Factors affecting emission revelation: Evidence from an emerging economy

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Abstract:

Purpose: Sustainability disclosures are being increasingly adopted as value relevant by investors but they are still in a budding stage in India. The present study examines the factors affecting emission revelation by Indian companies.

Methodology: The emission data disclosed by 39 Indian companies on the CDP (Carbon Disclosure Project) are taken as samples for this study and the relevant financial data of these companies are collected for analysis. A logistic regression approach has been applied to determine the disclosure possibility of selected companies.

Findings: From the findings, it is inferred **t**hat the size, profitability and leverage are the key determinants of emission disclosure for the sample firms. While size has a significant positive impact, profitability and leverage are negatively related to emission revelation.

Practical Implications: The current research will add value to the existing environmental research, especially in emerging economies. Further, it will assist managers and practitioners in formulating and implementing the disclosure policy.

Originality: This article has contributed to the preliminary investigations on carbon emission data, disclosed by Indian companies on CDP. In this study, the size, profitability and leverage along with the environmental sensitivity of the industry were chosen as independent variables to understand disclosure practices in a better way.

Keywords: Emission, Disclosure, Sustainability, Emerging Economy

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1. Introduction

Contemporary industries are operating on agency relationship among managers and investors and hence managers must reveal all material facts to ensure that the company is operating in the best interest of shareholders. Disclosure of information legitimatizes the business operations and helps in achieving the trust of shareholders as well as the public at large. However, such disclosures are mainly limited to the financial performance of firms and ignore a large spectrum of other essential facts such as the environmental impact of business operations. United Nations Framework Convention on Climate Change (UNFCCC) has enforced the Kyoto protocol to curtail the increasing deterioration of natural resources by reduction of greenhouse gases. Stakeholder awareness and regulatory pressure has forced the companies to reveal the carbon emission (Jeswani et al. 2008; Desai et al., 2021). Western economies have organized mechanisms to monitor the ecological performance of firms through obligatory disclosures whereas emerging countries like India follow voluntary disclosure practices. However, Indian investors are still dependent on the voluntary environmental revelation of firms which limits their ability to take informed decisions. In absence of any legal mandate, it is important to study the factors which induce firms to disclose emission data. The present research investigates the determinants of emission disclosure with reference to Indian firms.

The paper has been organized as follows: the second section presents the review of disclosure theories and empirical literature. This is followed by a discussion on the methodology used to analyze the data and the succeeding section highlights the data analysis and results. The final section concludes the research along with the limitations of the study.

2. Literature Review

2.1 Environmental Disclosure Theories

Corporate environmental disclosures are largely governed by two theories named as 'voluntary disclosure' (Luo and Tang, 2014) and 'legitimacy theory' (Gray et al.,1995). Voluntary disclosure theory states that firms with higher environmental performance tend to increase their disclosure levels to highlight their achievements and differentiate themselves from competitors (Clarkson et al., 2011). On the contrary, companies with high carbon emission are inclined to avoid disclosing such information and continue themselves as average performers (Giannarakiset al., 2017). Legitimacy theory, on the other hand, is based on the concept of 'corporate citizenship', wherein companies disclose non-financial information to legitimize their activities (Brammer and Pavelin, 2006). According to this approach, poor environment performers are expected to disclose more information to provoke the increased risk of legality and eventually change the opinion of stake-holders by educating and informing them

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about the changes in their performance and these companies attempt to highlight other accomplishments related to the social cause (Wilmshurst and Frost, 2000; Clarkson et al., 2011).

2.2 Review of empirical studies and conceptual model

In the absence of any institutional incentives or penalties, factors that motivate companies to disclose their emission are studied in the literature (Andrikopoulos and Kriklani, 2012; Chakladerand Gulati, 2015; Giannarakis, et al. 2017).

Company size is the most common factor affecting the revelation behavior of firms (Chithambo and Tauringana, 2014; Freedman and Jaggi, 2005; HalimahandYanto, 2018). According to legitimacy theory, large size firms have high pressure from the public to disclose the non-financial data to maintain the social contract that enables the firms to access the resources of the society (Patten, 1991). Further, large-size firms are more visible than smaller ones (Andrikopoulos and Kriklani, 2012) and hence cannot escape from the disclosure requirements. Several past studies have confirmed a significant positive impact of firm size on environmental disclosure (Chaklader and Gulati, 2015; Freedman and Jaggi, 2005).

Profitability indicates the firm's efficiency in generating earnings out of its investments (Halimahand Yanto, 2018) and hence financially poor firms cannot afford the cost of disclosing environmental information. Further, high profitability provides resources to the managers to absorb the cost of disclosure (Brammer and Pavelin, 2008). Ferrat, Y. (2021) suggested that corporate financial performance has been negatively impacted by carbon emission performance in short term. Higher carbon emissions resulted in higher long-term financial performance (Busch, T. et al., 2020). However, empirical studies have provided mixed results. Past research has shown positive (Cahya, 2017), negative (YantoandMuzzammil, 2016), as well as no effect (Bae Choi et al., 2013) of profitability on emission disclosure. Therefore, this relationship requires further probing.

The use of debt financing in the capital structure will give rise to agency cost. As a result, managers of high levered firms tend to disclose more information to avoid agency cost (Jensen and Mecknling, 1976). On the contrary, Chakledar and Gulati (2015) have argued that disclosing more information about the environmental performance may adversely affect the debt raising capacity of companies. Considering the empirical findings, several studies have confirmed the tenets of agency theory and found a positive impact of leverage on environment disclosure (Xiao et al., 2004; Prencipe, 2004).

Besides financial characteristics, the type of industry does have a considerable impact on disclosure practices. Environmentally sensitive firms (such as fossil fuels,

petroleum, coal) face greater risk relating to climate change (Kumar and Firoz 2018), and they are subjected to stringent regulatory norms due to their high propensity to the pollute environment. Past studies have argued that environmentally sensitive companies tend to disclose more information as compared to others (Peters and Romi, 2013; Cho and Patten, 2007).

Finally, based on the review of the literature, it can be concluded that research findings are not consistent and need further investigation especially in emerging economies like India. Referring to the existing work, a conceptual model (see figure – 1) has been developed which will eventually be tested in the present research paper.

3. Research Methodology

3.1 Variables of the study

Based on the review of the literature, the following variables are considered for study (refer Table – 1).

3.2 Sampling Design

The study considered the Indian firms that reported to CDP questionnaire. CDP is an independent non-profit organization that captures information on climate change and GHG from various companies across the world (CDP, 2012). A number of Indian firms disclosing their emission data on the CDP is not very impressive. In 2019, only 49 Indian companies have disclosed emission data on the CDP. Further, companies with inadequate financial data are also removed to ensure the reliability of results. Finally, 39 firms were selected from diverse manufacturing and service industries for the study.

3.3 Methods of data analysis

Descriptive and inferential statistics such as mean, standard deviation, correlation analysis, and multiple regression analysis are applied for data analysis. Further, variance inflation factor (VIF) has been used to test multicollinearity. Binary logistic regression has been adopted as the independent variable is categorical (Akbas and Canikli, 2019). The following regression model (Eq. 1) is framed to ascertain the effect of independent variables on dependent one.

$$EMR = \alpha + \beta_1 SZ + \beta_2 PRFT + \beta_3 LEVG + \beta_4 IND + \varepsilon \quad \text{_____ Eq. (1)}$$

Where,

EMR = Emission Disclosure (1 – Disclosed, 0 – Otherwise)

SZ = Size of the firm

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PRFT = Profitability

LEVG = Leverage

IND = Industry

4. Data Analysis and Interpretations

4.1 Descriptive and Correlation Analysis

Table – 2 presents the condensed descriptive statistics and correlation coefficients of the sampled data. The average emission disclosure is 0.689 which indicates that the majority of sample firms have disclosed the emission details on CDP. Average ROA value (8.30%) indicates a moderate to low profitability of selected firms along with higher variations among them as indicated by the standard deviation value (0.074). Further, the sample companies are moderately levered as the leverage ratio is approx. 45%. Based on descriptive results, it can be concluded that the selected firms are medium sized, less profitable, and moderately levered. Further, the correlation matrix is also included in table – 2. Except industry, all variables are found to be significantly correlated with disclosure. Firm size has significant positive relation whereas profitability and leverage are negatively related to emission disclosure. Besides, VIF has been calculated for detecting multicollinearity. The highest value of VIF is 1.204 which is below the threshold limit of 10 (Gujarati, 2003). Hence, it can be inferred that the problem of multicollinearity will not affect our regression results.

4.2 Result of Binary Logistic Regression

The output of the logistic regression model is reported in table – 3. To test model fit, Omnibus test as well as Hosmer and Lemeshow test has been performed and both have prescribed identical conclusion that the model is statistically significant ($\chi^2 = 44.317$, $p < 0.01$). Further, the pseudo R^2 value is 21.1% indicating that the selected model can explain 21% changes in the probability of the firm disclosing the carbon emission on the CDP. Percentage accuracy in classification (PAC) is 72.20% which suggests the success rate of predicting the probability of firms' disclosure. Referring to the individual factors, size (p value < 0.01), profitability (p value < 0.05), and leverage (p value < 0.01) are found to be significant determinants of emission disclosure. Size has a positive impact on disclosure indicating that large size firms tend to disclose more as compared to small firms. The negative impact of profitability and leverage implies that highly profitable and geared companies tend to disclose less information about the emission. The results are consistent with past findings of Prado-Lorenzo et al. (2009), Kumar and Firoz (2019), and Akbas and Canikli (2019).

5. Discussion of Results and Implications

Present research purports the factors affecting the revelation of carbon emission using CDP data of the Indian firms. Among the selected factors, size, leverage, and profitability are the significant factors however type of industry (sensitive or non-sensitive) does not have a significant effect on emission revelation. Chaklader and Gulati (2015) and Akbas and Canikli

(2019) have also reported similar results pertaining to industry type. Further, as hypothesized, firm size has a positive effect on carbon disclosure and it confirms the findings of Halimah and Yanto (2018) and Freedman and Jaggi (2005). Large firms are closely monitored by various stakeholders and hence they remain under pressure to improve their performance constantly. On the other hand, profitability and leverage have a significant negative effect on the likelihood of carbon revelation and the results are supported by Chakledar and Gulati (2015),Yanto and Muzzammil (2016), and Ferrat (2021). The negative effect of profitability can be justified as profitable firms may be inclined towards highlighting their financial results rather than other information (Irwhantokoand Basuki, 2016). Lastly, the relation between debt financing and carbon revelation is a result of voluntary disclosure policy in the Indian context wherein firms avoid disclosure of poor non-financial performance to access funds at competitive rates from banks (ChithamboandTauringana, 2014). To sum up, the findings of the present research are highly cohesive with past studies conducted in this area.

5.1 Implications of Study

Current research enumerates several important implications for academicians, scholars, and practitioners. Firstly, the study is based on CDP firms operating in India which is one of the fastest emerging countries in Asia where disclosure studies are still at the budding stage. Secondly, results reveal that Indian companies have not adopted the environmental disclosure practices fully leading to a poor governance framework. This requires the introduction of a separate legal context to address the same. Thirdly, as profitability and carbon revelation are negatively related, government/regulators have to incentivise the disclosing firms to improve their financial position and motivate them to pursue the same.

6. Conclusion

The increasing adoption of emission revelation practices in academic research is constrained to developed economies only and limited evidence is available for emerging markets like India. The present study examines the factors affecting carbon disclosure through the CDP questionnaire. Using emission data through voluntary disclosure on the CDP from 2014 to 2020, a regression model has been developed

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and estimated using the binary logistic regression method. The findings conclude that firm size, profitability, and leverage are major factors affecting firms' environmental disclosure.

Finally, the current research attempts to provide a comprehensive view of emission disclosure but few limitations are noted. Firstly, it considers only those companies which have disclosed their carbon emission under CDP, and therefore the sample includes a limited number of companies. Secondly, environmental regulations differ across various countries, hence the findings of current research should be interpreted in the Indian context.Despite the limitations, the present findings will assist managers and practitioners to device their disclosure policy. Further, the current research will add value to the existing environmental researches, especially in emerging economies.

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Nature of Variable	Name of Variable	Computation Method	Source
Dependent	Emission Revelation (EMR)	Dichotomous Variable 1 – disclosed emission data on CDP, 0 – otherwise	Kumar and Firoz (2019)
Independent	Size (SZ)	Log (Total Assets)	Halimah and Yanto (2018)
	Profitability (PRFT)		Chaklader and Gulati (2015)
	Leverage (LEVG)		Prado-Lorenzo et al. (2009)
	Industry (IND)	Dichotomous Variable 1 – sensitive industry, 0 – otherwise	Kumar and Firoz (2018)

Table: 1 Operationalization of Variables

Variables	Mean (SD)	Max (Min)	EMR	SZ	PRFT	LEVG	IND
EMR	0.689 (0.464)	1.000 (0.000)	---				
SZ	4.341 (0.495)	5.538 (3.456)	0.265**	---			
PRFT	0.083 (0.074)	0.319 (-0.161)	-0.602**	0.033	---		
LEVG	0.449 (0.171)	0.822 (0.091)	-0.207**	0.140*	-0.040	---	
IND	1.436 (0.497)	1.000 (0.000)	-0.015	-0.251	0.282*	-0.301*	---

**- Significant at Source: Compiled from SPSS output*

Table: 2 Descriptive Statistics and Correlation Matrix

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Variables	Co-efficient	Std. Error	p – value
Constant	-2.975	1.417	0.036
SZ	1.571	0.320	0.000
PRFT	-6.273	2.605	0.016
LEVG	-5.387	1.201	0.000
IND	0.076	0.308	0.806
Omnibus Test / LR Statistic (Sign. Value)	44.317 (0.00)		
Hosmer and Lemeshow Test (Sign. Value)	16.198 (0.074)		
Pseudo R^2	0.211		
PAC	72.20%		

Source: Compiled from SPSS output

Table: 3 Result of binary logistic regression

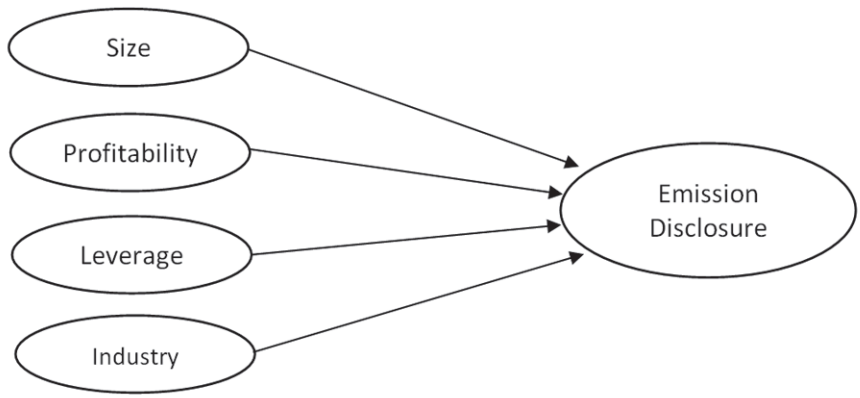

Figure 1 – Conceptual model – Determinants of emission disclosure

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