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How Does the Market Value Corporate Sustainability Performance?

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Abstract This study provides empirical evidence on how corporate sustainability performance (CSP), as proxied by membership of the Dow Jones sustainability index, is reflected in the market value of equity. Using a theoretical framework combining institutional perspectives, stakeholder theory, and resource-based perspectives, we develop a set of hypotheses that relate the market value of equity to CSP. For a sample of North American firms, our preliminary results show that CSP has significant explanatory power for stock prices over the traditional summary accounting measures such as earnings and book value of equity. However, further analyses suggest that we should not focus on corporate sustainability itself. Our findings suggest that what investors really do is to penalize large profitable firms with low level of CSP. Firms with incentives to develop a high level of CSP not engaging on such strategy are, thus, penalized by the market.

Keywords Corporate sustainability · Value relevance · Canada · USA

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Introduction

The concept of sustainable development integrates the consideration of economic growth, environmental protection, and social equity, simultaneously and on a macro-level (Figge and Hahn 2004). When incorporated by the firm, it is called corporate sustainability (CS) (ibid.). Although other concepts have been proposed over the years to conceptualize business and society relations, such as corporate social responsibility (CSR), CS has become the concept used most widely to address these relationships. Even though some authors propose distinctions between CSR and CS (Cheung 2011; Lo and Sheu 2007; López et al. 2007), widely acknowledged definitions and analyses of CSR relate it with sustainable development (Holme and Watts 2000; European Commission 2002). Thus, in this article, these concepts are considered to address the same basic issues, in the sense that they all are about companies' impacts on, relationships with, and responsibilities to, society.

Engaging in activities to contribute to sustainable development has emerged as an important dimension of corporate voluntary practice (Lacy et al. 2010). Corporate sustainability performance (CSP) measures the extent to which a firm embraces economic, environmental, social, and governance factors into its operations, and ultimately the impact they exert on the firm and society (Artiach et al. 2010). Engagement in activities promoting sustainable development is increasingly analyzed as a source of competitive advantage for the firm (Porter and Kramer 2006).

An important stream of research analyses whether firms which are perceived as sustainable out-perform or under-perform firms which are not perceived in the same way. Some mixed results can be found. Surveys of the numerous studies about the relationship between CS and corporate

financial performance (CFP) that have been undertaken abound. Findings of the majority of them indicate no clear tendency (Ullman 1985; Aupperle et al. 1985; Pava and Krausz 1996; Wood and Jones 1995) or a positive but weak correlation between the two (Margolis and Walsh 2003; Orlitzky et al. 2003; Roman et al. 1999). Recent research still provides mixed results: there is evidence both of a negative relation (López et al. 2007), no relation (Curran and Moran 2007; Garcia-Castro et al. 2010; Surroca et al. 2010), and a positive relation (Doh et al. 2010; Lo and Sheu 2007; Consolandi et al. 2009; Cheung 2011; Robinson et al. 2011; Wagner 2010) between the two.

In spite of mixed results of individual studies, a consistent conclusion emerges when we take them in aggregate: market forces generally do not penalize—and are more likely to reward—companies with high levels of CSP (Doh et al. 2010). Departing from this conclusion, the purpose of this study is to extend research by analyzing whether the market penalizes companies with lower levels of CSP and whether firm's characteristics like size and profitability interact with such penalizations.

This study contributes to the extant literature on this issue by investigating how the market views CSP, as proxied by membership of the Dow Jones sustainability index. Using a multi-theoretical framework which combines institutional perspectives, stakeholder theory, and resource-based perspectives (RBP), a set of hypotheses are developed that relate the market value of equity with CSP, considering the interaction of size and profitability with CSP. In this study, companies are considered to engage in CS activities to conform to stakeholder norms and expectations because they expect that having good relations with them may lead to increased financial returns by assisting in developing and maintaining valuable intangible assets.

The empirical analysis relies on the largest 600 firms from Canada and the United States of America in the Dow Jones global total stock market index (DJGTSM), which includes two sets of firms, those that belong to the Dow Jones sustainability United States index (DJSI) North America (higher level of CSP) and those that belong to the DJGTSM but are not included in the DJSI North America (lower level of CSP).

Given that national institutional contexts are relevant when assessing the stock market value relevance of financial and non-financial performance measures (Cormier and Magnan 2007), our study focuses on companies from Canada and the USA mainly in order to obtain a large sample that is homogeneous as to the institutional setting.

Our preliminary results indicate that CSP has significant explanatory power for stock prices over the traditional summary accounting measures such as earnings and book value of equity. However, further analyses suggest that we should not focus on the CS itself. Our findings show that what investors really do is to penalize large profitable firms with low level of CSP, which face greater public scrutiny and pressures from stakeholders.

This study contributes to the literature in several ways. First, we bring additional evidence on the value relevance of non-financial information. Some previous studies have already found a significant relation between the market value of equity and non-financial information, like network advantages (Rajgopal et al. 2003), environmental performance (Hassel et al. 2005), eco-efficiency (Sinkin et al. 2008), or technological conditions (Matolcsy and Wyatt 2008). We extend these conclusions to the issue of CSP. Second, we provide additional evidence on the relationship between CSP and firms' financial performance. This article reports evidence of a positive relation between CSP and firm performance. Finally, we contribute with new empirical evidence supporting that firms with incentives to develop a high level of CSP not engaging on such strategy are penalized by the market. Artiach et al. (2010) have already demonstrated that size and profitability are incentives to invest in sustainability. We also find that size and profitability are issues that matter in terms of CSP. In addition, our results suggest that the information on the relation between size, profitability, and level of CSP is relevant for investors.

The remainder of the article is organized as follows. Section 2 develops the theoretical framework of this study. Section 3 describes the research design and Sect. 4 presents the empirical results. Finally, Sect. 5 discusses the findings and offers conclusions and implications for future research.

Theory and Hypotheses Development

The theoretical framework adopted in this study combines institutional perspectives, stakeholder theory, and RBP. Some authors already provided important studies in which similar combinations were attempted (see, for example, Bansal 2005; Hillman and Keim 2001; Ruf et al. 2001; Surroca et al. 2010).

Institutional perspectives have been used as a lens through which to explore CS (Doh and Guay 2006; Doh et al. 2010; Campbell 2007). Institutional theory predicts that firms adopt specific behaviors to obtain access to resources and support by critical stakeholders (Doh et al. 2010). The analytical focus of institutional perspectives is on social legitimacy, which refers to the acceptance of the firm by its social environment, by its external constituents. Failure to conform to critical, institutionalized norms of acceptability can threaten its legitimacy, resources, and, ultimately survival. This perspective suggests that firms will respond strategically to institutional norms and to changes in their social environment to gain or maintain

legitimacy because they recognize that conforming will result in improved access to resources (Suchman 1995; Bansal 2005).

Stakeholder theory can be though as focusing the institutional perspective. Because the social environment within which firms operate is constituted by stakeholders, legitimacy depends on meeting their expectations. A firm builds legitimacy by conforming to stakeholder expectations (Bansal and Bogner 2002). Post et al. (2002, p. 8) define the stakeholders of a company as the "individuals and constituencies that contribute, either voluntarily or involuntarily, to its wealth-creating capacity and activities, and who are therefore its potential beneficiaries and/or risk bearers." CSP can be assessed in terms of a company meeting the demands of its multiple stakeholder groups (Ruf et al. 2001).

Stakeholder theory can be also complemented by the RBP since firms may view meeting stakeholder demands as a strategic investment, requiring commitments beyond the minimum necessary to satisfy stakeholders (Ruf et al. 2001). Engaging in CS activities when these are expected to benefit the company is a behavior that can be examined through the lens of the RBP (Branco and Rodrigues 2006; Gallego-Álvarez et al. 2010; Hussainey and Salama 2010; McWilliams et al. 2006; Siegel 2009; Surroca et al. 2010). The RBP suggest that companies generate sustainable competitive advantages by effectively controlling and manipulating their resources that are valuable, rare, cannot be perfectly imitated, and for which no perfect substitute is available (see, for example, Barney 1999; Bowman and Ambrosini 2003; Kraaijenbrink et al. 2010; Pertusa-Ortega et al. 2010).

Companies engage in CS because it is acknowledged that some kind of competitive advantage accrues to them. CS is seen as providing internal or external benefits, or both (Branco and Rodrigues 2006; Orlitzky et al. 2003). Investments in socially and environmentally responsible activities have internal benefits by helping a company in developing new resources and capabilities which are related to know-how and corporate culture. These investments have important consequences on the creation or depletion of fundamental intangible resources, namely those associated with employees. CS can be demonstrated to have positive effects on employees' motivation and morale, as well as on their commitment and loyalty to the company (Brammer et al. 2007). As well as productivity benefits, companies also save on costs for recruitment and training of new employees (Vitaliano 2010).

The external benefits of CS are related to its effect on corporate reputation (Branco and Rodrigues 2006; Gallego-Álvarez et al. 2010; Hussainey and Salama 2010; Orlitzky et al. 2003; Orlitzky 2008). Corporate reputation has been identified as one of the most important intangible resources that provide a firm sustainable competitive advantage (Roberts and Dowling 2002). Companies with a good CS reputation are able to improve relations with external actors such as customers, investors, bankers, suppliers, and competitors. They also attract better employees or increase current employees' motivation and morale as well as their commitment and loyalty to the company, which in turn may improve financial outcomes. Stakeholders ultimately control a firm's access to scarce resources and firms must manage their relationship with key stakeholders to insure that such access to resources is maintained (Roberts 1992).

In sum, CS can raise benefits in the long run namely through improved relations with stakeholders and reduced cost of conflicts with them, reputation creation, and employee productivity. All these aspects make firms more attractive to investors. Higher levels of CSP are subject to lower economic uncertainty, more predictable earnings, and lower risk for investors. In addition, **t**he degree of institutionalization reached by CS practices, such as ISO 14001 certification or sustainability reporting, has made these practices necessary requirements for entering the markets. Companies that do not conform to these practices are likely to be penalized. Thus, we expect that:

H1 The market penalizes firms with a lower level of CSP, when compared with firms with a higher level of CSP.

As companies grow larger their visibility increases and they become more susceptible to the scrutiny of their stakeholders and hence more vulnerable to the potential adverse reactions of these groups. Large companies, on average, are more diversified across geographical and product markets which means that they have larger and more diverse stakeholder groups (Brammer and Pavelin 2004).

Larger firms are more visible politically and so draw greater attention from the general public, government, and other stakeholders. They are more likely to create corresponding larger social problems because of the sheer scale and prominence of their activities. Thus, a passive or even negative response to stakeholder's demands is unlikely to be a successful strategy for big firms which face greater public scrutiny and external pressures (Artiach et al. 2010). Size may also be considered as an indicator for the capacity of a firm to engage in environmental and social activities, which lead to fixed costs that are less important for larger companies (Ziegler and Schröder 2010).

Godfrey et al. (2009, p. 430) suggest that firms with a larger market presence incur more risk than their smaller counterparts. They argue that a larger market presence translates into more transactions, which lead to a higher probability of negative events ("there are simply more opportunities for negative outcomes") (ibid.). The consequence is that larger firms should be more willing to

engage in socially and environmentally responsible activities to cover this increased risk than smaller firms.

The literature on the determinants of CSP provide empirical evidence on a positive relationship between firm's size and CSP (e.g., Artiach et al. 2010; Ziegler and Schröder 2010; Chih et al. 2010). Thus, we expect that:

H2 The market penalization of firms with a lower level of CSP is higher for larger firms, when compared with smaller firms.

Waddock and Graves (1997) studied the link between firms' social and financial performance, hypothesizing that social performance is both a predictor and consequence of financial performance. They concluded that corporate social performance depends on financial performance and that the sign of the relationship is positive. These findings were interpreted as meaning that firms with slack resources potentially available from strong financial performance may have greater freedom to invest in socially and environmentally responsible activities, and that those investments may result in improved social performance.

Artiach et al. (2010) also demonstrate that profitable firms are more likely to have a higher level of CSP. The managers of non-profitable firms are asked to reduce costs and maximize economic returns to financial stakeholders, instead of meeting social stakeholder's demands through expenditure on sustainable activities. In periods of low economic performance, the companies' economic objectives will be given more attention than social concerns (Ullman 1985).

On the other hand, companies which present abnormally high levels of profits are just as exposed to pressures from stakeholders as those of abnormally large companies or those that operate in socially sensitive industries (Branco and Rodrigues 2008). Public visibility may be related to high profits, with the more successful companies coming under more intense stakeholder scrutiny (ibid.). It follows that:

H3 The market penalization of firms with a lower level of CSP is also higher for profitable firms when compared with non-profitable firms.

Research Design

Sample and Data

The empirical analysis relies on the largest 600 firms from Canada and the United States of America in the Dow Jones Global Total Stock Market Index (DJGTSM) at the end of 2010. We started by looking for all the firms with data available every year for the four-year period 2007–2010. We exclude firms with negative book value at least in one of the 4 years.

Second, we classified the firms into two groups, those included in the DJSI in all the 4 years of the sample and those firms never included in the DJSI during the entire period of the sample, thereby representing an ongoing lack of investment in CSP.[1] This classification gives rise to the most important independent variable for our study, a proxy for the level of CSP.

Firms included in the DJSI North America consist of the top 20% of the 600 largest firms from Canada and the United States in the DJGTSM that lead the field in terms of sustainability (DJSI guidebook, 2010).[2] Firm's sustainability is evaluated by the sustainable asset management (SAM) group. The SAM's methodology is based on the application of criteria to assess the opportunities and risks deriving from economic, environmental and social dimensions for each of the eligible firms (DJSI guidebook, 2010). The integrity of the DJSI as a proxy for CSP is highlighted by some authors, who recommend the SAM Group research as the best practice in CS research (Artiach et al. 2010). An increasing number of studies on the relation between CSP and firm performance considers DJSI as a proxy for CSP (Lo and Sheu 2007; López et al. 2007; Consolandi et al. 2009; Cheung 2011; Robinson et al. 2011; Ziegler and Schröder 2010).

The accounting and market data were collected from the Thompson Worldscope Database. To insure that regression results are not influenced by outlying observations, the top and bottom 1% of each main variable's distribution have been excluded from the sample. This approach is in accordance with some other value relevance studies.[3] The final sample is an unbalanced panel composed by 241 firms-year observations for the 63 firms included in the DJSI during the 4 years of the sample and 1,356 firms-year observations for the 355 firms never included in the DJSI during the entire period of the sample.

Table 1 presents the sample distribution across industries. When all the observations are considered together, the industrial sector is the most representative with 36% of the sample. The smallest representations, with around 10%, are the mining, the commercial and the services industries. As expected, both DJSI and Non_DJSI firms are found in each industry and the latter dominates in all cases. The proportion of DJSI firms-year observations from each

[1] Firms which are persistently included in the DJSI have a more substantial financial and strategic investments in CSP than firms that are only occasionally included. Following Artiach et al. (2010), the latest firms were thus excluded from the sample.

[2] The DJSI Guidebook is available at http://www.sustainability-index.com.

[3] See Curto et al. (2011) where the impact of influential observations on regression results is discussed.

Table 1 Sample composition by industry

Industry	SIC code	DJSI firms-year obs.		Non_DJSI firms-year obs.		All firms-year obs.	
		n	%	*n*	%	*n*	%
Mining	SIC 1	23	5	124	9	136	9
Industrial	SIC 2 and 3	117	49	452	33	569	36
Utilities	SIC 4	34	14	184	14	218	14
Commercial	SIC 5	32	13	128	9	160	10
Financial	SIC 6	21	9	323	24	344	22
Services	SIC 7 and 8	25	10	145	11	170	11
		241	100	1356	100	1597	100

DJSI firms are those included in the DJSI every year for the sample period 2007–2010; *Non_DJSI* firms are those who have never been included in the DJSI during the sample period 2007–2010

industry is between 15 and 20%, except for the financial industry where this percentage is somewhat lower.

Research Method

To test the hypotheses formulated in Sect. 3, we estimate several regressions based on the same model, which relies on the accounting based valuation model developed in Ohlson (1995), who shows how the firm value relates to accounting data and other information. This approach is currently used in empirical studies on the value relevance of non-financial information (e.g., Rajgopal et al. 2003; Hassel et al. 2005; Matolcsy and Wyatt 2008; Johnston et al. 2008; Sinkin et al. 2008; Schadewitz and Niskala 2010). Our primary model shows that the market value of equity is a linear function of two summary measures of information reflected in financial statements, namely the book value of equity and earnings, given by the Eq. 1.

$$MV_{it} = \alpha_0 + \alpha_1 BV_{it} + \alpha_2 NI_{it} + \varepsilon_{it} \quad (1)$$

where *MV* is the market value of equity,[4] *BV* represents the book value of equity, and *NI* is the net operating income. All the variables are on a per share basis.

The Association of Market Value of Equity with CSP

In order to access whether the market penalizes firms with a lower level of CSP, when compared to firms with a higher level of CSP, we use a new regression equation, Eq. 2, which comprises the variable *Non_DJSI*, which assumes the value 1 if the firm is not included in the DJSI North America and 0 otherwise. If the market penalizes firms with a lower level of CSP, we would expect the estimated coefficient on *Non_DJSI*, α_3, to be negative and statistically significant.

$$MV_{it} = \alpha_0 + \alpha_1 BV_{it} + \alpha_2 NI_{it} + \alpha_3 Non\_DJSI_{it} + \varepsilon_{it} \quad (2)$$

The Association of Market Value of Equity with CSP: Effect of Size

In order to access whether the market penalization of firms with a lower level of CSP is higher for larger firms when compared with smaller firms, we use a new regression equation, Eq. 3, which comprises two binary variables splitting the *Non_DJSI* in two groups based on the firm's size (*Non_DJSI_Big* and *Non_DJSI_Small*). The variable *Non_DJSI_Big* assumes the value 1 if the firm has a lower level of CSP and its *SIZE* is above the median[5] and 0 otherwise. The variable *Non_DJSI_Small* assumes the value 1 if the firm has a lower level of CSP and its *SIZE* is below the median and 0 otherwise.

If the market penalization of larger firms is higher, when compared with smaller firms, we would expect the estimated coefficients on *Non_DJSI_Big*, α_3, and on *Non_DJSI_Small*, α_4, to be negative and statistically significant and the absolute value of the former to be statistically higher than the latter. If on the other hand the market does not distinguish groups of firms with a lower level of CSP based on size, then we would expect that $\alpha_3 = \alpha_4$. An alternative situation is also possible whereby the market penalizes only those firms with incentives to present a higher level of CSP but that do not engage on such strategy, i.e., the larger firms not included in the DJSI North America. In this case, we would expect the estimated coefficient on *Non_DJSI_Big*, α_3, to be negative and statistically significant and the estimated coefficient on *Non_DJSI_Small*, α_4, to be statistically insignificant.

$$MV_{it} = \alpha_0 + \alpha_1 BV_{it} + \alpha_2 NI_{it} + \alpha_3 Non\_DJSI\_Big_{it} + \alpha_4 Non\_DJSI\_Small_{it} + \varepsilon_{it} \quad (3)$$

[4] We use the market value of equity as of fiscal year-end. However, untabulated findings reveal that our inferences are not sensitive to using prices as of fiscal year-end or as of 3 months after fiscal year-end.

[5] The median is computed based on the mean value of each firm in the four considered years.

The Association of Market Value of Equity with CSP: Effect of Size and Profitability

In order to access whether the market penalization of firms with a lower level of CSP is also higher for profitable firms when compared with non-profitable ones, we use a new regression equation, Eq. 4, which comprises two binary variables splitting the *Non_DJSI_Big* (*Non_DJSI_Small*) in two groups based on the firm's profitability, namely the *Non_DJSI_Big_Profit* and the *Non_DJSI_Big_Loss* (*Non_DJSI_Small_Profit* and *Non_DJSI_Small_Loss*). The variable *Non_DJSI_Big_Profit* (*Non_DJSI_Small_Profit*) assumes the value 1 if the firm has a lower level of CSP, its *SIZE* is above (below) the median and its ROE is positive and 0 otherwise. The variable *Non_DJSI_Big_Loss* (*Non_DJSI_Small_Loss*) assumes the value 1 if the firm has a lower level of CSP, its *SIZE* is above (below) the median and its *ROE* is negative and 0 otherwise.

If the market penalization of profitable firms is higher, when compared with non-profitable ones, we would expect the estimated coefficients on *Non_DJSI_Big_Profit* (*Non_DJSI_Small_Profit*), $\alpha_3(\alpha_5)$, and on *Non_DJSI_Big_Loss* (*Non_DJSI_Small_Loss*), $\alpha_4(\alpha_6)$, to be negative and statistically significant and the absolute value of the former to be statistically higher than the latter. If on the other hand the market does not distinguish groups of Big (Small) firms with a lower level of CSP based on profitability, then we would expect that $\alpha_3 = \alpha_4(\alpha_5 = \alpha_6)$. An alternative situation is also possible whereby the market penalizes only those firms with economic incentives to present a higher level of CSP but that do not engage on such strategy, i.e., the larger and profitable firms not included in the DJSI North America. In this case, we would expect the estimated coefficient on *Non_DJSI_Big_Profit*, α_3, to be negative and statistically significant and the other estimated coefficients, α_4, α_5,α_4, and α_6, to be statistically insignificant.

$$\begin{aligned} MV_{it} = {} & \alpha_0 + \alpha_1 BV_{it} + \alpha_2 NI_{it} + \alpha_3 Non\_DJSI\_Big\_Profit_{it} \\ & + \alpha_4 Non\_DJSI\_Big\_Loss_{it} \\ & + \alpha_5 Non\_DJSI\_Small\_Profit_{it} \\ & + \alpha_6 Non\_DJSI\_Small\_Loss_{it} + \varepsilon_{it} \end{aligned} \quad (4)$$

Finally, following previous literature on the value relevance of financial and non-financial information, additional variables are used in this study to control for profitability, leverage, size, cash-flows, market risk, international listing, and industry. Thus, Eqs. 2–4 are estimated including the following control variables: *ROE*, *LEV*, *SIZE*, *CF*, *RISK*, *LIST*, and Industry. *ROE* is the return on equity, *LEV* is end-of-year total debt divided by end-of-year market capitalization, *SIZE* is the logarithm of total assets as of the end of the year, *CF* is net cash-flow from operating activities scaled by end-of-year total assets, *RISK* is Beta as reported by WorldScope, and *LIST* is a dummy variable that assumes the value 1 if the firm is listed in a foreign stock exchange and 0 otherwise. There are six dummies for industry: the *Mining* dummy which assumes the value 1 in the case of SIC 1 and 0 otherwise, the *Industrial* dummy which assumes the value 1 in cases of SIC 2 or 3 and 0 otherwise, the *Utilities* dummy which assumes the value 1 in the case of SIC 4 and 0 otherwise, the *Commercial* dummy which assumes the value 1 in case of SIC 5 and 0 otherwise, the *Financial* dummy which assumes the value 1 in cases of SIC 6 and 0 otherwise and, finally, the *Services* dummy which assumes 1 in cases of SIC 7 or 8 and 0 otherwise.

As our sample data is an unbalanced panel with 418 firms and 4 years of observations, empirical research is based on statistical techniques to estimate panel data regression models. As several variables do not vary within the firms in the four considered years, specially the dummy variables, they should be dropped from the model if fixed effects regression was conducted. However, as these variables are very important for testing the research hypotheses formulated before, fixed effects regression has been discarded. Due to this, and in order to check which one, pooled (where no panel effects exist) or random effects regression, is statistically more appropriate to describe the relationship between the dependent and the explanatory variables included in the regression models, the Breusch–Pagan test was computed.

Results

Descriptive Statistics and Correlations

Table 2 presents the descriptive statistics for the entire sample as well as for the sub-samples of 241 DJSI firms-year observations and 1,356 Non_DJSI firms-year observations. When comparing these two groups of observations, we find that for all the variables, except for *LEV* and *RISK*, the mean and the median values are higher for the DJSI firms. Untabulated results for the equality of means parametric *t* test show that the mean values are statistically different for the variables *MV*, *NI*, *ROE*, *SIZE*, *CF*, and *RISK*. These findings are consistent with those of Artiach et al. (2010) in their study on the determinants of CSP. They found that leading CSP firms are significantly larger and have a higher return on equity than non-leading CSP firms.

Table 3 shows Pearson correlations for the continuous variables included in the regressions. Consistent with established results in the accounting literature, the market value of equity is positively and significantly associated with *BV* and *NI*. Not surprisingly, the correlation between

Table 2 Descriptive statistics

	Mean	Median	SD	Min	Max	Skewness	Kurtosis
All firm-year obs. ($n = 1{,}597$)							
MV	37.460	34.540	21.024	1.290	103.050	0.717	0.061
BV	17.141	14.402	11.109	0.265	55.605	0.984	0.543
NI	1.954	1.932	2.329	−8.317	9.900	−0.408	2.802
ROE	0.132	0.134	0.325	−8.824	2.545	−13.154	368.412
LEV	0.770	0.276	2.896	0.000	71.780	16.201	327.701
SIZE	16.579	16.452	1.305	13.967	21.541	0.715	0.651
CF	0.104	0.094	0.074	−0.122	0.430	0.701	1.060
RISK	1.250	1.100	0.704	0.090	4.110	1.300	2.198
DJSI firm-year obs. ($n = 241$)							
MV	43.842	41.450	22.062	2.980	98.370	0.392	−0.686
BV	17.746	15.332	11.878	1.813	55.605	1.262	0.312
NI	2.707	2.580	2.259	−8.236	9.477	−0.326	3.168
ROE	0.177	0.171	0.226	−1.704	0.916	−2.992	25.301
LEV	0.541	0.199	1.581	0.000	18.693	8.133	79.935
SIZE	17.210	17.135	1.147	15.346	21.342	0.830	0.942
CF	0.121	0.116	0.070	−0.082	0.301	0.189	0.095
RISK	1.092	0.980	0.621	0.300	3.610	1.533	3.203
Non_DJSI firm-year obs. ($n = 1356$)							
MV	36.326	33.625	20.636	1.290	103.050	0.781	0.321
BV	17.034	14.187	10.968	0.265	54.932	0.917	0.322
NI	1.820	1.851	2.316	−8.317	9.900	−0.432	2.854
ROE	0.124	0.126	0.339	−8.825	2.545	−13.459	364.575
LEV	0.810	0.297	3.070	0.000	71.780	15.797	303.844
SIZE	16.467	16.335	1.300	13.967	21.541	0.790	0.781
CF	0.100	0.090	0.075	−0.122	0.430	0.802	1.326
RISK	1.278	1.140	0.714	0.090	4.110	1.262	2.071

DJSI firms are those included in the DJSI every year for the sample period 2007–2010, *Non_DJSI* firms are those who have never been included in the DJSI during the sample period 2007–2010, *MV* is the market price at the fiscal year-end, *BV* is the book value of equity as of the end of the year, *NI* is the net income of the year, *ROE* is the return on equity, *LEV* is end-of-year total debt divided by end-of-year market capitalization, *SIZE* is the natural logarithm of total assets as of the end of the year, *CF* is net cash-flow from operating activities scaled by end-of-year total assets, *RISK* is Beta as reported by WorldScope

market value and *ROE*, *LEV*, *SIZE*, *CF*, and *RISK* is also statistically significant. The signs of the correlation coefficients are largely consistent with findings in prior research.

Regression Results

Based on Breusch–Pagan test results (see Table 4), the pooled regression hypothesis was always rejected in favor of the random effects regression. Thus, we run random effects regressions[6] to establish the relationship between the dependent and the explanatory variables.

[6] STATA 10 has been used to compute the Breusch-Pagan test and to estimate the random effects models.

The Association of Market Value of Equity with CSP

Table 5 presents summary statistics resulting from the estimation of the Eq. 2, including the estimated coefficients for the control variables. The regression in column C1 includes all the covariates. Columns C2 and C3 drop from C1 the variable *Non_DJSI* and the control variables, respectively, in order to check if there are interaction effects within different sets of explanatory variables. The estimate for the coefficient of the variable *Non_DJSI* is negative and statistically significant (−4.157; p value = 0.020), which means that firms not included in the DJSI North America are associated with a lower average market price, after considering the competing variables included in the regressions.

The estimates for the accounting information are statistically significant and they have the expected sign. For

Table 3 Correlation matrix

	MV	*BV*	*NI*	*ROE*	*LEV*	*SIZE*	*CF*	*RISK*
MV	1	–	–	–	–	–	–	–
BV	0.470***	1	–	–	–	–	–	–
NI	0.605***	0.383***	1	–	–	–	–	–
ROE	0.191***	−0.083***	0.435***	1	–	–	–	–
LEV	−0.186***	−0.004	−0.162***	−0.099***	1	–	–	–
SIZE	0.062**	0.395***	0.116***	−0.052**	0.187***	1	–	–
CF	0.197***	−0.289***	0.237***	0.311***	−0.223***	−0.435***	1	–
RISK	−0.195***	0.036	−0.230***	−0.200***	0.186***	0.007	−0.250***	1

MV is the market price at the fiscal year-end, *BV* is the book value of equity as of the end of the year, *NI* is the net income of the year, *ROE* is the return on equity, *LEV* is end-of-year total debt divided by end-of-year market capitalization, *SIZE* is the logarithm of total assets as of the end of the year, *CF* is net cash-flow from operating activities scaled by end-of-year total assets, *RISK* is Beta as reported by WorldScope

Table 4 Breusch–Pagan LM test results

	Test value	Sig.
Equation 2	400.00	0.000
Equation 3	394.95	0.000
Equation 4	382.90	0.000

The Breusch–Pagan Lagrange Multiplier test is used to test the pooled regression against the random effects regression. If the null hypothesis is rejected, the random effects regression is more appropriate than the pooled regression (Baltagi 2001)

example, in the main regression, the *BV* and *NI* coefficients are 0.773 and 2.587, respectively, and the *p* value associated to the individual *t* tests is <0.01 in both cases. The majority of the control variables are also statistically significant and their sign is in accordance with the literature. For example, firms with larger cash-flows from operations are associated with a higher market price, while high leverage firms are associated with a lower market price. Contrary to the literature, the estimate for the variable *SIZE* is statistically significant but with a negative sign. Further analysis shows that the estimated coefficient associated with this variable is statistically significant but only when the variable *Non_DJSI* is also included in the regression (in C2, the *SIZE* is not statistically significant), which means that the relation between *SIZE* and *MV* is only observable for one of the groups of firms based on the sustainability criteria. The next section provides more detailed information on this issue.

The Association of Market Value of Equity with CSP: Effect of Size

Table 6 presents summary statistics resulting from the estimation of the Eq. 3. The coefficient estimate for the variable *Non_DJSI_Big* is negative and statistically significant (−5.060; p value < 0.01), while the coefficient estimate for *Non_DJSI_Small* is not statistically significant. These results show that the market does not penalize all the firms with a lower level of CSP. On the contrary, the market penalizes only those firms with incentives to present a high level of CSP (large firms) but that do not engage on such strategy, i.e., the group of the larger firms not included in the DJSI North America.

The Association of Market Value of Equity with CSP: Effect of Size and Profitability

Table 7 presents summary statistics resulting from the estimation of Eq. 4. The coefficient estimate for the variable *Non_DJSI_Big_Profit* is negative and statistically significant (−5.119; p value < 0.01), while the coefficient estimates for *Non_DJSI_Big_Loss*, *Non_DJSI_Small_Profit*, and *Non_DJSI_Small_Loss* are all statistically not significant. These results show that in average the market does not penalize all the larger firms with a lower level of CSP, but only those that are profitable. Thus, the market distinguishes groups of firms with a lower level of CSP based not only on size but also on profitability.

Overall, our findings seem to suggest that size and profitability matter in terms of CSP. The information on the relation between size and profitability and the level of CSP is value relevant for the market.

Discussion and Concluding Comments

This study provides valuable new insights that help to clarify the findings of recent studies on the relationship between CSP and CFP. Some studies, such as Curran and Moran (2007), Consolandi et al. (2009), Cheung (2011), Doh et al. (2010), and Robinson et al. (2011) test whether inclusion in, or deletion from, sustainability indexes (such as the FTSE4Good UK 50 Index, the Dow Jones Sustainability Stoxx Index, the Dow Jones sustainability world index and the Calvert social index), results in a positive (negative) impact. Results suggest that investors do value CSP.

Table 5 First hypothesis test: the association of market value of equity with CSP

	Exp. sign	C1	C2	C3
Intercept		45.617***	35.048***	24.917***
Main variables				
BV	+	0.773***	0.767***	0.618***
NI	+	2.587***	2.601***	2.963***
Non_DJSI	−	−4.157**		−4.432***
Control variables				
ROE	+	−1.187	−1.249	
LEV	−	−0.627***	−0.629***	
SIZE	+	−1.321**	−0.888	
CF	+	28.248***	29.545***	
RISK	−	−3.590***	−3.663***	
LIST	+	2.852	3.098	
Mining		1.107	0.555	
Utilities		−5.584***	−5.995***	
Commercial		−2.930	−2.877	
Financial		−1.593	−2.620	
Services		−1.007	−1.046	
Overall R^2		0.477	0.474	0.422
Wald test		810.04***	801.35***	140.85***

Dependent variable: *MV* market price at the fiscal year-end; Independent variables: *BV* book value of equity as of the end of the year, *NI* net income of the year, *Non_DJSI* an indicator that equals 1 if the firm have never been included in the DJSI during the sample period 2007–2010, *ROE* return on equity, *LEV* end-of-year total debt divided by end-of-year market capitalization, *SIZE* logarithm of total assets as of the end of the year, *CF* net cash-flow from operating activities scaled by end-of-year total assets, *RISK* Beta as reported by WorldScope, *LIST* an indicator that equals 1 if the firm is listed in a foreign stock exchange and 0 otherwise; Industry variables: *Mining* (SIC 1), *Utilities* (SIC 4), *Commercial* (SIC 5), Financial (SIC 6), and *Services* (SIC 7 and SIC 8)

Due to the sample panel data, and based on Breusch–Pagan test, random effects regression was conducted

***, **, and * Significance at the 0.01, 0.05, and 0.10 levels, respectively

Table 6 Second hypothesis test—the association of market value of equity with CSP: effect of size

	Exp. sign	
Intercept		31.612**
Main variables		
BV	+	0.764***
NI	+	2.594***
Non_DJSI_Big	−	−5.060***
Non_DJSI_Small	−	−1.957
Control variables		
ROE	+	−1.231
LEV	−	−0.626***
SIZE	+	−0.525
CF	+	27.758***
RISK	−	−3.657***
LIST	+	3.316
Mining		1.250
Utilities		−5.039**
Commercial		−2.792
Financial		−1.629
Services		−0.954
Overall R^2		0.480
Wald test		815.81***

Dependent variable: *MV* market price at the fiscal year-end; Independent variables: *BV* book value of equity as of the end of the year, *NI* net income of the year, *Non_DJSI_Big* an indicator that equals 1 if the firm have never been included in the DJSI during the sample period 2007–2010 and his size is above the median, *Non_DJSI_Small* an indicator that equals 1 if the firm have never been included in the DJSI during the sample period 2007–2010 and his size is below the median, *ROE* return on equity; *LEV* end-of-year total debt divided by end-of-year market capitalization, *SIZE* logarithm of total assets as of the end of the year, *CF* net cash-flow from operating activities scaled by end-of-year total assets, *RISK* Beta as reported by WorldScope, *LIST* an indicator that equals 1 if the firm is listed in a foreign stock exchange and 0 otherwise; Industry variables: *Mining* (SIC 1), *Utilities* (SIC 4), *Commercial* (SIC 5), *Financial* (SIC 6), and *Services* (SIC 7 and SIC 8)

Due to the sample panel data, and based on Breusch–Pagan test, random effects regression was conducted

***, **, and * Significance at the 0.01, 0.05, and 0.10 levels, respectively

Other studies, such as Lo and Sheu (2007), Garcia-Castro et al. (2010), and Wagner (2010), are more similar to our own in that they use panel data and examine whether CSP has an impact on market value. Given that their results suggest that KLD does not impact on financial performance, Garcia-Castro et al. (2010) argue that the positive relationship found in most of the previous research on the link between CSP and FP becomes a non-significant or even a negative relationship when endogeneity is properly taken into account.

The findings of the other two studies suggest that sustainable firms are more likely to be rewarded by investors. The findings of Lo and Sheu (2007), who examine whether CS has an impact on market value using large US non-financial firms from 1999 to 2002, are especially relevant to our study. They used listing in the DJSGI USA as the proxy for CS and the Tobin's q as the proxy for firm value. Their key finding is that sustainable firms are rewarded with higher valuations in the market place.

Our findings are consistent with the findings of Lo and Sheu (2007) and those of other studies that find a positive relation between CSP and CFP. We find that investors do value CSP. However, what happens is that they penalize large profitable firms with low level of CSP, which face greater public scrutiny and pressures from stakeholders. These companies are expected to signal sustainability

Table 7 Third hypothesis test—the association of market value of equity with CSP: effect of size and profitability

	Exp. sign	
Intercept		31.430**
Main variables		
BV	+	0.761***
NI	+	2.707***
Non_DJSI_Big_Profit	−	−5.119***
Non_DJSI_Big_Loss	−	−3.879
Non_DJSI_Small_Profit	−	−2.040
Non_DJSI_Small_Loss	−	−0.724
Control variables		
ROE	+	−1.077
LEV	−	−0.635***
SIZE	+	−0.529
CF	+	28.048***
RISK	−	−3.662***
LIST	+	3.227
Mining		1.239
Utilities		−4.961**
Commercial		−2.692
Financial		−1.604
Services		−0.899
Overall R^2		0.481
Wald test		823.05***

Dependent variable: *MV* market price at the fiscal year-end; Independent variables: *BV* book value of equity as of the end of the year, *NI* net income of the year, *Non_DJSI_Big_Profit* an indicator that equals 1 if the firm have never been included in the DJSI during the sample period 2007–2010 and his size is above the median and ROE is positive, *Non_DJSI_Big_Loss* an indicator that equals 1 if the firm have never been included in the DJSI during the sample period 2007–2010 and his size is above the median and ROE is negative, *Non_DJSI_Smal_Profit* an indicator that equals 1 if the firm have never been included in the DJSI during the sample period 2007–2010, and his size is below the median and ROE is positive, *Non_DJSI_Smal_Loss* an indicator that equals 1 if the firm have never been included in the DJSI during the sample period 2007–2010, and his size is below the median and ROE is negative, *ROE* return on equity, *LEV* end-of-year total debt divided by end-of-year market capitalization, *SIZE* logarithm of total assets as of the end of the year, *CF* net cash-flow from operating activities scaled by end-of-year total assets, *RISK* Beta as reported by WorldScope, *LIST* an indicator that equals 1 if the firm is listed in a foreign stock exchange and 0 otherwise; Industry variables: *Mining* (SIC 1), *Utilities* (SIC 4), *Commercial* (SIC 5), *Financial* (SIC 6), and *Services* (SIC 7 and SIC 8)

Due to the sample panel data, and based on Breusch–Pagan test, random effects regression was conducted

***, **, and * Significance at the 0.01, 0.05, and 0.10 levels, respectively

leadership. If they do not, they are penalized by the market. The findings in this study are important to the ongoing debate about the financial consequences of corporate investment in sustainability activities.

We address some problems identified by Garcia-Castro et al. (2010) as being likely to explain the heterogeneous results found in previous studies, such as using a consistent measure of CSP, including all the relevant control variables, distinguishing between short- and long run financial effects, and the endogeneity of strategic decisions. The latter two problems are addressed namely by using of panel data methods.

We also address the suggestion of Garcia-Castro et al. (2010), who used the most complete KLD panel data available at the time (1991–2005), that future research should look at firm-specific characteristics that push firms to adopt sustainability practices in the first place. Recently, Artiach et al. (2010) examined the incentives for US firms to invest in sustainability. They examined firm-specific factors associated with high CSP, as proxied by membership of the Dow Jones sustainability index. They found that leading CSP firms are significantly larger and profitable when compared with conventional firms. Our findings suggest that large and profitable firms are well advised to invest in CS, because they would not do well otherwise.

Our purpose is to describe the link between CSP and CFP. In a novel approach, we distinguish firms based on size and profitability. Our findings suggest that CSP is positively associated with the financial performance of large and profitable firms which are able to signal their sustainability performance, and has a negative association with the performance of large and profitable firms that are not able to signal their sustainability performance. CS makes large and profitable firms that have a reputation for being committed to sustainability better and large and profitable firms without that reputation worse.

It is prudent to conclude that our findings, obtained in the North American institutional setting, are not susceptible of generalization to other countries, especially those with very different characteristics. Cormier and Magnan (2007) suggest that national institutional contexts are relevant when assessing the stock market value relevance of financial and non-financial performance measures. This is one of the reasons for limiting our sample to North American companies and also a promising avenue for future research. We believe that studying international data for cross-country comparisons and industry comparisons would be an interesting future research area.

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