

DOES THE AUDIT COMMITTEE EFFECTIVENESS INFLUENCE THE REPORTING PRACTICE OF GHG EMISSIONS IN MALAYSIA?

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Abstract: Following the significant changes in climate change and capital market policies, the present study had examined if the audit committee (AC) effectiveness influences the reporting practice of greenhouse gas (GHG) emissions among the Malaysian public listed companies. Given that GHG emissions are part of corporate reporting, the reporting practice of GHG emissions should therefore be part of the AC's role. The present study selected Malaysian plantation sector as the sample, comprising 43 public listed companies on Bursa Malaysia. Content analysis of the annual and sustainability reports was conducted by establishing a checklist based on the sustainability reporting guide (SRG) to determine the level of GHG emissions disclosure from 2016 until 2019 in the annual and sustainability reports. Next, the disclosure was regressed against AC effectiveness, controlling for company size, profitability, leverage, board size and board independence variables. It was found that AC effectiveness is vital to ensure an adequate disclosure of GHG emissions. This study deepened the understanding about the functions of AC beyond the traditional and compulsory roles to oversee the financial reporting process. Empirical evidence that AC effectiveness leads to a better corporate disclosure practice had also been presented.

Keywords: Audit committee effectiveness, sustainability disclosure, GHG emissions, Malaysian public listed companies.

Abbreviations:

Abbreviation	Expansion
GHG	Greenhouse Gas
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
CG	Corporate Governance
AC	Audit Committee
GRI	Global Reporting Initiative
SRG	Sustainability Reporting Guide

Introduction

The United Nations Environment Programme (UNEP) and United Nations Framework Convention on Climate Change (UNFCCC) reported that the primary causes of GHG emissions are human activities (UNFCCC, 2007). Damaging and harmful activities such as deforestation and burning fossil fuel release smoke into the air and atmosphere that contain several different gases. When deforestation,

tropical forest conversion and peatland drainage occur to make space for plantation, carbon dioxide¹ is released into the atmosphere, hence contributing to global warming (Manning *et al.*, 2019). For example, palm oil industry that has expanded rapidly over the last decades requires a significant amount of land use. The industry alone occupies 56% agricultural land and this is equivalent to 11.75% of the country's total land areas (MPOC, 2019). While palm oil plantation

¹ Carbon dioxide (CO₂) makes up the majority of GHG emissions (Mardani *et al.*, 2019).

is argued to help absorb GHG, the palm oil industry has also been heavily criticised for becoming one of the GHG emissions sources.

In this case, fossil fuels used by oil palm mills and palm oil mill effluent are the two main sources of GHG emissions (Abdullah *et al.*, 2015). Globally, several sectors rely primarily on burning fossil fuels to carry out their operations, making corporations major contributors to global warming and climate change. Other than that, timber, petrochemical, agriculture, plantation and energy crop industries were reported as the major causes of GHG emissions in Malaysia (Mustafa *et al.*, 2012).

Over the past few decades, after the Kyoto Protocol was signed by 175 countries in 1997, government, media and social activities have shown concern and interest to scrutinize business activities. The agreement's aim was to reduce GHG emissions by the year 2012. The Kyoto Protocol is one of the global initiatives to reduce the GHG emissions to protect the global environment from unwanted consequences arising from climate change and global warming.

Similar global initiatives to reduce GHG emissions have continued through several amendments to the protocol, including setting new targets to reduce GHG emissions during the Second Commitment Period (2012 - 2020) in Doha, Qatar for participating countries. Three years later, on 12th December 2015, at the United Nations Climate Change Conference (COP 21) in Paris, an agreement known as Paris Climate Change Agreement was reached, and in 2019, COP 25 was held in Chile to discuss full implementations of the agreement and to date, it has been ratified by 189 parties to the United Nations Framework Convention on Climate Change (UNFCCC) 2020. The parties agreed to combat climate change for a sustainable low-carbon environment. In addition, the United Nations General Assembly set a global sustainability blueprint known as Sustainable Development Goals (SDGs) in 2015, and one of its main goals is to address the various issues surrounding climate change. Thus, addressing

the threat of climate change has become a global agenda including Malaysia.

According to the Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC) (2018), there is an upward trend in the Malaysia's temperature where the surface's mean temperature increase is around 0.13°C to 0.24°C per decade. Following this, the awareness and attempts to address climate change issues are gaining momentum in Malaysia. Mandatory and voluntary efforts to reduce GHG emissions are overseen by the government, corporations, Non-Governmental Organizations (NGOs) and individuals. In 2009, the Malaysian government launched National Green Technology Policy (NGTP) to address the issue of climate change in Malaysia. The NGTP 2009 developed five strategic trusts including Malaysia's ranking improvement in environmental rating under the Twelfth Malaysia Plan (2021-2025) and beyond.

This initiative shows the government commitment in the pursuit of green economic development and combating climate change. Next, during COP 15 held in Copenhagen, Denmark in December 2009, Malaysia's Prime Minister announced the country's voluntary initiative to attain a decrease of up to 40% in the intensity of GDP emissions by 2020 based on the level achieved in 2005 (Nik Ahmad & Mohamad, 2014). Malaysia also had repledged to reduce its GHG emissions intensity by 45% by the year 2030 (KeTTHA, 2017). In 2017, the Green Technology Master Plan 2017-2030 was issued which outlines the strategic plans for green technology development to support the NGTP, and the past few years have witnessed government initiatives to combat climate change issues.

Malaysia's temperature, rainfall and sea levels have been on the rise and are projected to continue rising to 2050 (Lee, 2019). In regard to this, business activities have been recognised to be the major source of climate change and temperature increase in Malaysia. Therefore, businesses should consider the environmental

effects caused by their operations (Wittneben & Kiyar, 2009). Wittneben and Kiyar (2009) further emphasized that businesses should attempt to assure the public that they are concerned about the environment, particularly about climate change, through various communication media such as the annual and sustainability reports. Instead of only reporting on the business activities and alternatives to reduce GHG emissions and energy usage, companies should also use their annual or sustainability reports to explain and elaborate the methods used to produce outputs especially initiatives that do not, in any way, harm the society. From a strategic standpoint, the business should strive for a positive society perception about the business.

Next, companies create impression management when they voluntarily disclose non-financial reporting to the public as part of their corporate social responsibility (CSR). CSR enables businesses to handle impressions received by companies from different stakeholders. In respect of the impression management, voluntarily reporting on GHG emissions can help minimize the legitimacy gap which can be detrimental to the business inasmuch as society may dismiss its product, business may face litigation, and society may want the business to be permanently closed. Businesses should therefore attempt to fulfil social expectations (Kauffman *et al.*, 2012).

On the other hand, a dispute may emerge if managers hide important information about the current and future performance from the owner or investors (Cheng *et al.*, 2014). Thus, company management should be more transparent on their climate action plans and performance. The transparency of climate action is one of the crucial climate actions taken forward in COP 25 (UNFCCC, 2019). In view of the growing importance of transparent climate action plans and performance, the Ministry of Natural Resources and Environment (NRE) and United Nations Development Programme (UNDP) Malaysia developed a national carbon disclosure programme (NCDP) framework for Malaysian companies 2012. The following year, in 2013,

National Corporate GHG Reporting Programme for Malaysia (MYCarbon) was commenced to provide guidance for the Malaysian companies to report their GHG emissions and to allow the ministry to measure progress toward achieving the emissions reduction target.

In addition, Bursa Malaysia Listing Requirement has strengthened its listing rules, requiring companies to disclose a sustainability statement in their annual report explaining how they manage their economic, environmental and social (EES) risks that are material to the companies, as well as the opportunities faced by the companies. This rule is already in force for the main listed companies with market capitalisation over RM2 billion for the financial year which ended on 31 December 2016 and is considered a significant change to the existing state. On the other hand, companies with market capitalisation below RM2 billion are required to disclose sustainability statement in their annual report issued for financial years ending on or after 31 December 2017.

Bursa Malaysia Listing Requirement delineates two options concerning how companies can prepare their reporting statement. For the first option, companies can prepare a general sustainability statement that only includes narrative statements of how the material EES risks and opportunities are being managed. For another option, companies can prepare a detailed sustainability statement together with a comprehensive statement on the scope and governance structure. A detailed disclosure on how the material sustainability matters was managed will also be included in the statement. The options are given to companies in cognizance of difficulties faced by them to fulfil the requirements. All public listed companies, however, should prepare a detailed sustainability statement in the annual report issued for the financial years ending on or after 31 December 2018. The information required in the sustainability statement is aligned with the GRI's Sustainability Reporting Standards; a revised version of the GRI G4 (Sustainability Reporting Guideline) requirements.

The Bursa Malaysia Sustainability Reporting Guide (BMSRG) was first issued in 2015 and subsequently revised in 2018 to consider development in sustainability reporting worldwide. The BMSRG is issued to assist companies in preparing the sustainability statement. While it is not mandatory for companies to comply with the BMSRG, the companies are strongly encouraged to do so. Since GHG emissions is part of the BMSRG under the subsection of environmental sustainability, the present study aimed to investigate the disclosure of GHG emissions in companies' annual reports. Furthermore, as the GHG emissions disclosure should be prepared and published voluntarily, this mainly depends on the direction given by the upper management. This is where corporate governance plays an important role in recognizing that GHG emissions reporting is one of the risk management tools for businesses.

Previous studies investigated the nexus between the Corporate Governance (CG) and carbon disclosure.² The CG mechanisms that are commonly tested are ownership structure, CEO duality, board effectiveness, board size, board independence, internal audit role and gender diversity (Prado-Lorenzo & Garcia-Sanchez, 2010; Ben-Amar & McIlkenny, 2015; Liao *et al.*, 2015; Taurigana & Chithambo, 2015; Trotman & Trotman, 2015; Ben-Amar *et al.*, 2017; Haque, 2017; Elsayih, *et al.*, 2018, Jaggi *et al.*, 2018; Krishnamurti & Velayutham, 2018; Akbaş & Canikli, 2019; Hollindale *et al.*, 2019; Kılıç & Kuzey, 2019). While many studies were conducted to examine the relationship between corporate governance and carbon disclosure, research that examines the relationship between AC effectiveness and carbon disclosure is scant. Hence, this study addressed the gap in the existing literature, extended the prior studies of carbon disclosure practices by examining the influence of AC effectiveness on GHG emissions disclosure, and employed composite index of AC effectiveness to understand how

AC effectiveness plays a significant role in the GHG emissions disclosure.

Based on the discussions, some of the practical implications of the present study are first, it provides current data on the capital market participation in reporting GHG emissions. The understanding about capital market involvement in the fight against climate change problem is essential. Participation from the capital market helps the government to provide transparent actions to reduce GHG emissions. Second, it was found that the AC effectiveness is important to ensure adequate disclosure on GHG emissions and for the function of AC to be understood and extended beyond the traditional and compulsory roles of overseeing the financial reporting process. Next, it provides empirical evidence that AC effectiveness can lead to better disclosure procedures, besides adding insights to the accounting literature by examining the efficacy of AC effectiveness in Malaysian companies.

The remainder of this paper is organized as follows. The following section discusses the related literature and hypotheses development, followed by a section presenting the research method. Then, the subsequent section presents and discuss the results while the final section concludes the study.

Literature Review and Hypothesis Development

GHG Emissions Reporting Practice

The literature on environmental accounting and reporting has been growing in respect of the dramatic industrial development in recent decades with much concentration on the moral aspect of being socially responsible and the stakeholders' protection in the business operations. Generally, CSR research within which the environmental accounting is ranked and widely discussed in various fields (Mishra & Suar, 2010; Cheng *et al.*, 2014; Huang &

² Carbon disclosure and GHG emissions disclosure are used interchangeably in this article according to the context of discussion.

Watson, 2015) due to the comprehensiveness of CSR concept which includes social, environmental, economic, stakeholder and voluntary perspectives (Dahlsrud, 2008). In regard to the early literature on GHG emissions reporting, which is part of environmental disclosure, the relevant issues addressed in the literature include GHG accounting and reporting (Bebbington & Larrinaga-González, 2008; Gentil *et al.*, 2009). More recently, literature on GHG emissions have examined factors affecting extensive disclosure of carbon emissions. Rankin *et al.* (2011) investigated the level of Australian corporate GHG emissions reporting in a voluntary environment and found that the extent and credibility of the disclosures are associated with the companies' internal organization. The findings of study showed that companies with higher quality governance proactively inform their stakeholders on how they manage climate change issues for their competitive advantage.

In the US setting, Datt *et al.* (2017) examined the association between carbon performers and voluntary carbon disclosure. The study found that companies under the category of good performers³ provide more extensive report on their commitment to carbon reduction activities. The results further indicated that the US companies have an incentive to show their superior performance in reducing carbon emissions to their investors and other decision makers. Thus, the GHG emissions reporting can be used to inform the stakeholders that the companies consider the impacts of climate change for the survival and growth of their businesses.

Corporate governance has the role to oversee management in communicating relevant information to stakeholders for reducing information asymmetry between the parties. As previously mentioned, ownership structure, CEO duality, board effectiveness, board size, board independence, internal audit roles and gender

diversity are some of the factors commonly tested in GHG emissions reporting literature. Most studies found significant, positive relationships between carbon disclosure and board effectiveness (Ben-Amar & McIlkenny, 2015), board size (Tauringana & Chithambo, 2015), board independence (Liao *et al.*, 2015; Haque, 2017; Elsayih, *et al.*, 2018; Jaggi *et al.*, 2018; Krishnamurti & Velayutham, 2018; Kılıç & Kuzey, 2019), CEO duality (Prado-Lorenzo & Garcia-Sanchez, 2010), institutional ownership (Akbaş & Canikli, 2019), gender diversity (Prado-Lorenzo & Garcia-Sanchez, 2010; Liao *et al.*, 2015; Ben-Amar *et al.*, 2017; Haque, 2017; Hollindale *et al.*, 2019) and board committee (Krishnamurti & Velayutham, 2018).

However, Kılıç and Kuzey (2019) found that board size and gender diversity have no influence on carbon disclosure quality. In addition, Akbaş and Canikli (2019) found that board size has negative impact on the carbon disclosure, while board independence has no impact on the carbon disclosure. On the other hand, Krishnamurti and Velayutham (2018) examined the effects of the formation of a combined risk and AC on GHG emissions. The results suggested the existence of combined committee decreases the GHG emissions disclosure. Using qualitative interview method, Trotman and Trotman (2015) found that internal audit plays a limited role in GHG emissions reporting and AC expects internal audit to play more roles in relation to GHG emissions disclosure in the near future. While previous research to a certain extent reached a consensus that the CG mechanisms affect the GHG emissions disclosures, studies on the influence of AC effectiveness on GHG emissions disclosure are limited.

Malaysian Code of Corporate Governance 2017 (MCCG, 2017) delineated that the AC plays a key role in a company's governance structure, in particular the AC oversees management in communicating information to stakeholders. In addition, one of the intended

³ Good carbon performers are measured by carbon reduction performance. A company is considered as a good performer if the company can reduce more carbon emissions.

outcomes of the MCCG 2017 is stakeholders are informed with the environmental issues affecting companies. Thus, it is imperative to understand the relationship between the AC effectiveness and GHG emissions disclosure. This study had developed the research hypothesis based on the premise that AC effectiveness influences corporate disclosure.

Audit Committee and Corporate Disclosure

Bédard and Gendron (2010) viewed AC as the most important mechanism for monitoring financial reporting and disclosure process. The primary role of AC is to ensure corporate accountability and transparent financial reporting. Specifically, the AC members are assigned with the responsibility to utilise their expertise and skill with the purpose of guaranteeing that the company's financial statement is prepared in an accurate, complete, transparent and timely manner. Consistent with oversight responsibilities to monitor the financial reporting process, Lin and Hwang (2010) found that AC members provide strong support for the positive effect of financial reporting quality.

Subsequently, AC roles have extended to monitoring non-financial reporting practices (Appuhami & Tashakor, 2017). Al-Shaer and Zaman (2018) suggested that AC adds credibility and helps improve sustainability reporting. Consistent with the previous findings, Bravo and Reguera-Alvarado (2018) examined the relationship between AC characteristics and the quality of voluntary ESG disclosures and posited that AC characteristics influence the disclosure. Therefore, it is vital to consider that the AC members' characteristics affect the capacity of AC to effectively exercise their oversight function. As AC effectiveness increases, corporate disclosure practice is expected to improve.

Instead of being examined as a mechanism of corporate governance (CG) in corporate disclosure studies, several studies have also focused on the impacts of AC characteristics on corporate disclosure. The AC characteristics that are commonly tested are independence, size,

financial expertise and diligence (Appuhami & Tashakor, 2017; Ahmed Haji, 2015; Madi *et al.*, 2014). While AC financial expertise is a vital characteristic for AC effectiveness, the characteristic is a mandatory characteristic and all sampled companies in this study adhered to the requirement, hence extending the literature of AC and corporate disclosure by measuring AC effectiveness index consisting of independence, size and diligence.

Agency theory suggests AC that consists of a majority of independent directors will provide an effective monitoring role that will improve the quality of information, enhance the quality of disclosure and minimise the information asymmetry between management and stakeholders (Akhtaruddin & Haron, 2010; Barako *et al.*, 2006; Fama & Jensen, 1983). The essence of AC members' independence is their willingness to challenge the management decisions especially matters relating to corporate reporting. Corporate reporting is an important means of communication between management and other stakeholders. Studies investigating the AC characteristics mostly reveal that AC independence is a key factor for its effectiveness and an essential element of producing quality financial reports (Bédard & Gendron, 2010; Lin & Hwang, 2010; Salehi & Shirazi, 2016).

Akhtaruddin and Haron (2010) found that firms with more outside directors on the AC are more likely to release more additional information. For example, findings from previous studies on AC independence and voluntary disclosure suggested that AC independence has a positive relationship with CSR disclosure (Appuhami & Tashakor, 2017), intellectual capital disclosure (Ahmed Haji, 2015) and corporate voluntary disclosure (Madi *et al.*, 2014). Indeed, AC independence is one of the characteristics in measuring AC effectiveness index.

A larger AC provides various different skills, knowledge and talents to rely on in overseeing the financial reporting (Lin & Hwang, 2010). It was argued that potential issues in corporate reporting disclosure are

more likely to be discovered and resolved with a relatively higher number of AC members (Naimi *et al.*, 2010) because AC with more diversity, expertise and capabilities are presumed to better perform their monitoring roles (Buallay & Al-Ajmi, 2019). Furthermore, Allegrini and Greco (2013) and Madi *et al.* (2014) found that AC size has a positive effect on the level of voluntary disclosure. Meanwhile, Li *et al.* (2012) proved that AC size is positively associated with intellectual property disclosure. Based on the same premise, AC size is therefore one of the characteristics in measuring AC effectiveness index.

A diligent AC is one that meets frequently during the year. Allegrini and Greco (2013) stated that the frequency of AC meetings acts as a proxy for the level of real monitoring and control. Therefore, higher levels of AC meetings indicate a more diligent and effective AC. The authors found that AC diligence, measured by the frequency of meetings of the AC, is positively associated with corporate voluntary disclosure. The finding is also supported by other studies that found the frequency of AC meetings is positively significant with voluntary disclosure in the scope of CSR disclosure (Appuhami & Tashakor, 2017) and intellectual capital disclosure (Ahmed Haji, 2015; Li *et al.*, 2012). An active AC is expected to effectively monitor the reliability and quality of corporate disclosure (Sun *et al.*, 2010), hence it is appropriate to include the frequency of AC meeting as one of the characteristics for measuring AC effectiveness index.

The revised MCCG (2017) concerned about the effectiveness of AC and requires AC to be independent, well-resourced, demonstrating an appropriate level of vigilance and actively probing questions to ascertain issues relating to disclosure. It also highlighted the need for stakeholders to be informed of the environmental issues affecting companies. Thus, it is timely to understand the role of AC to monitor non-financial reporting process because non-financial information disclosed to the public portrays company performance.

Consistent with the premise that investigating overall AC characteristics gives a stronger effect of measurement (Bin-Ghanem & Ariff, 2016; Ali *et al.*, 2018), this study inferred that AC effectiveness may lead to a higher level of GHG emissions disclosure, as illustrated in the following hypothesis:

H1: There is an association between AC effectiveness and GHG emissions reporting.

Methodology

Sample Selection

This study employed purposive sampling technique that leads to all population sampling with unique characters. The Malaysian plantation sector comprising 43 public companies listed on the main board of Bursa Malaysia as of August 2020 was chosen as the sample to be analysed, because plantation companies are bound under either the Malaysian laws regulating the palm oil industry or land matters and pesticide use. Land use and pesticide use are among the GHG emissions contributors (Manning *et al.*, 2019). Hence, this study argued under the premise that plantation companies will disclose a narrative statement about their GHG emissions in the annual reports.

Data Collection and Analysis

First, content analysis of the annual and sustainability reports was carried out by establishing a checklist based on the BMSRG to determine the level of GHG emissions disclosure. Both reports are perceived as the most important sources of corporate information (Hollindale *et al.*, 2019). In addition, it is clearly stated in the BMLR Chapter 9 Appendix 9C that companies are required to disclose sustainability matters in the annual report. This study considered all aspects of GHG emissions disclosure as stipulated in the BMSRG. Next, the disclosure was regressed against AC effectiveness index namely independence, size and diligence.

Data from the annual and sustainability reports of 43 plantation sectors over the period

2016 - 2019 were gathered, resulting in a total of 164 firm-year observations. The period was selected due to the issuance of BMSRG in 2015 and companies were strongly encouraged to follow the guidelines in preparing sustainability disclosure. GHG emissions disclosure was selected as the dependent variable, adapted from Bursa Malaysia Sustainability Reporting Guide (BMSRG) (emissions aspect), global reporting initiative standard (GRI, 2016) and GRI-305 requirements. GRI-305 is one of the subsections under GRI 2016 which represents emissions reporting guideline. In addition, general aspects of disclosure, namely company initiatives to reduce GHG emissions (Prado-Lorenzo *et al.*, 2009) were also considered in the checklist, resulting in a GHG emissions disclosure checklist comprising seven items, namely disclosure of direct GHG emissions (Scope 1), energy indirect GHG emissions (Scope 2), other indirect GHG emissions (Scope 3), other emissions, initiative in emissions reduction, emissions of ozone-depleting substance and achievement of emissions reduction. Scoring was calculated based on the presence of each item; companies were awarded 1 if an item was disclosed and 0 if it was not disclosed. The level of GHG emissions disclosure was determined by the number of items disclosed by the companies.

In order to calculate the composite measure of AC effectiveness, each of the non-binary variables was converted to a binary form by assigning one to the variable which was greater than, or equal to the median for all the samples and zero otherwise. In sum, the board composite was the sum of the three indicators in the range of zero to three. Higher scores indicated higher AC effectiveness. Previous studies carried out by DeFond *et al.* (2005), Kiatapiwat (2010), Johl *et al.* (2013), Qeshta (2015), Bin-Ghanem and Ariff (2016) and Hashim and Amrah (2016) applied similar method. This study's control variables were company's size, profitability proxied by return on assets (ROA), leverage, board size and board independence. While most studies used number of directors on board, this study used the same premise of converting the AC effectiveness variable using dummy variable to differentiate between board size, equal or greater than the median and below the median. In this case, Anderson *et al.* (2004) used binary variables to measure board size as either large or small size. The model of this study is as follows:

$$\text{GHGR} = \beta_0 + \beta_1 \text{ACEF} + \beta_2 \text{CSIZE} + \beta_3 \text{ROA} + \beta_5 \text{LEV} + \beta_4 \text{Boardsize} + \beta_6 \text{Indboard} + \varepsilon$$

Table 1: Measurement of variables

Dependent Variable	Acronym	Measurement
GHG emissions disclosure	GHGR	Disclosure score = The minimum is 0 and the maximum is 7.
Independent variable		
AC effectiveness	ACEF	ACEF = Sum of the three AC characteristics with scores ranging between 0 and 3; higher scores indicate greater effectiveness.
Control variable		
Company size	CSIZE	Natural logarithm of total assets
Profitability	ROA	Net income divided by total assets
Leverage	LEV	Total liabilities divided by total assets
Board size	Boardsize	A score of 1 if the board size is greater than, or equal to the median for all the samples and 0 if otherwise.
Board independence	Indboard	Percentage of total number of independent directors divided by board size

Results

Table 2 reports the descriptive statistics for the full sample of 164 firm-year observations. The descriptive analysis provides descriptive information to give better understanding and help interpret the data appropriately (Zikmund *et al.*, 2003). Table 2 Panel A illustrates the median, mean, standard deviation, and maximum and minimum of all variables in this study. The average percentage of GHG emissions disclosure (GHGR) level for the sample was 2.65, ranging from zero to five. While the maximum items were seven, none of the companies disclosed more than five items. The mean value of the overall AC effectiveness (ACEF) was 2.62 from a scale, spanning from zero to three. This variable was the result of the sum of three AC dummy characteristics. Table 2 Panel B shows the average for each item of GHGR. Most companies disclosed indirect GHG emissions (Scope 2) and initiative engaged by

the companies to reduce the GHG emissions in their corporate reports. Meanwhile, none of the companies disclosed other emissions and ozone-depleting substance. In addition, the results show upward trend in reporting disclosures related to GHG emissions from 2016 to 2019 which is consistent with the Bursa Malaysia listing requirements (BMLR) that require companies to disclose a sustainability statement in their corporate reports.

Next, the data was checked based on the assumption of multiple regression analysis to prevent misleading results. Diagnostic tests were conducted to check for outliers, normality, linearity, multicollinearity, heteroscedasticity and autocorrelation (Hair *et al.*, 2010). The results of correlation matrix confirmed that no significant multicollinearity was present because none of the variables correlated above 0.80 (Barka & Legendre, 2017).

Table 2: Descriptive statistics

Panel A: Descriptive Statistics for All Variables					
Variables	Mean	Min	Max	SD	
GHGR	2.65	0.00	5.00	1.949	
ACEF	2.62	0.00	3.00	0.693	
CSIZE	9.01	6.87	10.45	0.670	
ROA	0.01	-0.22	0.63	0.076	
LEV	0.34	0.00	0.98	0.220	
Boardsize	0.74	0.00	1.00	0.430	
Indboard	0.49	0.00	1.00	0.140	
N=164					
Panel B: Average Firm Disclosed Each Item of GHGR					
	2016	2017	2018	2019	Mean
Direct GHG emissions (Scope 1)	0.50	0.57	0.69	0.72	0.62
Energy Indirect GHG emissions (Scope 2)	0.57	0.62	0.71	0.77	0.67
Other indirect GHG emissions (Scope 3)	0.36	0.43	0.48	0.48	0.43
Other emissions	-	-	-	-	-
Initiative in emissions reduction	0.55	0.59	0.69	0.84	0.67
Emission of ozone-depleting substance	-	-	-	-	-
Achievement of emissions reduction	0.12	0.20	0.33	0.40	0.26
Total	2.10	2.41	2.90	3.21	2.65
N=43					

Concerning the problems of heteroscedasticity and autocorrelation, this study performed both tests for which the results confirmed the presence of heteroscedasticity and autocorrelation. Hence, the standard errors in the firm performance model were estimated based on Rogers (1993) clustered at the firm level. Clustering at the firm level produces an estimator that is robust to cross-sectional heteroscedasticity and within-panel correlation. This technique ensures valid statistical inference on the coefficient is made (Rogers, 1993).

In addition to the correlation matrix above, the variance inflation factor (VIF) was used to detect multicollinearity. Generally, the $VIF > 10$ indicated a high level of multicollinearity (Gujarati & Porter, 2009). Table 4 confirms that no multicollinearity problem existed and also shows the results of the fixed effect regression for ACEF on GHGR. The R^2 within the model is 12.79%, indicating that the GHGR variance could be explained by the independent variables in the model, which is low. However, it is worth

Table 3: Correlation matrix

Variables	GHGR	ACEF	CSIZE	ROA	LEV	Boardsize	Indboard
GHGR	1						
ACEF	0.158*	1					
CSIZE	0.001	-0.017	1				
ROA	-0.119	-0.106	-0.026	1			
LEV	0.316*	0.061	0.101	-0.052	1		
Boardsize	-0.119	0.138	0.221*	0.140	0.064	1	
Indboard	0.008	0.012	0.271*	-0.053	0.088	0.487*	1

* represents significance levels of 0.01

Table 4: Fixed Effect regression results for ACEF on GHG emissions disclosure

Variables	Exp Sign	Coefficients	t-stat	VIF
ACEF	+	0.393	2.310**	1.11
CSIZE	+	-0.137	-0.450	1.09
ROA	+	-3.468	-2.690**	1.04
LEV	-	1.719	2.210**	1.02
Boardsize	+	-0.779	-2.320**	1.15
Indboard	+	-0.475	-0.430	1.13
_cons		3.140	1.200	
R² between		0.1279		
Prob > F		0.0034**		
F-value		19.530		
N		164		
Hausman test	0.801			
Breusch-Pagan test	98.82***			

**represents significant levels of 0.05

noting that low R^2 values are often expected in the social sciences studies particularly in examining corporate governance (Mohd Saleh *et al.*, 2007), thus the R^2 value in this study was within an acceptable range of corporate governance studies.

The results show that the ACEF is positively and significantly ($t = 2.31$, $P < 0.05$) related to GHG emissions disclosure. This implies that ACEF affects the GHG emissions disclosure level. In addition, the overall effects of AC size, independence and the number of meetings had provided stronger measurement effects which engender favourable effects. The results of this study were consistent with the results of Al-Shaer and Zaman (2018) and Bravo and Reguera-Alvarado (2018) which found a positive relationship between AC and sustainability reporting. AC characteristics add credibility and increase the quality of voluntary ESG disclosure. GHG emissions disclosure is part of the overall sustainability disclosure under environmental section. Besides, the findings of the study suggested minimum characteristics of AC to be effective, namely size of AC, higher proportion of independent directors on AC and higher number of AC meeting collectively.

The study also performed an analysis to examine the effects of individual characteristics of AC on the GHG emissions disclosure. However, none of the individual characteristics of AC was significant. The results of the analysis (not tabulated) suggested relying on only one characteristic does not make AC effective in monitoring the GHG emissions reporting process. In regard to this, a large size of AC without diligence and independence will not help the AC to be effective in carrying out their responsibilities. This is because GHG emissions disclosure involves reporting sensitive issues due to their nature, hence requiring expertise and knowledge to understand and debate with the management.

A positive relationship between AC effectiveness (measured by composite index of AC independence, size and diligence) and GHG

emissions disclosure suggests that a larger size of AC with more independent members would bring diverse expertise and knowledge to the AC meeting. Moreover, more frequent AC meetings provide avenue for AC members to debate and deliberate all sensitive issues in relation to GHG emissions disclosure. The three characteristics should be in existence simultaneously.

Additionally, this study had included five variables that functioned as control variables to examine the level of GHG emissions disclosure, namely company size (CSIZE), profitability as proxied by ROA, leverage (LEV), board size (Boardsize) and board independence (Indboard). All control variables were subjected to multivariate tests in the model to determine whether company characteristics have any effects on GHG emissions disclosure. The regression result shows that among the control variables, ROA was found to be negative and significantly related to GHG emissions disclosure ($t = -2.69$, $P < 0.05$). The result is however in contrast with the findings of Krishnamurti and Velayutham (2018) and Akbaş and Canikli (2019), which suggested profitability is significantly and positively associated with carbon disclosure. However, using the premise of general environmental disclosure studies, the finding of this study is consistent with the results of Smith *et al.* (2007) which posited that profitable companies have a negative and significant relationship with environmental disclosure in Malaysia.

Next, LEV was found to be positively and significantly related to GHG emissions disclosure ($t = 2.21$, $P < 0.05$), suggesting that as the percentage of total debt to total assets increases, the level of GHG emissions disclosure increases. Based on the agency theory, highly leveraged companies incur higher monitoring costs. Therefore, the companies resort to increase the level of disclosure to reduce the agency cost. However, this result is inconsistent with a number of empirical studies which found LEV has a negative effect on carbon disclosure (Tauringana & Chithambo, 2015; Ben-Amar *et al.*, 2017).

Boardsize was found to be negatively and significantly related to GHG emissions disclosure ($t = -2.32$, $P < 0.05$). The result suggests that as the number of directors increases, the level of GHG emissions disclosure decreases. This is consistent with the findings of Prado-Lorenzo and Garcia-Sanchez (2010). However, the result is inconsistent with the findings of Tauringana and Chithambo (2015) which found a positive relationship between board size and carbon disclosure. A plausible explanation for the negative relationship between board size and GHG emissions disclosure is that the number of directors on the board might not reflect the directors' skill and knowledge which are more valuable for a board to function effectively or it has not shown serious attention to GHG emissions disclosure.

Thus, the finding of the study supports the notion that board size is only a factual number of directors, and does not reflect the directors' skill and knowledge, which are more valuable for a board to function effectively (Bonn, 2004). Furthermore, Table 4 shows that Indboard is negative and not significantly related to GHG emissions disclosure ($t = -0.43$). The result is inconsistent with the empirical results revealed by Liao *et al.* (2015), Haque (2017), Elsayih *et al.* (2018), Jaggi *et al.* (2018), Krishnamurti and Velayutham (2018) and Kılıç and Kuzey (2019) which found Indboard is positively and significantly associated with carbon disclosure. This is similar with the results of Bukair and Rahman (2015) and Che-Adam *et al.* (2019) on voluntary disclosure. Overall, the results provided a solid support with the generalised idea of AC effectiveness as the best measure for climate change outcomes.

Discussion and Conclusion

It was found in this study that AC is the main measure of excellent corporate governance. The AC has an important function in overseeing the process of corporate reporting. Being one of the key players in the corporate reporting process, an effective AC would bring corporate reporting disclosure to a higher level of transparency

and integrity. This study had examined the impact of AC effectiveness on the disclosure level of GHG emissions reporting of plantation companies publicly listed on main market of Bursa Malaysia. As expected, AC effectiveness measured by a composite index comprising independence, size and frequency of meetings are positively and significantly related with the level of GHG emissions disclosure. This portrays that AC functions to monitor the financial disclosure and is extended to non-financial (sustainability) disclosure.

The study further shows that AC independent directors play effective roles in monitoring activities since they are decision experts and are able to give independent judgment in reviewing non-financial reporting statements. They are also able to monitor and evaluate the management's disclosure practice, which, in turn, reduces the asymmetric information and increases reporting transparency. In addition, a larger size of AC seems to be able to provide the committee with a pool of expertise, rank of perspectives and diverse skills to improve firms' non-financial disclosure practices. Next, the frequency of AC meetings does contribute to the extent of GHG emissions disclosure level. However, in order to be effective in monitoring GHG emissions disclosure, the AC should possess all the characteristics.

As was previously mentioned and discussed, the AC size, independence and diligence had been found to be the minimum characteristics and requirements for AC to be effective and monitor companies to disclose beyond the Bursa Malaysia disclosure requirements. The GHG emissions reporting is a voluntary reporting because BMLR does not set any mandatory obligations and gives full freedom for companies to determine the items and elements for sustainability reporting. The BMSRG only serves as a guideline and companies are strongly encouraged to adhere to the guideline in preparing the sustainability statements. However, based on the disclosure level made by companies, effective AC was shown to have an important role in ensuring that

companies make more detailed and transparent environmental reporting.

In short, all the findings, however, are based on the Malaysian capital market, therefore, constraints may arise when expanding to other jurisdictions. This study only focused on three main characteristics of AC, thus additional features of AC such as gender, nationality and tenure of members could be employed in future studies. Another possible restriction of this study is that the sample was only selected from the plantation sector. Future research related to the level of GHG emissions disclosure may want to consider expanding to other sectors.

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