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Firm Characteristics, Industry Context, and Investor Reactions to Environmental CSR: A Stakeholder Theory Approach

James J. Cordeiro · Manish Tewari

Abstract We use an event study to capture the investor reaction to the first Newsweek Green Rankings in September 2009, a notable, multi-dimensional recent development in the rating of corporate environmental CSR performance. Drawing on stakeholder theory, we develop hypotheses about (a) market investor reaction to the disclosure of new, relevant corporate environmental performance in both the short and longer (6–12-month) term, (b) whether market investors' reaction reflects industry context, and (c) whether firm-level contextual variables representing firm size, and market legitimacy significantly impacts the investor reaction. We find that, for the sample of the largest 500 US firms ranked by Newsweek, investors react positively both to the raw and within-industry rankings of green performance in terms of both short-term and longer-term (up to 12 months) returns. Moreover, the investor reaction is significantly influenced by contextual variables such as firm size and firm market legitimacy. Our results are compatible with the inference that rating agencies like Newsweek serve a valuable information dissemination function such that investors in better ranked firms anticipate larger future cash flows due to more positive reactions from key stakeholders such as environmentally-conscious customers, employees, NGOs, regulators, and thus reward these firms with stock price increases. Finally, larger, more visible firms benefit more, while firms which have more market legitimacy (represented by past financial performance) benefit less. We believe these findings will be of considerable interest to scholars of environmental corporate social responsibility.

Keywords Corporate sustainability · Stock market performance · Stakeholder management · Newsweek Green Rankings · Legitimacy

Introduction

The question of whether it pays firms to be "green," i.e., whether firms that achieve superior environmental corporate social responsibility (CSR) performance perform better financially in terms of stock or accounting profit returns is an important one. Clearly, firms are more likely to invest in green initiatives if they believe that these investments make their owners wealthier. Alternatively, the lack of a positive relationship between green performance and financial performance is likely to suppress firm efforts and hold back progress toward a sustainable future.

However, despite the voluminous number of studies that have sought to address this issue, the cumulative evidence to date is largely inconclusive (see reviews by Ambec and Lanoie 2008; Berchichi and King 2007). As discussed by Lyon and Maxwell (2013), it is very hard to establish whether environmental CSR (green performance) pays financially either by using cross-sectional studies (which do not address possible reverse causality in the relationship between environmental CSR and firm financial performance) or more advanced panel studies (which must deal with concerns about appropriate length of lags, endogeneity, sufficient controls, and autocorrelation).

One approach that is especially promising in terms of dealing with the issue of reverse causality is the use of

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event studies which assess the immediate stock market reaction to the announcement of significant new information about the firm's environmental performance. To date, a majority of the recent event studies in this area (e.g., Cheung 2011; Consolandi et al. 2009; Lourenço et al. 2013; Lackmann et al. 2012; Robinson et al. 2011), with the exception of Lyon and Maxwell (2013) tend to use additions or deletions from the Dow Jones Sustainability Index (DJSI) or related indices as the relevant measure of sustainability performance. However, this is problematic when trying to gage the investor response to corporate *environmental* performance because as Lourenco et al. (2013) point out in the case of the DJSI studies: "*The emphasis on economic factors to the detriment of either social or environmental factors is difficult to reconcile with the definition of sustainable development*" (p. 5). The DJSI studies in other words cannot claim to be studying environmental performance *per se*. In addition, there is the concern that DJSI membership may be unduly influenced by what firm's chose to disclose (Cho et al. 2012).

In contrast, following Lyon and Shimshack (2012), we study the immediate and direct investor reaction to a clearly defined, discrete event (in this case the Newsweek 2009 Green Rankings release on September 21, 2009) that is clearly and solely related to corporate environmental performance. This allows us to sidestep the majority of the concerns detailed above. The event study directly measures the immediate stockholder reaction to the updated information about firms' environmental CSR that the release of the rankings by Newsweek conveys to the firm's stockholders and to the firm's other stakeholders such as its customers, employees, regulators, NGOs, and the like. As will be discussed shortly, these rankings arguably provide, for the first time, a comprehensive assessment of US firms' physical impact on the environment, their environmental management processes, and their environmental reputation based on data from reputed third parties. Our first major contribution is that we go beyond Lyon and Shimshack (2012) in studying not only the immediate, short-term investor reaction but also the longer-term (6, 12, & 18 month) performance of portfolios formed on the basis of the rankings.

We also develop stakeholder theory-based explanations for our models. Specifically, as we summarize in Fig. 1, we expect that the new information about firms' environmental CSR conveyed by the Newsweek rankings will help the firm's stakeholders (who as a result of information constraints are not privy to all the details about a firm's environmental CSR (Greenwald and Stiglitz 1990)) revise and update their expectations and assessment of the firm's past and future environmental CSR performance. Using a stakeholder theory framework (e.g., Freeman 1984; Donaldson and Preston 1995; Jones 1995; Jones and Wicks
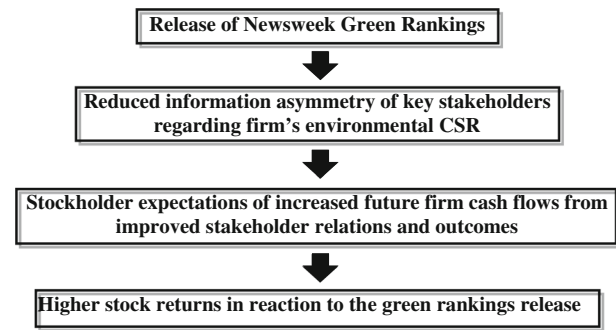
Fig. 1 Causal logic for stock market reaction to Newsweek Green Rankings

1999), and drawing especially on recent applications of the stakeholder view in the environmental management context (Delmas and Toffel 2011), we argue that the investor (stockholder) reaction in the stock market is likely related to revised stockholder expectations that the firm would benefit (lose) in terms of higher (lower) expected future cash flows from more (less) positive stakeholder perceptions of firms' environmental CSR related to the information disclosed by the Newsweek rankings. These benefits would be expected to result, for example, from retention and attraction of superior employees, gains in new business from customers with green preferences, lessening of costly resistance from NGOs and activists, or penalties, fines, and other sanctions from regulatory bodies. Consequently, firms with superior environmental CSR will benefit from more positive stockholder reactions.

Our second empirical contribution is to go beyond Lyon and Shimshack (2012) in investigating the salience of intra-industry rankings. Building on recent applications of stakeholder theory in the environmental CSR context (e.g., Delmas and Toffel 2004, 2008, 2011; Etzion 2007), we argue for the relevance of industry context as a dimension that must be controlled for in assessments of the informational importance of environmental CSR rankings such as the Newsweek Green Rankings we employ. Consequently, we test not only for the impact of the unadjusted rankings on the stock market reaction of investors, but also separately, the impact of within-industry rankings.

Using data on the entire sample of the 500 largest US firms ranked on environmental CSR by Newsweek in its 2009 Green Rankings, we find that the short-term investor reaction (consistent with the finding of Lyon and Shimshack 2012) as well as the 6–12 month portfolio performance (for portfolios based on 4 quartiles) is significantly and positively related to firms' environmental CSR performance as captured by the rankings of firms from 1 to 500. However, perhaps more importantly, we also find that the relationship between investor reaction and rankings holds even when we rank the firms on the basis of their

ranks within their industry consistent with our theoretical arguments about the salience of variations in stakeholder influence across industries.

Our final empirical contribution is to test the impact of two key firm characteristics on the relationship between the investor reaction and the Newsweek Green Rankings. These characteristics are firm size and firm legitimacy (measured in the short term using return on assets and in the long term using Tobin's Q). Consistent with our expectations, we find that larger firms, likely due to their greater visibility, benefit from a significantly stronger investor reaction to their ranking. However, contrary to expectations and earlier findings by Lyon and Shimshack (2012), we find that firms with superior financial performance have a significantly stronger negative reaction to their rankings.

We begin by reviewing the relevant theory and formulating our hypotheses. We then present our methods and findings, and conclude with a discussion of our findings and implications for theory, practice, and future research.

Theoretical Review and Hypothesis Development

Newsweek Green Rankings as a Valid Source of Environmental CSR Performance Disclosure

The first ever Newsweek Green Rankings released on September 21, 2009, elicited substantial interest from the public as well as investors and analysts given Newsweek's prominence and the significant national attention paid to the story in other national dailies, TV shows, and other media in the week or so following the release of the rankings.

For each of the ranked firms, Newsweek provided a Green Score which was a standardized and weighted composite of the following: (a) Environmental impact score (weighted 45 % of the final green score) using data on emissions and other environmental outcomes compiled by the prominent environmental accounting firm Trucost, (b) Green policies score (weighted 45 %) obtained from the "environmental strengths" factors for each firm compiled by KLD Research and Analytics and reflecting environmental practices such as pollution prevention or the production of environmentally beneficial products, and (c) Green reputation score (weighted 10 %) based on surveys of academics, industry executives, environmental, and corporate social responsibility experts by CorporateRegister.com as to whether firm led or lagged its sector in environmental performance, communication, and commitment. Firms were ranked from 1 (best environmental performance) to 500 (worst) based on the value of their green score within the entire sample. This ranking notably did not control for industry context or effects.

For the purposes of our event study, which assesses the stockholder reaction to the release of new information conveyed by a news event, the Newsweek release of the Green Ranking is attractive for several reasons. First, it provides a very comprehensive evaluation of a firm's environmental CSR, encompassing not only environmental impact data but also data on environmental processes and reputation. Second, the release date is unlikely to be confounded by firm-specific events that may also impact the investor reaction. Third, much of the information is likely to be new to the relevant parties we theorize about. Even if sophisticated investors such as Wall Street firms had access to some of the underlying data from Trucost and KLD, the complexity of environmental CSR performance ensures that the rankings are still likely to convey residual information that is useful. Most importantly, it is very likely that much of the information is new to relevant stakeholders such as customers, employees, and NGOs, and this is especially likely to be the case where firms have higher levels of information asymmetry.

Stakeholders and Environmental CSR Efforts

Modern stakeholder theory originated with Freeman's (1984), conceptual model (see also Freeman 2004) specifying that firms must go beyond merely maximizing stockholder value to address the interests of their stakeholders—groups and individuals who can affect or are affected by the organization's purpose. Stakeholders are seen as contributing to the firm's wealth-creating capacity and are also potential beneficiaries and bearers of the risk (Post et al. 2002). Satisfying the legitimate legal and moral claims of all stakeholders can thus be a means for the firm to maximize its total organizational wealth (Donaldson and Preston 1995; Jones 1995; Jones and Wicks 1999).

Recently, as Ayuso et al. (2012) observe, stakeholder theory can be connected with the literature of CSR broadly and corporate sustainability within CSR, as it provides a suitable theoretical framework for analyzing the relationship between business and society and to provide direction to the firm's managers (Clarkson 1995; Donaldson and Preston 1995; Waddock and Graves 1997). Converting corporate social responsibility into a business objective may perhaps be achieved best by the transformation of intangible social and environmental issues into tangible stakeholder interests (Clarkson 1995). Reflecting this, researchers have begun to explicitly apply stakeholder theory in the natural environment context largely by examining stakeholder pressures on firms to adopt proactive environmental strategies, routines, and innovations that they hope will result in improved environmental

performance (Delmas and Toffel 2004; Darnall et al. 2010; Delmas and Toffel 2011).

Delmas and Toffel (2004) were the first to provide a framework (subsequently updated in Delmas and Toffel 2011) describing how stakeholders, including regulators, customers, activists such as NGOs, local communities, and industry associations impose institutional pressures on plants and their parent companies. Arguably, relevant, appropriate, and effective firm responses (through environmental policies and strategies) become more urgent priorities when the firm faces stronger and more urgent pressures from key stakeholders such as those listed above. In the absence of adequate firm response, stakeholders can exact a toll on the firm's performance by (a) extracting fines and sanctions in the case of the government and (b) boycotting the firm in the case of employees and customers who value environmental concerns or damaging the firm's reputation in the case of activists and NGOs. Alternatively, firms with responses that satisfy key stakeholders such as the primary stakeholders we focus on above (Berman et al. 1999) benefit from the gains in revenue, employee talent, and reputation that result from superior environmental performance.

To the extent that firms find it imperative to accommodate stakeholder pressures both to avoid penalties, legal action, customer boycotts and the like as well as to derive competitive advantage from the sale of environmental products, processes, recruitment and retention of talented employees, and from gains in reputation (Delmas and Toffel 2008, 2011), the natural resource-based view (NRBV) of the firm (Hart 1995; Hart and Dowell 2011) suggests that the choice of the actual environmental policy or strategy chosen by a particular firm is likely to depend on that firm's unique stock of specific environmental resources and repertoire of relevant environmental capabilities (Etzion 2007) as well as the way that its managers' cognitive processes transform actual stakeholder pressures into perceived pressures (Delmas and Toffel 2004). The end result is that, given variations in these management cognitive processes and endowments of environmental resources and capabilities, firm responses are likely to be somewhat idiosyncratic even given similar pressures, underscoring the importance of disclosure of actual (rather than expected or unclear) firm environmental performance through rankings such as Newsweek's Green Rankings.

Stakeholders suffer from information asymmetry relative to the executives managing the firm (Greenwald and Stiglitz 1990). That is, they are not privy to all relevant information that impacts their interests. In the case of our present study, we focus on the environmental CSR practiced by the firm, which is of interest to environmentally-conscious customers, employees, NGOs, and regulators, and reasonably expect that the Newsweek Green Rankings,

because they are provided by a disinterested, reputable third party convey new information to the stakeholders, reducing the information asymmetry (Ramchander et al. 2012), and helping them revise and firm up their expectations concerning the firm's present and future environmental performance.

Ceteris paribus, stakeholders are likely to engage in higher (lower) levels of activism as a result of disclosure of inferior (superior) environmental performance and are also more likely to favor the firm with new or ongoing business or talented labor as a result of disclosure of superior (inferior) environmental performance. Since corporations must expend significant resources on negotiation, publicity, and similar efforts to combat stakeholder activism, or to attract customers and attract and retain talented employees, the firm's stockholders are likely to expect an increase in future expected cash flows to the firm in the wake of disclosure of superior environmental performance. This is especially likely to happen in the case of influential stakeholders such as customers, NGOs, and the like who have a direct relationship with the firm and impact on its operations and thus are especially salient in pressuring the firm's managers (Berman et al. 1999; Hillman and Keim 2001).

As a result of this expected increase in the firm's future cash flows from improved relations with its stakeholders in the wake of the new information conveyed by the Newsweek rankings, we predict that the firm's stockholders will react positively (negatively) to the disclosure of news about the firm's environmental CSR performance by demanding or selling more of the firm's stock at the time of the announcement,[1] thus, generating positive or negative stock returns, depending on the particular ranking that the firm receives. This argument is summarized in Fig. 1. Consequently, consistent with the findings by Lyon and Shimshack (2012), we expect to see a larger and more positive stock market reaction by investors to the disclosure of news about a firm's superior environmental performance (represented by the firm's higher ranking on the Newsweek Green Ranking which correlates very highly with the achievement of a higher Green Score).

H1a The initial short-term stock market reaction by investors will be positively, significantly related to the firm's position in the Newsweek Green Ranking.

Importantly, however, we go beyond the initial work on the Newsweek Green Rankings by Lyon and Shimshack (2012) to investigate not only the short-term stock market reaction by investors to the announcements of the green rankings but also the longer-term performance on portfolios formed based on

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[1] Like others employing event study methods, we assume that markets are informationally efficient, in the sense that investors (stockholders) react immediately to new information.

both the raw rankings and, separately, the rankings based on intra-industry rankings, as discussed below. The rationale for investigating the longer-term reaction in addition to the short-term reaction is based on the persistence of returns due to herding effects among investors.

Herding involves a group of investors trading in the same direction over a period of time, and can be attributed to both individuals' investors as well as institutional investors. It can potentially explain momentum in stock prices associated with a particular phenomenon or release of information (Nofsinger and Sias 1999).

It is important to differentiate between individual and institutional investors in the herding context. Shiller (1984) and DeLong et al. (1990), for example, posit that the influences of fad and fashion are likely to impact the investment decisions of individual investors who often trade on sentiment or factors other than information. Relatedly, Shleifer and Summers (1990) observe that individual investors may herd if they follow the same signals from brokerage house recommendations, popular market gurus, or forecasters or place greater importance on recent news overreact. In contrast, institutional investors respond to more salient information such as agency problems, firm and security characteristics. Nofsinger and Sias (1999) find that herding by institutions appears to impact prices to a greater extent than herding by individual investors, and that there is no evidence of return reversals in the 2 years following the herding period.

Lakonishok et al. (1992) provide evidence that the price movements due to institutional herding do not necessarily destabilize prices but that institutional investors may actually help market prices achieve equilibrium. For example, if institutional investors are better informed than individual investors, institutions will likely herd to undervalued stocks and away from overvalued stocks. Such herding can move prices toward, rather than away from, equilibrium values (Wermers 1999, Sias 2004, Froot et al. 1992, Bikhchandani et al. 1992, and Hirshleifer et al. 1994).

The findings reviewed above are pertinent for our sample and analyses: since we are analyzing stock price reactions to Newsweek Green Rating information disclosure for the largest US firms, we expect higher levels of herding behavior following this announcement, since larger firms will have larger institutional followings (Potter 1992). Environmental investments within the CSR context are increasingly used by institutional investors as a factor in investment decisions (Gillan et al. 2010)[2] given the potential for superior returns from investments in

environmentally superior performers (Consolandi et al. 2009). We expect that this higher level of herding behavior should result in persistence of abnormal returns for some time following the Newsweek announcement, until equilibrium is finally achieved. This leads to the hypothesis below:

H1b The longer-term stock market reaction by investors will be positively, significantly related to the firm's position in the Newsweek Green Ranking.

Salience of Industry Context in Evaluating Rankings of Firm Environmental Performance

As a unit of analysis for environmental issues, industry context has received substantial attention from researchers as a relevant unit of analysis for research on the natural environment. Etzion (2007) and Delmas and Toffel (2008), for example, note the environmental footprint-based distinction between "clean" industry sectors such as banking and other services and "dirty" industry sectors such as the chemical industry, the automotive industry, and the forestry/pulp/paper and the energy sectors traceable to variations across industry sectors in inputs, processes, outputs, and stakeholder salience.

More pertinent for our purpose is the explication by Etzion (2007) of how key stakeholders are concerned with industry as a discrete unit of analysis. We rely heavily on his framework in the discussion that follows. Consumer stakeholders differ widely in terms of their preferences for green product, process, and service features across industry product and service categories. In industries where firms sell "final goods" directly to the consumer (Arora and Casson 1996; McWilliams and Siegel 2001; King et al. 2002), there is more pressure to be environmentally proactive. Khanna and Anton (2002), for example, find that firms involved in the sale of final products directly to consumers are more likely to invest in high-quality environmental management systems than primary or intermediary good producers.

Additionally, given managerial cognitive limitations and reluctance to divulge relevant information that may well benefit the firm's rivals (Darnall and Carmin 2005; Potoski and Prakash 2005), consumers and current and future employees concerned about environmental performance and safety often infer industry-level behavior from the behavior of individual firms, effectively creating a "reputational commons" problem (King, et al. 2002) where major disasters at the firm level such as the Exxon Valdez, BP oil spill, or Three Mile Island can damage the reputation of the industry in which the firms are situated.

In the case of pressures from regulatory agencies, the substantial variation that exists in cross-industry environmental

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[2] These authors cite the fact that many institutional investors are signatories to the UN "Principles for Responsible Investment" (UNPRI) and that the CSR data provider Kynder, Lydenberg, and Domini (KLD) states that 31 of the top 50 institutional money managers worldwide use KLD research data in their investment decisions (p. 2).

footprints leads regulators with limited budgets (Potoski and Prakash 2005) to follow and to regulate dirtier industries more intensely, since these industries have appreciably greater negative impact on the environment. Moreover, given the more negative consequences of non-compliance with environmental regulations both in terms of enforced penalties, personal lawsuits targeting corporate officers with significant fines and incarceration, and the greater likelihood of targeting from NGOs, there is evidence that firms from dirtier industries are more likely to engage in proactive environmental strategies (Henriques and Sadorsky 1999; Hutchinson 1996).

NGO (non-governmental organization) stakeholders utilize various forms of activism including boycotts, protests, lawsuits, letter writing, and student mobilization campaigns (as in the case of Coca-Cola at the University of Michigan) to pressure corporations in order to significantly influence a shift to more proactive environmental behavior (Baron and Diermeier 2007; Doh and Guay 2006; Eesley and Lenox 2006). We would expect NGOs to be more active in pressuring firms, *ceteris paribus*, in industries that are dirtier or have a worse reputation due to a reputational commons effect.

Finally, the firm's existing and potential employees may also be a source of pressure on the firm to perform well environmentally. Research (Backhaus et al. 2002; Greening and Turban 2000; Turban 2001; Turban and Greening 1996) has shown that investments in CSR (including environmental CSR) and successful communication can help improve employee attitudes and morale (with positive implications for productivity). Environmental concern can also be a rallying point for employees. Herman Miller, for example, provides an example where employee culture strongly supported innovation and development of risky but environmentally superior products. Finally, a strong environmental record can help attract employees who may combine talent with a pro-active environmental outlook (Backhaus et al. 2002; Greening and Turban 2000). There is a strong likelihood that employees' self-selection and salience varies by industry: more environmentally concerned employees, for example, are unlikely to prefer to work in dirty industries. In industries that are not traditionally dirty as well, employee reaction is a potent internal force for spurring change. Consider, for example, the strong pro-change constituency within Coca-Cola that was mobilized in the wake of that company's environmental scandal in India in 2006.

By highlighting the importance of industry context, we do not mean to imply that the responses by firms within the same industry to stakeholder pressures (e.g., from consumers, regulators, NGOs) within the industry are likely to be homogenous. As noted earlier, the specific cognitive maps employed by managers, and the differences in firm-level endowments of resources and capabilities are likely to result in different environmental responses by firms in the same industry in the face of the same stakeholder pressures.

Other factors might also lead to heterogeneous responses at the firm level even if firms are in the same industry. In the case of pressures associated with an industry's level of "dirtiness," for example, Etzion (2007) notes that "…(a)ll industries, whether 'dirty' or not, have already developed a certain stance with regard to regulation. Some industries may have developed environmentally progressive cultures, may have established effective industry-level associations, may have cheap and easy access to sources of remediation, or may have powerful actors who promote a progressive agenda, all irrespective of the industry's 'dirtiness' (Prakash and Kollman 2004), p. 46)." Notwithstanding this important point, however, there are still likely to exist significant residual industry-level influences that impede or stimulate firm-level efforts at environmental CSR. In the context of the present research, the distinction between industries is an important one, since the Newsweek Green Rankings rank the 500 largest overall without taking industry context into account. Yet, given the differences in environmental footprints, it is vital that inter-industry differences be considered, since a firm's industry affiliation influences its environmental efforts and performance. Thus, for example, it is noteworthy that the top three firms in the ranking tend to be firms from the computer technology industry, while the firms toward the bottom tend often to be represented by utilities.

Simply put, a ranking score of 250 may not be very impressive for a firm from a cleaner industry such as technology but would be quite impressive for a firm from a dirty industry such as paper, chemicals, or utilities, since what is considered proactive environmental management in some industries may in fact be considered as being just above compliance in other industries (Hunt and Auster 1990).

Consequently, we hypothesize that the investor reaction to disclosure about a firm's environmental performance as represented by its Newsweek Green Ranking will be related not only to the firm's overall green ranking or score (as in the first hypothesis) but also to its green ranking within its industry. Thus, we hypothesize

H2a The initial short-term stock market reaction by investors will be positively, significantly related to the firm's industry-adjusted (i.e., intra-industry) ranking based on its Green Score within the industry.

H2b The longer-term stock market reaction by investors will be positively, significantly related to the firm's industry-adjusted (i.e., intra-industry) ranking based on its Green Score within the industry.

Organizational Size as a Moderator of Investor
Reaction to Environmental Disclosure

Environmental management researchers (notably Darnall et al. 2010) have recently turned their attention to firm size as a potentially important moderator of the relationship between stakeholder pressures and the adoption of proactive environmental management. We believe that firm size will significantly moderate the impact of environmental disclosure on investor reaction.

Larger firms are more visible to the public and stakeholder. Bowen (2000, 2002) noted the potential of the greater visibility that large firms possess to trigger green organizational responses (see also Jiang and Bansal 2003). Larger firms by definition have larger impacts on the environment, *ceteris paribus*. Further, in the case of larger firms, given their presence in the public eye and presumably deeper pockets, they (for example, Coca-Cola, Walmart, BP in recent years) are more likely to be targeted by environmental NGO stakeholders who may utilize boycotts, protests, lawsuits, letter writing, and student mobilization campaigns) to significantly influence corporate environmental behavior (Baron and Diermeier 2007; Doh and Guay 2006; Eesley and Lenox 2006).

In addition to NGOs, it is also likely that other stakeholders including customers, regulators, and investors are more aware of the environmental performance of larger firms given their greater visibility. Consequently, it is likely that larger firms may overcome their rigidity (King and Shaver 2001) to be more environmentally proactive especially in technical situations like eco-efficiency and pollution control initiatives (Sharma and Henriques 2005).

Stakeholders are likely to ramp up their activism in cases where poor environmental performance is prominently disclosed by the media, as in the case of the Newsweek Green Rankings, as such disclosure provides stakeholders with more credibility for their actions and a stronger basis for their demands More importantly, the larger the firm, the more likely it is to experience activism in the face of disclosure of poor environmental performance. Larger firms make attractive targets, since changes are likely to be on a larger scale and also because they provide "examples" of activist power for smaller firms to consider.

On the other hand, superior environmental performance rankings are likely to quiet stakeholder activism, resulting in less drain on the large firm's resources on fighting this activism. Reasoning in this fashion, stockholders of larger firms are likely to react more positively to disclosure of superior environmental performance and to react less positively to disclosure of inferior environmental performance. This leads to our third hypothesis as follows:

H3 The investor reaction to disclosure of environmental performance will be positively moderated by firm size.

Organizational Legitimacy as a Moderator of Investor
Reaction to Environmental Disclosure

A firm's legitimacy as reflected in its financial performance is also likely to serve as a moderator of investor reaction to environmental disclosure. First of all, it is not clear that all green investments pay off in economic terms (Ambec and Lanoie 2008). There is certainly a possible tradeoff between environmental investments by firms and their financial performance at least in the short run (Hart and Ahuja 1996; Cordeiro and Sarkis 1997). This tradeoff may lead managers to avoid these investments (Berchicci and King 2007) and invest too little (McWilliams and Siegel 2001) fearing lower economic returns and thus negative consequences for managers' performance evaluations and compensation (Cordeiro and Sarkis 2008).

Even in the absence of this tradeoff between environmental investments and economic returns to the firm, it is possible that managers may also invest too little due to informational constraints such as incomplete or biased information (Berchicci and King 2007) or systematically overlooked opportunities (Walley and Whitehead 1994).

We believe that these underinvestment problems are less likely to occur in firms with demonstrably sound financial performance. Firms with higher levels of financial performance are likely to have more capable and confident managers and a performance buffer that then draws on to make environmental opportunities, especially if they perceive these as being of strategic importance as recent surveys of corporate leaders suggest (e.g., Sloan Management Review and Boston Consulting Group 2011). Sound financial performance also provides organizations with more slack resources which may be deployed to pursue environmental opportunities (Sharma 2000; Sharma et al. 1999) in new green market segments or in green innovation, for example. In contrast, low slack (excess resources) may lead managers to assign lower priority to environmental concerns (Henriques and Sadorsky 1996).

We believe that a third argument is also relevant here. Benhabou and Tirole (2010) and Baron (2008) both propose that one explanation for environmental investment is managerial self-advancement (see also Gillan et al. 2010). These scholars theorize that managers may over-invest in environmental initiatives in order to burnish their own private reputations as environmental saviors or simply to generate intrinsic rewards in the case of managers with a personal preference for environmental causes. Such over-investment can be classified as agency costs that are detrimental to stockholders who might not share these

enthusiasms (Barnea and Rubin 2010). We theorize that in more legitimate firms (i.e., those with superior financial performance), stockholders will be less likely to be worried about the agency costs of actions and associated spending to advance environmental initiatives (i.e., the proportional hit from the negative NPV of the environmental investments is lower).

Given these arguments, our fourth hypothesis is as follows:

H4 The investor reaction to disclosure of environmental performance will be positively moderated by firm legitimacy (financial performance).

Data and Methodology

Our sample of firms comprises the largest firms in the US ranked by the prominent US magazine Newsweek (circulation circa 2 million) on September 21, 2009 in their first-ever "Greenest Big Companies in America" ranking. This ranking was discussed in detail in an earlier section.

The Newsweek Green Rankings simply ranked firms from 1 to 500 based on their green score. To facilitate interpretation of the regression results, we use a *complementary ranking* utilizing 501 minus the Newsweek green rank as our main independent variable. Thus, a complementary ranking of 500 reflects the best performing firm, while a complementary ranking of 1 correspondingly reflects the worst performing firm. In the tests for industry context, we use the *industry-adjusted complementary ranking* which is the complementary ranking for each firm within its industrial sector.

Estimation of Short-Term and Long-Term Stock Market Returns

In the case of the short-term investor impact, our dependent variable was the cumulative abnormal return (CAR) for each sample firm. This was obtained using an event study which captures investors' reactions to the announcement of significant events (such as the release of the Newsweek Green Rankings) and thus usefully relates financial market performance with environmental CSR performance. The event study captures the effect of the unexpected new information (in our case, the hitherto unknown green rankings of the sample firms) on the firms' stock prices. The abnormal return is calculated for each day by subtracting the firm's expected stock return (i.e., the return you would expect given its beta or association with the Fama–French value-weighted overall stock market return over the 255 days prior to the event) from the actual observed return (MacKinlay 1997).

For each firm, following (Lyon and Shimshack 2012), the abnormal returns were summed over the first to third

days that investors could trade on the information (i.e., from October 22, 2009 to October 24, 2009). However, in contrast to Lyon and Shimshack (2012), we use an arguably more sophisticated event study method that utilizes the Fama and French (1993) three-factor model that controls for size and book-to-market influences (in addition to the firm's systematic risk) on returns. The accompanying endnote explains our reasoning in more detail.[3]

Details of Tests of the Short-Term Announcement Effect

When studying the short-term announcement effect, we examine the cumulative abnormal return on the common stock of the firms over the event period $[+1, +3]$ which is the estimation period used by similar studies (e.g., Lyon and Shimshack 2012). We estimated the abnormal returns using the Fama and French (1993) three-factor model represented below with a standard pre-event estimation window of $[-255, -46]$ trading days prior to the event date (September 21, 2009):

$$\left(R_{it} - R_{ft}\right) = \alpha_i + \beta_i\left(R_{mt} - R_{ft}\right) + s_i \mathrm{SMB}_t + h_i \mathrm{HML}_t + \varepsilon_{it} \tag{1}$$

where R_{ft} is the risk-free rate; R_{it} is the daily return of stock i on day t; R_{mt} is the return on the CRSP (Center for Research in Security Prices) value-weighted index (a widely used

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[3] The capital asset pricing model (CAPM) developed by Sharpe (1964) and Lintner (1965) assumes that the market beta of a stock appropriately measures the systematic risk of the stock that is relevant for well- diversified investors formulating their expected returns. The model specifies a linear relationship between the expected risk premium and market beta of an individual stock and that differences in expected returns across securities can be explained completely by the difference in their market betas.

Recent research in financial economics does not support this last contention. For example, Banz (1981) finds that low market value (small) stocks earned a higher returns as compared to the return predicted from the market model. Fama and French (1992) observed that stocks with a high book value to market value ratio (book-to-market hereafter) exhibited higher average returns not captured by the market betas. Consequently, Fama and French (1993) proposed a three-factor model to compute expected returns with the factors being the market index, the excess return on a portfolio of small stocks versus large stocks, and the excess return on a portfolio of high book-to-market stocks versus low book-to-market stocks. This three-factor model, they maintain, appropriately captures the return on stock portfolios grouped by size and book-to-market ratio and is superior to the market model in its ability to capture the risk premium on smaller stocks with high book-to-market ratio that are susceptible to financial distress due to their relatively poor performance. Consistent with this, Fama and French (1996) show that the average absolute pricing errors from the market model are very large as compared to the three-factor model Overall, these advances in financial economics support the use of the three-factor (over market) model in estimation of both short-term and long-term market returns.

proxy for the market index) on day t; SMB_t is the return on the mimicking portfolio for size (Small minus Big) on day t; and HML_t is the return on the mimicking portfolio for book-to-market (High minus Low). $R_{mt} - R_{ft}$ is the excess market return and captures the market factor in stock returns expressed as the difference between the return on the market (the CRSP value weighed market index) and the risk-free return proxied by the return on Treasury securities. The small minus big variable SMB_t captures risk factor in returns related to the size, while the high minus low variable HML_t captures risk factor in returns related to the book-to-market equity. Data on SMB_t, HML_t, $R_{mt} - R_{ft}$, and R_{ft} and details on their construction are obtained from Kenneth French website at http://MBA.Tuck.Dartmouth.edu/pages/745faculty/ken.French/Data_Library.html.

Equation 1 defines the relationship between stock returns and market during the pre-event estimation period [−255, −46]. Regression analysis using Eq. 1 is used to predict the expected daily returns for a given stock on a given day using the return on the CRSP value-weighted index on that day. The expected return ($\hat{R}_{it}$) for a stock i on day t is represented by Eq. 2 below:

$$(\hat{R}_{it} - R_{ft}) = \hat{\alpha}_i + \hat{\beta}_i(R_{mt} - R_{ft}) + \hat{s}_i SMB_t + \hat{h}_i HML_t + \hat{\varepsilon}_{it} \tag{2}$$

Daily abnormal return (AR_{it}) and cumulative abnormal return (CAR) are calculated in the event window in order to examine the extent to which the stocks respond to the event. The abnormal return for a particular day, AR_{it} is calculated by Eq. 3 below:

$$AR_{it} = R_{it} - \hat{R}_{it} \tag{3}$$

where R_{it} is the actual return on stock i on day t in the event window [+1, +3].

The cumulative abnormal return over day t1 to t2 is designated as CAR and is calculated using Eq. 4 below:

$$CAR_{(t2,t1)} = \sum_{t1}^{t2} AR_t \tag{4}$$

where $t1$ and $t2$ represent beginning and the end of the three day trading window, $t \in (t1, t2)$.

Details of the Tests of the Longer-Term Stock Market Reaction

In addition to tests of the short-term market performance, we also use the Fama and French (1993) three-factor model to examine the long run stock performance of the 500 firms in our sample. This follows prior research, notably in the financial economics area (e.g., Affleck-Graves and Miller

2003) that looks at the intermediate and long-term impact of information releases. We divide our total sample of 500 firms into four equal portfolios ranked by the Newsweek Green Rankings in the increasing order. The first portfolio (Quartile 1) consists of the top 125 firms by the green ranking; the second portfolio (Quartile 2) consists of firms ranked 126–250; the third portfolio (Quartile 3) consists of firms ranked 251–375; and the fourth portfolio (Quartile 4) consists of firms ranked 376–500. In order to investigate the effect of taking into account rankings within industries, we separately formulate and test quartiles based on intra-industry portfolio rankings (where firms are ranked on the basis of the Newsweek Green Score within their industries and the industry-based rank then used as the basis for the final ranking and quartile formation).

In both cases, we examine the common stock returns for each portfolio over three different time periods corresponding to six, twelve, and 18 months from the event date.

We focus on the 6-month time frame to assess the persistence of monthly abnormal returns over the short duration. The remaining time periods were chosen to gage whether these monthly abnormal returns are transitory or persist over longer periods. We individually perform the regression for each of the four portfolios over the three periods using the Fama–French three-factor model (Equation 5).

$$(R_{pt} - R_{ft}) = \alpha + \beta(R_{mt} - R_{ft}) + sSMB_t + hHML_t + \varepsilon_t \tag{5}$$

where R_{pt} is the return on the portfolio of our independent sample firms in month t; R_{mt} is the return on the CRSP value-weighted index in month t; R_{ft} is the 1-month T-bill yield in month t; SMB_t is the return on small firms minus the return on large firms in month t; HML_t is the return on high book-to-market stocks minus the return on low book-to-market stocks in month t.

The intercept term α measures abnormal return per month and is the primary focus of the regression analysis, as this represents the estimated percent return per month that investors would have earned had they invested in that particular quartile portfolio. R_{pt} is computed using the calendar time average method described in Mitchell and Stafford (2000) i.e., by taking the average of the monthly returns for each stock in that month. We note that the R_{pt} value represents the portfolio return of every firm that falls in the event period. The assumption is that investment in the portfolio is made at the end of the month when the rankings are released (in our case at the end of September 2009) and continues for the entire event period.

Controls and Moderator Variables

Using data from Compustat, we calculated the following controls and moderators given their possible impact on the dependent variable (see for example Lyon and Shimshack 2012): *firm size* was operationalized as the natural log of firm sales (the log compensates for skewness in this variable), *firm leverage,* a measure of relative debt and risk, was operationalized as long-term debt divided by total assets, in terms of measures of *firm legitimacy* measures, *return on assets (ROA)* was operating income before interest and depreciation by total assets, while *Tobin's Q* was measured as the ratio of the market value to the book value of assets. These controls have been utilized in recent studies of environmental performance (Walls et al. 2011).

Our basic regression models (estimated using ordinary least squares (OLS)) use the form:

Cumulative Abnormal Return = f (Firm Complementary Ranking, Firm Size Control, Firm Leverage Control, Firm ROA Control, Industry Effects, Error)

In some models, we use the industry-adjusted complementary ranking (based on the computed green rank within the firm's industrial sector). We also test for moderation effects by interacting potential moderators such as *firm size, ROA, Tobin's Q*, with the firm complementary ranking. In all the tests of moderation, we follow the common practice of centering the interacted variables (i.e., complementary firm ranking and the moderator in question) by deducting their means before entering them into the regression. This procedure reduces the potential for multicollinearity in the regression.

Results

Table 1 presents the summary statistics and variable intercorrelations for the study variables. Following Lyon and Shimshack (2012), we multiply the cumulative abnormal return (CAR), ROA, leverage figures by 100 for comparability and greater ease of interpretation.

In terms of correlations, the cumulative abnormal return (CAR) is significantly related to the overall green rank (indicating that more highly ranked firms have significantly higher CARs) and also the within-industry rank. The CAR is also significantly related to the overall Green Score, Green Policy, and Green Reputation scores but not for the Green Impact score.

Table 2 provides the results of the multivariate OLS regressions of the CAR on the complementary Newsweek Green Rank (i.e., the 501-the Newsweek rank). Following

Lyon and Shimshack (2012), we increase the scales of the regression coefficients and standard errors by 100 for comparability and greater ease of interpretation. Column (a) provides the results of the regression of CAR only on the complementary green rank. The rank does in fact have a positive, significant impact on the CAR. We augment the model to control for the impact of industry fixed effects (utilizing industry dummy variables to represent each industry) in column (b), and in column (c), we also add standard financial controls for firm size, ROA, and leverage that may potentially impact CAR. In all these specifications, the impact of the complementary green rank on the CAR is significantly positive ($p < .01$) supporting H1a. A coefficient of 1 corresponds to a 1 percent increase in the CAR over the 3-day event window.

Table 3 provides the results for the longer-term performance using quartiles with quartile 1 representing the top performers and quartile 4 the worst in terms of green score rank. As can be seen, the alpha value (representing monthly average monthly abnormal return) is significantly higher for quartiles 1, 2, and the magnitude of the alpha coefficient is also correspondingly higher for quartile 1 relative to quartile 2 for both the six-month and the 12-month periods. Interpreting alpha is straightforward: the 0.48 for quartile 1 in the 6-month period represents a 0.48 % monthly return corresponding to a 2.92 % abnormal return to investors in the relevant portfolio if compounded over 6 months in the conventional manner (e.g., Affleck-Graves and Miller 2003). Thus, the abnormal stock returns evidently persist over a 12-month period, supporting H1b at the 10 % signficiance level.

The Newsweek rankings do not take industry explicitly into consideration. This is unfortunate, since as argued previously, industry has the potential to exert significant influence on a firm's environmental performance both through the variance in the nature of production and service processes, inputs, and outputs as well as the variance in the types and importance of stakeholders. Table 4 supports this view, since an ANOVA analysis conducted separately for the Overall Green Rank, Green Score, Green Impact Score, Green Policies Score, and Green Reputation Score shows them all to have significant variance across industries (F-tests in all cases are significant with $p < .001$). To accommodate this cross-industry variation in green scores and rankings, we re-rank firms within their industrial sectors based on the Newsweek Green Score and use this to obtain the complementary green ranking within industry by subtracting the rank from the maximum rank within the sector. The regression results in Table 5 show that the CAR is positively and significantly related to this intra-industry green ranking with a higher magnitude on the coefficient.

These results support hypothesis H2a which hypothesized that the stock market reaction by investors will be

Table 1 Sample statistics and correlation matrix

	Mean	SD	1	2	3	4	5	6	7	8	9	10
1. CAR	−0.6	2.26	1.00									
2. Overall green rank	249.80	143.99	−0.17***	1.00								
3. Green score	70.51	9.97	0.14***	−0.88***	1.00							
4. Green impact	50.22	28.79	0.04	−0.20***	0.28***	1.00						
5. Green policy	39.91	18.29	0.17***	−0.87***	0.77***	−0.09**	1.00					
6. Green reputation	34.43	13.50	0.12***	−0.48***	0.44***	−0.08*	0.46***	1.00				
7. Firm size	9.18	1.11	0.04	−0.27***	0.23***	−0.04	0.26***	0.41***	1.00			
8. ROA	13.00	−19.00	0.01	−0.01	0.04	−0.13***	−0.01	0.01	−0.04	1.00		
9. Leverage	15.00	−10.00	−0.02	0.09**	−0.12***	−0.25***	−0.03	−0.02	−0.08*	−0.04	1.00	
10. Tobin's Q	2.25	1.38	−0.03	−0.05	0.06	0.01	0.01	0.02	−0.21***	0.67***	−0.20***	1.00
12. Rank within industry	17.65	12.06	0.16***	−0.83***	0.73***	0.11**	0.78***	0.46***	0.24***	0.10	−0.06	0.24***

* Pairwise statistically significant at 10 % level

** Pairwise statistically significant at 5 % level

*** Pairwise statistically significant at 1 % level

Note In this table, we use the "raw" Newsweek ranking from 1 to 500 where a lower rank indicates better performance. In the analyses that follow, we use the complementary ranking where we subtract the raw rank from 501. This complementary ranking is the exact reverse so that firm ranked 10, for example, is now ranked 490 where a larger rank is now better, facilitating interpretation of the regression and other results that follow. Thus, a −0.17 correlation between CAR and overall green rank is really a +0.17 correlation between CAR and the complementary ranking

positively, significantly related to the firm's industry-adjusted (i.e., intra-industry) position in the green rank or green score. We note also that the magnitude of the results is stronger than the non-industry-adjusted rank as represented by the larger regression coefficient on the complementary green ranking score within industry relative to the complementary green ranking score unadjusted for industry. This supports our notion that the difference in stakeholder salience across industries makes the intra-industry rankings more useful for investors.

Table 6 provides the results for the longer-term performance using quartiles with quartile 1 representing the top performers and quartile 4 the worst in terms of green score rank. As with the non-industry-adjusted rankings, the alpha value (representing monthly average monthly abnormal return) is significantly higher for quartiles 1, 2, and the magnitude of the alpha coefficient is also correspondingly higher for quartile 1 relative to quartile 2 for both the 6-month and the 12-month periods Thus, the abnormal stock returns appear to persist over a 12-month period, supporting H2b at the 10 % significance level.

Table 7 shows the impact of the moderators (firm size, firm legitimacy) of the complementary green ranking. Column (a) in Table 7 shows that the interaction of firm size with the complementary green ranking is significantly positive supporting hypothesis H3 which stated that investor reaction will be positively moderated by firm size, possibly because of the greater visibility and environmental impact of larger firms which make them a more appealing target of NGOs, regulators, and customers. Column (b), (c) of Table 7 shows that investor reaction is not significantly related to Tobin's Q interaction with the Newsweek ranking, while ROA interaction is significantly negatively related. These results do not support hypothesis H4 which predicted a positive interaction between the financial performance variables and the Newsweek rankings.

Discussion and Conclusions

Drawing on stakeholder theory (e.g., Freeman 1984; Clarkson 1995; Donaldson and Preston 1995; Jones 1995; Jones and Wicks 1999) as applied to the field of sustainability and environmental CSR (Delmas and Toffel 2011), we hypothesize and find that, for the sample of the largest 500 US firms ranked by Newsweek, stock market investors react positively in terms of both the short and intermediate term, both to the raw and, importantly, industry-adjusted rankings of environmental CSR and that the investor reaction is significantly influenced by contextual variables such as the level of information asymmetry, firm size, and firm legitimacy.

Table 2 Regression of cumulative abnormal return (CAR) on complementary overall green rank

	(a) CAR	(b) CAR	(c) CAR
Overall Green Rank (complementary)	0.00264***	0.0025***	0.00258***
	(0.0007)	(0.0007)	(0.0008)
Firm size			−0.04
			(0.10035)
ROA			5.30046***
			(1.56208)
Tobin's Q			−0.349***
			(0.10952)
Leverage			−0.03304
			(0.67054)
Industry fixed effects	No	Yes	Yes
Constant	−1.22143	−0.98251	−0.13084
	(0.20133)	(0.33421)	(1.0384)
Observations	496	496	473
R^2	0.0284	0.0964	0.1249
Adj R^2	0.0265	0.0701	0.0882
F statistic	14.46***	3.67***	3.4***
Prob > F	0.0002	0.0000	0.0000

* Significant at 10 % value

** Significant at 5 % value

*** Significant at 1 % value

Our study fits in with the general class of studies reviewed earlier that address the unresolved question of whether green pays financially by using stock market reactions to clearly defined events (e.g., "event studies"). However, it is important to point out that the Newsweek Green Rankings provide arguably a more definitive test of the impact of corporate environmental performance on stockholder wealth than a majority of previous event studies in this area that have relied on the DJSI and its variants. This is because, the DJSI does not really measure environmental performance in a clean fashion for reasons pointed out earlier.

We believe that our results are consistent with the stakeholder theory perspective that we develop in detail: investors in better ranked firms anticipate larger future cash flows due to more positive reactions from key stakeholders such as environmentally conscious customers, employees, NGOs, regulators, and thus reward these firms with stock price increases. Recent work by Ramchander et al. (2012) and others underscores the importance of studying the role and effectiveness of third-party agencies in certifying CSR activity to stakeholders, including stockholders. Our study does this by studying the importance of the Newsweek rankings as a certification mechanism. A key aspect of our study is its reliance on the notion that third-party certification—such as that provided by Newsweek—can provide new information to stockholders that enables them to

Table 3 Results from Fama–French 3-factor model showing monthly abnormal return (α) for value-weighted (VW) portfolios (un-adjusted for industry) over the periods 6, 12, 18, and 24 months from the announcement date on the quartiles of green rankings

	α	β	s	h	Adj-R^2
Panel A: 6 months returns (VW)					
Quartile 1	0.48	0.87	5.89	−1.36	0.88
	(2.75)*	(13.99)	(0.96)	(−0.11)	
Quartile 2	0.39	1.22	18.26	8.86	0.85
	(2.07)*	(16.32)	(4.99)	(0.81)	
Quartile 3	0.21	0.81	28.45	5.21	0.82
	(2.33)*	(56.33)	(31.84)	(1.36)	
Quartile 4	−0.22	0.73	31.22	−3.81	0.81
	(−1.07)	(12.65)	(2.89)	(−0.71)	
Panel B: 12 months returns (VW)					
Quartile 1	0.32	1.12	5.88	8.21	0.86
	(2.11)*	(54.11)	(1.32)	(1.32)	
Quartile 2	0.23	1.21	19.99	−0.96	0.85
	(1.95)*	(21.18)	(6.21)	(−0.06)	
Quartile 3	0.06	1.03	28.31	−3.11	0.83
	(0.55)	(69.44)	(12.87)	(−1.15)	
Quartile 4	0.17	1.32	17.32	−2.12	0.81
	(0.61)	(22.81)	(2.01)	(−0.38)	
Panel C: 18 months returns (VW)					
Quartile 1	−0.08	1.41	9.11	−3.81	0.85
	(−0.28)	(54.61)	(2.89)	(−0.44)	
Quartile 2	0.13	1.31	23.88	−0.66	0.86
	(1.22)	(20.18)	(5.91)	(−0.16)	
Quartile 3	0.16	1.02	18.33	8.81	0.84
	(1.21)	(29.66)	(3.42)	(1.22)	
Quartile 4	0.19	1.21	16.33	1.91	0.85
	(1.88)	(25.12)	(1.38)	(0.61)	

Parameter estimates are presented with t statistics in parentheses. α represents monthly abnormal return (%). $β$, s, and h represent coefficients from the Fama–French three-factor model:

$$(R_{pt} - R_{ft}) = \alpha + \beta(R_{mt} - R_{ft}) + s\,SMB_t + h\,HML_t + \varepsilon_t$$

All t statistics are hetero-skedasticity consistent

** Significant at 5 % value

* Significant at 10 % value

effectively incorporate this information into their trading decisions by forming or revising their impressions of firms' environmental responsibility efforts and performance. Investors possess imperfect information about the firms that they invest in (Greenwald and Stiglitz 1990), and this makes the role of external information providers and rating agencies such as Newsweek more salient as they help uncover new information about firm performance and communicate it to outside investors (Ramchander et al. 2012). Moreover, the prestige of well-known and disinterested rating agencies such as Newsweek will help *credibly* provide this relevant information to investors.

Table 4 Analysis of variance (ANOVA) by industrial sectors

Industrial sector	No. of firms	Mean overall green rank	Mean green score	Mean green impact	Mean green policies	Mean green reputation	Mean information asymmetry index
Total sample	499	249.80	70.51	50.22	39.91	34.43	47.62
Banks and insurance	36	211.03	73.19	93.50	40.32	32.35	62.04
Basic materials	28	295.43	65.33	16.35	40.01	36.30	34.58
Consumer products, cars	29	223.83	73.04	37.90	41.45	41.75	35.83
Financial services	29	195.93	73.82	84.50	42.26	32.76	45.52
Food and beverage	29	283.83	67.50	10.89	47.32	31.86	37.32
General industrials	28	227.68	71.79	32.63	42.00	37.76	40.77
Health care	27	331.63	67.15	67.13	25.30	31.66	46.50
Industrial goods	47	244.85	71.12	52.85	37.12	32.96	37.55
Media, travel, leisure	35	235.09	71.53	56.03	37.96	33.73	42.74
Oil and gas	31	294.65	69.00	30.96	33.58	33.00	64.61
Pharmaceuticals	18	193.33	74.79	48.02	46.93	33.71	61.38
Retail	52	186.42	73.82	63.76	43.85	30.91	55.11
Technology	53	212.83	74.74	68.33	43.74	38.95	64.92
Transportation, aerospace	21	284.00	69.48	48.19	33.64	31.32	53.79
Utilities	36	382.17	58.02	11.86	39.40	36.45	27.73
F statistics		5.92***	8.46***	83.88***	2.87***	1.96***	8.03***
Prob > F		0.00	0.00	0.00	0.00	0.01	0.00

* Significant at 10 % value

** Significant at 5 % value

*** Significant at 1 % value

The major implication of our findings of a short-term reaction to the firm's ranking is consistent in direction and magnitude with empirical evidence from other recent work using the Newsweek rankings disclosure (Lyon and Shimshack 2012) and suggests that engaging in environmental CSR does appear to provide a benefit to firms in terms of their market performance as assessed by the reaction of the firms' owners, i.e., its stockholders. While we acknowledge that the magnitude of the market reaction is not very great (relative to earnings announcements, mergers, and other major corporate events), our evidence suggests that markets appear to approve of superior environmental performance and so there may be no necessary conflict between the pursuit of shareholder value and the pursuit of environmental CSR. Our research corroborates the findings of Lyon and Shimshack (2012) in terms of the short-term immediate stockholder reaction; however, we extend their and other event study evidence by also providing evidence on the persistence of returns (over the six- and 12-month periods following the Newsweek announcement) to investors holding portfolios comprised the top two performance quartiles. This finding augments the force of the earlier short-term findings that stockholders do benefit from the certification provided by ratings agencies such as Newsweek. Moreover, this benefit appears to be economically significant—of the order of 2.92 %

(i.e., 0.48 % per month compounded over the 6 months following announcement for the non-adjusted rank-based portfolios and 4.15 % over the 6-month following period. Environmental investments within the CSR context are increasingly used by institutional investors as a factor in investment decisions (Gillan et al. 2010). Our findings (which complement those of Robinson et al. 2011 who study DJSI listing additions and removals) suggest the possibility of earning abnormal returns on raw and intra-industry rank-based portfolios for several months prior to long-term equilibrium. Recognition by individual and institutional investors of superior environmental performance encourages more CSR investment by managers in a virtuous cycle (Consolandi et al. 2009).

Another notable finding that we present is that industry context matters in investor evaluations of environmental CSR, supporting theoretical arguments by Etzion (2007), Delmas and Toffel (2011) and others that we have built on in our research that highlights the variance in stakeholder salience and environmental CSR opportunities across industries. Investors appear to take industry context into account, since their reactions are significant when industry-adjusted rankings are used instead of the raw Newsweek ratings. Moreover, the effect appears to be larger within our sample than the effect for the non-industry-adjusted rankings. This finding squares with both our theoretical arguments based on

Table 5 Regression of cumulative abnormal return (CAR) on within-industry complementary green rank

	CAR	(b) CAR
Complementary green rank within industry	0.03285***	0.03194***
	(0.00862)	(0.00941)
Firm size	−0.05117	−0.03632
	(0.09823)	(0.09905)
ROA	2.63189*	5.42431***
	(1.44713)	(1.55992)
Tobin's Q	−0.268***	−0.35755***
	(0.10881)	(0.10947)
Leverage	−0.41389	0.01336
	(0.63406)	(0.66803)
Industry fixed effects	No	Yes
Constant	0.16073	0.13139
	(0.9944)	(1.04955)
Observations	476	476
R^2	0.0417	0.1269
Adj R^2	0.0315	0.0906
F statistic	4.09***	3.49***
Prob > F	0.001	0.000

* Significant at 10 % value

** Significant at 5 % value

*** Significant at 1 % value

stakeholder as well as casual empiricism. To our knowledge, ours is the first empirical event study in this area stressing the importance of controlling for industry context, and this need is especially pressing in terms of the Newsweek Green Rankings where, for example, a five of the firms ranked 1–10 are technology firms and two pharmaceuticals, while the firms ranked 491–500 comprise seven in the utilities industry. Further, in terms of prior studies using the DJSI rankings, even if the rankings are advertised as "best in class," they mix environmental, social, and economic factors reducing their value in terms of environmental signals (Lourenco et al. 2012).[4] We believe that we are the first to document and provide a theoretically grounded explanation for this phenomenon. Industry context-based evaluations, of course, have obvious practical implications for board member, security analyst, and institutional investor evaluations of firm's environmental performance. Managers should therefore be mindful not only of their own firm environmental CSR performance but also the ranking relative to that of the firm's industry peers.

As hypothesized, we find that larger firms benefit more from superior rankings. This finding is intuitively plausible

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[4] Sustainable Asset Management (SAM) uses a 33 % weight each for economic, environmental, and social dimensions in their criteria for the DJSI rankings; moreover industry-specific criteria are weighted only 57 % relative to the 43 % weighting for general criteria.

Table 6 Results from Fama–French 3-factor model showing monthly abnormal return (α) for value-weighted (VW) industry-adjusted portfolios over the periods 6, 12, 18, and 24 months from the announcement date on the quartiles of green rankings

	α	β	s	h	Adj-R^2
Panel A: 6 months returns (VW)					
Quartile 1	0.68	0.93	−2.45	0.98	0.86
	(3.31)*	(20.45)	(−0.58)	(0.94)	
Quartile 2	0.46	0.96	17.78	0.24	0.84
	(2.66)*	(11.86)	(3.68)	(1.48)	
Quartile 3	0.18	1.03	23.34	−0.16	0.83
	(1.08)	(27.83)	(12.36)	(−1.11)	
Quartile 4	0.06	2.36	33.71	−1.27	0.82
	(1.13)	(18.54)	(5.83)	(−1.95)	
Panel B: 12 months returns (VW)					
Quartile 1	0.46	1.02	2.48	3.53	0.84
	(3.23)*	(52.58)	(2.13)	(0.69)	
Quartile 2	0.31	1.09	18.46	−1.33	0.86
	(2.48)*	(26.39)	(5.88)	(−1.29)	
Quartile 3	0.11	0.98	27.88	−4.88	0.84
	(0.45)	(31.36)	(15.81)	(−0.98)	
Quartile 4	0.08	1.06	15.84	−1.98	0.81
	(0.68)	(24.29)	(3.16)	(−1.26)	
Panel C: 18 months returns (VW)					
Quartile 1	0.13	1.06	7.87	−3.01	0.86
	(0.82)	(45.61)	(2.03)	(−0.46)	
Quartile 2	0.11	1.04	21.28	0.32	0.84
	(0.76)	(27.45)	(5.30)	(0.56)	
Quartile 3	0.11	0.99	20.68	5.66	0.83
	(0.65)	(23.67)	(2.86)	(0.68)	
Quartile 4	0.08	1.88	14.28	1.09	0.83
	(1.61)	(23.21)	(1.66)	(0.86)	

Parameter estimates are presented with t statistics in parentheses. α represents monthly abnormal return (%). β, s, and h represent coefficients from the Fama–French three-factor model:

$$(R_{pt} - R_{ft}) = \alpha + \beta(R_{mt} - R_{ft}) + sSMB_t + hHML_t + \varepsilon_t$$

All t statistics are hetero-skedasticity consistent

** Significant at 5 % value

* Significant at 10 % value

given their greater visibility and vulnerability to stakeholder influence based on the arguments we provided earlier. On the other hand, contrary to our hypothesis, firms which have more market legitimacy (represented by past financial performance) benefit less. A possible explanation is that firms with more financial market legitimacy (proxied by past financial performance) do not stand to benefit as much from superior environmental CSR as do those that have inferior financial market legitimacy and can thus use the environmental legitimacy to compensate as part of the general impact of CSR on overall firm reputation. It is also possible that the stock market

Table 7 Regression showing effects of firm size and legitimacy on the relationship between CAR and complementary green ranking

	(a) CAR	(b) CAR	(c) CAR
Centered overall green rank (complementary)	0.00257***	0.00287***	0.00284***
	(0.0008)	(0.0008)	(0.0008)
Centered firm size	−0.07321		
	(0.10035)		
Centered rank × centered firm size	0.00222***		
	(0.0007)		
Centered Tobin's Q		−0.31853***	
		(0.111)	
Centered rank × centered Tobin's Q		−0.00080	
		(0.0005)	
Centered ROA			3.88976***
			(1.53379)
Centered rank × centered ROA			−0.01667**
			(0.00763)
Firm size		−0.03851	−0.04909
		(0.1007)	(0.10053)
Tobin's Q	−0.33825***		−0.32919***
	(0.10897)		(0.10984)
ROA	4.41563***	4.08876***	
	(1.50749)	(1.53107)	
Leverage	−0.21223	−0.20719	−0.29833
	(0.6598)	(0.66638)	(0.66362)
Industry fixed effects	Yes	Yes	Yes
Constant	−0.35628	−0.64996	0.77004
	(0.34383)	(0.97971)	(1.08961)
Observations	473	473	473
R^2	0.1337	0.1190	0.1230
Adj R^2	0.0973	0.0821	0.0862
F statistic	3.68***	3.22***	3.34***
Prob > F	0.0000	0.0000	0.0000

* Significant at 10 % value

** Significant at 5 % value

*** Significant at 1 % value

may anticipate that more profitable firms will invest more in environmental CSR and therefore react more positive to superior rankings of less profitable firms.

Our findings in terms of firm legitimacy having a significant negative moderating impact on the relationship between the investor reaction and green ranking are also in direct contrast to the finding by Lyon and Shimshack (2012) who find firm-level characteristics such as firm size (sales revenue), profitability (earnings per share), and market to book ratio (Tobins' Q), to have insignificant effect on investor reaction to the announcement. A potential reason for the disparity in findings between our results and theirs may lie in the fact that the Fama–French model we employ in the event study to estimate abnormal returns includes the influence of firm size and book-to-market ratios which have been argued (Fama and French 1993) to systematically influence firm returns; in contrast, the Lyon and Shimshack (2012) study employs the basic market model which does not take these factors into account. We believe that our approach is more robust in terms of identifying the true abnormal return and influence of firm size.

Our study is not without its limitations. Our reliance on a single year and a sample of the largest US firms warrants re-examination of the phenomenon in multiple years, and a more wide-ranging sample of firms to extend generalizability of our findings, as would replication in other national contexts and using other ratings releases. Replication using security analysts' earnings and cash flow forecasts (Cordeiro and Sarkis 1997) and long-term stock market and accounting performance to corroborate the immediate stock market reaction, we have provided using our event study approach, is also likely to provide excellent supplemental findings.[5] Further, our study relies principally on application of stakeholder theory. Future work could profitably augment our endeavors by using other theoretical lenses such as applications of institutional theory to CSR (Campbell 2007) as well as application of agency theory (Cordeiro and Sarkis 2008).

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[5] We also tested for significant differences in analysts' cash flow forecasts but do not find a significant difference for the two-year period preceding and the two-year period succeeding the announcement of the rankings. This result for cash flow forecasts could well be the result of a too-small sampling period post-announcement; however, we are collecting further data to test our findings in a more robust fashion.

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