

The Effect of ESG Disclosure on Firm Performance: Evidence from Pharmaceutical, Chemical and Textile Industries of Bangladesh

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This report is submitted to the school of Business and Economics, United International University as a partial requirement for the degree fulfilment of Bachelor of Business Administration

The Effect of ESG Disclosure on Firm Performance: Evidence from Pharmaceutical, Chemical and Textile Industries of Bangladesh

Submitted to

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Letter of transmittal

21st July, 2026

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Professor, School of Business & Economics

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Subject: Project report on “The Effect of ESG Disclosure on Firm Performance: Evidence from Pharmaceutical, Chemical and Textile Industries of Bangladesh”

Dear Sir,

You will be delighted to know that I have completed my report titled “The Effect of ESG Disclosure on Firm Performance: (Evidence from Pharmaceutical, Chemical and Textile Industries of Bangladesh)”. The objective of this report is to find the relation between ESG Disclosure and Firm Performance. The report is conducted based on extensive research on the pharmaceutical, chemical and textile industries of Bangladesh. The report provides and in-depth analysis and finding and draws conclusion on the relation between ESG Disclosure and Firm Performance in the pharmaceutical, chemical and textile sector of Bangladesh. I trust that this report will be valuable to researchers, representatives, and investors who are interested in the topic of ESG disclosure and its effect on firm performance.

I would like to express my gratitude to you for your guidance and support throughout the duration of this project. I am open to any feedback and recommendations you might have for me. Thank you for considering my submission.

Sincerely,

Tasnimul Hasan

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Declaration of The Student

I, Tasnimul Hasan, student of School of Business and Economics department of United International University, BBA in AIS program. Hereby declare that I have finished the project report on “The Effect of ESG Disclosure on Firm Performance: Evidence from Pharmaceutical, Chemical and Textile Industries of Bangladesh”.

I also state that this report has been solely prepared by me and for my educational requirement of BBA in AIS and it has not been previously published anywhere else for any purpose.

Tasnimul Hasan

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Acknowledgement

Firstly, I would like to show my gratitude to the Almighty Allah who kept me in good health and gave me the strength and capability to complete this project successfully. Then I would like to thank my honourable supervisor “Dr. Mohammad Tariq Hasan, Professor, School of Business & Economics, United International University” who helped me with his knowledge and skill to complete this project by providing the proper guidance and suggestions. Otherwise, it would have been very difficult for me to complete this project report properly.

Once again thank you very much, sir, for your contributions, support and guidance to make this project a success.

Sincerely,

Tasnimul Hasan

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Abstract

This research explores the impact of the practice of Environmental, Social, and Governance (ESG) disclosure on the financial performance of listed companies in the sector of Pharma, Chemical and Textile in Bangladesh. ESG disclosure is further measured using a custom unweighted binary scorecard with 33 indicators across the dimensions of environmental, social, and governance (ESG) based on a balanced sample of 105 firm-year observations drawn from 21 listed companies in the Dhaka Stock Exchange (DSE) for the 2021–2025 period. Financial performance is measured using Return on Assets (ROA) and control variables are firm size, leverage and revenue growth. ESG disclosure practices are well dispersed and differ significantly across the sample firms (mean score of 17.09/33), whilst the profitability too is well dispersed. The correlation and regression analyses indicate a positive relationship between ESG disclosure and ROA that is statistically significant, even when allowing for heteroskedasticity-consistent standard errors, meaning that companies with high ESG disclosure scores are more likely to have high ROAs. Leverage is also negatively and significantly associated with ROA, which reflects the higher financial risk of the debt-heavy capital structure while the firm size is positively associated with ROA. But once robust standard errors are used, revenue growth is not statistically significant. Such findings align with the Stakeholder and Legitimacy Theory which indicates that ESG disclosure is a value relevant signal for stakeholders even in an emerging market with weak enforcement like Bangladesh. The study also enriches the scarce empirical evidence on ESG performance relationship in environmental sensitive industries in Bangladesh and provides implications for industry stakeholders, regulators, investors and industry bodies that aim to have robust ESG reporting. Limitations such as sample size, survivorship effect and the binary nature of the disclosure scorecard are recognized and suggestions for future research employing richer panel methods and disclosure-quality measures are offered.

Keywords: ESG Disclosure; Firm Performance; Return on Assets; Corporate Governance; Dhaka Stock Exchange; Bangladesh

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List of Abbreviation

Abbreviation	Full Form
ESG	Environmental, Social, and Governance
ROA	Return on Assets
ROE	Return on Equity
LOGFSZ	Log of Firm Size (Natural Logarithm of Total Assets)
LEV	Leverage
GRW	Revenue Growth
FP	Financial Performance
DSE	Dhaka Stock Exchange
BSEC	Bangladesh Securities and Exchange Commission
TCFD	Task Force on Climate-related Financial Disclosures
GRI	Global Reporting Initiative
ISSB	International Sustainability Standards Board
WHO-GMP	World Health Organization – Good Manufacturing Practice
OLS	Ordinary Least Squares
VIF	Variance Inflation Factor
JB Test	Jarque-Bera Test
SE	Standard Error
H0	Null Hypothesis
H1	Alternative Hypothesis

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CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

There has been a major shift in paradigms from the small view of companies looking only at achieving wealth maximization by its shareholders, to a bigger view encompassing all stakeholder groups. Integrating ESG principles into business strategies and decision-making is key to driving this shift. Although the process started as largely voluntary measures for sustainability or PR has grown into a part of risk management, value creation and evaluation by investors. Today, institutional investors, regulators, and civil society are seeing strong ESG practices and disclosures as key to resilience, ethical behaviour and sustainable competitiveness not as a nice to have (Alam, Miraz, Ahmed, Hasan, & Qader, 2026; Dhar, Sarkar, & Ayttey, 2022). Internationally, rigorous ESG disclosure standards like the Task Force on Climate-related Financial Disclosures (TCFD), the Global Reporting Initiative (GRI), and the International Sustainability Standards Board (ISSB) have all strengthened the push for ESG disclosure efforts. Research in both developed and developing markets has investigated ESG performance/ESG disclosure in relation to a variety of performance measures such as firm value, profitability, and risk mitigation (Masum, Hasan, & Miraz, 2020; Zheng, Rashid, Siddik, Wei, & Hossain, 2022).

The discussion about corporate sustainability is gaining momentum in frontier and emerging markets like Bangladesh, as companies face economic development, regulatory changes and global connection. Bangladesh Securities and Exchange Commission (BSEC) and the Dhaka Stock Exchange (DSE), have adopted and revamped corporate governance codes and adopted sustainability reporting gradually, with the aim of fostering greater transparency and to attract foreign investment. All these are consistent with the overall broad national strategies for responsible industrialization and international sustainability standards (S. M. M. Islam, 2025; Masum et al., 2020). Among others, the Pharmaceutical and Chemical industries are relevant in terms of Bangladeshi context (Hasan, Molla, & Khan, 2019). These industries are considered economic engines and provide a good boot to export, employment and GDP. They are, however, also sensitive to the environment and

society. Pharmaceutical companies face challenging aspects of compliance with WHO-GMP and drug safety, while also having to address access to medicine challenges, and chemical companies have toxic effluents and hazardous waste management, carbon emissions and occupational health to worry about (Rahaman, Akter, Hossain, Chowdhury, & Wu, 2024). In fact, there are previous research works conducted in Bangladesh regarding environmental disclosures in these industries and their research revealed different scores among pollution, climate change etc (Dhar et al., 2022). Effective management and disclosure of ESG activities are therefore essential for these industries to remain compliant, build investor confidence, gain stakeholder trust and sustain their operations (Hasan et al., 2019; Hasan & Rahman, 2020).

1.2 The problem statement

While there is a growing understanding of the strategic relevance of ESG factors, empirical research on their financial consequences is limited, varies across contexts, and not always unequivocal, especially in the case of developing and frontier economies. In developed markets, the relationship between robust ESG practices and metrics, such as firm value or profitability, is more likely to be positive, but results in emerging markets are mixed, depending among other things on the degree of institutional limitations or enforcement gaps, as well as differences in the priorities of respective stakeholder groups (Aigbogun et al., 2025; Zheng et al., 2022).

However, in the peculiar context of Dhaka stock Exchange information asymmetry exist. While larger or more mature pharmaceutical and textile firms tend to have developed reports on sustainability or materiality, it is still unclear whether it can be said that more detailed and extensive disclosures necessarily lead to stronger financial results, such as ROA. International evidence suggests there are positive connections, but other studies indicate short-term effects are little or negative as a result of compliance costs. Furthermore, disclosing ESG is not necessarily indicative of its quality, materiality or strategic integration. Theoretical and empirical studies indicate that the financial benefit that can be gained by such disclosures is depending on

internal governance mechanisms (Hasan et al., 2019). However, the foregoing studies in Bangladesh have not often considered the dynamics quantitatively, particularly in the high impact sector such as pharmaceuticals, chemicals and textiles industry.

This addresses the existing gaps by examining the extent to which ESG disclosures are enough to exert influence on the performance of the firms in the context of Bangladesh or whether having a strong measurable board structure would be necessary to move the needle from non-financial statements towards financial statements. This study's emphasis on these sectors sheds light on a more nuanced perception of the role of ESG in corporate governance and sustainable development in emerging markets (Hasan, 2020; Hasan & Rahman, 2020; Rahaman et al., 2024).

1.3 Objectives of the Study

To empirically investigate the relationship between the absolute level of ESG disclosure and the financial performance of publicly listed Pharmaceutical, Chemical and Textile companies on the DSE.

1.4 Motivation of the Study

The need for this study comes from the growing need to connect the theoretical sustainability frameworks with financial results, in an emerging market. Literature on ESG dynamics for developed economies is far reaching, but studies on ESG dynamics in the context of Bangladesh are still in its formative days, especially in the context of high impact industries. Pharmaceutical, chemical and textile industries were targeted as being large scale economists and environmental, occupational risk generators. The delicate balance between profitability and strict ESG standards in these sectors in particular yields valuable insights for lawmakers in the process of developing future legislation and also investors looking for sustainable investment solutions.

1.5 Scope and limitations of the Study

This research's scope is conceptually delimited to explore the empirical effects of Environmental, Social, and Governance (ESG) disclosures on the corporate financial performance, under various sectoral, geographical, and temporal boundaries. Industry sector wise and geographical studies are limited to the Bangladesh regulated and environment sensitive Pharmaceuticals, Chemicals and Textiles industry sector which is exclusively listed in Dhaka Stock Exchange (DSE) in Bangladesh. The time period for the data is 5 years (between 2021 and 2025). A data-cleaning approach systematic rejected companies in the list that had missing values, companies whose operating status was not "operating" and companies whose information disclosed was not complete in order to provide econometric consistency and statistical reliability. The study is therefore based on a perfectly balanced sample of 21 companies that emitted 105 firm-year observations during five consecutive years where they have provided full disclosure of information. The primary independent variable is measured through content analysis of secondary, empirical data by applying a custom-made unweighted binary scorecard that includes 33 ESG disclosure indicators (S. M. M. Islam, 2025) directly taken from disclosure statements in the published annual reports and corporate compliance statements.

There are a number of caveats about interpreting the empirical results of this research. Firstly, because of how the incomplete or non-disclosing entities are deliberately removed to give a perfectly-balanced panel, there is a certain level of survivorship bias in the study and this may affect the transferability of the findings to non-listed firms or other different sectors on the DSE with a final sample of only 105 firm-year observations. Second, the use of a binary scorecard, based on disclosures being present or absent, goes to show that content analysis is primarily a quantitative method to measure the quantity and explicitness of ESG disclosures, but has little capability to measure the qualitative depth, strategic integrity and execution quality at a field level of corporate sustainability. Thirdly, the actual empirical findings are limited by the lack of transparency in corporate self-disclosure; there is high information asymmetry in frontier markets which means that firms could be engaging in

greenwashing, by emphasising positive ESG attributes and omitting any negative environmental or social externalities. Fourth, there may be some short-term, episodic changes involved in this conclusion since the time period of 2021-2025 represents a very specific macro-economic era in Bangladesh in which supply chains are being reset because of the post-pandemic era and reporting requirements have been tightened as a result of directives from the Bangladesh Securities and Exchange Commission (BSEC). Finally, the basic panel regression framework used in the analyses is still subject to the typical econometric problems: unobserved firm-specific heterogeneities as well as the risks of potential endogeneity or reverse causality arising because high-performance firms tend to have more capital to deploy and to disclose a wide range of ESG measures.

1.6 Definition of Key Terms

ESG Disclosure: The reporting of a company's Environmental, Social, and Governance-related practices and performance.

Stakeholder: Stakeholders are the individuals and groups of a business who have an impact on themselves if a business takes any decision or makes any changes.

Corporate Activities: Corporate activities are some of the different types of actions that businesses take to achieve its objectives.

CHAPTER TWO: REVIEW OF THE LITERATURE

2.1 Relevant Theory

ESG Disclosure is how much companies report on Environmental, Social and Governance (ESG) to their stakeholders, via annual reports, sustainability reports, and other disclosures or communications. ESG disclosure is seen as a tool that enables companies to either voluntarily or compulsorily disclose their non-financial performance which helps stakeholders to evaluate the effectiveness of the company in managing its environmental impact, social obligations and internal governance structures. ESG disclosure refers to the transparency of how a firm goes about reducing environmental degradation, advancing social equity and enforcing good and responsible governance, leading to trust and value creation for stakeholders. ESG disclosure has been thought to play a crucial role in establishing investor confidence, decreasing information asymmetry, and improving firm reputation and financial outcomes (Saroni, Hossain, & Sayaduzzaman, 2024).

The long-term survival of the firm is dependent upon satisfying a large number of stakeholders (employees, environmental agencies, local community, etc.) according to Stakeholder Theory (M. S. Islam, Rubel, & Hasan, 2023). In theory, more disclosure of ESG factors can lead to improved resource acquisition and brand loyalty, especially in the case of chemical and pharma companies. The theory of legitimacy explains the drivers for companies in environmentally sensitive industries to increasingly publicly reveal their ESG practices, as these disclosures are essential for them to maintain their legitimacy and contribute to the approval of relevant stakeholders, the life support of their companies (Adams, 2024).

The Pharmaceutical, Chemical and Textile industry in Bangladesh is a crucial sector for the economy and, being an environment-sensitive industry due to its production processes, as well as its direct impact on public health and safety, is important to explore for the context of ESG disclosure practice. These industries can meet concerns about pollution, workplace safety, product quality and corporate responsibility, and demonstrate responsible business practices to regulators, investors

and the broader community, all in the name of greater ESG disclosure, based on the stakeholder-driven social contract outlined above. Companies looking to disclose the impact of their business practices on the environment, social, and economic aspects of sustainability will find ESG disclosure to be a valuable asset. Thus, ESG disclosure can be considered a non-binding set of principles, which drives industries to take steps towards environmental sustainability, social responsibility, and good governance, and in doing so, affects their stakeholders' perception and performance in this globalized business landscape by providing transparency, enhanced resource access, brand affinity, and lowered risk exposure.

2.2 Literature Survey

As the demand for transparency and sustainable practices grows, Environmental, Social, and Governance (ESG) disclosure has become a substantial research field. In the context of Bangladesh, research on ESG disclosure is still in its infancy and lack even more in the pharmaceutical, chemical and textile sectors. Previous research has largely investigated the links between corporate disclosure and firm performance. For instance, A study (Khatun & Tabassum, 2021) concluded that higher mandatory disclosure positively impacts the performance measured in the form of ROA and ROE of the listed companies. Another study on the listed Banks of Bangladesh shows similar conclusion with the fact that disclosure is heavily driven by Bangladesh Bank's mandatory regulations, such as green banking and sustainable finance policies (Saroni et al., 2024). In Bangladesh's pharmaceutical and chemical industries, board size, board expertise, and audit committee size have shown a significant positive relationship with profitability (ROA and ROE). The presence of financial or accounting experts on the board reduces the likelihood of poor decision-making (Hasan et al., 2019). Also, the other studies reveals that there is a lack of environmental reporting and climate-related disclosures from Bangladesh firms which show that there is significant scope for enhancing the practice of sustainability reporting (M. S. Islam et al., 2023).

Although the literature on ESG disclosure has been growing (Adams, 2024; S. M. M. Islam, 2025; Saroni et al., 2024), but still the research gap exists. The complete effects of ESG disclosure on firm performance of both Bangladesh Pharmaceutical, Chemical

and Textiles Industries is a matter of concern. Thus, the purpose of this study is to fill this void and research the effects of ESG disclosures on firm performance based on the annual report and sustainability disclosures in the context of Bangladesh.

2.3 Hypothesis Development

ESG Disclosure and Green Accounting reporting in these industries is significantly influenced by firm-specific characteristics (size, category, risk management) and external factors (regulatory environment, global culture) rather than immediate organizational performance (Dhar et al., 2022; Rahaman et al., 2024). Stakeholder pressure also plays a positive role in encouraging these practices (Adams, 2024). Still, evidence from Bangladesh's pharmaceutical, chemical and textile industries shows that ESG disclosure, green-accounting and environmental-reporting practices remain uneven, with substantial scope for improvement (Rahaman et al., 2024). So, the findings are not conclusive. As a result, this study tests the following hypothesis:

- **H1:** There is a significant positive relationship between the ESG disclosure and firm financial performance (ROA)

CHAPTER THREE: RESEARCH METHODS

3.1 Research Design

This model investigates the direct impact of **ESG Disclosure** on firm performance metrics.

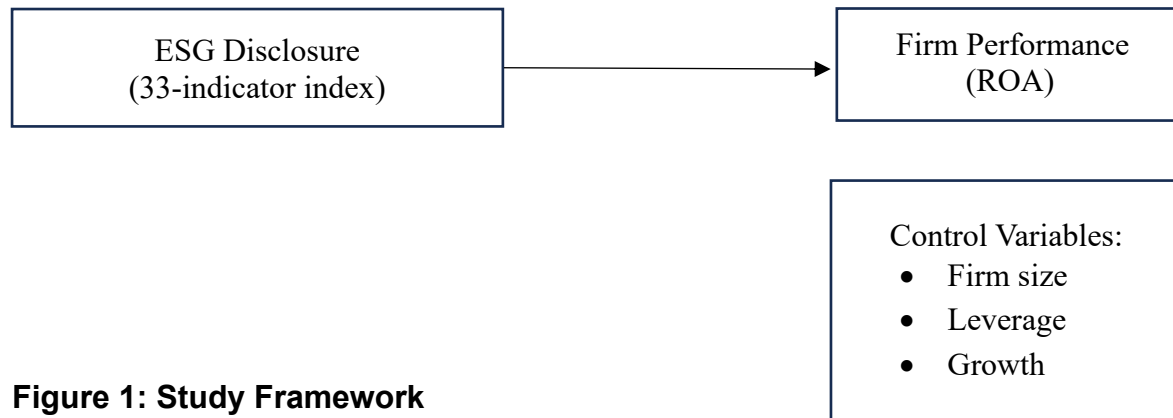


Figure 1: Study Framework

3.2 Sample and Population

The target population of this study are all publicly listed the companies in Pharmaceuticals & Chemicals (**34 companies**) and Textiles (**58 companies**) sectors of the Dhaka Stock Exchange (DSE) in total 92 companies. In order to assess the linkage between ESG disclosure and firm's performance, a purposive sampling was applied and a total panel sample of **21 listed companies** were observed for the consecutive fiscal years 2021–2025. The Bangladesh capital market is not yet mandated to include ESG and sustainability reporting, which means there is a huge disclosure gap among companies. The selection of companies reporting very detailed and verifiable disclosure information has been made through a strict multi-stage filtering process as follows:

Table 1: Selection Criteria and Filters

Selection Step / Filter	Criteria	Explanation & Justification
Mandatory ESG Data Availability	Continuous ESG/Sustainability disclosure (2021–2025)	Excludes firms that do not report non-financial ESG metrics or BSEC compliance details.
Financial Statement Continuity	5 consecutive years of audited annual reports	Ensures balanced panel data to calculate accounting and market-based financial performance measures without gaps.
Operational & Trading Status	Active trading status on DSE main board	Removes suspended, delisted, or distressed 'Z-category' firms to eliminate survivorship and default bias.
Final Sample Size	21 Companies	Represents the core panel of firms providing complete, verifiable, and balanced data for regression analysis.

3.3 Data Collection

The study is based on secondary data which was manually collected from the official and audited Annual Reports from the fiscal year 2021 till 2025. Quantifying ESG disclosure scores is achieved by extracting disclosures from stand-alone Sustainability Reports and Corporate Social Responsibility (CSR) sections of company disclosures and Annual Reports. Financial performance variables, such as Return on Assets (ROA), and firm-level control variables (e.g., firm size, leverage, firm age and sales growth) are calculated based on audited financial statements, independent auditors' reports, and the standard balance sheets/income statements of the sample companies.

Table 2: List of Sample Companies

Company Name	Established Year
ACI (Advanced Chemical Industries)	1973
ACIFORMULA (ACI Formulations Limited)	1995
ACMELAB (The ACME Laboratories Ltd.)	1954
MARICO (Marico Bangladesh Limited)	1999
ORIONPHARM (Orion Pharma Ltd.)	1965
RENATA (Renata Limited)	1972
SQURPHARMA (Square Pharmaceuticals PLC)	1958
ORIONINFU (Orion Infusion Ltd.)	1983
ADVENT (Advent Pharma Limited)	2007
AMBEEPHA (Ambee Pharmaceuticals PLC)	1976
IBNSINA (The Ibn Sina Pharmaceutical Industry PLC)	1983
BEACONPHAR (Beacon Pharmaceuticals PLC)	2001
JMISMDL (JMI Syringes & Medical Devices Ltd.)	1999
JHRML (JMI Hospital Requisite Manufacturing Ltd.)	2008
IBP (Indo-Bangla Pharmaceuticals Ltd.)	2014
SILVAPHL (Silva Pharmaceuticals Limited)	2001
ENVOYTEX (Envoy Textiles Limited)	2005
APEXSPINN (Apex Spinning & Knitting Mills Limited)	1991
SQUARETEXT (Square Textile PLC)	1997
HWAWELL (Hwa Well Textiles (BD) PLC)	2002
MATINSPINN (Matin Spinning Mills PLC)	2002

3.4 Research Model

To test the hypothesis across a five-year period (2021–2025), the below static panel data regression models will be used:

Equation 01: Regression Model

$$FP_{it} = \beta_0 + \beta_1 ESG_{it} + \beta_2 LOGFSZ_{it} + \beta_3 LEV_{it} + \beta_4 GRW_{it} + \epsilon_{it}$$

Where:

- FP_{it} represents the Financial Performance metrics (ROA_{it}) for firm i in year t .
- ESG_{it} represents the absolute counts from the 33-indicator binary scorecard.
- ϵ_{it} is the idiosyncratic error term.

3.5 Variable Definitions

To ensure the highest degree of statistical precision and to reflect structural corporate capacity accurately, this study heavily utilizes absolute values and raw counts, departing from traditional percentage-based metrics.

A. Independent Variable (IV)

- **Total ESG Disclosure (ESG):** Measured as an absolute count based on a 33-indicator binary scorecard (1 if disclosed, 0 otherwise). The score is the simple sum of the Environmental (E), Social (S), and Governance (G) parameters, yielding a maximum possible absolute score of 33. (Islam, 2025)

B. Dependent Variables (DV) – Financial Performance

- **Return on Assets (ROA):** Calculated as Net Income divided by Total Assets (expressed as a raw decimal, e.g., 0.166).

C. Control Variables

- **Firm Size (LOGFSZ):** The log number of Total Assets to determine the firm size
- **Leverage (LEV):** The ratio of Total Debt to Total Equity, controlling for capital structure and financial risk (expressed as a decimal).
- **Growth (GRW):** The year-over-year revenue growth rate, controlling for market expansion (expressed as a decimal).

Table 3: Variable Definition and Explanation

Variable Classification	Variable Name	Proxy	Empirical Measurement	Operational Measurement	Source
Independent Variable	ESG Disclosure	<i>ESG</i>	Unweighted binary score index computed across 33 parameters (0 to 33).		Annual Reports
Dependent Variables	Return on Assets	<i>ROA</i>	$\frac{\text{Net Profit After Tax}}{\text{Total Assets}}$		Financial Statements
Control Variables	Firm Size	<i>LOGFSZ</i>	Total Assets: $\ln(\text{Total Assets})$.		Balance Sheet

Variable Classification	Variable Name	Proxy	Empirical Measurement	Operational Measurement	Source
	Leverage	<i>LEV</i>	Total Debt divided by Total Equity ($\frac{\text{Total Debt}}{\text{Total Equity}}$).		Balance Sheet
	Revenue Growth	<i>GRW</i>	$\frac{\text{Revenue}_t - \text{Revenue}_{t-1}}{\text{Revenue}_{t-1}}$		Income Statement

3.6 Data Analysis Plan

This part presents a systematically sequence of analysis used to examine the relationship between e and the financial performance of the firm, which was tested using the hypothesis. Analyses are done in five steps: descriptive analysis, correlation analysis, multicollinearity analysis, normality test and regression estimation.

Stage 1: Descriptive Statistics

The descriptive values, including the mean, maximum, minimum and standard deviation, of all variables of the study (ESG disclosure score, ROA, LOGFSZ, LEV and GRW) are computed for the firm-year observations (105 in total). This stage defines the central tendency and dispersion of the panel and determine how much variation in the ESG disclosures and financial performance exists in the sampled firms.

Stage 2: Correlation Analysis

A Pearson correlation matrix is set up to investigate bivariate relationships between the independent variable (ESG) and the dependent variable (ROA), as well as between the dependent variable (ROA) and control variables (LOGFSZ, LEV, GRW). This step offers an initial indication of the direction and strength of association between ESG disclosure and firm performance before multivariate testing and is a preliminary test to check for possible multicollinearity between the explanatory variables (Hasan, Hossain, Rekabder, Molla, & Ashif, 2022; Hasan et al., 2019; Hasan, Rekabder, Hasan, & Kuri, 2023; Molla, Hasan, Miraz, Azim, & Hossain, 2021).

Stage 3: Multicollinearity Diagnostics

Multicollinearity, not evident in the correlation matrix, is formally tested by computing the Variance Inflation Factor (VIF) for each independent and control variable. The mean VIF and individual VIF values are compared to the traditional values of 5 and 10: VIF values below these indicate that the regression estimates are not distorted by shared variance among the predictors.

Stage 4: Normality Testing

The Jarque–Bera (JB) test is used to determine if the residuals of the baseline regression model are normally distributed: H0: residuals are normally distributed vs. H1: residuals are not normally distributed. In this particular instance, with the panel being relatively small ($n = 105$), the decision about conducting this test has implications for the type of inferential procedure to use — in particular, whether to use heteroskedasticity-robust standard errors in addition to the conventional OLS estimates (Hasan, 2020; Hasan et al., 2022; Hasan & Rahman, 2020; Hasan et al., 2023; Molla et al., 2021).

Stage 5: Regression Estimation

In order to test the core hypothesis (H1), a static Ordinary Least Squares (OLS) panel regression model is used and specified as:

$$FP_{it} = \beta_0 + \beta_1 ESG_{it} + \beta_2 LOGFSZ_{it} + \beta_3 LEV_{it} + \beta_4 GRW_{it} + \varepsilon_{it} \quad Eq.01$$

where firm performance (ROA) is regressed against the ESG disclosure score with controlling factors being firm size (LOGFSZ), leverage (LEV) and revenue growth (GRW). Conventional OLS standard errors and heteroskedasticity-robust standard errors are displayed and compared so that one can evaluate whether the significance of each coefficient (including that of ESG) remains when applying an inference procedure that is less sensitive to the possibility of non-constant error variance. Model's fit based on R², adjusted R² and overall F-statistic, individual coefficient's significance by conventional levels (0.01, 0.05 and 0.10).

CHAPTER FOUR: RESEARCH FINDINGS & ANALYSIS

4.1 Descriptive Analysis

Table 3 shows descriptive statistics for the variables in this study. A total of 105 firm-year observations is analysed from 21 companies from the period 2021 to 2025. The average ESG disclosure score is 17.09 out of 33 possible, meaning that on average, the sampled companies disclosed 51.8% of the ESG disclosure indicators under study. But, the ESG disclosure score has a minimum of 4, maximum of 30, and standard deviation of 7.50. This significant variation implies there is a significant difference in the ESG disclosure practices of the sample companies. The average value of Return on Assets (ROA) is 0.0666 or around 6.66%, which means that the companies earned approximately 6.66% on their total assets. ROA is between -0.0590 and 0.5365 which shows the variation in the profitability of the sample. The standard deviation of 0.0915 indicates substantial variation in profitability among the sampled firms.

Table 4: Descriptive Analysis of the Variables

Variable	Obs.	Mean	Std. Dev.	Minimum	Maximum
LEV	105	0.5371	0.6002	0.0000	2.6257
GRW	105	0.0739	0.1892	-0.6531	0.8286
LOGFSZ	105	9.8812	0.6421	8.6247	11.0897
ESG	105	17.0857	7.4963	4	30
ROA	105	0.0666	0.0915	-0.0590	0.5365

The leverage ratio average is 0.5371, which means that the total debts were around 53.71% on average of the total equity. But the highest leverage ratio obtained, 2.6257, indicates that some of these companies were heavily dependent on debt financing. The average value of revenue growth is 0.0739, representing an average annual year-over-year revenue growth rate of approximately 7.39% across the firm-year observations. However, minimum growth rate is -0.6531 and the maximum growth rate is 0.8286, which shows enough variation in the revenue performance of the firms. The firm size which is the natural log of the total assets has an average of 9.8812 and standard deviation equal to 0.6421. The overall descriptive statistics show that the sampled companies exhibit significant differences in ESG disclosure, profitability, leverage and revenue growth. This difference offers an adequate foundation to

consider the hypothesis that there is an association between ESG disclosure and firm performance, given the control of firm size, leverage, and revenue growth.

4.2 Correlation Matrix

Table 5: Correlation Matrix of the Variables

Variable	ROA	ESG	LOGFSZ	GRW	LEV
ROA	1.0000				
ESG	0.2305**	1.0000			
LOGFSZ	0.1760*	0.5099***	1.0000		
GRW	0.1760*	0.1567	0.2721***	1.0000	
LEV	-0.2954***	0.3428***	0.4436***	0.1750*	1.0000

(*** p < 0.01, ** p < 0.05, * p < 0.10. The correlation coefficients are based on the 105 firm year observations in the study)

Correlation analysis showed that Return on Assets (ROA) is positively and statistically significantly correlated with ESG disclosure ($r = 0.2305$, significant at 5%) which means that better ESG scores are associated with higher profitability, ROA is also positively correlated with firm size (LOGFSZ, $r = 0.1760$, significant at 10%) as well as with revenue growth (GRW, $r = 0.1760$, significant at 10%), and negatively and more strongly with leverage (LEV, $r = -0.2954$, significant at 1%) which suggests that companies with more debt are less profitable. Among independent variables, ESG has a moderate positive correlation with firm size ($r = 0.5099$, significant at 1%) and leverage ($r = 0.3428$, significant at 1%), firm size has a positive correlation with revenue growth ($r = 0.2721$, significant at 1%) and leverage ($r = 0.4436$, significant at 1%), and revenue growth has a weaker positive correlation with leverage ($r = 0.1750$, significant at 10%), whereas the correlation between ESG and growth is insignificant ($r = 0.1567$). Some of these inter-variable correlations are moderate and statistically significant (e.g., between ESG and firm size, and between firm size and leverage), but none of the correlation coefficients are close to the conventional threshold of 0.80 or 0.90 that would suggest a serious multicollinearity problem; therefore, the correlation matrix alone raises only a mild concern for the potential multicollinearity problem. This concern is then addressed by the VIF results with each individual VIF of 1.58 (firm size), 1.38 (ESG), 1.28 (leverage), and 1.08 (growth) below the commonly used VIF thresholds of 5 and 10, and the mean VIF of 1.33 also indicating that the predictors are not moving together in a manner that would confuse the estimates in the

regression. Taken together, the correlation matrix and the VIF values provide complementary evidence, the moderate correlations represent which pairs of variables might share some common variation, and the low VIFs confirm that this shared variation is not enough to increase the standard errors of the coefficients or reduce the stability of the coefficient estimates, so the VIF results suggest that serious multicollinearity is unlikely to pose a significant threat to the stability of the regression coefficient estimates.

Table 6: VIF (Variance Inflation Factor)

Variable	VIF	1/VIF
LOGFSZ	1.58	0.633025
ESG	1.38	0.722955
LEV	1.28	0.781987
GRW	1.08	0.922170
Mean VIF	1.33	

4.3 Normality Test

Table 7: Normal Distribution Test and Outcome

Test	Test Statistic	Degrees of Freedom	p-value	Decision
Jarque-Bera Test	887.8	2	2.0×10^{-193}	Reject H_0

The Jarque-Bera (JB) test was performed to evaluate the normality of residuals of the regression model (ROA on ESG, LOGFSZ, GRW, LEV) listing in table 6. By checking the skewness and kurtosis of the distribution of residuals, the test tests the following hypotheses: H_0 : The residuals are normally distributed versus H_1 : The residuals are not normally distributed. The results provide a Jarque-Bera test statistic of 887.8 that is compared with the chi-square distribution (χ^2) with 2 degrees of freedom and a p-value of 2×10^{-193} . This p-value is much smaller than both commonly used levels of significance ($\alpha = 0.05$ and $\alpha = 0.01$), thus it is a strong rejection of the null hypothesis

of normality, and the residuals are significantly non-normally distributed as is visually apparent in the residual density plot.

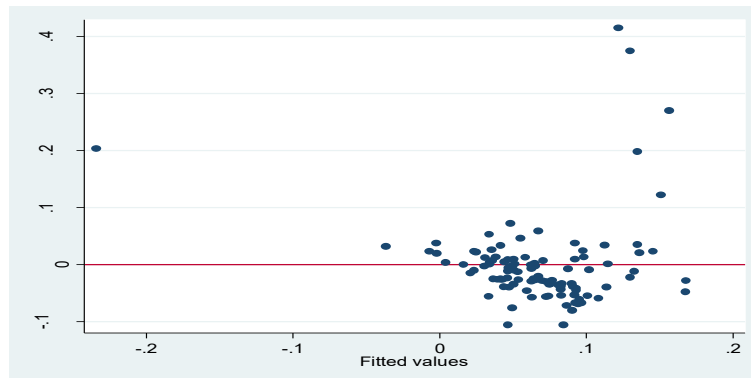
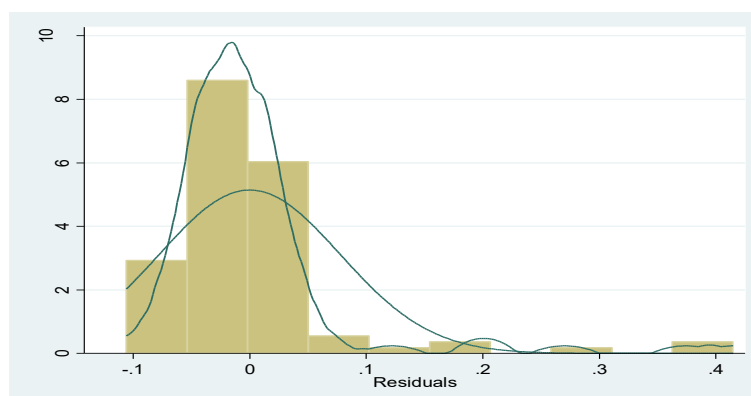


Figure 2: Plot of the residuals

However, this departure from normality is not a problem for the regression results as the Central Limit Theorem predicts that the coefficient estimates would be approximately normally distributed with a larger sample size and the JB test has been shown to have high statistical power to detect even a very slight deviation from the notion of perfect normality for a sample size of 105 observations. Consequently, although non-normal residuals warrant caution in interpreting conventional small-sample t- and F-statistics, the use of heteroskedasticity-robust standard errors in the following regression analysis provides inference that is less sensitive to heteroskedasticity. However, robust standard errors do not directly correct for non-normality, and the regression results should therefore be interpreted with appropriate caution.



(Note: bin=10, start=-.10575648, width=.0520376)

Figure 3: Normal Distribution of Residuals

4.4 Regression Model Analysis

Table 8: Results of Regression Model

Variable	Coef.	OLS SE	OLS t	OLS p	Robust SE	Robust t	Robust p
ESG	0.0033	0.0012	2.68	0.009***	0.0015	2.23	0.028**
LOGFSZ	0.0319	0.0152	2.10	0.038**	0.0116	2.74	0.007***
GRW	0.0790	0.0427	1.85	0.067*	0.0496	1.59	0.114
LEV	-0.0785	0.0146	-5.37	0.000***	0.0245	-3.20	0.002***
Constant	-0.2678	0.1397	-1.92	0.058*	0.1116	-2.40	0.018**

(Note: *** p<0.01, ** p<0.05, * p<0.10)

The conventional OLS regression model is jointly significant, with an R^2 of 0.2818, an adjusted R^2 of 0.2531, and an F-statistic of $F(4,100) = 9.81$ (Prob > F = 0.000), indicating that the four predictors collectively explain approximately 28% of the variation in ROA. This explanatory power is comparable in direction to, though lower in magnitude than, similar Bangladeshi disclosure performance models such as (Rahaman et al., 2024), who reported an R^2 of 0.54 for pharmaceutical firms.

ESG Disclosure is positively and statistically significant for **Firm Performance** (ROA) (OLS coefficient 0.0033, $p = 0.009$, significance level 0.01; the coefficient remains 0.0033 when heteroskedasticity-robust standard errors are used, while the corresponding robust p-value is 0.028 with significance level 0.05), meaning that when ESG scores (based on the 33 indicators (S. M. M. Islam, 2025)) increase by one point, firm performance (ROA) increases by 0.33 percentage points holding other variables constant consistent with the positive correlation ($r = 0.2305$) earlier and supports the hypothesis that higher level of ESG disclosure associates with better financial performance. This result is consistent with prior Bangladeshi evidence linking disclosure to profitability, including (Khatun & Tabassum, 2021) in the pharmaceutical and chemical sector, (Zheng et al., 2022) in the banking industry, and (S. M. M. Islam, 2025), who found ESG disclosure positively associated with firm value even after 2SLS and propensity-score-matching robustness checks.

The results are also positive and significant ($p = 0.038$ OLS with significance level 0.05, $p = 0.007$ robust with significance level 0.01) for firm size (LOGFSZ), implying

that larger firms tend to be more profitable, perhaps because of scale advantages and access to capital. This mirrors findings in Bangladesh's pharmaceutical sector by (Khatun & Tabassum, 2021), although another study (Hasan et al., 2019) found the opposite, a significant negative relationship between firm size and ROE in the same industry, suggesting the size–profitability link is not fully settled in this context. Leverage (LEV) is negative and highly significant for both models ($p < 0.01$, significance level 0.01), confirming that higher leverage is associated with lower ROA because of increased financial risk and financial burden. This negative leverage effect is consistent with (Khatun & Tabassum, 2021) and (Zheng et al., 2022), both of whom reported that higher debt levels reduce profitability among Bangladeshi listed firms. However, the coefficient on revenue growth (GRW) is marginally significant under conventional OLS inference ($p = 0.067$ with significance level 0.10) but becomes statistically insignificant when heteroskedasticity-robust standard errors are used ($p = 0.114$ greater than significance level .10), indicating that the statistical significance of the OLS estimate is not robust to the alternative inference procedure. A similarly unstable or insignificant findings documented in previous studies also (Adams, 2024; Khatun & Tabassum, 2021).

The positive and statistically significant relationship between **ESG disclosure** and **Firm Performance** (ROA) remains after using heteroskedasticity-robust standard errors, providing evidence that the main ESG finding is not sensitive to this alternative inference procedure. This pattern of robustness aligns with (S. M. M. Islam, 2025), whose ESG–firm value relationship persisted under 2SLS and propensity-score matching, and with (Zheng et al., 2022), whose CSR–productivity link held after 2SLS and GMM correction. However, the results should not be interpreted as resolving all potential econometric concerns, including non-normality, unobserved firm-specific effects, and possible endogeneity, concerns that (Zheng et al., 2022) addressed directly through Durbin–Wu–Hausman testing and 2SLS/GMM estimation, and that (Hasan et al., 2023) addressed via the Ramsey RESET test in a comparable Bangladeshi panel techniques that future extensions of this study could adopt.

CHAPTER FIVE: DISCUSSION

5.1 Conclusion

The current study aimed to analyse the connection between ESG disclosure and firm performance of the listed Pharmaceutical, Chemical and Textile companies in Bangladesh, covering 105 firm-year observations in the period of 2021-2025. The results show that the hypothesis stated that there is a positive relationship between ESG disclosure and Return on Assets (ROA) is accepted, thus it is statistically proven that there is a positive relationship between the two. The strong results of regression analysis also highlight the positive impact of ESG disclosure, and firm size also exhibits a positive correlation with ROA, and leverage has a significant negative correlation. But, when robust standard errors are used, there is no statistically significant relationship between revenue growth and firm performance. It could be concluded that, while ESG disclosure might lead to improved profitability and transparency in the pharmaceutical, chemical, and textile sectors in Bangladesh, this conclusion should be interpreted with caution because of the limited sample size, the use of an unweighted disclosure scorecard, and the lack of unobserved factors and reverse causality.

5.2 Recommendations

The empirical results suggest that the companies should consider ESG disclosure as a value adding practice, as the disclosure can be improved in terms of completeness and quality by the companies of Pharmaceutical, Chemical and Textile sector in Bangladesh. Regulators, including BSEC and DSE, should set more harmonised and step by step mandatory disclosure requirements that converge with international standards and investors should take the ESG disclosure as another measure of firm performance, in addition to classic financial metrics, but not as a measure of the quality of sustainability. Industry associations should also help smaller companies by establishing sector-specific reporting standards and providing technical training to minimize the wide gap between companies in ESG reporting.

5.3 Scope for Future Study

Future studies should increase sample sizes, both within and beyond the companies, industries and timeframe, in order to enhance generalizability. Individual dimensions of ESG should be compared with other performance measures, including Tobin's Q, ROE, and EPS, with the inclusion of robust panel data methods (fixed and/or random effects, and/or instrumental variables) to address issues of heterogeneity and reverse causality. Finally, qualitative governance factors and independent ratings will help to differentiate between disclosure quality and real sustainability performance.

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Appendix

Detailed Breakdown of the 33 Indicators Scorecard (S. M. M. Islam, 2025)

the 33 indicators are categorized under specific sub-dimensions within each pillar:

1. Environmental Disclosures (Indicators 1–11)

This pillar measures how transparently a firm reports its ecological footprint, resource efficiency, and regulatory compliance.

- **Environmental Policy and Strategy**
 - 1. Clear policy statements on environmental protection and sustainability.
 - 2. Alignment of environmental strategy with national and international standards.
- **Climate Change and Energy Use**
 - 3. Carbon emissions reporting across Scope 1, Scope 2, and Scope 3.
 - 4. Active measures for energy efficiency and the utilization of renewable energy.
 - 5. Disclosures identifying the strategic impact of climate change on business operations.
- **Waste and Water Management**
 - 6. Waste reduction, recycling, and responsible disposal strategies.
 - 7. Water usage tracking and conservation initiatives.
- **Biodiversity and Land Use**
 - 8. Documented efforts to preserve local biodiversity in active operational areas.
 - 9. Sustainable land use practices and corporate reforestation programs.
- **Environmental Compliance**

- 10. Formal compliance status with domestic and international environmental regulations.
- 11. Transparent disclosure of any penalties, fines, or ongoing litigation stemming from environmental breaches.

2. Social Disclosures (Indicators 12–21)

This dimension tracks corporate relationships with employees, supply chains, customers, and regional communities.

- **Human Rights and Labor Practices**

- 12. Established policies regarding human rights and adherence to fair labor practices.
- 13. Preventative corporate measures to mitigate forced and child labor within internal operations and the wider supply chain.

- **Diversity, Equity, and Inclusion (DEI)**

- 14. Workforce diversity metrics, explicitly reporting on gender, age, and ethnicity.
- 15. Dedicated inclusion and support programs for underrepresented groups.

- **Employee Health, Safety, and Well-being**

- 16. Occupational health and safety (OHS) management systems and safe workplace initiatives.
- 17. Mental health resources and wellness programs structured for employees.

- **Community Engagement and Development**

- 18. Explicit corporate financial contributions or programs supporting community development, such as healthcare and education.
- 19. Formally established partnerships with local community stakeholders.

- **Customer Relations and Product Responsibility**

- 20. Reporting on product safety guidelines, quality assurances, and product design innovation.
- 21. Customer satisfaction monitoring and structured feedback loop mechanisms.

3. Governance Disclosures (Indicators 22–33)

This pillar evaluates the systemic internal checks, leadership balance, ethics, and investor protections guiding a corporation.

- **Board Structure and Independence**

- 22. Detailed composition of the board, tracking the presence and ratio of independent directors.
- 23. Demographic and skill diversity within board composition.

- **Executive and Board Compensation**

- 24. Transparent disclosure of remuneration policies guiding board members and top executives.
- 25. Granular disclosure of corporate compensation structures, target conditions, and bonuses.

- **Shareholder Rights and Transparency**

- 26. Equitable voting rights protections and active shareholder engagement practices.
- 27. Dedicated administrative mechanisms ensuring symmetric and transparent shareholder communication.

- **Audit Committee and Risk Management**

- 28. Documenting the formal oversight role the audit committee maintains over ESG-related risks and reporting.
- 29. Explicit structural disclosure of strategic corporate risk management operations tied directly to ESG threats.

- **Ethical Conduct and Anti-corruption**

- 30. Publication of the corporate formal code of conduct.
- 31. Enforcement of anti-bribery and anti-corruption compliance policies and practices.

- **Data Privacy and Cybersecurity**

- 32. Concrete operational measures deployed to guarantee data protection and client/employee privacy.
- 33. Strategic cybersecurity initiatives, infrastructure investments, and disaster response plans.