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Determinants of Social and Environmental Accounting Information Disclosure: An Analysis of top 50 Firms in New Zealand

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In this study, we examine the determinants of voluntary disclosures of Social and Environmental Accounting (SEA) among the top 50 firms in New Zealand over the period of 2011 to 2017. The study is an extension of Hackston and Milne's (1996), however distinct in various ways; we use a relatively larger dataset spanning over seven years, we look at both qualitative and quantitative SEA information, and we include some additional industry and corporate governance variables that provides insightful results. The study is timely in that New Zealand is the first country to implement mandatory climate risk reporting according the New Zealand Minister for Climate Change, Mr. James Shaw (Climate Disclosure Standards Board, 2020), which is a significant step towards supporting SEA disclosure. Whilst realizing that it is optional for firms to be engaged in SEA disclosures, we come up with a more appropriate research design to examine both qualitative- and quantitative-types of SEA disclosure using probit and logit regressions. To contribute to this area of SEA, we extend our analysis to show the impact of industry-type, board size and board composition. The regression results show that profitability is positively associated with quantitative-type disclosure, and size is positively associated with both quantitative- and qualitative -type disclosures. The big four auditors are indifferent to the types of SEA disclosure; and board size is negatively associated with qualitative-type disclosure, and positively associated with quantitative-type disclosure. At sectoral level, building sector is positively associated only with the qualitative-type, whereas energy, retail and service sectors have positive associations in general. Interestingly, we note that female (male) directors have positive (negative) association with both type of disclosures. This study contributes to the SEA literature by categorizing and looking at both qualitative and quantitative SEA disclosures, looking at the type of industry preferring SEA disclosures, and extending the analyses to include corporate governance variables. In addition, the study presents some important factors that can influence the publication of both quantitative and qualitative SEA information for the interest of researchers, practitioners and regulators working in this domain in order to improve the overall SEA disclosure for firms. Finally, this paper shows the importance of gender balancing on boards in order to be engaged in voluntary disclosures such as SEA.

Keywords: *Social and Environmental Accounting; New Zealand; Qualitative and Quantitative Disclosure.*

Introduction

At least since the scandals at Enron, ImClone, Tyco International, Global Crossing, WorldCom, the paradigm of managers to maximize the shareholder value of corporations came under fire from the public. The paradigm of shareholder value maximization developed by Jensen and Meckling (1976) is justified by Friedman (1970), which is that that "s*ocial responsibility of business is to increase its profits."* In line with the shareholder value approach, the role of managers in management accounting was predominantly to focus on reporting the bottom line of a company to the shareholders. As a reaction on the scandals mentioned earlier, the stakeholder value approach, developed by Freeman (1984), gained greater recognition and practical importance in business world. While the shareholder value approach focusses only on profits, the stakeholder value approach considers the interests and objectives of all stakeholders who are directly or indirectly affected by the actions of a corporation. Specifically, stakeholders are the employees, local community, customers, environmental groups, non-government organisations, political parties, human right activists, trade unions, suppliers of intermediate and preliminary goods and creditors.

The starting point to fulfil the requirements of the stakeholder value approach and accordingly the legitimate claims and desires of the stakeholders, is to increase the transparency of the corporation by disclosing information about activities which may affect the economic, social and natural environment. This type of disclosure is part of Social and Environmental Accounting (SEA). The social and environmental accounting research was widely promoted in the 1970s and gained greater importance since the mid-1990s

(Deegan, 2007; Roberts & Wallace, 2015). According to John Elkington, the founder of a British consultancy firm known as Sustainability, the social and environmental accounting disclosures should follow the triple bottom line reporting thus simultaneously focussing on profit, people and planet, where the latter component is associated with the responsibility of a company towards the environment. Broadly, social responsibility concerns environmental damages, treatment of workers, product safety and overall sustainability.

According to Parker (2011), research on SEA has been conducted using different methods like content analysis, statistical relationships, case studies, field studies, action research, and ethnographic approaches. Milne and Gray (2013) argue that, an entity's economic, social and environmental performance are part of management and financial reporting and firms a subset of corporate sustainability. The authors emphasize an organizations role in contributing towards sustaining the earth's ecology, and argue that the accounting literature should, consider a broader set of decision-making and accountability concepts (Milne, 1991), and promote greater focus on social accounting research (Deegan & Soltys, 2007).

In this study, we explore the drivers that induce corporations to disclose social and environmental information. Although there is no legal obligation to disclose such information, some authors (Toms, 2002; Hasseldine *et al.,* 2005; Ho & Taylor, 2007; Dagiliene *et al.,* 2014) argue that disclosing SEA data enhances the reputation of corporations and hence can be considered favourably by their stakeholders, which in turn support in generating economic profits. Not surprisingly, several corporations have demonstrated an aptitude and interest in the environment by disclosing such information in their annual reports and websites. To distinguish themselves, some companies tend to allocate resources to provide separate sustainability reports to reflect their (positive) effects on society and the environment. A further impetus for the disclosure of SEA data evolved in 2002 due to the Global Reporting Initiative, which is a set of guidelines to assist firms in effectively reporting social and environmental issues (Bhattacharya, 2016).

Even if corporations disclose SEA, we cannot derive the motifs behind these disclosures. A good example of malicious intentions that can lead to the disclosure of environmental data is the Dieselgate of German Volkswagen Corporation in 2015. To increase its share in the USA market, managers of Volkswagen initiated a marketing campaign to emphasize the environmental friendliness of their cars (Porsche, Audi, Volkswagen) equipped with a Diesel engine by publishing the official emission data of these cars, although they had manipulated the emission data generated in the official exhaust tests by using illegally defective devices. Obviously, Volkswagen cheated their customers and the Environmental Protection Agency, who are the two important stakeholders of Volkswagen.

Another reason why corporations may choose to disclose SEA information is because, measuring and compiling environmental emission data incur investments which are sunk and that monitoring, measuring and compiling of such types data is associated with decreasing average costs. In this regard, with strong interest from the stakeholders, the disclosure activity can act as a barrier to market entry for other potential firms. The two examples imply that although management can change their language from using phrases like "maximizing shareholder value" to "maximizing company's contribution to the society", it does not really change its commitment to the shareholders.

The type of information disclosed in the SEA varies from soft (qualitative-type) to hard (quantitative-type) data. This study attempts to examine the determinants of both types. We consider data from the annual reports of the top 50 listed companies in New Zealand over the period 2011–2017. The top 50 firms in New Zealand are selected based on market capitalization. The top 50 firms are more developed and active on stock exchange, in addition to having more reliable and consistent data. Additionally, the findings derived using this sample can be compared with an earlier study on New Zealand (Hackston & Milne, 1996), and elsewhere. The contribution of the study is that we extend Hackston and Milne's (1996) study in the following ways. We use a relatively larger dataset spanning over seven years. We consider both qualitative- and quantitative-types of disclosure in the analyses. In terms of explanatory variables, we include industry-type, board size and board composition as additional variables. The study is timely in that New Zealand is the first country to implement mandatory climate risk reporting according the New Zealand Minister for Climate Change, Mr. James Shaw (Climate Disclosure Standards Board, 2020), which is a significant step towards supporting SEA disclosure. The findings of the studies can be of interest to researchers and practitioners of SEA disclosure.

The paper is outlined as follows. In section 2, we present a literature review and develop the hypothesis accordingly; section 3 is on the theoretical framework, which includes the design, method and model of the study. In section 4, we present the results and analysis, and finally, in section 5, we conclude.

Literature Review

Parker (2005), Malik (2015), and Brooks and Oikonomou (2018) reviews studies related to SEA since the late 1980's. Parker (2005) classifies SEA frameworks into two categories of theories – augmentation and heartland. The relevant theories within the augmentation theories are based on theories on decision-usefulness, agency theory, stakeholder theory, legitimacy theory and accountability theory. The Heartland theories focus on the fundamental role of information in the dialogue between organisation and society. The latter includes political economy accounting theories, deep green and social ecology theories, feminist and communitarian-based theories. According to Parker, environmental issues have received more attention than social issues. Owen (2008) presents a critical review of the developments and the state of the SEA research with reference to studies published in the *Accounting, Auditing & Accountability Journal*. Owen notes that research on SEA considers polemical debates where the focus is on investigating the determinants and motivation of managements. Recently, Fusco and Ricci (2019) present a bibliometric analysis on social and environmental accounting in the public sector.

According to Deegan (2002), a possible motivation of social and environmental accounting is to legitimize an organization's operations when viewed from the legitimacy theory. Legitimacy theory assumes that there is a social contract between the firm and the society, which the firms must adhere. Therefore, firms disclose about the society and environment to legitimise their business activity and not to breach the social

contract. In another study, Deegan et al. (2002) examine the SEA disclosures from 1983 to 1997 of BHP Ltd, a listed company from Australia. They find a positive correlation between the community concerns and the type of annual report disclosures made by BHP Ltd. In addition, it was noted that BHP management released positive SEA information in response to negative news on BHP Ltd through public media to justify certain actions (legitimacy theory). In an experimental setting, Kuruppu and Milne (2010) examined if the presence of an assurance statement matters in relation to the choices, attitudes and beliefs about the credibility of the information sources of corporate environmental disclosures. They note that corporate environmental disclosure and its assurance does not provide legitimising effects.

Clarkson et al. (2011) studied the environmental performance of fifty-one Australian firms from 2002 to 2006. They note that improvements in the disclosures are evident between the sample periods. Also, the study found that firms' willingness to disclose more environmental information increased when the firms' activities were harming the environment.

Mallin and Michelon (2013) investigated the effects of corporate governance model on social and environmental disclosure (SED). The authors develop two holistic measures of corporate governance – monitoring intensity and stakeholders' orientation. These measures were tested on "people" and "product" dimensions of social performance. Their sample included 100 U.S listed companies from the list of Business Ethics 100 Best Corporate Citizens covering the period 2005-2007. The study finds that stakeholders' orientation of corporate governance is positively related to corporate social performance (CSP) and SED. Also, CSP in the "product" dimension (relating to product and service quality, responsibility and a firm's stance towards the natural environment) is positively associated with the extent and quality of SED, whilst CSP in the people dimension (relating to contributions firms make to communities, employees and society in general) is negatively related with the extent and quality of SED.

Barbu et al. (2014) examined the compliance with the International Financial Reporting Standards (IFRS) in France, Germany and the UK. They find that environmental disclosures imposed by the IFRS increases with firm size, and firms domiciled in France and the UK report more on environmental issues compared to the firms in Germany. Chiu and Wang (2015) using stakeholder theory framework suggest that measures of stakeholder power, strategic posture, firm size and economic resources, and media visibility are related to social disclosure quality in Taiwanese publically listed firms.

Qiu, Shaukat and Tharyan (2016) studied the link between corporate performance and social and environmental disclosures of one-hundred UK firms from 2005 to 2009. It is noted that past profitability drives current social disclosures, social disclosures are more useful for investors, and firms which disclose more information have higher market values. Additionally, those firms with greater economic resources and positive net economic benefits make more extensive disclosures.

Profitability

It has been argued that profitable companies disclose more information regarding social and environmental issues in the annual reports as a strategy to improve firm value. (Bowman & Haire, 1976; Preston, 1978; Roberts, 1992; Edwards, 1998; Stanwick & Stanwick, 1998; Tagesson *et al.,* 2009; Gamerschlag, Moller, & Verbeeten, 2011; Pozniak, 2015). However, some studies find no significant relationship between profits and SEA disclosures (Cowen et al. 1987; Gray et al. 1995; Hackston & Milne, 1996).[1]

Bhattacharyya (2016) explored the association between SEA disclosures of forty-seven Australian companies from 2006 to 2007, and notes that firm-profit is negatively related to the level of social disclosure, a finding which is consistent with some earlier studies (Wallace & Naser, 1996; Ho & Taylor, 2007). Qiu et al. (2016) found that profitability drives social disclosures in large public British companies, and that social disclosures matter more than environmental disclosures for investors. The authors claim that their findings are consistent with the resource-based view of the firm, which suggests that firms with greater financial and economic resources (profitability) make more extensive disclosures which yield future economic benefits. Similar findings were reported by Aly, El-Halaby, and Hussainey (2017) who found that better financial performance are positively associated with tonal/narrative disclosure of good/bad news for Egyptian public listed firms. Higher profitability is more strongly associated with disclosure of good news and reduces the disclosure of bad news. Ismail, Rahman, and Hezabr (2018) and Sharma, Pandey, and Dangwal (2020) also suggest that higher profitability promotes corporate environmental disclosure quality in developing country's oil and gas industries, and in Indian publically listed firms, respectively. Therefore, we argue that profitability is positively associated with SEA disclosures.

H1: Profitability is positively associated with both qualitative and quantitative disclosures.

Size

The association between size, measured by total assets, and SEA disclosure is, in general, positive (Hackston & Milne, 1996; Deegan & Gordan, 1996; Adams *et al.,* 1998; Perry & Sheng, 1999; Comier & Gordon, 2001; Gao *et al.,* 2005; Ho & Taylor, 2007; Tagesson et al., 2009; Schreck & Raithel, 2018), although a few studies document negative association Stanwick & Stanwick, 1988; Davey, 1985; Ng, 1985; Roberts, 1992; Chandok & Singh 2017).

Hackston and Milne (1996) examine the top fifty New Zealand (NZ) firms listed on the NZ stock exchange over a single year (1992). They confirm a positive association between firm size and SEA disclosures. The positive association is generally explained by agency and legitimacy theories. The argument is that, larger firms are likely to undertake more (bigger) projects and investment activities which are clearly recognized in the community due to their impacts on the society and natural environment. Hence, managers can show concern for environment and communicate their position and influence by reporting this

[1] Roberts (1992) notes a lagged effect of profitability on the association with SEA disclosures, whereas Patten (1992) did not find any statistically significant relationship between lagged profits and corporate social disclosures.

in the annual report (Cowen *et al.,* 1987). Additionally, there is a coincidence with legal requirements regarding specific projects, which creates in some sense scale economies in the preparation of disclosures. King et al. (1990) argue that the extent of corporate disclosures tends to increase with the size of the firm because the need for more detailed information for managers and board increases, and that, disclosures are an implicit by-product of information that should be compiled. Therefore, firm size positively influences sustainability reporting because larger firms, enjoy more financial resources, have specialized staff due to more evolved administrative processes, and possess sophisticated internal control and reporting procedures to achieve scale effects (Brammer & Millington, 2006; Udayasankar, 2008; Gallo & Christensen, 2011; Baumann-Pauly *et al.,* 2013; Schreck & Raithel, 2018; Al-Farooque & Ahulu, 2016; Ismail *et al.,* 2018).

H2: Size is positively associated with SEA disclosures.

Audit Firms

A few studies have examined the association between the size of the audit firm and the SEA disclosure (Fama & Jensen, 1983; Watts & Zimmerman, 1986; Bhattacharyya, 2016). The general argument is that, although the management prepare the annual reports, its external auditors are responsible to validate the figures, the type of, and extent of disclosures provided by the firm. Studies documenting a positive association between the size of audit firms and a firm's level of SEA disclosure include Fama & Jensen (1983), Watts & Zimmerman (1986), Perego (2009), Al-Shaer et al. (2015), an Aly et al. (2017). Perego (2009) notes that the big 4 accounting firms positively affect assurance quality of sustainability reporting. Al-Shaer et al. (2015) found better audit quality in the presence of stronger audit committees. Aly et al.'s (2017) note that although auditor size reduces the disclosure of bad news, it has no bearing on the disclosure of good news, a finding which resonates with Bhattacharyya's (2016).

H3: The big four auditors do not influence SEA disclosures.

Board size and Diversity

Said et al. (2009) examined the Malaysian public listed companies in 2006 to look at the relationship between corporate social responsibility and corporate governance characteristics. They found that government ownership and audit committee were positively and significantly related to the level of corporate social responsibility disclosure. However, board size was found to be insignificant. Bear et al. (2010) studied the impact of board diversity and gender composition on corporate social responsibility (CSR) and firm reputation. Using data for 689 companies from U.S they note a positive association between firms CSR and the number of female directors. Post et al. (2011) analysed 78 Fortune 1000 companies from U.S, evaluating the relationship between board of directors' composition and environmental corporate social responsibility (ECSR). Their study find that the proportion of outside directors is positively related to ECSR while firms with boards consisting of three or more female directors received higher environmental rating scores. Similarly, Haque's (2017) study reported a positive association between board gender diversity and carbon reduction initiatives in UK firms. Therefore, we posit the following hypotheses:

H4: Board size is positively associated with quantitative disclosures.

H4.1: Gender composition (Female) board members influence SEA disclosure.

Industry Type and Age

The level of SEA disclosure is influenced by the industry type. Dierkes and Preston (1977), Khlif, Guidara, and Souissi (2015), Lauwo, Otusanya, and Bakre (2016), and Rodrigues and Mendes (2018) argued that companies whose operations have a direct impact on the environment, such as the mining industries, are likely to disclose more information related to SEA. Other studies which support this include Roberts (1992), Gray et al. (1995), Deegan and Gordan (1996), Hackston and Milne (1996), Adams et al. (1998), Adams (2002), Gao et al. (2005) and Kansal et al. (2014). Also, it has been noted that firms which are in the same industry tend to adopt similar disclosure policies (Dye & Sridhar, 1995; Craven & Marston, 1999). Ho and Taylor (2007) investigated the relationship in fifty largest U.S. and Japanese firms in 2003. Their results show that the extent of reporting is higher for manufacturing firms relative to others; and the triple bottom line disclosures are more for Japanese than the U.S. firms. Additionally, while it has been hypothesized that the age of a firm provides a learning curve and impetus to adopt SEA reporting, thus far, studies examining the link between the two do not find a significant association (Roberts, 1992; Gray *et al.* 1995; Bhattacharyya, 2016).

H5: High profile sectors positively influence the quantitative SEA disclosure.

Design, Method & Model

Data

The data used in the analysis is hand-picked from the annual reports and reports on social, environmental and sustainability disclosures of the top fifty firms listed on the New Zealand stock exchange. Following Hackston and Milne (1996), the top fifty firms in our sample are based on the ranking of market capitalization. For the firms in the top-fifty list, there are a few which did not have consistent data, and thus, the firms next in the rank which had consistent data, are included to compile the sample of fifty firms. The sample period is from 2011 to 2017. The SEA disclosure is the dependent variable, measured as either qualitative or quantitative variable. The qualitative disclosure is a dichotomous variable and takes the value of one if the firm provides soft (descriptive) information on social and environmental aspects, or zero otherwise.[2] For quantitative disclosures, a value of one is recorded for the firms which provide numeric (hard) or dollar value spent on social and environmental performance, or zero otherwise.

[2] For details on the types of SEA disclosures, please see the Global Reporting Initiative (GRI).

Table 1 presents the definition of the variables and the respective expected signs in relation to the two dependent variables. All financial and continuous data (return on assets, total assets and number of directors) are transformed into natural logarithm before conducting the analysis.

Table 1

Data Indicators

Variable Name	Definition	Expected Sign
	Dependent Variable	
Social and Environmental Accounting (SEA)	Two measures: Qualitative disclosures & Quantitative disclosures	N. A
	Primary Variables	
Return on Assets (ROA)	$ROA_{i,t} = \frac{Net\ profit_{i,t}}{Total\ Assets_{i,t}}$	(+/-)
Total Assets (SIZE)	$SIZE_{i,t} = ln(assets_{i,t})$	(+/-)
Big four Auditors (BIG4)	$AUD_{i,t} = 1\ if\ Big\ Four, 0\ otherwise$	(+/-)
Number of Directors (DIR)	$DIR_{i,t} = number\ of\ directors_{i,t}$	(+/-)
Industry/Sector (IND)	$IND_{i,t} = 1\ if\ high\ profile, 0\ otherwise$	(+)
	Sector	
Building (BUILD)	$INDBUILD_{i,t} = 1\ if\ part\ of\ construction\ industry, 0\ otherwise$	(+/-)
Energy (ENERG)	$INDENERG_{i,t} = 1\ if\ part\ of\ energy\ indusrty, 0\ otherwise$	(+/-)
Retail (RETAIL)	$INDRET_{i,t} = 1\ if\ part\ of\ retail\ industry, 0\ otherwise$	(-/+)
Service (SERV)	$INDSER_{i,t} = 1\ if\ part\ of\ service\ industry, 0\ otherwise$	(+/-)
Financial Institution (FI)	$INDFINAN_{i,t} = 1\ if\ part\ of\ financial\ instituitions, 0\ otherwise$	(-/+)
	Gender	
Male (MALE)	$MALDIR_{i,t} =\ percentage\ of\ male\ directors$	(+/-)
Female (FEMALE)	$FEMDIR_{i,t} =\ percentage\ of\ female\ directors$	(+/-)

Source: Author compilation

Method and Model

Using the model specification of Hackston and Milne (1996) and the modified form used by Bhattacharyya (2016) as guides, we specify the following base model with the primary variables:

$$SEA^{QUAL}{}_{i,t} = \beta_1 ROA_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 AUD_{i,t} + \beta_4 DIR_{i,t} + \beta_5 IND_{i,t} + \varepsilon_{i,t} \quad (1)$$

$$SEA^{QUAN}{}_{i,t} = \beta_1 ROA_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 AUD_{i,t} + \beta_4 DIR_{i,t} + \beta_5 IND_{i,t} + \varepsilon_{i,t} \quad (2)$$

The above specification is further extended to include industry effects as follows:

$$SEA^{QUAL}{}_{i,t} = \beta_1 ROA_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 AUD_{i,t} + \beta_4 DIR_{i,t} + \beta_5 BUILD_{i,t} + \beta_6 ENERG_{i,t} + \beta_7 RETAIL_{i,t} + \beta_8 SERV_{i,t} + \beta_9 FI_{i,t} + \varepsilon_{i,t} \quad (3)$$

$$SEA^{QUAN}{}_{i,t} = \beta_1 ROA_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 AUD_{i,t} + \beta_4 DIR_{i,t} + \beta_5 BUILD_{i,t} + \beta_6 ENERG_{i,t} + \beta_7 RETAIL_{i,t} + \beta_8 SERV_{i,t} + \beta_9 FI_{i,t} + \varepsilon_{i,t} \quad (4)$$

Additionally, we extend the model to estimate the effects of board composition in terms of gender and sector using the following:

$$SEA^{QUAL}{}_{i,t} = \beta_1 ROA_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 AUD_{i,t} + \beta_4 IND_{i,t} + \beta_5 GENDER_{i,t} + \varepsilon_{i,t} \quad (5)$$

$$SEA^{QUAN}{}_{i,t} = \beta_1 ROA_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 AUD_{i,t} + \beta_4 IND_{i,t} + \beta_5 GENDER_{i,t} + \varepsilon_{i,t} \quad (6)$$

$$SEA^{QUAL}{}_{i,t} = \beta_1 ROA_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 AUD_{i,t} + \beta_4 BUILD_{i,t} + \beta_5 ENERG_{i,t} + \beta_6 RETAIL_{i,t} + \beta_7 SERV_{i,t} + \beta_8 FI_{i,t} + \beta_9 GENDER_{i,t} + \varepsilon_{i,t} \quad (7)$$

$$SEA^{QUAN}{}_{i,t} = \beta_1 ROA_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 AUD_{i,t} + \beta_4 BUILD_{i,t} + \beta_5 ENERG_{i,t} + \beta_6 RETAIL_{i,t} + \beta_7 SERV_{i,t} + \beta_8 FI_{i,t} + \beta_9 GENDER_{i,t} + \varepsilon_{i,t} \quad (8)$$

where SEA is the qualitative and quantitative disclosures and *i* represents the *i-th* firm at time *t.* The terms ROA, SIZE, BIG4, DIR, IND, BUILD, ENERG, RETAIL, SERV and FI are defined as in Table 1, and the $\varepsilon_{i,t}$ is the error term. The term gender represents the number of male and female directors. We use the probit and logit method of regression. The logistic (logit) regression is used when the dependent variable is dichotomous (binary) and the assumption is that the dependent variable is a stochastic event. The probit model assumes a normal distribution of the probability of an event while the logit model assumes log distribution. In many instances, the model is fitted with both functions and the function with better fit is chosen. The general logistic regression can be expressed as:

$$\ln\left(\frac{\bar{p}}{1-\bar{p}}\right) = \beta_0 + \beta_1 x \quad (9)$$

where $\bar{p}$ is referred to as probability that the dependent variable Y is one (Y=1) and accordingly 1- $\bar{p}$ is the probability that Y=0. Solving (9) for $\bar{p}$ delivers:

$$\bar{p} = \frac{e^{\beta_0+\beta_1 x}}{1+e^{\beta_0+\beta_1 x}}. \quad (10)$$

where e represents Euler's number. Therefore, estimating the equations in both probit and logit forms can provide some indications of the consistency of the results.

Results

Descriptive Statistics and Correlation Matrix

From the descriptive statistics provided in Table 2, QUAL has an average of 0.84 and the standard deviation of 0.37 while QUAN has a mean of 0.74 with the standard deviation being 0.44. ROA ranges from 0.61 to -0.95 with an average and standard deviation of 0.04 and 0.15 respectively. SIZE has a mean of 20.60 with the standard deviation noted at 1.74 ranging from as low as 14.41 to 25.28. DIR ranges from 3 to 13 with an average and a standard deviation of 6.74 and 1.35, respectively. IND, which denotes whether a firm is part of a high profile or low-profile sector, has a mean value of 0.44 and a standard deviation of 0.50.

Table 2

Descriptive Statistics

	QUAL	*QUAN*	*ROA*	*SIZE*	*DIR*	*IND*
Mean	0.84	0.74	0.04	20.60	6.74	0.44
Median	1.00	1.00	0.06	20.76	7.00	0.00
Maximum	1.00	1.00	0.61	25.28	13.00	1.00
Minimum	0.00	0.00	-0.95	14.41	3.00	0.00
Std. Dev.	0.37	0.44	0.15	1.74	1.35	0.50
Skewness	-1.81	-1.12	-2.83	-0.28	0.39	0.24
Kurtosis	4.28	2.24	19.49	3.70	4.52	1.06
Jarque-Bera	213.79	80.20	4395.07	11.63	42.31	57.88
Probability	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sum	290.00	258.00	14.92	7149.37	2338.00	153.00
Sum Sq. Dev.	47.64	66.17	7.69	1014.53	633.14	85.54

From the sample of fifty firms, 83.57 % of the firms reported qualitative disclosures and 74.35 % of the firms reported quantitative disclosures of social and environmental accounting. To analyze the industry impacts, we categorize firms into high-profile or low-profile industry. We note that 44 % of the firms in the sample are part of the high-profile industries and that the remainders (56 %) are low-profile industries. Additionally, we classify the firms into six different industries to explore the industry specific effect on SEA disclosure. The six industry groups are as follows; Financial Institutions (FI), Energy (ENERG), Building (BUILD), Retail (RETAIL), Service (SERV) and Technology (TECH). The distribution of firms is as follows: 10 % are financial institutions, 24 % belong to Energy industry, 14 % to the Retail industry, 8 % the Technology industry, 32 % to the Service industry, and the remaining 12 % belong to the Building industry.

In Table 3, we present the correlation matrix using the variables of the base model. QUAL is positively correlated with ROA and SIZE within the conventional level of significance while negatively and insignificantly related to DIR and SIZE. ROA, SIZE, DIR and IND are positively correlated with QUAN with also being statistically significant.

Regression Results

The association between ROA and QUAL is positive but not statistically significant (Table 4: Model I-VI and Table 5: Model I-VI). Moreover, we note that association between ROA and QUAN is positive and significant at 1 % level (Table 6: Model I-VI and Table 7: Model I-VI), a finding which is consistent with some recent studies (Qiu et al., 2016; Aly et al., 2017; Ismail et al., 2018; Sharma, et al., 2020). An argument for this relationship is that firms' which are more profitable prefer greater transparency in SEA reporting to legitimize their high earnings and operations to the stakeholders and create greater confidence among customers. Hence, the results support $\mathbf{H_1}$. Yet, another interpretation is, that profitable firms use part of these resources to distinct them positively from competitors regarding being more transparent for shareholders and stakeholders. In the long run this creates a competitive advantage with respect to acquisition of external and equity capital and new customers.

Table 3

Correlation Matrix with the Dependent Variables

	QUAL	*QUAN*	*ROA*	*SIZE*	*DIR*	*IND*
QUAL /QUAN	1.00	1.00				
	-----	-----				
ROA	0.16***	0.33***	1.00			
	(<0.01)	(<0.01)	-----			
SIZE	0.25***	0.25***	0.30***	1.00		
	(<0.01)	(<0.01)	(<0.01)	-----		
DIR	-0.03	0.16***	-0.001	0.38***	1.00	
	(0.59)	(<0.01)	(0.97)	(<0.01)	-----	
IND	-0.01	0.11**	0.06	0.06	-0.01	1.00
	(0.80)	(0.04)	(0.23)	(0.26)	(0.88)	-----

Note: ***, ** and * represents 1 %, 5 % and 10 % levels of significance; --- indicates excluded variable.

The association between SIZE and QUAL is positive and statistically significant at 1 % level (Table 4: Model I-VI and Table 5: Model I-VI). Additionally, the relationship between SIZE and QUAN is positive and statistically significant at 1 % level (Table 6: Model I-VI and Table 7: Model I-VI), which is similar to the results on studies conducted elsewhere (Al-Farooque & Ahulu, 2016; Ismail *et al.,* 2018, among others). The association implies that larger firm in terms of their asset portfolios prioritize SEA disclosures. An alternative argument is that larger firms have greater impact on the environment and therefore justify or complement their efforts by highlighting their commitment to the environment, through more SEA disclosures. Hence, the results support **H_2**. However, it should be noted that legal requirements regarding disclosures and transparency are stronger the bigger the firms are, and hence to create additional disclosures, where the data is partly anyways available and having employed accountants with the expertise anyways the resulting costs of preparing the additional SEA disclosures are relatively low.

The association between BIG4 (the big four auditors) and both qualitative and quantitative disclosures is negative and statistically significant within the conventional levels (Table 4: Models I, III, IV, V and VI; Table 5: Models I, II, III, IV and VI; Table 6: Models I, III, IV, V and VI; and Table 7: Models I, III, IV, V and VI). The results deviates from the positive findings of Perego (2009) and Al-Shaer et al. (2015), however to some extent coincides with the results of Bhattacharyya (2016) and Aly et al.'s (2017). A reason for the negative association can be that the auditors mainly focus on the accuracy of the financial data and are not obliged to verify data related to voluntary disclosure, which incurs additional cost to the auditors. Audit firms can either charge additional fees to verify information pertaining to voluntary disclosure or otherwise restrict high levels of SEA disclosure to minimize the chances of disclosing unverified information. Also, since social and environmental reporting is voluntary, firms do not have any prescribed guidelines on best practices in SEA reporting, and therefore it becomes complex task for auditors to verify the qualitative and quantitative disclosures. Therefore, **H_3** is rejected. In fact, this result coincides with the latter result, firms are willing to provide SEA disclosures if they do not incur additional significant costs.

The number of directors on a firm's board (DIR) is negatively associated with the qualitative SEA disclosure at 5 % level of significance (Table 4: Model I and IV; and Table 5: Model I and IV). However, DIR is positively associated with quantitative disclosure, and is statistically significant (Table 6: Model I and IV; and Table 7: I and IV). The negative results noted in this study deviate from the positive association noted by Post et al. (2011). The negative association indicates that qualitative disclosure is preferred when the number of directors is low, whereas with more directors, there is a preference for quantitative disclosure. This is also confirmed by examining the positive association between larger SIZE (which implies more directors) and quantitative disclosure. Once again, an obvious interpretation is, the larger the firm the lower the relative costs for preparing additional disclosures because of scale economies in the firm administration. An additional possible rationale for the positive association between DIR and quantitative disclosure could be, that with more directors, it is difficult to get consensus on how much to disclose voluntary and qualitatively. Thus, quantitative aspects of disclosure can be an efficient one to provide. On the other hand, a small number of directors (and hence small firms) can opt for more qualitative disclosure by reaching agreements and without catching much visibility from the stakeholders in terms of substantiating the claims. The results thus support **H_4**.

Table 4

Qualitative Disclosure Probit Regression

	Model I	**Model II**	**Model III**	**Model IV**	**Model V**	**Model VI**
			Primary Variables			
ROA	0.41	0.42	0.42	0.48	0.59	0.59
	(0.530)	(0.533)	(0.533)	(0.603)	(0.560)	(0.560)
SIZE	0.25***	0.19***	0.19***	0.26***	0.20***	0.20***
	(0.059)	(0.055)	(0.055)	(0.067)	(0.064)	(0.064)
BIG4	-2.24**	-2.04	-3.09***	-3.70***	-3.43**	-4.32***
	(1.181)	(1.275)	(1.110)	(1.356)	(1.593)	(1.303)
DIR	-0.98**	---	-	-0.95**	-	-
	(0.462)			(0.488)		
IND	-0.10	-0.10	-0.10	-	-	-
	(0.170)	(0.170)	(0.170)			
			Sector			
BUILD	-	-	-	1.49***	1.60***	1.60***
				(0.433)	(0.428)	(0.428)
ENERG	-	-	-	0.96***	0.99***	0.99***
				(0.309)	(0.310)	(0.310)
RETAIL	-	-	-	1.00***	0.97***	0.97***
				(0.342)	(0.352)	(0.352)
SERV	-	-	-	1.90***	1.89***	1.89***
				(0.340)	(0.341)	(0.341)
FI	-	-	-	0.64*	0.73**	0.73**
				(0.366)	(0.368)	(0.368)
			Gender			
MALE		-1.05*			-0.89	
		(0.609)			(0.729)	
FEMALE			1.05*			0.89
			(0.609)			(0.729)

Notes: ***, ** and * represents 1 %, 5 % and 10 % levels of significance. ( ) contains the standard errors; and --- indicates excluded variable.

Additionally, the firms in the sample were classified by "high" and "low" profile industry (IND) by setting high = 1 and low = 0. (Hackston and Milne, 1996). The results show that IND is negatively associated with qualitative disclosure (Table 4: Model I, II and III; and Table 5: Model I, II and III). However, IND is positively associated with quantitative disclosure. (Table 6: Model I, II and III) and Table 7: Model I, II and III). Since a high-profile industry has a direct impact on and responsibility towards the environment, it will provide more quantitative disclosures to be objective and transparent. Also, it would be in the interest of the high-profile industries to disclose their relative contribution to restoring the environment, at least to justify their operation to the stakeholders and to improve the firm's public perception and reputation. Hence, the positive association confirms H5 that high profile firms opt for greater quantitative disclosure.

Sector

The firms in the sample are classified into six sectors: building (BUILD), energy (ENERG), retail (RET), service (SERV), and financial institution (FI). From the regression results, we note that BUILD is positively related to disclosure, however only statistically significant at 1 % level for qualitative disclosure (Table 4: Model IV, V and VI; and Table 5: Model IV, V and VI). The positive association between building and construction industry and SEA disclosure can be since the sector has direct impact on the environment. Also, the energy industry (ENERG) is positively related to SEA disclosures (Table 4: Model IV, V, and VI; Table 5: Model IV, V and VI; Table 6: Model IV; and Table 7: Model IV, V and VI). Like BUILD sector, the activities of the energy sector (ENERG) has a direct impact on the environment, and even at a greater scale due to activities such as exploration, development and drilling of oil and gases.

The retail sector (RETAIL) has a positive association with SEA disclosures (Table 4: Model IV, V and VI; Table 5: IV, V and VI; Table 6: Model IV, V and VI; Table 7: Model IV, V and VI). The positive association signifies the activities of retail sectors in terms of 'green marketing' and thereby attempting to attract, retain or build rapport with customers. Like RETAIL, positive association between the service sector (SERV) and SEA disclosures (Table 4: Model IV, V and VI; Table 5: IV, V and VI; Table 6: Model IV, V and VI; and Table 7: Model IV, V and VI) indicates the efforts towards gaining competitive advantages and brand recognition.

The existence of financial sector (FI) is highly dependent on increasing and retaining customers and customer confidence in their operation. In addition to hard marketing, financial sector can resort of soft strategies such as contributing to the environment and society and providing this information to the public. This could result in a positive association between SEA disclosure and the sector. It is also possible that FI firms prefer not to disclose or have any financial contribution but show concern for the environment and hence indicate the developments or strategies taken to operate as a green business. In the latter case, the association between SEA and FI will be positive with qualitative disclosure only (Table 4: Model IV, V and VI; and Table 5: Model IV, V and VI). The results showed a negative but insignificant association between quantitative disclosure and FI (Table 6: Model IV, V and VI; and Table 7: Model IV, V and VI). This indicates financial institutions prefer qualitative disclosures rather than quantitative disclosures of SEA.

Table 5

Qualitative Disclosure Logit Regression

	Model I	**Model II**	**Model III**	**Model IV**	**Model V**	**Model VI**
			Primary Variables			
ROA	0.36	0.43	0.43	0.75	1.10	1.10
	(0.912)	(0.911)	(0.911)	(1.088)	(1.061)	(1.061)
SIZE	0.48***	0.36***	0.36***	0.51***	0.37***	0.37***
	(0.112)	(0.103)	(0.103)	(0.129)	(0.120)	(0.120)
BIG4	-4.32**	-3.89*	-5.81***	-7.01***	-6.66	-7.90***
	(2.128)	(2.350)	(2.030)	(2.468)	(3.031)	(2.423)
DIR	-1.99**	-	-	-1.88**	-	-
	(0.848)			(0.892)		
IND	-0.26	-0.21	-0.21	-	-	-
	(0.308)	(0.306)	(0.306)			
			Sector			
BUILD	-	-	-	2.56***	2.82***	2.82***
				(0.852)	(0.844)	(0.844)
ENERG	-	-	-	1.57***	1.66***	1.66***
				(0.518)	(0.513)	(0.513)
RETAIL	-	-	-	1.71***	1.65***	1.65***
				(0.582)	(0.597)	(0.597)
SERV	-	-	-	3.49***	3.41***	3.41***
				(0.654)	(0.646)	(0.646)
FI	-	-	-	1.02*	1.17*	1.17*
				(0.621)	(0.620)	(0.720)
			Gender			
MALE	-	-1.92*	-	-	-1.24	-
		(1.134)			(1.372)	
FEMALE	-	-	1.92*	-	-	1.24
			(1.134)			(1.372)

Notes: ***, ** and * represents 1 %, 5 % and 10 % levels of significance. ( ) contains the standard errors; and --- indicates excluded variable.

Gender

The results showed MALE, ratio of male directors, is negatively associated with qualitative disclosure. The proportion of female directors (FEMALE) is positively related to qualitative disclosure and both being statistically significant at 10 % level of significance (Table 4: Model II and III; and Table 5: Model II and III), which is consisted with Haque (2017). A further analysis showed that, MALE is negatively associated with quantitative disclosure whereas FEMALE is positively associated. However, both results were statistically insignificant (Table 6: Model II and III; and Table 7: Model II and III). The overall results are somewhat consistent with Hollindale et al. (2016) and Liao, Luo and Tang (2015) who state that companies with more women on board report superior quantity and quality of greenhouse gas (GHG) emission-related disclosures. Moreover, these results to some extent supports the critical mass theory (c.f. Manita, *et al.,* 2018; Ben-Amar, Chang, & McIlkenny, 2017). Therefore, we accept **$H_{4.1}$**, that the relationship between the board of directors and SEA disclosures is influenced by the board composition.

Conclusion

In this paper, we paper set out to examine the determinants of SEA disclosure using the top 50 firms listed on the New Zealand Stock Exchange from 2011 to 2017. Whilst this paper is an extension of the work of Hackston and Milne (1996), it is distinct in that we use a relatively larger dataset spanning over seven years, we look at both qualitative and quantitative SEA information, and we include some additional industry and corporate governance variables that provides insightful results. In summary, the results indicate that firms have positive association with quantitative disclosures in terms of ROA and SIZE. The results seem to imply that larger firms have greater engagement on the social aspects, and hence willingly disclose their impact society and the environment. In addition, SEA disclosure can be a useful means to maintain greater visibility and to minimize political costs. Hackston and Milne (1996) also report a positive association between size and amount of SEA disclosure, however, they fail to establish any relationship with profitability and amount of SEA disclosure.

Sector-specific results show that building sector prefers qualitative disclosure while energy, retail and service industry prefer both qualitative and quantitative disclosures. The results here are also consistent with Hackson and Milne (1996) who report high profile industries to be disclosing more SEA information. The big 4 has a negative association with SEA disclosures. One rationale for this is that SEA disclosures are mainly at the management's discretion, and at times, it can be difficult to verify certain types of information. Interestingly, it is noted that larger boards prefer more quantitative disclosures. An in depth analysis showed that only female directors have preference for SEA disclosures. This study contributes to the literature by categorizing and looking at both qualitative and quantitative SEA disclosures, looking at the industry preferring SEA disclosures and showing the impact of industry type and corporate governance variables on SEA disclosures. It informs the profession, researchers, regulators, and policy makers on the importance of having gender balance on the boards so that transparent disclosures can be made surrounding things that are not actually mandatory such as SEA.

As noted from the literature, focus on SEA is gaining prominence at different levels of business operation. It can be argued that SEA provides credibility and legitimacy of operations, increases reputation and confidence among customers, and provides the necessary competitive edge. The study provides insightful perspectives which can assist regulators and practitioners' in understanding the evolving focus of social and environmental accounting.

Some caveats of the study are in order. First, the study is based on top 50 New Zealand firms. Therefore, extensions to the analysis can be done by expanding the sample size. Cross country and comparative analyses can be done with additional variables. Additionally, some alternative measures or indices of disclosure can be developed using factors like the age of an entity, emission level, degree of competition and industrialization. It must be noted that the study quantifies SEA data and hence reports the directional association. Whilst attempts have been made to theoretically rationalize the associations derived from the regression results, further qualitative analyses including in-depth interviews would definitely enrich the results of this paper.

Finally, given the voluntary nature of SEA disclosures, its uptake can be somewhat slow and hence of a lesser concern to the regulators and policy makers. However, from the stakeholder perspectives, firms influence various aspects of a society and the environment. Therefore, to broadly understand and appreciate the existence of certain type of firm behavior, and their respective contributions to the community at large, SEA reports become a useful device. Moreover, to ensure long-term protection and sustainability of the environment, SEA disclosure provides essential information to all the stakeholders. Additionally, SEA information can be used to assess the goals and mission of firm. Therefore, this study presents some important factors that can influence the publication of SEA information, both of quantitative- and qualitative types, for the interest of researchers, practitioners and regulators working in this domain.

Table 6

Quantitative Disclosure Probit Regression

	Model I	Model II	Model III	Model IV	Model V	Model VI
Primary Variables						
ROA	3.48***	3.18***	3.18***	2.75***	2.65***	2.65***
	(0.781)	(0.777)	(0.777)	(0.719)	(0.713)	(0.713)
SIZE	0.10**	0.13***	0.13***	0.20***	0.24***	0.24***
	(0.049)	(0.048)	(0.048)	(0.057)	(0.058)	(0.058)
BIG4	-3.23***	-1.82	-2.29**	-5.39***	-5.16***	-4.83***
	(1.046)	(1.197)	(0.974)	(1.214)	(1.496)	(1.178)
DIR	0.82**	-	-	0.72*	-	-
	(0.400)			(0.424)		

	Model I	Model II	Model III	Model IV	Model V	Model VI
Primary Variables						
IND	0.31**	0.29*	0.29*	-	-	-
	(0.159)	(0.158)	(0.158)			
Sector						
BUILD	-	-	-	0.14	0.05	0.05
				(0.347)	(0.344)	(0.344)
ENERG	-	-	-	0.66**	0.61**	0.61**
				(0.314)	(0.315)	(0.315)
RETAIL	-	-	-	0.75**	0.73**	0.72**
				(0.346)	(0.356)	(0.356)
SERV	-	-	-	1.37***	1.37***	1.37***
				(0.337)	(0.342)	(0.342)
FI	-	-	-	-0.24	-0.30	-0.30
				(0.357)	(0.360)	(0.360)
Gender						
MALE	-	-0.47	-	-	0.32	-
		(0.561)			(0.628)	
FEMALE	-	-	0.47	-	-	-0.32
			(0.561)			(0.628)

Notes: ***, ** and * represents 1 %, 5 % and 10 % levels of significance. ( ) contains the standard errors; and --- indicates excluded variable.

Table 7

Quantitative Disclosure Logit Regression

	Model I	Model II	Model III	Model IV	Model V	Model VI
Primary Variables						
ROA	6.01***	5.37***	5.37***	5.08***	4.72***	4.72***
	(1.423)	(1.403)	(1.403)	(1.366)	(1.332)	(1.332)
SIZE	0.16*	0.22***	0.22***	0.30***	0.39***	0.39***
	(0.092)	(0.089)	(0.089)	(0.106)	(0.108)	(0.109)
BIG4	-5.42***	-3.08	-3.96**	-8.77***	-8.27***	-7.86***
	(1.884)	(2.137)	(1.800)	(2.160)	(2.702)	(2.156)
DIR	1.46**	-	-	1.31**	-	-
	(0.697)			(0.734)		
IND	0.50*	0.47*	0.47*	-	-	-
	(0.340)	(0.275)	(0.275)			
Sector						
BUILD	-	-	-	0.25	0.07	0.07
				(0.561)	(0.554)	(0.554)
ENERG	-	-	-	1.13**	1.02**	1.02**
				(0.511)	(0.513)	(0.513)
RETAIL	-	-	-	1.26**	1.21**	1.21**
				(0.571)	(0.592)	(0.592)
SERV	-	-	-	2.41***	2.39***	2.39***
				(0.589)	(0.594)	(0.594)
FI	-	-	-	-0.33	-0.42	-0.42
				(0.582)	(0.588)	(0.588)
Gender						
MALE	-	-0.88	-	-	0.40	-
		(0.961)			(1.097)	
FEMALE	-	-	0.88	-	-	-0.40
			(0.961)			(1.097)

Notes: ***, ** and * represents 1 %, 5 % and 10 % levels of significance. ( ) contains the standard errors; and --- indicates excluded variable.

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