder satisfaction as it is directly linked with the goodwill of the organization. Organizations are careful to preserve their goodwill, as losing it can result in considerable financial repercussions (1). The textile industry of Bangladesh is a linchpin of the national economy that generates greater than 80% of the national export earnings and provides has about 4 million workers with a female dominance and 63,000 female workers directly associated with the RGM industry (2). Nevertheless, the process of rapid industrial growth has been accompanied by numerous environmental problems such as dumping of untreated waste effluents, chemical pollution, polluted water and improper waste disposal. These environmental debts cause doubt about what this industry means in long-term in terms of sustainability and public health and ecological health. Environmental accounting and reporting (EARP) are an important instrument to recognize, measure, and disclose environmental impacts from industrial activities. EARP can contribute to sustainable well-being by including environmental cost consideration into the decision-making

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processes of organizations; and guaranteeing transparency and accountability to stakeholders (3). However, empirical evidence indicates that Bangladesh textile industry has an unsystematic manner towards environmental disclosure procedure. An analysis of content in relation to textile organizations on the Dhaka Stock Exchange finds that about 69% of the firms had not made any mention about the environment in their annual report (4). Also, another study observed that the level of disclosure was significantly diverse and decision of board characteristics (like board size, female member) to the environmental disclosure is positive. But independent directors did not have significant effect (5). Another group of researchers conducted an environmental disclosure performance assessment of 22 textile companies with a GRI framework and found that the average disclosure score was around 0.50, revealing to some extent that the transparency of the companies' environmental information is relatively low (6). Furthermore, past study found a set of barriers that are hindering environmental accounting in environmentally sensitive industries in Bangladesh such as cost obstacles, lack of trained staff, and weak enforcement of regulation (7). Their results revealed EMA compliance to be between 20% and 67%, highlighting an institutional deficiency of the standards applied and of current practices (7). Given the high level of environmental footprint and socio-economic importance of the textile sector, enhancing EARP is particularly important for promoting sustainable wellbeing in Bangladesh. Accordingly, the objective of this research is to examine the existing state of affairs, to determine the reasons and motivations for non-disclosure as well as the inhibiting and driving forces of disclosure and to investigate the possibility of environmental accounting in such a way as to contribute to the sustainability of industry whilst not jeopardizing the health of the environment and that of the public.

Bangladesh Textile industry has become the backbone of country's economy which contributes over 80% of its export income and employs around four million workers (8, 9). But even as it makes its mark on economy, the industry has been facing environmental issues like untreated waste effluents, chemical pollution and improper disposal of wastes (9, 10). These environmental problems have prompted the question of whether this industry is sustainable in the long-term and if it affects public and environmental health.

There is a growing global interest towards environment sustainability (8, 11, 12). However, the Bangladesh textile industry in terms of EARP has not been able to keep pace yet and its practice is found incomplete (13). Research evidence reveals a significant number of textile companies quoted in the Dhaka Stock Exchange have not been practicing environmental disclosure management efficiently which indicates there are no transparency and accountability regarding their activities that impact on environment (14-16). Such under-reporting has important implications not only for corporate governance and regulatory compliance but also for the wider aspiration of sustainable development (17). The importance of this research is that it fills in the gap between environmental sustainability and financial performance for corporate organizations in the Bangladesh textile industry. Through the identification of drivers behind environmental recommendations and the financial implications of such an undertaking, this study yields significant insights into the role that environmental disclosure can play in corporate accountability and firm performance. Despite some possible costs, companies that achieve the level of a stronger degree in environmental performance could generate better financial performance than their counterparts, highlighting the importance of integrating sustainability into corporate strategy. The results of this study have implications for sustainable industry practices in developing countries in that it provides recommendations on policies to improve environmental governance and influences the textile sector to adopt more responsible approaches towards accounting for the environment. This is essential for ensuring long-term flourishing, not just of the industry itself, but also of the surrounding communities and ecosystems that its operations impact.

Theoretical Framework

In order to be able to firmly position this research within the literature, we need to build an explicit theoretical base for relations between welfare, environmental accounting and sustainability. Theoretical underpinnings of environmental and sustainability accounting A wide variety of widely-accepted theories have been used to explain the

reasons for which firms are more likely to report non-financial information and concerns, embrace sustainable activities, and release data on environmental performance. One of the underpinning theories commonly employed in sustainability and environmental accounting study is Stakeholder Theory. According to this perspective, firms react (or responsiveness) to the expectations and demands of stakeholders (e.g. customers, regulators, investors, communities) in order to maintain legitimacy and ensure continued access of resources they depend on and social license to operate. Incorporating stakeholder theory explains why firms pursue environmental accounting as a way of reconciling economic objectives and the environmental and social welfare interests of numerous groups including stakeholders in the firm (e.g., via sustainability reporting and environmental disclosures) rather than merely financial results (18, 19). Another important approach of analysis is the Institutional Theory which argues that companies respond to either normative (e.g., industry standards), coercive (e.g., regulatory pressures) and mimetic (e.g., copycat system accommodation) institutional pressure, in order to increase legitimacy and follow global sustainability norms. The research in environmental accounting reveals that the institutional environment significantly influences how sustainability practices are instantiated and reported in corporate discourses (20). A third major theoretical perspective is that of Legitimacy Theory firms to bridge the gap between images and practices by focusing on the role of legitimacy (21, 22). In this perspective, firms are signaling, for example, greenness (via disclosure of information on environmental performance and sustainability activities) in order to reduce information asymmetry as well as reputational risk in an environment where environmental issues directly or indirectly shape corporate reputation and stakeholder support. (23). Taken together these theoretical perspectives—stakeholder, institutional and legitimacy theories—provide a comprehensive lens through which to examine why firms adopt environmental accounting, as well as how it plays a role in sustainable development and social welfare. The extant theory bases advocate the incorporation of these theories in the context of examining accounting for sustainability, as they together account for strategic responses by organizations to environmental and social forces and the welfare consequences of corporate involvement with the environment (24). Crucially, as synthesis studies in environmental accounting suggest, sustainability accounting is not only a technical exercise but also a strategic managerial effort to react to complicated environmental and social requirements. Researchers have noted that theoretical precision is required but with more definition and differentiation of environmental accounting versus sustainability accounting at large (the latter incorporating social and governance elements) built on the same foundations of institutional logics. (18, 20) Grounding this work in these modern theoretical lenses would imbue the manuscript with academic rigor, and allow for stronger rationale (academically) of why environmental accounting's impact on firm behavior, welfare outcomes and sustainability performance is something that deserves empirical investigation.

Methodology

Data Extraction and Synthesis

To complete the study, we collected data carefully from annual reports of textile firms in Dhaka Stock Exchange (DSE) for 2023 and 2024. A summary of the study 58 companies are sample. The extraction involved the identification of environmental practices and disclosures in reports of companies operating in the key areas, such as waste disposal, energy provision, emissions and natural resource use. For a comprehensive analysis, data was coded and classified systematically based on the pre-constructed index the Environmental Accounting and Reporting Practices Index for Textile Industry (EARPITI). This 72-item index was developed according to the Environmental and Safety Guidelines for Textile Manufacturing and Health published by the International Finance Corporation. These instruments were applied to assess the level of quality and depth of environmental disclosures, both qualitative and quantitative. After extraction, data were organized in Excel that allowed the classification of firms according to their green reporting performance. The synthesis of those data did not simply amount to the sum of reported numbers, but an assessment of both how effective and transparent these were as a reporting mechanism. Richness of the analysis was then

added by recognizing patterns, correlations and inconsistencies in second-order data - with a particular emphasis on differences in environmental reporting among firms. The synthesis also investigated some of the determinants explaining inconsistencies, such as level of environmental consciousness, existence of environmental audits and financial health within the firm. This was necessary to comprehend the broader implications of environmental accounting practices in corporate governance and sustainability. It is the disclosure of the relationship, not its raw existence that can be subject to further analysis and scrutiny; thus the data extraction and synthesis phase ensured that environmental disclosures were analysed in depth as was possible.

Description of the Variables

To measure the impact of EAR practices on corporate measures, data on financial performance, liquidity, independent directors, leverage, firm size, board size, CEO duality, profitability, environmental audit has been extracted from corporate annual reports for the fiscal year 2022-2023. Table 1 below outlines the evaluation criteria for the chosen variables.

Table 1: Title of the Factors with Evaluation Criteria for the Corporate Measures

Name of the variables	Measured by
Environmental Accounting Reporting Score	Measured from annual reports comparing with pre-developed index
Financial Performance	Net Profit After Tax
Liquidity	Liquidity hold by the firm (Cash on hand / Cash equivalent)
IDirectors	Number of Independence of Directors
Leverage	Leverage holding by the firm (Total liability/ Total asset)
Firm Size	Total Assets
Board Size	Board Size measured by numbers director
DRCEO	Dual Role of CEO measured as dummy (Double role of CEO)
Profitability	Profitability measured by ROE/ROA
Audit	Environment Audit measured in dummy

Formulation of an Environmental Accounting and Reporting Practices Benchmark for the Textile Sector (EARPITI)

Utilizing prior research and referencing the Environmental, Safety Guidelines for Textile Manufacturing, and Health published by the International Finance Corporation, EandS Washington, D.C.: World Bank Group, the authors formulated the "Environmental Accounting and Reporting Practices Index for the Textile Industry" (EARPITI).

Development of Model

This study uses a multiple linear regression model to investigate the connection between several independent variables and the dependent variable, Environmental accounting and reporting score (ES). The Ordinary Least Squares (OLS) technique is utilized for estimation, ensuring unbiased and efficient parameter estimates under classical assumptions (8, 25). This study employed OLS, as it is a standard method known for providing unbiased and consistent parameter estimates for fitting linear relationships between one dependent variable and multiple independent variables when certain assumptions hold (9, 26). Hence why OLS makes a preferred choice as it allows also for direct explanation of coefficients, allowing an assessment of how the explanatory variables individually impact environmental sustainability.

The regression model is specified as follows (Equation [1]):

$$Es_i = \beta_0 + \beta_1 FP_i + \beta_2 Liquidity_i + \beta_3 IDirectors_i + \beta_4 Leverage_i + \beta_5 FirmSize_i + \beta_6 BoardSize_i + \beta_7 DRCEO_i + \beta_8 Profitability_i + \beta_9 Audit_i + u_i \quad [1]$$

Where, ES_i = Environmental Accounting and Reporting Score for firm i; FPi = Financial Performance (Net Profit After Tax); Liquidity = Liquidity hold by the firm (Cash on hand / Cash equivalent); IDirectors = Number of Independence of Directors; Leverage = Leverage holding by the firm (Total liability/ Total asset); Firm Size = Firm size is assessed based on the total assets of the company; Board Size = Board Size

measured by numbers; DRCEO: Dual Role of CEO measured as dummy; Profitability = Profitability measured by ROE/ROA; Audit = Environment Audit measured in dummy; U = Error term. β's are the unidentified variables to be determined, and I represent them for the firm.

The independent variables include financial performance, liquidity, and independence of directors, leverage, firm size, board size, CEO duality, profitability, and audit quality. Each variable is selected based on theoretical and empirical considerations, representing factors that potentially influence environmental sustainability outcomes. The dataset comprises 58 observations. OLS regression is applied to estimate the coefficients (β) of the explanatory variables. The significance of the coefficients is assessed using t-tests, with p-values.

PSM Model

This paper adopts PSM, proxied by Probit model to investigate the causal relationship between environmental accounting and reporting performance and financial performance. The dependent variable of the probit model is the likelihood that firms have good environmental performance. Two types of matching are employed: Kernel Matching, which puts more weight on control firms close to the propensity score of treated firms, and Radius Matching, that confines to matches within a certain radius. ATT is described to examine financial performance (ROE and ROA), reflecting that strong environmental disclosure has a positive effect on financial performance.

Matching Methods

The comparison between treated firms and control firms is done using two matching techniques.

i) Kernel Matching (KM): the Kernel method will use a weighted average of all control observations to match with treated observations, giving more weight to the control firms with propensity scores closer to the treated firms.

ii) Radius Matching: In this approach, treated firms are matched with control firms whose propensity scores are in a defined radius, therefore distant matches are not considered to enhance the accuracy of the comparison.

Model Specification

The Propensity Score Matching (PSM) technique was employed to assess the effects of firms' environmental accounting and reporting performance, or disclosure score, on their overall performance. The PSM is a quasi-experimental method used to evaluate intervention effects when subjects are not randomly assigned to treatment or control groups. Given the absence of baseline data on socioeconomic status, infrastructure structure, health, physical capital, land ownership, environmental concerns previous years in the study areas, PSM was preferred PSM over the difference-in-difference. PSM's flexibility justified its use, especially since other characteristics such as age, farm size, education, and marital status, which influence an individual`s decisions to adopt environmental activities, were not systematically examined, potentially biasing our estimates. Thus, a random simulation experiment was conducted to match respondents who did not adopt environmental risk reporting activities (control group) with those who did (treatment group). This enabled us to assess the effect of environmental accounting and reporting practices and to contrast the variations between the two groups. This study estimated PSM in three main steps. First, a probit model was used to predict respondents' likelihood of adopting ERD, formulated as follows (Equation [2]):

$$P(x_i) = Pr\ Pr\left[T = \frac{1}{x_i}\right] = \frac{exp\ (\beta x_i)}{1 + exp\ (\beta x_i)} \qquad [2]$$

Where, T is the treatment variable. If T=1, it indicates the respondent adopted EAR; T=0 indicates no such adoption. Xs are covariates such as liquidity, profitability, farm size, etc., that influence the its firm's decision to engage EAR.

The second phase of the analysis entailed comparing the anticipated values of the samples between the treatment and control groups. This matching procedure guaranteed that individuals in the treatment group were comparable to those in the control group regarding their likelihood of adopting EAR, thus reducing selection bias. Lastly, we conducted a matching analysis to estimate the

Average Treatment Effect on the Treated (ATT). ATT reflects the difference in EAR results between firms that implemented EAR and those that did not. The ATT can be expressed as Equation [3]:

$$ATT = E\left[Y_1^i - Y_1^0\right] = E[T = 1] = \ E[T = 1] - \ E[T = 0]ATT = E\left[Y_1^i - Y_1^0\right] = E[T = 1] = \ E[T = 1] - E[T = 0] \quad [3]$$

where, Y_1^i refers to the impact of EAR practice and Y_1^0 refers to the effect of EAR not practice. $E[T = 1]$ is the effect of firms in participation of EAR practice that is observable whereas, $E[T = 0]$ is the counterpart for those not participating (unobservable).

Thus, the difference between these groups represents the effect of practicing EAR and who did not practice on the firms' performance. This study considered firm performance, measured on a scale ROA and ROE, as the outcome variable. The dependent variable is whether respondents practice EAR or not. A schematic diagram of the study is shown below Figure 1.

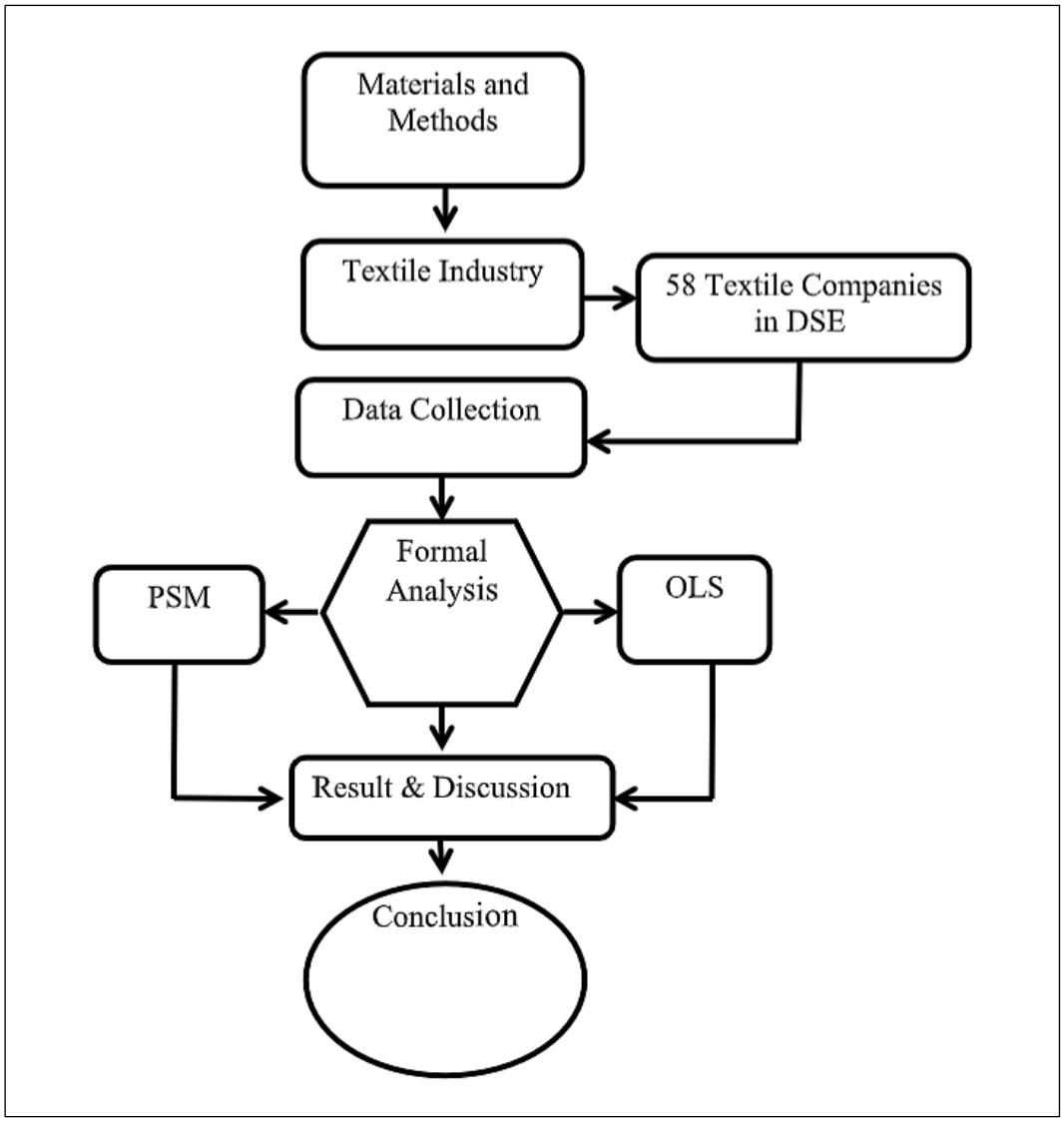

Figure 1: Schematic Diagram of the Study

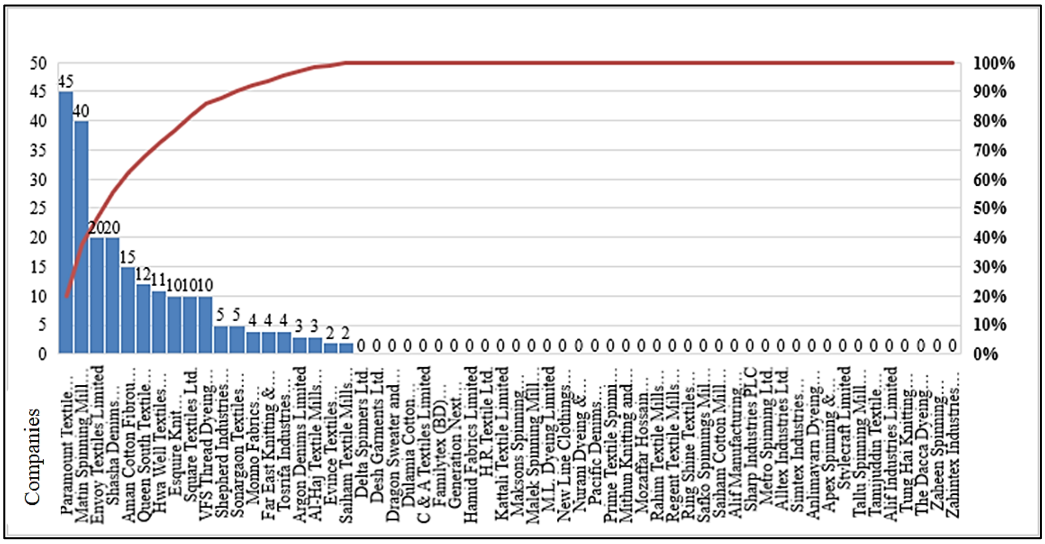

Figure 2: EAR Performance in the Textile Industry

Results

EAR Performance in Textile Industry

Figure 2 illustrates the EAR performance within the textile industry. Paramount Textile Ltd. has the highest reported value at 45, representing 75% of the indexed value. Matin Spinning Mills Ltd. ranks second, with a value of 40, attaining 66.7%. Several firms, such as Envoy Textiles Ltd. and Saiham Denim Ltd., reported values of 20 or above. Aman Cotton Fibrous Ltd. and Square Textiles Ltd. reported values ranging from 10 to 15. A significant number of enterprises reported zero, indicating either a lack of EAR reporting. The sector collectively fails to achieve the indexed value of 60, since the majority of enterprises exhibit little or no reporting. A substantial discrepancy exists in EAR performance within the textile industry.

Estimated Result of Correlation Matrix

Table 2 shows the Pearson correlation matrix which gives the correlation among Environmental Accounting and Reporting (EAR) and different corporate variables. A moderate negative relationship is discovered between EAR and FP (-0.424, $p < 0.01$), meaning that the firms, which make greater disclosure in environment, tend to exhibit lower performance. EAR is also negatively associated with Liquidity (-0.407, $p < 0.01$) and Leverage (-0.255, $p < 0.1$), this indicates that the companies with superior environmental disclosures would have a lower level of liquidity and consume less debt. Additionally, EAR has a significant negative association with Profitability (-0.343, $p < 0.01$) which suggests that the increase in environment complying and sustainable investment costs might decrease profitability. The matrix also indicates that FP is positively associated with Profitability (0.622, $p < 0.01$), Audit (0.312, $p < 0.05$), and Board Size (0.283, $p < 0.05$), which suggests that firms that are better performed firms are more profitable, better audited, and having larger boards. Liquidity is positively related to Firm Size (0.419, $p < 0.01$) but negatively associated with Board Size (-0.249, $p < 0.1$). Leverage is significantly and negatively associated with Independent Directors METRIX value (-0.534, $p < 0.01$) but positively related to both Profitability (0.655, $p < 0.01$) and Audit (0.648, $p < 0.01$). Findings are such the size of the board positively affects the profitability and negatively the liquidity, the higher detail on an audit and operation of an independent board have both a positive influence on the profitability and the leverage. In a nutshell, the matrix brings to fore the underlying intricate inter-relationships that shape corporate governance and sustainability behavior.

Table 2: Pearsons' Correlation Metrix

Variables	EAR	FP	Liquidity	IDerectors	Leverage	Firm Size	Board size	DRCEO	Profitability	Audit
EAR	1.000									
FP	-0.424***	1.000								
Liquidity	-0.407***	-0.087	1.000							
IDerectors	0.035	-0.080	0.163	1.000						
Leverage	-0.255*	0.223*	0.179	-0.534***	1.000					
Firm Size	0.093	-0.076	0.419***	-0.101	0.559***	1.000				
Board size	-0.032	0.283**	-0.249*	0.013	0.091	-0.192	1.000			
DRCEO	0.128	0.112	-0.202	0.054	-0.013	-0.094	0.034	1.000		
Profitability	-0.343***	0.622***	-0.022	-0.361***	0.655***	0.139	0.389***	-0.035	1.000	
Audit	-0.051	0.312**	-0.093	-0.573***	0.648***	0.214	0.071	0.169	0.547***	1.000

*** p<0.01, ** p<0.05, * p<0.1

Table 3: Estimated Result of Linear Regression

EAR	Coefficient	St.Err.	t-value	p-value	Sig
FP	-0.29	0.074	-3.94	00	***
Liquidity	-0.475	0.092	-5.17	00	***
IDerectors	-0.012	0.051	-0.24	0.809	
Leverage	-0.162	0.042	-3.82	00	***
Firm Size	0.073	0.014	5.18	00	***
Board size	0.01	0.009	1.16	0.251	
DRCEO	0.139	0.076	1.82	0.075	*
Profitability	-0.531	0.204	-2.60	0.012	**
Audit	0.723	0.206	3.52	0.001	***
Constant	2.895	0.994	2.91	0.005	***

Mean dependent var	3.653	SD dependent var	0.207
R-squared	0.657	Number of obs	58
F-test	10.199	Prob > F	0.000
Akaike crit. (AIC)	-61.004	Bayesian crit. (BIC)	-40.400

*** p<.01, ** p<.05, * p<.1

Estimated Result of Linear Regression

Table 3 presents results of a linear regression of EAR on financial and governance variables. The model accounts for 65.7% of the variance in the EAR with significant results (F-test: 10.199, p-value: 0.000). A number of financial aspects (FP, Liquidity, Leverage, and Profitability) are negatively correlated with EAR which could mean that financially healthier organisations prioritise short-term profits over long-term sustainability. Similarly, the effects of FP (coef: −0.29, p-value: 0.000), LIQT (coef: −0.475, p-value: 0.000), LEVR (coef: −0.162, p-value: 0.000), and PROF (coef: −0.531, p-value: 0.012) do not favor environmental practices. On the other hand, the coefficient of coefficient for Size (coef: 0.073, p-value: 0.000) and Audit practices (coef: 0.723, p-value: 0.001) are significantly positive with EAR, implying that large firms and firms with good audit mechanisms are more likely to be sustainable. The Dual Role of CEO (DRCEO) has a slightly positive impact (coef: 0.139, attributing value: 0.075), meaning a unique approach for the leadership can contribute to sustain it. In contrast, variables such as Independent Directors (coef: -0.012, p-value: 0.809) and Board Size (coef: 0.01, p-value: 0.251) are not significant determinants of environmental reporting. The paper provides evidence of the necessity of regulatory incentives for firms to incorporate sustainability into their strategies. The study underscores the influence of audits, firm size, and governance mechanisms to encourage environmental management activities, and posits that companies are forced to weigh short-term profitability against longer-term sustainability.

Figure 3 shows the PSM results applied to limit bias in observational studies. PSM calculates the probability of receiving treatment according to covariates, and pairs treated and untreated subjects using this probability. The X-axis denotes the propensity score, with higher values meaning higher propensity to be treated. The Y-axis represents the ratio of the treated and untreated. The plot distinguishes between "on support" (matched) and "off support" (unmatched) treated individuals, with the ones excluded from the analysis for bias purpose.

Figure 4 presents the propensity scores distribution for the treatment and control in an observational study. The X-axis is the propensity score (comprising treatment likelihood), and the Y-axis is the density of subjects for each score. There is an essential overlap between-groups for an efficient matching through matching on the Propensity Score (PS). If there's not much overlap, some people who received the treatment will have no matches in the untreated group, which could bias the analysis.

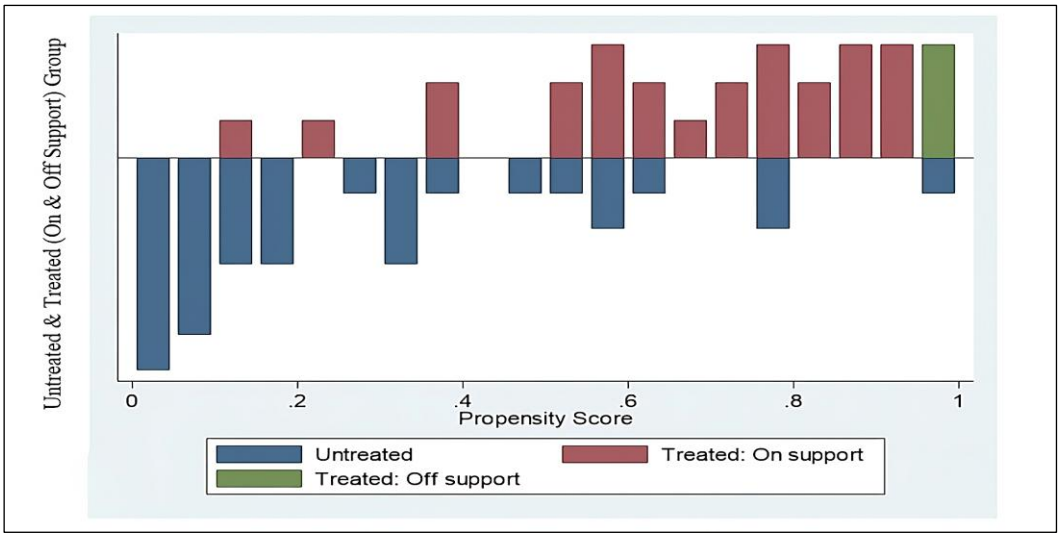

Figure 3: Results of Propensity Score Matching (PSM) (Karnel Marching Method)

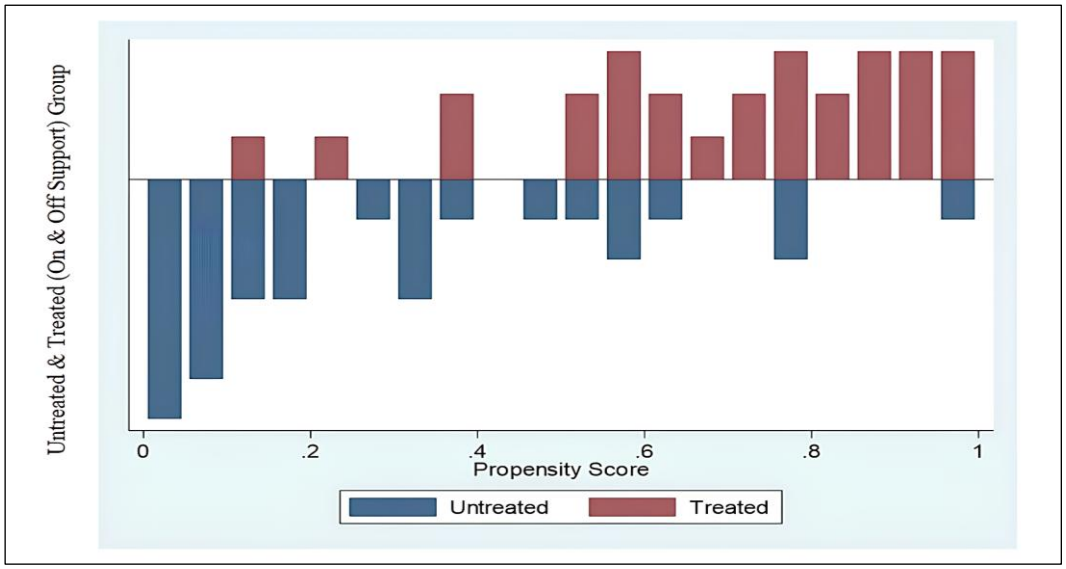

Figure 4: Results of Propensity Score Matching (PSM) (Radius Marching Method)

Table 4: Average Treatment Effect of Environmental Performance on Financial Performance

Variable name	Matching method	Treated Group	Control	ATT	Std. Err.	t value
ROE	Karnel	0.535	0.496	0.039 (1.07)	0.011	3.26**
	Radius	0.472	0.375	0.097 (1.25)	0.026	3.63**
ROA	Karnel	0.552	0.391	0.161 (1.41)	0.047	3.39**
	Radious	0.821	0.50	0.321(1.64)	0.054	5.90***

The Average Treatment Effect (ATT) of environmental performance on financial performance (ROE and ROA) codes as it is reported in Table 4, is illustrated by mean of both the Kernel and the RADIUS matching. For ROE, for Kernel Matching, Firms with Higher Environmental Performance have a 3.9 percentage point's higher ROE, and in Radius Matching, Firms with Higher Environmental Performance are 9.7 more percentage points higher on ROE. On ROA, Kernel Matching gives 16.1 percentage points more ROA and Radius Matching provides 32.1 percentage points more ROA. Both approaches expose a strong positive relationship between the environmental performance and the financial performance, with the impact being more distinct for ROA, particularly on Radius Matching. These findings indicate that companies who emphasize sustainability achieve noteworthy results in terms of financial performance, especially in asset efficiency. The results are in agreement with prior research thus confirming that environmental sustainability has a positive effect on financial performance.

Discussion

This study contributes to knowledge about the link between corporate financial actions, sustainability activities and EAR. The Pearson correlation matrix and regression analysis results demonstrate the impact of governance factors and EAR on the firm performance (FP), and financial conditions critically return on equity (ROE) and return on assets (ROA). A significant negative association between Environmental Reporting Disclosure (ERD) and FP indicates that environmental sustainability initiatives may lower short-run profit, as implied by prior studies associating CSR with higher costs (10, 27). ERD is also negatively related to liquidity and leverage, which means that companies with intense investments in sustainability will also have a decrease in their financial flexibility and would rely more on equity financing than on debt (11, 12, 28, 29). Reg-analysis also confirms that firms are less likely to invest in sustainability if they are financially sound (i.e. high FP, good liquidity, and low leverage) (supporting the trade-off hypothesis. Yet bigger companies and those with strong audit quality are likely to be drawn to the environmental sustainability based on their financial strength and stakeholder pressure (13, 30). The ATE (ATT) estimation methods (Kernel estimation and Radius matching) indicate that firms with better environmental performance have significantly higher returns on equity (3.9% to 9.7%) and assets (16.1% to 32.1%). Thereby, the findings of a bigger impact on ROA suggest that sustainable practices enhance the efficiency of assets and performance of operation (14, 15, 31, 32). This highlights the potential for environmental protection to bring about improved financial performance, firmer competitive edge and better long-term reputations among investors and customers (16, 17, 33, 34). The study underscores the importance of stringent environmental disclosure regulation, particularly for sectors like textile. Governments also need to implement mandatory reporting for investment and to provide incentives such as tax relief and grants to promote green investment (SDG 7, 13). In addition, by advancing sustainability-linked financing — in the form of green bonds, for instance — and incorporating ESG criteria into financial decision-making, companies can be nudged toward sustainable practices for the long term (SDG 12). Governments can also drive innovation through R&D into sustainable technologies and tie top executive pay to sustainability targets that promote environmental goals (SDG 13). Finally, businesses with international operations should adhere to international norms with regard to sustainability reporting and accounting, which will enable standardization of environmental and social impact reporting and performance, leading to transparency and accountability (SDG 16). These policies will facilitate the successful accomplishment of SDGs so that we leave a sustainable and just world economy for future generations.

Policy Recommendation

Some important recommendations can be made based on this study to improve Environmental Accounting and Reporting Practices (EARP) within the textile industry, especially in Bangladesh and other similar economic conditions across developing countries. Regulatory frameworks should first and foremost focus on enhancing compulsory reporting of sustainability information. The government must enforce rules that make it mandatory for companies to share their environmental practices based on international standards - like GRI. Such regulations would enshrine environmental accounting, ensuring greater transparency and comparability between firms as part of business as usual corporate governance. Financial incentives can also have a significant impact in stimulating environmental reporting, beyond that of regulation. The government should provide incentives in the form of tax incentives; grants or discounts to businesses that prove they are responsible steward of corporate reputation and operating with sustainability defining environ mental disclosures. Not only will such incentives prompt companies to use environmental accounting practices, they will also ensure that business objectives are tied to long-term sustainability and public health. Also, corporate governance reforms are necessary. The research established that there are significant relationships between variables such as firm size, CEO duality and audit quality on environmental disclosures. Accordingly, the promotion of better corporate governance, for example by promoting independent environmental audits and encouraging bigger companies to practice active

leadership to set a good model for smaller ones can have flow-on effects. The independence of audits and clear roles established for the corporate governance body can also enhance the conditions under which environmental reports are issued, thus reducing green washing bias. In addition, the development of capacity in the textile industry is the key to address some of the barriers found by this research: a shortage of well-trained personnel and low understanding in environmental accounting. Government and industry stakeholders should provide support and invest in training activities related to environmental management accounting (EMA) and best reporting practices. Such an education program presumably would be addressed to both the private-sector managers and public- sector regulators, increasing their ability to accurately assess and communicate environmental externalities. Again, stakeholder engagements are crucial to improving environmental accounting. Firms need to engage local stakeholders, workers and NGOs when they are preparing their environmental reports in order to provide more inclusive and transparent disclosures. This can in turn lead to more trust and cooperation between the parties -- helping ensure that issues of environmental concern are tackled as part of a bigger picture. Finally, the uptake of technology could be promoted to facilitate efficient and effective environmental reporting. Digital tools, like accounting software and block chain for traceability or AI for data management, can aid firms in gathering, managing and presenting environmental data more efficiently to ascertain real-time accuracy and ensure higher levels of transparency around sustainability efforts. The adoption of these recommendations would not only increase the level of environmental responsibility for the textile industry but also support that industry in reaching its general sustainability and financial performance objectives, thereby providing competitive advantages to firms while creating a more sustainable society for generations.

Conclusion

This study contributes to the growing literate in the context of EARP of the textile industries in Bangladesh. It finds that there is a significant lack of transparency with the majority of companies discussing their impact on the environment poorly, despite the industry having a big environmental footprint and being an important driver for social economic development. The results also provide evidence that corporate governance characteristics (company size, audit quality, and CEO duality) are significant determinants of environmental reporting. The profitability, liquidity and leverage also tend to be negatively related with the EARP implying that firms pay more attention to short-term financial goal at cost environmental sustainability. Yet the research also shows that companies with stronger environmental reporting end up performing better financially over time, as signaled by superior returns on equity and assets. This implies that stronger advances in environmental accounting practices may be profitable not only for the environment and public health, but also could enhance financial stability and competitive advantage in the long run. In that sense, the argument that adding sustainability to corporate strategy makes business sense is strengthened and the notion that responsible environmental actions generate superior financial results gains more traction. However, this study has several limitations despite the informative results provided. The sample is confined to the textile industry belonging to the list of the Dhaka Stock Exchange; hence it may not be fully representative of all textile industries in Bangladesh. In addition, this study is limited to quantitative analysis and does not include the qualitative side towards corporate attitudes or cultural obstacles that may affect ecological reporting. Subsequent research may consider extending the sample to other industries or regions, and adding a qualitative component (e.g., interviews and case studies) to provide more insight into why such obstacles exist for environmental accounting practices in emerging economies. Moreover, the use of secondary data from annual reports may introduce a bias in the reported environmental practices as companies might only report positive information. Future research might also consider the influence of consumer initiated behavior and demand from the market in shaping environmental reporting practices, and how recent regulations and global sustainability regimes may impact on this. To summarize, this research has highlighted the role of environmental accounting and reporting in promoting sustainable development. It is

important to strengthen regulatory frameworks and incentivize the private sector to integrate best practices into their businesses in a sustainable manner, over the long term. More studies in this direction will yield additional understandings of the efficacy of policy measures and corporate strategies to attain environmental and financial sustainability.

Abbreviations

DSE: Dhaka Stock Exchange, EARP: Environmental Accounting and Reporting, OLS: Ordinary Least Square, PSM: Propensity Score Matching.

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Author Contributions

Mohammad Main Uddin: investigation, conceptualization, formal analysis, methodology, resources, funding, writing original draft, revise manuscript, Md Sakib Khan: software, data curation, original and revise manuscript writing, Jesmin Ara: project management, writing paper, visualization, software, M Meherul Islam Khan: formal analysis, investigation, validation, Md Tazul Islam: project management, resources, conceptualization, methodology, Babor Ahmad: Visualization, Original and Revised Paper Writing.

Conflict of Interest

Authors have no conflict of interest.

Declaration of Artificial Intelligence (AI) Assistance

Authors declare that this paper maintains all the regulation regarding the AI use.

Ethics Approval

Not applicable.

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