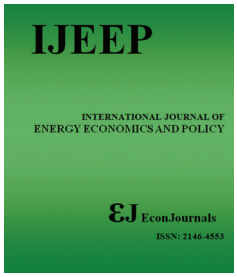

International Journal of Energy Economics and Policy

ISSN: 2146-4553

available at http: www.econjournals.com

International Journal of Energy Economics and Policy, 2026, 16(1), 8-21.

The Slack Factor: Resources Influencing Carbon Transparency

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Received: 02 June 2025 **Accepted:** 07 October 2025 **DOI:** https://doi.org/10.32479/ijeep.20880

ABSTRACT

This study examines the impact of slack resources—financial slack, human resource slack, and R&D intensity—on carbon emission disclosure (CDI) among top-listed firms in Bangladesh and India. It explores how both local and global resource availability influences carbon-related disclosure practices in emerging markets. Using data from 150 firms over the period 2019-2021, the study employs descriptive analysis, correlation, and ordinary least squares (OLS) regression models to assess these relationships. A content analysis approach was adopted, utilizing a non-weighted (binary) index to evaluate corporate sustainability and annual reports. The findings reveal a significant positive association between R&D intensity and CDI, suggesting that firms investing in R&D are more likely to disclose carbon emissions. Conversely, financial and HR slack exhibit a negative relationship with CDI, indicating that firms with surplus resources may prioritize other strategic objectives over carbon disclosure. These results highlight the critical role of strategic resource allocation in shaping environmental disclosure, particularly in regulatory environments with weaker enforcement. By contributing to the limited literature on slack resources and environmental transparency in emerging economies, this study provides valuable insights for policymakers and businesses. It underscores the need for stronger regulatory frameworks and incentives to encourage firms to integrate sustainability into their corporate strategies.

Keywords: Carbon Emission Disclosures, Financial Slack, HR Slack, Research and Development Intensity, Carbon Emission
JEL Classifications: G32, M14, Q56

1. INTRODUCTION

In the last few years, organizations have been becoming increasingly more transparent with regard to their environmental credentials or issues such as preserving forests, protecting the ozone layer, climate change, management of water and energy, conservation of natural resources, and protecting biodiversity (Harte and Owen, 1991; Gamble et al., 1995; Patten, 2002; Cormier and Magnan, 2003; Prado-Lorenzo et al., 2009). Greenhouse gas (GHG) emissions, especially CO_2, are widely considered the major contributors to global warming and climate change, which increase world temperatures. To counter the excessive GHG emissions, the Kyoto Protocol was signed in 1997, ratified under the United Nations Framework Convention on Climate Change, and redistributed the climate costs, creating a burden on developing nations. For decades, Climate Change has become one of the most important issues, with extreme consequences such as increased surface temperature, melting polar ice caps, rise in sea levels, extreme weather, etc. NASA found that 2015 was the warmest year on record — since 1880. Thus, the reporting of GHG emissions and their effects is an essential part of environmental reporting. Moorhead and Nixon (2015) identify that large corporations account for more than 10% of global carbon emissions (which are rising annually by 1%). In the last ten years, there has been much investigation into the area of environmental reporting and carbon emission disclosures, with works such as those of Akrout and Othman (2013), Chithambo and Tauringana (2014), Bai Choi et al., (2013), Liao et al., (2015) and Rankin et al., (2011) dealing with determinants around carbon disclosure. Both internal pressures (consideration of organizational strategies) and external

pressures (stakeholder-oriented expectations) have redefined roles in the sphere of voluntary disclosures (Zheng et al., 2014). Carbon disclosure is resource-intensive and costly, although it is voluntary. Slack resources, which are defined as surplus resources within an organization, can drive these practices. Financial slack boosts innovation and operational output (Lewis and Karoly 2013) According to Kock et al., (2012), social and environmental Flag (e.g., carbon disclosure) initiatives require expenditure, which may be funded by financial slack. Reporting carbon-related information will allow companies to identify key areas of emission, reduce climate change risk, and provide accountability to stakeholders. Additionally, carbon transparency fosters benchmarking with industry counterparts, gaining environmentally aware customers, and enhancing brand reputation. Prior studies on carbon disclosure practices primarily relate to developed economies and investigate relationships with size, profitability, leverage, and other traditional variables (Prado-Lorenzo et al., 2009; Chithambo and Tauringana, 2014; Gonzalez-Gonzalez and Ramírez, 2016).

The literature so far has an extensive inquiry into drivers of corporate carbon emission disclosure practices, particularly in developed countries with established regulatory frameworks and high environmental awareness. Previous studies highlight the importance of firm characteristics (e.g., size, profitability, and leverage) in determining disclosure (Prado-Lorenzo et al., 2009; Chithambo and Tauringana, 2014; Gonzalez-Gonzalez and Ramirez, 2016). Other studies investigated how financial slack affects a firm's potential to pursue sustainability-related engagements, contending that firms with a financial cushion have an additional capacity, and thereby are more likely to participate in voluntary environmental disclosures (Lewis and Karoly 2013; Kock et al., 2012). Nevertheless, the existing findings primarily stem from developed economies where institutional and stakeholder pressures are established and potent, highlighting a critical gap in our understanding of how firms based in emerging economies react to calls for the disclosure of carbon emissions. Emerging economies with their constraints on regulatory enforcement, limited resources, and competing development agendas are particularly underexplored in terms of carbon transparency. In particular, little is known about the effects of financial slack, human resource slack, and research and development (R&D) intensity on corporate carbon disclosure practices in these markets. As a result, there is a gap in knowledge regarding the mechanisms through which organizational characteristics and strategic priorities interact to shape carbon emission reporting practices. In summary, studies do not explore how financial, human, and innovation–related resources jointly affect disclosure practices. Thus far a very surface level compilation of consequences without exploration of causality is available in literature which ignores important contexts leading to those consequences and hence triggering a gap. The research aims to provide new perspectives in understanding resource allocation practices by firms in emerging economies for environmental disclosures and the trade-offs involved in balancing the priorities of stakeholders and the day-to-day running of businesses.

This paper attempts to evaluate the association between Carbon emission Disclosing practices variable and slack resources of companies in Bangladesh & India. Furthermore, this paper contributes to accomplishing a conclusive idea between the two. The primary objective of the research is to know whether there is any relationship between the slack resources of Bangladeshi and Indian top-listed firms and carbon emission disclosure practices. Most of the Bangladeshi and Indian industries a major contributor to GHG emissions. Bangladesh's top 100 and India's top 50 companies have been selected based on market capitalization because of the most carbon-emitting companies. As a result, this study chose 150 companies as a sample to investigate how slack resources affect companies' carbon emissions to cut down. To accomplish the research objective, the study conducts a disclosure analysis of the corporate reporting of Bangladesh's top 100 and India's top 50 companies on carbon emission issues. Through a content analysis of the annual reports of 150 companies listed in both the Dhaka Stock Exchange and Chittagong Stock Exchange of Bangladesh and the National Stock Exchange of India, the study attempts to highlight the utilization of slack resources on maintenance of environmental-related issues by disclosing relative practices properly in annual reports. The remainder of this paper is organized as follows. Section 2 addresses climate change and Bangladesh & climate change and India. Section 3 reviews previous literature on the efficiency of slack resources on carbon emission disclosure issues and identifies the research gap. In the next one, we outline the research design followed by a discussion of our analyses and findings. Finally, the last section presents our conclusions, implications, and limitations, and direction for future research to conclude this paper.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1. Climate Change and Bangladesh

Climate change in Bangladesh is a critical issue as the country is one of the most vulnerable to the effects of climate change. In the 2020 edition of Germanwatch's Climate Risk Index, it ranked seventh in the list of countries most affected by climate calamities during the period 1999-2018. The nation is currently seeing an unheard-of rise in temperature, with temperatures exceeding 40° Celsius (104° Fahrenheit). By 2050, sea levels in Bangladesh are expected to increase up to 0.30 meters, which would force 0.9 million people to relocate, and up to 0.74 m by 2100, which will force 2.1 million people to relocate. The Bangladesh Delta Plan 2100 was introduced in 2018 to address the danger posed by the rise in sea levels in Bangladesh. Bangladesh is resistant to any need to reduce greenhouse gas (GHG) emissions, which are the main contributor to global warming, due to its status as a least developed country (LDC). Emissions trading systems (ETS) and Carbon taxes are the two most common form of carbon pricing solutions. Carbon taxes involve implementing a direct tax on fossil fuels based either directly or on their carbon content to incentivize emitters of the gas to lessen the cumulative amount in order that they pay less income. Wealth or prosperity. Ganda, (2018). Emission Trading Systems (ETSs) set a cap on total emissions and distribute or auction off emission allowances for firms to buy, sell & trade permits in the regulated market. The idea behind both is to provide the appropriate economic incentives

that would drive down emissions while creating an incentive for companies developing low-carbon technology. Action is needed now to fight climate change. Ganda and Milondzo (2018). In light of the Paris Agreement, finalized in December 2015, countries recognize that they need to push for rapid decarbonization to reach ambitious national emissions targets. The World Bank's Put a Price on Carbon Statement (World Bank, 2014), endorsed by over one thousand companies, including top oil and gas firms like Shell and Totalquisites concerted global action to set a fair price that reflects the true cost of greenhouse gases. In addition, there is a push in the corporate sector for carbon pricing systems rather than traditional regulated mechanisms - ExxonMobil (Carroll, 2017), Royal Dutch Shell (Frumhoff et al., 2015), Total and BP are leading this charge.

In parallel with the Paris Agreement, World Bank officials set up a Carbon Pricing Leadership Coalition (CPLC) (Narassimhan et al., 2017). 2016 Carbon Pricing Leadership Coalition: shortly 21 member countries, particularly many states, and provinces (US, Canada part) At present, there are more than 40 different national carbon pricing instruments used and over twenty at the regional or municipal levels around the world. These actions are at 7 gigatonnes of carbon dioxide equivalent (GTCO2e) or about 13% of global emissions. Source - The World Bank, Edenhofer (2015); Aldy, (2020) Metcalf and Weisbach (2009), Schmalensee and Stavins (2017), Mao et al., (2023) concluded that carbon pricing policy instruments are the most efficient way to reduce greenhouse gas emissions; immaterial as such has already joined by evidence (Stiglitz, 2019) These strategies fall into three main categories: carbon taxes, cap-and-trade systems and hybrid models that incorporate attributes of both. The value of carbon in cap-and-trade systems, which restrict emissions by setting limits on allowable sources of pollution, is established through a secondary market for emission permit units; sensitive to rules set forth as well as economic and political pressures (Kulp and Strauss, 2019). In contrast to market-based systems, carbon tax systems simply place an exact monetary value on fuel's emitted and/or embedded carbon content. Some jurisdictions (Australia, for example) employ a combination of these three particularly as it concerns the coupling of carbon pricing and cap-and-trade including not only equivalent emissions between systems such that price collars in trading markets are removed, or even cross-region compatibility where regions use different forms (Kreft et al., 2019).What there needs to be is a meaningful carbon price that works - and the not-unrealistic aim of ensuring taxes beat at least some sectors down from high-performance air travel altogether. Griffin and Mahon, (1997)

2.2. Climate Change and India

It is well known that having a direct experience with acute climate events is harmful to one's physical and mental health (e.g., Manning and Clayton, 2018; Obradovich et al., 2018). However, recent studies have found that, due to the influence of climate change anxiety, the negative effects of climate change on mental health also affect those who do not directly experience extreme weather events or natural disasters (Clayton and Karazsia, 2020). India is unarguably the 4th most impacted country from climate change as of 2015 but it also is now facing the brunt of its side effects. The country releases around 3 gigatons (Gt) of CO2 equivalent (CO_2eq) per year, or about 2.5 tons per person on average, below the global average. India accounts for 7% of total global emissions despite 17% of the global population. In spite of the growing number of studies on GHG emissions, as of 2019, there is little comprehensive data available on GHG emission estimates, pointing to the necessity of a detailed inventory. Reducing GHG emissions in India would bring significant health and economic co-benefits. Reducing air pollution would have returns of four to five times the associated costs, and it would be one of the most cost-effective climate strategies anywhere in the world Qi and Yang (2022). India has committed to a 33-55% reduction in emissions intensity by 2030 in its national obligations under the Paris Agreement. India's per-capita emissions are projected to be between 3 and 4 tons by 2030 according to UNEP, which keeps it near the global averages but much below several developed nations. Daniel et al. (2004); Davis et al. (2018)

China is predicted to have produced 27% of global greenhouse gas emissions in 2019, followed by the US with 11% and India with 6.6%. The nationwide carbon trading scheme for India may be established in 2023. Sampedro et al., (2020). India's climate has changed as a result of a 0.7°C (1.3°F) increase in temperature between 1901 and 2018. In India, a severe heatwave was observed in May 2022. The mercury rose to 51°C. Such heatwaves are 100 times more likely as a result of climate change. Heatwaves that are more extreme than those that happened in 2010 are predicted to occur once every 312 years in the absence of climate change. They are now anticipated to happen every 3 years. Ayers et al., (2014); Rahman (2025).

2.3. Theoretical Discussion

2.3.1. Resource based view (RBV) theory

The resource-based view (RBV) is a managerial model for identifying the strategic resources that a company might use to gain a long-term competitive advantage. The RBV focuses managerial emphasis on the company's internal resources in an effort to pinpoint those resources, skills, and abilities that have the potential to produce superior competitive advantages. According to RBV, firms can adopt various strategies since they have various resource mixes, which makes them heterogeneous because they have such resources. Resources can be defined in terms of resource slack, which can be thought of as the opposite of resource scarcity or resource constraints Dolmans et al. (2014).

2.4. Literature Review and Hypothesis Development

Disclosures of GHG emissions are essential to prevent these harmful effects of global warming since they allow for well-informed decision-making (Allam and Diyanty, 2020). Companies that report their GHG emissions will likely have a better image, and in some cases, they may be more likely to receive tax breaks and grants from global corporations. Higher-income countries are leading the way in GHG production despite the above advantages of GHG disclosures and the detrimental effects of global warming (Union of Concerned Scientists, 2022). In this study, we attempt to identify from resource-based theory the significance of slack resources for CDI. According to resource-based theory, businesses utilize a variety of

resources to build organizational resilience, and wise resource management can make businesses grow more successfully According to the slack resource theory (Adams and Hardwick, 1998; Brammer and Millington, 2004), more financial slack is predicted to lead to more financial support for social and environmental sustainability issues. Greater financial slack can make businesses more powerful, but it also makes them more likely to prioritise safeguarding their corporate interests over supporting social and environmental concerns, according to research from the perspective of developing-economy markets (Julian and Ofori-Dankwa, 2013). According to the slack resource hypothesis, businesses can invest in more sustainable causes with higher financial resource flexibility (Cheng et al., 2014; Orlitzky et al., 2003). Organizations with a high level of financial slack are allegedly going to distribute extra financial resources with the related activities of the environment and climate change, as well as in the event such disclosure, in response to the growing environmental and sustainability concerns (Kock et al., 2012). According to Chithambo and Tauringana (2014), the corporation would be able to cover the costs of items associated with the administrative choice to make a voluntary disclosure, one of which is the disclosure of related carbon gas, if there was financial flexibility available. According to Chithambo and Tauringana (2014), there is a correlation between a company's amount of financial disclosure and its low greenhouse gas emissions. According to empirical research on the adoption of green energy, organizations have a higher possibility of embracing new technology and performing better environmentally if they have a stronger HR competence (Dasgupta et al., 2000; Pargal and Wheeler, 1996).

Based on the RBV theory that firms utilize slack resources disclose more carbon emission disclosure information in congruence with social responsibilities, our hypothesis is as follows:

2.4.1. Financial slack

Abdillah and Gunawan (2023). Examined the impact of ESG on firm performance as well as the function of financial slack of companies. Samples were taken using the judgment sampling technique with a total sample of 214 observations. The findings of this study demonstrated that financial slack as a moderating variable can boost the impact of ESG on firm performance.

A study has been done to analyze the effect of financial slack, institutional ownership, and media exposure on carbon emission disclosure with solvability ratio as a moderating variable (Aini et al., 2022). In order to conduct the research, the sample size of the study is 59 samples with 177 units of analysis. The result of this study shows that higher financial slack has a positively significant impact on disclosing carbon emission information. As a result, this concept led me to the following hypothesis.

- Hypothesis 1: There is a positive significant association between Financial Slack and Carbon emission disclosure indices (CDI).

2.4.2. HR slack

In this context, the aim of this paper is to find out the effect of human resource slack on sustainable innovation and its impact on environmental performance considering control variables including company size, age, and R&D expenditure. The hypotheses are tested using data from 301 small and medium-sized enterprises in Ghana. They found that HR slack positively relates to sustainable innovation and impacts environmental performance (Adomako and Nguyen 2020). This leads us to state the following hypothesis:

- Hypothesis 2: There is a positive significant association between HR Slack and Carbon emission disclosure indices (CDI).

2.4.3. Research and development Intensity

In this context, the aim of this paper is to find out the potential influence of several pertinent factors including R&D intensity, directors' education, and firm size towards ESG disclosure. They found that both R&D intensity and firm size do not influence the ESG disclosure. R&D intensity has a positive but insignificant effect on the ESG disclosure it can be inferred that there might not be a direct or indirect relationship between R&D intensity and the ESG disclosure (Ramadhan et al., 2023).

Yu et al. (2018) and Xie et al. (2019) found a positive and significant effect between R&D intensity and ESG disclosure. If a company wants to pursue green and innovative products they need to invest in research and development. Thus, the hypotheses are proposed as follows:

- Hypothesis 3: There is a positive significant association between Research and Development Intensity and Carbon emission disclosure indices (CDI).

So, from the above outcomes of prior related studies, we observe that organizations' slack resources have an impact on disclosure issues in annual reports of companies in the world. Although much research has been done in developed countries about greenhouse gas emission reporting by companies in their annual reports, little research has been done in developing and under-developed economies, such as Bangladesh. So, this study will add value to the existing literature, and help the policymakers, regulators, management, and stakeholders to take proper steps to control greenhouse gas emissions.

2.4.4. Conceptual framework

The conceptual framework is presented in Figure 1.

RESEARCH METHODOLOGY

3.1. Sample Design

The study is based on secondary data sources. There are 354 companies listed in both the DSE and CSE of Bangladesh and 5808 companies listed in both the Bombay Stock Exchange (BSE) and the National Stock Exchange (NSE). On the basis of market capitalization, it looks at 150 listed companies (100 companies from Bangladesh and 50 companies from India) between the years of 2019-2021. Data was extracted from audited financial statements, and firms with missing data were excluded. Finally, the study managed 150 firms with 397 firm-year observations during 2019-2021. Financial data is collected from the OSIRIS database while non-financial data (CDI variable) are managed from annual reports (Table 1).

Figure 1: The research framework

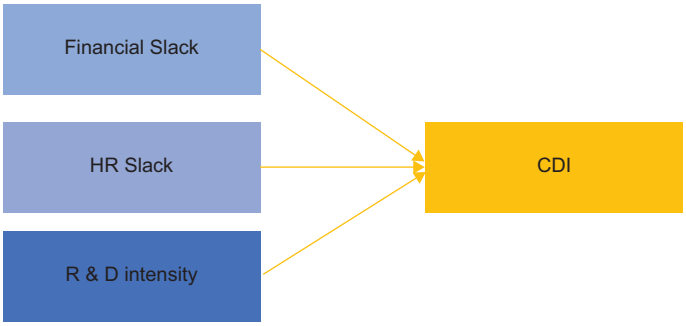

Table 1: Sample description

Panel A: Sample Size			
Sample Selection	**No of Firm**	**Total Observation**	
Total listed company	150	397	
Panel B: Yearly sample by countries			
Sample Year	**Bangladesh**	**India**	**Total**
2019	100	50	150
2020	100	50	150
2021	100	50	150
Total	300	150	450

3.2. Selection of Period

The study has been conducted in 2023. A total of 440 annual reports of Bangladesh's top 100 and India's top 50 companies for consecutive years from 2019 to 2021 were collected (Appendix A). During analysis, Bangladesh's five companies' 2019-year annual reports of Robi Axiata Ltd, Walton Hi-Tech Industries PLC, Unique Hotel & Resorts Limited, Dhaka Electric Supply Company Limited, and Bangladesh Finance and Investment Company Limited are not available online. At this moment of analysis, only Bangladesh's one company and India's one company (Dhaka Electric Supply Company Limited and Avenue Supermarts Limited) published their annual report for 2020 and 2019 respectively.

3.3. Data Analysis

3.3.1. Content analysis

A manual content analysis approach was followed in analyzing the annual reports to measure the volume of carbon emission issues disclosure. A data set consisting of 31 issues of Carbon emission information was developed through a literature review (Table 2). The data set of 31 items was collected from GRI 4 Disclosure Principles and the study of Prado-Lorenzo et al. (2009), Bae Choi et al. (2013) and Rankin et al. (2011).

The study used content analysis techniques to analyze corporate carbon emission disclosures by Bangladesh's top 100 companies and India's top 50 companies. A binary, unweighted index was created to measure all narrative sections of annual reports and stand-alone sustainability reports and included chairman or director statements, sustainability activity reviews, and related discussions. A score of 1 was assigned to each company for disclosing a particular item at least once, and a score of 0 otherwise. Thus, a Carbon Disclosure Index (CDI) was developed consisting of 31 items for measuring the level of carbon emissions disclosure by the firms. The CDI framework was based on insights from previous bodies of research such as Prado-Lorenzo et al. (2009), and Bai Choi et al. (2013). and Rankin et al. (2011). The Carbon Emission disclosure score was calculated by dividing the items disclosed by the maximum number of items that a firm could disclose.

The total CDI score was calculated as

$$CDI = \frac{\sum \frac{t}{i=1} ci}{t}$$

where ci = 0 or 1, as follows:
ci = 0 if the disclosure item was not found;
ci = 1 if the disclosure item was found; and
t = the maximum number of climate change and global warming disclosure issues a firm could disclose (i.e., 31 items).

3.3.2. Statistical analysis

3.3.2.1. Definition of variables

In this study, Variables are used to assess the relationship between the slack resources and Carbon emission disclosure practices of Bangladesh's top 100 and India's top 50 companies (Table 3). The independent variables of this study are denoted by financial slack, HR slack, and RD intensity. The dependent variable is CDI. The last one is control variables i.e., Firm Size, ROA, PPE, and Market to-book ratio.

3.4. Model Specification

The following regression model is used to test the study hypothesis:

$$CDI = \beta 0 + \beta 1 FinSlack + \beta 2 HRSlack + \beta 3 RD + \beta 4 Size + \beta 5 ROA + \beta 6 Invest + \beta 7 MB + \beta 8 Sales + \beta 9 Equity + \beta 10 Yeardummy + \beta 11 Industrydummy + \varepsilon$$

Where:

- CDI = The rate of carbon emissions disclosure
- FinSlack = Total Cash or equivalent divided by Assets
- HRSlack = No of total employees divided by Assets
- RD = Total amount of R&D investment divided by total Assets.
- ROA = Net income divided by the total assets
- MB (market to book ratio) = Market capitalization/equity book value

4. RESULTS

4.1. Descriptive Statistics

Table 4 displays the descriptive statistics for variables for the entire sample. The sample size (N) in this case is 397. The mean represents the average of the independent variable (Slack Resources), the dependent variable (CDI), and the control variables.

The average CDI is 12.06, indicating that, on average, companies disclose information on approximately 12 out of the 31 items in

Table 2: Carbon emission disclosures index

No.	ESG Category	Aspect	Disclosure issues
1	Environmental	EN2	Percentage of materials used that are recycled input materials
2	Environmental	EN3	Energy consumption within the organization
3	Environmental	EN4	Energy consumption outside of the organization
4	Environmental	EN5	Energy intensity
5	Environmental	EN6	Reduction of energy consumption
6	Environmental	EN7	Reductions in energy requirements of products and services
7	Environmental	EN15	Direct greenhouse gas (GHG) emissions
8	Environmental	EN16	Energy indirect greenhouse gas (GHG) emissions
9	Environmental	EN17	Other indirect greenhouse gas (GHG) emissions
10	Environmental	EN18	Greenhouse gas (GHG) emissions intensity
11	Environmental	EN20	Emissions of ozone-depleting substances (ODS)
12	Environmental	EN21	NOX, SOX, and other significant air emissions
13	Environmental	EN23	Total weight of waste by type and disposal method
14	Environmental	EN25	Weight of transported, imported, exported, or treated waste deemed hazardous under the terms of the Basel Convention Annex I, II, III, and VIII, and percentage of transported waste shipped internationally
15	Environmental	EN27	Extent of impact mitigation of environmental impacts of products and services
16	Social	Climate change: risks and opportunities (CC1)	assessment/description of the risks (regulatory, physical, or general) relating to climate change and actions taken or to be taken to manage the risks.
17	Social	Climate change: risks and opportunities (CC2)	assessment/description of current (and future) financial implications, business implications, and opportunities of climate change.
18	Governance	GHG emissions accounting (GHG2)	existence external verification of quantity of GHG emission– if so by whom and on what basis
19	Governance	GHG reduction and cost (RC2)	specification of GHG emissions reduction target level and target year
20	Governance	Carbon emission accountability (ACC1)	indication of which board committee and other executive body has overall responsibility for actions related to climate change.
21	Governance	Carbon emission accountability (ACC2)	description of the mechanism by which the board and other executive bodies review the company's progress regarding climate change
22	Governance		Description of policies, strategies, and programs
23	Governance		Assessment of performance against internal and/or external benchmarks
24	Governance		Description of GHG info management and monitoring procedures
25	Governance		Specific statement from the CEO or company chairman that mentions climate change
26	Governance		The words "climate change" or "global warming"
27	Social		A section devoted to climate change or global warming
28	Social		Involvement in emissions trading, such as buying or selling emissions allowances under the EU
29	Social		Opportunities for setting up a carbon fund or engaging in emissions brokering (within the EU emissions trading scheme
30	Social		Credits for Clean Development Mechanism (CDM) projects under the Kyoto protocol
31	Social		Credits from Joint Implementation (JI) b projects under the Kyoto Protocol

Table 3: Interpretation of variables

Variables	Item	Operational definition
Dependent Variables	CDI	The % of total items a firm disclosed to total items (i.e., 31 items) of disclosure index in year t.
Independent variables	Financial Slack (Cash)	The % of total cash and cash equivalents to total assets.
	HR slack (Employee)	The % of total number of employees to total assets.
	R &D intensity	Total amount of R&D investment collected from Osiris Database.
Control variables	Size	Log of total Assets
	ROA	Net income/total asset
	PPE	Total investment
	MB (market to book ratio)	Market capitalization/equity book value

Table 4: Descriptive statistics results (n=150)

Variable	Obs	Descriptive Statistics		Min	Max
		Mean	Standard Deviation		
CDI	397	12.06	8.31	1	25
Fin_S	397	4.93	0.96	0	5.75
HR_S	397	195.89	111.85	1	378
RD	397	59.25	31.53	1	104
Size	397	4.99	0.97	0	5.98
ROA	397	173.74	104.53	1	353
Investment	397	4.95	0.94	0	5.68
MB	397	4.99	0.97	0	5.95
Sales	397	4.95	0.94	0	5.68
ROE	397	190.87	109.46	1	364
Equity	397	4.99	0.97	0	5.98

the Carbon Emission Disclosure Index. The standard deviation (8.31) suggests a considerable variation in the level of carbon emission disclosure among the sampled companies, with some companies having relatively low disclosure (minimum of 1) and others having higher levels (maximum of 25). The mean value for financial slack is 4.93, indicating that, on average, companies have a financial slack score close to 5 (the maximum possible value). The standard deviation (0.96) suggests some variability in financial slack among the companies, with scores ranging from 0 to 5.75. The average human resource slack is 195.89, suggesting

that, on average, companies have approximately 196 employees per unit of assets. The standard deviation (111.85) indicates a wide range in the number of employees across the sampled companies, with values ranging from 1 to 378. The mean RD value is 59.25, indicating that, on average, companies invest a score of 59 out of 104 in research and development relative to their total assets. The standard deviation (31.53) suggests some variation in the intensity of research and development activities across the companies.

4.2. Correlation Analysis

The relationship among dependent, independent, and control variables of selected listed companies of Bangladesh and India are shown in the Table 5.

Table 5 reveals that CDI has a weak negative correlation with Financial Slack (Fin_S) at −0.0478. This suggests a slight tendency that higher financial slack is associated with lower levels of carbon emission disclosure, although the correlation is not strong. Companies with higher financial slack might prioritize financial activities over environmental disclosures. They may feel less pressured to disclose carbon emission information due to having surplus financial resources. Alternatively, these companies may believe that their financial strength alone is sufficient for stakeholders and may not see the need for extensive environmental reporting. CDI has a weak negative correlation with Human Resource Slack (HR_S) at −0.1225. This indicates a slight tendency that higher human resource slack is associated with lower carbon emission disclosure, but the correlation is not significant. Companies with higher human resource slack may face challenges in managing and implementing robust environmental reporting practices. Limited human resources could hinder their ability to collect, analyze, and disclose comprehensive carbon emission information. Additionally, companies with higher HR slack may have other operational priorities, diverting attention from environmental reporting. CDI has a weak positive correlation with Research and Development Intensity (RD) at 0.075. This suggests a slight tendency that higher research and development intensity is associated with higher levels of carbon emission disclosure. Companies with higher research and development intensity may be more focused on innovation and sustainability. They may have a greater awareness of the importance of environmental disclosures and could be actively engaged in research and development activities related to environmental initiatives. This proactive approach may lead to a positive correlation with CDI.

4.3. Regression Model

To examine the CDI relationship with slack resources of the company ordinary least squares regression (OLS regression) has been done. The coefficient for Financial Slack is consistently negative across all three models, indicating a negative relationship with CDI. The negative coefficients are statistically significant at the 10% level in each model (Table 6). The coefficient for Human Resource Slack is consistently negative and statistically significant at the 1% level across all models. This implies that higher Human Resource Slack is associated with lower levels of carbon emission disclosure. The coefficient for Research and Development Intensity is consistently positive and statistically significant at the 10% level in each model. This indicates a positive relationship between Research and Development Intensity and the Carbon Emission Disclosure Index. As Research and Development Intensity increases, there is a tendency for the CDI to increase. In terms of the regression co-efficient control variable Table 6 shows that ROA is positive (0.0028) associated with CDI. That means when the company has higher profitability (ROA), it has a positive impact to disclose more about CDI. Firm size (−0.1218) is negatively insignificant and associated with CDI. That means the firm size of India & Bangladesh has no impact on CDI.MB ratio (0.4489) and sales (0.5384) are positively insignificant and associated with CDI. None of the control variables (Size, ROA, Investment, MB, Sales, Equity, ROE) show statistically significant relationships with CDI across all models. These variables do not appear to be strong determinants of carbon emission disclosure in the given sample. The consistency in the signs of the coefficients across models adds robustness to the findings. The negative relationship between Financial Slack and CDI and the positive relationship between Research and Development Intensity and CDI are consistent throughout. The negative relationship between Financial Slack and CDI suggests that companies with higher financial resources might be less motivated to disclose carbon emissions information. This could be due to a perception that

Table 5: Correlation analysis results

Variables	CDI	Fin_S	HR_S	RD	Size	ROA	Investment	MB	Sales
CDI	1								
Fin_S	−0.0478	1							
	0.3417								
HR_S	−0.1225	−0.0211	1						
	0.0146	0.6754							
RD	0.075	0.2325	0.0473	1					
	0.1357	0	0.347						
Size	−0.0115	−0.0331	0.0543	0.108	1				
	0.8187	0.5111	0.2802	0.0315					
ROA	0.0308	−0.0641	−0.0888	−0.3168	−0.1012	1			
	0.5402	0.2023	0.0771	0	0.0439				
Investment	0.0059	0.1711	0.0714	0.411	0.0609	−0.2707	1		
	0.9064	0.0006	0.1553	0	0.2259	0			
MB	0.0125	0.3197	0.0278	−0.121	−0.0612	0.1866	−0.0669	1	
	0.8043	0	0.5814	0.0158	0.2234	0.0002	0.1832		
Sales	0.0695	0.1213	0.0675	0.3747	0.049	−0.0764	0.3241	−0.0308	1
	0.1668	0.0156	0.1795	0	0.3302	0.1285	0	0.54	

Table 6: Regression model

Variables	(1)	(2)	(3)
	CDI	CDI	CDI
Fin_S	−0.8163* (0.4782)	−0.8638* (0.4822)	−0.8308* (0.4780)
HR_S	−0.0097** (0.0037)	−0.0097** (0.0037)	−0.0099*** (0.0038)
RD	0.0283* (0.0159)	0.0294* (0.0160)	0.0261* (0.0156)
Size	−0.1218 (0.4318)		−0.1409 (0.4314)
ROA	0.0028 (0.0043)	0.0030 (0.0043)	
Investment	−0.1623 (0.5065)	−0.2097 (0.5096)	−0.2243 (0.5024)
MB	0.4489 (0.4688)	0.4035 (0.4724)	0.4976 (0.4630)
Sales	0.5384 (0.4905)	0.5449 (0.4903)	0.5664 (0.4890)
Equity		0.3477 (0.4438)	
ROE			−0.0005 (0.0038)
_cons	12.3148*** (4.4736)	10.5375** (4.1509)	13.1745*** (4.4937)
N	397	397	397
F	1.7331	1.8022	1.6800
r2	0.0345	0.0358	0.0335
r2_a	0.0146	0.0159	0.0136
N_g			

Standard errors in parentheses. *P<0.10, **P<0.05, ***P<0.01

financial strength alone suffices in stakeholder relations. The negative relationship between Human Resource Slack and CDI implies that companies with limited human resources may struggle to meet comprehensive carbon emission disclosure standards. Allocating resources to environmental reporting capabilities might be beneficial. The positive relationship between Research and Development Intensity and CDI indicates that companies emphasizing innovation and sustainability in their R&D activities tend to disclose more information on carbon emissions. This aligns with a proactive approach to environmental reporting. Abdillah and Gunawan (2023) in their study found a positive and significant relationship between financial slack and CDI, whereas our study found a negative but significant relationship between these two, suggesting new insights from emerging economies. Adomako and Nguyen (2020) also in their study relating HR slack and CDI found contrasting findings from ours which also provide unique insights from emerging economies, Ramadhan et al., (2023) in their study found a positive but insignificant relationship between R & D slack and CDI, whereas Yu et al. (2018) and Xie et al. (2019) found a positive and significant relationship between these two variable. So it cohorts our findings.

4.4. Variance Inflation Factors (VIF)

Variance inflation factors (VIF) must look for indications of multi-collinearity among explanatory variables while building a basic regression model (Table 7). According to Hair et al. (2010), a VIF score of 10 indicates a significant degree of multi-collinearity amongst the explanatory factors. All the VIF values are relatively low, ranging from 1.02 to 1.46. A VIF of 1 indicates no multicollinearity, and generally, values below 5 are considered acceptable. Therefore, the VIF values here suggest a low degree of multicollinearity. The VIF values indicate that there is no significant multicollinearity among the independent variables in the regression model. None of the VIF values exceed the commonly used threshold of 5, indicating that the variables are not highly correlated with each other. The mean VIF across

Table 7: VIF Measurement

Variable	VIF	1/VIF
RD	1.46	0.68277
Investment	1.31	0.765797
Fin_S	1.24	0.809299
Sales	1.22	0.81657
MB	1.21	0.829781
ROA	1.19	0.838751
SIZE	1.02	0.977489
HR_S	1.02	0.98003
Mean VIF	1.21	

all variables is 1.21, which further confirms the absence of severe multicollinearity. A low mean VIF suggests that the independent variables in the model are not redundant or highly correlated. The VIF values for each variable are well below 5, with the highest VIF being 1.46 for RD (Research and Development Intensity). The VIF values closer to 1 indicate that each variable is relatively independent of the others. The low VIF values suggest that the independent variables in the regression model are not exhibiting multicollinearity issues. Researchers and practitioners can have confidence in the stability of the regression coefficients and the interpretation of individual variable effects on the dependent variable (CDI).

4.5. Robustness Checks

In a further robustness check of our analysis, we have used heteroskedasticity-robust, firm-clustered standard errors, which account for the possibility of the variance of the residuals being unequal across firms (Table 8). We did so using White's robust standard errors in our OLS models. The signs of coefficients for Financial Slack, HR Slack, and R&D Intensity are similar to the original findings. The numbers are adjusted for heteroskedasticity and maintain statistical significance and support for hypothesis testing. There is no fundamental change of importance or orientation. This robustness analysis further strengthens the support for our main findings.

5. DISCUSSION AND POLICY IMPLICATIONS

5.1. Discussion

There is no association between financial slack and carbon emission disclosure practices. HR slack has no significant impact on CDI as they are not engaged directly due to being focused on their own assigned tasks. Research and development intensity has a significant impact on carbon emission disclosure practices. Firms (profitability, size, MB ratio) are frequently subject to media, regulators, and societal pressures. These firms release more carbon emission disclosure data to fulfill their obligations to diverse stakeholder groups. The findings yielded intriguing results:

Hypothesis 1 (H_1): While prior studies in advanced markets (e.g., the US and EU) indicate that firms with greater financial slack tend to enhance environmental disclosure due to regulatory compliance and stakeholder expectations (Ashraf et al., 2020), our study finds a negative association in emerging economies. The negative correlation between financial slack and carbon

Table 8: Robustness checks

Variables	CDI (robust standard errors)	Standard error	P-value	Significance
Financial Slack	−0.8142	0.4227	0.059*	*
HR Slack	−0.0102	0.0040	0.011**	**
R&D Intensity	0.0275	0.0148	0.067*	*
Firm Size	−0.1281	0.4183	0.762	
ROA	0.0026	0.0040	0.516	
Investment	−0.1973	0.4947	0.689	
Market to Book	0.4521	0.4586	0.322	
Sales	0.5498	0.4725	0.246	
Intercept	12.4871	4.1789	0.003***	***

n=397, Adjusted R^2=0.034, *p < 0.10, **p < 0.05, ***p < 0.01

emission disclosure (CDI) contradicts prior literature, which often associates slack resources with increased corporate social responsibility (CSR) initiatives (Cheng et al., 2014; Orlitzky et al., 2003). However, several factors unique to emerging markets may explain this contradiction; In developed economies, strong regulatory frameworks and stakeholder activism push companies to allocate financial slack toward sustainability initiatives, including carbon disclosure. In contrast, Bangladesh and India have weaker enforcement mechanisms, allowing firms to deprioritize carbon disclosures without significant financial or reputational consequences. Firms in emerging markets often face growth pressures, leading them to allocate slack resources to expansion efforts, acquisitions, and dividend payouts rather than voluntary sustainability initiatives.

Hypothesis 2 (H_2): HR slack has been linked to proactive environmental engagement in developed markets due to specialized sustainability roles (Qi and Yang, 2022). The negative association between HR slack and CDI is counterintuitive, as a higher workforce capacity would typically be expected to enhance organizational sustainability efforts. However, this unexpected finding may be attributed to that while firms may have a large workforce, not all employees possess the expertise required for carbon accounting, sustainability reporting, or ESG compliance. Many firms, particularly in emerging markets, lack dedicated sustainability teams, resulting in low-quality or inconsistent carbon disclosures despite an abundance of human resources.

Hypothesis 3 (H_3): The study confirms a positive relationship between R&D intensity and CDI, aligning with expectations that innovation-driven firms are more likely to engage in sustainability reporting. However, the statistical weakness of this relationship suggests that R&D investment alone does not guarantee comprehensive carbon disclosure. The following implications emerge:

The impact of R&D on carbon disclosure could be amplified through policy incentives, such as tax credits for sustainability-oriented research or mandatory carbon reporting requirements. Governments should introduce incentive-based mechanisms to encourage firms to channel R&D investments into green technology and transparent reporting practices. While R&D-intensive firms are generally more innovative, not all innovations align with ESG priorities. Companies should integrate carbon transparency as a core component of their innovation agenda, ensuring that sustainability is embedded in R&D investment decisions. Investors and stakeholders play a critical role in demanding greater ESG accountability from R&D-driven firms.

5.2. Policy Implications

The study's findings indicate that regulatory gaps in India and Bangladesh contribute to low carbon disclosure levels among firms. To enhance transparency, governments in both countries should consider the following targeted policy interventions: Unlike developed economies, carbon disclosure remains voluntary in many sectors of Bangladesh and India. Regulatory bodies, such as the Bangladesh Securities and Exchange Commission (BSEC) and Securities and Exchange Board of India (SEBI), should mandate climate-related disclosures under their respective corporate governance codes. India could expand its Business Responsibility and Sustainability Reporting (BRSR) framework to include small and mid-cap companies, ensuring broader adoption. Bangladesh should integrate carbon reporting requirements into the Corporate Governance Guidelines (CGG) for listed firms. Both governments can introduce tax deductions or subsidies for firms that invest in low-carbon technologies or adopt transparent environmental reporting standards. India's Production Linked Incentive (PLI) scheme could incorporate ESG-linked incentives, rewarding firms that demonstrate sustained carbon disclosure practices. Bangladesh's Green Transformation Fund (GTF) should expand eligibility to cover carbon reporting system enhancements for businesses. Stock exchanges in both countries should strengthen ESG indices (e.g., BSE Greenex in India and Dhaka Stock Exchange ESG framework) by requiring detailed carbon emission disclosures as a listing criterion for inclusion. Institutional investors should be encouraged to adopt carbon-risk-adjusted investment strategies, pushing firms toward greater transparency.

5.3. Practical Implications

Businesses in emerging economies often face challenges in adopting sustainability reporting practices. To overcome these barriers, the following strategic recommendations should be considered: Investors play a pivotal role in driving sustainability disclosures. Firms seeking capital should actively engage with ESG-focused institutional investors and integrate carbon disclosure metrics into investor relations materials. Companies listed in India's ESG mutual fund schemes and Bangladesh's green bond market should develop clear, standardized carbon reporting frameworks to attract investment. Many firms, particularly in Bangladesh, lack specialized ESG teams. To enhance reporting quality, firms should: Train finance and compliance teams on carbon disclosure best practices. Establish cross-functional sustainability committees to ensure integration of carbon transparency in corporate strategy. Indian firms can leverage AI-driven ESG analytics platforms to enhance data collection and reporting accuracy. Bangladeshi firms, particularly in manufacturing, should explore blockchain-based carbon footprint tracking to improve reporting reliability and meet investor expectations.

5.4. Theoretical Implications: Contribution to Environmental Disclosure Literature

The present study bridges the topical gap in the environmental

disclosure literature by extending the RBV to consider how different types of slack resources impact carbon emission disclosures in underrepresented developing economies. Providing cross-country empirical evidence from Bangladesh and India, diversifying a field characterized by developed country research. We propose a new CDI that uses weights and robust statistical techniques to yield a better understanding of the drivers of voluntary disclosure practices. Showing the necessity to reexamine the availability versus consumption of resources in disclosure behavior is an angle largely contextually missing in existing CSR or sustainability literature.

5.5. Research Implications (Limitations and Future Directions)

A key limitation of this study is the potential for endogeneity bias, which is common in research relying on financial data. The observed relationships between slack resources and carbon disclosure could be influenced by unobserved firm-specific factors, such as Strategic managerial choices that prioritize growth over sustainability initiatives. Industry-specific regulatory constraints affect disclosure norms differently. Reverse causality, where firms that already engage in sustainability initiatives attract more slack resources rather than the other way around.

To mitigate endogeneity concerns, future research could employ:

- Instrumental variable (IV) regression models to control for unobserved heterogeneity.
- Difference-in-differences (DiD) approaches, particularly if policy changes (e.g., ESG mandates) create natural experimental conditions.
- Propensity score matching (PSM) to compare firms with similar financial characteristics but different levels of carbon disclosure.

6. CONCLUSION

In the pursuit of understanding the dynamics between organizational resources and carbon disclosure, this study delved into the unexpected findings that emerged from hypothesis testing. Contrary to initial expectations, the study revealed negative associations between Financial Slack (Fin_S) and Human Resource Slack (HR_S) with the Carbon Emission Disclosure Index (CDI). The negative relationship between Fin_S and CDI challenges conventional assumptions about the positive influence of financial flexibility on environmental transparency. This finding suggests that, in practice, companies with higher financial slack may prioritize alternative strategic objectives over comprehensive carbon disclosure. Potential explanations include resource allocation dilemmas, where organizations weigh the costs and benefits of disclosure against other strategic imperatives, and the absence of significant regulatory pressure or market demands. Similarly, the negative correlation between HR_S and CDI introduces a nuanced perspective on the role of human resources in sustainability reporting. Organizations with abundant human capital may face resource allocation trade-offs, directing these resources toward diverse strategic goals rather than emphasizing carbon disclosure. Competing organizational priorities, coupled with the influence of organizational culture, may contribute to the unexpected findings. These results underscore the intricate interplay of organizational dynamics, strategic decision-making, and external influences in shaping corporate environmental practices.

The study highlights the need for a nuanced understanding of how companies navigate complex resource allocation decisions in the absence of clear regulatory frameworks or market pressures. As the business landscape continues to evolve, these findings emphasize the importance of considering multiple factors when formulating sustainability strategies. Organizations must carefully balance financial flexibility, human resource capacities, and strategic priorities to align with the growing emphasis on environmental responsibility. Future research could explore industry-specific nuances and conduct in-depth qualitative analyses to unravel the subtleties of corporate decision-making in the context of sustainability reporting. In conclusion, this study contributes valuable insights to the ongoing discourse on corporate environmental practices, prompting a reevaluation of assumptions and paving the way for further exploration of the intricacies within organizational sustainability strategies. Lack of available data and knowledge is the prime limitation of the study. There is a dearth of journal publications and other content on the relationship between ESG score and corporate governance.

Our evidence points to key new research directions. Future research may look at the quality and volume of carbon emission disclosure, as well as its determinants, in addition to the level of CDI reporting. Future study might also look into the role of free media and other stakeholders like local and state regulators, in motivating firms to share CDI data. This is crucial because an organization's sustainability initiatives and carbon emission related information disclosure are constrained by the institutional environment and accountability requirements, a feature that promotes firms' legitimacy. The engagement of these numerous stakeholder groups should enhance an organization's image and reputation rather than undermine it.

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APPENDIX

Company Name (Bangladesh)

Code.	Name of the companies	Code.	Name of the companies
1	Grameenphone LTD	51	Mercantile Bank Limited
2	Walton Hi-Tech Industries PLC	52	National Credit and Commerce Bank Limited - NCC Bank Limited
3	British American Tobacco Bangladesh Company Limited	53	Shahjibazar Power Company Limited
4	Square Pharmaceuticals LTD	54	Square Textiles Limited
5	Robi Axiata Limited	55	Paramount Textile Limited
6	Renata Limited	56	Sonali Paper and Board Mills LTD
7	United Power Generation and Distribution Company Limited	57	Ifad Autos Limited
8	Bangladesh Export Import Company Limited	58	Doreen Power Generations and Systems Limited
9	Investment Corporation Of Bangladesh	59	Saif Powertec Limited
10	Lafargeholcim Bangladesh Limited	60	Social Islami Bank Ltd
11	Beximco Pharmaceuticals Limited	61	Dhaka Bank Limited
12	Beacon Pharmaceuticals PLC	62	Crown Cement PLC
13	BRAC Bank Limited	63	Rupali Bank Limited
14	Titas GAS Transmission and Distribution Company Limited	64	BBS Cables LTD
15	Dutch-Bangla Bank Limited	65	Khulna Power Company LTD
16	Power Grid Company of Bangladesh LTD	66	Delta Brac Housing Finance Corporation Ltd
17	Summit Power Limited	67	JMI Hospital Requisite Manufacturing LTD
18	Bangladesh Submarine Cables PLC	68	Kohinoor Chemical Company (Bangladesh) Limited
19	Unilever Consumer Care Limited	69	One Bank Limited
20	Bangladesh Steel Re-Rolling Mills Limited	70	Bashundhara Paper Mills Limited
21	MJL Bangladesh Limited	71	THE IBN Sina Pharmaceutical Industry PLC
22	Trust Bank Ltd (The)	72	Genex Infosys Limited
23	Bsrm Steels Limited	73	South Bangla Agriculture & Commerce Bank Limited
24	Olympic Industries Limited	74	Confidence Cement Limited
25	City Bank Ltd	75	AB Bank Ltd
26	GPH Ispat Limited	76	Bangladesh Finance and Investment Company Limited
27	Bank Asia Limited	77	Shinepukur Ceramics Limited
28	Meghna Petroleum Limited	78	Energypac Power Generation Limited
29	Reckitt Benckiser (Bangladesh) PLC	79	ACI Formulations Limited
30	Padma OIL Company Limited	80	Anwar Galvanizing Limited
31	Orion Pharma Ltd.	81	Summit Alliance Port Limited
32	Advanced Chemical Industries Limited	82	JMI Syringes & Medical Devices LTD
33	IPDC Finance Limited	83	Matin Spinning Mills PLC
34	Linde Bangladesh Limited	84	MIR Akhter Hossain Limited
35	Jamuna OIL CO. LTD	85	Lub-Rref (Bangladesh) Limited
36	IFIC Bank Limited - International Finance Investment and Commerce Bank Limited	86	Runner Automobiles Limited
37	Shahjalal Islami Bank Ltd	87	Maksons Spinning Mills Limited
38	THE Acme Laboratories LTD	88	Baraka Patenga Power Limited
39	Unique Hotel & Resorts Limited	89	Malek Spinning Mills Limited
40	IDLC Finance Limited	90	Baraka Power Limited
41	Bangladesh Shipping Corporation LTD	91	M.L. Dyeing Limited
42	RAK Ceramics (Bangladesh) Limited	92	Eastern Housing Limited
43	United Commercial Bank Ltd	93	Rahima Food Corporation Limited
44	Southeast Bank Limited	94	SEA Pearl Beach Resort & SPA Limited
45	Dhaka Electric Supply Company Limited	95	CVO Petrochemical Refinery Ltd.
46	Fortune Shoes Limited	96	Active Fine Chemicals Limited
47	Jamuna Bank Ltd.	97	Premier Cement Mills Limited
48	Singer Bangladesh Limited	98	Index Agro Industries Limited
49	Export Import Bank of Bangladesh Limited	99	Quasem Industries Limited
50	Uttara Bank Limited	100	Esquire Knit Composite LTD

Company Name (India)

No.	Name of the companies	No.	Name of the companies
1	Reliance Industries Limited	26	HDFC Life Insurance Co. Ltd
2	Tata Consultancy Services Limited	27	Titan Company Limited
3	HDFC Bank Ltd.	28	OIL and Natural GAS Corporation Limited
4	Infosys Limited	29	Hindustan Zinc Limited
5	Hindustan Unilever Limited	30	Adani Enterprises Limited
6	Housing Development Finance Corporation Limited - HDFC Ltd	31	JSW Steel Limited
7	ICICI Bank Limited	32	Power Grid Corporation of India Limited
8	Kotak Mahindra Bank Limited	33	Shree Cement Limited
9	State Bank of India	34	Bajaj Auto Limited
10	Bajaj Finance Limited	35	Adani Total GAS Limited
11	Bharti Airtel Limited	36	Ntpc Limited
12	ITC Limited	37	Tata Motors Limited
13	HCL Technologies Limited	38	Adani Transmission Limited
14	Asian Paints Limited	39	Mahindra & Mahindra Limited
15	Wipro Limited	40	Tata Steel Limited
16	AXIS Bank Limited	41	Divi's Laboratories Limited
17	Maruti Suzuki India Limited	42	Tech Mahindra Limited
18	Larsen & Toubro Limited	43	Dabur India Limited
19	Ultratech Cement Limited	44	Grasim Industries Limited
20	Avenue Supermarts Limited	45	Bharat Petroleum Corporation Limited
21	Nestle India Limited	46	Pidilite Industries Limited
22	Adani Green Energy Limited	47	SBI Life Insurance Co., Ltd.
23	Bajaj Finserv Limited	48	SBI Cards and Payment Services Limited
24	SUN Pharmaceutical Industries Limited	49	Britannia Industries Limited
25	Adani Ports and Special Economic Zone Limited	50	Indian OIL Corporation Limited