

Environment and Financial Performance: The Case of the Canadian Oil Industry

ABSTRACT

Environmental and social responsibility has taken center stage in the corporate world. Companies operating in polluting industries are faced with stakeholders' growing demand for environmental governance and are expected to account publicly for their environmental and social actions in annual financial statements and sustainability reports. ISO14001 and OHSAS18001: 18001 certification systems measure environmental and social performance and foster consensus-making between companies and their stakeholders. Researchers, however, are still divided as to the significance and scope of the relationship between environmental/social and financial performance. We measure this relationship in a cross-section of businesses in the Canadian oil industry

Working with a sample of 23 certified companies consisting of six organizations identified as socially responsible by Corporate Knights magazine, a publication that issues a list of the best 50 corporate citizens in Canada, and 17 companies not recognized by the magazine, we assess the effect of certification on financial performance as measured by the companies' ROA over five-year pre- and post-certification periods. Regressions of post-certification on pre-certification ROA are performed. The results show that certification is economically beneficial for companies, and more so for those regarded as socially and environmentally responsible.

Keywords: certification, Corporate Knights magazine, environmental performance, financial performance, ISO14001 standard, OHSAS 18001, ROA.

1. INTRODUCTION

Recent scandals have intensified the longstanding debate about environmental and social responsibility, putting this issue squarely in the public eye. The spotlight is shining on companies that make profits without consideration for the environment, prompting many of them to fulfill their obligations by complying with regulations or making changes of their own accord. In doing so, they help to protect the environment by acting as good citizens [1].

Observing the proliferation of irresponsible practices, advocacy groups have felt compelled to use their influence to bring about the implementation of tools for monitoring environmental and social performance. The launch of certification systems has given rise to assurances of environmental protection [2]. In this regard, systems such as ISO14001 and OHSAS 18001 help forge corporate attitudes toward the environment and benefit companies through increased public legitimacy.

According to [3], to enjoy such legitimacy while remaining financially successful, companies must engage in environmental and social actions, thereby positively influencing stakeholders in relation to their major decisions. However, according to [2], the exorbitant costs generated by environmental actions offset companies' economic benefits.

The problem of the cost of environmental performance (EP) has led many researchers to investigate its relationship with financial performance (FP), but consensus is lacking [4]. Among studies on certification, few have highlighted the relationship between these two factors ([2]; [5]).

The aim of our analysis is to examine these factors and their relationship in the Canadian oil industry. Drawing on a sample of 23 certified oil companies, we use parametric and nonparametric tests to make corroborations. Performance is measured as return on assets (ROA), with the study period covering five years before and after the date of the companies' initial certifications.

The remainder of this paper is organized as follows. Section 2 recaps our literature review; Section 3 explains the research methodology; Section 4 presents the study's empirical results; and Section 5 presents our conclusions.

2. LITERATURE REVIEW

The financial impact of environmental and social responsibility is one of the most controversial topics in the literature. Numerous studies have been conducted and are at odds about the direction of the impact.

Some studies show a positive relationship between the two ([6]; [7]; [8]; [9]). Advocates of these findings argue that environmental and social performance is linked to proper management of resources, a skill that is necessarily positively correlated with profitability ([6]; [10]; [11]; [12]; [13]; [14]). [15] maintain that environmental and social responsibility is a business strategy component that leads to stakeholders' expectations of achievement. [16] adds that good environmental and social performance is necessary for legitimizing the company's activities, explaining the long-term positive relationship between the two variables.

Other researchers demonstrate a negative relationship between the two parameters ([17]; [18]; [19]; [20]). Supporters of neoclassical economic theory find a negative relationship between EP and FP, arguing that the cost of environmental and social action exceeds its economic benefits [21]. They assert that when outflow cannot enrich shareholders, it necessarily contributes to reducing the organization's FP ([22]; [23]; [24]; [25]). Companies that invest in environmental and social actions incur costs that negatively affect their economic operations, which may lead to a competitive disadvantage ([4]; [26]). [22] adds that attention paid by managers to interests other than those of investors amounts to a breach of trust, eroding company value.

A third stream claims there is no relationship between environmental/social responsibility and financial performance ([27]; [28]; [29]). [25] argues that any significant relationship between the two is only due to chance. Other authors find that the cost of social action is offset by decreases in company costs ([26]) and is unrelated to FP.

Lastly, supporters of the revisionist theory ([30]; [31]; [32]) consider that the relationship between EP and FP is concave, i.e., there is an optimal level of social performance beyond which financial performance becomes negative. Among other revisionists, some ([33]; [34]) obtained a rather convex relationship between the two variables.

[21] maintain that the measures used could be the cause of the disparity in results. These differences of opinion can be explained by several factors such as study period, instruments used to measure environmental and social performance, diversity of methodological approaches, nature of the industry, and so forth. We add to the body of research by examining the EP-FP

relationship in Canadian oil companies, given the oil industry's practice of environmental pollution coupled with large profit-making.

To achieve consistent results, we require a common theoretical reference, as highlighted by [2]. According to [2], attempts to study the relationship between EP and FP have had theoretical and methodological limitations owing to the variety of measures used to calculate FP, thus explaining the range of results in regard to a possible association with EP. Some authors use financial measures based on market data ([8]; [35]) while others opt for accounting measures such as return on equity (ROE) and return on assets (ROA) ([4]; [21]; [27]).

Moreover, most fundamental studies neglect the possible effects of other variables on the relationship [26]. To address these methodological weaknesses, [36] used company size as a control variable and obtained variable impacts, both positive and significant, on the relationship. More recently, [28] investigated the relationship by basing their performance measurement model equally on company size and systematic risk. Their findings show a positive and significant impact of the control variables on the EP-FP relationship.

As mentioned previously, the positive relationship between EP and FP is embedded in stakeholder theory, which states that companies must take into account the needs of direct stakeholders (shareholders, customers, investors, etc.) and indirect stakeholders (society, NGOs, etc.). By doing so, they can achieve their traditional objectives such as profitability and continuity. In addition, it has been argued ([3]; [37]; [38]) that when companies meet the expectations of their stakeholders, they create competitive advantages such as a positive reputation, good relationship with stakeholders, customer loyalty, respect for employees, etc. These benefits can be considered intangible assets that reduce implicit costs such as environmental expenses.

Among other factors, a policy of transparency towards employees leads to decreased company costs as a result of employee loyalty [2]. Building confidence in employees therefore contributes positively to productivity, giving the environmental and socially responsible company a competitive advantage over less responsible counterparts [21].

A high expertise to high managerial knowledge ratio leads to lower explicit costs [39]. In finding a balanced solution to stakeholders' different expectations, environmentally and socially responsible companies can minimize risk (such as increased environmental taxes, lawsuits etc.) and therefore improve FP [2].

We empirically examine the relationship between certification, our chosen measure of the environmental and social responsibility dimension, and financial performance. A credible authority must issue the certification in order to accurately convey the level of the company's social and environmental responsibility. Certification creates significant costs but these are justified by the signal sent to the market. This in turn gives the company the opportunity to negotiate a more attractive cost of capital than those without reputable certification, which end up suffering losses that exceed the cost of certification [2].

The oil industry presents the additional complexity of producing a raw material vital to the economy while generating profits that mask the damage caused by the product's use. We choose to examine this industry and use certification to measure the effect of environmental and social responsibility on financial performance.

3. METHODOLOGY

Our purpose is to analyze the relationship in the Canadian oil industry between certification, used to assess EP, and financial performance, as measured by ROA. To this end, we use a sample of large, certified oil companies. Certification is the start event or predictor of financial performance. Note that to simplify the analysis, we use only the initial environmental certification date as independent variable.

Given the complexity of the relationship between EP and FP, control variables such as company size and industry, although useful, were not included because the entire sample is formed of large companies listed on the Toronto Stock Exchange. These companies have not experienced any confounding events that could have influenced performance during their first year of certification. To be consistent, we standardized the certification year for the entire sample, known as date 0. The average ROA for a period of five years prior to this date was compared to the variable average value five years later.

Certified companies (ISO14001, ISO14001: 2004, OHSAS 18001) were identified using the information provided by knowledgeable organizations (Lloyd's Register, KPMG, Deloitte, etc.), company websites, annual reports and sustainability reports. Our initial sample consisted of 45 certified oil companies operating in Canada, after which only those that met established criteria were retained. Data on the organizations were then merged with financial information provided by Compustat, after which the companies with unknown certification dates or confounding events (mergers and acquisitions, trials, etc.) were eliminated. The final sample consisted of companies that fulfilled all the established criteria¹.

To test our hypotheses, we divide our sample into two groups. We use two statistical methods, the paired Wilcoxon test and univariate linear regression, to search for significant differences in financial performance as measured by ROA before and after certification. The sign of this relationship is also examined. Our hypotheses are as follows.

H1a: Oil companies experience a change in financial performance after certification.

H1b: Oil companies without social responsibility recognition experience a change in financial performance after certification.

H1c: Oil companies recognized as socially responsible experience a change in financial performance after certification.

H2a: The financial performance of oil companies improves after certification.

H2b: Certified oil companies recognized as socially responsible achieve better financial performance.

We test our first hypothesis (H1a) through a paired test measuring the difference between financial performance before and after certification across all companies. Since the combination of recognition of social responsibility and certification can influence financial performance, the sample is divided into two sub-samples, certified companies identified as socially responsible by Corporate Knights magazine, and other companies. The same test was performed on the two sub-samples, allowing us to test hypotheses (H1b) and (H1c).

To determine the sign of the significant difference, if any, and to test hypothesis (H2a), a linear regression of the post-certification ROA of all companies in the original sample on their pre-certification ROA is performed. To check whether certified companies that were recognized as socially responsible enjoy better financial performance than the group average, another post-certification ROA regression on pre-certification ROA is performed in view of hypothesis(H2b).

¹To determine our evaluation sample, we used systematic sampling. The final sample was composed of 23 companies. These companies have not experienced any mergers or acquisitions nor got bankrupt during their certification year. The sample is representative of our population because with a 5% precision level, the real Z-score can be obtained as follows: $Z_{calculated} = \sqrt{\frac{n\epsilon^2}{p\hat{p}(1-\hat{p})}} = \sqrt{\frac{23 \times 0.05^2}{\frac{23}{45} \times \frac{22}{45}}} = 0.4792$, which is lower than the theoretical Z-score(1.96) meaning that the null hypothesis should not be rejected. Hence, the sample is representative of the population.

The coefficients of the two regressions are compared to measure the effect of this variation on company financial performance.

4. RESULTS

Before the results of our analysis are presented, some relevant points about the sample and its related assumptions should be noted. These will allow us to interpret the results in regard to two dimensions, level of significance and meaning of the relationship between explanatory and explained variables. As mentioned previously, our original sample consisted of 23 certified companies. (H1a) and (H2a) were tested for the original sample. Only the sub-sample of companies recognized as socially responsible (six companies) was considered in (H1c) and (H2b) testing. The 17 certified companies not recognized as socially responsible were considered in testing (H1b). We are thus interested, first of all, in differences within the original group (23 companies), and then in differences between different subgroups. Each hypothesis is reiterated below, followed by individual results.

H1a: Oil companies experience a change in financial performance after certification.

The objective of this first hypothesis is to examine whether oil companies experience a change in financial performance before and after certification. Only the initial certification was considered. Tables 1 and 2 summarize the results for this first hypothesis.

209

210 **Table 1. Wilcoxon Signed Ranks Test Performed on Original Sample**

		N	Mean Rank	Sum of Ranks
POST-ROA –PRE-ROA	Negative Ranks	10 ^a	7.10	71.00
	Positive Ranks	13 ^b	15.77	205.00
	Ties	0 ^c		
	Total	23		

a. POST-ROA <PRE-ROA

b. POST-ROA >PRE-ROA

c. POST-ROA = PRE-ROA

211

212 **Table 2. Descriptive Statistics for Original Sample^a**

	POST-ROA - PRE-ROA
Z	-2.038 ^b
Asymptotic. Sig (2-tailed)	.042

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

213

214 Table 2 shows a significant relationship between pre- and post-certification ROA for the 23
 215 companies in the original sample, implying that certification has a significant impact on the oil
 216 companies' financial performance, as expressed in hypothesis (H1a). Table 1 shows that positive
 217 ranks (13) outnumber negative ranks (10), from which we theorize that financial performance
 218 improved for 13 companies after certification, but not for the remaining 10. In the latter case, it is
 219 assumed that the companies were certified but not identified as socially responsible by expert
 220 organizations. To verify this assumption, we divide our sample into two sub-samples (six certified
 221 companies recognized as socially responsible and 17 other certified companies) and perform the
 222 paired test. The following results were obtained for the next two hypotheses (H1b and H1c).

223

224 H1b: The financial performance of oil companies not classified as socially responsible before
 225 certification is different from their performance after certification.

226

Table 3. Wilcoxon Signed Ranks Test Performed on the First Sub-sample

		N	Mean Rank	Sum of Ranks
POST-ROA - PRE-ROA	Negative Ranks	10 ^a	6.30	63.00
	Positive Ranks	7 ^b	12.86	90.00
	Ties	0 ^c		
	Total	17		

a. POST-ROA <PRE-ROA

b. POST-ROA >PRE-ROA

c. POST-ROA = PRE-ROA

Table 4. Descriptive Statistics for the First Sub-sample^a

	POST-ROA –PRE-ROA
Z	-.639 ^b
Asymptotic. Sig (2-tailed)	.523

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks

Table 4 shows that there is no significant relationship between the pre- and post-certification ROAs for the 17 companies not included on the Corporate Knights list. In fact, statistical test significance was 52.3%, indicating no significant relationship between performance before and after certification of the companies in this sub-sample. Hypothesis (H1b) is therefore rejected. Negative ranks (10) exceed positive ranks (7) in table 3, therefore certification by a reputable agency does not necessarily improve the financial performance of oil companies that are not recognized as socially responsible. The statistical test does not allow us to state categorically that oil companies' financial performance suffers, but the previous findings indicate that certification combined with stakeholders' recognition of oil companies' social responsibility leads to improved financial performance. This assumption is the subject of our next hypothesis.

H1c: Oil companies recognized as socially responsible experience a change in financial performance after certification.

Table 6 shows a significant difference between the pre- and post-certification ROAs of the six socially responsible companies. We therefore infer that certification has a significant impact on financial performance, confirming hypothesis (H1c).

There were no significant differences (P -value = 52.3%) between certification and financial performance for certified firms not recognized as socially responsible. This finding corroborates the results of [2] and [5]. The relationship was, however, highly significant for certified companies recognized as socially responsible (P -value = 2.8%) as reflected in the ranks, all positive, obtained by the Wilcoxon test, shown in table 5. This leads us to believe that certification combined with good EP improves the financial performance of oil companies.

We performed paired tests to check for the existence of a significant relationship between financial performance before and after certification. These tests, however, do not explain the direction of the relationship. To determine the sign of this relationship, we performed parametric testing in the form of a regression of post-certification financial performance on pre-certification financial performance. An explanatory variable coefficient that is significant and greater than 1 would indicate that the companies' financial performance improved, whereas a positive coefficient less than 1 would indicate that financial performance significantly eroded. Note, however, that the regressions performed involve the original sample and the sub-sample of six certified companies recognized as socially responsible. There was no point in testing the sub-sample of certified companies without this recognition because the Wilcoxon non-parametric test failed to establish a significant relationship between their pre- and post-certification financial performance. The results are presented in tables 7 to 12.

Table 5. Wilcoxon Signed Ranks Test Performed on the Second Sub-sample

		N	Mean Rank	Sum of Ranks
POST-ROA – PRE-ROA	Negative Ranks	0 ^a	.00	.00
	Positive Ranks	6 ^b	3.50	21.00
	Ties	0 ^c		

Total	6
a. POST-ROA <PRE-ROA	
b. POST-ROA >PRE-ROA	
c. POST-ROA = PRE-ROA	

Table 6. Second Sub-sample Descriptive Statistics^a

POST-ROA – PRE-ROA	
Z	-2.201 ^b
Asymptotic. Sig (2-tailed)	.028
a. Wilcoxon Signed Ranks Test	
b. Based on negative ranks	

265

266 H2a: The financial performance of oil companies improves after certification.

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Table 7. Linear Regression Performed on Original Sample

Model	R	R Square	Adjusted R Square	Standard Error of the Estimate
1	.861 ^a	.741	.729	5.95701

a. Predictors : PRE-ROA

Table 8. AnovaTestPerformed on Original Sample^a

Model		Sum Of Squares	df	Mean Square	F	Sig.
1	Regression	2229.217	1	2229.217	62.820	.000 ^b
	Residuals	780.692	22	35.486		
	Total	3009.909	23			

a. Dependent variable: POST-ROA

b. Predictors: PRE-ROA

Table 9. Explanatory Variable Coefficient^{a, b}

Unstandardized Coefficients			Standardized Coefficients		
Model 1	B	Standard Error	R	t	Sig.
PRE-ROA	1.110	.140	.861	7.926	.000

268 a. Dependent variable: POST-ROA b. Linear Regression through the origin

269

Table 9 shows a highly significant and positive relationship between ROA values before and after certification. The coefficient of determination is 74.1%, i.e. a correlation coefficient of 86.1%, as shown in table 7, indicating a strong relationship between the two variables. As the regression coefficient is 1.11, hypothesis (H2a) is verified, i.e., oil companies achieve better financial performance following their certification. The Anova test presented in table 8 corroborates the robustness of the relationship between the two variables ($P\text{-value} = 0.000$). (H2b) is now examined using the same tests for the six socially responsible companies.

H2b: Certified oil companies recognized as socially responsible achieve better financial performance.

Although the sub-sample is too small, we performed a linear regression similar to the test performed on the original sample in order to compare the two explanatory variables' coefficients. Another regression was then performed for illustration purposes². The aim was to measure the coefficient of explanation for both the original sample and the sub-sample of certified companies recognized as socially responsible.

Table 10. Linear Regression Performed on Second Sub-sample

Model	R	R Square	Adjusted R Square	Standard Error of the Estimate
1	.993 ^a	.985	.982	1.60824

a. Predictors: PRE-ROA

Table 11. Anova Test of Second Sub-sample^a

Model		Sum Of Squares	df	Mean	F	Sig.
1	Regression	858.481	1	858.481	331.916	.000 ^b
	Residuals	12.932	5	2.586		
	Total	871.413	6			

a. Dependent variable: POST-ROA

b. Predictors : PRE-ROA

Table 12. Explanatory Variable Coefficient^{a, b}

Model 1	Unstandardized Coefficients		Standardized Coefficients		
	B	Standard Error	R	t	Sig
PRE-ROA	1.539	.084	.993	18.219	.000

a. Dependent variable: POST-ROA

b. Linear Regression through the origin

²A Spearman non-parametric test was run to corroborate the linear regression result. The test performed on the six companies identified as socially responsible results approximately in a correlation level of about 89% between pre- and post-certification ROA. This level is higher than the same coefficient obtained for the original sample (about 64%). Therefore, the relationship is more robust for the socially responsible companies, which corroborates the results obtained with the parametric statistical tests. We can therefore affirm that FP is higher for the socially responsible companies. The Spearman test outputs are given in Appendix A.

Results presented in tables 10 and 11 show a correlation between pre- and post-certification FP, indicating a positive and significant relationship between financial performance results before and after certification of the companies recognized as socially responsible. The coefficient of determination was 98.5%, as shown in table 12, showing a strong relationship between the two variables. Conversely, the coefficient of the regression is about 1.54, a better result than that obtained for certified companies not recognized as socially responsible (beta = 1.11). Hypothesis (H2b) is thus verified, i.e., certified companies with social responsibility recognition achieve better performance. Table 13 summarizes the results of our analysis.

Table 13. Study Results

Assumptions	Results	
H_{1a}	Certification has a significant impact on the financial performance of oil companies.	300
H_{1b}	There is no difference in the pre- and post-certification financial performance of certified companies without social responsibility recognition.	302
H_{1c}	Certification has a significant impact on the financial performance of oil companies recognized as socially responsible.	306
H_{2a}	Oil companies enjoy better financial performance when they are	307
H_{2b}	Certified oil companies enjoy better financial performance when they are recognized as being socially responsible.	309

H_{1a} and **H_{2a}**: All certified companies in the study.

H_{1c} and **H_{2b}**: Certified companies recognized as socially responsible.

H_{1b}: Certified companies not recognized as socially responsible.

5. CONCLUSION

In this paper, our goal was to analyze the relationship between the environmental and financial performance dimensions of social responsibility in the Canadian oil industry. We used certification as a measure of environmental and social responsibility levels. Our research question was whether a relationship exists between environmental and financial performance. To answer this question, we considered ROA as a measure of changes in our dependent variable. We used the date of the company's first certification to measure environmental and social performance. Our study involved a sample of 23 companies operating in the Canadian oil industry and covered a period of five years before and after the first certification date.

The results show that certification has a significant impact on the financial performance of oil companies (*P-value* = 0.042). We also established that certification could improve financial performance, as demonstrated by the higher number of positive ranks (13) vs. negative ranks (10) obtained by the Wilcoxon test. We concluded that financial performance improved for 13 companies and weakened for the remaining 10.

However, after dividing our initial sample into two sub-groups consisting of six certified companies identified as socially responsible by Corporate Knights magazine and 17 certified companies without that designation, we obtained compelling results establishing the significant effect of certification when combined with recognition of environmental and social responsibility. We then proved that the relationship was positive over time in the Canadian oil industry (*P-value* = 0.000).

Research Contributions

Prior empirical studies that investigated the certification aspect showed only a relationship between this variable and consumer response [2]. Few studies have stressed the relationship between certification and financial performance ([2]; [5]), hence the relevance of our analysis.

The second contribution of our research was the use of certification as a measure of the environmental performance of companies in the Canadian oil industry. To our knowledge, very few studies have used this evaluation tool. We were thus able to establish a link between the EP and FP of these companies.

Limitations of the Research

Our study has some limitations. First, our sample was composed of only 23 certified companies in the Canadian oil industry, with no confounding events. A wider sample of companies should be used in subsequent studies to generalize the results.

Another limitation may have been the use of company certification as the sole measure of environmental performance. No single certification criterion can encompass all the dimensions of environmental performance. Future studies should address the issue more comprehensively by using an appropriate multidimensional performance assessment measure.

Research Avenues

Future researchers might be interested in analyzing other industries such as mining, pharmaceuticals, etc., to examine the link between certification and financial performance.

It might also be useful explore this dimension even further by trying to determine what types of certification have greater impact on companies' financial performance.

Appendix A

Table A.1 Test of Correlation Performed on Original Sample

			PRE-ROA	POST-ROA
Spearman Rho	PRE-ROA	Coefficient of correlation	1.000	.638**
		Sig. (bilateral)	.	.001
		N	23	23
	POST-ROA	Coefficient of correlation	.638**	1.000
		Sig. (bilateral)	.001	.
		N	23	23

** . The correlation is significant at a level of 0.01 (bilateral).

Table A.2 Test of Correlation Performed on Socially Responsible Companies

			PRE-ROA	POST-ROA
Spearman Rho	PRE-ROA	Coefficient of correlation	1.000	.886*
		Sig. (bilateral)	.	.019
		N	6	6
	POST-ROA	Coefficient of correlation	.886*	1.000
		Sig. (bilateral)	.019	.
		N	6	6

*. The correlation is significant at a level of 0.05 (bilateral).

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