From Compliance to Sustainability: The Impact of the NZX Governance Code on Environmental Reporting

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ABSTRACT

This paper examined changes in environmental reporting following the introduction of the New Zealand Stock Exchange (NZX) Corporate Governance Code, which recommends reporting of environmental, social, and governance (ESG) information. The environmental disclosures of the top 50 NZX companies from 2016–2020 were analysed, comparing reporting pre-(2016–2017) and post-(2018–2020) introduction of the ESG guidance. Univariate and multivariate statistical analyses were used to examine changes in environmental reporting over these periods. The ESG guidance significantly improved environmental reporting, but not all companies disclosed information, indicating the need for stronger regulations. The study examined the trend in environmental disclosures, before and after implementation of the ESG guidance note, in the context of New Zealand's transition to mandatory climate reporting for listed companies. The study provides evidence of listed companies responding to listing requirements to provide greater transparency to capital markets regarding the environmental impact of their operations on the environment. The most frequently reported environmental disclosure was greenhouse gas emissions, widely recognised as a primary contributor to climate change.

Keywords: Environmental Reporting, ESG Guidance Note, Greenhouse Gas Emissions, Legitimacy Theory

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INTRODUCTION

Global warming and climate change are major threats to humanity, pressuring countries to adopt measures to protect the environment and reduce greenhouse gas (GHG) emissions (Ahmad et al., 2020; Zhang et al., 2020). In 2015, the United Nations (UN) developed 17 Sustainability Development Goals, including climate change action and sustainable practices (UN, 2015). The Paris Agreement, adopted by 196 parties, aim to limit global warming below 2, preferably to 1.5 degrees Celsius (UN, 2015).

Organisations are also under pressure to develop environmentally sustainable strategies, reduce their GHG emissions, and report externally on environmental performance. Environmental reporting informs stakeholders about an organisation's environmental impacts, promoting transparency and accountability, and enabling investors to make environmentally responsible investment decisions (Helfaya et al., 2018; Kuzey & Uyar, 2017). Research shows that environmental disclosures can influence investor behaviour (Zhang et al., 2020), and that the quality of these disclosures is positively associated with firm value (Bui et al., 2020, 2022; Khan et al., 2022). The demand for this information is recognised by regulators and standard setters (Bui et al., 2020; Khan et al., 2022; New Zealand Stock Exchange [NZX], 2020), as sustainable investments account for 35.9 per cent of total assets under management globally (Global Sustainable Investment Alliance, 2020).

In 2017, the NZX issued an ESG guidance recommending annual ESG disclosures. Studies show that regulatory intentions to enhance disclosures, increase their credibility and help organisations to legitimise their business operations (Arif et al., 2022; Barbu et al., 2022; Ioannou & Seraeim, 2017). The Legitimacy Theory suggests that organisations disclose their environmental impacts to meet stakeholder expectations (Ahmad et al., 2020; Cho et al., 2020; Dobbs & Staden, 2016) and gain social acceptance (Bui et al., 2020; Deegan, 2019). However, not all countries adopt the same corporate governance models and ESG standards, with different reporting mechanisms employed around the globe.

Our study examined the impact of the 2017 ESG guidance note on environmental reporting by the top 50 NZX-listed companies from 2016 to 2020. We analysed disclosures before (2016-2017) and after

(2018–2020) its introduction. We found an increase in environmental disclosures of the top 50 NZX-listed companies after implementing the 2017 ESG guidance note, indicating a positive effect of regulatory guidance. Significant improvements were seen in telecommunications, energy, food manufacturing, and financial services, with GHG emissions being the most frequently reported. The absence of environmental disclosures from 18 companies suggests a need for stronger regulations. These results provide insights for regulators and policymakers on shaping environmental and sustainability disclosure requirements. The study adds to existing ESG disclosure research documenting the evolution of ESG reporting in New Zealand. Since 2020, New Zealand's environmental reporting standards have evolved with mandatory climate-related disclosures based on the TCFD framework, making these findings indicative of pre-mandatory reporting behaviour by companies.

The remainder of this paper is structured as follows. Section 2 describes the theoretical framework and the relevant literature, leading to the development of the research questions. Section 3 explains the sample selection and the empirical model used in this research. Section 4 presents the results, and Section 5 discusses the findings. Finally, Section 6 concludes the paper.

THEORETICAL FRAMEWORK, LITERATURE REVIEW, AND HYPOTHESIS

Theoretical Framework

The Legitimacy Theory explains the impact of the ESG guidance note on environmental disclosures. It posits that there is a social contract between business and society, with organisations operating within social boundaries and expectations. If corporate activities breach society's values and norms, they may face severe sanctions, including government intervention (Deegan, 2002).

Studies have shown that companies use environmental disclosures as a legitimation tool to maintain societal support (Arif et al., 2022; Kuzey & Uyar, 2017; Masud et al., 2018). Mandated disclosures set additional

reporting requirements, and companies generally respond positively to such requirements to maintain their legitimacy (Ioannou & Seraeim, 2017; Manes-Rossi et al., 2018) and demonstrate responsible practices (Deegan, 2019).

The following section reviews previous research on the impact of regulations on environmental disclosures.

Literature Review

Impact of regulations on environmental disclosures

Countries use various approaches to improve environmental reporting, including laws, stock exchange requirements, and frameworks like the Global Reporting Initiative (GRI) (Chelli et al., 2018). Studies have analysed the effectiveness of these approaches. Ioannou and Seraeim (2017) found that mandated ESG disclosures in China, Denmark, Malaysia, and South Africa led to a significant increase in disclosures and were more likely to provide assurance reports.

Other studies have indicated that increased ESG disclosures were associated with improvements in firm value. Barth et al. (2017) found that mandatory integrated reporting in South Africa, which includes ESG disclosures, improved the information available to investors. In France, ESG disclosure requirements introduced in 2001 led to an increase in the quantity of disclosures, but not necessarily their quality (Chauvey et al., 2015). Chelli et al. (2018) argue that France's regulatory approach is more effective than the requirements set by Canada's stock exchange.

Barbu et al. (2022) found the EU Directive increased environmental disclosures of listed companies in France, Netherlands, Belgium, and Portugal, while national regulations showed no statistical impact, regardless of their severity. Arif et al. (2022) also found the EU Directive had a significantly positive effect on the quantity and quality of ESG disclosures among S&P Europe 350 Index firms.

In Australia, an amendment to the Corporations Act required companies to report their environmental performance, leading to an increase in environmental disclosures (Frost, 2007). Yang et al. (2021) examined its

impact over 21 years, noting improvements in compliance and disclosure quality over time.

Over the past decade, New Zealand sustainability research has focused on case studies about the motivations for publishing sustainability reports (Dobbs and Van Staden, 2016), the processes involved (Farooq & de Villiers, 2019), and company characteristics, including readability (Nilipour et al., 2020). Hoque and Khan (2022) found that carbon regulation, standardised reporting formats (GRI), and corporate governance attributes positively impacted the quality of carbon reporting for NZX-listed companies. Khan et al. (2022) found that the quality of carbon reporting of NZX Top 50 companies positively affected their market reputations.

New Zealand sustainability research has focused less on evolving ESG disclosures. The NZX published the ESG guidance note in December 2017, to improve the transparency of sustainability reporting (NZX, 2017). It recommends reporting frameworks like the GRI standards but does not specify required disclosures. This research examines the response of listed companies to the NZX Corporate Governance Code ESG guidelines and their impact on environmental disclosures. Given the mixed findings in prior studies, the null hypothesis was:

H1: Environmental Reporting is not affected by the adoption of the NZX ERS Guideline.

RESEARCH DESIGN

Sample Selection and Data Collection

The sample consisted of all companies listed on the NZX50 index ranked by market capitalisation as of 1st December 2020. The NZX 50 Index comprised approximately 90 per cent of the total market capitalisation (NZX, 2022) and has been used in prior research for measuring NZ environmental disclosures (e.g., Khan & Houqe, 2022; Khan et al., 2021). Of the 50 companies, thirty-nine (78 per cent) were registered in New Zealand, and 11 (22 per cent) were registered overseas.

All data were manually collected from company annual reports and sustainability reports (if available) from 2016 to 2020. As noted above, the disclosures made in 2016 and 2017 before the introduction of the ESG guidance note were compared with the disclosures made in 2018–2020 after the introduction of the guidance. This study employed panel data (i.e., combined cross-section and time series) with a data set of 250 observations. The number of companies was constant over the five years.

The NZX recommended using standardised formats such as GRI standards for reporting environmental data (NZX, 2020). The GRI environmental standard (GRI, 2022) includes eight categories: material, energy, water effluents, emissions, biodiversity, effluents and waste, environmental compliance, and supplier assessment, with 32 subcategories. The GRI Index was used to manually collect environmental disclosures from the sample of companies, in order to evaluate trends over time, by company, and by industry.

An environmental reporting score (ERS) was assigned 1 for disclosed items and 0 for non-disclosed items. An unweighted index approach was applied (Allegrini & Greco, 2013; Mahmood & Orazalin, 2017). Scores were averaged to obtain an overall percentage for each company, with ERS scores ranging from 100 per cent for full disclosure and 0% for no disclosures.

Method and Empirical Model

The study employed univariate analyses and panel data regression to examine environmental reporting scores (ERS). The model was specified as follows.

$$ERS_{it} = \beta_0 + \beta_1 PrePost + \beta_2 Size_{it} + \beta_3 ROA_{it} + \beta_4 BdInd_{it} + \beta_5 BdSize_{it} + \beta_6 Firm\ Effects + \beta_7 YearEffects + e_{it}^{1}$$

The dependent variable was the ERS, as outlined in Section 3.1. The independent variable was pre-post (*PrePost*), with 1 for the post-ESG guidance note years and 0 otherwise. A positive and significant coefficient of *PrePost* indicated that the ERS scores increased after implementing the ESG guidance note.

1 We considered Industry Sensitiveness as a variable in the model; however, its inclusion created model estimation and econometric issues; hence, it was excluded from our model.

Control Variables

Prior research identified firm characteristics influencing the level of ESG reporting (Deegan, 2019; Kuzey & Uyar, 2017; Legendre & Coderre, 2013; Masud et al., 2018;). We used control variables of firm size, profitability (Mahmood & Orazalin, 2017; Hoque & Khan, 2022), board independence, and board size (Hamdan & Mubarak, 2017).

Firm size (*Size*) was measured using the natural logarithm of total assets. Larger organisations often face more public scrutiny, which incentivises disclosures. Studies found a positive correlation between firm size and environmental disclosures using the GRI framework (Kuzey & Uyar, 2017; Legendre & Coderre, 2013).

Profitability was measured using return on assets (*ROA*). Listing companies in Portugal and India have reported positive associations between profitability and environmental disclosures (Branco et al., 2014; Kansal et al., 2014). However, no association was found for companies in Poland, Turkey, and Russia (Dyduch & Krasodomska, 2017; Kuzey & Uyar, 2016; Orazalin & Mahmood, 2018).

Board size (*BdSize*) was measured using the total number of directors on the board. Board independence (*BdInd*) was measured by the proportion of independent directors (*BdSize*) (Hussain et al., 2018; Mahmood & Orazalin, 2017). Some studies found a positive correlation between these board characteristics and sustainability reporting (Hu & Loh, 2018), while others found no association (Amran et al., 2014; Hussain et al., 2018; Masud et al., 2018).

Robustness Check: Difference in Differences (DD) Test

The DD technique was used to mitigate self-selection bias and endogeneity issues in longitudinal data. The design compared listed companies (treatment group) with a control group of 30 unlisted companies. The ESG guidance note was considered exogenous (uncorrelated to the error term).

The control group included one unlisted company from each industry, as presented in Table 2. The number of unlisted companies was made to

match the proportion of listed companies in that industry. The following model, using panel regression analysis, distinguished between listed companies (coded as 1) and unlisted companies (coded as 0) as the treatment variable (ListedUnlisted):

$$ERS_{it} = \beta_0 + \beta 1\ ListedUnlisted + \beta 2\ \ PrePost_{it} + \beta 3\ ListedUnlisted* PrePost_{it} + \beta 4\ Board\ Size_{it} + \beta 5\ Board\ Independence_{it} + \beta_6\ ROA_{it} + \beta 7\ Size_{it} + e_{it}$$

RESULTS

Descriptive Statistics

The descriptive variables are shown in Table 1. Panel A reports the trend in ERS. The mean ERS increased over the five years, with the highest mean score of 16.63 per cent in 2020 and the lowest mean of 8.13 per cent in 2016.

Table 1: Summary Statistics

Panel A: ERS statistics (%)					
	ERS 2016	**ERS 2017**	**ERS 2018**	**ERS 2019**	**ERS 2020**
Minimum	0.00	0.00	0.00	0.00	0.00
Maximum	50.00	44.00	47.00	47.00	56.00
Mean	8.13	9.69	12.25	14.81	16.63
Std. dev.	13.50	13.68	14.76	15.98	17.06
No. of companies	50	50	50	50	50
Panel B: Descriptive statistics for all variables (*N* = 250)					
	ERS (%)	**Size (ln)**	**ROA (%)**	**BdInd (%)**	**BdSize (count)**
Mean	12.30	8.03	6.90	81.60	6.86
Maximum	56.25	13.93	41.90	100.00	11.00
Minimum	0.00	3.58	-83.1	28.60	4.00
Std. dev.	15.26	1.70	11.60	19.60	1.46
Observations	250	250	250	250	250

Panel B of Table 1 reports the descriptive summaries for all the variables in the regression. The average ROA for all firms was 6.9 per cent, with a maximum ROA of 41.9 per cent in 2019. The average firm size was

NZ$ million, 45,801.82, equivalent to the log of 8.03. The average board size was seven directors, with 81.6 per cent of the directors being independent.

Table 2 reports the mean ERS by industry. The telecommunication industry reported the highest voluntary environmental disclosures, followed by oil and gas refining and energy. Real estate investment trusts (REIT), energy, and financial services sectors comprised 56 per cent of the sample and showed a gradual improvement in ERS. However, there was a slight decrease in reporting in 2020 in the aviation, airport & freight services, construction, retirement villages, and healthcare products sectors.

Table 2: Environmental Reporting by Industry

Industry	Frequency	%	ERS mean (%)				
			2016	2017	2018	2019	2020
REIT	12	24	3.65	5.21	7.29	9.11	9.64
Energy	9	18	13.19	10.76	15.27	18.05	23.96
Financial services	7	14	8.93	13.84	14.73	14.73	20.53
Retirement villages	5	10	0.00	0.00	1.87	4.37	0.63
Aviation, airport & freight service	4	8	12.50	17.97	21.87	24.22	18.75
Food manufacturing	3	6	0.00	4.17	10.42	18.75	26.04
Telecommunication	2	4	35.94	29.68	29.68	29.68	37.50
Healthcare products	2	4	0.00	1.56	6.25	18.75	12.50
Construction	1	2	0.00	12.50	12.50	21.88	18.75
Oil & gas refining	1	2	37.50	25.00	28.12	28.12	34.38
Other	4	8	5.47	10.94	10.94	10.94	11.72
Total	**50**	**100**					

Eighteen companies (36 per cent) had an ERS of 0, indicating that no environmental disclosures were reported over the five years. A content analysis of the 2019 and 2020 annual reports identified reasons for non-disclosure, as presented in Table 3. Of the 18 companies, nine (50 per cent) had initiated carbon footprint measurement, but emission data was absent in the annual reports. Five companies (27.78 per cent) had no measurable carbon footprint, while another had limited climate-related risks. Such statements, made without justification, demonstrated the shortcomings of voluntary environmental reporting.

Table 3: Non-disclosure of Environmental Data Based on Annual Reports From 2019 and 2020

Reasons for non-disclosure of environmental data	Firms No.	%
The company is at an early stage of measuring its carbon footprint.	**9**	50.00%
The company has no greenhouse gas emissions from operations to report	**5**	27.78%
The sustainability matrix recorded activities with the highest importance	**2**	11.11%
The company has limited climate-related risks	**1**	5.56%
The COVID-19 crisis resulted in a drop in emissions	**1**	5.56%
Total	**18**	**100%**

The mean ERS value of each GRI standard was calculated to analyse changes in reporting over time. Emissions-related reporting (GRI 305) showed the most significant increase, with 31 companies reporting in 2020 compared to 15 in 2016, an increase of 32 per cent (see Table 4). Reporting on waste generation and waste-related impacts (GRI 306) increased by 16 per cent, while disclosures of water consumption, discharge, and related effects (GR 303) rose by 14 per cent.

There was an 18 per cent increase in companies reporting on renewable, non-renewable, and recycled materials used in production and packaging (GRI 301). Supplier environmental assessment disclosures (GRI 308) increased by 10 per cent, mainly between 2019 and 2020. This suggests that companies are re-evaluating their supply chains to minimise environmental impacts and reduce GHG emissions. Companies reporting on protecting biodiversity and habitats (GRI 304) grew by 10 per cent. Increasing trends in reporting on water, biodiversity, GHG emissions, and supplier assessments were evident, as well as emissions-related reporting from 2018 to 2020 after the implementation of the ESG guidance note.

Impact of ESG Guidance Note

Paired sample t-tests (See Table 5) evaluated if there was an improvement in reporting after the introduction of the ESG guidance note. The results indicated that changes in environmental reporting levels between the pre- and post-periods were statistically significant. Mean ERS values during the pre- and post-period were 8.91 per cent and 14.56 per cent, respectively, with a statistically significant difference ($p < 0.001$). In the post-ERS period, the level of environmental reporting substantially increased.

Robustness tests comparing each year's ERS score with the preceding year, from 2016 to 2020, are presented in Table 6. The 2016 versus 2017 paired sample t-test results indicated no significant change in environmental reporting levels. However, the ERS scores showed a significant increase from 2017 to 2018, when the NZX ESG guidance note was introduced. The 2016 and 2017 ERS scores versus the 2018 ERS, confirmed a significant positive increase in environmental reporting levels. Environmental reporting continued to rise from 2018 to 2020, although the difference in ERS scores between 2019 and 2020 was not significant. Some companies reported that COVID-19 led to a reduction in economic activity, resulting in lower emissions, which may have contributed to a decrease in disclosures for 2020.

Table 4: GRI Environmental Standards by Mean ERS

GRI environmental standards	Mean ERS (%)					Count	%	Count	%	Difference 2016 & 2020
	2016	2017	2018	2019	2020	2016	2016	2020	2020	
GRI 301 (Materials)	5.33	6.00	7.33	8.67	10.67	6	12%	15	30%	18%
GRI 302 (Energy)	7.20	10.00	10.80	11.60	11.20	11	22%	15	30%	8%
GRI 303 (Water and Effluents)	6.80	7.20	6.80	10.00	15.20	10	20%	17	34%	14%
GRI 304 (Biodiversity)	6.50	5.00	4.50	7.00	11.00	7	14%	12	24%	10%
GRI 305 (Emissions)	14.57	17.43	24.86	32.00	34.00	15	30%	31	62%	32%
GRI 306 (Effluents and Waste)	5.20	7.20	8.40	11.20	8.40	7	14%	15	30%	16%
GRI 307 (Environmental Compliance)	6.00	10.00	8.00	10.00	10.00	3	6%	5	10%	4%
GRI 308 (Supplier environmental assessment)	7.00	8.00	8.00	10.00	16.00	5	10%	10	20%	10%

Table 5: ERS Paired Sample t-test

Paired sample t-test					
	Minimum	Maximum	Mean	Std. error	Std. dev.
Pre-ERS	0.00	46.88	8.91	1.84	12.99
Post-ERS	0.00	50.00	14.56	2.14	15.12

t-test: 95% CI of the difference							
Pair	Mean difference	Std. dev.	Lower	Upper	t	df	Sig. (2-tailed)
Pre-Post ERS	5.65	7.59	7.81	3.49	5.27	49	<0.001

Table 6: Robustness Test for ERS

Paired sample t-test	P(T<=t) Sig. (2-tailed)	Explanation
ERS 2016 vs 2017	0.169	No significant change in environmental disclosures.
ERS 2017 vs 2018	0.001	A significant change in environmental disclosures.
ERS 2016 & 2017 vs 2018	0.000	A significant change in environmental disclosures.
ERS 2018 vs 2019	0.002	A significant change in environmental disclosures.
ERS 2019 vs 2020	0.225	No significant change in environmental disclosures.

Findings

The Pearson correlation matrix is presented in Table 7. ERS was positively and significantly correlated with firm size (*Size*), board independence (*BdInd*), board size (*BdSize*), and the dummy variable (*PrePost*). A significant correlation (0.182; $p < 0.01$) between ERS and *PrePost* suggested that the ESG guidance note had a considerable effect on the level of environmental reporting. However, ERS did not significantly correlate with a firm's profitability. The size of the correlations suggested that multicollinearity was not a significant concern.

This study analysed panel data from 50 firms spanning five years (2016–2020) with a total of 250 observations. The Hausman test determined that the fixed effects model (FEM) controlling for firm and year fixed effects was preferable to the random effects model (REM) with a significant result of 0.05 level ($\chi^2 = 13.55$; $p = 0.019$). Table 8 reports the findings of three FEM regression models.

Table 7: Pearson Correlations

	ERS	Size	ROA	BdInd	BdSize	PrePost
ERS	1	0.540**	-0.013	0.240**	0.489**	0.182**
Size		1	-0.067	0.332	0.638**	0.075
ROA			1	0.075	-0.065	-0.051
BdInd				1	0.062	0.076
BdSize					1	-0.019
PrePost						1

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

Table 8: Results of the Fixed Effects Regression Models

Variable	Model 1 coefficients	Model 2 coefficients	Model 3 coefficients
Constant	0.089**	-0.238	0.144
Size	-	0.063**	0.010
ROA	-	-0.041	0.009
BdInd	-	-0.069	-0.091
BdSize	-	-0.012	-0.009
PrePost (dummy)	0.057**	–	0.056**
Fixed effects	Firm and year	Firm and year	Firm and year
R-squared	0.840	0.819	0.843
Adjusted R-squared	0.799	0.770	0.799
F-Statistic	20.85**	16.714**	19.358**
No. of Observations	250	250	250

** Significant at the 0.01 level (2-tailed)

Model 1 tested the relationship between ERS and the *PrePost* variable. The coefficient of *PrePost* was positive and significant (β = 0.057, p = 0.001), and the model (F=20.85, p=0.001) was significant. These results confirmed a significant change in the environmental reporting disclosures in the post-implementation period.

Model 2 presents the result of ERS on firm size (*Size*), board independence (*BdInd*), and board size (*BdSize*) variables. Firm size (Size) was significantly associated with ERS (β = 0.063, p = 0.001), aligning with previous research (Hackston & Milne, 1996; Hewagama & Dassanayake, 2022), which suggested that larger firms tended to disclose more environmental information due to their greater resources. Model 2 was significant, and the R-squared values showed that the predictor variables at least explained 77 per cent variation in the dependent variable (i.e., ERS).

Model 2 showed that profitability (*ROA*) was not associated with the level of environmental reporting, consistent with a previous New Zealand study by Hackston and Milne (1996) and, more recently, research by Hewagama and Dassanayake (2022).

The coefficients of board independence (*BdInd*) and board size (*BdSize*) had no significant impact on the level of environmental reporting. Prior research has produced mixed findings, with some studies showing

these variables having a positive impact on environmental reporting, while others have no relationship (Amran et al., 2014; Mahmood & Orazalin, 2017; Masud et al., 2018).

Model 3 presents the results of the primary model, as stated in section 3.2. In this model, the *PrePost* variable tested the impact of the ESG guidance note on the level of environmental reporting. The coefficient was positive ($\beta = 0.056$) and significant at the 0.01 level, indicating that ERS improved after the implementation of the ESG guidance code. These findings confirmed that adopting the ESG guidance note significantly impacted the level of environmental reporting. The null hypothesis was then rejected as the implementation of ERS guidelines by the NZX had a positive influence on the level of environmental reporting. The variance inflation factor (VIF) was less than 2 in all Models, showing no multicollinearity in the multiple regression variables (Gago Rodríguez et al., 2020).

Table 9: Average ERS Comparison Before and After Treatment for Listed and Unlisted

Mean DD analysis	Average ERS Pre	Average ERS Post	Difference
Treatment (Listed company)	8.90%	14.60%	5.70%
Control (Unlisted company)	8.40%	9.70%	1.30%
Difference	0.50%	4.90%	4.40%*

* Significant at the 0.05 level (2-tailed)

Table 9 shows that the non-zero difference estimates confirmed variations in ERS scores between listed and unlisted companies before and after the introduction of the ESG guidance note. The average ERS score of listed companies increased significantly, from 8.90% pre-treatment to 14.60% post-treatment, a difference of 5.70%. Unlisted companies, in contrast, experienced a lesser increase—from 8.40% to 9.70%—with a 1.30% difference. The difference-in-differences (DiD) analysis revealed a significant treatment effect of 4.40% ($p < 0.05$), highlighting that the ESG guidance note had a more pronounced impact on listed companies compared to unlisted ones.

Table 10: Combined Results for Listed and Unlisted Firms, DD Panel Regression

Variable	DD model listed and unlisted***
Constant	-0.1100
ListedUnlisted (Listed =1; Unlisted =0)	0.0585
PrePost (Pre=0; Post =1)	0.0132
ListedUnlisted* PrePost	0.0407**
Board size	0.0074*
Board independence	0.0281
ROA	-0.0003
Size	0.0085
F-Statistic	8.8957**

** Significant at the 0.01 level (2-tailed)
* Significant at 0.05 level (2-tailed)
*** Random effects model

Table 10 presents the combined results for listed and unlisted firms for the random effects regression model. The coefficient of *PrePost* of 0.0132 was not statistically significant. This suggested that there was no difference in the average ERS for the control group (unlisted companies) before and after the implementation of the ESG guidance note. The coefficient of *ListedUnlisted* was 0.0585 and not statistically significant. This suggested that there was no difference in the average ERS for the control group (unlisted companies) and the treatment group (listed companies) before the introduction of the ESG guidance note in 2017. The coefficient for the difference-in-differences (*ListedUnlisted*PrePost*) was positive 0.0407 and statistically significant. This confirmed that the ESG guidance note had a positive effect on the ERS for the listed companies, with environmental disclosures increasing after the implementation of the ESG guidance note in 2017 compared with the unlisted companies.

Our results aligned with Ioannou and Seraeim's (2017) and Barth et al.'s (2017), which showed that companies subject to regulations significantly increased their environmental disclosures. Similarly, Chellie et al. (2018) observed improvement in environmental practices over time in French companies complying with regulations. Frost (2007) noted a rise in the number and level of companies disclosing environmental information due to legislative changes. Yang et al.'s (2021) study from 1997 to 2021 indicated a continuous increase in both the quantity and quality of disclosures under changes in the Australian Corporations Act, underscoring

the effectiveness of legal requirements in enhancing companies' compliance over time. These findings were consistent with our research.

DISCUSSION

The analysis of environmental reporting of the top 50 NZX-listed companies revealed a consistent increase in environmental disclosures over the five-year study period from 2016 to 2020. The difference in the level of reporting before and after the implementation of the 2017 ESG guidance note was statistically significant. The results were compared with a control group of 30 unlisted companies unaffected by the ESG guidance and indicated significantly higher ESG disclosures for the listed companies.

These findings align with the Legitimacy Theory that to gain societal acceptance, firms need to comply with societal norms and expectations (Bui et al., 2020). However, 18 top listed companies in the sample did not make any environmental disclosures, indicating that stronger regulatory approaches may be required in the future to meet society's growing expectations regarding environmental reporting.

The industry-wide analysis showed that companies in the energy, telecommunication, food manufacturing, and financial services sectors (42 % of the sample) showed the most improvement in environmental reporting. GHG emissions were the most frequently reported disclosure, with a 32 per cent increase in the number of listed companies reporting them over the five years. This finding reflected increasing concern internationally that GHG emissions significantly contribute to climate change. New Zealand aims to reduce GHG emissions to 50 per cent below 2005 levels by 2030 as per the 2015 Paris Agreement (Ministry for the Environment, 2024), but the rate of decrease in GHG emissions may not be fast enough to meet the 2030 goal (Stats NZ, 2020). Firms should provide quantifiable evidence, such as GHG emissions, to demonstrate that genuine efforts are being made to reduce GHG emissions. The introduction of mandatory reporting of climate-related disclosures for large entities introduced by the New Zealand Government (Climate-related Disclosures and Other Matters Amendment Act 2021) was a step forward in addressing this issue.

Our findings provide practical insights relevant to management accounting practices, including how internal control systems are associated with environmental disclosures and performance metric design. ESG can also improve internal controls by integrating environmental risks into risk management models as well as control processes (Dyduch & Krasodomska, 2017). For management accountants, the research highlights the importance of aligning reporting practice with overall corporate sustainability strategy and assisting in ESG investment choices with the appropriate use of financial analysis. Auditors can have an increased role in ensuring the validity of ESG disclosures, especially with increasing expectations from stakeholders as well as regulatory demands. Regulators can use these insights to identify sectors lagging behind in environmental reporting and to tailor future ESG mandates accordingly.

All relevant GRI environmental indicators across industries were included in our study analysis. While Table 2 presents a breakdown of environmental reporting scores (ERS) by industry, the analysis did not focus on explaining the drivers of these industry-specific disclosure patterns. As shown in Table 2, there were noticeable variations in the level of environmental reporting across sectors—for instance, the telecommunication and oil and gas refining industries consistently show higher ERS values compared to sectors like retirement villages and REITs. Industry-specific variations in disclosure, however, had not been analysed separately, as analysis in this case emphasised overall trends in environmental reporting as opposed to sector-specific reporting practice. Future research could explore industry-specific disclosure patterns to provide deeper insights into sectoral differences in environmental reporting.

The implications of these findings are significant for various stakeholders. The results indicated an increase in the reporting of environmental disclosures over the five-year period, showing the growing recognition of environmental impact within the corporate sector and highlighting the steps companies and regulators can take. For companies, the increased transparency in GHG emission reporting provides a foundation for setting more targets for emissions reduction. Conversely, regulators can use these disclosures to refine policies and enforcement mechanisms that ensure corporate practices align more closely with national climate goals. This trend towards enhanced disclosure offers investors the data needed

to make informed decisions and align their investment choices with their environmental values.

CONCLUSION

This paper presents evidence of significant increases in voluntary environmental reporting among large, listed companies after the NZX recommended ESG disclosures. These findings are consistent with the Legitimacy Theory, which places increasing pressure on companies globally to report on how their business activities impact the environment and their actions to reduce climate change. However, not all companies reported on environmental impacts. With New Zealand requiring mandatory climate change reporting from 2004 for large financial institutions, environmental reporting levels look set to rise significantly. The move to mandatory reporting on climate change will provide a range of research opportunities.

A limitation of this study is that the panel data regression model was restricted to a period of five years. Future research could expand the study's time frame and sample size. The use of globally accepted GRI environmental reporting standards to calculate the ERS excludes other environmental reporting measures, which is a potential limitation. This research was based on the reporting of top New Zealand-listed companies, which may have limited the generalisability of the results. Our findings of New Zealand environmental reporting contribute to the literature by providing insights into global trends in environmental reporting.

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