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VOLUNTARY CARBON DISCLOSURE AND FIRM VALUE: EVIDENCE FROM MALAYSIAN CARBON-INTENSIVE INDUSTRIES

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Abstract

Using a regression model with a sample of 114 Malaysian public listed companies operated in carbon-intensive industries, this study aims to explore the link between voluntary carbon reporting (VCD) quality and firm value. The quality of a VCD is measured based on disclosure score using a modified carbon disclosure index. The index was crafted based on MYCarbon Greenhouse gas (GHG) reporting guidelines. By utilising content analysis of the annual report for the year 2015, this study found that the quality of VCD influences firm's value. The result suggests that high quality standard of information provided could assist firms to achieve competitive advantages and create a strong firm reputation, eventually lead to the creation of firm value. For control variables, the empirical results indicate leverage and liquidity is associated firm's value. This study has a significant contribution towards VCD domain through the creation of a viable index instrument for future application and has a contribution to policy development, especially when considering the introduction of the specific standard on carbon disclosure as well as disclosure regulation.

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Keywords: Carbon disclosure, MYCarbon GHG reporting guidelines, firm performance, market value, signalling theory.

1. Introduction

Greenhouse gas (GHG) emissions have global consequences and it is one of the biggest challenges the world faces. In accordance with the Marrakech Proclamation in 2016, Malaysia are working to find a way to reduce emissions by 45% by 2050 (Rasiah et al., 2017). One of the proposed ways to combat this climate change is through reporting by businesses on the impact of their activities. Najah (2012) defined carbon disclosure as a set of quantitative and qualitative information that relates to a firm's past and forecasted carbon emissions levels; its exposure to and financial implications of climate change associated risk and opportunities; and its past and future. Although in most jurisdictions and for most firms around the world, carbon disclosure is largely prepared on a voluntary basis (Olson, 2010), the use of carbon emission information has been increasingly prevalent in making an informed investment decision by investors (Luo & Tang, 2014). Several studies find that carbon emission information reported in the annual report or sustainability report can enhance firm reputation as environmental responsibility companies, thus result in economic benefits

There is, however, the current literature on the quality of GHG reporting quality is quite limited and little is known about how GHG reporting quality has developed or whether it has evolved and improve (Comyns & Figge, 2015). Additionally, value relevance of VCD is still incomplete and questionable (Ganda, 2017, Liu, Zhou, Yang, & Hoepner, 2017). This study attempts to provide insight into how VCD disclosure affects firm value and contribute to the ongoing debate on VCD and market's value nexus. The broader implication of this study may assists accounting regulatory body with a better understanding of the current state of carbon disclosure of Malaysian companies and help them in considering the need to circulate a specific standard on carbon disclosure. Most importantly, this study helps policy maker by providing insight of the extent to which VCD might contribute to the policy formulation to address climate change.

2. Problem Statement

Nowadays, firms are facing daunting demand from stakeholder to provide carbon disclosure due to increasing concern on the impacts of climate change, particularly its impacts on financial performance (Liesen, Figge, Hoepner, & Patten, 2017; Nurunnabi, 2016). A review of the past carbon disclosure literature has documented carbon emissions information provided by the firm is identified as difficult to compare and has been criticised for poor quality (Baboukardos, 2017; Comyns & Figge, 2015). The major concern of various stakeholders on the disclosure is the credibility, reliability and comparability of reported information (Talbot & Boiral, 2015). Such dissatisfaction with VCD have triggered the need for more research into the quality of carbon disclosure in order to monitor the disclosure practices of the firms and to provide explanations to various stakeholder groups regarding their concerns on firms' long-term corporate sustainability (Liao, Luo, & Tang, 2014).

Despite an increasing number of companies are proactively publishing carbon-related information, the question arises whether such disclosure can enhance firm value. A number of studies suggest that proper carbon disclosures should help investor to obtain a better understanding of carbon performance of the firm, assist them in evaluating firms' risk in making investment decisions and associated with better firm performance (Jaggi, Allini, Macchioni & Zampella, 2017). Nevertheless, there is limited accounting studies on the market-value relevance of VCD particularly in developing countries. Moreover, how VCD affect

firms' value is less clear (Liu et al., 2017; Ganda, 2017). Kalu, Buang, and Aliagha (2016) assert that developing countries also responsible for a significant portion of the carbon emissions (CO_2) and contribute to substantial global warming. As such, developing countries have a significant role to play in climate change mitigation (Costantini, Sforna, & Zoli, 2016). Without doubt, it is crucial for companies in developing countries, including Malaysian companies to control CO_2 emissions and adopt comprehensive and constructive approaches to address the climate change issues (Ghazali & Zahid, 2015). Pellegrino and Lodhia (2012) suggested that VCD can be applied in controlling CO_2 emissions as the disclosure could potentially put a pressure on firms to reduce their CO_2 emissions. In fact, Kalu et al. (2016) asserted that VCD is an essential part of the climate change mitigation process. Thus, it is crucial to undertake VCD studies in Malaysia

3. Research Questions

Is there any relationship between VCD and firm value of Malaysian public listed companies operated in carbon-intensive industries?

4. Purpose of the Study

The study aims to assess the quality of VCD of Malaysian public listed companies operated in carbon-intensive industries for the year 2015 and to explore the link between VCD quality and firm value of these companies.

5. Literature Review

The debate about the relationship between voluntary disclosure and firm value has developed considerably in recent times. A review of the extant studies on the link between VCD quality and firm value has mixed conclusions. The findings suggested that the relationship is either insignificant, positive, negative or mixed. Ennis, Kottwitzz, Lin, and Markusson (2012) investigated the relationship between carbon disclosure score form Carbon Disclosure Project (CDP) report and stock price. The finding reveals that there is no systematic evidence that the disclosure of carbon information drive a firm performance for UK firms. While Ennis et al. (2012) reports insignificant finding, Lee, Park and Klassen (2015) report a negative association on this relationship in their study. Lee at al. (2015) reveal that shareholder perceived climate change announcement as a bad news that destroying shareholder wealth maximisation due to the potential costs paid by the company in addressing global warming. While, Ganda (2017) has found both positive connections between carbon emission reporting and corporate financial performance, that is, a positive relationship with accounting based indicator but a negative relationship with market based indicator.

Contradict with the above findings, several studies find that carbon emission information reported in various reporting medium can enhance the reputation of the firm as environmentally conscious and responsible companies and has a valuation effect for investors and large companies (Skouloudis, Jones, Malesios, & Evangelinos, 2014). VCD enables internal and external parties of the firm to make informed decision and enhance the ability of the firm to manage risk and sustain competitive advantages (Venus, 2011). Several researchers such as Griffin and Sun (2013), Jaggi et al. (2017) and Liu et al. (2017) looked at the relationship between carbon disclosure and stock performance. They reported a positive effect of

carbon-related information disclosure on stock price. The result suggests that investors perceived carbon information is helpful in making investment decisions. Using the event study method, Griffin, Lont and Sun (2017) attempts to document the investors' response to firm disclosures about GHG emissions or related factors in 8-K filings of S&P 500 firm for reporting year 2006 to 2012. The authors find that there is an increase in mean unsigned excess stock return around the day of an 8-K emission filing. The finding suggests that the response as an indication of how a given disclosure might change investor uncertainty about future stock returns. In most recent year, Liesen et al. (2017) revealed that costs associated with producing and managing carbon information does not become a constraint to corporate financial resources. Moreover, financial market less valued companies with incomplete quantitative GHG information. As a result, it puts a pressure on companies to provide high quality GHG information in order to reduce information asymmetry.

Signaling theory posits that in order to satisfy the investors' demands, firms need to disclose value relevant information (Wang & Hussainey, 2013). Even an efficient capital market exists; the manager has superior information about the companies' expected future performance as compared to outside investors. Thus, managers may improve the financial reporting quality by voluntarily disclose additional non-financial information to outside investors (Healy & Palepu, 2001). If comprehensive disclosure and relevant information are provided to investors, it portrays that the firm has strong governance mechanisms and lesser agency conflicts, accordingly lead to higher firm value (Sheu, Chung, & Yang, 2010). From the prior researches, it recognises that the usefulness of information depends on its relevance and credibility (Gu & Li, 2007). Based on signaling theory and the arguments above lead to our predictions that company that voluntarily disclose high quality carbon information have higher market value. In summary, this study hypothesised that:

H1: There is a positive relationship between VCD quality and firm value

6. Research Methods

6.1. Sample and data collection.

Given that carbon disclosure is at its introductory stage and the scarcity studies in carbon disclosure practices in Malaysia, this study use purposive sampling by focusing merely on companies operate in carbon-intensive industries. The choice of industries was based on the fact that the operation of these industries is sensitive, has contributed significantly to the climate change and they are most responsible for this form of ecological degradation (Huisingh, Zhang, Moore, Qiao, & Li, 2015). Thus, firms in these industries fronting with massive climate-risk-related liabilities and costs (Stanny & Ely, 2008) and perceived to be more likely to engage in carbon disclosure. The selected industries are based on previous studies such as Choi, Lee and Psaros (2013), Hosseini, Wahid and Aghili (2013), Luo and Tang (2014) and Borghei, Leung and Guthrie (2016).

The original data consist of 258 public carbon-intensive companies listed on Bursa Malaysia at the end of 2015. Multinational companies (MNCs), companies with unavailable annual reports and incomplete data were discarded from the sample. MNCs are excluded because these companies subject to different requirement for carbon disclosure and face pressure to conform to their parent company's expectation

(Kostova, Roth & Dacin, 2008). Thus, social responsibility of MNCs is likely to differ (Nurunnabi, 2016). Initially, 117 firms met all these criteria. Out of the total 117 sample firms, three were eliminated as they are considered as outliers because the Tobin's Q were extremely high and thus 114 companies constitute the final sample.

Data to test the hypotheses is collected from the annual reports using the content analysis method for the year 2015. Content analysis was the main instrument used to analyse the information publicly reported (Jose & Lee, 2007). Due to its validity (Hooks & van Staden, 2011), content analysis is widely used in carbon disclosure studies. Krippendorff (2013: 24) defined content analysis as "a research technique for making replicable and valid inferences from text (or other meaningful matter) to the contexts of their use". The essential stage to any content analysis study is deciding on which documents to analyse. This study uses annual reports as it is widely recognised as having a disclosure function, in which it can serve as a crucial public relations function (Tsang, 2011). It is a mandatory document and needs to be produced on an annual basis, thus can be easily accessed (Smith, Yahya, & Amiruddin, 2007). Most importantly, due to auditing verification and the structure of annual reports is formalised, thus a comparison with other annual reports in other companies can be made (Baroma, 2013). Another crucial element of content analysis is the construction of a disclosure measurement index (Borghei-Ghomi & Leung, 2013). This study used MYCarbon GHG reporting guidelines to construct a disclosure index to achieve research objectives. In order to ensure validity of the disclosure index construct, the opinion from the expert and academician are obtained. Further, to improve the validity and applicability of the scoring process as well as disclosure measurement index, a pilot study was undertaken.

6.2. Variable measurement.

6.2.1. Dependent variable-firm value.

This study uses Tobin's Q as a proxy for market value. Tobin's Q is recognised as the superior firm performance measure since it had better reflect the market performance measure as compared to accounting performance measure (Amran & and Che Ahmad, 2009). In addition, it reflects the view that shareholders are the main stakeholder group and represents the stakeholders' valuation of the environmental sustainability practices developed by the firm (García-Sánchez & Prado-Lorenzo, 2012). Jermias and Gani (2014) claimed that Tobin's Q is more objective to measure firm performance since it is beyond the control of management. Consistent with previous studies such as Dragomir (2010) and Endrikat, Guenther, and Hoppe (2014), this study use Tobin's q because it had better capture the long-term value of certain environmental activities. Tobin's Q is measured as the market value of equity plus short-term debt (excluding non-monetary elements and pension liabilities) net of short-term assets, plus the book value of its long-term debt divided by book value of the total assets of the firm.

6.2.2. Independent variable- Quality of VCD.

The quality of a VCD is measured using an index score. The checklist is constructed based on MYCarbon GHG reporting guidelines. The index consists of 19 disclosure items related to corporate governance on climate change, greenhouse gas emissions accounting, reduction strategies and performance. Hossain and Hammami (2009) posit that the adoption of either weighted or unweighted score make no or

little difference to the finding. Thus, all items are treated as equally important and 1 point will be awarded for each item. The disclosure index for each company is then expressed as a percentage.

6.2.3. Control variable.

Guided by previous studies, firm size, leverage, liquidity, firm age, asset tangibility and audit quality are selected as control variables for firm value. These variables are constantly found to be related to the financial value (Ahmed Haji & Mubaraq, 2015; Che Haat, Abdul Rahman, & Mahenthiram, 2008; Dawar, 2014; Jaffar & Abdul-Shukor, 2016). Each of the variable are measured as shown in Table 01.

Table 01. Control variables used in the model and measurement

Variables	Definition	Measure
FSIZE	Firm size	The natural logarithm of total assets
LEV	Leverage	Ratio of total debt divided to total asset
LIQ	Liquidity	Ratio of current asset divided to current liability
FAGE	Firm age	The number of years since incorporation to the date of observation
TANG	Asset tangibility	Ratio of proportion of tangible assets to total assets
AUDQ	Audit quality	Binary variabled coded 1 if the firm is audited by Big 4 audit firm and 0 otherwise.

6.2.4. Econometric modelling.

The study uses STATA 15 to perform a statistical test. Multiple regression is used to examine the relationship between the VCD quality and firm value. Thus, this study constructs the following model.

$$\text{TOBIN'S Q} = B_0 + B_1 VCDQ + B_2 FSIZE + B_3 LEV + B_4 LIQ + B_5 FAGE + B_6 TANG + B_7 AUDQ + e$$

7. Findings

7.1. Descriptive statistic.

In total, out of 114 companies, 69.30% of Malaysian public listed companies operated in carbon-intensive industries and reported carbon related information in their annual reports. Table 02 provides descriptive statistics of dependent, independent and control variables. An average disclosure score is 8.14 %, suggesting that the quality of a VCD is relatively low. This may due to the absence of a statutory requirement in Malaysia that require public listed companies to carbon information to public. Most of the reporting companies provide information on action to tackle carbon emissions. Only two companies disclose information on total emission levels. As for market performance, the average Tobin's Q is 1.240844 with the minimum value of 0.214321 and maximum of 4.18. Firm size represents on average RM8.662169 billion, with the minimum value of 7.385484 and maximum of RM11.0686 billion. The average level of corporate debt is 21.06% and the result indicated that on average every RM1 in current liabilities, the companies have RM2.192456 in current assets.

Table 02. Descriptive statistics of variables

Variables	Mean	Std. dev	Min.	Max.	Skewness	Kurtosis
TOBIN'S Q	1.240844	.7744813	.214321	4.18	1.561238	5.695684
VCD	8.138402	7.286036	0	33.33333	.6559386	3.150757
FSIZE	8.662169	.6777539	7.385484	11.0686	.8504465	3.802124
LEV	.2106343	.1687919	0	.6440977	.6301553	2.533194
LIQ	2.192456	1.391942	.05	7.29	1.430354	5.233359
FAGE	1.394841	11.86357	10	61	.6784774	2.683172
TANG	0.3277413	.2455935	0	.9714461	.6146318	2.799409

7.2. Correlation of independent and independent variables.

Table 03 presents correlation coefficient of key variables of the study. Non-parametric test has been used since the distribution of data was found to be not normal. The Spearman correlation is utilised to check the severity of multicollinearity in the model of the study (Field, 2013). Overall, the highest inter-correlation between variables is 51.14 (between AUDQ and FSIZE). The problem with multicollinearity exists if the correlation coefficient between two variables is greater than 0.80. However, this coefficient is less than 0.8. Thus, the examined model and the analysis fulfill the assumption of multicollinearity (Field, 2013).

Table 03. Correlation among dependent and independent variables

Variables	TOBIN'S Q	VCD	FSIZE	LEV	LIQ	FAGE	TANG	AUDQ
TOBIN'S Q	1.000							
VCD	0.2432	1.000						
FSIZE	0.0038	0.4105	1.000					
LEV	-0.3473	-0.0606	0.3018	1.000				
LIQ	0.3913	-0.0602	-0.1363	-0.4219	1.000			
FAGE	-0.0715	0.1200	0.2295	0.0162	-0.0333	1.000		
TANG	-0.0872	0.0852	-0.0181	-0.0567	-0.2942	0.0605	1.000	
AUDQ	0.1428	0.1545	0.5114	0.0823	0.0180	0.2050	0.0855	1.000

7.3. Multivariate results and discussion.

The results obtained in the estimations of the model proposed for H1 are synthesised in Table 4. As indicated in Table 4, the adjusted R^2 for Tobin's Q regression is 0.2387 and the model is significant at 0.000 level (F=6.06), which implies that the variables explain about 23.87 percent of the variation in Tobin's Q. The finding provides a similar finding reported by previous studies such Liesen et al. (2017) and Liu et al. (2017). Consistent with H1, this study finds VCD quality is positively and significantly (p=.005) associated with firm value. This suggested that VCD has a completing effect in closing information asymmetry gap between companies and investors (Jaggi et al., 2017). Consistent with signaling theory, Malaysian firms provide relevant information to meet the demand from investors. By signal for high quality of information, information asymmetry can be reduced and investors may use this information to enhance their understanding of the companies' carbon risk and performance, thus it enables investors to make precise investment decisions (Jaggi et al., 2017). A firm that discloses its carbon emissions signals its' concerned about their environmental responsibilities and ability to measure and manage its emissions. Thus, the

markets will reward the firms that disclose their carbon emissions and consequently these firms achieve superior financial performance (Matsumura, Prakash &Vera-Munoz, 2014).

For control variables, the empirical results indicate that firm size, firm age, asset tangibility and audit quality have no significant relationship with firm's value. However, leverage is found to has significant negative correlation with Tobin-s q with p value 0.043, suggest that firms with lower debt tend to have higher market value. Conversely, liquidity was significantly positively correlate with Tobin-s q with p value 0.003. Whenever the firm asset is liquid, it enhance the flexibility of the firms to sell the asset for the best interest of firms (Morellec, 2001).

Table 04. Multivariate results

	Tobin-s Q		
	Coefficient	**T-stat**	**Robust std. err**
CONSTANT	1.6252093	1.58	0.118
VCD	.0284236	2.87	0.005
FSIZE	-.0810634	-0.63	0.531
LEV	-.9243371	-2.04	0.043
LIQ	.1628633	3.00	0.003
FAGE	-.0070124	-1.26	0.209
TANG	-.1419108	-0.51	0.614
AUDQ	.2698584	1.78	0.077
R-Squared		0.2858	
Adjusted R-Squared		0.2387	
F-statistic		6.06	

8.   Conclusion

This paper aims to shed light on the quality of VCD and highlights the financial implications of a VCD in the context of Malaysian companies. Using a sample of 114 companies operated in carbon intensive industries, the result indicates that the quality of VCD is associated with the firm value. This study adds to ongoing academic debate on the usefulness of carbon disclosures. Knowledge of this relationship is relevant to the businesses, investors and significant for carbon policy instruments discussion. VCD is important for the firm to achieve, maintain or resolve some of the legitimate problems since this type of disclosure could assist firms to maintain good relationship with relevant parties (Berthelot & Robert 2011). A comprehensive disclosure on the climate change issue combining with the high quality standard of information provided could assist firms to achieve competitive advantages and create a strong firm reputation (Qiu, Shaukat & Tharyan, 2014). Eventually, VCD may lead to the creation of corporate value. This therefore provides a motivation and idea to the firms about the importance of enhancing the quality of VCD. Some limitations and future research lines should be noted. First, the study focused only on carbon-intensive industries, which limited the results to only these industries. Exploring the VCD effect on firm value for other sectors may generalise the results. Second, the data are based on the one-year observation that it is based on 2015 annual reports. Therefore, future research could conduct a longitudinal analysis and explore carbon information in other reporting media such as sustainability reports or company websites. Thus, the trend and the changes in the voluntary carbon disclosure can be observed. Additionally, this study merely focuses on carbon disclosure and firm value link. Future research could extend the model to include moderating or

mediating variable to enrich the understanding of the role played by the mediator and moderator variables on the carbon disclosure and firm value link

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