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Making sense of conflicting empirical findings: A meta-analytic review of the relationship between corporate environmental and financial performance

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ABSTRACT

Despite the tremendous number of publications concerned with the relationship between corporate environmental performance (CEP) and corporate financial performance (CFP), inconsistent empirical findings persist and the overall picture remains vague. Drawing on a hybrid theoretical framework (combining the theoretical reasoning of the natural-resource-based view (NRBV) with instrumental stakeholder and slack resources arguments), we address the apparent lack of consensus by meta-analytically integrating the findings of 149 studies. We pay particular attention to two highly material issues: the direction of causality and the multidimensionality of the focal constructs. Meta-analytic results indicate that there is a positive and partially bidirectional relationship between CEP and CFP. In addition, our findings suggest that the relationship is stronger when the strategic approach underlying CEP is proactive rather than reactive. Furthermore, we reveal moderation effects of methodological artifacts, which may provide explanations for the inconsistency of the results of previous studies. Based on our findings, we discuss the implications and outline avenues for further research.

Introduction

> "While the question of whether it pays to be green has probably generated more research pages than any other single question, the answer remains unresolved" (Hoffman & Bansal, 2012, p. 14).
>
> "Science advances when scholars reach consensus about the conclusions offered by a body of evidence, and meta-analysis is our best methodology for reaching consensus" (Combs, Ketchen, Crook, & Roth, 2011, p. 194).

The relationship between corporate environmental performance (CEP) and corporate financial performance (CFP) constitutes one of the most puzzling phenomena pertaining to research on organizations and the natural environment. Insofar as scholars have tackled environmental issues, the discovery of the link between CEP and CFP has evolved into something similar to finding the "holy grail" (Boons & Wagner, 2009; Peloza, 2009). Over the last four decades, myriad studies have sought to identify the relationship between these performance constructs. In this context, one of the most fundamental issues shaping research on the focal relationship refers to the direction of causality (i.e., whether CEP influences CFP, whether CFP influences CEP, or whether there is a bidirectional relationship) (e.g., Ambec & Lanoie, 2008; Molina-Azorín, Claver-Cortés, López-Gamero, & Tarí, 2009; Preston & O'Bannon, 1997). Furthermore, in recent years, several scholars (e.g., Aragón-Correa & Sharma, 2003; Delmas, Hoffmann, & Kuss, 2011; Etzion, 2007; Orlitzky, Siegel, & Waldman, 2011) have emphasized the need to extend the scope of analysis by exploring the determinants, potential contingency factors, and boundary conditions under which CEP and CFP are related. In other words, research has been called upon to adopt a more sophisticated view and to "look beneath the surface" (Delmas et al., 2011, p. 117) in order to get a better understanding of the mechanisms connecting both performance constructs.

Despite the enormous number of publications concerned with the relationship between CEP and CFP, the overall picture remains vague. While some studies have provided evidence of a positive relationship (e.g., Clarkson, Li, Richardson, & Vasvari, 2011; Hart & Ahuja, 1996; King & Lenox, 2001; Konar & Cohen, 2001; Russo & Fouts, 1997; Wagner & Schaltegger, 2004), others have sup-

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ported the conclusion of a negative relationship (e.g., Cordeiro & Sarkis, 1997; Hassel, Nilsson, & Nyquist, 2005; Morris, 1997) or yielded insignificant results (e.g., Cohen, Fenn, & Konar, 1997; Graves & Waddock, 1999). Several explanations for the apparent inconsistency have been proposed, involving both methodological and theoretical issues (Ruf, Muralidhar, Brown, Janney, & Paul, 2001). These explanations address different aspects, describing (1) the lack of a sound theoretical foundation (e.g., Aragón-Correa & Sharma, 2003; Ullmann, 1985); (2) the lack of a clear idea of the direction of causality (e.g., Ambec & Lanoie, 2008; Surroca, Tribó, & Waddock, 2010; Waddock & Graves, 1997); (3) the inconsistency of defining and measuring the constructs of interest (e.g., Busch & Hoffmann, 2011; Griffin & Mahon, 1997; McWilliams, Siegel, & Wright, 2006); and (4) the use of misspecified models due to omitted variables and a lack of consideration of moderating or mediating influences (e.g., Russo & Minto, 2012; Telle, 2006).

Prior reviews and meta-analyses: Rationale for the present study

Inconclusive findings in a given field of inquiry (as it is the case for the CEP-CFP nexus) constitute great nuisances to researchers by limiting the understanding of certain phenomena and impeding credible scientific generalizations (e.g., Rousseau, 2006). Thus, it is not surprising that several attempts have been made to consolidate the empirical research on the relationship between CEP and CFP. In order to clarify the distinct contribution of our study, we briefly review these prior works and explain why they merely allow limited conclusions regarding the focal relationship.

Narrative reviews, vote counts and the superiority of meta-analysis

The vast majority of existing reviews on the relationship between CEP and CFP either used narrative approaches or applied vote count procedures. Narrative reviews, provided for example by Ambec and Lanoie (2008), Blanco, Rey-Maquieira, and Lozano (2009), Guenther and Hoppe (2014), Molina-Azorín et al. (2009), and Salzmann, Ionescu-Somers, and Steger (2005), summarize the available research in a descriptive manner without providing a quantitative integration. These reviews without any doubt have contributed to the integration of the vast amount of CEP–CFP studies. However, without calling into question the general appropriateness of narrative reviews, at least in cases where multiple studies have yielded inconclusive results, narrative approaches are subject to several limitations (e.g., purely descriptive nature, subjectivity, and lacking critical assessment) and thus hardly enable conclusions that make sense of conflicting empirical findings (e.g., Hart, 1998; Tranfield, Denyer, & Smart, 2003). Another approach that has been applied for synthesizing the body of empirical CEP–CFP studies refers to the vote count technique (e.g., Guenther, Hoppe, & Endrikat, 2011; Horváthová, 2010; Margolis & Walsh, 2001).[3] In vote counts study findings are simply coded and aggregated as positive, negative, or non-significant (Orlitzky, Schmidt, & Rynes, 2003). This approach has been strongly criticized by many management scholars and statistical experts due to several substantial problems (e.g., Type II error problems, ignoring of sample size differences, or lacking provision of a point estimate of effect sizes), which likely lead to invalid conclusions (Combs et al. 2011; Dalton & Dalton 2005; Orlitzky et al. 2003).[4] In contrast to narrative reviews or vote counts meta-analytic methodology, which is based on accurate statistical aggregation, is the most sophisticated research-integration technique providing a sound way to quantitatively accumulate empirical findings, to make sense of inconclusive empirical evidence, and to draw conclusions that reconcile conflicting results (e.g., Aguinis, Dalton, Bosco, Pierce, & Dalton, 2011; Combs et al., 2011; Geyskens, Krishnan, Steenkamp, & Cunha, 2009; Orlitzky et al. 2003).

Previous meta-analyses

Orlitzky et al.'s (2003) prominent meta-analysis explored the more general relationship between corporate social performance (CSP) and CFP.[5] Their study sample covered the years from 1972 to 1997 and only included US studies. By breaking down the entire sample of studies in different subgroups they examined, among other points, the relationship between CEP and CFP (139 effect sizes). Allouche and Laroche (2005) provided another meta-analysis including 82 studies concerned with the relationship between CSP and CFP. They also partly captured the CEP–CFP link by means of subgroup analysis (84 effect sizes).

There are several reasons why the existing CSP–CFP meta-analyses hardly allow drawing definitive conclusions with regard to the relationship between CEP and CFP. First, the number of CEP–CFP studies included in these analyses is far from exhaustive. That applies in particular to the influential study of Orlitzky et al. (2003), which included at the most only 17 CEP–CFP studies.[6] Furthermore, their analysis only included studies published until 1997. Given that knowledge about social phenomena, in general, tends to be historically dependent (Combs et al., 2011; Gergen, 1976), and that environmental issues in particular have gained increasing importance during the last years, it is likely that study findings vary over time and that more recent studies that have not been included yielded different results. Second, despite the lack of a commonly shared definition or conceptualization of CEP (e.g., Etzion, 2007; Walls, Phan, & Berrone, 2011; Xie & Hayase, 2007), it is beyond question that CEP is a multidimensional construct (e.g., Clemens & Bakstran, 2010; Dooley & Fryxell, 1999; First & Khetriwal, 2010; Trumpp, Endrikat, Zopf, & Guenther, in press), which has been measured in several different ways. However, none of the CSP–CFP meta-analyses decomposed the CEP construct into more specific dimensions and thus failed to account for the multidimensional nature of CEP and possible moderation effects concerning this matter. Third, in all CSP–CFP meta-analyses the moderator analyses as well as analyses with regard to the direction of causality have been conducted only at the level of the overall analysis pertaining to CSP. As CEP constitutes one dimension of the broader (meta-) construct of CSP (Orlitzky et al., 2003), there are undoubtedly similarities regarding theoretical reasoning and empirical manifestations. However, methodological literature on multidimensional constructs urgently cautions that confounding construct level (in this case CSP) and dimension level (in this case CEP) would imply serious threats to validity (e.g., Law, Wong, & Mobley, 1998; Wong, Law, & Huang, 2008). Indeed, notwithstanding the similarities, there are also fundamental differences that may warrant a separate treatment of CEP and CSP (Bansal & Gao, 2006). Walls, Berrone, and Phan (2012, p. 892), for example, argued that environmental issues tend to differ from social issues because "they are technical, require specific firm capabilities and significant capital investment, are guided by regulation, and have their own reporting criteria". Also empirical examinations have shown that CEP should be considered a distinct part of the overarching construct of CSP and that certain levels of CSP do not necessarily correspond to sim-

[3] While Horváthová (2010) labeled her study as a meta-analysis, she obviously applied a vote count procedure.

[4] For a detailed discussion pertaining this issue see for example Combs et al. (2011) or Hedges and Olkin (1985).

[5] As CEP constitutes a subdimension of the more general concept of CSP (Orlitzky et al., 2003), there is a strong intermingling of research on CEP and research on CSP. Throughout this paper, when analogies are obvious and appropriate, we draw on arguments and findings that refer to the broader construct of CSP.

[6] The exact number cannot be determined due to missing information.

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ilar levels of CEP (e.g., Baughn, Bodie, & McIntosh, 2007; Hillman & Keim, 2001; Scholtens & Zhou, 2008; Schreck, 2011). Some scholars even questioned the general suitability of CSP as a meaningful construct (e.g., Marom, 2006; Peloza, 2009; Rowley & Berman, 2000; Schreck, 2011). Rowley and Berman (2000, p. 405) asserted that the CSP construct is "fatally flawed" due to aggregation of seemingly unrelated aspects, or in their words "mishmashes of uncorrelated variables". Without taking a stand on this debate, we argue, at the very least, that empirical findings and conclusions regarding CSP cannot be readily transferred to CEP. Hence, apart from the finding that the relationship between CEP and CFP tends to be positive, at least for the (limited) number of studies examined in previous CSP–CFP meta-analyses, we cannot draw any inferences from these works pertaining to the CEP–CFP link, neither with regard to moderation effects, nor regarding the question of causality.

Two recently published meta-analyses sought to address this apparent gap in the literature. By conducting a meta-analysis of CEP–CFP studies, Dixon-Fowler, Slater, Johnson, Ellstrand, and Romi (2013) found a positive, though weak, overall relationship. Moreover, they examined a set of contingent variables such as different firm characteristics (e.g., large vs. small firms) or methodological issues (e.g., archival measures vs. self-reported data). Despite the importance of the analysis provided by Dixon-Fowler et al. (2013), their study has three major limitations. First, the sample of studies on which Dixon-Fowler et al. (2013) based their examination is far from comprehensively encompassing the available empirical evidence, which is somewhat contradictory to the idea of systematic research syntheses (Rousseau, Manning, & Denyer, 2008). While their meta-analysis covered 37 studies (71 effect sizes) yielding a cumulative sample size of 22,869 observations, we draw in our main analysis on a sample of 149 studies (245 effect sizes) yielding a total of 201,511 observations. Hence, our analysis is based on much more fuller representation of available research allowing better estimation results and thus more powerful, valid, and generalizable insights. Second, Dixon-Fowler et al. (2013) did not account for the issue of causality. Their study provided only a one-sided analysis, as it was exclusively based on studies that considered the causal direction of CEP on CFP. Although the majority of studies have focused on this direction of effect, the reverse direction, theoretically underpinned by the slack resources hypothesis (Waddock & Graves, 1997), has also been tested and supported empirically (e.g., Earnhart & Lizal, 2006; Konar & Cohen, 2000). Moreover, by focusing solely on the direction from CEP to CFP, the possibility of a bidirectional relationship (e.g., Hart & Ahuja 1996; Molina-Azorín et al., 2009; Surroca et al., 2010) remained untested. Third, as CEP is considered a multidimensional construct consisting of a process dimension and an outcome dimension (e.g., Busch & Hoffmann, 2011; Delmas & Nairn-Birch, 2011; Trumpp et al., in press) both dimensions should be kept separately. However, Dixon-Fowler et al. (2013) did not distinguish between process-based CEP and outcome-based CEP and thus failed to account for the multidimensional nature of CEP. This proceeding, to some extent, confounds construct level and dimension level, which has been shown to entail questionable conclusions (Wong et al., 2008).

Another meta-analysis of CEP–CFP studies has been provided by Albertini (2013). However, this study is subject to similar limitations. First, this meta-analysis build upon a sample of 52 studies yielding a total of 62,943 observations. While this exceeds the basis of the study of Dixon-Fowler et al. (2013) it is still far away from what we found to be the empirical evidence at hand. Second, although Albertini (2013) itself mentioned the problem of "green-washing", her analysis also included studies that examined the relationship between corporate environmental disclosure and CFP. Several studies have shown that environmental disclosure cannot be equated with environmental performance, neither with the process dimension, nor with the outcome dimension (e.g., Clarkson, Overell, & Chapple, 2011; de Villiers & van Staden, 2011; Hughes, Anderson, & Golden, 2001; Patten, 2002). Moreover, several theoretical frameworks (e.g., legitimacy theory or political economy theory) suggest a negative relationship between environmental disclosure and CEP.[7] Third, like Dixon-Fowler et al. (2013) also Albertini (2013) limited the focus of analysis to the causal direction from CEP to CFP and thus neglected the issue of reverse causality and potentially bidirectional mechanisms. Finally, the meta-analysis of Albertini (2013) included studies using measures of product and process innovation (e.g., Montabon, Sroufe, & Narisimhan, 2007) or manufacturing performance (e.g., Klassen & Whybark, 1999) as dependent variables. While innovation or manufacturing performance represent important constructs within the realm of organizational effectiveness they do not constitute measures of CFP (e.g., Combs, Crook, & Shook, 2005; Hamann, Schiemann, Bellora, & Guenther, 2013; Venkatraman & Ramanujam, 1986).[8]

Our meta-analysis addresses the lack of a methodological sound and genuinely comprehensive integration of the available evidence regarding the relationship between CEP and CFP. The primary aim of our study is to establish some consensus on the relationship between CEP and CFP and to make sense of the inconclusive findings yielded so far. We draw particular attention to the question of causality. Causality is an inherent part of theory and fundamental to research questions concerned with the relationship between two or more variables or constructs (Bono & McNamara, 2011; Colquitt & Zapata-Phelan, 2007). We examine the issue of causality by distinguishing between three sets of temporal associations (i.e., (1) the relationship between CEP and subsequent CFP, (2) the relationship between CEP and prior CFP, and (3) the relationship between CEP and concurrent CFP). In doing so, we address the complex and likely reciprocal nature of the focal relationship. Furthermore, in order to account for the multidimensional nature of CEP and CFP, we simultaneously decompose both focal constructs. Thus, we provide a differentiated examination of the CEP–CFP link which coincides with the frequently expressed argument that the use of a wide range of different measures for both constructs is one reason why previous research has yielded conflicting results (e.g., Busch & Hoffmann, 2011; Griffin & Mahon, 1997; Konar & Cohen, 2001). Our approach enables a fine-grained analysis of the interplay of the dimensions of the focal constructs and the direction of causality. Finally, we complement our main analysis, which is based on bivariate correlations, with a meta-analysis based on partial correlations. This serves as a kind of robustness test and allows us to examine a broad set of methodological artifacts that may account for the variation in the results of previous studies. More specifically, we examine the type of sample used in the primary studies, the degree to which particular control variables were applied, the (non-) controlling for possible endogeneity, and the timing of research. In sum, the main contribution of our paper is to consolidate the mixed empirical findings and to place the research on the CEP–CFP link on solid ground from which avenues for further research can be laid out.

After having discussed existing reviews and meta-analyses in order to provide the rationale for our study, we continue with pre-

[7] See Patten (2002) for a more elaborated discussion of this topic.

[8] In addition to the studies of Dixon-Fowler et al. (2013) and Albertini (2013), there is another meta-analysis (partially) covering the CEP-CFP link. Golicic and Smith (2013) provided a meta-analytic study examining the impact of sustainable supply chain management practices on firm performance. Drawing on a sample 31 studies (77 effect sizes) they found a positive overall effect on firm performance as well as on respective subdimensions (i.e., market-based performance, accounting-based performance, and operational based performance). While their analysis undoubtedly focused on an important issue, it is worth mentioning that sustainable supply chain management is one of many specific business practices for dealing with environmental issues though representing only one (rather narrow) aspect of CEP.

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senting the theoretical background from which we derive our hypotheses and explain the importance of examining potential moderation effects arising from methodological artifacts. Then we describe the study collection process, the coding of the studies, and the meta-analytic procedures. After that, we present our findings and discuss the implications. Finally, we note the limitations of our analysis and describe possible directions for further research.

Theoretical background and hypotheses

Extending back to the 1960s, "when a general public awareness of businesses' environmental pressures emerged" (Blanco et al., 2009, p. 464), research on the relationship between CEP and CFP has yielded a myriad of empirical studies. In essence, the research stream centered around two fundamental issues. One refers to the manifestation of the relationship itself (i.e., whether there is a positive, negative, or neutral relationship between both constructs). The second issue refers to the direction of causality (i.e., whether CEP influences CFP, either positively or negatively, whether CFP influences CEP, either positively or negatively, or whether there is a reciprocal or bidirectional relationship) (Preston & O'Bannon, 1997; Schreck, 2011). Several theoretical arguments have been proposed for each of the hypothetical forms of the focal relationship (e.g., Preston & O'Bannon, 1997; Salzmann et al., 2005). In the following we briefly review the most important theoretical approaches and present the hypotheses we seek to test.

CEP influences CFP

Traditional economic reasoning suggests a negative impact of CEP on CFP. Proponents of the trade-off theory, such as Levitt (1958) or Friedman (1970), argued that environmental activities withdraw financial resources from a firm and thus weaken its financial performance, as the financial benefits of environmental activities are deemed to be lower than their costs (Preston & O'Bannon, 1997; Waddock & Graves, 1997). Based on (short-term) shareholder maximization logic, this perspective contends that environmental activities conflict with firms' primary objectives, as the voluntary reduction of environmental impacts is considered philanthropy, which incurs social costs and contravenes profit-maximization (King & Lenox, 2002). These neoclassical positions have been increasingly challenged by various scholars who have provided explanations for a positive impact of CEP on CFP leading to a "win–win" situation (Porter & van der Linde, 1995). The most important theoretical frameworks along these lines are the natural-resource-based view (NRBV) and the instrumental stakeholder theory.

Introduced by Hart (1995), the NRBV extends the resource-based view of the firm (RBV) (Barney, 1991; Wernerfelt, 1984) by integrating the natural environment into this framework. According to the NRBV, a firm's ability to address the increasing challenges imposed by the natural environment fosters the development of rare and inimitable organizational resources and capabilities, leading to a competitive advantage and superior financial performance (Chan, 2005; Hart & Dowell, 2011). The NRBV argues that there are three key strategic capabilities, each building upon different key resources and each providing different sources of competitive advantage: pollution prevention, product stewardship, and sustainable development (Hart, 1995; Hart & Dowell, 2011). Pollution prevention, for example, can save costs of installing and operating end of pipe technologies and may reduce material and waste disposal costs, and decreases compliance and liability costs (Hart & Ahuja, 1996; King & Lenox, 2002; Klassen & Whybark, 1999). Because the RBV emphasizes the interconnectedness of resources and capabilities, competitive advantage and improved CFP may not result from single resources, but from rather complex resource bundles (Hart & Dowell, 2011; Hoskisson, Hitt, Wan, & Yiu, 1999). Consequently, there are several mechanisms through which CEP may translate into CFP. For example, the adoption of environmental technologies and the implementation of an environmental policy can stimulate process innovations that may increase the efficiency of production processes (Sharma & Vredenburg, 1998; Surroca et al., 2010). A proactive environmental strategy may also foster organizational learning and advanced human resources practices that may increase employee skills and involvement (Hart, 1995; Russo & Fouts, 1997; Waldman, Siegel, & Javidan, 2006; Weber, 2008). Furthermore, high levels of CEP can improve reputation (Brammer & Pavelin, 2004; Hart, 1995; Surroca et al., 2010), which may increase a firm's attractiveness as an employer and thus provides potential competitive advantages (Turban & Greening, 1996). Environmental activities can also lead to fundamental and beneficial changes with regard to decision-making processes and other aspects of organizational culture (Hillman & Keim, 2001; Sharma & Vredenburg, 1998). Hence, the reasoning of the NRBV allows a systematic examination of the CEP–CFP link by providing a rationale as to why proactive environmental strategies and management practices may constitute sources of competitive advantage and superior financial performance (Hart & Dowell, 2011).

Instrumental stakeholder theory (e.g., Donaldson & Preston, 1995; Jones, 1995) provides another theoretical perspective from which a positive impact of CEP on CFP can be explained. As responsible behavior towards the natural environment constitutes an essential part of the stakeholder expectations firms are faced with, CEP can be viewed as an attempt to meet these expectations (Buysse & Verbeke, 2003). Instrumental stakeholder theory argues that meeting the claims of key stakeholders (e.g., claims for improved CEP) contributes to superior CFP. Through successful stakeholder management and the satisfaction of stakeholder demands, firms may acquire several sources of competitive advantage, such as reputation, long-term relationships with suppliers and customers, or increased efficiency in its adaptation to external demands in general (Bansal & Roth, 2000; Hillman & Keim, 2001; Lankoski, 2008; Orlitzky et al., 2003; Surroca et al., 2010). For example, firms with superior CEP can increase their sales due to costumer's willingness to pay premium prices for products of environmentally responsive firms (Hart & Dowell, 2011; Hillman & Keim, 2001). Furthermore, CEP may lead to improved investor relations and thus may lower market risk (Busch & Hoffmann, 2011; Orlitzky & Benjamin, 2001; Sharfman & Fernando, 2008) and the cost of financial capital (Ambec & Lanoie, 2008; Lankoski, 2008).

In line with other scholars (e.g., Hart & Dowell, 2011; Russo & Minto, 2012; Surroca et al., 2010) we argue that instrumental stakeholder theory and the NRBV should not be considered as competing or disparate frameworks but as complementary approaches. First, a firm's ability to encourage stakeholder integration can be considered an organizational capability (e.g., Aragón-Correa & Sharma, 2003; Hart & Dowell, 2011). Second, successful stakeholder management allows firms to access and capitalize on tangible and intangible resources (Russo & Minto, 2012). Moreover, stakeholders can provide incentives or information to improve a firm's efficiency and thus may push firms to explore profit opportunities that have been overlooked by the firms' management or whose costs have been overestimated and whose benefits have been underestimated (Hart & Dowell, 2011; Kim & Statman, 2012; King & Lenox, 2002). Along these lines, Sharma and Vredenburg (1998), for example, showed that effective stakeholder integration may enable firms to improve their waste reduction and energy conservation programs and thus may contribute to the development of valuable organizational capabilities. Hence, we ar-

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gue that conflating instrumental stakeholder arguments with the 'resources and capability accentuation' of the NRBV provides a solid theoretical basis to propose a positive link from CEP to CFP.

CFP influences CEP

While most of the research on the CEP–CFP relationship focused on the question whether it pays to be green and thus examined the causal link from CEP to CFP, some scholars emphasized the possibility that the causal direction might be the other way around (i.e., from CFP to CEP) (e.g., Dooley & Lerner, 1994; McGuire, Sundgren, & Schneeweis, 1988; Ullmann, 1985). Formally stated by Waddock and Graves (1997), the slack resources hypothesis suggests that superior CFP results in available (slack) resources that allow companies to invest in environmental activities. Organizational slack can be defined as "that cushion of actual or potential resources which allows an organization to adapt successfully to internal pressures for adjustment or to external pressures for change" (Bourgeois, 1981, p. 30). It allows firms to make investments in resources and capabilities that are not likely to immediately pay-off but that are necessary to improve the speed and degree to which firms can adapt to their external environments (Bansal, 2005; Cheng & Kesner, 1997; Levinthal & March, 1981). As emphasized by the NRBV, the development and implementation of environmental strategies and management practices draw on several resources and capabilities. Consequently, organizational slack allows firms to direct more resources towards the improvement of CEP (Kock, Santaló, & Diestre, 2012) and permits firms the latitude to seek innovative and environmentally sound solutions (Bansal, 2005; Russo & Fouts, 1997).

An implicit assumption of the slack resources hypothesis is that high levels of CFP result in available slack resources (e.g., Dooley & Lerner, 1994; Makni, Francoeur, & Bellavance, 2009; Preston & O'Bannon, 1997; Schreck, 2011). Correspondingly, the majority of studies testing the slack resources hypothesis draw on CFP measures as proxies for slack (e.g., Clarkson, Li et al., 2011; Schreck, 2011; Surroca et al., 2010). However, it is worth mentioning that superior CFP does not necessarily result in organizational slack. Nevertheless, literature on organizational slack constantly conceived CFP as a precursor of slack resources (Seifert, Morris, & Bartkus, 2004; Singh, 1986) and thus slack is more likely to appear in high CFP firms. Moreover, Daniel, Lohrke, Fornaciari, and Turner (2004) provided meta-analytic evidence for a positive relationship between slack resources and CFP.

Bidirectional relationship between CEP and CFP

Given that both the arguments for a positive link from CEP to CFP and those for the reverse direction hold, the relationship between CEP and CFP would be reciprocally causal, forming what Hart and Ahuja (1996) termed a *virtuous circle*. A possible theoretical explanation for such a bidirectional relationship refers to an integration of the reasoning of the NRBV (complemented by instrumental stakeholder arguments) with the slack resources hypothesis (Surroca et al., 2010). Without a conjecture about where the circle begins, whether in the availability of slack resources (resulting from superior CFP) or in initial environmental activities (Waddock & Graves, 1997), CEP and CFP may reinforce each other and thus constitute a complex relationship involving causal mechanisms going from CEP to CFP as well as mechanisms in which higher levels of CFP lead to increased CEP. In other words, financially successful firms may have the resources necessary to improve their environmental performance, which in turn increases financial benefits that again can be ploughed back into further improvements of CEP (Hart & Ahuja, 1996; Makni et al., 2009; Orlitzky, 2008; Surroca et al., 2010).

In the context of empirical examination, causality can be incorporated through different temporal sequences of measuring both constructs. That means, in order to draw causal inferences, the constructs must be measured with a time lag so that the independent construct precedes the dependent construct (Mitchell & James, 2001).[9] Thus, studies that relate CEP to subsequent CFP imply a causal link from CEP to CFP, while studies that relate CEP to prior CFP imply a causal link from CFP to CEP. Studies which employ a contemporaneous measurement of both constructs (which unfortunately pertains to the majority of the CEP–CFP studies) strictly speaking, indicate mere association but do not allow establishing causal inferences (Bausch & Pils, 2009; Bono & McNamara, 2011). However, in line with Orlitzky et al. (2003) we argue that if the meta-analytic effect sizes are significant and positive for all three temporal sequences of measurement, the proposition of a bidirectional relationship would be supported.

Multidimensionality of both focal constructs

Both CEP and CFP are considered to be multidimensional constructs (e.g., Griffin & Mahon, 1997; Hamann et al., 2013; Ilinitch, Soderstrom, & Thomas, 1998; Richard, Devinney, Yip, & Johnson, 2009; Trumpp et al., in press). Accordingly, a great variety of measures have been applied in empirical studies for both constructs, which may constitute an important source of the inconclusiveness of previous empirical findings and may account substantively for the failure to establish consensus hitherto (e.g., Barnett & Salomon, 2006; Busch & Hoffmann, 2011; McWilliams et al., 2006; Ullmann, 1985).

Despite the enormous interest that CEP has received in research, a commonly shared understanding or conceptualization of CEP has not been established so far (e.g., Etzion, 2007; Walls et al., 2011). Instead, a plethora of measures can be found in the empirical studies. Examples include measures of the amount of toxic releases (e.g., Hart & Ahuja, 1996), the extent of pollution reduction or pollution prevention measures (e.g., King & Lenox, 2002), the degree of environmental compliance (e.g., Barth & McNichols, 1994), the type of environmental strategy (e.g., Sharma & Vredenburg, 1998), and measures based on ratings or rankings, such as those provided by Kinder, Lyndenberg, Domini Research and Analytics (KLD) (e.g., Wagner, 2010).

However, notwithstanding the "rampant inconsistency" (Russo & Minto, 2012, p. 36) in how CEP has been defined and operationalized, we argue that a kind of a least common denominator can be deduced from the literature insofar that CEP consists of two main dimensions: a process dimension (i.e., process-based CEP) and an outcome dimension (i.e., outcome-based CEP) (e.g., Busch & Hoffmann, 2011; Delmas, Etzion, & Nairn-Birch, 2013; Delmas & Nairn-Birch, 2011; Günther & Kaulich, 2005; Ilinitch et al., 1998; Molina-Azorín et al., 2009; Trumpp et al., in press; Xie & Hayase, 2007). This dichotomy corresponds (1) with the "*process* of strategy making" and "performance *outcome* of strategy" terminology used in the strategic management literature (e.g., Ginsberg, 1988; Miller & Friesen, 1983), (2) with Wood's (1991) accentuation of processes and outcomes regarding CSP (Busch & Hoffmann, 2011), and (3) with the differentiation according to the ISO 14031standard on environmental performance evaluation. Furthermore, in a recent study using factor analytic methodology Trumpp et al. (in press) provided empirical evidence that CEP must be considered a multidimensional construct consisting of an environmental management performance dimension (i.e., process-based CEP) and an environmental operational performance dimen-

[9] While temporal precedence is not identical to causality it is at least a strong indicator for it (e.g., Bono & McNamara, 2011; Mitchell & James, 2001; Wagner & Blom, 2011).

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sion (i.e., outcome-based CEP). Process-based CEP refers to a strategic level and focuses on managerial principles and processes such as environmental objectives, environmental policies, or environmental management structures. Thus, process-based CEP reflects a firm's internal efforts to address environmental issues (Busch & Hoffmann, 2011). Outcome-based CEP reflects the observable and quantifiable results of these efforts (Delmas & Nairn-Birch, 2011) and refers to measures such as the amount of released pollutants or the ratio of recycled waste to total waste. In general, process-based CEP can be considered a precursor of outcome-based CEP (e.g., Klassen & McLaughlin, 1996; Xie & Hayase, 2007). However, it should be noted that research has shown that process-based CEP does not inevitably lead to improved outcome-based CEP in all cases (Darnall & Sides, 2008; Jung, Kim, & Rhee, 2001; Nawrocka & Parker, 2009).[10]

Given the substantial differences between the process-based dimension of CEP and the outcome-based dimension, it is reasonable to suggest that the relationship between CEP and CFP varies depending on which CEP dimension is addressed. Busch and Hoffmann (2011), for example, found that process-based CEP (in terms of carbon management) negatively affects CFP, while outcome-based CEP (in terms of carbon emissions) has a positive influence on CFP. Contrary, Delmas et al. (2013) in a recent study found the process dimension to be correlated with CFP while the outcome dimension showed no significant correlation. As we do not have strong reasoning as to whether the relationship would be stronger for process-based CEP or for outcome-based CEP, we do not offer directional hypotheses in this regard.

Aside from distinguishing between process-based CEP and outcome-based CEP, CEP can be differentiated with regard to a firm's underlying strategic approach to dealing with environmental issues. The strategic approach can be conceived in terms of a continuum ranging from reactive to proactive (e.g., Aragón-Correa, 1998; Buysse & Verbeke, 2003; Russo & Fouts, 1997; Sharma & Vredenburg, 1998). Reactive approaches aim at compliance with environmental regulations and imply environmental activities to a minimum level, usually referring to end-of-pipe solutions. Such approaches emphasize the minimization of risk and liabilities and do not fundamentally change a firm's processes (Russo & Fouts, 1997; Walls et al., 2011). Contrary, proactive approaches refer to environmental practices that go beyond compliance, focus on pollution prevention activities, and involve higher-order learning and redesign of existing processes (Russo & Fouts, 1997; Sharma, 2000; Sharma & Vredenburg, 1998). King and Lenox (2002) showed that firms pursuing a proactive approach (pollution prevention) experience superior financial performance, while firms pursuing a reactive approach (end-of-pipe pollution control) fail to do so. The theoretical rationale for this observation is that reactive approaches do "not require the firm to develop expertise or skills in managing new environmental technologies or processes" (Russo & Fouts, 1997, p. 538), while proactive approaches involve the development of organizational resources and capabilities that are potential sources of competitive advantage and that affect a firm's ability to gain financial benefits from improved CEP (Hart, 1995; Hart & Dowell, 2011; Russo & Fouts, 1997; Sharma, 2000; Sharma & Vredenburg, 1998).

[10] We are aware of the fact that there are authors who confine CEP to outcome-based CEP and conceive the process dimension as a distinct construct. However, we follow the argumentation of Trumpp et al. (in press) who provide two reasons why both dimensions together form the CEP construct. First, they argue that process-based CEP, enabling the identification and management a firm's environmental aspects, provides a firm with the capabilities needed to improve outcome-based CEP in the first place. Second, they point out that process-based CEP also focuses on environmental aspects that go beyond the traditional boundaries of the firm. Limiting CEP to the outcome dimension would neglect a considerable amount of the upstream and downstream environmental impacts.

The multidimensional nature of CFP has been widely acknowledged and several possibilities for the classification of different measures have been proposed (e.g., Hamann et al., 2013; Peloza, 2009; Richard et al., 2009). With regard to the existing CEP–CFP studies, the most widely used measures of CFP refer to accounting-based performance (e.g., return on assets (ROA), return on sales (ROS), or return on equity (ROE)) or market-based performance (e.g., market value, stock returns, or Tobin's q). These fairly broad dimensions of CFP refer to end-state metrics, which are particularly important for measuring the business case of CEP as they reflect the overall financial health of a firm (Peloza, 2009). Consequently, we distinguish between market-based measures and accounting-based measures of CFP. This parallels other meta-analyses examining CFP (e.g., Bausch & Pils, 2009; Lee & Madhavan, 2010; Van Essen, Otten, & Carberry, in press).

Several scholars have emphasized that the differences pertaining to the focus and nature of both measurement approaches may significantly account for the variation of the study results (e.g., Allouche & Laroche, 2005; Davidson & Worrell, 1990; Delmas & Nairn-Birch, 2011; Peloza, 2009). Accounting-based measures capture a firm's efficiency at using their assets to generate value (Peloza, 2009) and reflect internal capabilities and performance rather than external perceptions of performance (Orlitzky et al., 2003). Furthermore, accounting-based measures imply a short-term perspective and are rather backward-looking measures (Baird, Geylani, & Roberts, 2012; Peloza, 2009; Richard et al., 2009). Hence, while accounting-based measures may capture immediate impacts, they may not appropriately account for intangible and long-term effects which are likely to be involved in the CEP-CFP link. Market-based measures, on the other hand, integrate estimations of a firm's future prospects and reflect the notion of external stakeholders (primarily investors) (Delmas & Nairn-Birch, 2011; Orlitzky et al., 2003; Peloza, 2009). Thus, market-based measures may better capture the long-term value of certain environmental activities. Moreover, while accounting-based measures tend to consider only tangible costs and revenues, market-based measures also incorporate intangible assets and reputational effects (Busch & Hoffmann, 2011; Richard et al., 2009; Surroca et al., 2010).

Based on the former considerations and drawing on the rational of the NRBV, the instrumental stakeholder theory, and the slack resources argumentation we derive the following hypotheses we seek to test:

Hypothesis 1a. Process-based CEP is positively related to subsequent market-based CFP.

Hypothesis 1b. Process-based CEP is positively related to subsequent accounting-based CFP.

Hypothesis 1c. Outcome-based CEP is positively related to subsequent market-based CFP.

Hypothesis 1d. Outcome-based CEP is positively related to subsequent accounting-based CFP.

Hypothesis 2a. Process-based CEP is positively related to prior market-based CFP.

Hypothesis 2b. Process-based CEP is positively related to prior accounting-based CFP.

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Hypothesis 2c. Outcome-based CEP is positively related to prior market-based CFP.

Hypothesis 2d. Outcome-based CEP is positively related to prior accounting-based CFP.

Hypothesis 3a. Process-based CEP is positively related to concurrent market-based CFP.

Hypothesis 3b. Process-based CEP is positively related to concurrent accounting-based CFP.

Hypothesis 3c. Outcome-based CEP is positively related to concurrent market-based CFP.

Hypothesis 3d. Outcome-based CEP is positively related to concurrent accounting-based CFP.

Hypothesis 4. The relationship between CEP and CFP depends on whether measures of proactive or reactive approaches of CEP are used such that the relationship between CEP and CFP is stronger when measures of proactive approaches of CEP are used.

Moderation effects of methodological artifacts

One of the outstanding features of meta-analytic methodology is its potential to identify methodological and conceptual moderation effects that may be hidden in the empirical findings (Daniel et al., 2004; Lee & Madhavan, 2010). These moderation effects may emerge from systematic differences with regard to the applied statistical procedures or other study settings (Lipsey & Wilson, 2001). For example, several scholars have argued that misspecified models (i.e., models that do not account for important determinants of the relationship) may be the reason for the inconsistency of the empirical results (e.g., McWilliams & Siegel, 2000; Surroca et al., 2010; Telle, 2006). These determinants may be correlated with either one or both of the focal constructs and can take the form of moderating variables, mediating variables or confounding variables (Orlitzky, 2008). Since the CEP–CFP studies differ considerably with regard to the extent to which they have controlled for these determinants, study findings are likely to vary due to differences concerning this matter. In the following we briefly discuss potential determinants of the relationship and describe the reasons for the suggested influence.

Firm size has been suggested as a determinant of both CEP and CFP (Ullmann, 1985). According to Etzion (2007), firm size, rather than being a determinant factor in itself, may proxy several other firm characteristics that affect the focal relationship. For example, larger firms are more exposed to publicity and stakeholder scrutiny and face greater risks of litigation, making them more likely to focus on environmental issues (Clarkson, Li et al., 2011; Konar & Cohen, 2000). Moreover, larger firms tend to possess more (slack) resources (Pfeffer & Salancik, 1978) that allow them to invest in environmental activities (Clarkson, Li et al., 2011). It has also been shown that firm size is positively associated with CFP for reasons such as economies of scale, better access to resources, or greater control over stakeholders (e.g., Gooding & Wagner, 1985; Orlitzky, 2001).

Because industries differ regarding their environmental impact (i.e., high- vs. low-polluting industries), factors such as the regulatory context, pressures from stakeholders, or a firm's general ability to lower its environmental impact vary between industries (Etzion, 2007; Patten, 2002). Moreover, Russo and Fouts (1997) showed that industry growth may moderate the relationship between CEP and CFP such that the relationship strengthens in high-growth industries. Also the intensity of competition, which differs between industries, may influence the focal relationship (Ambec & Lanoie, 2008; McWilliams & Siegel, 2000). Hence, many studies have found evidence for a moderating effect of the type of industry (e.g., Busch & Hoffmann, 2011; Waddock & Graves, 1997; Wagner, 2010), which, however, may be caused by several reasons. In addition, the type of industry may also have confounding influences pertaining to the focal relationship, as the type of industry may also determine CFP (Porter, 1985), separately from CEP.

Empirical evidence suggests that firms with better CEP tend to incur lower levels of financial risk (e.g., Feldman, Soyka, & Ameer, 1997; Spicer, 1978; Sun & Cui, in press). Since CEP is likely to influence reputation and investors' perceptions of a firm's future performance (e.g., Gilley, Worrell, Davidson, & El-Jelly, 2000; Russo & Fouts, 1997), it may provide a type of insurance value by decreasing financial risk (Peloza, 2006). In other words, high levels of CEP, implying reduced environmental risk, determine investors' risk perception and will be rewarded by the market (Sharfman & Fernando, 2008). Furthermore, firms with a proactive stance towards environmental issues face lower litigation risks and may attenuate the likelihood of regulatory interventions which can also have risk-reducing effects (Orlitzky & Benjamin, 2001). In sum, financial risk may mediate the relationship between CEP and CFP, which suggests that studies that fail to control for financial risk would yield upwardly biased estimates of the focal relationship (McWilliams & Siegel, 2000).

The relationship between CEP and CFP is also likely to be determined by a firm's R&D activities. First, there is relatively strong empirical evidence that R&D intensity positively influences CFP (e.g., Griliches, 1979; McWilliams & Siegel, 2000). According to McWilliams and Siegel (2000) R&D constitutes a form of investment in "technical" capital which is suggested to result in knowledge enhancement leading to product and process innovation which in turn increase long-term financial performance. While, of course, R&D intensity does not represent a perfect measure of innovation (Baysinger & Hoskisson, 1989), it has been widely used in empirical studies as a proxy for innovation (Camisón-Zornoza, Lapiedra-Alcamí, Segarra-Ciprés, & Boronat-Navarro, 2004; Hitt, Hosskisson, & Kim, 1997). Second, R&D intensity may also be associated with CEP as R&D activities may be a precursor of CEP providing firms with innovative approaches to environmental issues (Christmann, 2000). For example, the initiation and implementation of a clean technology policy or the development of "green" products require R&D efforts (Etzion, 2007; Hart, 1995; Russo & Fouts, 1997). Hence, R&D intensity may have a confounding effect on the relationship between CEP and CFP and therefore should be considered as control variable (McWilliams & Siegel, 2000; Orlitzky, 2008).

Advertising intensity constitutes another factor that is likely to be involved in the CEP–CFP relationship. Capon, Farley, and Hoenig (1990) provided evidence for a positive association between advertising intensity and financial performance. Furthermore, advertising can be viewed as a means to signal environmental activities to stakeholders, which may expand the opportunities to derive financial benefits from CEP (Arora & Cason, 1996; Wagner, 2010). Especially with regard to financial benefits resulting from consumers' "environmentally informed buying behavior" (Russo & Fouts, 1997, p. 539) and from an increased willingness-to-pay for "green" products advertising intensity may have a substantial moderating effect (Wagner, 2010).

Capital intensity is another frequently used control variable in CEP–CFP studies (e.g., Elsayed & Paton, 2005; Russo & Fouts, 1997). As capital assets are difficult to adapt to changing purposes

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and uses (Miller & Cardinal, 1994), capital-intensive firms may be less flexible and rigid in their maintained procedures, and need more long-term planning horizons (Kukalis, 1991; Miller & Cardinal, 1994). Therefore, firms with high capital intensity may be more reluctant to change their technologies and business models towards more environmentally sound practices (Etzion, 2007; Sharma & Henriques, 2005). Furthermore, capital intensity has been shown to be related to a firm's cost structure (Berman, Wicks, Kotha, & Jones, 1999; Fiegenbaum & Karnani, 1991) and may be a determinant of CFP (Capon et al., 1990). Thus, capital intensity may confound the relationship between CEP and CFP.

Aside from whether the studies controlled for potential determinants of the CEP–CFP link, the study findings may also depend on whether a study controlled for the possible endogeneity of CEP on CFP. Endogeneity occurs in cases where the independent variable in a regression model is correlated with the error term, or due to simultaneous causality between the dependent and the independent variable (Sánchez-Ballesta & García-Meca, 2007; van Essen et al., in press). As outlined earlier, the relationship between CEP and CFP may involve bidirectional causality. Therefore, the fact of controlling or not controlling for endogeneity can be conceived as a kind of methodological artifact, which may have a moderation effect on the study findings.

Another study artifact likely to affect the findings regarding the CEP–CFP relationship refers to the type of sample underlying the empirical examinations. Previous studies have drawn on both single industry samples and cross-sectional samples. As already outlined, industries differ with regard to several issues that may determine the focal relationship. Thus, multiple industry samples may mask differences due to specific industry contexts (Griffin & Mahon, 1997). Consequently, several scholars pointed out, that research on the CEP–CFP link should be conducted within specific industries (e.g., Griffin & Mahon, 1997; Moore, 2001; Rowley & Berman, 2000; Wokutch & Spencer, 1987).

As knowledge about social phenomena is historically dependent, relationships between constructs may vary over time (Combs et al., 2011; Gergen, 1976). In view of the continuously increasing relevance of environmental issues this may particularly apply to the relationship between CEP and CFP. Moreover, study findings are determined by the underlying research design, which might have improved over time (Combs et al., 2011). Again, this may apply to the empirical research concerned with the focal relationship as earlier studies are subject to several methodological shortcomings (e.g., Russo & Fouts, 1997; Wood & Jones, 1995). Consequently, the timing of research may represent an artifact entailing potential moderation effects.

We argue that the outlined methodological artifacts may constitute important explanations for the inconsistency of empirical findings. However, as we have rather limited theoretical rationale for the effects of these artifacts, we do not offer hypotheses in this regard. This exploratory approach is in line with previous meta-analytic studies (e.g., Crook, Ketchen, Combs, & Todd, 2008; Geyskens, Steenkamp, & Kumar, 2006; Kirca, Hult, Deligonul, Perryy, & Cavusgil, 2012).

Methodology

Literature search and inclusion criteria

To ensure that our study sample was as comprehensive as possible, we used three complementary search strategies. First, we conducted a systematic search in the following databases: Academic Search Complete, Business Source Complete, E-Journals, Elsevier Science Direct, Environment Complete, and GreenFILE.[11] Second, we manually searched the reference lists of prior reviews and the studies we identified in step one (i.e., we employed an "ancestry" approach) (Aguinis et al., 2011). Third, we searched the SSRN database to locate additional unpublished manuscripts. After a first scan, in which non-empirical papers and case studies were excluded, our initial sample comprised 432 studies. We then filtered this sample against a set of several inclusion/exclusion criteria. First, to be included, a study was required to provide an empirical examination of the relationship between CEP and CFP.[12] Second, we excluded studies that focused on the relationship between environmental disclosure and CFP. While several studies, mostly earlier works, used disclosure measures as proxies for CEP, more recent works have suggested that environmental disclosure does not necessarily represent CEP; it may even be negatively related to it (e.g., Hughes et al., 2001; Patten, 2002). Fourth, we excluded event studies due to their fundamentally different methodology. Finally, to be included in our sample studies had to report sample sizes and bivariate correlations or outcome statistics convertible to those (e.g., Bausch & Pils, 2009; Orlitzky et al., 2003). As we run a second meta-analysis relying on partial correlations, we also included studies that facilitated the calculation of partial correlations (i.e., studies using regression analyses and providing t statistics and degrees of freedom). We accounted for the issue of non-independent samples by excluding studies based on the same data set. If we found different versions of a study, one published and others in the form of working papers, we included the published version. If we found several published versions of a study that used the same data set, we included the version with the largest number of firms (Rosenbusch, Rauch, & Bausch, 2013). By applying these criteria, we yielded a final sample of 149 studies, from which we calculated a total of 245 bivariate correlations ($k = 245$) that in sum are based on 201,511 observations ($N = 201{,}511$) and a total of 208 partial correlations ($k = 208$) based on 179,318 observations ($N = 179{,}318$). It should be noted that there is some overlap between both study samples because several studies provided both bivariate correlations as well as statistics allowing the calculation of partial correlations.[13]

Meta-analytic procedures

In line with recent meta-analyses in management research (e.g., Carney, Gedajlovic, Heugens, van Essen, & van Oosterhout, 2011; van Essen et al., in press) we used Hedges-Olkin-type meta-analysis (HOMA) (Hedges & Olkin, 1985) and run separate bivariate and partial HOMAs. For our main analysis we relied on product-moment correlations (r) as bivariate measures. As a kind of robustness test and in order to examine the influence of methodological artifacts, we run a second analysis using partial correlations ($r_{xy.z}$) (Carney et al., 2011; van Essen et al., in press). We computed the partial correlations from the t statistics and degrees of freedom (Doucouliagos & Ulubaşoğlu, 2008; Greene, 2007).[14] Partial correlations capture the association between the variables of interest (xy), given a set of n control variables (z) used in multiple regression models (Carney et al., 2011). In line with van Essen et al. (in press) and

[11] We used the following keywords: "social*," "environment*," "green", "pollut*," "firm," "compan*," "business," "corporat*," "financ*," "economic*," "value," "performance," "pay," "market," and "return*." As methodological keywords, we applied "empirical," "statistical," "test," "analy*," "relation*," and "survey*."

[12] We included studies that either used accounting-based measures or market-based measures of CFP. However, several studies used perceptual measures derived from questionnaires. We included these studies when they applied quasi-objective measures (i.e., measures that replicate objective measures) (Richard et al., 2009) referring to the accounting-based or market-based dimension of CFP.

[13] A list of the studies included in the analysis is provided in the appendix.

[14] We used the following formula: $\sqrt{(t^2/(t^2+df))}$, where t is the t statistic and df is the degrees of freedom. Because this calculation always produces a positive number, we converted it to a negative number if the regression coefficient was negative (Greene, 2007).

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Doucouliagos & Ulubaşoğlu (2008) we used this property to examine the effects of certain control variables typically included in the regression models of the primary studies. As partial correlations measure the relationship of the variables of interest holding other factors (i.e., the applied control variables) constant, we can control for the contribution of these factors to the heterogeneity of the results (Doucouliagos & Ulubaşoğlu, 2008). We applied subgroup-analysis for this purpose.

For the calculation of the summary effects, we applied random-effects models (Hedges & Olkin, 1985). Since the majority of studies did not provide reliability estimates, we corrected the effect sizes for measurement error using a conservative 0.8 reliability estimate (e.g., Dalton, Daily, Certo, & Roengpitya, 2003; Deutsch, 2005; Lee & Madhavan, 2010) as recommended by Dalton and Dalton (2005) and Geyskens et al. (2009). Admittedly, this is an assumed artifact distribution. However, it corresponds with the mean value that Aguinis et al. (2011) calculated across 196 meta-analyses conducted in management research and in related fields.[15] We used inverse variance weights to give more weight to more precise effect sizes. Additionally, we applied Fisher's Z transformation procedures (Lipsey & Wilson, 2001). Confidence intervals were calculated at the 95% level. We calculated *Q*-statistics for testing the homogeneity of the effect size distribution (Hedges & Olkin, 1985). A statistically significant *Q* indicates the presence of moderation effects (Lipsey & Wilson, 2001).

A common issue in meta-analysis refers to the so called "file drawer problem" or publication bias. Publication bias is present when the magnitude, direction, or significance of a study's results is likely to affect the probability that a study is published (Begg, 1994; Geyskens et al., 2009; Rosenthal, 1979). This may happen when the decision for submitting or publishing studies is influenced by the presence or absence of statistically significant results (Begg, 1994; Geyskens et al., 2009). To account for a possible publication bias, we applied Rosenthal's (1979)) "file-drawer" method and calculated the fail-safe *k*. The fail-safe *k* provides an estimate of the number of null-effect studies that would be needed to make the summary effect insignificant.

For testing Hypotheses 1a, 1b, 1c, 1d (referring to CEP and subsequent CFP), 2a, 2b, 2c, 2d (referring to CEP and prior CFP), 3a, 3b, 3c, 3d (referring to CEP and concurrent CFP), and 4 (referring to reactive versus proactive approaches), we run bivariate HOMA and differentiated in each case between process-based CEP and outcome-based CEP and between market-based CFP and accounting-based CFP respectively. For testing the potential moderation effects of methodological artifacts, we run partial HOMA. We divided the complete sample into subsets referring to methodological artifacts. Thus, we contrasted the effect sizes of studies that failed to control for certain determinants (i.e., firm size, type of industry, financial risk, R&D intensity, advertising intensity, and capital intensity) with studies that included pertinent control variables. Therefore, if we report a statistically significant Q_B (indicating significant between-group heterogeneity and thus the presence of a moderation effect) (Aguinis, Sturman, & Pierce, 2008), this suggests that studies that did not include this variable systematically reported stronger or weaker relationships than studies that did control for this variable. This procedure parallels the approach used by van Essen et al. (in press) and Allouche and Laroche (2005). We also distinguished between studies controlling for possible endogeneity and studies accounting for this issue. Furthermore, we contrasted studies drawing on cross-sectional samples with studies that focused on a single industry. Finally, we distinguished between studies published after the year 1997 and studies published earlier.[16]

Coding of the studies

To gather the data needed for our analysis, we developed a coding protocol (Lipsey & Wilson, 2001). In general, the unit of analysis in our meta-analyses was the individual study (Hedges & Olkin, 1985). However, as noted earlier, we used two different types of effect size statistics: product-moment correlations for the bivariate HOMA and partial correlations for the partial HOMA. From 117 out of 149 studies we were able to derive both types of effect size measures, from 32 studies only bivariate correlations were available. While the coding of product–moment correlations was relatively straightforward, the coding of the partial correlations merits some explanation. A substantial number of the studies reported the results of several regression models, due to different measures of the constructs or different model specifications. In cases in which studies reported multiple results due to different regression model specifications that did not imply different sub-dimensions of CEP (i.e., process-based CEP and outcome-based CEP) or CFP (i.e., accounting-based CFP and market-based CFP), different temporal sequences of measurement, or differences with regard to the methodological artifacts we sought to examine, we calculated the effect sizes from the model with the largest R^2 (Aloe & Becker, 2009). In cases in which the studies reported multiple results referring to different sub-dimensions of CEP or CFP, in cases of different temporal sequences of measurement, and in cases in which multiple results involve the methodological artifacts of interest, we included several effect sizes from the same study in our analysis. This proceeding, to some extent, introduced the problem of non-independence of data (e.g., Gleser & Olkin, 1994). However, we argue that it was the best possible approach, given the purpose of examining potential moderation effects (Bausch & Pils, 2009). Moreover, as Dalton and Dalton (2005) noted, dependency does not appear to be a serious problem in the field of management research, when compared to other fields. For each model from which we derived a partial correlation, we coded categorical variables referring to the methodological artifacts we suggested for potential moderation effects. Table 1 provides a description of the coding of the variables.

Initially a set of studies was coded collectively by the authors to establish and validate the coding rules and the decision heuristics (Sleesman, Conlon, McNamara, & Miles, 2012). Afterwards, one author coded all studies. In cases of ambiguity the authors met and resolved the issues through discussion before reaching consensus (Bausch & Pils, 2009; Kirca et al., 2012; Sleesman et al., 2012).

Results

Bivariate HOMA

Table 2 summarizes the results of the bivariate HOMA. The summary effect of the overall relationship between CEP and CFP is .102 ($k = 245$, $N = 201{,}511$, $p < .001$). The 95% confidence interval, ranging from .085 to .119, does not include zero. To test for potential publication bias, we calculated the fail-safe *k* ($p = .05$), which indicated the absence of publication bias, as 10,959 null-effect studies would be necessary to make the summary effect insignificant. To examine the causal direction of the relationship, we divided the data set according to the temporal sequence of measurement. Hypothesis 1b, was supported as we found a positive effect of process-based CEP on subsequent accounting-based

[15] For robustness purposes, we also calculated the reliability-corrected correlations by using a 0.7 and 0.9 reliability estimate. We did not find changes in the main results of our analyses.

[16] 1997 is the latest year covered by the meta-analysis of Orlitzky et al. (2003).

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Table 1
Coding of the studies included in the meta-analysis.

Coding item	Coding rule
Causal direction	
CEP and subsequent CFP	Lagged measurement of CFP
CEP and prior CFP	Lagged measurement of CEP
CEP and concurrent CFP	Concurrent measurement of both constructs
Dimensions of CEP	
Process-based CEP	Measures of a firm's internal efforts, management processes, and principles regarding environmental issues (Busch & Hoffmann, 2011; Ilinitch et al., 1998; Xie & Hayase, 2007). Example: Existence of an environmental management system
Outcome-based CEP	Measures focusing on tangible results of a firm's internal efforts and management processes regarding environmental issues (i.e., directly quantifiable measures) (Busch & Hoffmann, 2011; Xie & Hayase, 2007). Example: Amount of pollutants released
Approaches of CEP	
Proactive CEP	Measures capturing a firm's environmental activities, which go beyond environmental regulations as well as measures of pollution prevention (Aragón-Correa & Sharma, 2003; Sharma & Vredenburg, 1998). Example: Pollution generation measures
Reactive CEP	Measures capturing a firm's environmental activities, which aim to meet the regulatory standards as well as measures of end-of-pipe pollution treatment (Russo & Fouts, 1997; Sharma & Vredenburg, 1998). Example: Pollution treatment measures
Dimensions of CFP	
Market-based measures of CFP	Measures of CFP referring to stock market indicators of a firm's financial performance. Example: Tobin's q.
Accounting-based measures of CFP	Measures of CFP referring to accounting indicators of a firm's financial performance. Example: ROA.
Methodological artifacts	
Controlling for firm size	Incorporation of a measure of firm size (e.g., total assets) as control variable.
Controlling for type of industry	Incorporation of industry membership as a control variable or the use of single-industry samples.
Controlling for financial risk	Incorporation of a measure of financial risk (e.g., debt-to-asset ratio) as a control variable or the use of risk-adjusted measures of CFP (e.g., risk-adjusted returns). Note that we coded both operationalizations of risk, accounting risk and market risk.
Controlling for R&D intensity	Incorporation of a measure of R&D intensity (e.g., R&D expenditures) as control variable.
Controlling for advertising intensity	Incorporation of a measure of advertising intensity (e.g., advertising expenditures) as control variable.
Controlling for capital intensity	Incorporation of a measure of capital intensity (e.g., assets-to-sales ratio) as a control variable.
Controlling for endogeneity	Use of fixed-effects panel data models and instrumental variable regressions (Sánchez-Ballesta & García-Meca, 2007; van Essen et al., in press).
Type of sample	Single industry samples versus cross-sectional samples.
Timing of research	Studies published after the year 1997 versus studies published earlier.

Table 2
Results of the bivariate HOMA.

H	Relationships	*k*	*N*	*r*	95% CI		*Q*	Q_B	*p*
	Overall relationship between CEP and CFP	245	201,511	.102***	.085	.119	2959.662		.000
	CEP and subsequent CFP								
1a	Process-based CEP and subsequent market-based CFP	27	25,350	.007	−.037	.051			.755
1b	Process-based CEP and subsequent accounting-based CFP	23	16,970	.085**	.030	.147			.001
								5.342*	.021
1c	Outcome-based CEP and subsequent market-based CFP	17	22,789	.096***	.048	.145			.000
1d	Outcome-based CEP and subsequent accounting-based CFP	20	16,606	.051*	.004	.097			.033
								1.754	.185
	CEP and prior CFP								
2a	Process-based CEP and prior market-based CFP	4	1,503	.066	−.102	.230			.440
2b	Process-based CEP and prior accounting-based CFP	12	5,716	.124*	.029	.217			.010
								.350	.554
2c	Outcome-based CEP and prior market-based CFP	5	4,671	.080	−.003	.162			.060
2d	Outcome-based CEP and prior accounting-based CFP	8	5,303	.026	−.048	.099			.496
								.913	.339
	CEP and concurrent CFP								
3a	Process-based CEP and concurrent market-based CFP	24	28,599	.095**	.040	.150			.001
3b	Process-based CEP and concurrent accounting-based CFP	55	43,215	.130***	.095	.166			.000
								1.105	.293
3c	Outcome-based CEP and concurrent market-based CFP	21	15,200	.167***	.093	.239			.000
3d	Outcome-based CEP and concurrent accounting-based CFP	29	15,589	.194***	.129	.258			.000
								.301	.583
	Proactive CEP vs. reactive CEP								
4	Proactive CEP and CFP	72	54,361	.138***	.106	.169			.000
	Reactive CEP and CFP	48	44,170	.072**	.031	.112			.001
								6.348*	.012

Note: H = hypothesis, *k* = number of effect sizes, *N* = total sample size, *r* = mean product–moment correlation, CI = confidence interval, *Q* = *Q* statistic, Q_B = between-group *Q* statistic.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

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CFP (r = .085, k = 23, N = 16,970, p = .001). Contrarily, Hypothesis 1a was not supported and our findings suggest that there is no significant relationship between process-based CEP and subsequent market-based CFP as the confidence interval includes zero (95% CI: −.037 to .051). Hypotheses 1c and 1d, which dealt with the influence of outcome-based CEP on subsequent CFP, were confirmed; we found a positive effect of outcome-based CEP on subsequent market-based CFP (r = .096, k = 17, N = 22,789, p < .001) and on subsequent accounting-based CFP (r = .051, k = 20, N = 16,606, p = .033).

Hypothesis 2a, which proposed a positive relationship between process-based CEP and prior market-based CFP was not supported as the confidence interval includes zero (95% CI: −.102 to .230). However, we found support for Hypothesis 2b, concerned with process-based CEP and accounting-based CFP (r = .124, k = 12, N = 5716, p = .010). Furthermore, we found no support for Hypothesis 2c, which proposed a positive relationship between outcome-based CEP and prior market-based CFP (95% CI: −.003 to .162). Also our results indicated that there is no significant relationship between outcome-based CEP and prior accounting-based CFP (95% CI: −.048 to .099). It is worth mentioning that the findings concerning Hypotheses 2a–d should be interpreted with some caution because the number of effect sizes for the different subsets is relatively small. Nevertheless, small numbers of effect sizes are in line with other meta-analyses (e.g., Kirca et al., 2012) and should not seriously affect the estimation results (Geyskens et al., 2006).

Hypotheses 3a and 3b, predicting a positive relationship between process-based CEP and concurrent market-based CFP and concurrent accounting-based CFP, were confirmed as we found positive relationships for process-based CEP and concurrent market-based CFP (r = .095, k = 24, N = 28,599, p = .001) as well as for process-based CEP and concurrent accounting-based CFP (r = .130, k = 55, N = 43,215, p < .001). We also found support for Hypotheses 3c and 3d, dealing with the relationship between outcome-based CEP and concurrent market-based and accounting-based CFP. Outcome-based CEP was positively related to concurrent market-based CFP (r = .167, k = 21, N = 15,200, p < .001) and to concurrent accounting-based CFP (r = .194, k = 29, N = 15,589, p < .001).

Supporting Hypothesis 4, our findings indicated that the relationship varies depending on whether proactive or reactive approaches of CEP are applied (Q_B = 6.348, p = .012). Moreover, as proposed, the relationship is stronger for proactive CEP (r = .138, k = 72, N = 54,361, p < .001) than for reactive CEP (r = .072, k = 48, N = 44,170, p = .001). It is worth mentioning, that we were not able to unambiguously assign all effect sizes to the categories of proactive or reactive. Therefore, the sum of the effect sizes of both subgroups (k = 120) is smaller than the overall number of effect sizes (k = 245).

It should be noted that overall the summary effects we found are small by conventional standards (Cohen, 1992), implying that the magnitude of relationship between CEP and CFP is rather modest. However, Aguinis et al. (2011) showed that meta-analyses in management research commonly yield rather weak summary effects in terms of magnitude.

Partial HOMA

Table 3 reports the results of the partial HOMA. The partial correlation-based summary effect is smaller compared to that based on product–moment correlations ($r_{xy.z}$ = .083, k = 208, N = 179,318, p < .001). The 95% confidence interval ranges from .066 to .100, not including zero. That means that even if the effects

Table 3
Results of the partial HOMA.

Study characteristics	k	N	$r_{xy.z}$	95% CI		Q	Q_B	p
Overall relationship between CEP and CFP	208	179,318	.083***	.066	.100	2133.051***		.000
Control variables								
Firm size controlled	180	142,459	.081***	.062	.100			.000
Firm size not controlled	28	36,859	.081***	.050	.111			.000
							.000	.992
Type of industry controlled	147	114,786	.090***	.069	.110			.000
Type of industry not controlled	61	64,532	.061***	.032	.090			.000
							2.577	.108
Financial risk controlled	98	98,791	.049***	.025	.072			.000
Financial risk not controlled	110	80,527	.113***	.089	.137			.000
							14.154***	.000
R&D intensity controlled	38	34,428	.115***	.074	.157			.000
R&D intensity not controlled	170	144,890	.073***	.054	.091			.000
							3.403	.065
Advertising intensity controlled	20	12,832	.120***	.070	.170			.000
Advertising intensity not controlled	188	166,486	.076***	.059	.094			.000
							2.662	.103
Capital intensity controlled	32	47,398	.075***	.039	.110			.000
Capital intensity not controlled	176	131,920	.082***	.063	.101			.000
							.173	.712
Endogeneity								
Endogeneity addressed	58	82,942	.027*	.006	.047			.011
Endogeneity not addressed	150	96,376	.107***	.085	.129			.000
							27.726***	.000
Type of sample								
Cross-sectional sample	135	127,689	.063***	.042	.084			.000
Single-industry sample	73	51,629	.115***	.088	.141			.000
							8.922**	.003
Timing of research								
Until 1997	28	21,270	.117***	.067	.167			.000
After 1997	180	158,048	.076***	.059	.093			.000
							2.402	.121

Note: H = hypothesis, k = number of effect sizes, N = total sample size, $r_{xy.z}$ = mean partial correlation, CI = confidence interval, Q = Q statistic, Q_B = between-group Q statistic.
* p < .05.
** p < .01.
*** p < .001.

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of other variables that were included in multiple regression models are partialled out, or in other words, even if the focal relationship is purified (Greene, 2007), it remains positive, albeit relatively weak in terms of its magnitude. Again, the fail-safe k ($p = .05$) indicated the absence of publication bias; 10,849 null-effect studies would be needed to make the summary effect insignificant.

In terms of potential moderation effects arising from differences in the primary studies with regard to the applied control variables, we only found a significant effect for the financial risk variable ($Q_B = 14.154$, $p < .001$). As studies controlling for financial risk yield smaller relationships ($r_{xy.z} = .049$, $k = 98$, $N = 98{,}791$, $p < .001$) than studies which do not control for this variable ($r_{xy.z} = .113$, $k = 110$, $N = 80{,}527$, $p < .001$), this finding indicates that latter studies tend to show upwardly biased estimates of the focal relationship. Also, our findings suggested that studies controlling for possible endogeneity ($r_{xy.z} = .027$, $k = 58$, $N = 82{,}942$, $p = .011$) show weaker relationships than studies not controlling for this issue ($r_{xy.z} = .107$, $k = 150$, $N = 96{,}376$, $p < .001$) ($Q_B = 27.726$, $p < .001$). Furthermore, our results indicated that studies relying on single industry samples ($r_{xy.z} = .115$, $k = 73$, $N = 51{,}629$, $p < .001$) tend to find stronger relationships than studies drawing on cross-sectional samples ($r_{xy.z} = .063$, $k = 135$, $N = 127{,}689$, $p < .001$) ($Q_B = 8.922$, $p = .003$). Finally, our findings suggested that the timing of research does not significantly moderate the focal relationship ($Q_B = 2.402$, $p < .121$).

Discussion

In conducting this study, we sought to address the widely deplored lack of consensus regarding the CEP–CFP relationship. Our main purposes were (1) to shed light on the direction of causality, (2) to account for the multidimensional nature of both constructs by disentangling the available empirical evidence with respect to the constructs' underlying dimensions, and (3) to explore whether methodological artifacts provide possible explanations for the inconsistency of the findings yielded by empirical studies to date. Our findings enable us to provide solid ground for future research on one of the most puzzling questions facing research on organizations and the natural environment.

While several scholars, on the basis of narrative reviews and vote counts, have noted that a general conclusion cannot be drawn or that "the only conclusion to be extracted is that empirical estimates report mixed results" (Blanco et al., 2009, p. 465), our study provides evidence that, overall, the relationship is positive. Although the summary effects derived from our analyses are small in terms of magnitude, we can clearly reject the neo-classical arguments for a trade-off between CEP and CFP. Furthermore, though our findings do not fully support the existence of a virtuous circle, our results indicate that the relationship involves some reciprocal causal mechanisms. Finally, we identified moderation effects of several methodological artifacts, which to some extent provide reasons for the inconsistency of study findings. In the following passages, we expand on these and other issues that arise from our analysis.

While most of the research on the relationship between CEP and CFP has been tied to the question of whether it pays to be green, more recently, scholars have begun to challenge the assumption of an unidirectional relationship by introducing theoretical arguments for a reverse direction or even a possible "two-way interaction" (Molina-Azorín et al., 2009, p. 1094) in terms of bidirectional causality. Hence, we divided the complete sample of effect sizes in terms of the temporal sequence of measuring both constructs. With regard to the causal link from CEP to CFP our findings preponderantly confirm the arguments of the NRBV and the instrumental stakeholder theory. Outcome-based CEP is positively related to both subsequent market-based and accounting-based CFP with a slightly stronger relationship for the latter dimension of CFP. First, this means that the observable and quantifiable results of a firm's environmental activities (i.e., outcome-based CEP) increase the firm's internal efficiency and have positive impacts on its tangible costs and revenues (reflected by accounting-based measures). This finding reinforces Porter and van der Linde's (1995) assertion that pollution is a sign of inefficiency and entails hidden costs. Therefore, reduced environmental impacts in terms of less waste or decreased levels of pollution are accompanied with short-term benefits that may result from lower costs of raw materials (due to better utilization of inputs), reduced waste disposal costs, or lowered liability costs (Delmas et al., 2011; Hart & Ahuja, 1996; Peloza, 2009; Shrivastava, 1995). Second, this indicates that outcome-based CEP also positively influences external evaluations of a firm and may entail reputational effects (reflected by market-based measures). Hence, this finding suggests that the market does indeed value CEP in terms of accomplished environmental impact reductions (Konar & Cohen, 2001). A recent example for the market interest in outcome-based CEP is the Carbon Disclosure Project (CDP), denoted as "the most powerful green NGO you've never heard of" (Winston, 2010), which is tracking the greenhouse gas emissions of major companies worldwide. The establishment of the CDP goes back to an international initiative of institutional investors, presently having $78 trillion under management.

With regard to process-based CEP, we found a positive relationship for subsequent accounting-based CFP but not for subsequent market-based CFP. This finding is somewhat surprising. As contended by the NRBV, the relationship between CEP and CFP involves the development of resources and organizational capabilities, which in large parts are of rather intangible nature (e.g., reputation, human resources, or organizational culture). Therefore, market-based measures of CFP were suggested to be more capable of considering the intangible effects of CEP (e.g., Baird et al., 2012; Delmas & Nairn-Birch, 2011). Moreover, several scholars emphasized the rather long-term value creation potential of environmental processes (e.g., Hillman & Keim, 2001; Kim & Statman, 2012; Lankoski, 2008), which is more likely to be captured by market-based CFP. One possible explanation refers to the fact that environmental processes do not always lead to improved environmental outcomes (Busch & Hoffmann, 2011; Xie & Hayase, 2007). For example, research has highlighted that the implementation of environmental management systems (referring to process-based CEP) does not guarantee ecological success in terms of outcome-based CEP (Nawrocka & Parker, 2009). In some cases environmental processes may even constitute merely a symbolic gesture without meaningful and substantial implications (Delmas et al., 2013; Wagner, 2008; Walker & Wan, 2012). Thus, our finding that process-based CEP does not influence subsequent market-based CFP, while outcome-based CEP does so, suggests that the market rewards firms' environmental performance if pertaining to objective and quantifiable results but not if pertaining to environmental processes, which might be considered as less reliable measures or even as "green-washing" attempts (Busch & Hoffmann, 2011). The positive impact of process-based CEP on subsequent accounting-based CFP, on the other hand, may result from successful internal efforts such as altered production processes, which go along with direct cost savings that are not apparent to the market or for some reason (e.g., overlapping effects of other market-related incidents) are not reflected in investors' perceptions.

With regard to the causal direction from CFP to CEP, we found a significant relationship between prior accounting-based CFP and process-based CEP. This confirms the slack resources hypothesis proposing that financial resources are necessary for environmental processes (e.g., the redesigning of production processes or substitution of polluting inputs). However, we did not find a significant

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relationship between CEP (both in terms of process-based CEP as well as in terms of outcome-based CEP) and market-based CFP. Also, we did not find a significant relationship between prior accounting-based CFP and outcome-based CEP. The former finding, in our view, is not surprising and may be due to the fact that accounting-based measures, with their rather internal focus and their backward-looking nature, better proxy for organizational slack than market-based measures. The latter finding might be explained again by the fact that process-based CEP does not necessarily lead to improved outcome-based CEP. Therefore, there might be cases in which high CFP firms use their resources for mounting environmental processes that do not effectively affect environmental outcomes.

While the findings discussed so far referred to studies allowing the establishment of causal inferences, most of the studies examining the relationship between CEP and CFP unfortunately draw on concurrent measurement for both constructs. Regarding this type of studies our findings revealed positive relationships for all subgroups. Furthermore, both process-based CEP and outcome-based CEP are more strongly related to concurrent accounting-based CFP than to concurrent market-based CFP. As noted earlier, studies that measure CEP and CFP contemporaneously strictly speaking do not allow establishing causal inferences. However, we argue that there may be certain circumstances under which it might be conceivable that CEP and CFP are related to each other in a concurrent manner. First, both CEP and CFP may be possible expressions of superior management quality. Several scholars suggested that the boundaries between CEP and good management practices are fluent and that CEP just reflects managerial excellence (e.g., Bowman & Haire, 1975; Waddock & Graves, 1997; Wagner & Blom, 2011). Along this line, both CEP and CFP may constitute the results of effective management and thus may represent two sides of the same coin. Accordingly, the quality of management would constitute a confounding variable in the CEP-CFP relationship. Unfortunately, empirical studies face the problem that good management is hardly measurable, if possible at all (Telle, 2006). Second, it should be noted that *concurrent measurement* of both constructs in this context is not necessarily equivalent to *absolute simultaneity*. Usually, studies use data referring to a particular fiscal year. Hence, *concurrent measurement* in this context may involve a time span of one year. Therefore, certain environmental initiatives such as the conservation of energy or the reduction of costly hazardous materials may entail cost savings and immediate financial benefits that affect accounting-based CFP in the current period. For example, a recent study of McKinsey and Company suggested that the US economy bears a $1.2 trillion energy reduction potential (Granade et al., 2009). That means that even nowadays, a great number of low hanging fruits (Hart & Ahuja, 1996) are waiting to be reaped. One might argue that suggesting that managers would overlook such profitable opportunities is somewhat implausible and simpleminded. However, King and Lenox (2002) pointed out that managers may underexploit opportunities for profitable emission reductions due to search costs, prior expectations, or lacking complementary resources and capabilities for exploring "the locus of profitable pollution reduction" (King & Lenox, 2002). Third, regarding market-based CFP, concurrent measurement may not undermine causal interpretation as market-based measures reflect investors' expectations of future returns and thus should index CEP effects even in concurrent measurement. Several scholars argued that market-based measures are more appropriate than accounting-based measures for capturing the financial benefits of CEP (e.g., Davidson & Worrell, 1990; Delmas & Nairn-Birch, 2011; Hillman & Keim, 2001). Our analysis to some extent questions these theoretical sound propositions as we found stronger relationships for accounting-based measures, unambiguously at least for studies measuring both constructs concurrently. However, this finding is in line with the CSP–CFP meta-analysis of Orlitzky et al. (2003). One possible interpretation is that the relationship between CEP and CFP may be driven primarily by internal effects (e.g., increased production efficiency) rather than by external effects (e.g., reputation effects). First, this is indicated by the finding of a stronger relationship between CEP and CFP for accounting-based measures, which may be better indicators of internal efficiency than market-based measures (Orlitzky et al., 2003; Van Beurden & Gössling, 2008). Second, also our finding that outcome-based CEP, implying a more internal focus than process-based CEP, tends to show a stronger relationship with CEP points in that direction.

Furthermore, our findings showed that the strategic approach underlying a firms' dealing with environmental issues significantly determines the relationship between CEP and CFP. We confirmed the widely expressed argument that proactive approaches to CEP are more likely to be associated with superior financial performance than reactive approaches (e.g., King & Lenox, 2002; Klassen & Whybark, 1999). Hence, our findings suggest that the redesign of production processes and the focus on source reduction and process innovation, inherent to proactive approaches (Russo & Fouts, 1997), induce greater financial benefits than a compliance mode.

Our partial HOMA results provided additional evidence for a positive relationship between CEP and CFP in general, because even when the influence of other variables was partialled out the relationship remained positive and significant. Moreover, our partial HOMA indicated the existence of moderation effects of several methodological artifacts. In order to examine whether other variables are involved in the focal relationship, we examined the influence of control variables applied in the primary studies. Surprisingly, we only found a significant effect for the financial risk variable while other control variables such as the type of industry, firm size, R&D intensity, advertising intensity, and capital intensity did not appear to affect the relationship. Our finding that studies controlling for firms' financial risk yield weaker relationships parallels the result of Orlitzky and Benjamin (2001), who found that firms with superior CSP incur less financial risk. Hence, also with regard to the CEP–CFP link risk may play an important role. CEP may well provide some type of insurance effect (Minor & Morgan, 2011; Peloza, 2006) as it may reduce the probability of litigation, increase firm reputation, and may lead to tax benefits, lower costs of equity capital and lower costs of debt (Orlitzky & Benjamin, 2001; Sharfman & Fernando, 2008). In terms of the reverse causal direction lower risk may allow better evaluations of prospective CFP and thus provides certainty with regard to the financial planning of environmental activities (Orlitzky & Benjamin, 2001). With regard to our (non)findings concerning the other control variables, it seems possible that variables such as firm size or capital intensity may be too broad proxies and that other contingent variables which so far have not been taken into account determine the focal relationship. For example, Delmas et al. (2011) showed that absorptive capacity may leverage cost advantages from environmental strategies. Furthermore, Surroca et al. (2010) provided evidence for mediating effects of human capital and organizational culture.

In addition, the partial HOMA revealed moderation effects with regard to the control for endogeneity and the type of sample. In view of the fact that study findings vary systematically with regard to whether the problem of endogeneity has been addressed or not, the partial HOMA provided additional support for the suggestion of bidirectional causal linkages between CEP and CFP. Furthermore, as our findings indicated that studies relying on single industry samples yield significantly stronger results than studies using cross-sectional samples, it reinforces the skepticism towards the appropriateness of cross-sectional designs for examining the CEP–CFP link, which has been raised by several scholars (e.g., Griffin & Mahon, 1997; Rowley & Berman, 2000; Wokutch & Spencer, 1987). In-

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deed, especially outcome-based measures of CEP such as toxic emissions or water pollution releases are hardly comparable across different industries. Moreover, industries differ substantially with regard to public visibility and stakeholder pressures (e.g., Griffin & Mahon, 1997; Walker & Wan, 2012). Therefore, the opportunity to reap financial benefits from CEP is likely to be contingent upon several industry-specific factors.

Limitations and future research

Although we sought to provide the best possible evidence on the CEP–CFP link in both accuracy and comprehensiveness, our meta-analysis is not free from limitations. Like any meta-analysis our study is constrained by the nature and scope of the primary studies it draws on (Hunter & Schmidt, 1990). As outlined earlier, many of the studies on the relationship between CEP and CFP are subject to methodological flaws such as poor measurement of the constructs of interests, omitted variables, inadequate sampling procedures, and so on. We tried to account for these issues by distinguishing between different measurement approaches for both focal constructs, by examining different sets of temporal associations, and by examining methodological artifacts in our partial HOMA (i.e., the use of control variables, the consideration of potential endogeneity, the type of samples used). In doing so, we tried to shed light on potential reasons for the inconclusiveness of the empirical findings yielded so far. Nevertheless, we have to admit that there are further issues we were not able address by means of our analysis.

As pointed out, both constructs of interest are of multidimensional nature. While our analysis accounted for this issue by differentiating between outcome-based and process-based CEP and market-based and accounting-based CFP respectively, a more fine-grained breakdown was prevented by the number of available effect sizes. Along with differences pertaining to corporate activities (e.g., industry-level differences or differences due to varying levels of vertical integration), environmental impacts may differ substantially across firms making them highly context-specific (Goldstein, Hilliard, & Parker, 2011). Therefore, a more sophisticated differentiation of the CEP construct may yield important insights. Furthermore, the varying findings with regard to process-based CEP and outcome-based CEP call for further research. Similarly, the somewhat counterintuitive finding of a stronger relationship for accounting-based measures of CFP for studies measuring both constructs concurrently clearly warrants further investigations. Is the relationship indeed mainly driven by mechanisms internal to the firm rather than by external aspects? Furthermore, our analysis of potential moderation effects regarding the influence of control variables was limited to variables that had been employed in a sufficiently large number allowing subgroup comparisons. Given that the most commonly used control variables, except firm risk, did not appear to influence the results in a systematic manner, our analysis opens the door to an examination of other factors that might be involved in the focal relationship. In particular, we encourage scholars to look "under the tip of the iceberg" (Delmas et al., 2011) and to examine the influence of less visible aspects, which remained unexplored (e.g., human capital, organizational learning, or certain management styles). Additionally, future research may examine several characteristics of the general business environment, highlighted by contingency theorists, which might be important determinants of the CEP–CFP relationship (Aragón-Correa & Sharma, 2003; Russo & Minto, 2012). Future research should also look to the concrete mechanisms of how financial risk influences the focal relationship. While Orlitzky and Benjamin (2001), regarding the CSP–CFP link, conceived financial risk as a mediator, we argue that risk might also constitute a confounding variable. Less risky firms constitute generally favored investments and thus face lower costs of capital and higher levels of CFP (Sharfman & Fernando, 2008). On the other hand, firms with lower levels of risk have greater financial security, which may positively influence the decision for investments in CEP (Orlitzky & Benjamin, 2001). Finally, an issue that has not been addressed by our study refers to the potential influence of country-level factors such as different regulatory systems or different cultural values. Thus, examining whether the relationship between CEP and CFP varies across different institutional settings might be an interesting area for future research.

Hence, while our study commenced with disassembling the complexity of the relationship between CEP and CFP with regard to the multidimensionality of both constructs and by (simultaneously) incorporating the issue of causality, future research can build upon our findings and may provide more detailed insights pertaining to the mechanisms linking CEP and CFP and the circumstances shaping that link.

Conclusion

Motivation and starting point of our analysis was the inconsistency in the empirical findings on the relationship between CEP and CFP. By conducting a meta-analysis based on 245 bivariate correlations and 208 partial correlations derived from a total of 149 studies, we addressed the lack of consensus and provided evidence for an overall positive relationship between CEP and CFP. By considering the multidimensionality of both constructs and by focusing on the direction of causality, our analysis centered around two highly material issues pertaining to the focal relationship. Moreover, by examining the role of methodological artifacts we provided some explanations for the inconsistent results of previous empirical research.

Put in a nutshell, our analysis demonstrated that the relationship between CEP and CFP (1) is generally positive, (2) involves bidirectional causation, with a positive link from CEP to CFP and a partially positive link vice versa, (3) varies with regard to the dimensions of CEP (process-based CEP versus outcome-based CEP) and CFP (market-based CFP versus accounting-based CFP), (4) is stronger for proactive approaches of CEP, (5) is influenced by a firm's financial risk, and (6) is subject to moderation effects of methodological artifacts (control for endogeneity and type of sample).

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at http://dx.doi.org/10.1016/j.emj.2013.12.004.

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