Does Environmental Morality Need the Restriction of Pressures? An Empirical Analysis of the Construction Corporations

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Abstract. Rapid urbanization triggers more demand for buildings and infrastructure; thus, construction corporations need to take on more environmental responsibility. There is a decoupling of environmental morality in construction corporations, i.e. environmental moral disengagement (EMD), which is likely to serious failures in corporate management matters (e.g. greenwashing behaviors). Construction corporations frequently use unethical behavior, i.e., EMD, to justify their actions, which eventually prevents society from developing sustainably. Through the lens of neo-institutional theory and resource dependence theory, this study applies the necessary conditions analysis (NCA) to examine the importance of four types of pressure in regulating construction corporations' EMD. The results of NCA show that coercive pressure, normative pressure, and mimetic pressure have inhibitory effects on EMD. However, economic pressure positively contributes to EMD and its effect has been present since the birth of EMD. This study provides contingent suggestions for the development of environmentally sensitive corporations in their moral behavior in combination with a multi-dimensional pressure circumstance.

Keywords: Environmental morality · Corporation management · Necessary conditions analysis · Coercive pressure · Normative pressure · Mimetic pressure · Economic pressure

1 Introduction

Construction corporations, as significant and direct actors in construction, should be actively encouraged to adopt environmentally friendly practices in order to address the environmental issues brought on by urbanization. Yet, some construction corporations merely turn to immoral practices (such as greenwashing techniques, which involve misrepresenting and hiding environmental difficulties during construction to project a favorable green image) to justify their actions [1]. This kind of immoral behavior is inherently rooted in the decoupling of construction corporations' ethos (i.e. EMD) [2]. EMD can explain unethical behaviors, which means construction corporations disassociate from their internal moral standards and cast reflections unethically without distress [3].

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Table 1. Four Types of Pressure

Type of pressure	Definitions
Coercive pressure	Requirements of relevant government departments for construction environmental protection work [5].
Normative pressure	The effects of both traditional media (e.g. TV stations, newspapers, etc.) and new media (e.g., Weibo, WeChat, etc.) coverage or exposure on construction environmental work [7].
Mimetic pressure	The recognition of the construction environmental protection works of the participants in other corporations [8].
Economic pressure	Environmental difficulties in construction could result in expenses [6].

Construction corporations need to ensure that they are acting under moral constraints through constant struggle, which is necessary due to the pressures and temptations they encounter in and around organizations [4]. In order to regulate behavior in a more targeted manner, many scholars have introduced the neo-institutional theory to regulate immoral behavior in corporations through three aspects: coercive pressure, normative pressure, and mimetic pressure [5]. Besides, faced with the triple test of investment, duration, and quality, construction corporations need to save costs; the waste generated in production also requires significant investment in treatment to achieve the goal of environmental friendliness [6]. In the case of constrained resources, economic pressure can be introduced into the analysis based on resource dependence theory. In sum, the restraining effects of coercive pressure, normative pressure, mimetic pressure, and economic pressure on construction corporations' EMD have been addressed in previous studies. However, these four types of pressures have not been studied within the same framework. Our novel findings shed new light on conventional wisdom, and reconcile the contradictory relationships between EMD and different types of pressures. The specific definitions of the four types of pressure are shown in Table 1.

2 Data Analysis and Results

2.1 Sample and Data Collection

In this study, a questionnaire survey method was adopted to collect data, and the design of the questionnaire was carried out by reading a large amount of relevant literature and conducting interviews with experts. The questionnaire design work was divided into the following four stages. First, this study refers to the established scales within the journal literature and appropriately migrates them according to the actual situation to identify relevant questions and establish a question bank. Second, experts were invited to propose modifications to the questionnaire, including adding or removing individual dimensions and items. Thirdly, in order to further improve the questionnaire, participants were asked to answer. The first 30 data filled out earliest were selected for the pilot test. After that, a total of 903 questionnaires were distributed, and invalid samples were identified and eliminated. In particular, 216 samples with insufficient answering time or outliers (e.g.,

Table 2. Descriptive analysis results

	Measurement	Frequency	Percentage (%)
Work experience (years)	<5	139	23.72
	5–10	179	30.55
	11–15	87	14.85
	16–20	55	9.39
	>20	126	21.50
Professional role	Project owner	146	24.92
	Project supervision	249	42.49
	Construction contractor	150	25.60
	Others	41	7.00
Education background	College or below	132	22.53
	Bachelor	337	57.51
	Master	107	18.26
	Doctor	10	1.71

the same scoring on a page) as well as 56 samples with "do not know" responses regarding on-site construction environmental management were removed. Finally, there were 586 valid samples, with a recovery rate of 64.89%. This study used a power analysis to confirm the sample size after receiving valid samples [9]. The power analysis shows that this study has a power of 0.999 to uncover the association between four stressors and the EMD of the construction corporations given the current sample size.

The results of the descriptive analysis are shown in Table 2. It can be presumed that the respondents have a thorough understanding of the questionnaire items and the actual circumstances of the projects because nearly 80% of them have a bachelor's degree or above and 76.3% have at least five years of work experience. According to the study's self-assessment and other assessments' design, owners, supervisors, and construction corporations contributed different percentages of responders (24.9, 42.5%, and 25.6%, respectively). [10].

2.2 Necessary Conditions Analysis

Examining the effects of many elements that are necessary but not sufficient to explain how they contribute to an outcome is possible through the use of necessary conditions analysis (NCA) [11]. This method includes three aspects: a scatter plot, effect size, and a bottleneck [12]. The overall association between condition X and result Y is shown in a scatter plot [13]. The effect size demonstrates the degree of the constraint of condition X on outcome Y [11]. The bottleneck is the marginal level for the desired effect level [13].

Scatter plots.

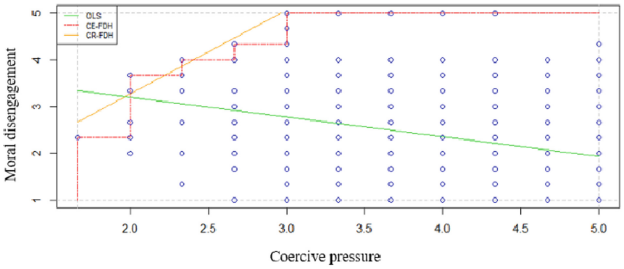
By dividing the regions of the scatter plot, NCA can determine the presence of a necessary condition. This is shown by drawing a ceiling line that divides the entire region into two parts: the presence and absence of observations [11]. The EMD upper range is determined by four types of pressure, which are expressed as a ceiling line. Ceiling Regression with Free Disposal Hull (CR-FDH) and Ceiling Envelopment with Free Disposal Hull (CE-FDH) are two ceiling lines [14]. The default result is CE-FDH for non-parametric methods and CR-FDH for parametric linear methods. When a straight ceiling line does not accurately depict the data along the zone border, CE-FDH is chosen. The relationships between the four types of pressures and EMD are shown in Fig. 1.

Effect size.

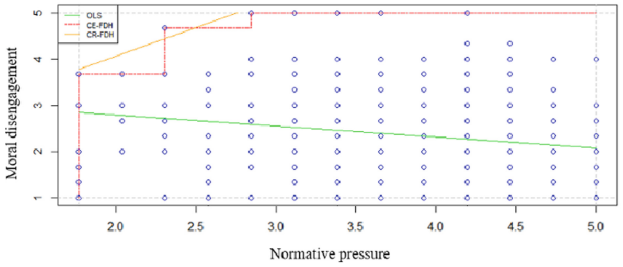
The effect size of the necessary condition is related to the ceiling mentioned before. The larger the area of the ceiling envelope, the stronger the constraint of the necessary condition can be considered [11]. The formula for the effect size is d. There are four types of thresholds to evaluate the strength of the effect: $0 < d < 0.1$ as a "small effect", $0.1 \leq d < 0.3$ as a "medium effect", $0.3 \leq d < 0.5$ as a "large effect", and $d > 0.5$ as a "very large effect" [14]. To ensure the reliability of findings, two analysis techniques, namely ceiling envelopment (CE) and ceiling regression (CR), were employed. As shown in Table 3, the effect of normative pressure under both approaches was minimal ($d < 0.1$), indicating that its impact on EMD was relatively negligible. However, other pressures showed medium effects, which can also be considered as necessary conditions.

Bottleneck.

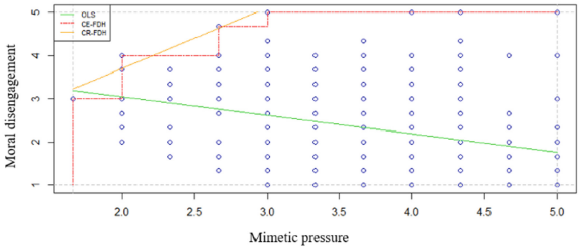
In addition to the scatter plots and effect size, the bottleneck table provides another way to display the ceiling line. The values observed (ranging from 0 to 1) represent the threshold levels of necessary condition X for achieving the desired level of outcome Y [13]. Conditional factors, specifically coercive, mimetic, normative, and economic pressures, play diverse roles in different levels of outcomes, as shown in Table 4. Economic pressure becomes a necessary condition only after EMD reaches a level of 0.1, while coercive pressure becomes a prerequisite when EMD reaches 0.5. Mimetic pressure becomes a necessary condition when EMD reaches 0.6, and normative pressure becomes the necessary condition when EMD is at the level of 0.7. To restrain the 90% quantile of EMD, coercive pressure needs to reach 0.322, while normative, mimetic, and economic pressure each need to reach 0.206, 0.293, and 0.300, respectively. It can be observed that to restrain the highest level of EMD, the requirements of different condition factors such as normative pressure (from 0.206 to 0.306) and mimetic pressure (from 0.293 to 0.379) are elevated.



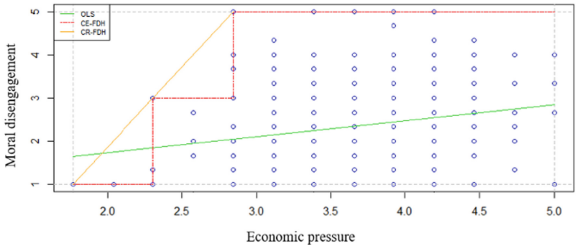
(a) Coercive pressure and environmental moral disengagement



(b) Normative pressure and environmental moral disengagement



(c) Mimetic pressure and environmental moral disengagement



(d) Economic pressure and environmental moral disengagement

Fig. 1. Scatter plots of different pressure and environmental moral disengagement **a** Coercive pressure and environmental moral disengagement; **b** Normative pressure and environmental moral disengagement; **c** Mimetic pressure and environmental moral disengagement; **d** Economic pressure and environmental moral disengagement

Table 3. Analysis results of necessary conditions

Conditions	Method	Accuracy (%)	Ceiling zone	Effect size (*d*)
CP	CE	100	1.889	0.142
	CR	99.3	1.512	0.113
NP	CE	100	1.111	0.069
	CR	99.8	0.747	0.047
MP	CE	100	1.444	0.108
	CR	99.5	1.115	0.084
EP	CE	100	4.000	0.250
	CR	100	2.667	0.167

Note: CP = coercive pressure; NP = normative pressure; MP = mimetic pressure; EP = economic pressure

Table 4. The bottleneck result

Y	X1	X2	X3	X4
EMD	CP	NP	MP	EP
0	NN	NN	NN	0.000
0.1	NN	NN	NN	0.033
0.2	NN	NN	NN	0.067
0.3	NN	NN	NN	0.100
0.4	NN	NN	NN	0.133
0.5	0.056	NN	NN	0.167
0.6	0.122	NN	0.036	0.200
0.7	0.189	0.006	0.121	0.233
0.8	0.256	0.106	0.207	0.267
0.9	0.322	0.206	0.293	0.300
1	0.389	0.306	0.379	0.333

Note: NN = not necessary

3 Conclusions

The results of NCA reveal that coercive pressure, normative pressure, mimetic pressure, and economic pressure become the necessary conditions at different levels of EMD. An interesting finding is that all three types of pressures based on the neo-institutional theory: coercive pressure, normative pressure, and mimetic pressure have inhibitory effects on EMD. However, economic pressure is the only type of pressure that positively contributes to EMD. And its effect has been present since the birth of unethical behavior (i.e., when the level of EMD reaches 0.1, economic pressure becomes the necessary condition.). The basis for developing tailored environmental protection rules based on various degrees of EMD is found and demonstrated by NCA analysis, which identifies and demonstrates conditions in terms of the necessity for achieving a given level of results. The results of this study provide a novel and nuanced perspective to explain the pressure mechanisms underlying the construction corporations' EMD. In the future, we will use other data analysis methods based on the results of NCA to study the effects of different pressure combinations on EMD in depth.

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