Determinants of Social Performance Efficiency of ESG and Non-ESG Firms: Evidence from Southeast Asian Countries

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ABSTRACT

The skewed research attention of past literature relatively failed to emphasize on the true objective of firms' social responsibility; which is upholding stakeholders' wellbeing. Hence, this study investigated the efficiency of firms in giving back to the masses. Primarily, this study examined firms' social performance (SP) efficiency by using Data Envelopment Analysis (DEA). Next, by using Panel Regression Analysis; this study investigated the determinants of SP efficiency (internally and externally), based on Institutional Theory. The study focused on both ESG and non-ESG firms in Malaysia and Singapore from 2010 to 2019. First, novelties on SP efficiency are that both countries' ESG firms are far more efficient in giving back to the masses, compared to non-ESG firms. Additionally, firms' SP efficiency is significantly influenced by firm's pure technical inefficiency in directing their financial returns toward ESG contribution. Second, for determinants of SP efficiency; the study yielded findings that are unique to each country. Both firm characteristics (internal) and country characteristics (external) had a significant influence of Malaysia's ESG firms. While, only country characteristics were significant influence of Singapore's ESG firms. Moreover, only firm characteristics were found to be significant predictors of SP efficiency for both countries' non-ESG firms.

Keywords: ESG; Social performance efficiency; Data envelopment analysis; Institutional theory; Southeast Asia

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INTRODUCTION

Corporate calamities initiated by poor business practices, such as Enron and WorldCom in the US, Marconi in the UK, Parmalat in Europe, and Royal Ahold in the Netherlands have been the main catalyst of firms' increased awareness towards environmental, social, and governance (ESG) issues. To date, there are increasing numbers of firms that incorporate ESG reporting into their establishments (Starks, Venkat, and Zhu, 2017). ESG reporting disclosures by firms signals firms' transparency and awareness about ESG issues. This further indicates that firms are adamant in achieving wholesome objective for the firm, its stakeholders and the economies. Which would have significant impact on firms' financial performance (FP) in the long run.

However, a plethora of academic literature has investigated the effect of being socially responsible (SR) on firms' FP and yield mixed findings. Theoretical literatures argued the idea of competitive advantage (Porter, 1991; Porter and van der Linde, 1995), added financial costs (Friedman, 1970; Rothchild, 1996; McWilliams and Siegel, 1997; Jensen, 2002), lack of diversification and increased in firms' specific risk (Kurtz and DiBartolomeo, 1996; DiBartolomeo and Kurtz, 1999) that being SR brings to firms. Moreover, these literatures are heavily focused in the western economies (Renneboog *et al*., 2008; Perez-Gladish and M'Zali, 2010).

In contradiction, this study is determined in focusing on the true objective of SR practice; which is sustainability. This study questions, whether SR firms are actually upholding their stakeholders' wellbeing? This study introduces a non-parametric methodology in order to measure firms' social performance (SP). The Production approach data envelopment analysis (DEA) was used to measure firm's SP efficiency. This methodology provides a transparent SP measure, which is imperative to investors in making informed SR investment decisions (Hollingworth, 1998; Perez-Gladish and M'Zali, 2010). Firms' scores of Corporate Social Responsibility (CSR) or ESG that are published by information intermediaries (e.g., Bloomberg, Dow Jones, Morningstar, Lipper) do not directly measure firms' SP. Market practitioners have further argued that there is no uniformity in measuring firm's SP, as its indicators vary from each industry and country (Perez-Gladish *et al*., 2013). ESG factors of SR firms are non-financial and qualitative in nature making them hard to measure (ASEAN-Japan

Centre (AJC), 2019). Jeong *et al*. (2013) stated that a globally uniformed SP measurement is required, as the ESG scores provided by information intermediaries are contended to be theoretically and methodologically unreliable (Wartick and Mahon, 2009; Siew, Balatbat, and Carmichael, 2016) and plagued with information asymmetry possibilities (Kulkarni, 2000; Cho, Lee, and Pfeiffer, 2013).

Furthermore, firm's SP is said to carry informational advantage and information transparency (Verrecchia, 2001; Lambert, Leuz, and Verrecchia, 2009) to various stakeholders of the firm. The informational advantage is contended to be reflected in firm's stock prices and is valued by investors (Bauer, Gunster, and Otten 2004; Derwall, Gunster, Bauer, and Koedijk, 2004; Cremers and Nair, 2005). The perceived-value of firm's SP by stakeholders is what makes engagement in social responsibility costly to a firm (Jensen, 2002). For that reason, this study sought to examine the internal (firm characteristics) and external (country characteristics) factors which influence firms' SP efficiency. The identification of both internal and external factors that influence firms' SP efficiency are imperative in protecting stakeholders from the risk of information asymmetry. Past scholars largely investigated the association between firm's SP and FP; in an effort to distinguish the economic justification of firm's SR commitment. Recent empirical literatures on CSR, frequently examined firm characteristics as determinants of firm's SP (Ali, Frynas, and Mahmood, 2017). But there is limited empirical evidence of country characteristics affecting firm's SP (Jackson and Apostolakou, 2010; Ioannou and Serafeim, 2012). Ioannou and Serafeim (2012) state that there exist variations in firm's SP across firms, industries and countries. Moreover, Aguilera *et al*. (2007) contend that firms are rooted to their country's system, which instigates different level of pressures towards social responsibility commitments. Hence, it would be interesting to examine the effect of firm and country characteristics towards firm's SP efficiency.

Scope of the Study

The Economies of Malaysia and Singapore were selected in order to investigate the set objectives. Malaysia is considered a developing economy, while Singapore is considered a developed economy in the Southeast Asian region (The State of Asian and Pacific Cities, 2015; International Monetary

Fund (IMF), 2015). These economies suit the study's objectives due to three central reasons. First, these countries lead the ESG development in the Southeast Asian region. Second, the issue of firm inefficiency is prevalent in the few regions of the Asia Pacific (Kinda, Plane, and Veganzones-Veroudakis, 2014; See, 2015). Jarboui, Pascal, and Younes (2013) highlight that firm efficiency level in different economies might vary due to institutional differences, as such; capital market development, economic development, investment level, market infrastructure and facilities, legal systems, corporate control, and information asymmetry environment. Lastly, these economies are characterized with high information asymmetry by various past literature. Asian countries are said to possess weak investor protection (La Porta *et al*., 2000), high family ownership concentrations (Claessens, Djankov, and Lang, 2000), and inadequate corporate controls (La Porta *et al*., 2000). These predicaments lead to less transparency and a greater information asymmetry problem. Moreover, Hemmer and Bardhan (2000) contend the institutional underdevelopment in Asian countries are caused by their reluctance in reforming their traditional enforcement.

Table 1: Malaysia and Singapore ESG-related Development

Country	Exchange Name	*Global Disclosure Ranking	Require ESG Reporting	Written Guidance on ESG Reporting	ESG Related Training	Sustainability Indices	ESG Investment (%)
Malaysia	Bursa Malaysia	15	Yes	Yes	Yes	Yes	35
Singapore	SGX	16	Yes	Yes	Yes	Yes	70

*ranking as at 2017, among 55 economies globally
Source: AJC (2019)

LITERATURE REVIEW

Literature Review of Social Performance Measurement

Rappaport (1981) introduced the concept of market capitalization that centers on firm's responsibility in maximizing of shareholders' equity. However, the Stakeholder Theory contends that in order to have a sustainable long-term growth, firm should focus on not only its shareholders, but its stakeholders too (Freeman, 1983). The contradiction of these two theories further incites arguments of whether being SR could affect firm's FP.

The Porter Hypothesis (Porter, 1991) is often cited as the focal theory that links SP and FP of a firm. Excellent sustainability achievements can create competitive advantage to firms through technological innovation. Firm's innovation in green technology will yield efficient processes, reduce compliance cost, increase productivity, and create competitive edge among its competitors (Porter, 1991; Porter and van der Linde, 1995).

Furthermore, the Slack Resources Theory (Waddock and Graves, 1997) suggests that a firm with high FP has excess resources (slack resources) to be invested in various dimensions of SR, such as employee, customer, and community relations, environmental protections, and philanthropy programs. Firms would achieve high SP through efficient allocation of slack resources, where high FP is the main catalyst.

Thus, these theoretical concepts are the basis of this study's SP measurement, which link firm's SP-FP relationship. SP is a byproduct of FP therefore SP is an output production of FP as input. Many past empirical literatures have used output-input DEA in measuring the efficiency of firms' SP.

Belu (2009) used output-input DEA, where its output variables are sustainability scores of 0 to 100 calculated from questionnaire of CSR dimensions. For its input, firm's measures of FP were used, such as return on assets (ROA), return on equity (ROE), and annual average stock returns. Chen and Delmas (2011) used the DEA model to address the ordinal nature of SP, based on SP ratings from the KLD database. The model's SP is calculated by the weighted sum of the category scores. The assigned weights are derived from three methods, based on; (1) equal weights, (2) Waddock and Graves (1997), and (3) Ruf, Muralidhar, and Paul (1998). While the category scores are calculated by subtracting SP concerns from strengths obtained from KLD database. The DEA analysis is done separately for each industry of finance, manufacturing, and service. Jeong *et al*. (2013) used the ESG scores of Korean publicly listed firms and convert them into ESG costs as output. FP measures of firms such as; return on asset, return on equity, and operating profit percentage are used as its set of input. In Belu and Manescu (2013) DEA model, ROA and Tobin's Q are used as its inputs. While for its outputs, CSR scores of 0 to 100 obtained from the Sustainable Asset Management (SAM); an asset management company in Switzerland.

In investigating the relationship between operational productivity, SP, FP, and risk of 476 US manufacturing firms, Jacobs, Kraude, and Narayanan (2016) uses KLD database ratings. Similar to Chen and Delmas (2011), the study takes into account the ordinal nature of KLD ratings' strengths and concerns.

Literature Review of Social Performance's Determinants

Recent empirical literature on CSR, frequently examined firm characteristics as determinants of firm's SP (Ali, Frynas, and Mahmood, 2017). Studies in developed economies have reported firm characteristics such as; firm size (Bouten *et al*., 2011), industry sector (Hou and Reber, 2011), and corporate FP (Tagesson *et al*., 2009) to have significant positive relationship with CSR disclosure.

As for country characteristics' determinants, the Institutional Theory such as Whitley (1999) National Business System (NBS) is used as basis for independent variables selection. Variation in firm SP can be influenced by the characteristics of the country where the firm resides. Each country possesses distinct opinion and legal practice on SR activities that a firm should abide to, especially in comparison between firms in developed and developing economies. The Theory connects the link between business, owners, and other stakeholders. The Theory suggests that country-level institutional dimensions have instrumental effect on firm's economic performance. These dimensions narrate firm's access to resources that are perilous for the sustainability of its economic wellbeing. These country-level institutional dimensions are (1) financial system, (2) educational system, (3) political system and (4) cultural system.

NBS's first dimension is country's financial system. It relates to a country's capital availability for firms. Capital financing is imperious to a firm's longevity and sustainability. A country with a market-based (equity financing) financial system is hypothesized to influence firm's SP positively (Ioannou and Serafeim, 2012). A market-based financial system is considered to be more organized and liquid, with lesser capital-constraints (Whitley, 1999; Ioannou and Serafeim, 2012). While, a country with a credit-based (debt financing) financial system is hypothesized to influence firm's SP negatively. A credit-based financial system is considered illiquid

and plagued with capital-constraints (Kubik, Scheinkman, and Hong, 2011; Ioannou and Serafeim, 2012).

NBS's second dimension is a country's educational system. It relates to the capability of the country's labor, a competent workforce with regard to their educational level. Positive CSR policies have been used by firms to recruit and retain workers (Siegel, 1999) and boosting workers' self-esteem and productivity (Moskowitz, 1972). This notion is supported by the empirical findings of Murnane, Willett, and Levy (1995), Greening and Turban (2000), and Ioannou and Serafeim (2012).

NBS's third dimension is country's political system. It relates to the political environment, either directly or indirectly affect firm's growth and market development. Since firms are obligated to abide by the rules and regulations set by the government, hence power of the state influences firms' growth (Whitley, 1999). This economic relationship between firms and the government sets an environment for bargaining, lobbying and bribery (Rodriguez, Uhlenbruck, and Eden, 2005). Corruption or the abuse of power by firms for their personal benefit is believed to affect firm's SP negatively. Moreover, in a highly competitive economy a firm would sacrifice quality and safety of their products, services, and stakeholders for the sake of financial returns; which in turn negatively affect firm's SP (Ioannou and Serafeim, 2012).

NBS's fourth dimension is country's cultural system. It refers to the influence of various stakeholders in the firm's economic activities, namely the governing authorities. These relationships are imperious to the economic exchanges, compliance culture, and regulations setting within an economy. Ali, Frynas, and Mahmood (2017) stated that variations in country's contextual factors; such as social, political, and cultural systems could affect the level of CSR disclosures. Especially in developing economies, it is natural for governments to hold authority or part-ownership of a country's large businesses. The culture of government ownership in businesses initiate variations in firms' regulations on CSR disclosures. However, empirical findings in developing economies in relation to ownership structure are rather mixed; with positive significant relationship (Alsaeed, 2006; Saleh, Zulkifli, and Muhamad, 2010) and negative significant relationship (Rizk, Dixon, and Woodhead, 2008; Haji, 2013).

METHODOLOGY

Data Collection

Firstly, in measuring firms' SP efficiency, the data for inputs and outputs were obtained from two different databases. Firms' ESG scores as outputs were obtained from the Thomson Reuters ASSET4 ESG database. Whereas, the financial data for inputs were firm's financial data, obtained from the Worldscope database. Secondly, firm-level characteristics data was collected from the Thomson Reuters DataStream and Worldscope databases. The financial data were converted into US dollar (USD) to guarantee standardization of the whole data. Lastly, country-level characteristics data was collected from the World Bank and DataStream.

The sample comprised of 1,395 listed, "active" firms of various sectors from the two selected economies. Out of these sample population, only 100 firms were labelled as ESG; 58 firms from Malaysia and 42 firms from Singapore.

Next, this study adopted the method used by Nofsinger and Varma (2014) in matching of firms. The ESG firms were matched with a non-ESG counterpart from the same sector of economies and with a similar total assets value. Firms' total asset data were obtained from Worldscope. In some instances, the study relaxed its total assets criteria and matched the ESG firm with a non-ESG firm that has second largest total asset value. Furthermore, few ESG firms were omitted from the sample when they were the sole firm in the respective sector with no available ESG match.

This final sample included a total of 160 firms, 94 firms from Malaysia (ESG: 47 firms, non-ESG: 47 firms) and 66 firms from Singapore (ESG: 33 firms, non-ESG: 33 firms). The data spanned over a period of 10 years, between the year 2010 to the year 2019. The time period was selected for this study as it was in the aftermath of 2008 global financial crisis and before the effect of the Covid-19 global pandemic.

Research Methods

First Stage: DEA and Input Output Selection

The first objective of this study was to compare the SP efficiency between ESG firms and non-ESG firms. The Non-parametric frontier models, such as DEA is highly apposite in examining efficiency of firms over a specified time period (Charoenrat, Harvie, and Amornkitvikai, 2013; Cummins and Weiss, 2013). Efficiency relates to the economies of scale concept, where firms achieve maximum output production through cost savings and efficient usage of inputs (Farrell, 1957).

The DEA is capable of measuring the efficiency of each decision-making unit (DMU) through maximum of ratio of weighted outputs and weighted inputs. This study used the Banker, Charnes, and Cooper (BCC) model under the variable returns to scale (VRS) assumption in assessing the efficiency of each DMU. Under the VRS, not all DMU was assumed to operate at an optimum level (Banker, Charnes, and Cooper, 1984).

DEA measures firm's technical efficiency (TE) in producing output near or on the efficient production frontier. TE in this study was related to firm's SP efficiency in giving back to its stakeholders by means of ESG contribution. TE is further divided into two measurements of pure technical efficiency (PTE) and scale efficiency (SE). VRS assumption provides measurement of PTE and SE. Furthermore, firm's inefficiency as such pure technical inefficiency (PTIE) and scale inefficiency (SIE) can be identified. PTIE measures firm's managerial inefficiency and SIE measures firm's size inefficiency. Hence, TE scores in this study were measures to both ESG and non-ESG firm's SP efficiency. Efficiency scores (TE, PTE, and SE) ranging between 0 to 1, a score closer to 1 was considered higher efficiency.

This study used the production approach of DEA, which translates firm's FP into ESG achievements (SP) in serving the its stakeholders. The SP-FP link is based on the slack resources theory (Waddock and Graves, 1997). This thesis deliberates firm's FP as inputs and firm's SP as outputs. A production is considered efficient when more output is produced (SP) from a given set of inputs (FP). As for the selection of inputs and outputs, the study followed various past reputable empirical literature, such as Belu (2009), Jeong *et al*. (2013), and Belu and Manescu (2013).

This study's DEA model had a combination of three inputs and outputs respectively. The study consisted of balanced DMUs for both ESG and non-ESG firms. Where 94 DMUs for Malaysia (ESG: 47, non-ESG: 47) and 66 DMUs for Singapore (ESG: 33, non-ESG: 33) thus, satisfying the rule of thumb, as described by Equation 1 (Cooper, Seiford and Tone, 2000). Since the total number of DMUs for each country is more than the numbers of inputs and outputs variables (3 inputs × 3 outputs or 3 [3 inputs + 3 outputs]). Therefore, the selection of variables was valid and permits the measurement of DMUs efficiencies.

$$N \geq \max \{m \times s, 3 (m + s)\} \quad (1)$$

Where, N is the number of DMU or sample, m is the number of inputs, and s is the number of outputs. Table 2 summarizes these outputs and inputs variables.

Table 2: DEA's Inputs and Outputs Variables

Variables	Name of Variable	Acronym	Definition / Measurement	Source
Inputs	Return on Asset	ROA	(Net Income – Bottom Line – ((Interest Expense on Debt-Interest Capitalized) * (1 – Tax Rate))) / Total Asset Last 2 Years Average * 100	Worldscope
	Return on Equity	ROE	(Net Income – Bottom Line – Preferred Dividend) / Common Equity's Last 2 Years Average * 100	Worldscope
	Operating Profit Margin	OPM	(Operating Income / Net Revenues) * 100	Worldscope
Outputs	Environmental Score	ES	Calculated from data points related to firm's environmental performance, such as resource reduction, emission reduction, product innovation.	ASSET4
	Social Score	SS	Calculated from data points related to firm's social performance, such as employment quality, health and safety, training and development, diversity, human rights, community, product responsibility	ASSET4
	Governance Score	GS	Calculated from data points related to firm's corporate governance, such as board structure, compensation policy, board functions, shareholders rights, vision and strategy	ASSET4

Source: Worldscope and Thomson Reuters ASSET4 ESG Database

Second Stage: Panel Regression Analysis and Proxies Selection

The second objective of this study was to identify the potential firm and country characteristics determinants which influence firms' SP efficiency. Hence, Panel Regression Analysis was used in the second stage analysis. Breusch-Pagan Lagrange Multiplier (BP-LM) test was conducted to determine whether pooled ordinary least squares (OLS) or generalized least squares (GLS) was appropriate for the study's data (Breusch and Pagan, 1980). Next, Hausman test (Hausman, 1978) was applied in selecting between FEM or REM under GLS regression model.

$$TE_{i,t} = \alpha + \beta_{i,t} (\Sigma FC_{i,t}) + \beta_{i,t} \Sigma CC_{i,t} + n_{i,t} + \varepsilon_{i,t} \quad \text{.....} \quad (2)$$

Equation 2 explains; i is the individual observation, t is the time period, α is the constant term, β is the vector of coefficients, n is an unobserved effect, and ε is the error term. *TE* is technical efficiency in relation to SP efficiency. *TE* is obtained from the first stage analysis of DEA and is selected as dependent variable as it measures the entirety of firms' SP efficiency, rather than *PTE* and *SE*. *FC* is various proxies for firm's characteristics. While, *CC* is various proxies for country's characteristics, grounded on the dimensions of NBS institutional theory (Whitley, 1999). Equation 2 adheres to the past literatures that call for empirical evidence of country characteristics affecting firm's SP (Aguilera *et al*. 2007; Jackson and Apostolakou, 2010; Ioannou and Serafeim, 2012). Table 3 summarizes all the proxies used in investigating the second objective of this study.

The study was well aware that estimation of equation 2 may cause potential econometric issue of endogeneity bias. However, according to Wooldridge (2005) and Murtazashvili and Wooldridge (2008), the issue of endogeneity bias can be resolved by using the fixed-effects instrumental variables.

Table 3: Summary of Dependent and Independent Variables for the Second Objective

Name of Variable	Acronym	Definition / Measurement	Predicted Sign	Source
Dependent Variables				
TE of firms	TE	TE scores obtained from DEA	N/A	DEA
Independent Variables				
Firm Characteristics, *FC*				
Firm Size	SIZE	Firm's total assets	(+)	Worldscope
Systematic Risk	BETA	Measure of market risk, the relationship between stocks and market volatility	(-)	Worldscope
Herfindahl Index	HHI	Sum of squared ratios of firm revenue over industry revenue	(-)	Worldscope
Country Characteristics, *CC*				
Financial System Dimension				
Market Capitalization	MCap	Market value of listed firms' outstanding shares in the country's capital market (% of GDP)	(+)	World Bank
Country's Debt	DEBT	Country's debt ratio (% of GDP)	(-)	World Bank
Education and Labor System Dimension				
Labor Productivity	LP	Real economic output per labor hour	(-)	World Bank
Political System Dimension				
Competitive Index	CompI	A summary measure of various macro and microeconomics aspects that influence country's productivity in capitalizing its resources	(-)	World Bank
Corruption Index	CorrI	A summary measure of country's public sector corruption level	(+)	World Bank
Cultural System Dimension				
Government Ownership	GovtO	Shareholding percentage of government bodies in the firm.	(+)	DataStream

Source: Worldscope DataStream, and World Bank

RESULTS AND DISCUSSION

Descriptive Statistics of Inputs and Outputs Variable

Inputs and outputs of the study's DEA model are described in Table 4. Via the production approach, the study's DEA model consisted of three inputs and three outputs. Panel A and Panel B summarizes the descriptive statistics of ESG and non-ESG firms of Malaysia and Singapore, respectively. For both Malaysia and Singapore, it was noted that the ESG firms had higher average value of inputs compared to non-ESG firms from 2010 to 2019. While non-ESG firms recorded 0.000 mean output value for ES, SS, and GS, indicating that non-ESG firms had zero contribution towards ESG.

Table 4: Summary Statistics of Input and Output Variables in DEA Model for Malaysia and Singapore (2010-2019)

	ESG				Non-ESG			
Variables	**Mean**	**Min**	**Max**	**Std. Dev**	**Mean**	**Min**	**Max**	**Std. Dev**
Panel A: Malaysia								
Inputs								
ROA	9.087	-10.400	51.160	8.675	4.560	-46.440	38.610	8.189
ROE	21.226	-51.980	369.910	39.563	6.916	-182.780	88.150	20.525
OPM	17.369	-27.800	58.880	13.190	2.678	-664.800	76.840	55.004
Outputs								
ES	23.758	0.000	91.070	22.723	0.000	0.000	0.000	0.000
SS	33.461	0.000	97.020	25.372	0.000	0.000	0.000	0.000
GS	36.517	0.000	91.760	26.011	0.000	0.000	0.000	0.000
Panel B: Singapore								
Inputs								
ROA	7.480	-14.570	38.130	5.966	6.387	-17.860	92.070	9.575
ROE	24.935	-80.560	1087.140	85.499	10.573	-106.470	136.380	19.056
OPM	19.174	-37.740	63.360	16.436	13.779	-179.000	97.470	29.866
Outputs								
ES	32.188	0.000	92.980	26.911	0.000	0.000	0.000	0.000
SS	37.061	0.000	97.360	25.445	0.000	0.000	0.000	0.000
GS	40.038	0.000	90.860	26.032	0.000	0.000	0.000	0.000

Findings of Firm's SP Efficiency of ESG and Non-ESG Firm

The DEA method was used to measure the TE change and was divided into two components of (1) PTE and (2) SE. This study constructed ten separate annual efficiency frontiers (2010–2019), in order to observe ESG and non-ESG firms' SP efficiencies. The advantage of this type of efficiency frontier is that each firm can be observed more than once over a period of time, since a firm might be efficient in one period of time and inefficient in another (Isik and Hassan, 2002), thus, assuming that the errors or data problems are not consistent over time. Allowing the aforementioned assumption, reduces the lack of random error issue in DEA (Isik and Hassan, 2002; Sufian, Mohamad, and Muhamed-Zulkhibri, 2008).

Malaysia

The results as in Table 5 suggests that Malaysia's ESG firms' SP has been on an increasing trend, with an increased mean TE score from 40.7% in year 2010 to 75.5% in year 2019. While, for Malaysia's non-ESG firms, the results displayed a very low mean TE scores with a fluctuating trend between 3.8% and 7.5%. Based on Panel K (All Years), Malaysia's ESG firms exhibited a higher mean TE (75.5% vs. 5.2%), PTE (77.5% vs. 8.3%), and SE (97.5% vs. 93.6%) relative to the non-ESG firms. First, the empirical findings showed that both ESG and non-ESG firms in Malaysia were inefficient in utilizing their inputs to produce the same outputs, where ESG firms had lower input waste compared to non-ESG (TIE: 24.5% vs 94.8%). Second, ESG firms displayed a considerably higher pure managerial efficiency than non-ESG firms, with lower wastage of inputs (PTIE: 22.5% vs 91.7%) to produce the same level of outputs. Third, both types of firms were scale efficient, with ESG firms having slightly more optimal scale of operation and wasted lower input (SIE: 2.5% vs. 6.4%) compared to non-ESG firms.

Table 5: Summary Statistics of Efficiency Scores for ESG and Non-ESG Firms in Malaysia (2010-2019)

	Malaysia				Singapore			
	ESG		Non-ESG		ESG		Non-ESG	
Efficiency Measures	No. of DMUs	Mean	No. of DMUs	Mean	No. of DMUs	Mean	No. of DMUs	Mean
Panel A: Year 2010								
TE	47	0.407	47	0.075	33	0.557	33	0.059
PTE	47	0.416	47	0.095	33	0.581	33	0.106
SE	47	0.974	47	0.937	33	0.949	33	0.913
Panel B: Year 2011								
TE	47	0.442	47	0.065	33	0.609	33	0.060
PTE	47	0.465	47	0.067	33	0.630	33	0.079
SE	47	0.957	47	0.950	33	0.949	33	0.941
Panel C: Year 2012								
TE	47	0.487	47	0.045	33	0.497	33	0.043
PTE	47	0.490	47	0.059	33	0.531	33	0.043
SE	47	0.983	47	0.971	33	0.925	33	0.947
Panel D: Year 2013								
TE	47	0.516	47	0.065	33	0.518	33	0.038
PTE	47	0.521	47	0.065	33	0.583	33	0.073
SE	47	0.988	47	0.990	33	0.881	33	0.868
Panel E: Year 2014								
TE	47	0.548	47	0.064	33	0.637	33	0.045
PTE	47	0.551	47	0.064	33	0.648	33	0.045
SE	47	0.994	47	0.993	33	0.983	33	0.965
Panel F: Year 2015								
TE	47	0.607	47	0.065	33	0.601	33	0.048
PTE	47	0.625	47	0.082	33	0.615	33	0.075
SE	47	0.973	47	0.962	33	0.972	33	0.920
Panel G: Year 2016								
TE	47	0.639	47	0.050	33	0.585	33	0.043
PTE	47	0.651	47	0.080	33	0.606	33	0.044
SE	47	0.981	47	0.951	33	0.968	33	0.978
Panel H: Year 2017								
TE	47	0.735	47	0.063	33	0.657	33	0.044
PTE	47	0.745	47	0.080	33	0.680	33	0.045
SE	47	0.984	47	0.972	33	0.961	33	0.963
Panel I: Year 2018								
TE	47	0.724	47	0.038	33	0.683	33	0.037
PTE	47	0.733	47	0.058	33	0.717	33	0.045
SE	47	0.985	47	0.969	33	0.947	33	0.949
Panel J: Year 2019								
TE	47	0.755	47	0.052	33	0.664	33	0.056
PTE	47	0.775	47	0.083	33	0.730	33	0.074
SE	47	0.975	47	0.936	33	0.905	33	0.903
Panel K: All Years								
TE	470	0.755	470	0.052	330	0.601	330	0.047
PTE	470	0.775	470	0.083	330	0.632	330	0.063
SE	470	0.975	470	0.936	330	0.944	330	0.935

Singapore

As for Singapore, as specified in Table 6 ESG firms' SP have been on a fluctuating trend, between 49.7% and 68.3% from 2010 to year 2019. While, non-ESG firms also displayed a fluctuating trend with very low mean TE scores, between 3.7% and 6.0%. To compare the findings in Panel K (All Years), Singapore's ESG firms showed a higher mean TE (60.1% vs. 4.7%), PTE (63.2% vs. 6.3%), and SE (94.4% vs. 93.5%) relative to the non-ESG firms. Firstly, mean TE scores (60.1% vs. 4.7%) showed that both ESG and non-ESG firms were inefficient in utilizing their inputs to produce the same outputs, illustrating that, ESG firms are being more managerial efficient with lower output loss of 39.9%, than non-ESG firms' 95.3%. Secondly, based on the PTE scores comparison (PTE: 63.2% vs. 6.3%), non-ESG firms were more purely managerial inefficient with high output loss of PTIE of 93.7%, compared to ESG firms' PTIE of 36.8%. Lastly, based on SE scores comparison (SE: 94.4% vs. 93.5%), both ESG and non-ESG firms were closely scale efficient with a very low output loss of 5.6% and 6.5% (SIE) for ESG and non-ESG firms respectfully.

Robustness Checks for DEA

Next, robustness checks were done in order to test the correctness of the efficiency scores that were obtained earlier to see whether the difference in the TE, PTE and SE of the ESG and non-ESG firms in selected Southeast Asian countries were statistically significant. To test for significant difference, Sufian and Kamarudin (2015) and Kamarudin *et al*. (2017) suggest both parametric (t-test) and non-parametric tests (Mann-Whitney and Kruskall-Wallis) to attain more robust results as the data might violate the assumption of a parametric t-test, hence non-parametric test is also required (Coakes and Steed, 2003; Kamarudin *et al*., 2017).

Table 6 illustrates the robustness tests for DEA model's efficiency scores of both ESG and non-ESG firms. Panel A and Panel B presents the results for Malaysia and Singapore respectfully. The results from parametric t-test displays that; both Malaysia and Singapore ESG firms had a higher level of mean TE and PTE compared to non-ESG firms that was significantly different at the 1% level. Both non-parametric tests confirmed the results of the parametric t-test. Moreover, ESG firms also exhibited a higher mean SE relative to non-ESG firms. However, only Malaysia's findings were significantly different at the 5% level. Whereas, Singapore's was non-significant. These findings were also confirmed by both non-parametric tests.

Table 6: Robustness Tests for Efficiency Scores of ESG and Non-ESG Firms of Malaysia and Singapore (2010-2019)

Test Statistics	Parametric Test		Non-Parametric Test			
	t-test		Mann-Whitney test		Kruskall-Wallis test	
	T (Prb > t)		z (Prb > z)		χ^2 (Prb > χ^2)	
	Mean	T	Mean rank	Z	Mean rank	χ^2
Panel A: Malaysia						
Technical Efficiency						
ESG	0.586	13.251***	15.50	-3.780***	15.50	14.286***
Non-ESG	0.058		5.50		5.50	
Pure Technical Efficiency						
ESG	0.597	12.977***	15.50	-3.780***	15.50	14.286***
Non-ESG	0.073		5.50		5.50	
Scale Efficiency						
ESG	0.979	2.308**	13.30	-2.117**	13.30	4.480**
Non-ESG	0.963		7.70		7.70	
Panel B: Singapore						
Technical Efficiency						
ESG	0.601	27.769***	15.50	-3.780***	15.50	14.286***
Non-ESG	0.047		5.50		5.50	
Pure Technical Efficiency						
ESG	0.632	27.088***	15.50	-3.780***	15.50	14.286***
Non-ESG	0.063		5.50		5.50	
Scale Efficiency						
ESG	0.944	0.636	11.50	-0.756	11.50	0.571
Non-ESG	0.935		9.50		9.50	

Note: ***, ** and * indicate significance at the 1%, 5%, and 10% level respectively

Descriptive Statistics on Efficiency, Firm Characteristics, and Country Characteristics of Malaysia and Singapore

Table 7 summarizes the descriptive statistics of efficiency scores, proxies for firm and country characteristics both ESG and non-ESG firms. Descriptive statistics of Malaysia is presented in Panel A and Singapore in Panel B. For both countries, in comparison to non-ESG firms, it was noted that the ESG firms had a higher mean value of *TE*, *SIZE*, and *HHI*, in comparison to non-ESG firms. However, only *BETA* was higher for non-ESG firms relative to ESG firms.

For country characteristics, Malaysia exhibited a lower mean value for all proxies except for *LP*. Interesting to note, Singapore reported an

average value of 0.000 of *GovtO* for both of its ESG and non-ESG firms, which indicated, based on the study's sample, that the government bodies in Singapore hold no shareholding percentage in the country's ESG and non-ESG firms.

Table 7: Descriptive Statistics of ESG and Non-ESG Firms in Malaysia and Singapore (2010-2019)

	ESG				Non-ESG			
Variables	**Mean**	**Min**	**Max**	**Std. Dev**	**Mean**	**Min**	**Max**	**Std. Dev**
Panel A: Malaysia								
TE	0.586	0.012	1.000	0.356	0.058	0.010	1.000	0.180
Firm Characteristics								
SIZE (USD billion)	5.931	0.031	42.762	7.548	1.765	0.001	20.876	3.362
BETA	1.062	-1.091	4.032	0.631	1.204	-3.616	5.039	0.863
HHI	0.097	0.000	1.000	0.207	0.008	0.000	0.225	0.023
Country Characteristics								
MCap	134.316	110.764	160.260	16.572	134.316	110.764	160.260	16.572
DEBT	53.067	50.700	54.700	1.193	53.067	50.700	54.700	1.193
LP	109.958	100.000	123.600	8.303	109.958	100.000	123.600	8.303
CompI	25.750	4.870	74.600	31.671	25.750	4.870	74.600	31.671
CorrI	48.400	43.000	53.000	3.043	48.400	43.000	53.000	3.043
GovtO	0.117	0.000	0.729	0.172	0.031	0.000	0.800	0.074
Panel B: Singapore								
TE	0.601	0.008	1.000	0.307	0.047	0.006	1.000	0.162
Firm Characteristics								
SIZE (USD billion)	9.154	0.193	59.434	9.502	1.665	0.006	7.773	1.867
BETA	1.011	0.217	1.921	0.417	1.019	-1.442	5.010	0.678
HHI	0.212	0.000	0.931	0.326	0.001	0.000	0.019	0.003
Country Characteristics								
MCap	223.505	184.144	269.892	27.895	223.505	184.144	269.892	27.895
DEBT	106.760	97.000	126.300	8.320	106.760	97.000	126.300	8.320
LP	108.829	100.000	118.384	6.039	108.829	100.000	118.384	6.039
CompI	29.046	5.470	84.780	35.865	29.046	5.470	84.780	35.865
CorrI	86.500	84.000	93.000	3.143	86.500	84.000	93.000	3.143
GovtO	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Residual Diagnostic

Prior employing Multivariate Regression Analyses, the normality of the study's underlying distribution is tested. This study conducted both

numerical and visual tests of (1) skewness and kurtosis *z*-values, (2) the Shapiro-Wilk test, and (3) histograms, normal Q-Q plots and box plots. The study found, for data on both Malaysia and Singapore, that all explanatory variables were approximately not normally distributed. Although many parametric statistical methods require the data to be normally distributed, according to Enders (2004) and Gujarati and Porter (2009), ordinary least squares estimators are still BLUE even when the error term are not normally distributed. Additionally, the Central Limit Theorem and Law of Large Numbers state, as the sample size approaches infinity the centre of the distribution of the sample means becomes very close to the population mean and that any sample with more than 30 observations are considered normal. Based on these arguments, the study's data remained not normally distributed.

Next, the study used the Pearson correlation coefficients to detect the problem of multicollinearity. Both Malaysia and Singapore exhibited the possibility of the multicollinearity problem. The matrices identified few variables that correlated highly with one another, with coefficients that were greater than 0.80 (Gujarati and Porter, 2009). Thus, this study computed the mean VIF value of the explanatory variables in the regression models, to further identify the multicollinearity problem (Gujarati and Porter, 2009). If the regression model was found with a high mean VIF value (more than 10), a corrective measure was done to address the issue. The study eliminated the variable that had the highest VIF value and correlated highly with other explanatory variables.

Findings of SP Efficiency's Determinants of ESG and Non-ESG Firms

Malaysia ESG and Non-ESG Firms

Table 8 presents the results of regression on determinants of firm's SP efficiency (*TE*) for Malaysia's ESG and non-ESG firms. The study tested a regression model with all the independent variables for both ESG and non-ESG firms. Both regression models found a high mean VIF value of (ESG: 19.635, Non-ESG: 19.763), indicating that both models were plagued with the multicollinearity problem. Thus, the study then identified and removed the variable *LP* to correct the multicollinearity problem.

Both regression models used the GLS REM framework and were statistically significant in explaining the variability in firms' SP efficiency (*TE*) (ESG: 28.3%, Non-ESG: 12.1%). The regression model for ESG firms highlighted four statistically significant variables (*SIZE*, *MCap*, *CompI*, *GovtO*). *SIZE* was significant at the 1 per cent level, while *MCap*, *CompI*, and *GovtO* were significant at the 5 per cent level. Whereas, the regression model for non-ESG firms found only two variables to be statistically significant (*SIZE*, *BETA*) and all country characteristics variables rendered insignificant findings. *SIZE* was significant at the 1 per cent level, while *BETA* was significant at the 5 per cent level.

For ESG firms' regression model; first, *SIZE* was positively related to firm's SP efficiency, indicating that larger firms tended to experience higher SP efficiency (Buniamin, 2010; Chih, Chih, and Chen, 2010; Bouten *et al*., 2011; Hou and Reber, 2011; Chiu and Wang, 2015; Kansal, Joshi, and Batra, 2014; Ali, Frynas, and Mahmood, 2017). Second, *MCap* was negatively related and may be for three reasons, which are; (1) Malaysia's market-based financial system is still developing and unorganized, hence being less liquid in providing firms with efficient capital allocation, (2) market-based financial system encourages intense competition for financing, which pushes firms to behave in socially irresponsible ways to survive, and (3) the intense competition for financing forces firms to focus on short-term profit maximization, hence limiting higher investment in SP and long-term reputation building (Fombrun and Shanley, 1990; Teoh, Welch, and Wong, 1998a; 1998b; Schneiberg, 1999). Third, *CompI* was positively related, indicating a competitive environment encourages firms to be more socially responsible; an effort in separating itself among its competitors, signaling firm's quality, and attract new investors (Ioannou and Serafeim, 2012). Lastly, *GovtO* is positively related, suggesting that a higher level of government ownership encourages a higher level of SP by firms. The Malaysian government has passed a mandatory requirement on firms CSR disclosure, consequently it is reasonable to observe firms with a high level of government ownership to exhibit a higher level of SP (Rizk, Dixon, and Woodhead, 2008; Haji, 2013).

Table 8: Regression on Relationship of both ESG and Non-ESG Firms' SP Efficiency with Firm Characteristics and Country Characteristics in Malaysia (2010-2019)

	ESG			Non-ESG		
Variables	**Pooled OLS**	**FEM**	**REM**	**Pooled OLS**	**FEM**	**REM**
Constant	4.378	-4.615	3.209	-4.938	-1.923	-4.052
	(16.614)	(14.072)	(13.324)	(11.042)	(9.618)	(9.558)
Firm Characteristics						
SIZE	0.626***	1.081***	0.696***	-0.223***	-0.396***	-0.286***
	(0.045)	(0.206)	(0.088)	(0.029)	(0.059)	(0.041)
BETA	-0.133	-0.181	-0.166	0.226***	0.160*	0.176**
	(0.091)	(0.125)	(0.109)	(0.059)	(0.089)	(0.074)
HHI	-0.090***	0.085	-0.021	1.165	2.301	1.604
	(0.032)	(0.106)	(0.058)	(1.782)	(2.475)	(2.125)
Country Characteristics						
MCap	-0.997*	-0.919**	-1.004**	0.391	0.268	0.352
	(0.548)	(0.441)	(0.436)	(0.365)	(0.319)	(0.316)
DEBT	-3.876	-2.820	-3.730	0.488	0.150	0.407
	(3.850)	(3.098)	(3.060)	(2.562)	(2.220)	(2.214)
CompI	0.136*	0.136**	0.135**	0.009	0.016	0.010
	(0.079)	(0.063)	(0.063)	(0.053)	(0.047)	(0.046)
CorrI	1.178	0.777	1.149	0.056	0.384	0.181
	(0.908)	(0.756)	(0.728)	(0.604)	(0.530)	(0.524)
GovtO	2.114***	1.148	1.676**	0.025	-0.898	-0.379
	(0.429)	(0.996)	(0.693)	(0.605)	(0.803)	(0.700)
R-squared	0.415	0.669	0.296	0.180	0.452	0.136
Adjusted R-squared	0.405	0.626	0.283	0.166	0.380	0.121
F-statistics	40.854***	15.509***	24.191***	12.692***	6.329***	9.041***
d statistics	0.560	1.009	1.875	1.272	1.863	1.676
Mean VIF	1.651			1.624		
BP-LM x^2			252.997***			119.562***
Hausman x^2			0.000			0.000
No. of Obs	470	470	470	470	470	470

Note: ***, ** and * indicate significance at the 1%, 5%, and 10% level respectively. Figures in parentheses ( ) are standard error. *LP* variable is omitted due to multicollinearity problem.

For non-ESG firms' regression model; first, *SIZE* was negatively and opposed the slack resources theory (Waddock and Graves, 1997). This finding is exclusive to non-ESG firms, as it explains; despite having larger total assets or excess financial resources, the firms invested lesser into SR dimensions, which decreases SP efficiency. Next, *BETA* was positively related, showing that firms with higher systematic risk experience higher SP efficiency. The finding is also exclusive to non-ESG firms. A firm with

high systematic risk is highly volatile and tends to incur high information costs in its risk assessment (Foster, 1986). Hence, a firm would provide additional environmental disclosure to reduce its information costs (Lang and Lundholm, 1993); in turn increasing firm's SP efficiency (Belkaoui and Karpik, 1989; Cormier, Magnan, and Van Velthoven, 2005).

Singapore ESG and Non-ESG Firms

Table 9 presents the results of regression on determinants of firm's SP efficiency (*TE*) for Singapore's ESG and non-ESG firms. The study tested a regression model with all the independent variables for both ESG and non-ESG firms. Both regression models reported a high mean VIF value (ESG: 43.087, Non-ESG: 43.104), signalling the presence of the multicollinearity problem. To address the issue, the study then identified and omitted the *LP* variable as it had the highest VIF value.

Both regression models used the GLS REM framework and were statistically significant in explaining the variability in firms' SP efficiency (*TE*) (ESG: 8.3%, Non-ESG: 3.6%). Important to note; the variable *GovtO* was found to be a constant and was omitted from the both regression models, as it reported an average value of 0.000 (Refer Table 7). Interestingly, the regression model for ESG firms reported no significant firm characteristics variables, but identified three significant country characteristic variables (*MCap*, *DEBT*, *CompI*). *MCap* and *CompI* were significant at the 1 per cent level, while *DEBT* was significant at the 5 per cent level. Additionally, the regression model for non-ESG firms was consistent with Malaysia's findings. Only two firm characteristics variables were significant (*SIZE*, *BETA*), while all country characteristics variables rendered insignificant findings. *SIZE* and *BETA* were significant at the 10 per cent and 1 per cent levels, respectively.

For the ESG firms' regression model; first, *MCap* was negatively related and did not agree with its predicted sign. Singapore's financial market is considered a well-developed in the Asia Pacific region, categorized as a tax haven to offshore non-resident companies (The State of Asian and Pacific Cities, 2015; IMF, 2015). Thus, the Singaporean financial system encourages intense competition for financing, which pushes firms to behave in socially irresponsible ways to survive, resulting in firms to focus towards short-term profit maximization, rather than long-term reputation building (Fomburn and Shanley, 1990; Teoh, Welch, and Wong, 1998a; 1998b;

Schneiberg, 1999). Second, *DEBT* was negatively related, signifying that the capital-constraint dilemma in Singapore's financial system decreases firm's incentive to invest towards SR (Kubik, Scheinkman, and Hong, 2011; Ioannou and Serafeim (2012). *CompI* was positively related, indicating that in an economy with a high competition index, firms tend to exercise higher social responsibility to separate themselves from competitors and to appeal to new investors (Ioannou and Serafeim, 2012).

Table 9: Regression on Relationship of both ESG and Non-ESG Firms' SP Efficiency with Firm Characteristics and Country Characteristics in Singapore (2010-2019)

	ESG			Non-ESG		
Variables	**Pooled OLS**	**FEM**	**REM**	**Pooled OLS**	**FEM**	**REM**
Constant	1.266*	1.444***	1.382***	-0.285	-0.215	-0.234
	(0.736)	(0.416)	(0.002)	(0.384)	(0.358)	(0.349)
Firm Characteristics						
SIZE	0.008***	-0.001	0.002	-0.013***	-0.006	-0.012*
	(0.002)	(0.003)	(0.003)	(0.005)	(0.016)	(0.007)
BETA	0.028	0.034	0.038	-0.083***	-0.031*	-0.059***
	(0.044)	(0.039)	(0.038)	(0.013)	(0.019)	(0.015)
HHI	-0.111**	0.139	-0.022	-5.410*	-1.140	-4.367
	(0.052)	(0.209)	(0.117)	(3.215)	(6.550)	(4.288)
Country Characteristics						
MCap	-0.001*	-0.001***	-0.001***	0.000	0.000	0.000
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
DEBT	-0.005	-0.005**	-0.005**	0.000	0.000	0.000
	(0.004)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
CompI	0.001**	0.002***	0.001***	-0.000	-0.000	-0.000
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
CorrI	0.001	-0.001	-0.000	0.004	0.003	0.004
	(0.006)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
R-squared	0.105	0.750	0.102	0.137	0.366	0.056
Adjusted R-squared	0.085	0.716	0.083	0.118	0.281	0.036
F-statistics	5.379***	22.256***	5.231***	7.296***	4.300***	2.750***
d statistics	0.419	1.491	1.639	1.295	1.749	1.555
Mean VIF	1.810			1.777		
BP-LM x^2			686.439***			38.434***
Hausman x^2			0.000			0.000
No. of Obs	330	330	330	330	330	330

Note: ***, ** and * indicate significance at the 1%, 5%, and 10% level respectively. Figures in parentheses ( ) are standard error. *LP* variable is omitted due to multicollinearity problem. *GovtO* variable is constant, thus it has been omitted.

For the non-ESG firms' regression model, the findings were consistent with Malaysia's non-ESG firms. Only firm characteristics variables were found to be significant (*SIZE*, *BETA*) and none of the country characteristics were significant. Similar to Malaysia's; *SIZE* was negatively related and went against the Waddock and Graves (1997) hypothesis. Secondly, *BETA* agreed with its predicted signs, indicating that firms with high systematic risks are vastly volatile and less likely to commit to SR activities (Toms, 2002), thus hampering firm's SP. Additionally, the hypothesized negative relationship also suggested that an increase in firm's SP helps to mitigate its systematic risk (Roberts, 1992; Toms, 2002).

Robustness Checks for Panel Regression

Robustness checks are to be conducted in order to test the reliability of the findings of the study's regression models. The study executed the BP-LM test (Breusch and Pagan, 1980) to determine whether Pooled OLS (POLS) or GLS is appropriate for the data. As presented in Table 8 and Table 9, the *d* statistic values for most POLS regression models of both Malaysia and Singapore evidenced the presence of the autocorrelation problems. Hence, the study performed the Hausman test (Hausman, 1978) to determine whether the FEM or REM under GLS regression model was appropriate. The results as in Table 8 and Table 9 shows that the REM under the GLS method was appropriate for the majority of the study's regression models. More important, following the aforementioned tests, the values of the Durbin-Watson test's *d* statistics for all the regression models improved to around two, indicating that there was no first-order autocorrelation problem (Gujarati and Porter, 2009).

Next, the White test and the likelihood ratio test were used to test for the heteroscedasticity problem of all regression models. The likelihood ratio test was used to further solidify the findings of the White test, since there exist a school of thought that contends that the White test is suitable for investigating the heteroscedasticity problem in panel data only, and not cross-sectional data. The null hypotheses (*H0*) of these two tests specified that there was no heteroscedasticity problem or the variance of all residuals was constant (Gujarati and Porter, 2009). The results of the White test revealed that all regression models in this study were plagued with heteroscedasticity problems, where the F-statistics were significant at the 5 per cent level or less; thus, rejecting the null hypothesis. Whereas, the

likelihood ratio values for all regression models were significant at the 1 per cent level thus, confirming that all regression models in this study were beset with heteroscedasticity. For this reason, the study decided to employ the GLS method in order to correct the heteroscedasticity problem in the study's panel data (Gujarati and Porter, 2009).

CONCLUSION AND POLICY IMPLICATIONS

Infamous corporate calamities of the past have increased firms' awareness towards ESG issues, resulting in numbers of firms incorporating ESG reporting into their establishments. In the wake of such event, a plethora of past empirical literature set in western economies heavily investigated the effect of SP on FP of firms. Such skewed research focus has failed to focus on the true objective of SR practice; which is sustainability. The question of whether firms actually holding up to their end of the bargain in preserving their stakeholders' ESG wellbeing?

Hence, the study objectives were twofold. First, the study sought to measure firms' SP efficiency (both ESG and non-ESG firms) in giving back to their stakeholders. By using the DEA method, the study further identified firms' inefficient areas. Second, the study examined the potential internal (firm characteristics) and external (country characteristics) determinants of firms' SP efficiency. Determinants of firms' SP efficiency were investigated through panel regression analysis. The study chose to focus on the developing and developed economies in the Southeast Asian region; which are Malaysia and Singapore respectively. The reasons being, that these economies are among (1) the leaders in ESG development, (2) the issue of firm inefficiency is prevalent in the regions of Asia Pacific, and (3) these economies are characterized with high information asymmetry by various past literatures.

Note that, SP is firm's efficiency in exploiting its financial returns for the masses through ESG contribution. The findings highlight that the SP efficiency of both ESG and non-ESG firms have been fluctuating for both countries, with ESG firms fluctuating on an increasing trend. The higher level of mean TE scores indicates that both countries' ESG firms are far more efficient in giving back to the masses, compared to non-ESG firms.

Furthermore, the factor that significantly influenced the firm's TE was mostly consistent across both countries. Where PTIE dominates SIE for both ESG and non-ESG firms, indicating that the firms are managerially inefficient in directing their financial returns towards ESG contribution.

Next, in investigating the determinants of firms' SP efficiency; the study's novel findings are exclusive to each respective country. Both regression models for Malaysia and Singapore were able to explain the variability of firms' SP efficiency. The regression model for Malaysia had a higher explanatory power compared to Singapore, for both ESG and non-ESG firms. For ESG firms in Malaysia, the findings highlight that firm characteristic (*SIZE*) and country characteristics (*MCap*, *CompI*, *GovtO*) were significant in determining firms' SP efficiency. Interestingly for ESG firms in Singapore, only country characteristics (*MCap*, *DEBT*, *CompI*) were found to be significant predictors of SP efficiency. This may be contributed by the developed state of Singapore's economy which is very different from Malaysia. Singapore's tax-neutral state as a financial offshore provides different levels of competition, policies, and institutional structure. These findings further cement that firms' SP efficiency level in different economies vary due to institutional differences, as such; financial system, educational system, political system and cultural system. While for non-ESG firms, both regression models for Malaysia and Singapore yielded consistent findings, where only firm characteristics (*SIZE, BETA*) were found to be significant predictors of SP efficiency. Highlighting that; exclusively for non-ESG firms, country characteristics play no role in influencing firms' SP efficiency.

Primarily, this study clearly calls for ESG firms to formulate and implement new strategies to better the allocation and resource usage of FP. As the findings highlight that ESG firms from both countries are not fully efficient in giving back to the masses or upholding their wellbeing, although the SP efficiencies are on an increasing trend. The study also identified that the SP inefficiency was caused primarily by managerial inefficiency, rather than size inefficiency, which further cements that ESG firms in both countries are inefficient in managing their FP toward ESG contribution.

ESG firms are able to do so through the identified significant determinants that influence SP efficiency. ESG firms' management could strategize and develop precautionary measures on these internal and external

determinants that influence firms' SP in each country. As an example, it is imperative for ESG firms in Malaysia to maintain a certain level of total assets in order to maintain their SP efficiency. Also, further implications on various stakeholders are that government and institutional developers need to improve the state of capital markets in Malaysia to provide easier market-based financing so that ESG firms are able to be more SP efficient. Moreover, stakeholders can rest assured that ESG firms with high government ownership are more SP efficient. ESG firms with high government ownership conscientiously monitor firm's management actions, which restricts agency cost and ultimately reduces information asymmetry (Hope, Thomas, and Vyas, 2009). As for ESG firms in Singapore, its well-developed capital market has resulted in ESG firms becoming less SP efficient due to intense financing competition. Thus, the country's institutional developers need to formulate new development in providing better access to liquid financing for firms to remain SP efficient. As for non-ESG firms in Malaysia and Singapore, the study could help these firms to reassess their ESG stance, based on efficiency of resource usage that SR brings as the study evidenced that being SP efficient reduces firm's systematic risk.

Secondly, the proposed SP measure in this study could influence policy makers in regulating new directives that promote sound ESG disclosure by firms. Market practitioners could develop a better ESG disclosure framework that would result in increased protection of capital market investors in these Southeast Asian economies. In addition, policy makers could design institutional policies that are fully conscious of the influences that they may bring towards firms' SP efficiency. These institutional policies relating to a country's financial system, education and labor, politics and culture are critical in efforts to uplift stakeholders' well-being and ultimately resolve ESG-related issues.

Thirdly, this study provides both local and foreign investors with an SP measure that is methodologically transparent and theoretically sound. The proposed SP measure of this study gives investors knowledge on which firm is excellent in giving back to its stakeholders. The identification of these firms would assist investors in constructing their SR investment portfolio. Next, investigation on the potential influence of firm's SP efficiency, enhances investors' understanding of the factors that could affect their investment returns either internally or externally.

Lastly, the study provides informative knowledge by filling the gap in the existing finance and efficiency literature. This study contributes in the scant areas of ESG literatures as such; (1) SP measurement and (2) country-level influence. The study uses efficiency in relation to firm's SP providing to the underdeveloped literatures on SP measurement. Concerning the efficiency literature, this study presents a study on firm efficiency in a cross-country context; especially in developing economies such as the East Asian region. In addition, this study extends the literature by investigating external or country-level influence on firm's SP, discussing influence of various institutional dimensions such as financial systems, education and labor, politics and culture.

Due to the study limitations, it would be interesting to test the consistency of the findings by investigating other economies that are leading in ESG development; as such Indonesia and Thailand. Furthermore, it is compelling to extend this study in relation to the informational role of firms' SP. Future studies may test the influence of this study's SP measurement on capital market information asymmetry - whether the study's proposed SP measurement is able to mitigate capital markets' information asymmetry.

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