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Corporate social responsibility, environmental leadership and financial performance

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Abstract

Purpose – *The purpose of this paper is to statistically assess the relationship between corporate characteristics, environmental contribution and financial performance. To this end, the authors compare the financial performance of all US corporations making up the Dow Jones Sustainability Indexes, being the most proactive companies in providing services and goods, while maintaining ethical responsibility and environmental sustainability.*

Design/methodology/approach – *Various performance measures are compared to the mean performance of the related industry, sector and market portfolio. We employ an analysis for several time horizons of the financial measures.*

Findings – *Analysis by the authors suggests that firms that are proactive in supporting social responsibility and environmental sustainability (SRES corporations) are characterized by significantly higher profit measures than the industry and the sector, though not higher than the entire market. They have lower short-term liquidity measures than those of the industry and related sector, and surprisingly, their long-term leverage is significantly higher. Strong SRES corporations are characterized by significantly higher managerial efficiency ratios than the respective industry and sector. Interestingly, however, the per-worker operating efficiency ratios are significantly lower than for all of the benchmarks.*

Practical implications – *The revealed preference of corporations can be extracted from several horizon dependent financial measures. For instance, we could infer the corporate degree of SRES from their long-term capital structure, i.e. their long-term leverages and short-term liquidity measures.*

Originality/value – *These results illustrate the strong relation between social and environmental sustainability, and long-term business plans in respect to the corporate capital structure.*

Keywords *Corporate social responsibility, Financial performance, Dow Jones sustainability index, Environmental leadership*

Paper type *Research paper*

Introduction

For some years now, there has been a movement to counteract the widely held belief that a business has no obligation other than to maximize shareowners' wealth. The idea that there are people and groups other than shareowners to whom a firm has obligations, has come to be widely known as *the stakeholder theory*. This theory, however, encounters intractable philosophical difficulties in providing credible principles for business managers dealing with some of the more ethical topics, such as the impact of a corporation on the natural environment, which do not directly involve human beings within the business firm or those engaging in transactions with the firm. Corporate decision-making does, however, include an appreciation of these ethical values, even though they cannot be captured in the stakeholder theory. Alongside increased awareness of the social responsibility of corporations, we observe consumers' increasing awareness of quality of life, rather than narrow economic benefits, which has accelerated ethical considerations in the economy and in business behaviors. Consumers are increasingly considering social and environmental criteria in their buying decisions, a growing share of private and institutional investors are making investment decisions based on social screening services, and

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governments around the world are implementing stricter environmental and social policies. Together, this is expected to directly and indirectly affect the behavior and performance of corporations. Székely and Knirsch (2005) thoroughly summarize the well-accepted metrics for the measure of sustainable performance. The relation between pro-social policies and performance is not, however, entirely linear (Barnett and Salomon, 2006).

Previous studies in the field that have forecast, to some extent, the relationship between corporate social responsibility (CSR) and financial performance have been based on a number of theoretical arguments. Those that have suggested a negative relation between social responsibility and financial performance have argued that high responsibility results in additional costs that put the firm at an economic disadvantage compared to other, less socially responsible, firms (Bradgon, 1972; Vance, 1975; Aupperle *et al.*, 1985; Ullmann, 1985). Higher costs are expected to decrease the cash flow left within the firm.

However, other studies concluded that the additional costs are potentially compensated for by a range of direct and indirect benefits which, overall, results in a positive association of social responsibility and financial performance. One such beneficial factor, partly mentioned, is that social responsibility improves employee and customer goodwill as an important outcome of social responsibility, along with higher employee morale and productivity (Davis, 1960; Parket and Eibert, 1975; Soloman and Hansen, 1985, Campbell and Kamlani, 1997; Becchetti *et al.*, 2008).

This approach is in accordance with the stakeholder theory, which contends that the value of a firm depends on the cost of not only explicit claims, but also implicit ones: if a firm does not act in a socially responsible manner, parties to implicit contracts concerning the social responsibility of the firm may attempt to transform these implicit agreements into explicit agreements, which will be more costly (Cornell and Shapiro, 1987). Moreover, socially irresponsible actions may spill over to other implicit stakeholders who may doubt whether the firm will honor their claims, while pro-CSR policy may strengthen good implicit stakeholder relationships (Stanwick and Stanwick, 1998). Thus, firms with an image of high CSR may find that they have more low-cost implicit claims than other firms, and thus achieve higher financial performance. Gompers *et al.* (2003) and Bauer *et al.* (2004) show that the benefits of corporate governance – one of the CSR components – are generated into higher prices, and hence corporate values. Van de Velde *et al.* (2005) found that during the 2000-2003 period, highly rated sustainability-oriented European firms received higher, though insignificant, style-adjusted performances when estimated using the Fama and French (1992) model. Schreck (2011) documents higher Tobin's Q performance ratios for firms managed with a high environmental orientation.

An additional key factor in the cost benefit analysis of CSR orientation associates the positive reputation effect of CSR with managerial skills. It is believed that high social responsibility levels signal high managerial skill levels to stakeholders. Therefore, higher CSR levels result in a corporate value increase, since the managers earn a reduction in explicit costs in return for lower implicit charges to increase the firm's reputation (Alexander and Bucholtz, 1978; Bowman and Haire, 1975).

Nonetheless, there are a number of studies that deduce no significant direction in the link between CSR and corporate performance. For instance, McWilliams and Siegel (2001) observe that the financial performance of CSR firms is not significantly different from that of a control sample, when per capita R&D expenditure is added to the other regressors. Other articles, such as those of Anderson and Frankel (1980) and Freeman and Jaggi (1988), find inconclusive results regarding the impact of CSR on corporate financial performance.

Given the counter effects that social responsibility and environmental sustainability (henceforth SRES) may generate, we find it necessary to split the analysis into four performance frameworks, each of which identifies the impact of SRES on determined classes of performances. Furthermore, we control for each performance measure's potential impact on the industry, sector and market level.

Hence aligned with previous studies, we classify the four financial-economic classes of performance into:

1. market return measures;
2. market risk measures;
3. accounting-based performance measures; and
4. accounting-based risk measures.

McGuire *et al.* (1988) conducted an analysis within a similar framework to evaluate the performance of corporations with social responsibility during the period 1983-1985. They showed that pre-performance measures of all of the above-specified classes are more closely related to the CSR rating than the post-rating performance, and that risk measures are closely associated with CSR. McGuire *et al.*'s (1988) analysis was based on *Fortune* magazine's annual survey of CSR ratings.

Our results for the period 2008-2010 are consistent with previous results of CSR firms' performance, but highlight an interesting phenomenon that was not identified in previous literature: long-term considerations significantly increase the financial performance of firms, relative to the mean performance of their related industry and sector, in comparison to short-run considerations. This phenomenon is reasonable, as it coincides with social responsibility, which is highly associated with environmental performance. The investment and attitude supporting environmental sustainability necessitate long-run thinking and considerations. Moreover, this strong relation between SRES and long-term business plans is reflected in the corporate capital structure, i.e. in corporate long-term leverages and short-term liquidity measures.

Literature review and theoretical background

The significance of corporate responsibility and environmental sustainability is accelerating in its importance as a long-run adjustment factor to investors within the current growing global uncertainty. Hence, in addition to the classical financial parameters, investors acknowledge the costs and benefits of sustainability on the corporate value.

The impact of non-financial parameters on corporations' short-term performance has been thoroughly researched over the last decades by Worrell and Sharma (1991), Clinebell and Clinebell (1994), Posnikoff (1997), Wright and Ferris (1997), Hong *et al.* (1999), and Ruf *et al.* (2001). In general, these studies suggest that social responsibility is a broad and multidimensional concept that cannot be attributed to one specific performance index. Orlitzky *et al.* (2003) performed a meta-analysis of 52 studies in search of the relationship between corporate social performance (CSP) and corporate financial performance. The findings suggest that corporate virtue in the form of social responsibility and, to a lesser extent, environmental responsibility is likely to pay off. Social responsibility appears to be more highly correlated with the accounting-based measures of financial performance than with market-based indicators.

The long-run impact of CSR was studied via an analysis of accounting profitability measures by Aupperle *et al.* (1985), McGuire *et al.* (1988), and Waddock and Graves (1997), along with the more recent works of Becchetti *et al.* (2008), Becchetti and Ciciretti (2009), and Lourenco *et al.* (2011). These above-mentioned studies provide mixed results about the relations between corporate SRES and financial performance, when the latter is mainly measured using size and profitability. However, most of the studies document that a positive but weak correlation was found to dominate between SRES and financial performance.

The link between corporate responsibility-environmental sustainability and financial performance is projected from the strategic management theoretical approach of the resource-based view or perspective (RBV or RBP) and its extensions. According to

Barney (1991) the sustained competitive advantages of the firm are generated from several main potential firm resources. The core potential resource indicators are: value, rareness, imitability and substitutability. Moreover, the implementation of value creating strategies necessitates the use of key main groups of resources: physical capital resources (e.g. technology, plant and equipment, geographic location and raw material accessibility), natural capital resources, human capital resources (i.e. intelligence and emotional quality interactions of the firms' workers and managers) and organizational capital resources (such as formal and informal reporting structure and planning, control and coordination systems, formal and informal relations among the firms' groups and interactions between the firm and its environment).

The prime intention of the firm's wise use of its various groups of resources is to generate a competitive advantage over its competitors (Barney, 1986, 1991, 2001; Barney *et al.*, 2001; Lopez-Gamero *et al.*, 2009). As high homogeneity of resources alleviates the firm's ability to extract this competitive advantage, it is not surprising that firms would constantly seek to find valuable rare advantages and to try to preserve its superiority over the contestants. That is the main motivation beyond an important extension of the RBV theory, named the Dynamic Capabilities Approach. Teece *et al.* (1997) define dynamic capabilities as "the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments". Therefore, the authors extend RBV theory to control for the sources of a firm's competitive advantage over time, and hence to cope with the problem of rapidly changing environments (Priem and Butler, 2001; Teece, 2007).

The approach of RBP sheds light on the interaction between corporate responsibility-environmental sustainability and financial performance in the following way. Corporations continuously try to gain a competitive advantage using strategies that would differentiate them from their counterparts. One increasingly popular strategy is the adoption of environmental proactive policies to converge with long horizons social values. Thus, the firm would be willing to allocate resources that would accelerate its value creation with respect to the competitors, and maintain its superiority over time. One practical way to achieve that is to exert efforts or to channel resources that would enter the firm to an exclusive club of corporations. As this prominent list of firms is publicly recognized as highly corporate responsibility-environmental sustainability oriented, it is expected that the firm would eventually gain far beyond with respect to its value creation process. Hence this RBP is also testable regarding the benchmark groups' performance measures which are expected to be inferior than those of the highly pro social firms.

The RBP reasoning motivated studies that examined Environmental Proactive Strategy interaction with the corporations' financial performance (Buysse and Verbeke, 2003; Boons and Wagner, 2009; Bansal and Roth, 2000). Russo and Fouts (1997) find a positive relation between stock returns and environmental performance and conclude that "it pays to be green". Aragon-Correa *et al.* (2008) confirm those findings on a unique sample of small- and medium-sized enterprises. Other studies such as Murillo-Luna *et al.* (2008) and Murillo-Luna *et al.* (2011) discuss the barriers firms may face when adopting proactive environmental strategies.

The corporate SRES indicator selected in recent studies is the Domini Social Index developed by Kinder, Lyfenberg and Domini (henceforth KLD), who have been documenting CSR behavior information since 1991. In fact, KLD provides information on CSP, which is considered as a proxy for CSR. By integrating information from surveys, corporate financial statements, press media, academic journals and governmental agencies, KLD rates the CSP according to the company's social and environmental criteria. The 13 criteria are (as appears in the WRDS-KLD database): community relations, corporate governance aspects, corporate employee diversity, employee relations, environmental issues orientation, human rights, product quality and innovation, alcohol, firearms, gambling, military involvement and weapons contracting, nuclear power

involvement and concerns and tobacco. Based on this information, KLD constructed the KLD400 (formerly KLD's Domini 400 Social Index) which, similarly to the formation technique of the SP 500 Index, is the market capitalization weighted average of the 400 highest-rated socially responsible firms.

The present study makes use of a unique long-term and short-term database generated by Dow Jones in collaboration with RobecoSAM, the Sustainable Asset Management (henceforth SAM) company, and their related Dow Jones Sustainability Indexes (henceforth DJSI). The database generated by this collaboration (since 1999) focuses on firms that have adopted a corporate sustainability business approach. The crux of his approach is based upon the long-term shareholder value creation by implementing investment opportunities, while controlling for financial economic, environmental and social risks. If the SAM approach is valid, then the SRES leading corporations are characterized by substantial higher quality of: long-term strategic plans (economic, environmental and social), long-term financial performance and disclosure, long-term customer and product bonding, corporate governance and stakeholders' transparency and managing internal human resources (as stated in the DJSI Web site)[1].

The Corporate Sustainability Assessment (henceforth CSA) is SAM's main tool for identifying companies that are better equipped to identify and respond to emerging opportunities and risks resulting from global sustainability trends[2]. The CSA, for screening corporations by SAM, is based on a questionnaire (RobecoSAM Questionnaire). The questionnaire includes ranking 80-120 questions on three, not necessarily equally weighted, dimensions: the firm's financial-economic performance (i.e. corporate governance, risk management, customer relations, innovation management), its environmental pro-active level of involvement (i.e. environment management systems and performance, climate strategy) and its social practices (human capital development, talent attraction and retention, health and safety, stakeholder engagement, social reporting)[3]. Over half of the questions are industry-specific in order to express SAM's belief that sector-specific sustainability risk management and investment opportunities play a central role in the corporation's long-term performance.

It is important to further emphasize that, in addition to the CSA rating tool and the classical identifiers, SAM continuously adjusts the corporations' ratings through real-time Media and Stakeholder Analysis. Likewise, SAM implements a yearly double-verification process for the data provided in the questionnaires. One verification process is conducted internally by SAM, while the other is an external audit service assessment carried out by a third party, Deloitte Consulting[4].

Our analysis is based on the DJSI, composed of the above CSA highest-rated corporations in each industry. Hence, DJSI extends the scope of social responsibility beyond the factors included in the KLD index, i.e. air pollution and emissions reduction, as was primarily analyzed by [Hart and Ahuja \(1996\)](#) and [King and Lenox \(2001\)](#). Launched in 1999, the DJSI's are the first global indexes to track the financial performance of leading sustainability-driven companies worldwide. The indexes presented in collaboration by the Dow Jones and SAM, provide asset managers with reliable and objective benchmarks to manage sustainability portfolios.

In the following study, we statistically assess the relationship between corporate sustainability behavior and financial performance, while paying particular attention to the long- and short-term impacts of SRES on key financial indicators. We compare the financial performance of all firms making up the US DJSI in 2008, which were also included in the indexes in the preceding five years, as these are the most proactive companies when it comes to providing services and goods, while maintaining ethical responsibility and environmental sustainability. Companies included in the analysis belong to nine distinct sectors and related industries within those sectors. Mean market and accounting-based financial performance and risk are evaluated at three levels:

1. the industry level;
2. the sector level (considering nine sectors), and for a more general benchmark; and
3. the US market portfolio represented by the S&P 500 index.

Methodologies and hypotheses

Recall that according to the RBP approach the firm would allocate its resources to get accepted to the prestigious group of firms which are recognized as the most pro-social responsible – environmental sustainable firms. This physical, human and organizational resources allocation is conducted to gain the competitive advantage that would be translated to excess performance measures. To measure the corporate financial performance, we consider acceptable market and accounting-based financial performance and risk measures. Hence we would conjecture to find over performance of the proactive firms in the terms of higher acceptable financial performance measures and lower risk measures. This very reasoning shapes our hypotheses with respect to the benchmark groups.

Corporate sustainability is valued by statistically comparing the mean financial performance and risk measures of 99 firms included in the US DJSI in 2008-2010 with those of three benchmark levels. The first benchmark is the related industry performance; the second is the same sector performance; the third relates to the majority of stock-exchange market portfolio performance measures, represented by the S&P 500 index. All financial data used in this research were collected from the REUTERS financial markets database and combined with the Dow Jones and SAM databases of firms that make up the US DJSI. [Table I](#) includes the full list of sectors and industries considered in this study. The presented classification follows the Dow Jones classification.

We define the following primary null hypothesis: there is no significant difference between the mean performance and risk measures of DJSI and the benchmarks. Hence, three null hypotheses for mean performance or risk measure differences and the respected alternatives are defined as follows:

$$H_0: \mu_{DJSI} - \mu_I = 0 \quad (1)$$

$$H_1: \mu_{DJSI} - \mu_I \neq 0 \quad (2)$$

$$H_0: \mu_{DJSI} - \mu_S = 0 \quad (3)$$

$$H_1: \mu_{DJSI} - \mu_S \neq 0 \quad (4)$$

$$H_0: \mu_{DJSI} - \mu_{SP} = 0 \quad (5)$$

$$H_1: \mu_{DJSI} - \mu_{SP} \neq 0 \quad (6)$$

where index *I* stands for the industry benchmark and index *S* stands for the sector benchmark. The subscript SP stands for the market portfolio proxy, S&P 500.

Our analysis includes an examination of the following six core hypotheses, tested using the relevant financial performance parameters. Based on the conviction that the merits of long-term pro-environment policies exceed their drawbacks, our general alternative hypothesis considers that CSR firms are characterized by higher performance measures and lower risk measures. The six hypotheses to be tested are:

H1. Corporate SRES is positively correlated with profitability ratios.

To examine the conjecture that SRES is positively correlated with profitability measures, we examine the difference in mean profitability measures between DJSI firms and their three benchmarks. We therefore examine the profitability measures of sales-adjusted gross earnings, GrossE (%), sales-adjusted earnings before interest, tax depreciation and amortization, EBITDA (%), sales-adjusted operating earnings, OperatingE (%), sales-adjusted net earnings, NetE (%), dividend-to-price ratio or dividend return, Div (%), and five-year cumulative earnings per share increase, EPSGrow (%). All of the above, except EPSGrow (%), are calculated as the last five years' average measure and reflect different

Table I List of sectors and related industries for the benchmark formations

<i>Industries class. No.</i>	<i>The sectors Financial services and real estate</i>	<i>Technology, media and telecommunications</i>	<i>Health-care</i>	<i>Consumer goods and retail</i>	<i>Energy</i>	<i>Industrials, materials and utilities</i>
1	Banks	Advertising/marketing	Advanced medical equipment	Apparel and accessories	Coal	Aerospace and defense
2	Consumer financial services	Broadcasting	Biotechnology	Appliances, tools and housewares	Integrated oil and gas	Air freight and courier services
3	Financial services – diversified	Communications equipment	Health-care facilities	Auto and truck manufacturers	Oil and gas drilling	Airlines
4	Financials – specialty	Computer hardware	Managed health care	Auto/truck/motorcycle parts	Oil and gas exploration and production	Airport services
5	Home furnishing	Entertainment production	Medical equipment, supplies and distribution	Beverages – brewers	Oil and gas refining and marketing	Aluminum
6	Homebuilding	Integrated telecom. services	Pharmaceuticals – diversified	Beverages – distillers and wineries	Oil-related services and equipment	Chemicals – agricultural
7	Insurance – life and health	IT services and consulting	Pharmaceuticals – generic and specialty	Beverages – non-alcoholic		Chemicals – commodity
8	Insurance – multiline	Media diversified		Casinos and gaming		Chemicals – diversified
9	Insurance – property and casualty	Office equipment		Consumer electronics		Chemicals – specialty
10	Investment services	Publishing		Fishing and farming		Commercial printing services
11	Investment trusts	Semiconductor equipment and testing		Food distribution and convenience stores		Commercial services and supplies
12	Real estate operations	Semiconductors		Food processing		Construction – supplies and fixtures
13	Reinsurance	Software		Footwear		Construction – agricultural machinery
14	REIT – residential and commercial	Wireless telecommunication services		Hotels, motels and cruise lines		Construction materials
15				Household products		Diversified trading and distribution
16				Leisure and recreation		Electrical components and equipment
17				Leisure products		Engineering and construction
18				Personal products		Environmental services
19				Personal services		Forest and wood products
20				Restaurants		Heavy electrical equipment
21				Retail – apparel and accessories		Highways and railways
22				Retail – catalog and internet order		Industrial conglomerates
23				Retail – computers and electronics		Industrial machinery and equipment
24				Retail – department stores		Marine port services
25				Retail – discount stores		Marine transportation
26				Retail – drugs		Mining and metals – specialty
27				Retail – specialty		Non-paper containers/packaging
28				Textiles and leather goods		Paper packaging
29				Tires and rubber products		Paper products
30				Tobacco		Precious metals and minerals
31						Rails and roads – freights
32						Railways and roads – passengers
33						Steel
34						Utilities – electric
35						Utilities – multiline
36						Utilities – natural gas
37						Utilities – water and other

Note: Table I presents the breakdown of firms into the six sectors and 37 related industries that formed the benchmarks for the DJSI firms. Hence, we can carefully examine the various hypotheses regarding performance, efficiency and risk measures of the DJSI firms, compared with their industry and sector benchmarks

accounting and economic performance measures that eventually result in an ongoing value creation process or corporate market value change:

H2. SRES is positively correlated with business maturity ratios.

To examine the hypothesis that high SRES is positively correlated with the corporation's business maturity, we examine the difference in mean business maturity measures between DJSI firms and their three benchmarks. We concentrate on measures that typically signal a rather advanced phase of the business's life, which allows for the taking on of sustainable opportunities. We expect that firms with high SRES will be characterized by a relatively low (five-year cumulative) dividend growth, DivGrow (%), and a high (last year) dividends-to-profit payout ratio, Div/E (%). Following a similar line of reasoning, we expect SRES firms to have lower (five-year cumulative) sales growth ratios, SalesGrow (%). All of these measures reflect a status in which the firm has already completed a quick growth phase and entered into a steadier business period. Therefore, it can spare funds for the purpose of long-term SRES policy:

H3. SRES is positively correlated with higher financial liquidity and lower financial leverage ratios.

To examine the hypothesis of positive association with high financial liquidity ratio, we compare the current ratio, Current, and the quick ratio, Quick, of the DJSI firms to the three respective benchmarks. We expect to find higher liquidity ratios for the SRES firms. Similarly, we presume that the more sustainable corporations incorporate lower levels of capital funding risk, and hence will demonstrate lower financial leverage ratios. However, in contrast to most previous studies that examined financial leverage, we examine not only the classical financial leverage, i.e. total debt to equity, TD/Eq, but also the long-term financial leverage, i.e. long-term debt to equity, LTD/Eq. We hypothesize that the capital funding horizon should not affect the anticipated pattern of lower leverage for the more socially responsible DJSI firms:

H4. SRES is positively correlated with managerial efficiency ratios.

Previous studies assumed that high CSR categorization would be associated with better managerial performance measures. We test this hypothesis for SRES corporations by statistically comparing the means of common managerial efficiency measure ratios, including return on assets, ROA (%), return on investment, ROI (%), and return on equity, ROE (%), with the corresponding three levels of benchmarks. To capture the corporation's ongoing performance trend, these measures are calculated over a five-year average (2005-2009):

H5. SRES is positively correlated with operating efficiency ratios.

To examine this hypothesis, we use two measures of mean difference tests of the operational aspect. One is the difference in revenue per worker ratio, REV/Emp (%), between the DJSI firms and their benchmarks, and the other is represented by the difference in net profit per worker ratio, NetE/Emp (%). We expect to find higher operating efficiency for the CSR firms:

H6. SRES is correlated with a higher yearly sales growth ratio.

As we are inclined to identify high SRES, firms as more immune to 2008 economic crises (the defensive firm hypothesis), we expect a significantly higher yearly sales growth, SalesG-Crisis (%), in 2009 for the CSR firms than for the three benchmarked levels.

The six core hypotheses and their sub-hypotheses are summarized in [Table II](#).

The table shows a total of 19 different hypotheses that are examined using *t*-test for mean differences between matched observations. Each hypotheses is tested with respect to three different benchmark levels: the industry, the sector and the market represented by the market S&P500. We therefore define the difference in matched observations \bar{D}_k , $k \in \{1, \dots, 99\}$ of the DJSI corporations, such that the difference mean estimator is given by:

Table II The alternative hypotheses regarding the DJSI pro-environment firms

<i>The core alternative hypotheses</i>	<i>Performance/risk measure</i>
<i>H1: CSR excess profitability</i>	
<i>H1.1:</i> $\mu_{\text{DJSI}} - \mu_{\text{Benchmark}}$ (GrossE) > 0	GrossE (%)
<i>H1.2:</i> $\mu_{\text{DJSI}} - \mu_{\text{Benchmark}}$ (EBITDA) > 0	EBITDA (%)
<i>H1.3:</i> $\mu_{\text{DJSI}} - \mu_{\text{Benchmark}}$ (OperatingE) > 0	OperatingE (%)
<i>H1.4:</i> $\mu_{\text{DJSI}} - \mu_{\text{Benchmark}}$ (NetE) > 0	NetE (%)
<i>H1.5:</i> $\mu_{\text{DJSI}} - \mu_{\text{Benchmark}}$ (Div) > 0	Div (%)
<i>H1.6:</i> $\mu_{\text{DJSI}} - \mu_{\text{Benchmark}}$ (EPSGrow) > 0	EPSGrow (%)
<i>H2: CSR higher business maturity</i>	
<i>H2.1:</i> $\mu_{\text{DJSI}} - \mu_{\text{Benchmark}}$ (DivGrow) < 0	DivGrow (%)
<i>H2.2:</i> $\mu_{\text{DJSI}} - \mu_{\text{Benchmark}}$ (Div/E) > 0	Div/E (%)
<i>H2.3:</i> $\mu_{\text{DJSI}} - \mu_{\text{Benchmark}}$ (SalesGrow) < 0	SalesGrow (%)
<i>H3: CSR higher liquidity and lower financial leverage</i>	
<i>H3.1:</i> $\mu_{\text{DJSI}} - \mu_{\text{Benchmark}}$ (Current) > 0	Current (%)
<i>H3.2:</i> $\mu_{\text{DJSI}} - \mu_{\text{Benchmark}}$ (Quick) > 0	Quick (%)
<i>H3.3:</i> $\mu_{\text{DJSI}} - \mu_{\text{Benchmark}}$ (TD/Eq) < 0	TD/Eq (%)
<i>H4.4:</i> $\mu_{\text{DJSI}} - \mu_{\text{Benchmark}}$ (LTD/Eq) < 0	LTD/Eq (%)
<i>H4: CSR higher managerial efficiency</i>	
<i>H4.1:</i> $\mu_{\text{DJSI}} - \mu_{\text{Benchmark}}$ (ROA) > 0	ROA (%)
<i>H4.2:</i> $\mu_{\text{DJSI}} - \mu_{\text{Benchmark}}$ (ROI) > 0	ROI (%)
<i>H4.3:</i> $\mu_{\text{DJSI}} - \mu_{\text{Benchmark}}$ (ROE) > 0	ROE (%)
<i>H5: CSR higher operating performance</i>	
<i>H5.1:</i> $\mu_{\text{DJSI}} - \mu_{\text{Benchmark}}$ (REV/Emp) > 0	REV/Emp (%)
<i>H5.2:</i> $\mu_{\text{DJSI}} - \mu_{\text{Benchmark}}$ (NetE/Emp) > 0	NetE/Emp (%)
<i>H6: CSR higher defensive</i>	
<i>H6.1:</i> $\mu_{\text{DJSI}} - \mu_{\text{Benchmark}}$ (Current) > 0	SalesG_Crisis (%)
Notes: The list of tested hypotheses aimed to statistically assess differences between SRES companies and related benchmark performance. Three benchmarks are considered: industry benchmark; sector benchmark, market benchmark	

$$\bar{D} = \mu_{\text{DJSI}} - \mu_{\text{b}} \quad (7)$$

where b stands for each of the benchmarks: $b = \{I, S, \text{SP500}\}$, I is the industry benchmark, S is the sector benchmark and S&P500 is the market benchmark. The matched observations for one sample *t*-statistic, according to a null of zero difference and a standard deviation for that difference are given by:

$$\frac{\bar{D}}{S_D} \cdot \frac{1}{n^2} \sim t(n-1). \quad (8)$$

We conclude the analysis section by shedding light on the average systematic risk sensitivity of the SRES firms, relative to their benchmarks. This is conducted to examine the conjecture regarding different systemic risks of the DJSI firms that would derive different performance and risk measures in comparison to the different benchmarks.

Results

In the following tables, we present the results of the different hypothesis tests, relative to the three benchmark levels. Examining the overall results will enable us to characterize the SRES firms that entered the prestigious club of US DJSI, composed of the top 90th percentile of firms that advance corporate sustainability management in the USA, and position their performance, relative to other corporations in the same industry, and relative to the sector. [Table III](#) presents the results of the mean difference test for the performance measures between the DJSI firms and the respective matched firms.

The table clearly shows that the DJSI firms have higher profitability measures for all phases of profit, dividend return and earnings per share growth when compared with either the same industry or the same sector. In accordance with our prediction for the alternative

Table III The mean difference *t*-test for performance measures

H1: CSR excess profitability		Industry		Sector		S&P 500	
Benchmark:							
Measure	difference	$\mu_{DJSI} - \mu_{Bench.}$	p-value	$\mu_{DJSI} - \mu_{Bench.}$	p-value	$\mu_{DJSI} - \mu_{Bench.}$	p-value
GrossE (%)	H1.1	6.524***	0.001	8.800***	0.000	2.186	0.320
EBITDA (%)	H1.2	3.589***	0.002	4.557***	0.000	-2.375**	0.034
OperatingE (%)	H1.3	3.341***	0.001	3.286***	0.002	-4.922***	0.000
NetE (%)	H1.4	2.188**	0.012	2.388***	0.007	-4.095***	0.000
Div (%)	H1.5	0.527***	0.000	0.549***	0.000	-0.174	0.234
EPSGrow (%)	H1.6	7.527***	0.000	9.599***	0.000	-0.571	0.780

Notes: Table III shows the mean difference *t*-test for performance measures with respect to the three benchmark levels; **and; ***indicate 95 and 99 per cent confidence levels, respectively

hypotheses, the mean difference of the profitability measures is positive and highly significant. As for the S&P 500 benchmark, not only can we not reject the null hypothesis, but we see that for some profitability measures, such as EBITDA, OperatingE and NetE, the market profitability measures indicate a highly significant negative mean difference.

Table IV displays the results of the mean difference test for business maturity measures between the DJSI firms and the respective matched firms.

We can see that, relative to the same industry and sector, the DJSI firms are characterized by a statistically significantly higher dividend payout (high Div/E backs business maturity) and cumulative sales growth (note that higher SalesGrow rejects business maturity). While the DJSI Div/E demonstrates higher business maturity than its industry and sector counterparts, a comparison with the entire stock market shows a significantly higher business maturity for all S&P500 stocks than for the pro-environment DJSI firms.

An additional interesting characteristic of SRES firms hinges on the following hypothesis testing in Table V.

This table includes the analysis of financial liquidity and leverage of the DJSI companies. Contrary to our expectations, the DJSI firms are characterized by statistically significantly

Table IV The mean difference *t*-test for business maturity measures

H2: CSR higher business maturity		Industry		Sector		S&P 500	
Benchmark:							
Measure	difference	$\mu_{DJSI} - \mu_{Bench.}$	p-value	$\mu_{DJSI} - \mu_{Bench.}$	p-value	$\mu_{DJSI} - \mu_{Bench.}$	p-value
DivGrow (%)	H2.1	1.527	0.358	0.871	0.498	2.491*	0.059
Div/E (%)	H2.2	24.369***	0.000	28.657***	0.000	-12.413**	0.020
SalesGrow (%)	H2.3	2.261**	0.012	3.120***	0.000	-4.673***	0.000

Notes: Table IV shows the mean difference *t*-test for business maturity measures with respect to the three benchmark levels; *, **and; ***indicate 90, 95 and 99 per cent confidence levels, respectively

Table V The mean difference *t*-test for maturity measures

H3: CSR higher liquidity and lower financial leverage		Industry		Sector		S&P 500	
Benchmark:							
Measure	difference	$\mu_{DJSI} - \mu_{Bench.}$	p-value	$\mu_{DJSI} - \mu_{Bench.}$	p-value	$\mu_{DJSI} - \mu_{Bench.}$	p-value
Current	H3.1	-0.191**	0.038	-0.279***	0.003	0.131*	0.051
Quick	H3.2	-0.190**	0.013	-0.330***	0.000	-0.046	0.345
TD/Eq	H3.3	-4.484	0.716	-22.266*	0.092	-92.457***	0.000
LTD/Eq	H3.4	20.826**	0.024	19.599**	0.028	-54.589***	0.000

Notes: Table V shows the mean difference *t*-test for liquidity and financial leverage measure with respect to the three benchmark levels; *, **and; ***indicate 90, 95 and 99 per cent confidence levels, respectively

lower immediate liquidity measures, i.e. a negative and significant mean difference for the current and quick ratios. The classical leverage of DJSI firms, TD/Eq, which represents the total debt-to-equity ratio, is lower but not significantly so when compared with the industry. The total debt DJSI leverage difference is negative and significant, relative to the sector and the entire stock market, in accordance with our expectation and former research findings. However, we conduct a unique examination of the long-run debt-to-equity ratio, comparing the pro-environmental and social corporations. Contrary to our expectations and previous studies, we find that the DJSI firms' long-run debt-to-equity ratio, LTD/Eq, is statistically significantly higher than that of its counterparts in the industry and the related sector. Both total and long-run leverage of DJSI is lower than the total market, S&P 500, leverage. The significantly higher long-term leverage of the DJSI firms, in comparison to the industry and the sector, is an important finding.

In Table VI, we present the managerial efficiency measures test of the DJSI firms and the three respective benchmark levels.

The table illustrates that DJSI firms clearly have higher and significant managerial efficiency measures, i.e. all the measures' mean differences of the DJSI firms – ROA, ROI and ROE – are positive and highly significant. Nevertheless, we see from the table that we cannot reject the null hypothesis that the DJSI and the entire market have different managerial efficiency measures.

Table VII presents test results for a set of hypotheses concerning the per worker operating efficiency of SRES firms in comparison to the benchmark levels.

Although we expected these firms to demonstrate higher operating measures, we find significantly lower operating performance measures in comparison to each of the benchmarks. We find a negative difference for the revenue per worker and net earnings per worker, statistically significant at the 99 per cent confidence level. This finding is interesting, as we already showed (Table III analysis) that the profit measures are consistently higher for the DJSI firms than for the industry and sector. The same superiority was found in Table III for total profitability when tested with respect to net earnings of the DJSI (NetE).

Table VIII shows the defensive hypothesis test for the DJSI firms in comparison to the three benchmarks.

Table VI The mean difference *t*-test for managerial efficiency measures

H4: CSR higher managerial efficiency		Industry		Sector		S&P 500	
Benchmark:							
Measure	difference	$\mu_{DJSI} - \mu_{Bench.}$	p-value	$\mu_{DJSI} - \mu_{Bench.}$	p-value	$\mu_{DJSI} - \mu_{Bench.}$	p-value
ROA (%)	H4.1	2.318***	0.000	2.660***	0.000	-0.950	0.110
ROI (%)	H4.2	3.875***	0.000	4.457***	0.000	0.324	0.758
ROE (%)	H4.3	7.729***	0.000	8.069***	0.000	-2.349	0.104

Notes: Table VI shows the mean difference *t*-test for managerial efficiency measures with respect to the three benchmark levels; ***indicate 99 per cent confidence levels, respectively

Table VII The mean difference *t*-test for operating performance measures

H5: CSR higher operating performance		Industry		Sector		S&P 500	
Benchmark:							
Measure	difference	$\mu_{DJSI} - \mu_{Bench.}$	p-value	$\mu_{DJSI} - \mu_{Bench.}$	p-value	$\mu_{DJSI} - \mu_{Bench.}$	p-value
REV/Emp (USD 1,000s)	H5.2	-849.631***	0.0008	-8,593.4***	0.0000	-149.395***	0.0021
NetE/Emp (USD 1,000s)	H5.3	-76.380*	0.0577	-248.366***	0.0000	-27.615***	0.0046

Notes: Table VII shows the mean difference *t*-test for business maturity measures with respect to the three benchmark levels; *and; *** indicate 90 and 99 per cent confidence levels, respectively

Table VIII The mean difference *t*-test for defensive hypothesis

H6: CSR higher defensive Benchmark:		Industry		Sector		S&P 500	
Measure	difference	$\mu_{DJSI} - \mu_{Bench.}$	p-value	$\mu_{DJSI} - \mu_{Bench.}$	p-value	$\mu_{DJSI} - \mu_{Bench.}$	p-value
SalesG_Crisis (%)	H6	-5.453***	0.000	-4.454***	0.007	-3.484**	0.011

Notes: Table VIII shows the mean difference *t*-test for business maturity measures with respect to the three benchmark levels; **and; *** indicate 95 and 99 per cent confidence levels, respectively

The defensive hypothesis examines the adaptation rate of a firm to economic crises by measuring its rate of sales growth after an economic crisis. Originally, we had conjectured that the DJSI would show a higher defensive ability. Nevertheless, from Table VIII we see that the DJSI mean difference from the industry, sector and the entire stock market is negative and highly significant. The immediate post-economic crisis sales growth reaction of the DJSI CSR firms seems to be lower than every possible benchmark level. The moderate response following a crisis corresponds to several findings from Tables V and VI, from which we infer that the entire activity planning for the DJSI firms is aimed at long-run periods; therefore, they adopt non-myopic, long-run, pro-social policies.

Finally, we analyze whether this total or long-term capital structure is associated with a systematic risk explanation. Thus, we conduct a Beta analysis for the DJSI firms and their respective benchmarks. Table IX provides the descriptive statistic with respect to beta (β); Tables X and XI provides the analysis of hypotheses with respect to the beta mean difference of DJSI firms and the firms within the selected benchmark levels (I, S, SP500).

The results of the mean difference analysis of the sensitivity towards systematic risks, Beta, clearly show that the DJSI firms have a higher Beta than the industry and sector at a high statistical significance, but their Beta is not statistically different from that of the S&P 500 firms.

Table IX Market beta descriptive statistics

	N	Minimum	Maximum	Mean	SD
β company [DJSI]	98	0.1600	3.3700	1.144490	0.6407778
β_i (Industry)	98	0.1600	1.6400	0.866429	0.3702556
β_s (Sector)	98	0.2000	1.1500	0.855102	0.2917782
β_m (Market, S&P500)	98	1.0900	1.0900	1.090000	0.0000000
Diff ($\beta - \beta_i$)	98	-1.1400	2.7400	0.278061	0.6217794
Diff ($\beta - \beta_s$)	98	-0.6500	2.4100	0.289388	0.5632579
Diff ($\beta - \beta_m$)	98	-0.9300	2.2800	0.054490	0.6407778

Notes: The table presents descriptive statistics for the beta coefficient of the DJSI companies and their three benchmarks levels: the industry, the sector and S&P500. Note that the beta was computed on the NYSE composite return, which is the most diversified index in the US stock exchange. Hence, the S&P500 beta is 1.09. Notations β_i , β_s , β_m , represent the betas of the industry, the sector and the market proxy (S&P500), respectively (data on one of the DJSI firms was missing)

Table X Beta mean differences with the three benchmarks: mean differences

	N	Mean	SD	Standard error mean
Diff ($\beta - \beta_i$)	98	0.278061	0.6217794	0.0628092
Diff ($\beta - \beta_s$)	98	0.289388	0.5632579	0.0568976
Diff ($\beta - \beta_m$)	98	0.054490	0.6407778	0.0647283

Discussion

The results of this paper strongly support former studies results (see the literature review section) regarding higher performance measures for the social-environmental proactive firms. Our finding of higher financial performances for the exclusive DJSI index corporations further supports the RBP approach. It appears that the DJSI firms allocation of resources results in a value increasing strategy. The branding of this group of firms as unique with respect to social-environmental issues significantly results in superior financial performance measures.

Concordant with our preliminary conjectures, the mean difference of the profitability and managerial efficiency measures is positive and highly significant with the industry and sector. The results show a lower business maturity level with respect to the latter benchmarks. *A priori*, it seemed reasonable to surmise that the SRES DJSI firms would have lower risk measures, regardless of the time horizon of analysis. However, we uniquely find that the long-run debt-to-equity ratio, LTD/Eq, of the DJSI firms is statistically significantly higher than that of the industry and the related sector firms. This surprising finding, which was not given attention in former studies, illustrates that SRES are reflected in several horizon-derived capital structure measures of the corporation.

The higher long-term leverage of the SRES and its lower liquidity ratios show that the capital structure of DJSI firms is based on long-run, rather than short-range plans. Hence, we identify another potential explanation for the high involvement of the DJSI in pro-social policies. As these SRES firms choose to fund their business activities from long-run debt sources, they are heavily bound with different components of society. They therefore signal investors about their high concern over social issues, perhaps to decrease the long-term cost of capital. Another fundamental argument might be that firms that depend on long-term borrowing from society are, by definition, more aligned with society's interests and sustainability.

The significantly lower DJSI firms' operating performance measures, in comparison to each of the benchmarks, is another aspect of their high human resources relative to their industry and sector benchmark. We find a negative difference for the revenue per worker and net earnings per worker. We therefore conclude that SRES companies employ a larger number of workers and interact with a higher level of human resources, compared to other companies in the same industry and sector. This also applies at the sector level. Employing a larger number of workers is natural to higher sensitivity toward long-term social issues and vice versa. This results in a considerably lower value of per-worker operating efficiency measures.

Finally, we conclude from the Beta analysis (systemic risk sensitivity) that DJSI firms have a higher Beta than the industry and sector at a high statistical significance, but their Beta is not statistically different from that of the S&P 500 firms[5]. This higher systematic risk for the DJSI firms is not, however, a result of the lower total leverage with respect to the industry and the sector. This is not consistent with the classical financial theory analysis, which predicts that higher total leverage will generate higher sensitivity toward systematic risk (higher Beta). That is, given the lower total leverage of the DJSI firm found in our analysis (tested via *H3* regarding lower operating risk, [Table V](#)), we would expect their Betas to be lower than those of their related industry and sector. However, the findings of higher Beta for the DJSI, compared with the industry and sector, are consistent with the significantly higher long-run leverage of the DJSI firms. Therefore, the higher Beta sensitivity of DJSI firms could be derived from their long-term-based capital structure. The conducted Beta analysis shows a further uncovered dimension in the literature, which impacts the sensitivity of corporations towards systemic risks, as a result of their higher SRES.

Concluding remarks

According to the RBV the competitive business environment generates firms to an allocation of resources that would create a competitive advantage and hence a positive value creation state. In the last decades the notion of proactive social responsibility-environmental sustainability became crucial among the business community. Hence, many corporations divert valuable resources to get proactive social-environment public recognition, since it is perceived as a long horizon lucrative strategy.

Following the conviction that SRES generate higher corporate values and efficiency and lower the corporate risk exposure, our analysis assessed three key characteristics of firms practicing CSR. The first is related to profitability measures. High CSR firms are characterized by significantly higher profit measures than those of industry and sector, but not when compared to total market performance measures.

The second relates to financial liquidity and leverage. The short-term liquidity of DJSI firms is significantly lower than that of industry and sector. While the total financial leverage of high SRES corporations is significantly lower than that of industry and sector, interestingly, the long-term financial leverage is significantly higher. We could phrase this important result by saying that *SRES corporations look far beyond the short-run, and hence, also care more about long-term social issues*. Hence, the strong relation between SRES firms and socio-environmental issues is reflected in its horizon – accounting based of capital structure.

The third relates to higher involvement with employees and a long-term point of view. High SRES corporations are characterized by significantly higher managerial efficiency ratios than the respective industry and sector. The per-worker ratios are significantly lower than those of all of the benchmarks. We conjecture that these high SRES firms are characterized by a high number of employees, and hence bear higher environmental awareness.

Our study adds to the previous literature that focused primarily on CSR and financial performance in a unique subgroup that fosters sustainable social responsibility, emphasizing the need to build the corporation and society at large by looking far beyond today's needs. The study strongly supports the RBV and finds a translation of the competitive advantage that SRES firms acquire into preferable financial performance measures. Our analysis supports the vision that sustainability is a company's capacity to prosper in a competitive and changing global business environment by anticipating and managing current and future economic, environmental and social opportunities and risks. Companies that address these factors through innovation, quality and productivity enhance their ability to generate long-term shareholder value. The adoption of sustainable practices is a long-term systematic approach that integrates economic, environmental and social considerations into traditional financial operation.

The paper illustrates that the revealed preference of corporations towards SRES can be extracted from several horizon-dependent financial measures, i.e. from publicly accounting information. The study supplies an important practical tool for both investors and analysts to identify the corporate degree of SRES. The counterintuitive suggested decision support

Table XI Beta mean differences with the three benchmarks: mean differences hypotheses test

	t	df	Sig. (2-tailed)	Mean difference	95% confidence interval of the difference	
					Lower	Upper
Diff ($\beta - \beta_i$)	4.427	97	0.000	0.2780612***	0.153402	0.402720
Diff ($\beta - \beta_s$)	5.086	97	0.000	0.2893878***	0.176462	0.402314
Diff ($\beta - \beta_m$)	0.842	97	0.402	0.0544898	-0.073978	0.182958

Notes: The table presents the hypothesis test for the beta mean difference of DJSI firms and the respected three benchmark levels; ***indicate 99 per cent confidence levels, respectively

instrument is to examine the corporation horizon-based capital structure, i.e. to compare their long-term leverages and short-term liquidity measures. This would supply the investors with a relative indication of the firm's socio-environmental level of involvement.

It is important to conduct the analysis over further periods of study to control for systematic economy changes. Further research implications are to extend a similar aspect of analysis on other parts of the world sustainability indices to examine whether our US findings hold. Likewise, it is interesting to study the SRES entrance and exit from the DJSI index using the long horizons accounting measure. Finally, it would be fascinating to design a methodology that estimates the value of inclusion in such exclusive indices.

Notes

Equal Contribution of the authors.

1. The DJSI Web site at: [www.sustainability-indices.com/sustainability-assessment/corporate-sustainability-assessment.jsp.Home=>Sustainability Assessment=>Corporate Sustainability](http://www.sustainability-indices.com/sustainability-assessment/corporate-sustainability-assessment.jsp.Home=>Sustainability%20Assessment=>Corporate%20Sustainability)
2. Over 2,500 of the largest market capitalization US major indices firms are requested to participate and complete the questionnaire every year.
3. The DJSI Web site at: [www.sustainability-indices.com/sustainability-assessment/corporate-sustainability-assessment.jsp.Home=>Sustainability Assessment=> Corporate Sustainability Assessment=> Assessment](http://www.sustainability-indices.com/sustainability-assessment/corporate-sustainability-assessment.jsp.Home=>Sustainability%20Assessment=>Corporate%20Sustainability%20Assessment=>Assessment)
4. The DJSI Web site at: [www.sustainability-indices.com/sustainability-assessment/corporate-sustainability-assessment.jsp.Home=>Sustainability Assessment=> Corporate Sustainability Assessment=>Assurance](http://www.sustainability-indices.com/sustainability-assessment/corporate-sustainability-assessment.jsp.Home=>Sustainability%20Assessment=>Corporate%20Sustainability%20Assessment=>Assurance)
5. Contrary to the unique approach of our study, former studies that conducted Beta analyses, such as those of [Becchetti and Ciciretti \(2009\)](#), did not connect this systemic sensitivity to the horizon of corporate business plans

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