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Abstract Review of extant research on the corporate environmental performance (CEP) and corporate financial performance (CFP) link generally demonstrates a positive relationship. However, some arguments and empirical results have demonstrated otherwise. As a result, researchers have called for a contingency approach to this research stream, which moves beyond the basic question ''does it pay to be green?'' and instead asks ''when does it pay to be green?'' In answering this call, we provide a meta-analytic review of CEP–CFP literature in which we identify potential moderators to the CEP–CFP relationship including environmental performance type (e.g., reactive vs. proactive performance), firm characteristics (e.g., large vs. small firms), and methodological issues (e.g., self-report measures). By analyzing these contingencies, this study attempts to provide a basis on which to draw conclusions regarding some inconsistencies and debates in the CEP–CFP research. Some of the results of the moderator analysis suggest that small firms benefit from environmental performance as much or more than large firms, US firms seem to benefit more than international counterparts, and environmental performance seems to have the strongest influence on market- measures of financial performance.

Keywords Corporate environmental performance · Corporate financial performance · Environmental sustainability · Meta-analysis

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Introduction

A large body of research has sought to answer the question, ''Does it pay to be green?'' (see Ambec and Lanoie 2008, for a review). This focus on firm environmental performance leading to financial benefits for the organization continues to be explored in both the academic literature (e.g., Baker and Sinkula 2005; Christmann 2000; Clarkson et al. 2008; Coombs and Gilley 2005) and the business press (e.g., Engardio et al. 2007; Spaeder 2006; Tozzi 2008). Although results have been mixed, the majority of the research, including meta-analytic results (Orlitzky et al. 2003), suggest that indeed a positive relationship does exist between corporate environmental performance (CEP) and corporate financial performance (CFP).

While establishing a link between CEP and CFP provides an important contribution, the specific boundary

conditions surrounding the relationship remain unclear. As a result, interest is growing in identifying relevant variables that may moderate the CEP–CFP relationship (Russo and Fouts 1997). A poll of scholars in the Organizations and the Natural Environmental division of the Academy of Management stressed the need for, "increasingly sophisticated research to examine the link between environmental strategy and competitive advantage" (Sharma and Starik 2002, p. 11). Moreover, a number of scholars have emphasized the need for adopting a contingency perspective in the treatment of CEP–CFP research (e.g., Sharma and Starik 2002; Wagner 2007; Christmann 2000). In response, a few studies have found promise in attempting to address these issues (e.g., Christmann 2000; Klassen and Whybark 1999). The results of these studies highlight the need to better understand competitive advantage resulting from CEP. Thus, we must move beyond simply asking ''Does it pay to be green?'' to ''When does it pay to be green?'' (Sharma and Starik 2002).

Unfortunately, answering these questions has presented a challenge for a number of reasons. First, the research examining the CEP–CFP link spans academic disciplines (i.e., management, finance, economics, accounting, marketing) and theoretical lenses making synthesis and interpretation difficult (Klassen and Whybark 1999). Second, there has been a lack of consensus and norms in empirical studies regarding the selection of the appropriate environmental performance, financial performance, and control variables necessary to examine these relationships (Wagner 2007). These differences in methodologies have often been blamed for the inconsistencies in findings in the CEP–CFP literature (Griffin and Mahon 1997; Russo and Fouts 1997; Ullman 1985). As a result of these issues, the practical implications of this research stream remain limited (Klassen and Whybark 1999) leaving managers with limited guidance in their efforts to improve CEP.

Although research on organizations and the natural environment, including the CEP–CFP link, has been the subject of narrative and meta-analytic reviews in the management literature (Ambec and Lanoie 2008; Etzion 2007; Orlitzky et al. 2003, Sharma and Starik 2002), to date, there has not been a meta-analytical empirical synthesis which goes beyond the basic question ''Does it pay to be green?'' In an effort to advance CEP–CFP research, we focus on systematically answering the question, ''When does it pay to be green?'' to provide important and necessary clarifications for both research and practice. To do so, we provide a meta-analytic review of CEP–CFP literature in which we identify potential moderators to the CEP–CFP link including environmental performance type (reactive vs. proactive), firm characteristics (e.g., large vs. small firm, public vs. private firm, US-based firms vs. international firms, and worst offenders vs. a broader representation of firms), and methodological issues (financial performance measures, emissions measures, self-report measures). By analyzing these contingencies, this study attempts to provide a basis on which to draw conclusions regarding some inconsistencies and debates in the CEP–CFP research.

We begin by discussing the background of the general CEF–CFP relationship. Next, we examine the arguments for the contingencies we identify including types of environmental performance, firm-level characteristics, and methodological inconsistencies. We then describe our meta-analytic procedures and outcomes. Finally, we conclude with a discussion of our results, implications, and possible directions for future research.

Corporate Environmental and Financial Performance

The research on the relationship between corporate environmental and financial performance has been the focus of several literature reviews (see Ambec and Lanoie 2008; Etzion 2007; Sharma and Starik 2002, for examples). The majority of the existing studies support a generally positive relationship between CEP and CFP (e.g., Bragdon and Marlin 1972; Nehrt 1996; Russo and Fouts 1997; Spicer 1978). The primary arguments in this line of research are that positive environmental performance represents a focus on innovation and operational efficiency (e.g., Porter and van der Linde 1995), reflects strong organizational and management capabilities (e.g., Aragon-Correa 1998), enhances firm legitimacy (e.g., Hart 1995), and allows a firm to meet the needs of diverse stakeholders (e.g., Freeman and Evan 1990). First, environmental performance is viewed as a proxy for operational efficiency (e.g., Porter and van der Linde 1995; Starik and Marcus 2000). The eco-efficiency argument is based on the notion that pollution is a waste of resources and represents unnecessary costs for the firm (Porter and van der Linde 1995). Improved efficiency via environmental performance lowers costs and increases innovation leading to competitive advantage (Aragon-Correa 1998; Christmann 2000; Judge and Douglas 1998; Klassen and Whybark 1999; Russo and Fouts 1997; Shrivastava 1995). Second, strong environmental performance might be viewed as a measure of organizational and managerial capabilities including a long-term versus short-term perspective, a focus on continuous innovation and reduced organizational risk (Aragon-Correa 1998; Hart 1995; Sharma 2000; Russo and Fouts 1997; Sharma and Vredenburg 1998; Shrivastava 1995). Third, firms with strong environmental performance might reap reputational benefits, which result in social legitimacy (Hart 1995), the ability to attract and retain quality employees (Turban and Greening 1997), and

increased sales (Russo and Fouts 1997). Finally, instrumental stakeholder theory posits that to be successful, firms must meet the needs of diverse stakeholder groups, including environmental, employee, and societal groups (Freeman and Evan 1990; Marcus and Geffen 1998; Sharma and Vredenburg 1998).

Although most CEP–CFP studies suggest a positive relationship, there are some conceptual arguments and empirical studies which support a negative relationship or suggest no significant relationship (e.g., Fogler and Nutt 1975; Freedman and Jaggi 1986). The traditional economic trade-off argument posits that firms incur large costs to improve environmental performance and that these costs exceed the financial benefits gained from them (e.g., Friedman 1970; Greer and Bruno 1996; Jaffe et al. 1995; Walley and Whitehead 1994). Moreover, by improving environmental performance a firm is simply transferring societal costs to the firm (e.g., Bragdon and Marlin 1972). Thus, this approach suggests that pursuing environmental initiatives may be both unprofitable and inappropriate for organizations.

In an effort to address this ongoing debate, Orlitzky et al. (2003) meta-analyzed CEP–CFP empirical studies, through 1997, as part of a larger study on corporate social performance. The results of their analysis demonstrate a positive relationship between CEP and CFP, and conclude that, in fact, it does pay to be green. While these results have provided some closure to the debate surrounding the general CEP–CFP relationship, work in this area has continued. In fact, there have been a number of studies which examine the CEP–CFP relationship since Orlitzky's meta-analysis. Therefore, in an effort to move forward, we extend their analysis here, while expecting similar results in our baseline analysis. We also argue, however, that it is time to move on from this general question to address remaining unanswered questions surrounding the CEP–CFP relationship. We agree with other researchers who have emphasized that, unlike other dimensions of CSP, environmental initiatives may not lead to a cost advantage for all firms under all conditions (Christmann 2000; Russo and Fouts 1997). In answering the call for a contingency perspective on CEP–CFP research, our contribution lies in extending our meta-analysis of CEP–CFP empirical studies to a more fine-grained examination of firm-and industry-level characteristics, types of environmental performance, and methodological issues. In doing so, we hope to provide more clarity and guidance for research and practice, on when it pays to be green.

Reactive Versus Proactive Environmental Strategies

Typologies of environmental strategies and performance abound. Roome (1992) suggests a five-step progression from "noncompliance" to "leading edge." Hunt and Auster (1990) also posit five types of environmental approaches ranging from "beginner" to "proactivist". In the larger domain of corporate social responsibility literature, typologies include reactive, defensive, accommodative, and proactive approaches (Carroll 1979; Clarkson 1995; Wartick and Cochran 1985). Generally found within each of these typologies is a dichotomy which has been termed compliance versus proactive (Buysse and Verbeke 2003; Russo and Fouts 1997), traditional versus modern approaches (Aragon-Correa 1998), conformance versus voluntariness (Sharma 2000), or reactive versus proactive (Henriques and Sadorsky 1999).

For the purposes of this study, we will use the terms reactive and proactive to represent these two forms of environmental strategies. Reactive strategies are driven by compliance and aims to meet legal requirements (Buysse and Verbeke 2003; Sharma 2000) which usually require the use of traditional end-of-pipe methods (Bucholz 1993) such as trapping, storing, or treating emissions (Hart 1995). Reactive environmental approaches generally, although not always, lack significant involvement from top management, do not include employee environmental training and involvement (Henriques and Sadorsky 1999), and as the title would indicate, only ''react'' to solve problems when they arise (Aragon-Correa 1998).

By contrast, a proactive environmental approach incorporates environmental issues into corporate business strategy beyond the requirements of government regulation (Buysse and Verbeke 2003) and is focused on preventing problems by dealing with the source (Aragon-Correa 1998). Thus, proactive approaches may involve better ''housekeeping'', material substitution, process innovation, redesign of production and service delivery processes, creative problem solving, the adoption of innovative technologies, or collaboration with stakeholders (Hart 1995; Russo and Fouts 1997; Sharma 2000). Firms that utilize proactive strategies view environmental management as important for business, encourage employee involvement, and receive significant support from top management (Henriques and Sadorsky 1999). Beyond the benefits to the natural environment, proactive environmental strategies may also benefit the firm through decreased costs for raw materials due to better utilization of inputs, simplification and removal of unnecessary steps in production leading to decreased cycle times (Hart 1995) and the development of valuable organization capabilities such as stakeholder integration, higher-order learning, and continuous innovation (Sharma and Vredenburg 1998). It is also possible, and likely, that some firms also pursue proactive and reactive strategies simultaneously.

Most researchers would conclude that proactive strategies should lead to greater reduction of environmental impact than reactive approaches. However, the question of

interest for this study involves the influence of proactive versus reactive environmental strategies on CFP. Thus, the question can be stated, ''does the additional investment in proactive environmental practices (e.g., process innovation) positively influence the financial bottom line to a greater extent than reliance on traditional, reactive, end-of-pipe solutions or when both strategies coexist?'' In other words, ''when does it pay to be green?'' Through meta-analytical techniques, we compare the results of studies using reactive environmental strategy measures (e.g., pollution control) to studies using proactive environmental strategy measures (e.g., process redesign), as well as studies using measures reflecting both, in regards to their influence on CFP.

Firm Characteristics

Large Versus Small Firms

A significant number of management studies use samples consisting of large firms, often from the *Fortune* 500, which may limit the generalizability of findings. Researchers have pointed out strategic differences between large and small firms raising the question of whether small firms stand to benefit more or less than large firms from corporate environmental performance (e.g., Clemons 2006; Dean et al. 1998; Okada and Sawai 1999). On one hand, large firms may have more resources than small firms allowing for advantages associated with scale and greater investment in R&D and new technologies (D'Amboise and Muldowney 1988; Eden et al. 1997; Woo and Cooper 1981) while small firms may not have the slack resources to address environmental performance (Welsh and White 1981). On the other hand, it is possible that small firms are not burdened by the inertia of their larger counterparts and are more flexible, making them better able to respond to environmental challenges and organizational change (e.g., Chen and Hambrick 1995; Fiegenbaum and Karnani 1991; Storey 1994; Yu 2001).

Thus, arguments have been made that large firms should benefit more than small or private firms from environmental performance, as well as vice versa, resulting in a lack of guidance for future research and organizations alike. In meta-analyzing the moderating effect of firm size in the CEP–CFP relationship, our objective is to answer the question of whether the benefits of environmental performance are the same or different for large versus small firms.

Public Versus Private Firms

In addition to size, organizational form may influence the CEP–CFP relationship. Public firms, whose shares are traded on a stock exchange, often receive higher levels of media attention and public interest making them better able to capitalize on reputational benefits achieved through environmental performance, whereas privately owned firms may have difficulty differentiating themselves via environmental performance if publicity surrounding the organization is low. At the same time, private firms receiving less attention from the press, the public, and environmental stakeholders may differ from public firms because they are able to use more discretion in the types of environmental initiatives they choose to implement, while public firms may feel pressured to adopt a wide range of environmental initiatives regardless of potential profitability (Dean et al. 1998).

Therefore, arguments can be made for benefits of both public and private firms. As such, it is important to meta-analyze the moderating effect of corporate form to shed light on the nature of this relationship. In doing so, we will enhance our understanding of whether performance benefits from CEP are the same or different for public versus private firms.

US Versus International Firms

Recently, researchers have begun to look beyond US firms to examine the CEP–CFP link in firms based in other countries (e.g., Bansel 2005; Judge and Elenkov 2005; Menguc and Ozanne 2005), however, the majority of CEP–CFP research uses samples consisting of US-based corporations (i.e., *Fortune* 500). A firm's ability to capitalize on environmental performance may be influenced by differences in economic, social, legal, and political environments. Economic disparity may lead to differences in resource scarcity which may affect environmental attitudes and practices (Zhu et al. 2007). In certain national contexts, the relationship between CEP and CFP may be influenced by social norms, public pressure, and expectations regarding environmental practices (Pasquero 1991; Sharma and Vredenburg 1998). In addition to attitudinal differences, variation in environmental regulations and enforcement may also influence the CEP–CFP link (Christmann 2000) with firms in countries with stricter regulations regarding environmental issues facing stronger threats to organizational legitimacy (Zhu et al. 2007). The use of US firms in much of the CEP–CFP literature raises questions as to the generalizability to other national settings where environmental regulation and laws differ. Interestingly, although much of the CEP–CFP research uses samples consisting of US corporations, the United States is one of the few industrialized nations *not* to have signed the Kyoto Protocol, the highly publicized global environmental initiative, leading to further issues of the relevance of broadly applying US-based studies. In today's global business

environment, the lines between domestic and international firms are blurred with the majority of companies having some degree of internationalization (e.g., importing/exporting supplies, products, subsidiary in other country, etc.). We focus here, however, only on the location of the firm's headquarters. For example, Ford Motor Company, imports, exports, and has facilities in countries other than the US. However, Ford is still typically perceived as a US firm. Whereas, Toyota is not typically perceived as an American firm although the company has manufacturing plants and sells products in the US. Here, we attempt to answer the question, ''Does CEP matter more or less for firms who are based in the U.S. than for internationally based counterparts?'' In doing so, we hope to shed light on whether findings regarding the CEP–CFP link are generalizable to firms in other national contexts.

Industry—Worst Offenders Versus Others

Regulatory differences for firms in certain industries may also influence the relationship between CEP and CFP. Specifically, it is possible that the "worst offenders," firms in industries with negative reputations regarding environmental performance, may experience greater media attention and more pressure from NGOs, consumers, and governmental authorities, resulting in the potential for greater gains in organizational legitimacy through better environmental performance (Bansel 2005; Berrone and Gomez-Mejia 2009; Hoffman 2001). Moreover, executives in such high polluting industries, for example, may have less influence over the environmental performance given the nature of the business (Berrone and Gomez-Mejia 2009). A number of existing CEP–CFP studies have focused on the "worst offenders," particularly high polluting industries (i.e., oil and gas, heavy manufacturing, EPA lists, etc.) (e.g., Bragdon and Marlin 1972; Christmann 2000; Clarkson et al. 2008; Freedman and Jaggi 1986). In addition to the contextual industry-level differences (i.e., regulatory and social pressure), the use of the "worst offenders" in longitudinal studies may also create issues with regression toward the mean making interpretation of results complicated (Trochim 2001). As such, researchers have emphasized the need for future studies to replicate CEP–CFP studies in other types of industries where the results of environmental performance may differ (Sharma and Vredenburg 1998). Through meta-analytical techniques, we compare the results of studies using samples of firms from industries often considered to be the "worst offenders" and studies with samples representing firms from a broad set of industries to see if environmental performance matters more for firms in high polluting industries, than for firms in other industries.

Methodological Issues

Financial Performance Measure

The research methodology of the CEP–CFP literature has been the subject of past criticism. One methodological issue that is commonly raised is the lack of consistency in operationalizing the independent (i.e., environmental performance) and the dependent (i.e., financial performance) variables. The lack of uniformity in measures has been thought to be a reason for some of the inconsistent findings in the literature (Greiffen and Mahon 1997; Ullman 1985). For example, while competitive advantage resulting from reputational benefits of positive environmental performance, reduced risk perceptions, and meeting the needs of stakeholders may be reflected in market-based measures, accounting measures may be better indicators of efficiency and organizational capabilities (Orlitzky et al. 2003). Additionally, some financial performance measures may represent short-term performance gains (e.g., stock-price), whereas others may represent more long-term financial viability (e.g., ROE). Thus, we may expect different outcomes based on the choice of the financial performance variable (i.e., ROA, stock-price, sales growth, market share, etc.). A second methodological issue is that past research has not consistently considered the potential for a lag between a firm's environmental performance and subsequent financial performance results raising issues of causality. Therefore, we compare studies which measure environmental and financial performance simultaneously to those studies in which the dependent variable, financial performance, is lagged for 1-year or more. A better understanding of if and how CEP affects different measures of financial performance will assist managers in their decision-making regarding environmental initiatives. We provide an analysis of these potential differences.

Environmental Performance Measure

Environmental performance has also been measured using a variety of objective and non-objective measures using data such as independent databases (e.g., KLD; Turban and Greening 1997), self-report surveys from managers (e.g., Judge and Douglas 1998), and pollution indicators (e.g., TRI: Clarkson et al. 2008). The toxic release inventory (TRI), the US Environmental Protection Agency's data measuring toxic chemical releases and waste management activities (EPA 2008), is a commonly used proxy for evaluating environmental performance in CEP–CFP studies. As some researchers have pointed out, however, that the TRI data is primarily a measure of chemical emissions, not a comprehensive indicator of a firm's total environmental performance (e.g., Ambec and Lanoie 2008; Sharma and Starik

2002). Thus, the conclusions drawn from the results of such studies may or may not be capturing the true picture of the environmental performance–financial performance link. In this meta-analysis, we hope to clarify the issue of whether the use of different measures of environmental performance (i.e., TRI vs. others) has a substantive effect on the CEP–CFP relationship. This clarification should shed light on the importance of environmental performance operationalizations, in turn guiding future research. Additionally, it will help inform managers as to whether it is pollution reduction alone or other environmental performance indicators that matter to the firm's bottom line.

Self-Report Measures

Another measurement concern that has been raised in this body of work is the issue of the potential inherent bias in the practice of surveying managers who provide self-reported measures of their firm's environmental performance (Sharma 2001). For example, managers may perceive that their firms are really greener than actually are. The question of the objectivity of self-report questionnaires is not unique to the corporate environmental performance literature, but has been debated by academicians for a number of years. Some researchers argue that self-reports create major threats to validity (e.g., social desirability, selective memory, etc.) making them a fallible source of data (e.g., Schwarz 1999). In contrast, others argue that while all methodologies have weaknesses, the variance resulting from the use of survey methodology is minimal and not problematic if researchers give proper consideration to addressing potential validity threats (e.g., Howard 1994; Schmitt 1994). Moreover, they claim that self-reports may actually provide advantages over other methods because they are a useful tool for accessing perceptions (Spector 1994) and are easy to administer (Howard 1994). We systematically examine the CEP–CFP literature to determine whether the use of self-report measures of environmental performance results in different outcomes than the use of archival data (e.g., KLD, TRI, etc.). Again, addressing this issue through a meta-analysis will inform researchers as to whether performance differences exist based on the type of measure.

Method

Sample

We conducted an extensive search for reported correlations between indicators of CEP and CFP in the primary journals from multiple disciplines, including management, accounting, marketing, economics, and finance from 1970 through 2009. Our initial search used keywords including *corporate environmental performance, environmental performance, environment, CEP, sustainability, corporate sustainability, green, green business, environmental strategy, social responsibility, corporate social responsibility, CSR, and environmental responsibility*. In addition to electronic searches using EBSCO and ProQuest databases and manual searches of journals, we identified and examined potential articles from the sources cited in our retrieved article set, which resulted in a total of 72 studies in the original dataset. Any CEP–CFP Pearson product–moment correlation, reported directly or derived from reported *t* or *d* statistics was included in the analysis. The product–moment correlations were transformed using Fisher's *Z* transformation. This resulted in a total of 39 usable studies with 202 samples that examined the CEP–CFP relationship. The large sample to study ratio resulted from several studies that included multiple operationalizations of CEP, CFP, or both. Consistent with the meta-analytical approach used in management literature, each of the authors independently analyzed and coded the CEP and CFP operationalizations. After comparing results, the authors arrived at a consensus for coding papers with multiple operationalizations. To ensure statistical independence, multiple correlations within moderator groups derived from the same samples were aggregated by calculating the mean of the correlations (Lipsey and Wilson 2001). This conservative approach resulted in 71 usable samples ($n = 22{,}869$).

Procedure

Moderators were coded collectively by the authors based on characteristics of the measures and samples using the approach outlined above. Reactive environmental approaches included measures of compliance with legal requirements (e.g., TRI, fines and penalties), whereas proactive environmental strategies were coded based on environmental initiatives beyond regulatory requirements (e.g., sustainable development, employee involvement). In some cases, both approaches were reflected in a measure (e.g., KLD) and were coded accordingly. Several studies explicitly examined CEP for small firms (e.g., local utilities), which we compared against the majority of studies using large firms only (e.g., Fortune 500 firms). Similarly, studies using US-based samples were compared to studies using international-based samples. Several articles also explicitly used ''worst offenders" as their sample by studying only high polluting industries (e.g., oil and gas, heavy manufacturing, EPA lists, etc.), which we compared to all others. The methodological moderators are fairly straightforward: financial performance measures were coded as either profitability (e.g., ROA) or market (e.g., market share); emissions measures included TRI, air pollution measures, waste disposal, etc.; and

self-reported measures were coded based on explicit use of self-report survey.

We aggregated results across studies to estimate a true statistical relationship between CEP and CFP using meta-analysis mixed-effect model methods developed by Hunter and Schmidt (1990), as described by Lipsey and Wilson (2001). In combining the studies' empirical results, we corrected for sampling error by calculating weighted average correlations across the studies. We examined whether the effect sizes were all drawn from a homogenous population of effect sizes using a statistical test described by Lipsey and Wilson (2001). Heterogeneous populations are indicated if the dispersion of effect sizes around the mean is greater than that expected by sampling error alone. Heterogeneity is tested using a Q test, which is distributed as v^2 with k-1 degrees of freedom (Lipsey and Wilson 2001, p. 115). If Q is significant, the presence of one or more sample level moderators is likely to be present.

Statistical tests of the various moderators examined in this study were also carried out using statistical methods described in Lipsey and Wilson (2001, pp. 135–138). In each moderator analysis, the samples were separated into subgroups, on which separate meta-analyses were conducted. The results can then be used to test for statistical significance by comparing the variance explained by the categorical variables against the total variance. Statistical significance is achieved if mean effect sizes differ across moderator categories by more than sampling error. Tests of homogeneity and moderator analyses were analyzed using a random effects model calculated with SPSS code written by Wilson (2001).

Results

Table 1 provides the meta-analytic results for the overall relationship between CEP and CFP. Similar to Orlitzky et al. (2003), results indicate it does pay to be green, with a mean correlation of 0.062 (71 samples, $n = 22{,}869$, p ₩ 0.001). In order to establish a consensus between our baseline CEP–CFP relationship findings and that of prior meta-analytic literature, we further examine the similarities between the Orlitzky et al. (2003) sample of 17 studies prior to 1997 and our additional sample of 54 and find no statistical differences ($Q = 0.31$, $p = 0.58$). With similar results in the CEP–CFP relationship established, we extend our analysis to include the potential moderating effects of environmental performance type, firm-specific characteristics, and methodological issues to determine when and how it pays to be green.

Reactive Versus Proactive Environmental Strategies

As previously noted, there are many environmental performance strategies incorporated by firms and examined throughout literature. For the purposes of this study, we focus on comparing the subgroup of reactive versus proactive environmental strategy measures in regards to their influence on the relation between environmental performance and firm financial performance, as well as comparing to measures reflecting both proactive and reactive initiatives simultaneously. Table 1 provides the results for each of the moderating variables and their subgroups. Contrary to our expectations, results indicate there is not a significant moderating effect in terms of the influences of proactive ($r = 0.06$) versus reactive ($r = 0.07$) environmental strategies on CEP ($Q = 0.93$, $p = 0.63$). Firms appear to benefit similarly, in terms of financial performance, from pursing either proactive or reactive initiatives. Proactive strategies, surprisingly, do not appear to lead to greater financial returns than reactive approaches. Interestingly, firms pursuing both proactive and reactive strategies seem to benefit similarly to firms pursuing either one or the other strategy.

Firm Characteristics

Another potential set of moderating variables affecting the CEP–CFP relationship is firm-specific characteristics. We analyze this relationship by forming subgroups of small versus large firms, public versus private firms, US-based versus internationally based firms, and worst environmental offenders versus the inclusion of a broader set of firms. In meta-analyzing the effect of firm size, we attempt to answer whether the benefits of environmental performance are different for large firms as opposed to small firms. In support of our expectations, results indicate there is a significant difference between samples of large firms versus small firms ($Q = 5.91$, $p = 0.02$). Samples including small firms have a greater affect on the correlation between CEP and CFP ($r = 0.074$) than those that only include large firms ($r = 0.04$). However, there does not seem to be a significant difference between public versus private firms ($Q = 0.75$, $p = 0.39$). The correlation between private firms CEP and CFP ($r = 0.08$) is not significantly different than the relationship between public firms CEP and CFP ($r = 0.06$).

A firm's country of residence includes specific economic, social, legal, and political factors that may significantly influence a firm's environmental performance. In order to assess the influence of these cross-border environmental differences, we examine these subgroups separately. As reported in Table 1, there is a significant difference in the moderating ability of US-based firms versus internationally based firms ($Q = 4.47$, $p = 0.04$). Specifically, US firms appear to benefit more ($r = 0.07$) than international counterparts (-0.01). Consequently, our

Table 1 Corporate environmental performance and corporate financial performance moderators mixed-effects model

	Number of samples	*r*	SE	95% Confidence intervals	*Q*	*Z*	*p*
Overall	71	0.0622	0.007	0.050–0.080		9.4	0.000
Moderators							
Environmental strategy							
					0.93		0.629
Reactive	23	0.070	0.0106	0.050–0.091		6.64	0.000
Proactive	40	0.057	0.0094	0.039–0.076		6.05	0.000
Both	8	0.057	0.0196	0.019–0.096		2.92	0.000
Firm characteristics							
					5.91		0.015
Large firms	33	0.040	0.0114	0.017–0.062		3.48	0.000
Small firms	38	0.074	0.0081	0.058–0.090		9.06	0.000
					0.75		0.387
Public firms	45	0.061	0.0070	0.047–0.080		8.32	0.000
Private firms	24	0.077	0.0170	0.044–0.110		4.50	0.000
					4.47		0.035
International	11	-0.013	0.0362	-0.084 to 0.058		-0.36	0.720
Domestic	60	0.065	0.0067	0.052–0.078		9.62	0.000
					0.56		0.455
Worst offenders	19	0.052	0.0173	0.018–0.086		2.97	0.000
All other firms	50	0.066	0.0073	0.051–0.080		8.97	0.000
Methodological issues							
					0.42		0.517
Emission measures	22	0.059	0.0087	0.041–0.076		6.70	0.000
Other measures	49	0.067	0.0102	0.047–0.087		6.61	0.000
					1.18		0.277
Self-report measures	53	0.059	0.0072	0.045–0.073		8.28	0.000
Archival measures	18	0.080	0.0175	0.046–0.114		4.57	0.000
					14.90		0.005
Profit	39	0.048	0.0099	0.028–0.067		4.84	0.000
Market	17	0.079	0.0100	0.060–0.099		7.92	0.000
Growth	7	0.017	0.0256	-0.033–0.067		0.67	0.510
Cost-efficiency	5	0.049	0.0445	-0.038–0.137		1.11	0.270
Other outcome	3	0.181	0.0461	0.091–0.271		3.92	0.000
					0.00		0.995
Lagged D.V.	17	0.062	0.0085	0.046–0.079		7.31	0.000
Same year D.V.	54	0.062	0.0105	0.042–0.083		5.90	0.000
					1.25		0.263
In Orlitzky et al.	29	0.091	0.0241	0.043–0.138		3.75	0.000
Not in Orlitzky et al.	173	0.063	0.0053	0.053–0.073		11.94	0.000

Random effects variance component range: 0.002–0.003

expectation that these cross-border differences would influence the CEP–CFP relationship is supported.

In examining the relationship between CEP and CFP a firm's industry is often examined separately or used as a control variable because it is believed that the media attention, public pressure, and specific regulations are different for firms in industries with high pollution propensity. Our comparison of studies using firms from industries considered to be ''worst offenders' to studies incorporating firms from a broader set of industries reveals there is not a significant moderating effect for the pollution intensity of the firm's industry ($Q = 0.56$, $p = 0.46$). Contrary to expectations, studies examining a broad set of firms found no significant differences between CEP and CFP ($r = 0.07$) as opposed to studies investigating only those firms from industries that are worst offenders ($r = 0.05$).

Methodological Issues

As previously discussed, the methodology used in CEP–CFP studies has employed a variety of operationalizations of environmental performance and financial performance of firms. Meta-analyzing studies to determine whether different means of measuring environmental performance and firm performance renders valuable results. We performed a meta-analysis with the profitability, market-based, firm growth, cost-efficiency, and other outcomes, with each of the 202 samples being in one category. We report the results in Table 1. Our results indicate that the categories are statistically different from one another ($Q = 14.90$, p ₩ 0.01) and statistically significant individually with each reflecting a positive CEP–CFP relationship. Overall, a review of the corrected effect sizes for the categories of financial outcomes measures indicates that CEP appears to influence market-based financial performance measures to a greater extent than other indicators (Table 2).

We further examine the moderating effect of methodological issues by examining the different measurements of environmental performance. We meta-analyze the subgroup of emissions measurements, such as toxic release, versus other environmental performance measurements (e.g., inclusion in independent environmental index). Contrary to expectations, results reveal the difference in operationalizing environmental performance does not significantly influence the CEP–CFP relationship ($Q = 0.42$, $p = 0.52$). In an attempt to clarify issues of causality, we examined studies in which environmental and financial performance (DV) were measured at the same point in time to those that utilized a minimum of a 1-year lagged dependent variable (i.e., financial performance measure). Contrary to expectations, we found no significant difference in outcomes regardless of whether the dependent variable was lagged or was measured simultaneously ($Q = 0.00$, $p = 0.99$).

Researchers have long criticized the use of self-report measures of environmental performance as having a bias

Table 2 Summary of Findings

CEP–CFP question	Results
Overall	
Does it pay to be green?	Meta-analytic results of multiple studies of the general CEP–CFP link suggest a significant positive relationship
Moderators	Our results further suggest that important contingencies moderate the CEP-CFP relationship
Environmental strategy	
Do proactive environmental strategies influence CFP to a greater extent than reactive environmental strategies?	There is no difference between the strategies on CFP. Both have a similar positive influence individually and when both coexist
Firm characteristics	Overall, nearly all types of firms seem to benefit from CEP. Although, certain types of firms appear to benefit even more than others
Do large or small firms benefit more from CEP?	While both large and small firms benefit, small firms appear to benefit more
Do public or private firms benefit more from CEP?	Both public and private firms benefit similarly
Does CEP matter more or less for firms who are based in the U.S. than for international-based counterparts?	U.S-based firms benefit more than international counterparts, who do not appear to benefit
Does CEP matter more for firms from ''worst offender'' industries than for firms in other industries?	CEP matters for all firms regardless of industry
Methodological issues	Overall, the criticism of CEP-CFP research, including the choice and nature of variables used, seems generally unfounded
Does CEP influence various financial performance measures differently?	Firms appear to reap a wide range of benefits from environmental initiatives given the robust and positive nature of the CEP–CFP relationship across a wide range of measures for both variables The choice of CEP measure does not make a significant difference with the exception of having a somewhat greater influence on market-based measures
Does lagging our DV in CEP–CFP students make a difference?	Lagging the DV variable does not influence the results
Does the type of environmental performance measure used make a difference?	The choice of environmental performance measure does not make a difference
Does using self-reported data lead to different results than using archival data?	Self-report data does not lead to different results than archival data

towards increasing environmental performance and creating a false or heightened CEP–CFP link. In order to determine whether self-reported measures of environmental performance lead to a different relationship between CEP and CFP, we analyze a subgroup of methodological issues that includes self-report versus archival measures of environmental performance. Contrary to expectations, there is no significant difference in the outcomes when using self-reported measures as opposed to archival data ($Q = 1.18$, $p = 0.28$). Studies using self-reported measures of environmental performance do not seem to have a stronger association with firm financial performance ($r = 0.06$, $r = 0.08$).

Supplemental Analyses

In addition to the meta-analysis, two supplemental analyses were performed to increase the robustness of the results. First, publication bias, also known as the file-drawer problem, is a potential threat with meta-analyses such that the published studies included the sample may not be representative of all existing studies, including those unpublished. Following the method proposed by Orwin (1983), we found that the number of additional samples with a correlation of 0 that would be necessary to bring the effect size in this study of 0.062 down to 0.05 would be 17. To bring the effect size down to 0.04, would require an additional 39 additional samples, while doubling the number of samples with effect sizes of 0 would bring it down to about 0.03. Given the large number of additional samples necessary to substantially change the overall effect size we found in this study, we feel the results of our study are further strengthened.

A subsequent modified weighted regression analysis that provides for a simultaneous test of the proposed moderators was also performed. The analysis was conducted using an algorithm Lipsey and Wilson (2001) developed to correct for standard errors, which is run within SPSS. The results of the regression generally corroborate the findings of the meta-analysis, further suggesting robust results. Interestingly, the results do indicate that the international moderator is as important as in the bivariate analysis, whereas the emissions moderator attains significance.

Discussion

As expected, our meta-analytic results of multiple studies of the general corporate environmental performance and financial performance link suggest a significant positive relationship, consistent with prior research (Orlitzky et al. 2003). In answering the question, ‘‘When does it pay (or not pay) to be green?’’ our results further suggest that important contingencies moderate the CEP–CFP relationship while others may not be as important as previously argued. Surprisingly, and contrary to existing theoretical frameworks (e.g., Aragon-Correa 1998; Sharma 2000; Henriques and Sadorsky 1999), proactive environmental initiatives do not appear to increase firm profitability more than reactive initiatives. Therefore, firms that go beyond regulatory requirements and focus on prevention by integrating environmental concerns into process innovation, stakeholder collaboration, employee involvement, and other proactive approaches may not necessarily expect greater financial returns than firms focusing on mere compliance or end-of-pipe methods. In either case, firms reap similar positive financial returns. Further, firms pursuing both strategies do not appear to benefit more than firms taking either a proactive or reactive approach. Perhaps there is still enough “low-hanging” fruit available for end-of-pipe solutions to be still profitable, although this could change over time as they run out. It is possible that proactive efforts are more comprehensive and thus more costly since they are not targeted at resolving a specific problem. Therefore, these efforts may lead to more costs and do not necessarily lead to direct revenue benefits. Reactive efforts would be more targeted and less costly. They also may reduce fines paid and still allow firms to capitalize on the benefits of stating that they are environmentally friendly.

Some firm characteristics do influence the CEP–CFP relationship while others do not. Our moderator analysis suggests that small firms seem to benefit from environmental performance as much or more than large firms. Perhaps small firms are able to compensate for a lack of slack resources by being more flexible (e.g., Chen and Hambrick 1995; Fiegenbaum and Karnani 1991; Storey 1994; Yu 2001). Private firms, however, do not appear to benefit any more than public firms. These firms may reap similar benefits through different means. The decreased public and media interest surrounding private firms may enable them to exercise more discretion in choosing the types of environmental initiatives they pursue (Dean et al. 1998). On the other hand, public firms may be able to capitalize on the environmental initiatives they do pursue as a result of additional media attention. Environmental performance also does not seem to matter any less for the “worst-offenders”, although subject to a different regulatory environment, than for other firms. Therefore, results of studies using samples consisting only of high polluting firms may be more generalizable than previously thought. Moreover, perhaps due to differences in economic, political, and social environments, US-based firms do appear to benefit more than international counterparts. This may be due to a more stringent regulatory environment in the US, wherein lower environmental performers end up being

penalized. It could also be due to other firms preferring to do business with compliant producers. International firms may be less likely to be held to the same standards, and in fact may be selected based on non- or even anti-environmental criteria, namely cost.

In response to past methodological-based criticisms of CEP–CFP research, we meta-analyzed the moderating role of financial and environmental performance measures and data sources. Interestingly, we did not find support for a number of moderators. This is particularly insightful given the abundance of evidence over these issues in the field. In this case, the lack of results provides important insights about CEP–CFP research and hopefully puts an end to some of the ongoing criticisms about this research. Environmental performance has a similar relationship with most indicators with the exception that market-based performance indicators have a stronger relationship than others. The choice of environmental performance measure has also been criticized. Yet, the relationship between CEP and CFP was consistent for emission measures (i.e., TRI) and other measures of environmental performance (i.e., KLD). This does not suggest that the choice of financial performance and environmental performance measures may not be guided by theory, only that from a practical stand-point, the choice of financial measures does not appear to be the reason for past inconsistencies in the literature. Further, from a practical standpoint, firms may reap a wide range of benefits from environmental initiatives given the robust and positive nature of the CEP–CFP relationship across a wide range of measures for both variables. We were also surprised to find no differences between studies utilizing a 1-year or more lagged financial performance variables and those measuring environmental and financial performance in the same year. It is possible that the use of a longer lag time criteria may offer different results. To date, little is understood regarding the time necessarily to fully capture the benefits of environmental initiatives, as the number of longitudinal studies remains limited. We also found that self-reported data does not tend to be more strongly associated with performance than archival measures. This suggests that self-reported measures of environmental performance may not be significantly biased after all. Overall, much of the criticism of CEP–CFP research methodology appears unfounded.

Limitations and Future Research

The use of meta-analytic procedures is not without limitations. First, our results cannot demonstrate causality of the relationships tested. For example, it is possible that firms with strong financial performance are more likely to invest in environmental initiatives. Unfortunately, we did not have enough longitudinal studies examining the CEP–CFP relationship to analyze this issue. Future research should examine this important relationship. The measures of environmental performance that we used are the ones available from the existing studies and should be interpreted with caution. Contrary to existing frameworks, our findings that reactive and proactive environmental performance does not lead to significant differences in financial performance. Perhaps future research could evaluate different time horizons. It seems likely that reactive approaches are more likely to create immediate or short-term returns, whereas proactive initiatives require more significant up-front investment and may not pay off for longer periods of time. We feel this is an interesting area for future research to explore as well with additional theoretical development being especially important.

Conclusion

The results of our meta-analysis confirm and extend the findings of Orlitzky et al. (2003) in demonstrating that existing empirical studies support the position that it ‘‘pays to be green.” However, our findings regarding the moderating influences on the CEP-CFP relationship suggest that future research should investigate additional moderating influences to better understand this relationship. Of particular interest would be relationships that help guide managers in understanding the conditions that lead to the greatest performance benefits when supporting the environment.

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