

CAN STAKEHOLDER THEORY ADD TO OUR UNDERSTANDING OF MALAYSIAN ENVIRONMENTAL REPORTING ATTITUDES?

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Abstract

This research aims to ascertain whether stakeholder theory could, in fact, add to our understanding of the corporate environmental disclosure attitudes from a developing country perspective. Multiple ordinary least squares regression was used where Ullmann's (1985) three dimensional stakeholder model was operationalized to test whether the quality and quantity of annual report environmental disclosures (AREDs) were associated with the proxies for stakeholder power, strategic posture and economic performance. Of the three stakeholders represented, only government power (GP) was significant; the other two - shareholder power (SP) and creditor power (CP) – were not significantly related to AREDs. The results also showed that proxies for strategic posture were significant and positively related to AREDs while the economic performance proxy was not. Subsequent interviews with CEOs of disclosing firms confirmed that while AREDs were used to disseminate environmental information to stakeholders, there was not much demand from both shareholders and creditors given the low level of environmental awareness in Malaysia.

Keywords: *Stakeholder theory, annual report environmental disclosures, Malaysian listed companies.*

Introduction

Malaysia's quest to become a developed country by the year 2020 has been well disseminated since the launch of *Vision 2020* in 1991. Concerned about the need to maintain a well balanced development, the Malaysian government has intensified the incorporation of environmental considerations since the Eighth Plan period, 2001-2005 (Economic Planning Unit (EPU) 2006). Despite

this government initiative, the Malaysian Quality of Life Index (MQLI) for 1990 to 2004 showed a negative percentage change in two areas, one of which is on the environmental front (the other being on public safety)¹.

Having gone past the mid-point of its journey towards the 2020 target, Malaysia is now in its final fifteen-year phase commencing with the Ninth Plan period, 2006 - 2010. Recognizing the necessity to improve the environmental index, the Ninth Plan promotes preventive measures to mitigate negative environmental effects by “fostering closer cooperation between *stakeholders* in addressing environmental concerns” (EPU, 2006 p. 453, italics added).

Given this shift to focus on stakeholder engagement, this study used a stakeholder model to understand the environmental reporting attitudes of publicly listed Malaysian companies in order to get a glimpse as to what had transpired in the corporate arena before the Ninth Plan period. Stakeholder theory has the potential to offer a useful framework given its basic premise that successful management of the relationship with stakeholders is the key to success (Freeman, 1983).

The lessons learned from the Western experience hint that with rapid economic growth comes the price of environmental degradation as a downside to industrialization. Being a rapidly developing economy, Malaysia offers a fertile setting from which an investigation could be made on how corporate entities manage their possibly competing stakeholder demands through the provision of environmental disclosures.

The motivations for this study are two-fold: (1) to ascertain whether stakeholder theory can, in fact, add to our understanding of corporate environmental reporting attitudes from a developing-country perspective; and (2) to gain relevant insights as to whether the way forward to better annual report environmental disclosures (AREDS) in Malaysia is to rely on its key stakeholders. In other words, do demands from key stakeholders drive corporate management to improved environmental accountability and reporting? This has practical relevance for policy decisions particularly since prior studies from developing economies suggest that the public is less demanding in developing countries (Newson and Deegan 2002) and that voluntary disclosures are less when the perceived threat from stakeholders is less (de Villiers and van Staden 2006). Furthermore, Taylor and Shan (2007) assert that Western-derived theories are only partially relevant for social and environmental reporting. Hence, it is paramount to get insights on the extent to which a Western-developed stakeholder model can be applied to analyze the Malaysian context.

To facilitate the analysis, Ullmann’s (1985) three dimensional stakeholder model comprising of *stakeholder power, strategic posture and economic performance* was operationalized using ordinary least squares regression to test whether significant relationships existed between the quality and quantity of AREDS and the chosen proxies to Ullmann’s three dimensions. Of the three stakeholders represented, only government power (GP) was significant; the other two—shareholder power (SP) and creditor power (CP) – were not significantly related to AREDS. The results also showed that both proxies for strategic posture were significant and positively related to AREDS while the economic performance

proxy was not significant. Despite the insignificant results, subsequent interviews with CEOs of disclosing firms confirmed that while AREDs were used as a way to disseminate environmental information to stakeholders, there was not much demand from both shareholders and creditors given the low level of environmental awareness in Malaysia.

The rest of the paper is organized as follows. The next two sections provide a review of relevant literature on Malaysian corporate social and environmental reporting and a brief discussion of stakeholder theory literature leading to hypotheses development. An explanation of the research method is outlined next followed by the discussion of the main findings. Finally, the summary and conclusion are provided.

Malaysian Regulatory Background and Literature Review

The Malaysian government's Eighth Five-year Plan (2001-2005) highlights the roles of local authorities in encouraging firms to consider such matters like environmental cost computation, ISO14001, environmental reports and environmental audits. Despite these initiatives, there is very limited requirement for Malaysian companies to provide environmental disclosures in their Annual Reports.

Malaysian Environmental Reporting Regulations

The main authority for the prevention and control of environmental pollution in Malaysia is the Department of Environment (DOE), a department under the umbrella of the Ministry of Science, Technology and Environment. DOE is empowered to develop standards and guidelines to ensure compliance and to enforce the Environmental Quality Act of 1974 (EQA). Section 37 of the EQA entitles the Director General of DOE to demand environmental information from companies in the event of non-compliance with the EQA but such information is not disclosed to the public.

Sub-regulation 22 of the Occupational Safety and Health Act of 1996 (OSHA) requires manufacturers to make public disclosures on the incidence of any major accident hazards and their impact on the population and environment. Section 169 subsection 7 of the Companies Act of 1965 (CA) requires directors to include information on any item, transaction or event of a material and unusual nature that may have arisen during the course of the financial year. Although these legislations can be interpreted to include environmental information, disclosures are not often provided, particularly in the annual report, as phrases such as, "major accident hazards" and "material and unusual nature" can be vaguely interpreted.

The only other source of environmental reporting guidelines is the Malaysian Accounting Standards Board (MASB). Financial Reporting Standard (FRS) 101 (formerly known as MASB 1) makes explicit reference to environmental reports encouraging companies to present additional information if management believes they will assist users in making economic decisions. FRS 137 (formerly MASB 20) sets out the disclosure requirements for the recognition of contingent liabilities and assets. Although FRS 137 does not provide

specific details of the types of liability, it is foreseeable that environmental liabilities could potentially be included within a company's financial statement.

It is clear from the above discussion that annual report environmental disclosure in Malaysia is largely optional. Despite the absence of mandatory requirement, the literature reveals that Malaysian corporate environmental reporting practice is on the increase.

Malaysian Corporate Environmental Reporting

Since the 1980s, Malaysia had attracted researchers examining corporate social responsibility practices (Teoh and Thong, 1984) and reporting attitudes (Andrew, Gul, Guthrie and Teoh, 1989). Similar conclusions were reached in these studies, i.e. that Malaysian corporate social reporting practice is still at its infancy, particularly in the environmental area. Following up on Teoh and Thong's investigation, Rashid and Ibrahim (2002) reported that only about half of the companies included in their study had disclosed their socially responsible practices even though most claimed that they were involved in socially responsible activities.

Studies focusing on Malaysian environmental reporting have not appeared in the literature until the turn of the millennium. In a first-of-its-kind study commissioned by the Association of Chartered Certified Accountants (ACCA), the state of Malaysian corporate environmental reporting was examined by the Environmental Resources Management Malaysia (ERMM). An analysis of annual reports and stand-alone environmental reports by companies listed in the Kuala Lumpur Stock Exchange (KLSE) main board from 1999 to 2001 showed an increase in environmental reporting, albeit minimal. The study revealed that:

The number of reporting companies grew from 25 in 1999, to 35 in 2000, reaching 40 companies by 2001. This represented 5.3%, 7% and 7.7% of the KLSE main board listed companies in 1999, 2000 and 2001 respectively... Half the reporting companies were in the list of the top 100 companies in Malaysia... (ERMM 2002, p. 8).

The ERMM report showed clearly that environmental reporting was not widely practised in Malaysia. The report also highlighted that 50% of disclosers are in the top 100 large companies. Thompson and Zakaria (2004) confirmed that Malaysian environmental reporting was still at its infancy and that majority of environmental disclosers were large companies with seven of the top 10 companies (by market capitalization) providing mostly general policy statement with some unsubstantiated declarative statements.

There was an increase in the number of studies examining the motivations behind Malaysian environmental disclosures using different theoretical perspectives and methodologies. Adopting the contracting and political cost perspective, Ahmad, Hassan and Mohammad (2003) examined the voluntary disclosure of environmental information in the annual reports of 299 KLSE-listed companies. Their results showed lack of support for the general hypothesis that firms voluntarily disclosed environmental information to mitigate contracting and political costs. They attributed this result to the "argument that

the commonly held theoretical framework of principal-agent relationship may not hold in the Malaysian context” (p.85). Ahmad and Sulaiman (2004) employed legitimacy theory in their study of KLSE main board listed companies from the construction and industrial products sectors. They concluded that given the very low level of disclosure, there was no serious attempt on the part of the companies to use AREDs to appear legitimate. Although different theoretical frameworks were used in these two studies, both found limited support for the central theories adopted.

Three recently published Malaysian studies (Yusoff, Lehman and Nasir, 2006; Sumiani, Haslinda and Lehman, 2007; Smith, Yahya and Amiruddin, 2007) adopted no specific theoretical model. In examining the AREDs of top 50 companies listed in KLSE, Yusoff et al. (2006) used content and discourse analysis. Their analysis showed that “majority of disclosures made were around the motive of stakeholders’ concern” (p. 140). Sumiani et al. (2007) also examined the disclosures made by top 50 Malaysian public companies to explore the reporting behaviour of ISO-certified companies. They found that out of 36 disclosing companies, 13 were ISO14001 certified and all the ISO-certified firms provided some form of environmental disclosure in their annual reports. Smith et al. (2007) concentrated on the disclosing companies identified by the ERMM (2002) study. Only financial performance was found to be significantly related to disclosures. However, contrary to expectation, it was negatively associated with AREDs prompting their conclusion that “environmental reporting practices in Malaysia appear to differ from those elsewhere, which may be partly attributable to the maturity of reporting process” (p. 195).

The Malaysian studies reviewed highlighted two important points. First, that environmental reporting in Malaysia, although increasing, was still lagging behind the adoption of socially and environmentally responsible activities indicating a low level of maturity. Second, the theoretical frameworks used in various attempts to understand the motivations behind Malaysian corporate environmental reporting practices achieved limited support.

In consideration of the above points and following up on Yusoff et al’s (2006) finding that majority of AREDs were motivated by stakeholders’ concerns, it is envisaged that stakeholder theory has much to offer in a study focused on the Malaysian context. The next section outlines the background to stakeholder theory and the model adopted in this study.

Stakeholder Theory: Background and Model

The term stakeholder is originally introduced by Stanford Research Institute (SRI) to refer to “those groups without whose support the organization would cease to exist” (Freeman, 1983, p. 33). In developing stakeholder theory, Freeman (1983) introduces the stakeholder concept in two models: (1) a business planning and policy model; and (2) a corporate social responsibility model. In the first model, the focus is on developing and evaluating the approval of corporate strategic decisions by groups whose support is required for the firm’s continued existence, e.g. the owners, customers, public groups and suppliers. Although these groups are not adversarial in nature, their conflicting

behavior is considered a constraint for the strategy developed by management to best match the firm's resources with the environment. In the second model, corporate planning extends to include external influences which may be adversarial to the firm, such as, the regulatory bodies, environmentalist and special interest groups. This model enables managers to consider a strategic plan that is adaptable to changes in social demands of non-traditional stakeholders.

Corporate environmental responsibility is one area in which much community awareness has developed given the increasing effects of global warming, deforestation and unprecedented pollution. This increased level of environmental awareness creates the need for companies to include non-traditional stakeholders like the adversarial groups in formulating their corporate plans to adapt to changing social demands. The literature hints that companies provide disclosures voluntarily for various reasons (Gray and Bebbington, 2001; Buhr, 2007), most of which could be related to satisfying various stakeholder groups including adversarial stakeholders. Therefore, it is not surprising to see a proliferation of studies in developed countries, like the USA, Australia and elsewhere, indicating a wide diversity on corporate social and environmental reporting practices (Guthrie and Parker, 1990; Deegan and Rankin, 1996; Tilt and Symes, 1999). Some provide inadequate environmental disclosures which showed no relationship with the firm's environmental performance (Wiseman, 1982; Fekrat, Inclan and Petroni, 1996) while others even show a negative association between environmental disclosures and environmental performance (Patten 1992, 2002; Hughes, Anderson and Golden, 2001). In these studies, environmental performance is measured in various ways, such as, using toxic release data, environmental ratings by independent organizations, or even a specific event, like an oil spill.

Ullmann (1985) argued that CSR models developed in prior studies were misspecified because the relationship between firm strategy and social responsibility decisions was not included in the empirical tests. Ullmann proposed that these data needed to be analyzed from the context of theories, hence the title of his paper, "data in search of theory".

Ullmann's Three-Dimensional Stakeholder Model

Ullmann suggests that firms use social disclosures as a means to manage their relationships with their stakeholders and the external environment. This is the basic tenet of stakeholder theory. He then develops a three-dimensional framework consistent with the concept advanced in stakeholder theory.

Ullmann's framework is useful to explain the correlations between social disclosures, social performance and economic performance. The first dimension, *stakeholder power*, explains that a firm will be responsive to the intensity of stakeholder demands. For example, when stakeholders control critical resources, the firm is likely to react in a way that satisfies their demands. The second dimension, *strategic posture*, describes the mode of response the firm is likely to take concerning social demands. Companies employing an active posture try to influence their status by monitoring their position with stakeholders, e.g. by initiating socially responsible programs and disclosing their commitment. The third dimension, *past and current economic performance*, determines the relative weight of a social demand and

the attention it receives. This dimension is relevant because it is conceivable that firms suffering from poor profitability may place economic demands ahead of social demands.

Prior Studies Adopting Ullmann's Model

Roberts (1992) tested Ullmann's model to understand the determinants of corporate social responsibility (CSR) disclosure, using a sample of 80 companies drawn from a population of 130 major companies investigated in 1984, 1985 and 1986 by the Council of Economic Priorities (CEP) in the United States (US). Roberts found that his "measures of stakeholder power, strategic posture and economic performance are significantly related to levels of corporate social disclosure" (Roberts, 1992, p. 595).

Although Ullmann's model was initially used in CSR, at least four studies have used it in the environmental responsibility area. Husillos and Alvarez-Gil (2008) used the model to examine environmental disclosures by Spanish small and medium enterprises (SME) in the automobile industry. They concluded that "SMEs do not seek increased transparency by disclosing environmental information in their annual accounts" (p. 146). Magness (2006) employed a different approach. She used Ullmann's original contingency framework to conduct an empirical test of legitimacy theory following a major accident in the mining industry in Canada. Magness found no evidence that disclosure was moderated by financial performance but firms that had high public profile disclosed more.

Two Australian studies used Ullmann's model in examining listed companies' environmental disclosures (Chan and Kent, 2003) and environmental performance (Elijido-Ten, 2007). Chan and Kent regressed the quality and quantity of environmental disclosures against the variables similar to Roberts (1992). They found their proxies for strategic posture to be significant. Two measures of stakeholder power – shareholders and lobby groups – were also found to be significantly related to environmental disclosures. Elijido-Ten's study, on the other hand, examined the extent to which such measures were related to corporate environmental performance by using an independent, third-party ranking system (introduced by the Australian Conservation Foundation) as a measure for the level of corporate environmental performance. She found environmental performance to be significantly associated with stakeholder power (shareholder and government power) and strategic posture but not with economic performance.

The current study adopted the Ullmann's model to understand the ARED practices in Malaysia to gain relevant insights on the extent to which a Western-developed stakeholder model can be applied to analyze a developing economy, like Malaysia.

Research Design and Hypotheses Development

Sample and Data Collection

In order to understand the Malaysian corporate environmental reporting attitudes, it is important to focus on the disclosing companies and their incentives. The ERMM (2002)

study produced the list of Malaysian listed companies that provided AREDs. Hence, all the companies identified in the ERMM Report were used as the sample in this study. The Chief Executive Officers (CEOs)/Chief Financial Officers (CFOs) of these companies were contacted to request copies of annual reports (ARs) and to solicit interests for an interview to clarify questions that might arise from the analysis. Of the eight companies that sent their ARs, two CEOs agreed to be interviewed²: one from East Malaysia and one from West Malaysia. Despite this small number, their relevant knowledge provided important insights and additional explanations.

Hard copies of ARs not directly received from the companies contacted were downloaded from the KLSE website. The actual pooled data consisted of 79 companies: 40 for year 2000 and 39 for 2001 (one company was delisted³).

Hypotheses Development

Stakeholder Power

Ullmann (1985) suggests that if the firm believes that its stakeholders are concerned with social and environmental issues, the firm will be motivated to provide such disclosures. The hypothesis arising from this dimension states that:

Hypothesis 1: The power of the firm's stakeholders is associated with the quantity and quality of a firm's environmental disclosure.

From this hypothesis, it is necessary to identify the stakeholders. In line with the definition of stakeholders being "any group or individual who can affect or is affected by the accomplishment of that organization's goals" (Freeman, 1984, p. 46), it follows that nearly everyone is considered a stakeholder of the firm. This broad definition does not provide useful means of analysis since it is not possible to examine all the stakeholders. Given this limitation, it is decided to limit the number of stakeholders to those who have the potential to exercise the strongest power on the management of the firm. Consistent with Roberts (1992) and Elijido-Ten (2007), this study chose representative stakeholder groups, namely: (1) the shareholders, being a substantial group of stakeholders which in most cases are the primary provider of capital; (2) the creditors, having economic power through debt provision; and (3) the government, having the ability to intervene via legislation and penalize companies damaging the environment. In line with the first dimension, and consistent with Hypothesis 1, the following stakeholder-specific hypotheses were developed.

Shareholder Power (SP)

Prior studies (Christopher and Hassan, 1996; Craswell and Taylor, 1992; Frost, 1999) suggest that shareholder power (SP) may be measured by examining the degree of ownership concentration, e.g. the less the influence of the top 20 shareholders, the greater the likelihood that firms disclose more information because of the need to communicate when ownership is more dispersed. It is also suggested (e.g. Mckinnon and Dalimunthe, 1993; Malone et al., 1993) that there is a positive relationship between the number of shareholders and disclosure practices in the Annual Reports. These studies imply that wider ownership dispersion is associated with more and/or better disclosures. Hence, H1a states that:

H1a: Firms with high level of shareholder concentration are less likely to provide more and better quality environmental disclosures than firms with low level of shareholder concentration.

Creditor Power (CP)

The creditor power (CP) depends upon the degree to which the firm relies on debt financing (Roberts, 1992). Numerous studies suggest that the market considers the firm's environmental performance in its assessment of the firm's unbooked environmental liabilities which capital providers consider in their assessment of the firm's risk level (Barth and McNichols, 1994; Cormier and Magnan, 1997; Hughes, 2000; Clarkson et al., 2004). The implication is such that the more the firm relies on debt financing, the more likely it will provide more disclosures to be seen as a company with lower risk. This suggests that:

H1b: Firms with high leverage (i.e. debt/equity ratio) are more likely to provide more and better quality environmental disclosures than less leveraged firms.

Government Power (GP)

The power of the government as a stakeholder is manifested in its enforcement mechanisms. Watts & Zimmerman (1978) argue that corporations use socially responsible activities to reduce the risk of governmental intrusions. Furthermore, the government can be viewed as a powerful stakeholder, particularly in the Malaysian context that incorporates environmental considerations in its strategic vision. It is conceivable that companies belonging to environmentally sensitive industries (ESI) are likely to face more stringent government regulation as these firms are more likely to damage the environment because of the nature of their operations and the discharge of hazardous wastes. Prior studies (Chan and Kent, 2003; Deegan and Gordon, 1996; Jaffar et al., 2002) give evidence that ESI-firms provide more environmental disclosures possibly to deter government sanctions. The following hypothesis is, therefore, developed suggesting positive relationship:

H1c: Firms that belong to environmentally sensitive industries are more likely to provide more and/or better quality environmental disclosures than those in non-sensitive industries.

Strategic Posture

Strategic posture, the second dimension in Ullmann's model, pertains to the way an entity responds to social demands. A firm adopting a passive strategic posture makes no attempt to monitor and manage its relationship with its stakeholders. On the other hand, an active strategic posture implies continuous monitoring and management of the company's relationship with key stakeholders. Consequently, firms displaying active strategic posture are expected to disclose more environmental information. Hence, H2 is developed.

Hypothesis 2: The strategic posture adopted by the firm is associated with the quantity and quality of environmental disclosures.

Two alternate proxies for strategic posture are used: (1) the presence/absence of environmental committees and/or inclusion/exclusion of environmental concern in their vision/mission statement; or (2) the presence/absence of ISO14001 certification. The presence of environmental committee may not be sufficient to imply better strategic

posture as some firms may outsource environmentally responsive activities. A common certification process that recognizes environmental compliance is the ISO14001: Environmental Management System. There is no mandatory requirement to get ISO14001-certified but some companies choose to go through the rigorous certification process implying an active posture for environmental compliance. Using these proxies, the following alternate hypotheses are stated:

Environmental Concern (EC)

H2a: Firms with environmental committees and/or environmental concern in their vision/mission statement are more likely to provide more and/or better quality environmental disclosures than those firms without such committees or concern.

ISO 14001 Certification (ISO)

H2b: Firms that are ISO 14001 certified are more likely to provide more and/or better quality environmental disclosures than firms that do not have such certification.

Economic Performance

The accounting-based measure of economic performance is chosen as it has the advantage of being free from market perceptions of a firm's future earnings ability (as opposed to past performance). Ullmann's third dimension is based on past and current economic performance of the firm. Thus, the Average Return on Assets (AROA) was used as a proxy. Given the substantial costs involved in becoming environmentally responsible, the economic performance of the firm is an important factor to consider in determining whether environmental issues are a priority. Arguably, in periods of low economic performance, the firm's economic objectives will be given more attention than environmental concerns. Therefore, it is predicted that the economic performance of the firm is directly related to environmental disclosures. The third hypothesis is formed as follows:

Hypothesis 3: Firms with higher AROA are more likely to provide more and/or better quality environmental disclosure than firms with lower AROA.

Regression Model

Two ordinary least squares regressions are conducted: one for the dependent variable of quality of environmental disclosure (QLENDIS) and the other for quantity of environmental disclosure (QTENDIS). There were six independent variables namely: the shareholder power (SP); creditor power (CP); government power (GP) (measures of stakeholder power); environmental concern (EC), ISO14001 certification (ISO) (alternate measures of strategic posture); average return on assets (AROA) (measure of economic performance); and two control variables – the size (LSIZ) and the age of the firm (AGE). Further descriptions of the variables and the model used are shown below:

$$\text{QLENDIS/QTENDIS} = B_0 + \beta_1 \text{SP}_i + \beta_2 \text{CP}_i + \beta_3 \text{GP}_i + \beta_4 \text{EC}_i / \beta_5 \text{ISO}_i + \beta_6 \text{AROA}_i + \beta_7 \text{LSIZ}_i + \beta_8 \text{AGE}_i + e_i$$

Where:

QLENDIS	total quality score of environmental disclosure for firm <i>i</i> at period <i>t</i> ;
QTENDIS	total quantity score of environmental disclosure for firm <i>i</i> at period <i>t</i>
β_0	Intercept
SP	percentage of ownership of firm <i>i</i> held by shareholders holding 5% or more of total shareholding for firm <i>i</i> at period <i>t</i> ;
CP	average debt to asset ratio of firm <i>i</i> at period <i>t</i> ;
GP	1 for firms in environmentally sensitive industry; 0 otherwise;
EC	1 for firms with environmental committee and/or includes environmental concern in Mission/Vision statement; 0 otherwise
ISO	1 for firms with ISO 14001 certification as of 2001; 0 otherwise
AROA	average return on assets of firm <i>i</i> at period <i>t</i> ;
LSIZ	natural log of average sales revenues of firm <i>i</i> at period <i>t</i> ;
AGE	age since incorporation of firm <i>i</i> at period <i>t</i> ; and
<i>e</i>	error term

Content analysis was used to analyze QLENDIS and QTENDIS. QLENDIS was evaluated by giving the greatest *score of 3* to *quantitative specific disclosures* related to each of the items in the Environmental Disclosure Index (see Table 1). A *score of 2* was assigned to *non-quantitative but specific information* and a *score of 1* was given to *general qualitative or vague comments* (in line with prior studies such as Al-Tuwaijri et al., 2004; Hughes et al., 2001; Wiseman, 1982). QTENDIS was measured using the number of sentences. In cases where tables or figures were provided, each figure and description was counted as one sentence. The findings from the analysis are discussed next.

Results and Discussion

Quality and Quantity of Environmental Disclosures

Table 1 contains the summary of the category of related disclosures made in 2000 and 2001 tabulated by the number of companies disclosing in different parts of the Annual Report. The Chairman's Statement (CSTAT) was where a considerable number of companies provide AREDs. However, the most common place to find AREDs was in the Operations Review section and/or in Other sections (OR/O), like the vision/mission statement or in a separate section. Table 1 shows that majority of companies provided general disclosures (score of 1) with only three (3) companies, providing quantitative information (score of 3). It is interesting to note that none provided any information on *accrued liabilities/deferred tax provision relating to environmental expenditures, present litigation, potential litigation and estimated litigation cost / contingent liability* (categories 5, 7, 8 and 9) despite FRS 137 requirement.

Table 1: Environmental Disclosure Ratings Summary According to Location of Disclosures in Annual Report for 2000-2001

Categories and Items of Information	NUMBER OF COMPANIES DISCLOSING WITH THE																	
	SCORE=3			SCORE=2			SCORE=1											
	FS/N '00	'01	'00	OR/O '00	'01	'01	FS/N '00	'00	'01	OR/O '01	'00	'01	FS/N '00	'00	'01	OR/O '00	'01	
ECONOMIC FACTORS																		
1.Past/current expenditures: environmental equipment, facilities and remediation				1	2											4	1	
2.Past/current operating costs: environmental equipment, facilities and remediation	1	1	1	1	2										2	2		
3.Future expenditures: environmental equipment, facilities and remediation																		
4.Future operating costs: environmental equipment, facilities and remediation				2	1													
5.Accrued liabilities/ Deferred tax provision relating to environmental expenditures																		
6.Restructuring, shutdown and/or plant closing due to environmental concerns																		
LITIGATION																		1
7.Present litigation																		
8.Potential litigation																		
9.Estimated cost / Contingent liability																		
POLLUTION ABATEMENT																		
10.Pollution abatement																		
11.Emission and discharge information				2	2											5	5	
12.Compliance status of facilities				1	1											4	5	
OTHER ENVIRONMENTALLY-RELATED INFORMATION																		
13.Discussion of regulations and requirements																		
14.Policies or concern for the environment																		
15.Conservation of natural resources				3	2													
16.Awards for environmental protection																		
17.Recycling				2	1													
18.Department/committee/offices for pollution control																		
19.Other environmentally friendly products and/or activities																		

FS/N = Financial Statements and Notes to Accounts
 ## CSTAT = Chairman's Statement
 ### OR/O = Operations Review and Others

The quantity of AREDs (see Table 2: Descriptive Statistics) ranged from 0 to 95 sentences with a mean (median) of 16.37 (9) sentences. The quality of AREDs, however, ranged from 0 to a maximum of 22 with a mean (median) of 6.58 (5). Overall, the quality of disclosure was low given that none of the companies provided disclosure on all eight (8) items in the Environmental Disclosure Index (EDI) in any part of the Annual Report. The maximum number a company could get for quality is 54 (or 57), i.e. 18 (or 19 including others) items multiplied by the maximum score of 3 if specific quantitative information is provided.

Descriptive Statistics

Descriptive statistics are shown in Table 2. Panel A shows the dependent variables and the independent continuous variables whilst Panel B has the indicator variables. Shareholder power (SP) had a minimum of 14.87%, maximum of almost 87% and a mean (median) of 58.88% (59.16%) indicating that majority of the firms in the sample had high ownership concentration. The creditor power (CP) had a wide range from a low of 2.47% to a high of 1031%. The median of 72.43% was probably a better representation rather than the mean of 127.83% which was too high because of an outlier, i.e. a company in the financial sector with more than 1000% debt to equity ratio. Despite this, it is clear that majority of the Malaysian disclosing companies were highly geared. The average return on assets (AROA) shows that half the companies in the sample had AROA of 5.72% and above with a mean return of 6.22%. The age of the firms (AGE) ranged from a minimum of 3 to a maximum of 51 years. Panel B shows that majority (about 80%) of the firms were in an environmentally sensitive industry (GP = 1). In keeping with previous studies (e.g. Wiseman, 1982; Patten, 1992, 2002; Hughes, 2000; Clarkson et al., 2004), the industries considered to be environmentally sensitive were those in the plantation, property development, construction, infrastructure and certain companies in the industrial/consumer products and trading services (particularly those involved in steel/metal, heavy equipment, power generation, chemicals and paper and forest timber products). Panel B also shows that only a third (34%) of the firms showed environmental concern (EC) in their Vision/Mission Statement and/or had an environmental committee. The same percentage (34%) of firms had ISO 14001 certification. It is interesting to note, however, that not all ISO14001-certified companies showed environmental concern (EC).

Correlation Matrix and Bivariate Analysis

The Pearson product moment correlation matrix (see the bottom left side of Table 3) shows that the quality and quantity of disclosures had a high correlation coefficient of 0.901 at a significance level of $p < 0.0001$, suggesting close association.

There was no indication that an unacceptable level of multicollinearity was present because none of the correlation coefficient between independent variables was higher than 0.80⁴. The highest correlation coefficient was 0.381 for environmental concern (EC) and ISO 14001 (ISO) independent variables. Given that EC and ISO are alternate measures to strategic posture (i.e. only one is alternately included in the multiple regression), it should not raise any concern for multicollinearity even if the correlation coefficient exceeds 0.8.

Table 2: Descriptive Statistics

Panel A: Continuous Variables						
Variable	Variable Description	Minimum	Maximum	Mean	Median	Standard Deviation
QLENDIS	Quality of Environmental Disclosure: Total score for quality of environmental disclosure for firm <i>i</i> at period <i>t</i> ;	0.00	22.00	6.58	5.00	5.92
QTEINDIS	Quantity of Environmental Disclosure: Total quantity of environmental disclosure (number of sentences) for firm <i>i</i> at period <i>t</i>	0.00	95.00	16.37	9.00	20.37
SP	Shareholder Power: Percentage of ownership of firm <i>i</i> held by shareholders holding 5% or more of firm <i>i</i> at period <i>t</i>	14.87	86.59	58.88	59.16	18.61
CP	Creditor Power: Average debt to equity ratio of firm <i>i</i> at period <i>t</i>	2.47	1031.24	127.83	72.43	191.13
AROA	Average Return on Assets of firm <i>i</i> at period <i>t</i>	-10.32	21.09	6.22	5.72	5.26
LSIZ	Log Size: Natural log of average sales revenues of firm <i>i</i> at period <i>t</i> ;	7.51	10.15	8.86	8.77	0.59
AGE	Age: Number of years since incorporation of firm <i>i</i> at period <i>t</i>	3.00	51.00	25.46	28.00	12.18

Panel B: Indicator Variables						
Variable	Variable Description	Number of Firms with 1	(%)	Number of Firms with 0	(%)	
GP	Government Power: 1 for firms in environmentally sensitive industry; 0 otherwise	63	79.75	16	20.25	
EC	Environmental Concern: 1 for firms with environmental committee and/or includes environmental concern in Mission/Vision statement; 0 otherwise	27	34.18	52	65.82	
ISO	ISO 14001 Certification: 1 for firms with ISO 14001 certification as of 2001; 0 otherwise	27	34.18	52	65.82	

Table 3: Correlation Matrix

	QLENDIS	QTENDIS	SP	CP	GP	EC	ISO	AROA	LSIZ	AGE
Correlation	1	0.923**	0.036	0.029	0.302**	0.518**	0.171	-0.205	-0.005	0.016
Sig. (2-tailed)		0.000	0.755	0.801	0.007	0.000	0.132	0.070	0.968	0.888
Correlation	0.901**	1	0.032	0.057	0.277**	0.504**	0.130	-0.137	-0.013	0.040
Sig. (2-tailed)	0.000		0.779	0.616	0.013	0.000	0.255	0.229	0.910	0.729
Correlation	0.015	0.006	1	0.146	0.159	0.193	0.351**	-0.007	0.253	0.100
Sig. (2-tailed)	0.893	0.955		0.199	0.162	0.088	0.002	0.950	0.025	0.379
Correlation	0.042	0.115	-0.156	1	-0.005	-0.073	0.067	-0.267*	0.473	0.039
Sig. (2-tailed)	0.713	0.315	0.169		0.966	0.522	0.559	0.017	0.000	0.732
Correlation	0.291**	0.238*	0.145	-0.316**	1	0.297**	0.098	-0.108	-0.144	-0.225
Sig. (2-tailed)	0.009	0.035	0.203	0.005		0.008	0.393	0.345	0.207	0.259
Correlation	0.487**	0.440**	0.166	-0.065	0.297**	1	0.381*	-0.037	-0.074	-0.074
Sig. (2-tailed)	0.000	0.000	0.145	0.567	0.008		0.001	0.747	0.518	0.518
Correlation	0.242*	0.210	0.316**	-0.050	0.098	0.381**	1	-0.070	0.268*	0.236*
Sig. (2-tailed)	0.032	0.064	0.005	0.664	0.393	0.001		0.542	0.017	0.036
Correlation	-0.201	-0.117	0.030	-0.191	-0.165	-0.069	-0.014	1	0.038	-0.246*
Sig. (2-tailed)	0.076	0.304	0.795	0.091	0.146	0.544	0.905		0.741	0.029
Correlation	-0.010	0.057	0.185	0.311**	-0.131	-0.090	0.254*	0.004	1	0.106
Sig. (2-tailed)	0.928	0.616	0.102	0.005	0.249	0.430	0.024	0.974		0.355
Correlation	0.028	0.032	0.067	0.131	-0.231*	-0.102	0.246	-0.104	0.061	1
Sig. (2-tailed)	0.808	0.781	0.560	0.250	0.041	0.371	0.029	0.361	0.595	

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Note: Pearson Product Moment Correlation is in the bottom left matrix while Spearman's Correlation is in the top right matrix.

For a complete description of the variables, see Table 2

To check the robustness of Pearson's correlation, a non-parametric Spearman's correlation is shown in the top right side of Table 3. Overall, the significance levels shown in non-parametric measure appeared to coincide with the parametric measure.

The correlation matrix also shows the bivariate results using ordinary least squares (OLS) regressions between the dependent variables QLENDIS and QTENDIS and the independent variables. Bivariate results show that EC was significant and positively associated with both QLENDIS and QTENDIS at $p < .001$. GP and ISO were strongly and positively related to QLENDIS at 1% and 5% significance level, respectively. GP and ISO were also positively related to QTENDIS but slightly weaker at 5% and 10% significance level, respectively. All the other variables were not significant except for AROA which was marginally negatively associated with QLENDIS at 10% significance level.

Multivariate Results and Robustness Check

The results for the multivariate analysis are shown in Table 4. The first model with quality of environmental disclosures (QLENDIS) as the dependent variable explains about 24% of the variation in quality and was significant at $p < 0.0001$. The second model with quantity of environmental disclosures (QTENDIS) as the dependent variable explains about 19% and was significant at $p = 0.002$. **Government Power (GP - H1c)** and **Environmental Concern (EC - H2a)** were both significant and positively associated with QLENDIS and QTENDIS at $p < .10$ and $p < .01$ respectively. **ISO14001 (ISO - H2b)** was also significant and positively related with QLENDIS at $p < .05$ although the relationship was weaker at $p < .10$ for QTENDIS. All the coefficients of the independent variables had the expected sign except for the economic performance measure, the average return on assets (AROA), which showed a negative sign (consistent with Smith, et al., 2007) but was not significant. Suggestions that firm size and age could act as intervening variables were not supported in this study.

Roberts (1992 p. 599) suggests that a time lag between measures of the explanatory factors and disclosure is necessary mainly because of "the dynamic nature of strategic planning, the focus of stakeholder theory on meeting the long-term interests of stakeholders... [and] the fact that social disclosures relate primarily to past social responsibility activities." Hence, to ensure the robustness of the results, multiple OLS regressions were recalculated, using lagged values for the continuous variables. The OLS results using lagged values (not shown) were very similar to the original multivariate results.

Discussion of Results and Insights from CEOs

Table 5 provides a summary of the hypotheses and key findings. Hypotheses *H1c*, *H2a* and *H2b* were supported for both QLENDIS and QTENDIS.

The quantitative findings confirmed that the *strategic posture* adopted by the firm's top management was indeed a main determinant of the quality and quantity of AREDs since both alternate measures for environmental concern (EC) and ISO14001 (ISO) were significant. However, of the three stakeholders represented in the *stakeholder power*, only government power (GP) was found to have significant relationship with both QLENDIS

Table 4: OLS Results for Quality and Quantity of Disclosure

Panel A: Quality of Environmental Disclosure- Full sample: 2000-2001 (N = 79)										
$QLENDIS_{it} = \beta_0 + \beta_1 SP_{it} + \beta_2 CP_{it} + \beta_3 GP_{it} + \beta_4 EC_{it} / ISO_{it} + \beta_5 AROA_{it} + \beta_6 LSIZ_{it} + \beta_7 AGE_{it} + e_t$										
Variable	β_0	SP	CP	GP	EC	/	ISO	AROA	LSIZ	AGE
coefficient	-0.908	-0.029	0.0023	2.9973	5.6152		3.153	-0.122	0.4569	0.0503
t-statistic	-0.095	-0.845	0.643	1.781*	4.298***		2.094**	-1.03	0.418	0.997
Adj. R ²	0.237	F	4.465	Sig.	0.000					
Panel B: Quantity of Environmental Disclosure- Full sample: 2000-2001 (N = 79)										
$QTENDIS_{it} = \beta_0 + \beta_1 SP_{it} + \beta_2 CP_{it} + \beta_3 GP_{it} + \beta_4 EC_{it} / ISO_{it} + \beta_5 AROA_{it} + \beta_6 LSIZ_{it} + \beta_7 AGE_{it} + e_t$										
Variable	β_0	SP	CP	GP	EC	/	ISO	AROA	LSIZ	AGE
coefficient	-24.998	-0.101	0.016	10.408	17.996		8.924	-0.0461	3.0198	0.1712
t-statistic	-0.738	-0.843	1.266	1.743*	3.882***		1.686*	-0.11	0.778	0.957
Adj. R ²	0.1884	F	3.5858	Sig.	0.0023					
***	Significant at the 1% level;		**	Significant at the 5% level;		*	Significant at the 10% level			
Where:										
QLENDIS (quality)	total quality score of environmental disclosure for firm <i>i</i> at period <i>t</i> ;									
QTENDIS (quantity)	total quantity score of environmental disclosure for firm <i>i</i> at period <i>t</i>									
β_0	Intercept									
SP (shareholder power)	% of ownership by shareholders holding 5% or more of total shareholding for firm <i>i</i> at period <i>t</i> ;									
CP (creditor power)	average debt to asset ratio of firm <i>i</i> at period <i>t</i> ;									
GP (government power)	1 for firms in environmentally sensitive industry; 0 otherwise;									
EC (environmental concern)	1 for firms with environmental committee and/or includes environmental concern in Mission/Vision statement; 0 otherwise									
ISO (ISO 14001 certification)	1 for firms with ISO 14001 certification as of 2001; 0 otherwise									
AROA (ave. return on assets)	average return on assets of firm <i>i</i> at period <i>t</i> ;									
LSIZ	Natural log of average sales revenues of firm <i>i</i> at period <i>t</i> ;									
AGE	age since incorporation of firm <i>i</i> at period <i>t</i> ; and									
<i>e</i>	error term									

Table 5: Summary of Key Findings

Legend: H1 - Stakeholder Power; H2 - Strategic Posture; H3 - Economic Performance *Note that H2a and H2b are alternative dependent variables.	Dependent Variable	Supported/ Not Supported
H1a: Firms with high level of shareholder concentration are less likely to provide more and better quality environmental disclosures than firms with low level of shareholder concentration	Shareholder Power (SP)	Not Supported
H1b: Firms with high leverage (i.e. debt/equity ratio) are more likely to provide more and better quality environmental disclosures than less leveraged firms.	Creditor Power (CP)	Not Supported
H1c: Firms that belong to environmentally sensitive industries are more likely to provide more and better quality environmental disclosures than those in non-sensitive industries.	Government Power (GP)	Supported
*H2a: Firms with environmental committees and/or environmental concern in their vision/mission statement are more likely to provide more and better quality environmental disclosures than those firms without such committees or concern.	Environmental Concern (EC)	Supported
*H2b: Firms that are ISO 14001 certified are more likely to provide more and better quality environmental disclosures than firms that do not have such certification.	ISO14001 certification (ISO)	Supported
H3: Firms with higher AROA are more likely to provide more and better quality environmental disclosure than firms with lower AROA	Ave. ROA (AROA)	Not Supported

and QTENDIS. This implies that government sanctions can play a vital role in improving the level of disclosure, particularly in the environmentally sensitive industry. While the CEOs interviewed did not explicitly admit this, it is implied in the following responses when asked what they believed were the reasons for non-disclosure:

...for others...maybe this is a small part of their business... because we are in plantation industry so we feel that environmental matters are an integral part of environmental reporting (CEO1).

I believe for others, it is not...a priority...but as you know, [we're] in resource-based industry...so we are very concerned about environmental issues... if not the government will step in (CEO2).

It is clear from these comments that the environmental sensitivity of their industry is a key driver to their decision to provide environmental disclosures. CEO2's statement went on to unveil the management's motive to deflect possible government intervention, further reinforcing that the government, was indeed, a powerful stakeholder.

The other two stakeholder groups represented, i.e. shareholder power (SP) and creditor power (CP) were not significantly related to AREDs. This is a curious finding particularly since the descriptive statistics confirmed that majority of companies had high ownership concentration and were highly geared. The possible explanations could be that Annual Reports were not deemed to be an effective way to disseminate environmental information and/or these stakeholders did not demand such disclosures. Consistent with prior studies on developing countries (Newson and Deegan 2002; de Villiers and van Staden 2006), subsequent interviews with the CEOs of disclosing firms confirmed that while they used AREDs as a way to communicate environmental information to their stakeholders, there was no pressure for firms to provide AREDs generally because of the low level of environmental awareness in Malaysia. As such, there was neither a demand from shareholders and creditors nor was there any mandatory requirement to provide this type of information.

The result also showed that economic performance had no significant bearing on the level of AREDs provided. Whilst this was consistent with prior studies from other countries (Freedman and Jaggi, 2005; Hackston and Milne, 1996; Magness, 2006), the CEOs were asked whether they saw AREDs as being related to financial performance. CEO1 believed that, in the short term, firm value was not associated to ARED provision, however, certain benefits could emanate from it:

*Does [providing disclosures] mean the value of the firm will be enhanced? I think **in the long-run, that is the plan**... if you have been very transparent, there will be less effort... to continue to look at your quality... that saves cost...and also less hassle in terms of how we'll deal with the public... (CEO 1)*

CEO2 agreed that ARED provision was not directly associated with firm profitability. When asked if he believed that providing AREDs was good for profitability, he replied:

We can not interpret it directly like that... if we are seen to be environmentally conscious, then we will be more acceptable to more people... we will have a better position in the market. (CEO2)

Both comments indirectly point to the reason why past/current measure of economic performance was not related to AREDs, i.e. to pro-actively provide environmental disclosure is to be future-driven given that there is currently very little demand to provide such disclosures.

Taken together, these findings reaffirmed the basic proposition of stakeholder theory: that corporate managers react to competing stakeholder demand in the order of their priority. Both interviewees believed that for Malaysian companies to actually show their concern for the environment, the demand had to come from their powerful stakeholders. For example, despite CEO2's reluctance to procure environmental audits, his company showed no hesitation to engage a London-based certification body when environmentalists raised their concern to the firm's major customers.

...these greenies in UK (who influenced our overseas customers) are talking about illegal logging... So we volunteer to ask ...Tropical Timber Trust to come to us and audit our logs supply system... (CEO2)

CEO1 also conceded that it was the demand from customers which drove some companies to get ISO 14001 certified as described in this quote:

Some [companies] would ONLY [get ISO14001certified] because their major customer requires ISO14001 certification ... (CEO1)

Hence, the reality is that companies are likely to take sustainability and environmentalism seriously if there is a demand from their valued stakeholders, which in this case, are the overseas major customers. Given the low level of environmental awareness in Malaysia, the demand from key stakeholders such as shareholders and creditors is nearly non-existent. Although the analysis confirmed that stakeholder theory could provide relevant insights to our understanding of Malaysian company's environmental reporting attitudes, it is paramount to consider country-specific circumstances. For example, both interviewees expressed their concern that standards set by Western environmental groups might not be the best for Malaysia:

...these overseas greenies who are against our tropical timber are misinformed. ... Because they are far away from us, they do not understand... I can say, we plant more trees than we cut down... (CEO2)
... what frightens me is that... environmentalists in Scandinavian/European countries... they don't understand our local situation...they wanted to set very high benchmark. For instance, [if they say], do not touch this land because it will kill the flora and fauna, [they] are, in fact, degrading the population here... by stopping people from using the land, it's as dangerous as not using the land properly. [We have to find] a reasonable balance. (CEO1)

Whilst it is difficult to make generalizations from these comments, it is clear that conducting country-specific studies are important if we are to understand corporate reporting behaviour in the developing world.

Summary and Conclusion

In examining Malaysian companies' voluntary environmental reporting attitudes, this research extends the use of stakeholder theory to environmental reporting from the context of a developing country. The adoption of stakeholder theory is motivated by studies highlighting the importance of stakeholder involvement in the reporting process. The developing country of Malaysia was chosen as the focus in this investigation because it offered a fertile setting given its rapid economic development consistent with its quest to achieve the developed nation status by 2020.

Using ordinary least squares regression, Ullmann's three-dimensional framework comprising of *stakeholder power*, *strategic posture* and *economic performance* was operationalized. Of the three stakeholders represented, only government power (GP) was significant; the other two - shareholder power (SP) and creditor power (CP) – were not significantly related to the quality and quantity of AREDs. The results also showed that proxies for strategic posture were significant and positively related to AREDs while the economic performance proxy was not significant.

At first glance, the quantitative results can be easily interpreted to suggest that the stakeholder model used in Western developed countries is not effective in the Malaysian setting. However, the insignificant relationships established provide an impetus to ask further questions in order to understand Malaysian corporate reporting behaviour. Hence, the usefulness of the model is not only based on the established significant relationships but also on the opportunity to probe deeper into the possible explanations behind the insignificant relationships discovered.

Subsequent interviews with the CEOs of disclosing firms provided the necessary explanation for these insignificant results, i.e. there was no ARED demand from shareholders and creditors generally because of the low level of environmental awareness in Malaysia. Likewise, the CEOs' belief that environmental disclosures were future-driven and therefore not necessarily related to past/current financial performance explains why the economic performance measure had no significant bearing on the level of AREDs.

Although these results were subject to several limitations, such as, the constraint on the choice of proxies and stakeholders represented⁵ (e.g. customers/employees are not included) plus the constraint on the sample used (only the disclosing companies), the empirical results provide evidence that stakeholder theory can contribute towards our understanding of Malaysian companies' voluntary environmental reporting attitudes.

From a theoretical perspective, the analysis shows that the top managements' conviction to adopt and disclose environmentally friendly practices is indeed very much related to the demand from various stakeholders. Consequently, it is concluded that although it is useful to adopt a model used in developed countries as a starting point, it is important to ensure that its interpretation considers the specific context of the country being examined.

From a practical perspective, the most pivotal conclusion drawn from this investigation is that given the considerably low level of environmental awareness in Malaysia, it is not surprising to see that environmental reporting is still the exception, not the norm. Hence, the onus is still on the relevant government agencies to exercise their power to mobilize public awareness and to drive environmentalism and sustainability up the priority list of corporate Malaysia.

Notes

- ¹ The Malaysian Quality of Life Index (MQLI) is an aggregate measure of the quality of life using forty-two indicators, representing eleven components of life, namely: (1) transport and communications; (2) working life; (3) education; (4) housing; (5) health; (6) culture and leisure; (7) social participation; (8) income and distribution; (9) family life; (10) environment; and (11) public safety (EPU's Ninth Malaysia Plan, 2006, p. 11).
- ² The two CEOs interviewed represent 4 of the 40 disclosing firms (i.e. 10%) because one is the Group CEO of a big plantation company in West Malaysia and also the Chairman of the Board of two other disclosing companies.
- ³ Whilst ERMM indicated that there were forty disclosing companies in 2001, the study actually used some 2000 Annual Reports to represent 2001 since their cut-off date was the third quarter of 2001 (p. 18).
- ⁴ A number of statistics experts (see, for example, Hair, Anderson, Tatham and Black, 1998; Tabachnik and Fidell, 2001) agree that a harmful level of multicollinearity is not present until the correlation coefficient reaches around 0.80 or 0.90.
- ⁵ For example, a choice was made to use environmentally sensitive industries as proxy for government power in line with prior research. However, subsequent discussions with top management revealed that the influence from overseas customers is one of the main drivers of Malaysian AREDS. Hence, as pointed out by the anonymous reviewer, an alternative proxy could be export sales in the industry.

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