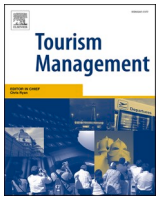
Tourism Management 81 (2020) 104158

Contents lists available at ScienceDirect

Tourism Management

journal homepage: http://www.elsevier.com/locate/tourman



Does sustainability index matter to the hospitality industry?

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ARTICLE INFO

JEL classification:
M14
Q01

Keywords:
Sustainability
Dow jones sustainability index
Event study
Financial performance

ABSTRACT

Employing the Dow Jones Sustainability North America Index (DJSI) as a proxy for a firm's socially responsible investments, this research analyzes whether DJSI generates short- and long-run impacts on hospitality firms' financial values. Results indicate that due to characteristics intrinsic to the hospitality industry, hospitality firms' financial performance is more sensitive to addition or deletion events, as compared with the performance of non-hospitality firms, whether measured over the short run or long run. In addition, some firm features, including size, Tobin's Q, and institutional ownership, might also intensify the abnormal returns of firms. The findings would throw some light on environmental, social, and governance (ESG) literature and pave the way to develop new socially responsible investment strategies and ESG-oriented practices that help consolidate tourism-related firms' financial performance and positively benefit society.

1. Introduction

Sustainability is at the core of any business nowadays. The *Brundtland Report* in 1987 first defined the term "sustainability" and noted that sustainable development meets the needs of the present without compromising the well-being of future generations (United Nations World Commission on Environment and Development, 1987). As a result of the rising tide of sustainable development, corporate environmental and social performances are becoming increasingly important concerns, causing stakeholders to request companies to enhance their sustainability leadership and corporate social responsibility (CSR) (Robinson, Kleffner, & Bertels, 2011). With the emergence of CSR, ethically responsible investing has grown in the past decade, leading to a new capital investment trend (Social Investment Forum, 2007) with global popularity (Louche & Lydenberg, 2012).

Socially responsible investing[1] (SRI), also known as a sustainable or ethical investing, involves integrating environmental, social, and governance (ESG) factors into investment decisions. Socially responsible investing is a best practice that actively supports the sustainable development of companies and applies to investors' attention toward the social, economic, and environmental growth and health of a company in conjunction with a consideration for traditional finance and the careful selection of targeted high-performance investment in order to position personal investments toward substantially impactful sustainable developments (Chipeta & Gladysek, 2012). Socially responsible investing is a product of sustainable economic growth that is cultivated through the integration of multi-oriented considerations (social justice, environmental sustainability, and financial performance) in order to generate both financial and social benefits. Socially responsible investing is not a commodity name, but rather it is an application method or philosophy that sets up a specific value for a portfolio.

Global SRI has grown at greater than a 40% annual rate since 2016 (Bloomberg, 2019). The year-on-year growth of the SRI market substantiates that SRI performance is an area of significant interest to both companies and investors. In 2011, the World Business Council for Sustainable Development predicted that SRI might grow by 25% every year over the next few years and that global responsibility investment would increase by as much as 30% per year once SRI enters its hyperplasia period (proliferation phase).

A socially responsible investment index (SRI index) is one that helps evaluate and quantify sustainability efforts put forth by companies and represents a dynamic and effective intermediate for managing sustainability and financial performance (Urdangarin & VanderBeek, 2015). Socially responsible investing indices have become important guides for investors in determining whether a company can further create higher yield. Their development has prompted the sustainable investing trend, because CSR is highly valued in 21st century equity markets. It is acknowledged that a company that is selected as an index constituent

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[1] The authors shall use the term "socially responsible investment" to refer to sustainable or ethical investing in this paper.

https://doi.org/10.1016/j.tourman.2020.104158
Received 14 January 2020; Received in revised form 25 April 2020; Accepted 17 May 2020
Available online 26 May 2020

not only brings positive investment signals to investors (Bebbington, 2001) but also offers investors a pragmatic picture of a firm's environmental, social, and governance sustainability efforts (Robinson et al., 2011).

This research analyzes the impacts of SRI in North America with a particular focus on the hospitality industry, which is generally recognized as a primary provider in the service industry, because it comprises a broader range of service-related segments. According to Statista (2018), the economic contribution of the hospitality industry has a growing influence on global economies, indicating that hospitality-related businesses generate relatively greater substantial economic/financial impacts. Such an influence drives consumers' expectations that hospitality companies should also devote business leadership efforts at sustainability development and social responsibility. Consequently, CSR has gained more importance in the hospitality industry as companies acknowledge its importance, and the associated value results in more hospitality companies making ESG initiatives central to internal policies. Investors also focus more on a company with high sustainability since being classified as a good sustainable company can create positive ecological and social benefits to investors.

The literature has shown the need for corporate financial performance (CFP)[2] to be linked to a hospitality firm's ESG practices (Cvelbar & Dwyer, 2013; De Grosbois, 2012; Inoue & Lee, 2011; Wang, 2014). However, in particular, to our knowledge, research into any noticeable relationship between the SRI index and subsequent market valuation in North America's hospitality market is scant. Therefore, the intent of the present study is to examine the impacts of socially responsible investing in the hospitality industry in North America. The above background and previous literature motivate our research topic. We aim to provide new insights in terms of the information content of sustainability on firm values in North America. To fill this knowledge gap, we set up an event study using EGARCH (exponential generalized autoregressive conditional heteroskedasticity) estimation and employing the Dow Jones Sustainability North America Index (DJSI) as a multi-dimensional sustainability assessment proxy. This method is intended to provide evidence in terms of whether there are different impacts on firm values, including stock returns and company financial performance in the short and long runs before and after hospitality and non-hospitality companies are added to and/or removed from DJSI's component list. The above approach is firmly grounded in the fact that sustainability plays an important role in business operations and has successfully become a key element in company valuations. The findings herein have necessary implications for the hospitality industry and may also shed light on the importance of a sustainability index's influence on a firm's financial performance, including stock prices and other financial ratios.

The remainder of the paper is organized as follows. Section 2 provides a brief review of the literature. Section 3 develops the hypotheses. Section 4 offers the data and methodological considerations. Section 5 presents empirical results and discussions. Finally, Section 6 concludes the paper and gives managerial suggestions.

2. Literature review

2.1. Socially responsible business performance of the global hospitality industry

The hospitality industry has historically had a dramatic environmental impact through the volume of consumable goods it uses. A recent hospitality industry outlook (Select USA., 2019) shows that the hospitality sector is one of the industries in the world with great economic potential and projects that over the next few years the overall market capitalization of hospitality-related segments (e.g., food and beverage, travel and tourism) will hit $12.5 trillion. The hospitality grouping of industries in this study includes (a) travel & leisure, (b) airlines, (c) gambling, (d) hotels, (e) recreational service, (f) restaurants & bars, and (g) travel & tourism, according to industry classification benchmarks launched by DJSI in 2005.

Since 1980 the United Nations World Tourism Organization (UNWTO) has promoted the development of sustainable tourism by requiring tourism-related businesses to conform to its norms that encourage the development of sustainable tourism (UNWTO, 2017). Consequently, increasing numbers of leaders in the hotel industry have committed to managing their businesses responsibly. InterContinental Hotels Group (IHG®), Hilton Hotels Corp, Starwood Hotels and Resorts Worldwide, Hyatt Hotels Corporation, and many more have pledged to establish a *Code of Business Conduct and Ethics* to reflect their commitments to sustainability and to provide a guide for making ethical business decisions. The global leisure industry leader, Walt Disney Company, announced a guided environmental management policy with long-term goals in 2009 with the hope of reducing greenhouse gas emissions, waste, electricity and energy consumption, and their impact on water resources and ecosystems to promote an eco-friendly and socially responsible tourism industry.

The hospitality sector is continuously and prosperously growing and developing. According to the report of the 2017 World Economic Forum, global tourism and travel industry revenue accounts for 10% of total global GDP, and has a pace of development that is much faster than the global economic development average. Given the tremendous economic impact, leaders from across sectors of the hospitality industry understand how vital sustainability leadership is. For example, IHG®, with its 5518 hotels and 825,746 rooms, commits to positively impacting the lives of everyone who interacts with the firm (InterContinental Hotels Group, 2018). McDonald's (McDonald's®) operates 37,855 restaurants worldwide as of 2018 (Statista, 2019) and is committed to conducting business in a fair and ethical manner in order to meet the needs of its stakeholders. McDonald's® established the supplier quality index to ensure the product processes offered by its suppliers comply with McDonald's standards for social responsibility, environmental sustainability, and animal welfare standards (McDonald's Corporation, 2018). Additionally, Starbucks Corporation (Starbucks®), which has 14,606 company-operated stores in the United States (Statista, 2019), established a mission statement that reflects the values of Starbucks® ESG with its coffee and farmer equity practice (C.A.F.E) in 2001 – an initiative that committed to attaining 99% ethically-sourced coffee, pioneering green building practices in their store portfolio, and contributing millions of hours in community service to environmental leadership. It is evident that companies in the hospitality sector want to incentivize their impacts on sustainable performance. Thus, understanding the impacts of DJSI constituent changes on such companies' financial performance is beneficial to investors or other stakeholders as an SRI signal for those who wish to invest in hospitality companies that manage responsibly.

2.2. SRI index

Socially responsible investing is a modern investment strategy that takes into account both financial performance and social/environmental impacts on society. With the proliferation of economic and financial globalization, investors are focusing on broader dynamics such as social effect, employee and consumer satisfaction, and public influence as their investment strategy. The origins of the SRI concept can be traced back to the early 20th century (Bragdon & Marlin, 1972; Moskowitz, 1972), when the Methodist church founded one of the first retirement pension funds in 1908. It was established that the church would not invest in any enterprise that involved the manufacture of products or employed practices that were counter to the principles of Methodism – for example, the manufacture of armaments, alcohol and tobacco, or the use

[2] Both stock prices and financial ratios are used in this paper to reflect the CFP.

of child labor (United Methodist Church, 2016). In 1970, as other new funds began to develop, the concept grew in acceptance. The *Pax World Balanced* Fund and the *Dreyfus Third Century* Fund were two of the first socially responsible funds.

The total money flows of global SRI account for one-third of the tracked assets, indicating that companies are paying greater attention to sustainable or green investment trends (Global Sustainable Investment Alliance, 2019). From 1997 to 2003, the total assets of SRI increased by 55% in the United States (Girard, Rahman, & Stone, 2007). The European SRI market started a little later, first appearing in the United Kingdom in 1980, but still experienced remarkable growth with an increase of about 87% since 2008 (Eurosfi, 2010), demonstrating that the European region, after the United States, is another burgeoning market for SRI. Due to the high demand by SRI fund managers in screening targets for investment, and also reflecting the market behavior and overall performance of SRI funds, some SRI institutions and internationally well-known index companies and even exchanges have created SRI indices. An SRI index promotes a corporation's CSR performance through the power of capital markets and provides reassurance for investors that constituent companies are screened, monitored, and assessed in accordance with objective ESG criteria. Current major SRI indices include the Dow Jones Sustainability Global Indexes, Financial Times Stock Exchange 4 Good (FTSE4Good), and Johannesburg Stock Exchange (JSE). The importance of ESG to a company's bottom line is indisputable; however, due to information asymmetry, stakeholders may not always understand whether or not a company implements ESG for true sustainable development. For this reason, an SRI index is vital to providing investors with a better understanding of a company's sustainability efforts using real-time data.

2.3. DJSI

Starting in the early 2000s, DJSI has been increasingly viewed as an effective tool for helping corporations assess how well their ESG practices are doing over time and in relation to their corporate social responsibility commitments (Lopez, Garcia, & Rodriguez, 2007; Consolandi, Jaisawl-Dale, Poggiani, & Vercelli, 2008; Artiach, Lee, Nelson, & Walker, 2010; Robinson et al., 2011; Cheung & Eduardo, 2013). The Dow Jones Sustainability Index is the first global SRI index and is one of the most prestigious corporate sustainability rankings developed by Dow Jones Company and Sustainable Asset Management (RobecoSAM). A listing in the DJSI has become one of the most highly sought-after corporate rankings (Ritchie & Dowlatabadi, 2014), evidencing the increased importance placed on sustainability and social responsibility by businesses and consumers. Corporations use the listings, which are based on the environmental, social, and governance performance of industry leaders, to promote their ESG leadership role and to increase consumer and investor awareness of the company's commitment to ESG initiatives.

The DJSI family is composed of benchmarks that range from regions to countries, such as DJSI World, DJSI North America, DJSI Europe, DJSI Asia Pacific, and DJSI Australia. Research has found that companies selected for DJSI create long-term shareholder value (Bebbington, 2001); as a result, nearly half of the companies on the DJSI include their listing in corporate sustainability reports and/or on the company website as part of a strategy to generate short-term stakeholder profits and long-term value-added investments (Searcy & Elkhawas, 2012). A trend has arisen in which companies seek out DJSI selection in an effort to satisfy the capital market's sustainable investment principles as well as to meet stakeholder expectations for a sustainable commitment.

Due to the DJSI's comprehensive sustainability assessment methodology[3] and broad family of global, national, and regional DJSI benchmarks, this study employs the DJSI to gain an in-depth and holistic understanding of whether a firm's value and financial performance is affected by the company's addition to and/or deletion from the DJSI components.

3. Hypothesis development

The hospitality industry has become more competitive, with a variety of operational formats competing for market share. The sustainability concept has been a successful mechanism for managers to expand their business. According to a DJSI North America report issued on September 24, 2018, by RobecoSAM, hospitality companies that were selected to the DJSI North America Composite Index in 2017 exhibited a strong inclusion growth rate of 75% from 2016. The evidence shows that hospitality companies are maintaining continuous interests for corporate social responsibility commitment actions.

The literature has shown increasing interest in the relationship between DJSI constituent announcements and firm stock price (Ameer & Othman, 2012; Cheung & Eduardo, 2013; Consolandi et al., 2008; Hawn, Chatterji, & Mitchell, 2018; Lourenco, Challen, Branco, & Curto, 2014; Oberndorfer, Schmidt, Wagner, & Ziegler, 2013; Perez-Calderon, Milanes-Montero, & Ortega-Rossell, 2012; Schaeffer, Borba, Rathmann, Saklo, & Branco, 2012; Searcy & Elkhawas, 2012; Ziegler & Schroder, 2010). All seem to agree that being included on the DJSI adds value to corporations and can enhance corporate image, promote corporate reputation (Searcy & Elkhawas, 2012), and reduce contractual costs with stakeholders (Bebbington, 2001) such that companies improve their profitability and exceed financial return expectations (Consolandi et al., 2008; Robinson et al., 2011). However, one problem with this area of research is that most previous studies were conducted with top-performing companies, but 90% of those industry leaders are non-service firms, making it difficult to apply the results to the service industry. We have not found any publications that report on how ESG achievement influences stock prices in the service industry. With a noticeable absence of research dealing with service-oriented companies such as hospitality businesses, we propose the following hypotheses.

Hypothesis1a. Compared with non-hospitality firms, hospitality firms experience better CFP after they are added to the DJSI component list.

Hypothesis1b. Compared with non-hospitality firms, hospitality firms experience worse CFP after they are deleted from the DJSI component list.

Expanded organizational ESG achievement approaches, such as cumulative average abnormal returns (CAARs) surrounding the event day, have been adopted by firms in the corporate sector to help avoid any bias in the results created by compounding daily average abnormal returns (AARs). Fama, Fisher, Jensen, and Roll (1969) introduced CAAR as statistical analysis in addition to AAR so as to audit stock price performances in terms of the aggregate effect of the abnormal returns. Including CAAR calculations in this study can provide evidence showing the long-term success of sample companies of DJSI on the integrated audit of the financial performance measures in 20-day and wider event windows. In the current complex business environment, managers of hospitality businesses are increasingly treating tangible stock price reactions as an effective method to assess organizational CSR accomplishment to attract investors. Based on the discussion, we propose the following two hypotheses.

Hypothesis2a. : Surrounding the announcement day, hospitality companies added to the DJSI component list show better CFP than do

[3] RobecoSAM AG. (2019). *DJSI review results September 2018*. https://www.robecosam.com/media/0/2/1/02188034046af5db919d7ce87dd72b98_djsi-review-presentation-results_tcm1016-14658.pdf.

Table 1
Number of sample companies 2005–2017

Year	# of Component Companies in DJSI	# of Companies Added in DJSI	# of Companies Deleted from DJSI	# of HOSP Companies Added in DJSI	# of HOSP Companies Deleted from DJSI
2005	111	–	–	15	–
2006	113	18	14	1	1
2007*	120	17	9	1	1
2008*	124	16	14	1	1
2009	139	24	11	2	0
2010	136	20	22	5	3
2011	143	19	12	5	1
2012	140	17	21	1	1
2013	140	22	22	4	5
2014	149	19	11	2	2
2015	145	15	17	2	2
2016	146	18	15	2	2
2017	150	21	19	6	2

Note: Due to the global financial crisis period, the data of 2007 and 2008 are deleted from the sample period to avoid any possible estimation bias.

non-hospitality companies.

Hypothesis2b. : Surrounding the announcement day, hospitality companies deleted from the DJSI component list show worse CFP than do non-hospitality companies.

The essence of ESG focuses on the practice of improving the environment, society, the economy, and other associated risks that can affect a company's future. Companies often have to inflate resources and funds in the short term in order to achieve its ESG goals. The DJSI is a strategic investment tool that not only links organizational ESG commitments, structures, and prospects but also combines financial performance appraisal indicators. Thus, companies consider participating in the DJSI selection process as an approach for measuring their tangible ESG performance, which can transform into long-term stock investing strategies and innovative company values to attract potential investors. The findings of Lopez et al. (2007) imply that while DJSI selection is not entirely conducive to European firms' financial performance in the short term, long-term CFP growth can be expected. With respect to the asymmetric effect in the financial market, Morse (1980) and Chen and Kutan (2016) confirmed that negative news generates stronger and longer impacts on stock returns that does positive news. The following testable Hypothesis is thus proposed.

Hypothesis 3. When a new DJSI component list is announced, the deletion events generate greater and longer impacts on sample companies' stock returns than do the addition events.

4. Data and methodology

4.1. Data

This study examines whether the announcements of new DJSI component lists affect hospitality versus non-hospitality firms' financial performances, as well as whether asymmetric effects exist when a company is announced to be added to (good news) and/or removed from (bad news) DJSI. The sample companies consist of all the components in DJSI during the period 2005 to 2017, but, due to data availability, we only select companies that are currently listed in the United States or Canada. Avoiding any possible estimation bias, we exclude the period of the global financial crisis (2007–2008) from the original sample period and screen the data to ensure that no other significant information events occur around the announcement dates of new DJSI component lists. Table 1 shows the number of companies involved in this study. The data include daily stock prices of all sample companies and benchmark index prices, totaling 161 daily observations for the price series and for each firm's stock prices surrounding the event day.[4] The data are sourced from the CRSP database and Bloomberg.

4.2. Methodology

In an efficient market, the effect of a news report or event should be reflected in stock prices immediately following the announcement or publication. Customarily, market reaction is measured using residual analysis. Fama et al. (1969) introduced the concept of an event study, and his research design has inspired a large number of empirical studies on market efficiency, allowing us to accumulate evidence that stock prices respond in apparently clever ways to information. Our paper also employs an event study. Empirical evidence shows that stock returns exhibit clusters of outliers, implying that the volatility series evolves over time in a non-linear fashion.[5] We therefore use an event study that assumes that returns follow an EGARCH (1,1) process in order to examine the effects of new DJSI list announcements on the stock returns of the sample firms.

Unlike most previous research, we utilize the event study model with an EGARCH (1,1) estimation to calculate the abnormal returns realized from investing in sample stocks. The abnormal returns are calculated around the announcement date (AD). Specifically, we define the abnormal return (AR) for stock (firm) i on day t as:

$$AR_{i,t} = R_{i,t} - (\widehat{\alpha}_i + \widehat{\beta}_i R_{m,t}) = \varepsilon_{i,t}, \quad (1)$$

where $R_{i,t}$ is the return on stock i on day t, $R_{m,t}$ is the benchmark index return on day t, $\varepsilon_{i,t}|\Psi_{t-1}\tilde{}(0, h_{i,t})$, and Ψ_{t-i} denotes all information available at time $t-1$. The conditional variance in the EGARCH (1,1) case is:

$$\log h_{i,t} = \omega_i + \delta_i \log h_{i,t-1} + \gamma_i |z_{i,t-1}| + \phi_i z_{i,t-1}, \quad (2)$$

where $z_{i,t} = \varepsilon_{i,t}/\sqrt{h_{i,t}}$. The coefficients of $\widehat{\alpha}_i$, $\widehat{\beta}_i$, and other parameters (ω_i, δ_i, γ_i, and ϕ_i) are estimated based on the market model by using the maximum likelihood (EGARCH process) and by modeling $R_{i,t}$ for the 120-day (about half year) period (−140, −21) - that is, 140 trading days

[4] The number of days for the estimation period and the event window are 120 days and 41 days, respectively. The benchmark indices are S&P 500 Index and S&P/TSX Composite Index.

[5] The application of the classical event study methodology, without checking the behavior of security returns for stochastic beta and GARCH (Generalized Autoregressive Conditional Heteroscedasticity) effects, may very well cause researchers to draw inappropriate conclusions, as pointed out by Brockett, Chen, and Garven (1999). Cao and Tsay (1992) and Corhay and Tourani Rad (1996) find that the GARCH-family models are superior to the OLS approaches.

Table 2
Daily average abnormal returns - addition events.

	All (N = 290)			Non-HOSP (N = 251)			HOSP (N = 39)		
Day	AAR	Z-value		AAR	Z-value		AAR	Z-value	
−20	−0.14%	−1.260		−0.08%	−0.703		−0.47%	−1.652	*
−19	0.08%	−0.086		0.07%	−0.451		0.16%	0.910	
−18	−0.10%	−0.673		−0.09%	−0.703		−0.13%	−0.051	
−17	−0.01%	−0.790		−0.02%	−0.956		0.10%	0.270	
−16	−0.06%	−1.730	*	−0.08%	−1.713	*	0.11%	−0.371	
−15	0.11%	2.264	**	0.13%	3.084	***	−0.04%	−1.652	*
−14	−0.02%	0.854		−0.05%	0.812		0.12%	0.270	
−13	0.07%	0.384		0.06%	0.686		0.13%	−0.691	
−12	0.08%	1.206		0.12%	1.948	*	−0.24%	−1.652	*
−11	0.11%	0.972		0.08%	0.686		0.29%	0.910	
−10	−0.06%	−0.203		−0.02%	0.180		−0.28%	−1.012	
−9	−0.13%	−3.140	***	−0.09%	−2.471	**	−0.37%	−2.293	**
−8	−0.14%	−1.847	*	−0.12%	−1.335		−0.31%	−1.652	*
−7	0.03%	0.267		0.07%	0.686		−0.22%	−1.012	
−6	0.20%	1.794	*	0.12%	1.191		0.70%	1.871	*
−5	0.21%	2.381	**	0.18%	1.948	*	0.40%	1.551	
−4	−0.04%	−1.965	**	−0.07%	−2.218	**	0.18%	0.270	
−3	−0.01%	−0.086		−0.05%	−0.451		0.22%	0.910	
−2	0.09%	0.972		0.08%	1.191		0.12%	−0.371	
−1	0.05%	0.737		0.07%	0.559		−0.05%	0.590	
0	−0.07%	1.089		−0.09%	0.559		0.02%	1.651	*
1	−0.10%	−0.321		−0.07%	−0.451		−0.27%	0.270	
2	0.06%	1.441		−0.06%	0.180		0.79%	3.473	***
3	−0.10%	0.032		−0.11%	−0.198		−0.02%	0.590	
4	0.01%	0.619		−0.08%	−0.072		0.57%	1.871	*
5	−0.04%	0.032		−0.04%	0.054		−0.05%	−0.051	
6	−0.07%	−0.086		−0.06%	0.180		−0.16%	−0.691	
7	−0.11%	−2.317	**	−0.06%	−1.587		−0.40%	−2.293	**
8	0.03%	1.559		0.02%	1.317		0.09%	1.910	*
9	−0.01%	0.737		−0.08%	0.433		0.44%	0.910	
10	−0.09%	−1.378		−0.11%	−1.335		0.00%	−0.371	
11	0.13%	0.502		0.14%	0.686		0.04%	−0.371	
12	0.00%	1.794	*	−0.07%	0.559		0.41%	3.473	***
13	0.01%	−0.438		0.01%	−0.198		−0.04%	−0.691	
14	0.00%	1.206		−0.05%	0.938		0.37%	0.910	
15	−0.20%	−1.495		−0.20%	−1.335		−0.23%	−0.691	
16	0.00%	−0.790		−0.05%	−0.830		0.29%	−0.051	
17	−0.02%	−0.438		−0.02%	−0.325		−0.06%	−0.371	***
18	−0.01%	0.267		−0.02%	0.307		0.06%	−0.051	
19	−0.06%	−0.086		−0.01%	0.433		−0.35%	−1.332	
20	−0.07%	0.737		−0.10%	0.686		0.14%	0.270	

Notes: The symbols *, **, and *** denote statistical significance at the 0.10, 0.05, and 0.01 levels, respectively, using a two-tail test. N is the total number of observation firms during the sample period.

before the event date.

We also calculate the cumulative abnormal return (CAR) for each individual firm *i* first, covering 20 trading days pre-AD to 20 days post-AD.

$$CAR_{i,t} = \sum_{T=-20}^{20} AR_{i,t}. \tag{3}$$

The cross-sectional average of abnormal returns (AARs) and cross-sectional cumulative average abnormal returns (CAARs) are then estimated to investigate their statistical significance. We calculate AARs for each trading day within the event window by:

$$AAR_{i,t} = \frac{1}{N}\sum_{i=1}^{N} AR_{i,t}, \tag{4}$$

where N is the number of stocks with ARs during day t. We calculate CAARs over the event window from day −20 until day 20 by:

$$CAAR_{i,t} = \frac{1}{N}\sum_{i=1}^{N} CAR_{i,t}. \tag{5}$$

This paper employs the generalized sign Z-test to examine whether the number of stocks with positive cumulative abnormal returns in the event window exceeds the number expected in the absence of abnormal performance. The non-parametric test statistic in the stock return setting stems from the results of recent return-based studies (e.g., Bartholdy, Olson, & Peare, 2007; Campbell, Polk, & Vuolteenaho, 2010; Campbell & Wasley, 1996; Corrado, 1989), which find it to be more powerful in detecting abnormal security return performance when compared to the parametric test statistic (e.g., T-test). The number expected is based on the fraction of positive abnormal returns in the 120-day estimation period.

$$\hat{p} = \frac{1}{n}\sum_{i=1}^{n}\frac{1}{120}\sum_{t=E_1}^{E_{120}} S_{i,t}, \tag{6}$$

Where:

$$S_{i,t} = \begin{Bmatrix} 1 & \text{if } AR_{i,t} > 0 \\ 0 & \text{otherwise} \end{Bmatrix}. \tag{7}$$

The test statistic uses the normal approximation to the binomial distribution with parameter$\hat{p}$. Define *w*as the number of stocks in the event window for which the cumulative abnormal return $CAAR_{i,(T_1,T_2)}$ is positive. The generalized sign Z (non-parametric) test statistic is:

$$Z_G = \frac{w - n\hat{p}}{[n\hat{p}(1-\hat{p})]^{1/2}}. \tag{8}$$

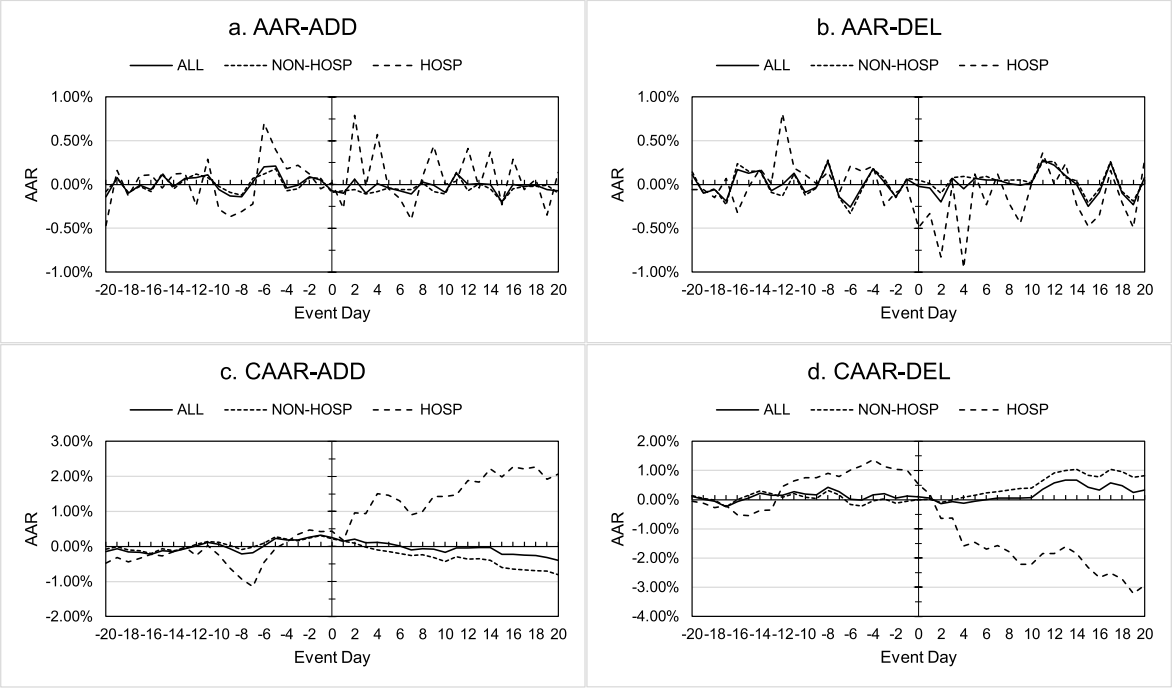

Fig. 1. AARs and CAARs during the event window of (−20, +20).

To make sure our estimation period does not affect the results (robustness check), we also use a 240-day (one year) period to estimate the EGARCH (1,1) model for the robustness test.

We further explore cross-sectional variation in the absolute values of the abnormal returns. In fact, cross-sectional AARs and CAARs do not control for other exogenous factors that might cause a variation in the *AAR* and *CAAR* values. Therefore, we estimate regressions of the following form [6]

$$\mathrm{AAR}_{i,t} \text{ or } \mathrm{CAAR}_{i,(T_1,T_2)} = a + \sum_{\gamma=1}^{11} b_\gamma X_\gamma + \varepsilon_R i = 1, \ldots, 426, \quad (9)$$

where X contains 10 weakly exogenous variables. These 10 variables are, respectively: the natural logarithm of the years since establishment (AGE), the natural logarithm of the market capitalization of firm equity (SIZE), Tobin's Q ratio (Q),[7] ROE ratio (ROE) in the event year, the natural logarithm of the number of board members (BDM) (*see* Yermack, 1996, and Cheng, 2008), institutional ownership (IO) (*see* Chaganti & Damanpour, 1991),[8] and three dummy variables including the gender of CEO (GEN) (*see* Khan and Vieito, 2013), the firm's first addition into DJSI (ADD), and the firm's first deletion from DJSI (DEL).[9] In order to further understand the relationships between a firm's abnormal returns and ROE when the firm is added into or deleted from DJSI, two interaction variables are then added to the cross-sectional regression model: $\mathrm{ROE}_{t+1} \times \mathrm{ADD}$ and $\mathrm{ROE}_{t-1} \times \mathrm{DEL}$.

[6] We measure here the absolute values of AAR and CCAR in equation (9) since the goal is to determine what kind of firm characteristics may increase the chance that stock prices from their equilibrium levels due to the events.

[7] Q-ratio of the firm's market value to its replacement value.

[8] Percent of stock owned by institutional investors.

[9] A dummy variable with the value of 1 if the CEO is female, the firm is added into DJSI for the first time, the firm is deleted from DJSI for the first time, and 0 otherwise.

5. Results and discussion

5.1. Daily abnormal performance

Table 1 shows the basic sample information of the study, and we find that the sample observations are fairly distributed during the study period. Table 2 and Fig. 1a and c presents the daily average abnormal returns (AARs) and cumulative average abnormal returns (CAARs) of the addition events for the overall sample (all firms) and non-hospitality/hospitality ones. The daily AARs are calculated over a −20 and + 20 period relative to the event day 0. The results indicate that the overall sample firms in the addition events experience several significant abnormal returns (signs are mixed) for two weeks (−9 to −4) prior to the publication of the DJSI component list, but the AARs following the event date are mostly negative and statistically insignificant except for day +7, implying that the information content does exist during the period of pre-publication of the DJSI component list.

We then divide all addition sample firms into two sub-categories by two different industries, non-hospitality (hereafter, Non-HOSP) and hospitality (hereafter, HOSP) firms, to estimate AARs. For Non-HOSP firms, AARs are mostly negative during the pre- and post-event periods, suggesting that such addition events for Non-HOSP firms might not be good news to investors. For HOSP firms, the AARs are positive but insignificant one week before the event day. The event day (day 0), day +2, and day +12 are statistically significantly positive, and the other daily AARs are either negative or insignificantly positive. We may conclude the AARs of HOSP firms during the event window (−20, +20) are more volatile than those of Non-HOSP firms (as presented in Fig. 1a), and the addition events do not consistently generate positive AARs for the sample firms.

Focusing on Fig. 1c, we find an interesting result for the sample firms, particularly for HOSP ones. For overall and Non-HOSP firms, their CAARs are relatively stable, and there are no obvious upward and downward patterns. The CAARs of HOSP firms, however, indicate an upward tendency when the HOSP sample firms are added to the DJSI component list, indicating that the DJSI addition announcements could still be good news to investors since positive impacts are found for HOSP firms (up to +2%) versus those for Non-HOSP ones. Therefore, the

Table 3
Daily average abnormal returns - deletion events.

	All (N = 136)			Non-HOSP (N = 118)			HOSP (N = 18)		
Day	AAR	Z-value		AAR	Z-value		AAR	Z-value	
−20	0.11%	0.487		0.14%	0.746		−0.06%	−0.570	
−19	−0.10%	−1.228		−0.10%	−1.464		−0.06%	0.373	
−18	−0.06%	−3.114	***	−0.05%	−2.753	***	−0.15%	−1.513	
−17	−0.19%	−1.056		−0.23%	−1.096		0.07%	−0.098	
−16	0.17%	−0.027		0.24%	0.009		−0.32%	−0.098	
−15	0.13%	−0.027		0.15%	0.377		−0.03%	−1.041	
−14	0.16%	−0.713		0.15%	−0.543		0.18%	−0.570	
−13	−0.07%	−1.228		−0.09%	−1.096		0.01%	−0.570	
−12	0.00%	−1.056		−0.13%	−1.280		0.81%	0.373	
−11	0.13%	0.487		0.12%	0.009		0.19%	1.316	
−10	−0.09%	−0.027		−0.12%	0.009		0.11%	−0.098	
−9	−0.03%	−1.571		−0.04%	−1.464		0.01%	−0.570	
−8	0.26%	1.345		0.28%	1.114		0.14%	0.845	
−7	−0.14%	0.316		−0.15%	0.193		−0.10%	0.373	
−6	−0.26%	−0.885		−0.33%	−1.096		0.21%	0.373	
−5	−0.03%	1.173		−0.06%	0.746		0.15%	1.316	
−4	0.18%	1.002		0.18%	0.746		0.21%	0.845	
−3	0.03%	−0.885		0.07%	−0.727		−0.24%	−1.857	*
−2	−0.14%	−0.027		−0.15%	−0.175		−0.09%	2.373	*
−1	0.06%	0.659		0.07%	0.746		−0.03%	−1.798	*
0	−0.02%	0.144		0.05%	0.746		−0.49%	−2.513	**
1	−0.04%	0.830		0.01%	1.114		−0.33%	−1.995	**
2	−0.20%	−0.027		−0.10%	−0.175		−0.83%	−2.373	**
3	0.07%	−0.027		0.08%	0.377		0.01%	−1.041	
4	−0.05%	0.659		0.09%	0.930		−0.95%	−2.570	**
5	0.07%	1.345		0.07%	1.482		0.12%	−0.098	
6	0.05%	0.487		0.09%	0.746		−0.23%	−2.107	**
7	0.05%	0.316		0.04%	0.930		0.12%	−1.713	*
8	0.01%	0.659		0.05%	0.562		−0.21%	0.373	
9	−0.01%	0.487		0.05%	0.562		−0.44%	−1.890	*
10	0.02%	0.487		0.02%	0.746		0.01%	−0.570	
11	0.28%	0.659		0.26%	0.193		0.36%	1.316	
12	0.22%	1.002		0.26%	1.298		0.00%	−0.570	
13	0.10%	1.002		0.08%	1.298		0.24%	−0.570	
14	0.00%	−0.713		0.04%	−0.543		−0.23%	−0.570	
15	−0.25%	−1.571		−0.21%	−1.096		−0.48%	−1.513	
16	−0.09%	−0.199		−0.05%	−0.727		−0.35%	1.316	
17	0.25%	2.889	***	0.26%	3.324	***	0.16%	−0.570	
18	−0.10%	−1.399		−0.08%	−1.096		−0.21%	−1.041	
19	−0.23%	−1.742	*	−0.19%	−1.280		−0.49%	−1.513	
20	0.08%	1.345		0.05%	0.746		0.27%	1.788	*

Note: Please see Table 2.

results support Hypothesis 1a that addition events generate greater positive impact on HOSP firms than on N–HOSP firms.

As seen in Table 3 and Fig. 1b and d, the AAR and CAAR results of the deletion events show different patterns. There are no significant AARs for the overall deletion firms during the period of −15 to +15 days, and similar results are found in the Non-HOSP sample. Interestingly enough, for HOSP firms, there are significantly negatively AARs surrounding the event day (day −3 through +9), indicating that firms being deleted from the DJSI component list exhibits negative news to investors. Fig. 1d also provides evidence that there is an obvious CAAR downward movement for HOSP firms and the CAARs are over −3% during the event window. Consistent with Hypothesis 1 b, such deletion events are bad news to HOSP firms, and investors have negative responses in the face of these deletion announcements.

Reviewing the results of Tables 2 and 3 and Fig. 1, we find an asymmetric effect with respect to the DJSI addition and deletion events similar to the asymmetric volatility phenomenon in financial markets - that is, negative news usually generates greater impacts on firms' stock returns than does positive news, because fear often outweighs greed (−3% versus +2%). Thus, Hypothesis 3 is supported. Investors should set up short positions for those firms when the deletion events are announced; conversely, earning positive returns could still be possible when investors realize that HOSP firms are added into the DJSI component list.

The CAARs of the specific event windows are also estimated, and the results are presented in Table 4. For the combined periods, HOSP firms have positive (negative) CAARs when those firms are added to (deleted from) DJSI component lists. However, the addition events are not that good to Non-HOSP firms since CAARs are significantly negative during the window of −2 to 2. For the event windows prior to the event date, we only find a positive CAAR for the overall addition sample during the window (−5, 0), implying that information leaking might not exist before the event day. The CAARs after the event date provide valuable information that the announcements of new DJSI component lists generate significant impacts on the sample firms, particularly for HOSP and Non-HOSP firms. There are positive (negative) CAARs for HOSP (Non-HOSP) firms within one or two weeks after the event days, and the negative impacts generated by the deletion events seem to last longer than do the addition events, because we also find significant negative CAAR during the window (1, 10). The above results are also supportive of Hypotheses 2a, 2 b, and 3, since the deletion events (bad news) versus addition events (good news) generate greater impacts on HOSP firms, and such negative impacts even last longer than positive ones. On the other hand, for Non-HOSP firms there are significant negative CAARs for the event windows after the event days, suggesting a price correction effect occurs even though the Non-HOSP firms are added to the DJSI component list. Hence, from the results mentioned above, we conclude that HOSP firms are more sensitive to both addition and deletion announcements of DJSI component lists since the events generate stronger impacts on the abnormal returns of HOSP firms versus their impacts on

Table 4
Daily cumulative average abnormal returns surrounding the event day.

	Addition Events						Deletion Events					
	All (N = 290)		Non–HOSP (N = 251)		HOSP (N = 39)		All (N = 136)		Non–HOSP (N = 118)		HOSP (N = 18)	
Combined periods	CAAR	Z-value	CAAR	Z-value	CAAR	Z-value	CAAR	Z-value	CAAR	Z-value	CAAR	Z-value
(-20, 20)	−0.64%	−0.438	−1.02%	−0.830	1.83%	0.910	0.23%	0.487	0.58%	0.562	−2.12%	−0.098
(-10, 10)	−0.36%	−0.086	−0.61%	−0.577	1.26%	1.231	−0.15%	0.316	0.16%	0.377	−2.21%	−0.098
(-5, 5)	0.04%	0.384	−0.24%	−0.451	1.88%	2.191 **	0.03%	0.830	0.36%	0.746	−2.14%	0.373
(-2, 2)	0.02%	−1.613	−0.07%	−2.092 **	0.59%	1.901 *	−0.28%	−0.027	−0.07%	0.193	−1.65%	−1.957 *
(-1, 1)	−0.12%	−1.378	−0.09%	−1.461	−0.28%	−0.051	0.01%	0.659	0.15%	1.114	−0.85%	−1.741 *
Prior to the event date												
(-2, 0)	0.07%	0.854	0.07%	0.686	0.09%	0.590	−0.09%	−0.027	−0.01%	0.562	−0.61%	−1.513
(-5, 0)	0.22%	1.794 *	0.12%	1.317	0.88%	1.551	0.08%	0.144	0.16%	0.175	−0.49%	0.845
(-10, −1)	0.18%	0.502	0.15%	0.180	0.32%	0.910	−0.17%	−0.027	−0.26%	0.009	0.39%	−0.098
After the event data												
(0, 2)	−0.12%	0.149	−0.22%	−0.830	0.51%	2.512 **	−0.22%	1.002	−0.02%	0.930	−1.56%	0.373
(0, 5)	−0.25%	−1.025	−0.44%	−2.092 **	0.99%	2.512 **	−0.09%	0.659	0.23%	1.114	−2.23%	−1.975 **
(1, 10)	−0.44%	−1.495	−0.65%	−2.092 **	0.90%	1.231	0.00%	1.345	0.36%	1.482	−2.35%	−2.098 **
(0, 20)	−0.80%	−2.200 **	−1.15%	−2.850 ***	1.47%	1.231	0.24%	1.002	0.75%	1.298	−3.11%	−0.570
CAAR Difference: HOSP minus (”-”) Non–HOSP					T-value						T-value	
(1, 10)			1.54%		1.692	*			−2.71%		2.475	**
(0, 20)			2.62%		2.179	**			−3.86%		1.974	**

Notes: This table represents the cumulative average abnormal returns surrounding the event date. ***, **, and * mean statistically significant at 1%, 5%, and 10%, respectively. (N) defines the number of observation firms.

the abnormal returns of non-HOSP firms. Moreover, the different CAAR patterns (the period since the event day) for Non-HOSP and HOSP firms are observed in Fig. 1c and d, we then conduct T-test to examine whether the CAARs of Non-HOSP and HOSP firms are statistical difference during the windows of 1–10 and 0 to 20. The results show that, for addition (deletion) events, the CAARs of HOSP firms are statistically significantly higher (lower) than those of Non-HOSP ones, indicating that Hypotheses 1a and 1 b are both supported in a statistical manner.

5.2. Monthly abnormal performance

The results analyzed in Tables 2–4 and Fig. 1 are the estimations of short-term (daily) abnormal returns. In Table 5, we perform long-term (monthly) estimations for AARs and CAARs to see whether the announcements of new DJSI component lists provide positive impacts on sample firms in the long run. For addition events, both overall and Non-HOSP firms have significant positive abnormal returns (1.29% and 1.76%, respectively) in months −1 and 2, and there are positive returns in months −2 and 1 for HOSP firms, implying such addition events could be good news and investors could use the good news to earn monthly positive abnormal returns. In addition, there are price correction effects for the overall sample and Non-HOSP firms since we find positive monthly abnormal returns in the event month (month 0) and negative abnormal returns following the event month (month 1). For the addition events, no CAAR is found during the event windows.

Focusing on the results of the deletion events, we only find significantly negative abnormal returns for the HOSP firms that are deleted from the DJSI component list before and after the event month and during several event windows. These results suggest that when DJSI removes HOSP firms from the list, investors feel pessimistic in terms of such events. Given the results of short- and long-term abnormal returns, the deletion events do affect the values of the sample firms more than they do to firms that are added into the DJSI lists, and the effect could even last longer. The above evidence shows that Hypothesis 3 is empirically supported once again.

5.3. Analysis of key financial ratios and cross-sectional regression models

Since determining CFP includes evaluating financial ratios, for testing Hypotheses 1 and 2, we further analyze several key financial ratios one year before and after the event date and use the Z test to examine whether the financial ratios are significantly statistically different when the firms are added to and deleted from the DJSI component lists. As shown in Table 6, for addition events, Total Asset T. O. and ROE before the events are significantly higher than those after the events for both Non-HOSP and HOSP firms, and HOSP firms also have a higher quick ratio, implying that firms generally have better financial performance in the last year before they are added into the lists. Comparing with the addition events, after the firms are removed from the DJSI component list, their financial performance becomes worse with respect to the quick ratio and ROE for Non-HOSP firms and with respect to the Current Ratio, Debt to Equity, Profit Margin, ROE, and ROA for HOSP firms. We contend that the sample firms usually have good financial ratios prior to the addition events; however, the firms' financial ratios become worse after they are announced to be deleted from the list, and such performances are more obvious and stronger for HOSP firms. Hypothesis 2 b is thus supported based on the above finding.

The results in Table 7 are further helpful in understanding what might affect abnormal returns upon the announcements of new DJSI component lists. By examining the relationships between the abnormal patterns and several important variables of firm characteristics, this table presents summary statistics using a regression of the absolute values of abnormal returns on exogenous variables, which are introduced in Section 4.2. First, no relationship between AGE and abnormal return is found since the coefficients of AGE are all insignificant. The SIZE coefficients are positive in the AAR(0), AAR(1), and CAAR(-2, 2) regression models, meaning the larger the size of a firm, the greater its stock price deviation. For firm performance category, both Q and ROE_t are positively related to abnormal returns – namely, greater AARs and CAARs would occur while sample firms own higher Tobin's Q and ROE_t ratios. In the category of corporate governance variables, the number of

Table 5
Monthly average abnormal returns and cumulative average abnormal returns.

Month	Addition Events									Deletion Events								
	All (N = 285)			Non–HOSP (N = 246)			HOSP (N = 39)			All (N = 136)			Non–HOSP (N = 118)			HOSP (N = 18)		
	CAAR	Z-value		CAAR	Z-value		CAAR	Z-value		CAAR	Z-value		CAAR	Z-value		CAAR	Z-value	
−2	0.24%	0.644		0.02%	0.054		1.61%	1.872	*	0.07%	0.106		0.45%	0.518		−2.38%	−2.316	**
−1	1.29%	3.472	***	1.76%	4.464	***	−1.67%	−1.940	*	0.97%	1.376		1.05%	1.210		0.46%	0.450	
0	0.52%	1.405		0.51%	1.309		0.56%	0.651		1.00%	1.415		1.31%	1.514		−1.06%	−1.030	
1	−0.04%	−0.116		−0.28%	−0.716		1.46%	1.699	*	0.39%	0.558		0.49%	0.566		−0.24%	−0.235	
2	0.63%	1.703	*	0.78%	1.977	**	−0.29%	−0.338		0.61%	0.860		0.58%	0.670		0.78%	0.757	
3	0.20%	0.536		0.23%	0.585		0.00%	0.003		−0.07%	−0.094		0.19%	0.214		−1.72%	−1.672	*
4	0.23%	0.620		0.39%	0.979		−0.75%	−0.867		1.69%	2.397	**	2.42%	2.790	***	−3.07%	−2.994	***
Windows																		
(-2,+4)	0.45%	0.463		0.91%	0.873		−2.41%	−1.060		−0.27%	−0.147		1.28%	0.557		−10.44%	−3.841	***
(-1,+4)	0.88%	0.970		1.48%	1.539		−2.91%	−1.381		0.81%	0.469		2.03%	0.957		−7.20%	−2.860	***
(0,+1)	0.28%	0.539		0.02%	0.041		1.92%	1.580		1.22%	1.225		1.57%	1.285		−1.09%	−0.753	
(0,+2)	0.62%	0.970		0.53%	0.773		1.23%	0.826		1.14%	0.935		1.52%	1.013		−1.34%	−0.750	
(0,+3)	0.44%	0.595		0.40%	0.503		0.73%	0.422		0.42%	0.296		1.03%	0.592		−3.57%	−1.739	*
(+1,+4)	0.17%	0.225		0.27%	0.343		−0.48%	−0.280		0.66%	0.471		1.63%	0.943		−5.70%	−2.772	***

Note: Please see Table 4.

board members (BDM) and institutional ownership (IO) are somewhat positive with abnormal returns – that is, such corporate governance variables might positively enlarge the abnormal patterns; however, CEO gender is not a key factor when analyzing the abnormal returns. As expected, the dummy variables of ADD and DEL affect the abnormal returns. More importantly, the results also show that the absolute values of the DEL coefficients are larger than that of the ADD coefficients. This result is consistent with the conclusions of Tables 2 and 3 In most cases, deletion events (bad news) can generate larger impacts on abnormal return than do addition events (good news). The coefficients of two interaction variables, $ROE_{t+1} \times$ ADD and $ROE_{t-1} \times$ DEL, also show interestingly results; the CAARs become larger (smaller) when together considering the factors of addition (deletion) events and the firm's annual ROE ratio after (before) the event year. Assessing the fit of regression models, the estimations are satisfied in terms of adjusted R^2, F values, and Durbin Watson tests (DW Test).

6. Conclusions and implications

Sustainable investing aims to identify companies that offer potential for strong financial returns, sustainable business practices, and positive societal impacts. This paper analyzes the impacts of DJSI's additions and deletions on hospitality firms' financial performance versus those impacts on non-hospitality firms. The results show that the financial performances of hospitality firms are more sensitive to changes in the DJSI component list since addition (deletion) events generate greater and longer positive (negative) impacts on hospitality firms than that on non-hospitality firms. Addition events seem not that good to non-hospitality firms, and such a result is consistent with the finding of Lopez et al. (2007). We find that only negative impacts on stock returns last longer when hospitality firms are deleted from the DJSI component list. In addition, ROE and total asset turnover ratios are statistically significantly different before and after both addition and deletion events occur. Finally, the results of the cross-sectional regression model further indicate that size, Tobin's Q, and institutional ownership might affect the levels of abnormal returns.

The present findings have implications for firm managers and investors. First, for industry professionals, this study provides firm managers with managerial implications for developing effective socially responsible investing marketing or investor relations strategies particularly when their companies are added to or deleted in DJSI constituent announcements. The results also provide investors with insights and guidance toward their investment decision-making by taking into consideration sustainability. Furthermore, the results can motivate the service industry to fully commit to sustainability as it appears there are positive stock price rewards for their ESG commitments.

Impact statement

Sustainability is at the core of any business nowadays. Ethical investing, which incorporates environmental, social, and governance (ESG) factors into an investment strategy and/or the allocation of capital, is a megatrend that no top management in a firm should ignore. The Dow Jones Sustainability North America Index (DJSI) is a reputational metric (a multi-dimensional sustainability assessment tool) that testifies to a firm's commitment to ESG causes and is also an excellent indicator to interpret the company's sustainability commitments. This research analyzes whether DJSI affects a hospitality firm's stock market value. Results indicate that hospitality firms' financial performance is more sensitive to addition or deletion events than other non-hospitality firms regardless of over the short run or long run. The findings motivate the hospitality industry to fully commit to sustainability as it appears there are positive stock price rewards that help consolidate firms' financial performance and positively benefit society.

Table 6
Key financial ratios one year before and after the event date and two sample Z test.

		Addition Events							Deletion Events						
		Non-Hospitality Firms			Hospitality Firms				Non-Hospitality Firms			Hospitality Firms			
Average Ratios	Definitions	Before Event	After Event	Diff. (Z Test)	Before Event	After Event	Diff. (Z Test)		Before Event	After Event	Diff. (Z Test)	Before Event	After Event	Diff. (Z Test)	
Current Ratio	CA ÷ CL	0.77	0.86	0.09	1.26	1.41	0.15		1.69	1.97	0.28	1.58	1.01	−0.57	*
Quick Ratio	(CA – Inv.) ÷ CL	1.76	1.62	−0.14	1.53	1.92	0.39	*	2.06	1.26	−0.80	*	1.09	1.03	−0.06	
Debt Ratio	TD ÷ TA	0.22	0.31	0.08	0.30	0.25	−0.05		0.45	0.47	0.02	0.58	0.49	−0.09	
Debt to Equity	TD ÷ TE	0.51	0.49	−0.02	0.42	0.40	−0.01		0.51	0.50	−0.01	0.42	0.62	0.20	*
Total Asset T. O.	Sales ÷ TA	0.89	0.95	0.06	*	0.37	0.59	0.22	*	0.51	0.57	0.06	0.29	0.27	−0.03	
Profit Margin	NI ÷ Sales	0.11	0.13	0.02	0.21	0.22	0.02		0.19	0.17	−0.02	0.12	0.08	−0.03	*
ROE	NI ÷ TE	0.44	0.48	0.14	*	0.30	0.44	0.13	**	0.45	0.33	−0.12	*	0.36	0.30	−0.06	***
ROA	NI ÷ TA	0.18	0.14	−0.04	0.21	0.12	−0.09		0.14	0.18	0.04	0.23	0.13	−0.10	*
N		251	251		39	39			118	118		18	18		

Notes: ***, **, and * mean statistically significant at 1%, 5%, and 10%, respectively. N is number of the Observations. CA: Current Assets, CL: Current Liabilities, COGS: Cost of Goods Sold, TA: Total Assets, NI: Net Income, TD: Total Debts, TE: Total Equities, Inv.: Inventory, T.O.: Turnover. (N) defines the number of observation firms.

Table 7
Results of cross-sectional regression models for all sample firms.

	AAR(-1)		AAR(0)		AAR(1)		CAAR(-2, 2)		CAAR(-5, 5)	
ln(AGE)	−0.0412		−0.1001		0.0613		−0.0452		0.0004	
ln(SIZE)	−0.0003		0.0013	*	0.0009	*	0.0302	*	0.1210	
Q	−0.0048		0.1572	*	0.0312		0.1721	**	−0.0023	
ROE_t	0.0248	*	−0.0065		0.0103	*	0.0279	*	0.0245	*
ln(BDM)	0.0315	*	0.0517		0.1084		−0.1181		0.0581	
IO	0.0162	*	0.0052	*	0.0084		0.0275	*	0.0038	
GEN	0.0101		−0.0036		−0.0198		−0.0430		−0.0118	
ADD	0.0057	*	0.0156	**	−0.1022		0.0112	*	0.0104	**
DEL	−0.0714		−0.0332	*	−0.0167	*	−0.0246	**	−0.0179	*
$ROE_{t+1} \times$ ADD							0.0080	*	0.0018	*
$ROE_{t-1} \times$ DEL							−0.0373	***	−0.0176	*
Intercept	0.1895	*	0.6200	**	0.0517	**	0.2753	*	0.1232	*
Adjusted R^2	0.0715		0.0632		0.1097		0.1365		0.1128	
F Value	4.3460	***	4.1672	***	3.0489	***	4.3634	***	5.3069	***
DW Test	2.1031		1.1854		2.3738		2.0246		2.1631	

Note: ***, **, and * mean statistically significant at 1%, 5%, and 10%, respectively.

Credit author statement

Ching-Hui (Joan) Su conceived of the presented idea; took the lead in writing the manuscript. **Chun-Da Chen** processed the data, performed the analysis, and wrote the manuscript. All authors contributed to the final manuscript.

Funding

This research was partially funded by Iowa State University (grant number: FSU 0000009).

Research involving human participants and/or animals

This research does not contain any studies with human participants or animals performed by any of the authors.

Declaration of competing interest

The authors declare that we have no conflict of interest.

References

Ameer, R., & Othman, R. (2012). Sustainability practices and corporate financial performance: A study based on the top global corporations. *Journal of Business Ethics, 108*, 61–79.
Artiach, T., Lee, D., Nelson, D., & Walker, J. (2010). The determinants of corporate sustainability performance. *Accounting and Finance, 50*(1), 31–51.
Bartholdy, J., Olson, D., & Peare, P. (2007). Conducting event studies on a small stock exchange. *The European Journal of Finance, 13*(3), 227–252.
Bebbington, J. (2001). Sustainable development: A review of the international development business and accounting literature. *Accounting Forum, 25*(2), 128–157.
Bloomberg. (2019). Retrieved from https://www.bloomberg.com/professional/blog/category/sustainable-investing/. (Accessed 10 October 2019).
Bragdon, J. H., & Marlin, J. (1972). Is pollution profitable? *Risk Management, 19*(4), 9–18.
Brockett, P. L., Chen, H. M., & Garven, J. R. (1999). A new stochastically flexible event methodology with application to Proposition 103. *Insurance: Mathematics and Economics, 25*(2), 197–217.
Campbell, J. Y., Polk, C., & Vuolteenaho, T. (2010). Growth or glamour? Fundamentals and systematic risk in stock returns. *Review of Financial Studies, 23*(1), 305–344.
Campbell, C. J., & Wasley, C. E. (1996). Measuring abnormal daily trading volume for samples of NYSE/ASE and NASDAQ securities using parametric and nonparametric test statistics. *Review of Quantitative Finance and Accounting, 6*(3), 309–326.
Cao, C. Q., & Tsay, R. S. (1992). Nonlinear time-series analysis of stock volatilities. *Journal of Applied Econometrics, 7*(S1), S165–S185.
Chaganti, R., & Damanpour, F. (1991). Institutional ownership, capital structure, and firm performance. *Strategic Management Journal, 12*(7), 479–491.
Cheng, S. (2008). Board size and the variability of corporate performance. *Journal of Financial Economics, 87*(1), 157–176.

Chen, C. D., & Kutan, A. M. (2016). Information transmission through rumors in stock markets: A new evidence. *The Journal of Behavioral Finance, 17*(4), 365–381.
Cheung, A. W. K., & Eduardo, R. (2013). The effect on price, liquidity and risk when stocks are added to and deleted from a sustainability index: Evidence from the Asia Pacific context. *Journal of Asian Economics, 24*(C), 51–65.
Chipeta, C., & Gladysek, O. (2012). The impact of socially responsible investment index constituent announcements on firm price: Evidence from the JSE. *South African Journal of Economic and Management Sciences, 15*(4), 429–439.
Consolandi, C., Jaisawl-Dale, A., Poggiani, E., & Vercelli, A. (2008). Global standards and ethical stock indexes: The case of Dow Jones sustainability STOXX index. *Journal of Business Ethics, 87*(1), 185–197.
Corhay, A., & Tourani Rad, A. (1996). Conditional heteroskedasticity adjusted market model and an event study. *The Quarterly Review of Economics and Finance, 36*(4), 529–538.
Corporation, McDonald's (2018). *McDonald's corporation 2018 annual report*. Retrieved from https://corporate.mcdonalds.com/content/dam/gwscorp/investor-relations-content/annual-reports/McDonalds_2018_Annual_Report.pdf. (Accessed 11 April 2019).
Corrado, C. J. (1989). A nonparametric test for abnormal security-price performance in event studies. *Journal of Financial Economics, 23*(2), 385–395.
Cvelbar, L. K., & Dwyer, L. (2013). An importance-performance analysis of sustainability factors for long-term strategy planning in Slovenian hotels. *Journal of Sustainable Tourism, 21*(3), 487–504.
De Grosbois, D. (2012). Corporate social responsibility reporting by the global hotel industry: Commitment, initiatives and performance. *International Journal of Hospitality Management, 31*(3), 896–905.
Eurosfi. (2010). *European SRI study 2014*. Retrieved from http://www.eurosif.org/wp-content/uploads/2014/09/Eurosif-SRI-Study-20142.pdf. (Accessed 10 November 2018).
Fama, E. F., Fisher, L., Jensen, M. C., & Roll, R. (1969). The adjustment of stock prices to new information. *International Economic Review, 10*(1), 1–21.
Girard, E. C., Rahman, H., & Stone, B. A. (2007). Socially responsible investments: Goody-two-shoes or bad to the bone? *Journal of Investing, 16*(1), 96–110.
Global Sustainable Investment Alliance. (2019). *2018 Global sustainable investment review*. Retrieved from http://www.gsi-alliance.org/wp-content/uploads/2019/03/GSIR_Review2018.3.28.pdf. (Accessed 19 March 2018).
Hawn, O., Chatterji, A. K., & Mitchell, W. (2018). Do investors actually value sustainability? New evidence from investor reactions to the Dow Jones sustainability index (DJSI). *Strategic Management Journal, 39*(4), 949–976.
Inoue, Y., & Lee, S. (2011). Effects of different dimensions of corporate social responsibility on corporate financial performance in tourism-related industries. *Tourism Management, 32*(4), 790–804.
InterContinental Hotels Group. (2018). *2017 responsible business executive summary report*. Retrieved from https://www.ihgplc.com/-/media/7556EC517E324903B57E8AB4DB895E83.ashx. (Accessed 12 February 2018).
Lopez, M. V., Garcia, A., & Rodriguez, L. (2007). Sustainable development and corporate performance: A study based on the Dow Jones sustainability index. *Journal of Business Ethics, 75*(3), 285–300.
Louche, C., & Lydenberg, S. (2012). From preaching to investing: Attitudes of religious organisations towards responsible investment. *Journal of Business Ethics, 110*, 301–320.
Lourenco, I. C., Challen, J. L., Branco, M. C., & Curto, J. D. (2014). The value relevance of reputation for sustainability leadership. *Journal of Business Ethics, 119*(1), 17–28.
Morse, D. (1980). Asymmetrical information in securities markets and trading volume. *Journal of Financial and Quantitative Analysis, 15*(5), 1129–1148.
Moskowitz, M. (1972). Choosing socially responsible stocks. *Business and Society Review, 1*(1), 71–75.
Oberndorfer, U., Schmidt, P., Wagner, M., & Ziegler, A. (2013). Does the stock market value the inclusion in a sustainability stock index? An event study analysis for German firms. *Journal of Environmental Economics and Management, 66*(3), 497–509.
Perez-Calderon, E., Milanes-Montero, P., & Ortega-Rossell, F. J. (2012). Environmental performance and firm value: Evidence from Dow Jones sustainability index Europe. *International Journal of Environmental Research, 6*(4), 1007–1014.
Ritchie, J., & Dowlatabadi, H. (2014). Understanding the shadow impacts of investment and divestment decisions: Adapting economic input–output models to calculate biophysical factors of financial returns. *Ecological Economics, 106*, 132–140.
Robinson, M., Kleffner, A., & Bertels, S. (2011). Signaling sustainability leadership: Empirical evidence of the value of DJSI membership. *Journal of Business Ethics, 101*(3), 493–505.
Schaeffer, R., Borba, B. S. M. C., Rathmann, R., Saklo, A., & Branco, D. A. C. (2012). Dow Jones sustainability index transmission to oil stock market returns: A GARCH approach. *Energy, 45*, 933–943.
Searcy, C., & Elkhawas, D. (2012). Corporate sustainability ratings: An investigation into how corporations use the Dow Jones sustainability index. *Journal of Cleaner Production, 35*, 79–92.
Select, U. S. A. (2019). *Travel, tourism & hospitality spotlight*. Retrieved from https://www.selectusa.gov/travel-tourism-and-hospitality-industry-united-states. (Accessed 28 June 2019).
Social Investment Forum. (2007). *2007 Report on socially responsible investing rends in the United States*. Washington, DC: Social Investment Forum.
Statista. (2018). *Number of Starbucks stores in the United States from 2005 to 2018*. Retrieved from https://www.statista.com/statistics/218360/number-of-starbucks-stores-in-the-us/. (Accessed 1 October 2019).
Statista. (2019). *McDonald's–Statistics & facts*. Retrieved from https://www.statista.com/topics/1444/mcdonalds/. (Accessed 25 September 2018).
United Methodist Church. (2016). *The book of resolutions of the united methodist church 2016*. Nashville, TN: The United Methodist Publish House.
United Nations World Commission on Environment and Development. (1987). *Report of the world commission on environment and development: Our common future*. New York, NY: Oxford University Press.
UNWTO. (2017). *World Tourism Day 2017 addresses the power of sustainable tourism for development*. Retrieved from http://media.unwto.org/press-release/2017-09-27/world-tourism-day-2017-addresses-power-sustainable-tourism-development. (Accessed 24 November 2017).
Urdangarin, J., & VanderBeek, B. (2015). *Six reasons to respond to the Dow Jones sustainability index survey*. Retrieved from https://www.greenbiz.com/article/six-reasons-respond-dow-jones-sustainability-index-survey. (Accessed 17 March 2018).
Wang, C.-J. (2014). Do ethical and sustainable practices matter? Effects of corporate citizenship on business performance in the hospitality industry. *International Journal of Contemporary Hospitality Management, 26*, 930–947.
World Business Council for Sustainable Development. (2011). *Collaboration, innovation, transformation ideas and inspiration to accelerate sustainable growth: A value chain approach*. Retrieved from https://www.wbcsd.org/Programs/People/Sustainable-Lifestyles/Resources/Collaboration-Innovation-Transformation-Ideas-and-Inspiration-to-Accelerate-Sustainable-Growth-A-value-chain-approach. (Accessed 2 December 2017).
World Economic Forum. (2017). *The travel & tourism competitiveness report 2017*. 0zerland: World Economic Forum Reports.
Yermack, D. L. (1996). Higher market valuation of companies with a small board of directors. *Journal of Financial Economics, 40*, 185–212.
Ziegler, A., & Schroder, M. (2010). What determines the inclusion in a sustainability stock index? A panel data analysis for European firms. *Ecological Economics, 69*(4), 848–856.

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