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# Do environmental responsibility views influence investors' use of environmental performance and assurance information?

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## **Abstract**

**Purpose** – The purpose of this study is to investigate whether investor views regarding the benefits of corporate environmental responsibility moderate the influence of environmental performance and assurance information on their judgments. Specifically, the authors examine the effects of two broad views: environmental responsibility is more important than financial performance, regardless of investment returns (i.e. environmental responsibility importance) and positive environmental performance will increase investment returns (i.e. environmental performance return).

**Design/methodology/approach** – Nonprofessional investors completed an online study where environmental performance (high or low) and assurance on environmental performance information (present or absent) were varied. Participants' corporate environmental responsibility views were assessed using a series of questions adapted from Cheah et al.'s (2011) study.

**Findings** – Environmental performance and assurance information had a greater influence on the investment judgments of investors with strong environmental responsibility views. In contrast, participants' environmental performance return views did not moderate the influence of environmental performance and assurance information on their judgments. Supplemental analysis indicates that these contrasting results are due to the fact that the two investor views have differing influences on the relative importance that investors place on financial vs environmental performance information.

**Research limitations/implications** – This study presented participants with summarized financial and environmental performance information to maintain scale compatibility between financial and environmental measures. However, the information was presented in a format similar to those used by online brokerages.

**Practical implications** – This study suggests that financial statement preparers should consider investors' views regarding the importance and value of environmental performance information when making decisions to disclose and obtain assurance on this information.

**Social implications** – Standard setters should consider individual differences among investors when developing guidance regarding the disclosure and assurance of environmental performance information.

**Originality/value** – There is limited prior research which examines how investors' views of the importance of environmental performance information may influence investment judgments. This research indicates that the strength of investors' environmental responsibility importance moderates the previously reported influence of environmental performance and assurance information on investment judgments.

## **Keywords**

Environmental disclosure, Information credibility, Environmental performance assurance, Investor corporate social responsibility views, Investor judgements

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**Disciplines**

Accounting | Business Law, Public Responsibility, and Ethics | Environmental Indicators and Impact Assessment | Environmental Sciences | Environmental Studies | Natural Resource Economics | Strategic Management Policy

**Comments**

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**Keywords** Environmental disclosure, Environmental performance assurance, Information credibility, Investor CSR views, Investor judgments

**Paper type** Research paper

**Data availability** Contact the authors.

## 1. Introduction

Nonprofessional investors are a large, heterogeneous group (Elliott *et al.*, 2008; Gödker and Mertins, 2018) who currently control a significant amount of investment capital in the U.S. (Morgan Stanley, 2015, 2017; SIF, 2016; Verma and Renick, 2017). These individuals increasingly base their investment decisions on both traditional financial statement information and corporate social responsibility (CSR) disclosures (Gödker and Mertins, 2018). Indeed, a substantial body of behavioral research now indicates that nonprofessional investors' judgments are influenced by CSR disclosures (Cohen *et al.*, 2011; Huang and Watson, 2015; Gödker and Mertins, 2018). In addition, behavioral studies show that CSR assurance influences nonprofessional investors' investment value judgments (Cohen and Simnett, 2015; Rivière-Giordano *et al.*, 2018).

Interestingly, this stream of prior research does not account for the fact that nonprofessional investors' views regarding the importance and value of CSR performance and assurance on this information vary (Nilsson, 2009; Alewine, 2010; Dilla *et al.*, 2016). This gap in the research exists despite evidence that investors' CSR views are an important driver of individuals' decisions to hold socially responsible investments (Cheah *et al.*, 2011; Dilla *et al.*, 2016; Riedl and Smeets, 2017; Gödker and Mertins, 2018). Therefore, this study's objective is to examine whether these views attenuate or exacerbate the previously documented relationships between CSR performance, assurance, and investor judgments.

Specifically, this study addresses the research question: Do investors' views regarding corporate environmental responsibility moderate the influence of environmental performance and assurance disclosures on investment judgments? The two views examined are: (1) environmental responsibility is more important than financial performance, regardless of

investment returns (i.e., environmental responsibility importance) and (2) positive environmental performance will increase investment returns (i.e., environmental performance return). These views represent two commonly-held broad perspectives on CSR (Cheah *et al.*, 2011; Moser and Martin, 2012). The study uses an experimental setting, following Patten and Shin's (2019) suggestion that such studies can more carefully ascribe causality for outcomes on factors such as investor beliefs. The study focuses on the influence of environmental performance information on investor judgments, since these disclosures comprise an important segment of CSR reporting overall (GRI, 2013; Khan, Serafeim, and Yoon, 2016; SASB, 2017). Further, a substantial majority of assurance reports presented by publicly traded companies address environmental disclosures, as opposed to other aspects of CSR reporting (Gürtürk and Hahn, 2016).

The study uses a research framework based upon Hogarth's (1987) conceptual model of judgment to predict that investors' environmental responsibility performance and environmental performance return views will moderate the influence of environmental performance and assurance information on judgments. We test these predictions in an experimental study using 278 nonprofessional investor participants. Participants viewed a filtered summary report about a diversified manufacturing company presented in a format similar to those used by online brokerages (e.g., Fidelity Investments, 2018), then made judgments about the company's desirability as an investment and the amount they would invest in the company. Environmental performance (low or high relative to the industry) and assurance on environmental information (present or absent) were manipulated in a  $2 \times 2$  between-participants design. Participants' environmental responsibility importance and environmental performance return views were assessed using an instrument based on Cheah *et al.*'s (2011) survey of socially responsible investors' attitudes.

As predicted, we find that participants' environmental responsibility importance views influence the extent to which environmental performance and assurance information affects their investment judgments. Specifically, investors with stronger environmental responsibility importance views make higher investment desirability and amount judgments when environmental performance is higher. At the same time, assurance has a positive effect on these investors' investment desirability judgments, but not on their investment amount judgments. Neither environmental performance nor assurance on environmental measures influences the investment desirability judgments of participants with weaker environmental responsibility importance views. In contrast to these results, the influence of environmental performance and assurance information on investment judgments does not vary depending on the strength of investors' environmental performance return views. Supplemental analyses show that the two investor views have differing influences on investors' weighting of environmental versus financial performance information, thus indicating why contrasting results occurred for these views.

Despite the growing interest of nonprofessional investors in socially responsible investments and calls to examine how differences in these investors' views may influence their reactions to CSR disclosures and assurance on CSR information (Moser and Martin, 2012; Gödker and Mertins, 2018), little is currently known about how differences in investors' CSR views influence investment behavior. As Patten and Shin (2019) observe, a majority of the sustainability disclosure research papers that appear in *SAMPJ* and other social and environmental (SEA)-related journals uses archival approaches that do not allow for controlling for investors' CSR views. This has occurred, even though Alewine (2010) outlined the advantages of experimental approaches for investigating the influence of sustainability

disclosures on investor judgments in an early issue of *SAMPJ*. While an emerging stream of behavioral sustainability disclosure research does appear in other accounting journals (Huang and Watson, 2015; Gödker and Mertins, 2018), it also does not directly address the influence of investors' CSR views on their judgments. Therefore, this study extends prior research by demonstrating that nonprofessional investors' environmental responsibility importance views moderate the influence of environmental performance and assurance information on their investment decisions. Our results suggest that environmental performance disclosures and related assurance reports may be of greater or lesser importance to investors, depending on their corporate environmental responsibility views. These results should be of interest to financial statement preparers when making decisions to disclose and obtain assurance on environmental performance information. They should also be of interest to assurance providers and standard setters as they develop sustainability assurance procedures and the associated reports.

## **2. Theory and hypotheses**

### *2.1. Investor views on the importance of environmental performance information*

Moser and Martin (2012) describe two differing views on CSR activities. These closely parallel the first two investor views about CSR investment described by Cheah *et al.* (2011). We refer to the first view as the *environmental responsibility importance* view. This view holds that companies should make investments benefiting society, even when doing so decreases shareholder value. Investors who adopt this view give higher priority to the goals of promoting social and environmental responsibility than to maximizing shareholder wealth. Such investors may be tolerant of accepting an "ethical penalty" for socially responsible investing (McLachlan and Gardner, 2004; Williams, 2007; Renneboog *et al.*, 2011). Consequently, investors who hold



this view believe that a company's financial performance is less important than its social and environmental performance.

We refer to the second view as the *environmental performance return* view. It is based on the idea that companies should engage in socially responsible activities only when doing so maximizes shareholder value (Jensen and Meckling, 1976). Indeed, the emerging body of evidence that shows a positive relationship between environmental and other CSR performance dimensions and company value is consistent with this idea (Dhaliwal *et al.*, 2011; Clarkson, Fang, Li, and Richardson *et al.*, 2013; Matsumura, Prakash, and Vera-Munoz *et al.*, 2014; Saka and Oshika, 2014; Fazzini and Dal Maso, 2016; Ferrell *et al.*, 2016; Khan *et al.*, 2016; Brooks and Oikonomou, 2018). Thus, investors who hold this view will believe that environmentally responsible companies yield higher returns than environmentally irresponsible ones.<sup>1</sup>

## 2.2 Influence of Environmental Performance Information on Investor Judgments

Several behavioral studies show that environmental and other corporate social performance information influences investment judgments (e.g., Holm and Rikhardsson, 2008; Guiral *et al.*, 2014; Elliott *et al.*, 2014; Cohen *et al.*, 2015b; Elliott *et al.*, 2017; Brown-Liburd *et al.*, 2018). In general, these papers find that positive environmental and social performance disclosures have positive effects on investors' valuation and investment judgments. These studies, however, do not test the possibility that the influence of environmental performance information on investors' judgments may vary, depending on their individual views regarding corporate environmental responsibility.

Therefore, we use Hogarth's (1987) conceptual model of judgment to develop predictions regarding how investor views influence the weighting of environmental performance and assurance information in making investment judgments (also see Maines and McDaniel, 2000).

As shown in Figure 1, the framework models investor judgments as a linear combination of cues (Slovic, Fleissner, and Bauman, 1972; Libby, 1981). In cases where investors acquire, evaluate, and weigh both financial and environmental performance cues, the investor judgment model can be stated as:  $J = \alpha + \sum \beta_f X_f + \sum \beta_e X_e$ , where J is investor judgment,  $X_f$  and  $X_e$  are financial and environmental performance cues, respectively, and  $\beta_f$  and  $\beta_e$  are the weights on those cues. Thus, as Figure 1 depicts: (1) investors acquire and evaluate financial and environmental performance and assurance information, (2) investors' environmental responsibility importance and environmental performance return views influence the relative weights that they place on environmental, relative to financial performance cues, and (3) these relative cue weights influence the degree to which environmental performance and assurance information affects investors' judgments.

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Insert Figure 1 about here.  
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Wright (1977, 1979) finds that nonprofessional investors have self-insight into cue usage when making investment judgments using filtered information. Therefore, it appears likely that investors' views regarding the importance of environmental performance will influence the relative weight that they place on environmental, relative to financial performance information (i.e., the third phase of the model in Figure 1). By definition, individuals with strong environmental responsibility importance views place a higher priority on the goals of promoting environmental responsibility as opposed to maximizing shareholder wealth. As the strength of the environmental responsibility view increases, the weight these investors place on environmental performance cues should increase and the weight that they place on financial performance cues should decrease. As shown in Figure 2—Panel A, individuals with strong

environmental responsibility importance views should place relatively more weight on environmental versus financial performance when making investment judgments. Individuals with weak environmental responsibility importance views should place little or no weight on environmental versus financial information.

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Insert Figure 2 about here.  
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Therefore, for investors with strong environmental responsibility importance views, environmental performance information that is high relative to the industry average should have a positive effect on investment judgments. Conversely, when investors have weak environmental responsibility importance views, environmental performance information should have little or no effect on their investment judgments. This suggests the following hypothesis:

*H1a.* Environmental performance will have a greater positive influence on the investment judgments of investors with strong environmental responsibility importance views vs. investors with weak environmental responsibility importance views.

The environmental performance return view assumes that shareholders prefer to maximize profits and that firms will only undertake environmentally responsible investments to the extent that such activities increase firm value (Jensen and Meckling, 1976; Moser and Martin, 2012). This suggests that investors should consider financial performance information to be important, regardless of the strength of their environmental performance views. Since investors with strong environmental performance return views believe that socially responsible companies are more profitable than socially irresponsible companies, these views should only influence the importance that they place on environmental performance information. Therefore, the strength of investors' environmental performance return views should influence the relative weight that they place on environmental versus financial information, as shown in Figure 2—

Panel B. Specifically, investors with weak environmental performance return views should place substantially more weight on financial versus environmental performance information, while those with strong environmental performance return views will place equal weight on the two types of information. These relationships indicate that investors' environmental performance return views will have only an ordinal interactive effect on the weighting of financial and environmental performance information, as opposed to the disordinal effect of environmental performance importance views depicted in Figure 2—Panel A. Even so, this still indicates that environmental performance return views will moderate the influence of environmental performance and assurance disclosures on investment judgments. Specifically, the judgments of investors with strong environmental performance return views are more likely to be positively influenced by environmental performance information that is high relative to the industry average than those of investors with weak environmental performance return views. This suggests the following hypothesis:

*H1b.* Environmental performance will have a greater positive influence on the investment judgments of investors with strong environmental performance return views vs. investors with weak environmental performance return views.

### *2.3 Investors' Attention to Assurance on Environmental Performance Information*

Assurance is one of several factors that influence management disclosure credibility (Mercer, 2004; Cho *et al.*, 2014; Rivière-Giodarno *et al.*, 2018). In general, experimental evidence suggests that assurance increases the perceived credibility of non-financial information, and increases the weight that decision makers place on such information (Libby *et al.*, 2004; Coram *et al.*, 2009; Hodge *et al.*, 2009; Pflugrath, *et al.*, 2011; Reimsbach *et al.*, 2018; Rivière-Giodarno *et al.*, 2018). Two studies, however, indicate that these effects may be context-specific.

Brown-Liburd *et al.* (2015) report that assurance increases stock price assessments only when a company's CSR investment level is above the industry average and management's compensation is directly tied to corporate social performance. Cheng *et al.* (2015) find that assurance on CSR performance measures has a positive influence on individuals' willingness to invest only if they perceive the CSR measures to have high strategic relevance. In addition to the contextual effects demonstrated in these studies, it is possible that the influence of environmental assurance on investor judgments may be contingent on the relative importance that investors place on environmental versus financial performance information.

Specifically, we argue that when investors have strong environmental responsibility views, they might perceive providing environmental performance information without assurance as a form of "greenwashing" or reputation management (Cho and Patten, 2007; Holder-Webb *et al.*, 2009; Cho, *et al.*, 2012; Cho, *et al.*, 2015). In turn, this perception might lead these investors to believe that a company will overstate its environmental performance in the absence of assurance, even when the reported level of performance is low relative to the company's industry. The credibility lent to environmental performance information by the presence of an assurance report should mitigate this belief. In addition, it is possible that these investors may view an environmental information assurance report as a symbol of legitimacy (Power, 2003; O'Dwyer *et al.*, 2011), a signal indicative of high-quality corporate governance (Cohen *et al.*, 2015), or an indicator that an organization has more effective control processes for managing sustainability-related challenges and risks (Steinmeier and Stich, 2017). These arguments with respect to credibility, legitimacy, governance quality, and control processes all indicate that sustainability assurance should have a consistent positive influence on the judgments of investors with strong environmental responsibility importance views. On the other hand, since investors

with weaker environmental responsibility importance views will place little or no emphasis on environmental performance information in the first place, such investors will not be influenced by environmental performance assurance. Therefore, we propose the following hypothesis:

*H2a.* Assurance on environmental performance information will have a greater positive influence on the investment judgments of investors with strong environmental responsibility importance views vs. investors with weak environmental responsibility importance views.

As discussed above, investors' environmental performance return views should have a different influence on their weighting of financial vs non-financial information than their environmental responsibility importance views. Even so, the two views should have similar moderating effects on the influence of assurance on investment judgments. The arguments advanced above with respect to the signaling of credibility, legitimacy, governance quality, and strong control processes conveyed by a sustainability assurance report also suggest that such assurance should have a positive influence on the investment judgments of individuals with strong environmental performance return views. Further, as previously noted, individuals with weak environmental return views will place little or no weight on environmental performance information; therefore, their investment judgments should not be influenced by assurance on that information. This suggests the following hypothesis:

*H2b.* Assurance on environmental performance information will have a greater positive influence on the investment judgments of investors with strong environmental performance return views vs. investors with weak environmental performance return views.

### **3. Method**

#### *3.1. Participants*

Two hundred seventy-eight nonprofessional investors from the United States participated in the study. They included 216 faculty and staff at a large public university recruited through an email announcement, 17 recruited through an online survey firm, and 45 MBA students who participated as a class exercise. Participants were individuals 24 years of age or older who had investment activity within the last five years. Investment activity is defined as: (1) buying or selling stocks, bonds, or mutual funds at least once or (2) managing asset or contribution allocations in a retirement fund account. The 17 online survey firm participants and two university participants completed the study online. The remaining 259 participants completed the study in a computer lab under the supervision of one of the researchers. The faculty and staff from the large university were given a flat \$25 cash payment at the end of the study and the online survey firm participants were compensated directly by the survey firm. The MBA students did not receive any cash compensation.<sup>2</sup>

Participants' mean age is 41.1 years, and ranges from 21 to 75. One hundred sixteen (41.7 per cent) are female. One hundred eighty-three (65.8 per cent) participants report actively trading stock within the last five years. One hundred forty-four (51.8 per cent) participants report actively trading stock for more than two years. The mean (median) proportion of participants' portfolios held in socially responsible investments is 33.6 per cent (27.5 per cent). Ninety-five (34.2 per cent) participants report using socially responsible investing products or services, such as SRI stock and mutual fund screens.

### 3.2. Methodology

The study used a 2 by 2 design. Environmental performance was manipulated as either high or low and assurance on environmental performance was manipulated as either present or absent. Participants were randomly assigned to experimental conditions. Participants' environmental responsibility views were measured using a scale based upon Cheah *et al.*'s (2011) survey of socially responsible investors' attitudes. The company background information was consistent across all conditions. The average percentile of financial performance measures relative to the industry was held constant at 53. A financial audit report was always present.

One hundred twenty-four participants viewed high environmental performance information and 154 viewed low environmental performance information. One hundred fifty-nine participants completed the assurance on environmental information present condition and 119 completed the no assurance condition. The order of presentation of information was varied—the link to the environmental summary information (and the related assurance report, if present) appeared either first or second in the performance metrics menu on the right-hand side of the screen.

Participants first viewed background information on a hypothetical diversified manufacturing company called Corvus Industries, followed by a page describing Corvus' key financial and environmental performance metrics. The environmental performance metrics were consistent with items identified by the Sustainability Accounting Standards Board (SASB) as likely to be material for the resource transformation sector (SASB, 2017). Participants were then asked to navigate between environmental summary information, financial summary information, an environmental information assurance report (in conditions where the assurance report was present), and Corvus' financial statement audit report. The environmental information assurance



report was modeled on the accounting firm reasonable assurance report used in Hodge *et al.* (2009). The summary financial and environmental information pages contained Corvus' key financial and environmental performance metrics. Participants were able to view definitions of each metric by moving their cursor over the metric name.

Participants viewed financial and environmental information in a filtered summary format, as opposed to the detailed, unfiltered formats used in previous studies of environmental (e.g., Holm and Rikhardsson, 2008) and CSR (e.g., Elliott *et al.*, 2014; Brown-Liburd and Zamora, 2015) information usage. The information display formats were adapted from a large online brokerage (Fidelity Investments, 2018). Displays showed the value for each performance metric, the industry average for the metric, and the company's industry percentile for that metric.<sup>3</sup> By using consistent scaling metrics, we control for differences in information evaluation behavior (i.e., the second phase of the model in Figure 1) that are not attributable to perceived environmental information importance (Jackson, 2008) and for the possibility that participants may not be familiar with the scaling or definition of environmental performance metrics (Eccles, *et al.*, 2015). Further, Elliott *et al.* (2008) provide evidence that investors are more effective in maximizing their returns when using filtered as opposed to unfiltered performance information. Therefore, we use an experimental setting where both financial and environmental information are presented in a filtered format with consistent scales.

After viewing the key financial and environmental metrics page, participants indicated Corvus' desirability as an investment on a scale ranging from 0 (very undesirable) to 10 (very desirable).<sup>4</sup> They also indicated how much of \$10,000 US they would invest in Corvus versus a fixed-yield savings account. Participants provided brief explanations of their judgments, then responded to a series of post-experimental questions. These included two manipulation check

questions about whether there was assurance on the financial and environmental information, and questions about the overall reliability and credibility of Corvus' financial and environmental information. Participants responded to four questions based on Cheah *et al.* (2011) to assess their views regarding the importance of environmental versus financial performance and about whether companies' environmentally responsible activities increase investment returns (Table I).<sup>5</sup> Finally, participants provided demographic information.

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Insert Table I about here.  
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### 3.3. Analysis variables and testing methodology

#### 3.3.1 Dependent and independent measures

The study's dependent measures are participants' investment desirability ratings (*DESIRE*: on a scale ranging from 0: very undesirable to 10: very desirable) and how much of \$10,000 they would invest in the hypothetical company described in the experimental materials versus a fixed-yield savings account (*INVEST*). There are two manipulated independent variables: the level of environmental performance (*PERFORM*: high or low) and whether assurance on the environmental performance information is present or not (*ASSUR*). The two measured independent variables are the strength of participants' environmental responsibility importance (*ENV\_RESP\_IMP*) and environmental performance return (*ENV\_PERF\_RET*) views. These were assessed by performing a factor analysis on the scale indicator questions listed in Table I, as described below in Section 3.3.3.

#### 3.3.2 Manipulation check analysis

Similar to other studies of the influence of sustainability assurance on investor judgments (e.g., Brown-Liburd and Zamora, 2015; Cheng *et al.*, 2015), we analyzed environmental information assurance manipulation check responses. Sixty-eight participants (24.5 per cent)

failed this manipulation check.<sup>6</sup> Fifty-six out of the 159 participants (35.2 per cent) assigned to the no assurance condition reported that environmental information assurance was present, while 12 out of the 119 participants (10.1 per cent) assigned to the assurance present condition reported that there was no assurance on environmental information.<sup>7</sup> In addition, 24 participants (8.6 per cent) failed the financial information assurance manipulation check (i.e., indicated that the financial ratios were not based on audited financial statements). We eliminated the 82 participants who failed one or both manipulation checks from all analyses.<sup>8</sup> Out of the remaining 196 participants, 87 were in the high environmental performance condition and 109 in the low performance condition. One hundred and four of the remaining participants were in the environmental assurance present condition and 92 in the no assurance condition.

### 3.3.3 *Measures of environmentally responsible investment views*

The indicator questions used to assess the strength of participants' *ENV\_RESP\_IMP* and *ENV\_PERF\_RET* views were based on Cheah *et al.* (2011). Table I presents these questions, along with descriptive statistics. A factor analysis on the four scale indicator questions extracted two factors with eigenvalues greater than 1.0. Since there is evidence that investor views regarding the relative importance of environmental performance and the extent to which environmental performance affects investment returns may be correlated (Nilsson, 2009), we used oblimin rotation to obtain the factor loadings, instead of varimax rotation, which assumes uncorrelated factors (Abdi, 2003). The two factors explain a total of 63.9 per cent of the variance in the data. Table II displays the factor analysis results. The two *ENV\_RESP\_IMP* measures load on the first factor, and the *ENV\_PERF\_RET* measures load on the second factor. The two factors are correlated ( $r = 0.167$ ;  $p = 0.02$ ).

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Insert Table II about here.  
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### 3.3.4 Hypotheses testing models

H1a and H2a predict that the effects of environmental performance and assurance on investors' judgments will vary, depending on their environmental responsibility importance view. H1b and H2b predict that the effects of environmental performance and assurance on investors' judgments will vary, depending on investors' environmental return views. To test these hypotheses, we estimated the following regression models:

$$DEP\_VAR = b_0 + b_1PERFORM + b_2ASSUR + b_3ENV\_RESP\_IMP + b_4ENV\_PERF\_RET + b_5PERFORM * ASSUR + b_6PERFORM * ENV\_RESP\_IMP + b_7PERFORM * ENV\_PERF\_RET + b_8ASSUR * ENV\_RESP\_IMP + b_9ASSUR * ENV\_PERF\_RET$$

Where:

*DEP\_VAR*: *DESIRE* or *INVEST* judgments

*PERFORM*: Environmental performance level, coded -1 for low and +1 for high<sup>9</sup>

*ASSUR*: Assurance on environmental performance information, coded -1 for absent and +1 for present

*ENV\_RESP\_IMP*: Factor 1 score from analysis of environmentally responsible investment scale items, as described above

*ENV\_PERF\_RET*: Factor 2 score from analysis of environmentally responsible investment scale items, as described above

## 4. Results

### 4.1. Hypotheses tests

Table III shows results for the hypotheses testing models.<sup>10 11</sup> H1a indicates that the *PERFORM \* ENV\_RESP\_IMP* interaction will be significant, while H1b indicates that the *PERFORM \* ENV\_PERF\_RET* interaction will be significant. The *PERFORM \* ENV\_RESP\_IMP* interaction is significant in the models with *DESIRE* ( $p = 0.01$ ) and *INVEST* ( $p$

= 0.03) as dependent measures, consistent with H1a.<sup>12</sup> The *PERFORM \* ENV\_PERF\_RET* interaction is not significant in either model, thus failing to support H1b.

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Insert Table III about here.  
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To further investigate the *PERFORM \* ENV\_RESP\_IMP* interaction, we estimated mean values for the two *PERFORM* conditions at strong and weak levels of *ENV\_RESP\_IMP*. We define strong and weak *ENV\_RESP\_IMP* as 1.0 standard deviation above and below the mean of this variable, respectively (Aiken and West 1991). Panel A of Figure 3 displays graphs of the *PERFORM* by *ENV\_RESP\_IMP* interaction for *DESIRE* and *INVEST*. Panel B of Figure 3 shows dependent measure estimates for each combination of *PERFORM* and *ENV\_RESP\_IMP*, and results of simple effects tests at the strong and weak levels of *ENV\_RESP\_IMP*. *PERFORM* influences both *DESIRE* ( $p = 0.001$ ) and *INVEST* ( $p = 0.01$ ) judgments at the strong level of *ENV\_RESP\_IMP*, but does not influence either *DESIRE* ( $p = 0.53$ ) or *INVEST* ( $p = 0.55$ ) judgments at the weak level of *ENV\_RESP\_IMP*. These results therefore support H1a.

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Insert Figure 3 about here.  
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H2a indicates that the *ASSUR \* ENV\_RESP\_IMP* interaction will be significant and H2b indicates that the *ASSUR \* ENV\_PERF\_RET* interaction will be significant. The *ASSUR \* ENV\_RESP\_IMP* interaction is significant ( $p = 0.01$ ) in the model with *DESIRE* as a dependent measure, but is not significant ( $p = 0.75$ ) in the model with *INVEST* with a dependent measure. These results are therefore consistent with H2a for *DESIRE*, but not for *INVEST*. The *ASSUR \* ENV\_PERF\_RET* interaction is not significant in either model, failing to support H2b.

Panel A of Figure 4 displays a graph of the *ASSUR* by *ENV\_RESP\_IMP* interaction for *DESIRE*. Panel B of Figure 4 shows estimates of *DESIRE* for each combination of *ASSUR* and *ENV\_RESP\_IMP*, and results of simple effects tests at the strong and weak levels of *ENV\_RESP\_IMP*. *ASSUR* influences *DESIRE* judgments at the strong level of *ENV\_RESP\_IMP* ( $p = 0.003$ ), but does not influence these judgments at the weak level of *ENV\_RESP\_IMP* ( $p = 0.36$ ). These results therefore support H2a with respect to *DESIRE* judgments.

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Insert Figure 4 about here.  
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#### 4.2. Supplemental tests

The adapted Hogarth (1987) framework used to develop our hypotheses posits that investors' environmental responsibility importance and environmental performance return views influence the relative weights investors place on environmental, relative to financial performance cues. Therefore, we conducted supplemental tests to validate these assumptions. We obtained participants' ratings of the importance of each of the environmental and financial performance measures provided in the experimental materials. These ratings were indicated on five-point Likert-type scales, anchored at -2 for very unimportant and +2 for very important. Three variables were constructed based on these responses. *IMP\_ENV* is the sum of ratings for the six environmental performance measures, *IMP\_FIN* is the sum of ratings for the six financial measures, and *IMP\_DIFF* is the difference between *IMP\_ENV* and *IMP\_FIN*.

We then fit regressions with these three information importance variables as dependent measures and *ENV\_RESP\_IMP* and *ENV\_PERF\_RET* as independent variables. As Table IV-- Panel A shows, the coefficients on *ENV\_RESP\_IMP* are significant ( $p < 0.001$ ) and positive in the regression models with *IMP\_ENV* and *IMP\_DIFF* as the dependent measure, and significant ( $p < 0.001$ ) and negative when *IMP\_FIN* is the dependent measure. These results are consistent

with the assumptions underlying H1a and H2a: as the strength of investors' environmental responsibility importance views increases, they place relatively more weight on environmental, as opposed to financial performance information.

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Insert Table IV about here.  
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Figure 5--Panel A provides a graphical depiction of these results. It displays regression estimates of *IMP\_ENV* and *IMP\_FIN* at weak (i.e., one standard deviation below the mean) and strong (i.e., one standard deviation above the mean) levels of *ENV\_RESP\_IMP*. When *ENV\_RESP\_IMP* is weak, the estimated value of *IMP\_ENV* (-0.09) is less than that of *IMP\_FIN* (7.29). On the other hand, when *ENV\_RESP\_IMP* is strong, the estimated value of *IMP\_ENV* (6.71) is greater than that of *IMP\_FIN* (5.55).

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Insert Figure 5 about here.  
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As Table IV--Panel B shows, the coefficients on *ENV\_PERF\_RET* are significant ( $p = 0.03$ ) and positive in the regression models with *IMP\_ENV* and *IMP\_DIFF* as the dependent measure, but not significant ( $p = 0.63$ ) when *IMP\_FIN* is the dependent measure. These results are consistent with the assumptions underlying H1b and H2b: as the strength of investors' environmental performance return views increases, they place relatively more importance on environmental information, while the importance they place on financial information remains constant. Figure 5—Panel B further illustrates this result. It shows that the regression estimate of *IMP\_ENV* increases from the weak (2.32) to the strong (4.30) level of *ENV\_PERF\_RET*. However, the estimate of *IMP\_ENV* remains less than *IMP\_FIN* (6.32) at the strong level of *ENV\_PERF\_RET*. The fact that investors place relatively more importance on financial versus

environmental performance, regardless of the strength of their environmental performance return views, indicates why Hypotheses 1b and 2b were not supported.

## **5. Summary, limitations, and conclusions**

### *5.1. Summary*

Research that examines individual determinants of the extent to which investors incorporate environmental performance and assurance information into their judgments is only starting to emerge (Gödker and Mertins, 2018). This study contributes to this line of research by examining the influence of nonprofessional investors' views regarding the benefits of companies' environmental activities on the extent to which environmental performance and assurance disclosures influence their investment judgments. Using a framework adapted from Hogarth (1987), we posit that the strength of investors' views regarding the relative importance of corporate environmental responsibility and the extent to which environmentally responsible companies yield higher returns will influence the relative weight they place on environmental versus financial performance measures. In turn, this assumption leads to hypotheses which predict that the strength of these views moderates the previously reported influence of environmental performance and assurance information on investment judgments (e.g., Holm and Rikhardsson, 2008; Hodge *et al.*, 2009; Elliott *et al.*, 2014; Brown-Liburd and Zamora, 2015; Cheng *et al.*, 2015).

As predicted, environmental performance influences the investment desirability and amount judgments of investors with strong environmental responsibility importance views, while it does not affect the judgments of those with weak environmental responsibility importance views. In addition, assurance on environmental performance information influences the investment desirability judgments of investors with strong environmental responsibility importance views, while it does not affect the judgments of those with weak environmental



responsibility importance views. However, the strength of investors' environmental performance return views does not affect the influence of environmental performance and assurance information on investors' judgments. Supplemental analyses indicate that investors' environmental responsibility importance and environmental performance return views have differing effects on their relative weighting of environmental versus financial performance information. When considered in light of the Hogarth (1987) framework used in this paper, these results indicate why the predictions regarding the moderating influence of environmental responsibility importance views on investor judgments were supported, while those regarding the moderating influence of environmental performance return views were not.

In addition, investors with strong environmental responsibility importance views make higher investment desirability judgments when assurance on the environmental information is present, regardless of environmental performance level. Thus, investors who view environmental responsibility as relatively more important appear to believe that without assurance, the company's actual environmental performance may be worse, even when the performance level reported is lower than the industry median. This is consistent with the idea that providing environmental performance information without assurance is a form of "greenwashing" or reputation management (Cho and Patten, 2007; Holder-Webb *et al.*, 2009; Cho *et al.*, 2012; Cho *et al.*, 2015).

### *5.2. Limitations and opportunities for further research*

One limitation of this research was that the experimental materials only presented summarized financial and environmental performance information, in order to maintain scale compatibility between financial and environmental measures (Jackson, 2008). In addition, we used summary information to ensure that participants were able make investment judgments and

complete questions about their views regarding environmentally responsible investment during the time allotted for the study. The use of summarized environmental performance information did not allow us to manipulate the quality of these disclosures. Indeed, Guidry and Patten (2010) show that investors see value in higher quality sustainability reports. Zahller, Arnold, and Roberts (2015) find that the quality of a corporation's CSR disclosure increases its perceived organizational legitimacy. Future research might examine whether investors' views regarding the benefits of companies' environmental activities moderate the relationship between the perceived quality and value of CSR disclosures.

Second, our study examines the judgments of US based investors. Research suggest that investors outside of the US, especially in Europe, may be more attuned to CSR performance as an investment criterion (Tschopp 2005; PRI 2018). Thus, we encourage future research to investigate whether our findings hold for non-US based investors.

Third, the experimental materials did not explicitly discuss whether environmental performance was related to the company's strategy. In comparison, Cheng *et al.* (2015) find that assurance influences investors' willingness to invest to a greater extent when CSR indicators have high relevance to the company strategy. Thus, it may be necessary to make the importance of environmental performance to a company's strategy explicit in order for investors' environmental performance return beliefs to influence their investment judgments. Future research might extend the Cheng *et al.* (2015) study to determine if investors' views moderate their results.

Finally, the experimental approach used in this study limited the assessment of investor views to a short series of questions. Qualitative approaches, such those used by Mori Junior and Best (2017) to examine sustainability report (SR) stakeholders' perceptions of G4 report

credibility and assurance processes, might be helpful for gaining additional insights on how investors' views moderate the influences of sustainability disclosures and assurance on their judgments. Qualitative research might be especially useful for understanding why nonprofessional investors' environmental performance return views did not moderate investor judgments in this study. This occurred despite recent evidence that firms which adopt shareholder CSR proposals experience positive announcement returns and improved accounting performance (Flammer, 2015) and firms with good ratings on material sustainability issues outperform firms with poor ratings (Khan *et al.*, 2016). Therefore, further qualitative research might examine how nonprofessional investors learn about the association between environmental performance and investment returns and how this knowledge might influence these investors' weighting and use of financial versus environmental performance information.

### 5.3. Conclusions

As Patten and Shin (2019) suggest, experimental studies can examine how individual characteristics such as investor beliefs might moderate the influence of sustainability disclosures on judgment outcomes. However, accounting judgment research that incorporates the fact that nonprofessional investors' views with respect to corporate sustainability may vary is limited. Our study contributes to this literature by providing evidence that investors' environmental responsibility importance views moderate the influence of environmental performance and assurance information on investor judgments. Supplemental analyses show that this likely occurs because environmental responsibility importance views influence the relative weight that investors place on financial versus environmental performance information.

These results also have implications for practice. Given that the judgments of investors with strong environmental responsibility importance views are more likely to be influenced by

environmental performance and assurance information, companies who wish to attract environmentally responsible investors can benefit from obtaining and disclosing this information. In addition, both assurance providers and standard setters need to be aware of individual differences in investor views and the influence of these views on investor judgments as they work to develop environmental assurance products and the associated reports.

## Notes

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<sup>1</sup> Cheah *et al.* (2011) describe two additional views of CSR investment. Their third view is that “companies should be more responsible to their shareholders than to the broader society” (p. 309). This view focuses on the perspectives of non-investor stakeholders and is not relevant to our analysis of investor decision making. Their fourth view of CSR investment is that “the accuracy of financial statements of many companies cannot be trusted” (p. 309). This relates to the reliability of *financial* information and is also not relevant to our discussion of factors that influence the relative importance of environmental performance information.

<sup>2</sup> The regressions used to test the study’s hypotheses were estimated with control variables for: (1) online vs. computer lab study completion and (2) MBAs vs. other nonprofessional investors. Neither control variable was significant at conventional levels ( $p > 0.10$ ).

<sup>3</sup> The actual brokerage display does not include detailed metrics for environmental performance; it only shows an overall rating for each company and its industry at one of three levels (i.e., high, medium, or low). Therefore, we created a display format for summary environmental performance information that was similar to the financial display, showing the environmental measures on a 0 to 100 scale. This facilitates comparability across measures and is consistent with the format of well-known environmental performance reports, such as Newsweek’s (2017) Green Rankings.

<sup>4</sup> Investment desirability is an analog for return measures used in archival research (Koonce and Lipe, 2010). Perceived investment desirability helps drive market demand for the company’s stock, and consequently, its return.

<sup>5</sup> An additional two scale items asked about whether companies should be environmentally responsible to outside stakeholders (i.e., Cheah *et al.*’s (2011) view 3). Responses to these items are not included in this analysis, since they address the perspectives of non-investor stakeholders, and are therefore of less relevance to the analysis of investor judgments.

<sup>6</sup> Brown-Liburd and Zamora (2015) report a 25 per cent failure rate for a similar manipulation check and Cheng *et al.* (2015) report a 35 percent failure rate.

<sup>7</sup> The difference in failure rates for this manipulation check across assurance conditions is statistically significant ( $p < 0.001$ ). Cheng *et al.* (2015) also report finding a higher manipulation check failure rate when sustainability assurance was absent versus when it was present. Manipulation check failure rates did not differ across the high (25.8 per cent) and low (23.4 per cent) environmental performance conditions ( $p = 0.64$ ).

<sup>8</sup> Results are substantively equivalent for the entire sample (no drops), except as noted below in the presentation of hypotheses test results.

<sup>9</sup> Aiken and West (1991) recommend mean-centering categorical variables at zero by coding them as either -1 or +1. This facilitates the interpretation of conditional effects in a multiple regression model that includes interactions between continuous and categorical variables.

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<sup>10</sup> These regressions were also estimated including a main effect term for presentation order (i.e., whether environmental or financial performance information appeared first in the experimental materials). There is a significant presentation order effect for *DESIRE* ( $b = 0.59$ ;  $t(df=185) = 2.18$ ;  $p = 0.03$ ), which indicates that participants make higher investment desirability judgments, on average, when they view financial performance information first. Presentation order is not significant in the regression with *INVEST* as the dependent variable. Including presentation order in the regression models does not affect the significance of the interactions that are used to test the hypotheses.

<sup>11</sup> The regressions were also estimated including gender, age, education level, and investment experience as control variables. These factors have been shown to influence socially responsible investment (SRI) views (Cheah *et al.*, 2011; Nilsson, 2009), SRI information search behavior (Nilsson, Nordvall, and Isberg, 2010), and SRI holdings (Nilsson, 2008). None of the control variables affected *DESIRE*. There is a significant gender effect for *INVEST* ( $b = -911.65$ ;  $t(df=182) = -2.35$ ;  $p = 0.02$ ), which indicates that on average, female participants had lower *INVEST* values. Including gender in the regression models does not affect the significance of the interactions that are used to test the hypotheses.

<sup>12</sup> The *PERFORM \* ENV\_RESP\_IMP* interaction is not significant ( $p = 0.11$ ) in the model with *INVEST* as a dependent measure when participants who failed manipulation checks are included in the analysis. The other significant results reported in Table III are not affected by the inclusion of dropped participants in the analysis.

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**Table I.**

Descriptive statistics for environmentally responsible view measures

Measures	Mean	Median	SD	Minimum	Maximum
Views regarding the relative importance of environmental responsibility ( <i>ENV_RESP_IMP</i> ) <sup>a</sup>					
1. It is more important that a company maximizes its financial performance as opposed to its environmental performance. <sup>b</sup>	0.37	1.00	1.09	-2.00	2.00
2. I would invest in a company whose environmental performance was one of the best in its industry, even if its financial performance was below average for the industry.	-0.28	0.00	1.14	-2.00	2.00
Overall for <i>ENV_RESP_IMP</i> <sup>c</sup>	0.09	0.00	1.89	-4.00	4.00
Views regarding the extent to which environmental performance affects investment returns ( <i>ENV_PERF_RET</i> )					
1. Companies that are environmentally responsible yield higher returns for their shareholders than those that are not.	-0.20	0.00	0.81	-2.00	2.00
2. The costs of improving a company's environmental performance are greater than the financial benefits to the company. <sup>b</sup>	0.26	0.00	0.93	-2.00	2.00
Overall for <i>ENV_PERF_RET</i> <sup>c</sup>	0.06	0.00	1.31	-4.00	4.00

**Notes:** <sup>a</sup> All items are coded on a scale where -2 equals strongly disagree and +2 equals strongly agree;

<sup>b</sup> Reverse-coded item, so that higher values indicate greater agreement with the construct;

<sup>c</sup> Values reported are for the sum of items 1 and 2.

**Table II.**

Factor analysis results for environmentally responsible investment scale items

Item	Brief description	Constructs <sup>a b</sup>	
		<i>ENV_RESP_IMP</i>	<i>ENV_PERF_RET</i>
<i>ENV_RESP_IMP 1</i>	More important that a company maximizes its environmental performance	<b>0.834</b>	0.215
<i>ENV_RESP_IMP 2</i>	Environmental performance more important in choosing investments	<b>0.856</b>	0.074
<i>ENV_PERF_RET 1</i>	Companies that are environmentally responsible yield higher returns	0.153	<b>0.701</b>
<i>ENV_PERF_RET 2</i>	Financial benefits are greater than the costs of improving environmental performance	0.094	<b>0.787</b>
	Eigenvalue	1.537	1.017
	Percentage of variance explained	38.43	25.42

**Notes:** <sup>a</sup>Highest factor loading for each item is in **bold**; <sup>b</sup>Oblimin rotation was used to obtain the factor loadings. Correlation between the two factors is significant ( $r = 0.167$ ;  $p = 0.02$ ).

**Table III.**

Regression results for hypotheses tests

Variables	Dependent measures					
	<i>DESIRE</i>			<i>INVEST</i>		
	Coefficient	<i>t</i> -statistic	<i>p</i> -value	Coefficient	<i>t</i> -statistic	<i>p</i> -value
Constant	5.95	44.27	0.00	5123.76	27.55	0.00
<i>PERFORM</i>	0.22	1.60	0.11	236.39	1.27	0.20
<i>ASSUR</i>	0.22	1.63	0.10	-183.47	-0.98	0.33
<i>ENV_RESP_IMP</i>	-0.04	-0.28	0.78	-96.97	-0.51	0.61
<i>ENV_PERF_RET</i>	-0.02	-0.18	0.86	-314.56	-1.67	0.10
<i>PERFORM * ASSUR</i>	0.02	0.18	0.86	93.47	0.50	0.62
<i>PERFORM * ENV_RESP_IMP</i>	0.38	2.76	0.01	415.43	2.18	0.03
<i>PERFORM * ENV_PERF_RET</i>	-0.08	-0.57	0.57	173.85	0.92	0.36
<i>ASSUR * ENV_RESP_IMP</i>	0.36	2.61	0.01	61.23	0.33	0.75
<i>ASSUR * ENV_PERF_RET</i>	-0.04	-0.30	0.77	176.45	0.94	0.35
Adjusted R <sup>2</sup>	0.07			0.03		
F (9, 186)	2.58			1.72		
<i>p</i> -value	0.01			0.09		

**Notes:** *DESIRE*: Corvus' desirability as an investment on a scale ranging from 0 (very undesirable) to 10 (very desirable); *INVEST*: Amount out of \$10,000 US that one would invest in Corvus versus a fixed-yield savings account; *PERFORM*: Environmental performance level, coded -1 for low performance and +1 for high performance; *ASSUR*: Presence of assurance on environmental performance information, coded -1 for no assurance and +1 for assurance present. *ENV\_PERF\_IMPORT*, *ENV\_PERF\_RET*: See Table 3 for definitions.

**Table IV.**

Regression results for information importance measures

Panel A: Regressions with *ENV\_RESP\_IMP* as independent measure

Variables	Dependent measures								
	<i>IMP_ENV</i>			<i>IMP_FIN</i>			<i>IMP_DIFF</i>		
	Coefficient	<i>t</i> -statistic	<i>p</i> -value	Coefficient	<i>t</i> -statistic	<i>p</i> -value	Coefficient	<i>t</i> -statistic	<i>p</i> -value
Constant	3.31			6.42			-3.11		
<i>ENV_RESP_IMP</i>	3.40	9.14	<0.001	-0.87	-4.53	<0.001	4.27	10.73	<0.001
Adjusted R <sup>2</sup>	0.30			0.09			0.37		
F (1, 194)	83.54			20.52			115.21		
<i>p</i> -value	<0.001			<0.001			<0.001		

Panel B: Regressions with *ENV\_PERF\_RET* as independent measure

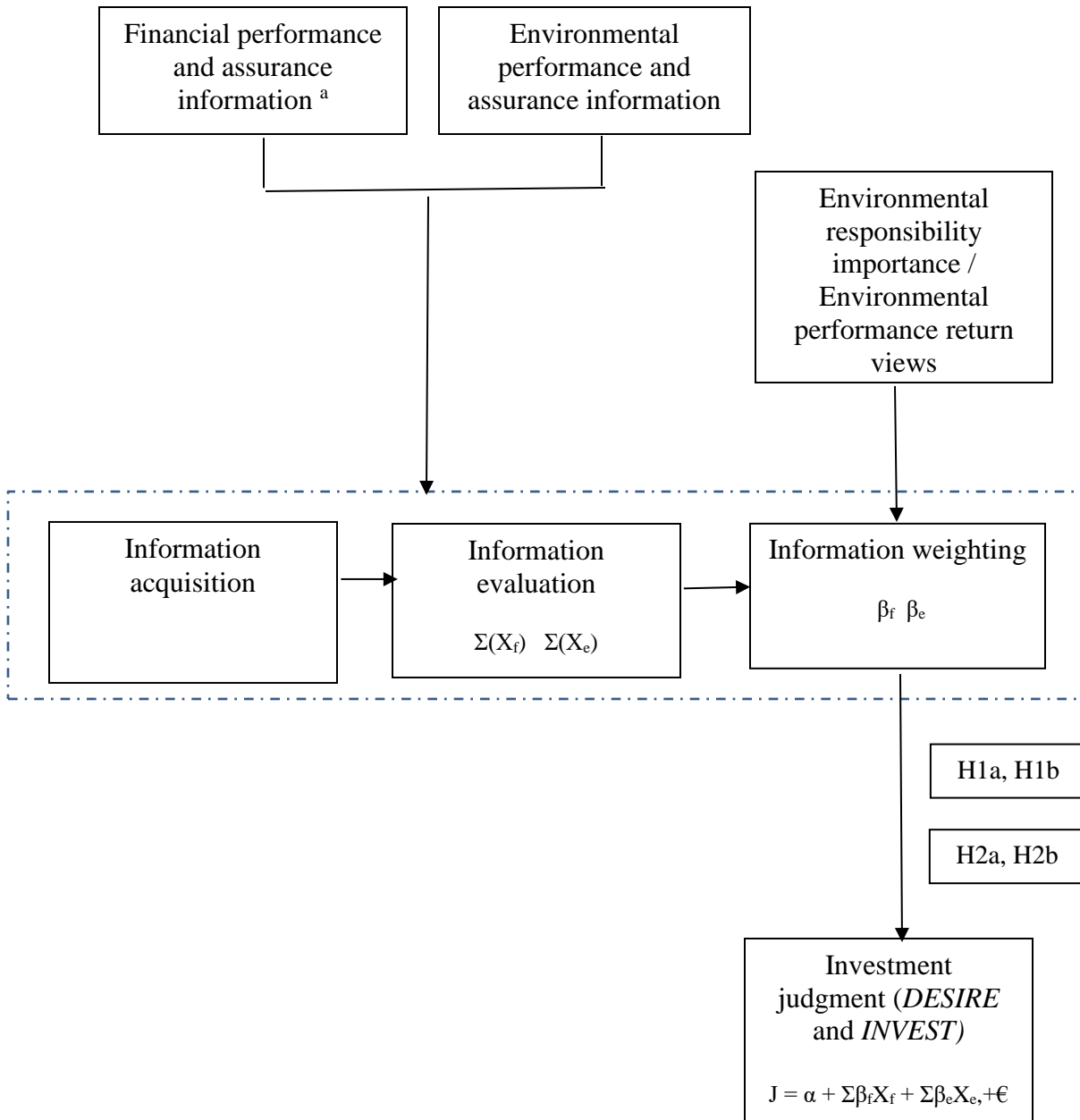
Variables	Dependent measures								
	<i>IMP_ENV</i>			<i>IMP_FIN</i>			<i>IMP_DIFF</i>		
	Coefficient	<i>t</i> -statistic	<i>p</i> -value	Coefficient	<i>t</i> -statistic	<i>p</i> -value	Coefficient	<i>t</i> -statistic	<i>p</i> -value
Constant	3.31			6.42			-3.11		
<i>ENV_PERF_RET</i>	0.99	2.26	0.03	-0.10	-0.48	0.63	1.09	2.20	0.03
Adjusted R <sup>2</sup>	0.02			0.00			0.02		
F (1, 194)	5.11			0.23			4.82		
<i>p</i> -value	0.03			0.63			0.03		

**Notes:** *ENV\_RESP\_IMP*, *ENV\_PERF\_RET*: See Table 3 for definitions. *ENV\_IMP*: Sum of importance ratings for six environmental performance measures, ranging from -12 (very unimportant) to +12 (very important); *FIN\_IMP*: Sum of importance ratings for six financial performance measures, ranging from -12 (very unimportant) to +12 (very important); *IMP\_DIFF*: Difference between *ENV\_IMP* and *FIN\_IMP*.



**Figure 1.**

Framework for how investors attend to environmental performance and assurance information

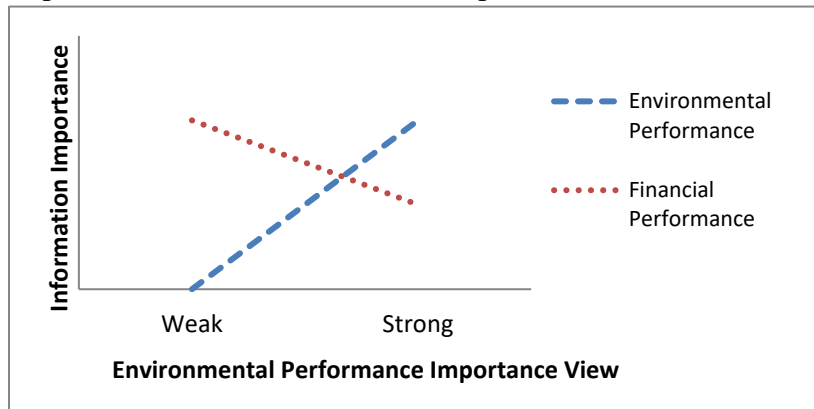


**Notes:** <sup>a</sup> Not varied in experiment; Subscripts <sub>f, e</sub> denote financial and environmental information, respectively; *DESIRE*: Corvus' desirability as an investment on a scale ranging from 0 (very undesirable) to 10 (very desirable); *INVEST*: Amount out of \$10,000 US that one would invest in Corvus versus a fixed-yield savings account.

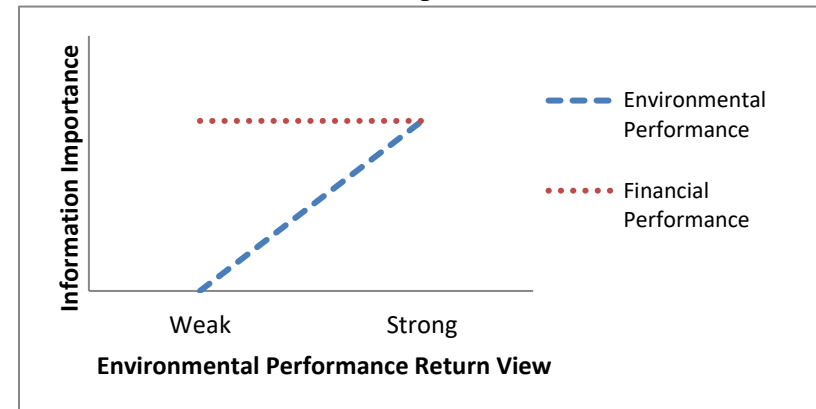
**Figure 2.**

Relationships between investor views and information importance

Panel A: Relationship between environmental responsibility importance view and information importance



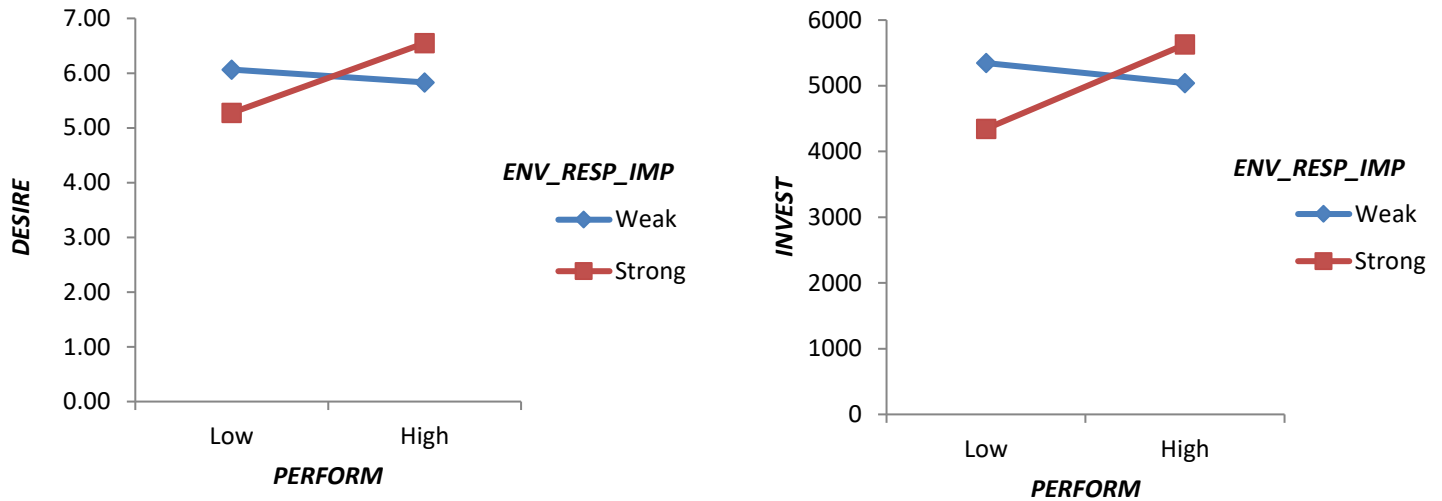
Panel B: Relationship between environmental performance return view and information importance



**Figure 3.**

Estimates of dependent measures by environmental performance and *ENV\_RESP\_IMP* level

Panel A: Graph of the *PERFORM* by *ENV\_RESP\_IMP* interaction for *DESIRE* and *INVEST*



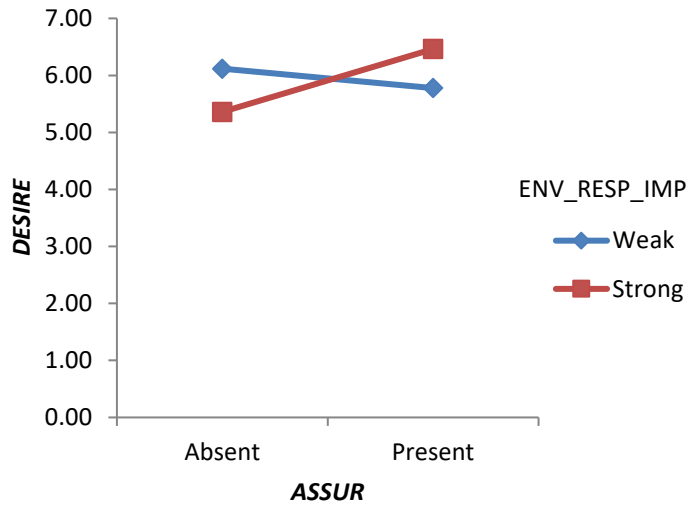
Panel B: Dependent measure estimates and simple effects tests

<i>ENV_RESP_IMP</i>	<i>DESIRE</i>				<i>INVEST</i>			
	<i>PERFORM</i>		<i>t</i> -statistic	<i>p</i> -value	<i>PERFORM</i>		<i>t</i> -statistic	<i>p</i> -value
Low	High	Low			High			
Weak	6.06	5.83	-0.63	0.53	5346	5040	-0.59	0.55
Strong	5.27	6.55	3.42	0.001	4346	5629	2.49	0.01

**Figure 4.**

Estimates of *DESIRE* by environmental assurance condition and *ENV\_RESP\_IMP* level

Panel A: Graph of the *ASSUR* by *ENV\_RESP\_IMP* interaction for *DESIRE*



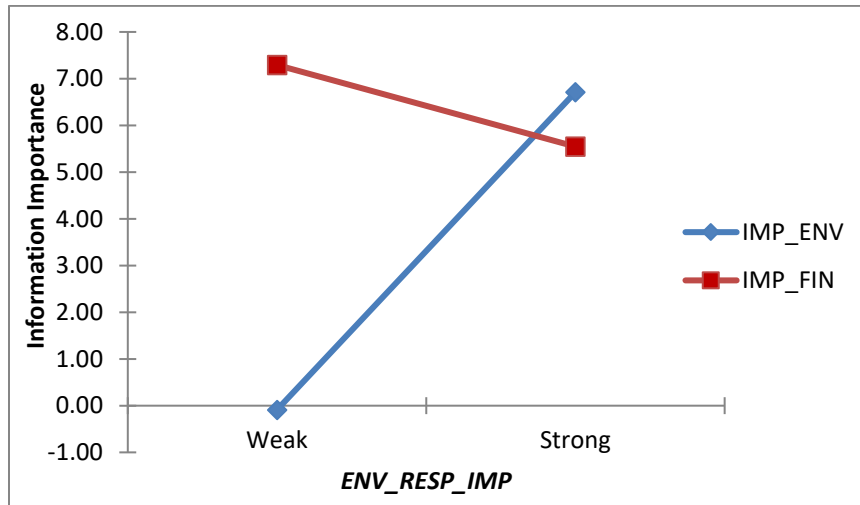
Panel B: Estimates for *DESIRE* and simple effects tests

<i>ENV_RESP_IMP</i>	<i>ASSUR</i>		<i>t</i> -statistic	<i>p</i> -value
	Absent	Present		
Weak	6.12	5.78	-0.91	0.36
Strong	5.36	6.46	2.96	0.003

**Figure 5.**

Information importance measures graphs

Panel A: Regression estimates of information importance measures by strength of *ENV\_RESP\_IMP* views



Panel B: Regression estimates of information importance measures by strength of *ENV\_PERF\_RET* views

