ARE SHAREHOLDERS WILLING TO PAY FOR FINANCIAL, SOCIAL AND ENVIRONMENTAL DISCLOSURE? A CHOICE-BASED EXPERIMENT

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ABSTRACT

This study investigates whether shareholders are willing to pay for higher levels of corporate financial, social, and environmental disclosure. We conduct a choice-based conjoint experiment wherein 65 shareholders are asked to make 12 choices, choosing each time between two predetermined randomized combinations of different levels of investment returns, financial disclosure, environmental disclosure, and social disclosure. Results indicate that whereas shareholders are *willing* to pay for financial disclosure and environmental disclosure, they are *unwilling* to pay for social disclosure. Hence, the latter finding does not provide conclusive evidence on the overall question. However, the result that investors are *willing* to pay for non-financial disclosures—such as environmental information—constitutes our main contribution as prior research has not been able to provide strong evidence that investors are willing to forfeit investment returns in order to gain access to more corporate disclosures. The use of a choice-based conjoint experiment to examine these matters is novel and potentially opens avenues for future research. We believe our theoretical and practical contributions to be of interest to various stakeholders, including firms in making decisions about disclosure levels and regulators in assessing the need for financial disclosure regulation.

Keywords: choice-based conjoint; environmental disclosure; financial disclosure; social disclosure; non-financial disclosure; willingness to pay

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1. Introduction

There is growing consensus that stakeholders are interested in social and environmental matters and that firms should actively address them (Bebbington, Russell, & Thomson, 2017; Deegan, 2017; Helfaya, Whittington, & Alawattage, 2019). Among various stakeholders, however, there is an increasing divide between theory and practice regarding whether *shareholders* value non-financial disclosure (Bernardi & Stark, 2016; Rensburg & Botha, 2014; Stubbs & Higgins, 2014). Archival studies have provided mixed evidence when examining whether non-financial disclosures *overall* are valued by market participants (Barth, Cahan, Chen, & Venter, 2017; Cahan, de Villiers, Jeter, Naiker, & van Staden, 2016; Cho, Michelon, Patten, & Roberts, 2015; Clarkson, Fang, Li, & Richardson, 2013; de Villiers & Marques, 2016; Dhaliwal, Li, Tsang, & Yang, 2011; Dhaliwal, Radhakrishnan, Tsang, & Yang, 2012; Hughes, 2000; Jorgensen & Kirschenheiter, 2012; Murray, Sinclair, Power, & Gray, 2006; Simpson, 2010; Xu, Magnan, & Andre, 2007). Experimental studies have reported that investors will use non-financial disclosures if, or when, provided—which serves to demonstrate their perceived value in investment decision making (Chan & Milne, 1999; Holm & Rikhardsson, 2008; Liyanarachchi & Milne, 2005; Milne & Chan, 1999; Milne & Patten, 2002; Rikhardsson & Holm, 2008). Surveys have shown that a large majority of investors call for additional social and environmental disclosures (de Villiers & van Staden, 2010). However, a limitation of these studies is that participants were able to demand any desired additional disclosure *at no cost*. Further, the examination of *trade-offs* between disclosure types was constrained because survey questions did not require such situations, and the experimental designs most often included only one disclosure manipulation in terms of the extent of non-financial information provided.

In this study we adopt a *choice-based conjoint* experimental design—which aims to overcome these limitations. Our objective is to determine whether shareholders are *willing to pay* for financial, social and environmental disclosures. In choice experiments, decision-makers select the preferred investment alternative from several sets of two experimentally predetermined options (Bridges, 2003). Information concerning the magnitude of trade-offs among attributes, as well as direct preferences, can be examined through comparisons of *willingness to pay* (WTP) estimates (Morikawa, Ben-Akiva, & McFadden, 2002), which also have the advantage of being unaffected by the scale of the error. The concept of WTP is aligned with the standard economic view of a consumer reservation price—the maximum price at, or below, which a consumer would definitely purchase the product (Varian, 1992). This enables a meaningful comparison of the value shareholders place on financial disclosure *relative to* non-financial (social and environmental) disclosures.

Our investigation focuses on experienced retail shareholder participants[1] who were asked to complete a sequence of choice-based conjoint tasks. These involved each participant choosing twelve times between two experimentally designed fixed-investment alternatives (choice tasks), each offering differing levels of financial and non-financial (social and environmental) disclosure and differing investment returns.[2] Within confines of the choice-based conjoint experimental setting, real-world decision-making can be accurately reflected (Louviere & Street, 2000).

Based on 65 shareholders and their 780 choices (65 shareholders x 12 choices) between two investments that offer different levels of returns and financial, social and environmental

[1] We selected experienced retail shareholders because regulators focus their protection efforts on this group due to their lack of access to private information (as is the case with institutional shareholders). Prior research suggests that less-informed shareholders trade to their own disadvantage until they are provided with additional information (Bloomfield, Libby, & Nelson, 1999; Chewning, Coller, & Tuttle, 2004).

[2] Participants in the current study are experienced individual retail investors, and therefore bring their experiences and preferences to the task. In addition, as the choice tasks are not overly detailed, this means participants' choices are likely to match their more general preferences.

disclosures, our results indicate that shareholders (a) are *willing* to pay for *financial* disclosure; and (b) are *willing* to pay for *environmental* disclosure. However, we find that shareholders are *unwilling* to pay for *social* disclosure. We also investigate whether shareholders value *changes* in financial disclosure more than *changes* in social or environmental disclosure. Our findings suggest that when comparing financial and environmental disclosure, shifting from a low level of disclosure to an average level are of *equal* value to shareholders. This suggests that whereas previous research evidence shows shareholders prefer economic (i.e., financial) information over non-financial information (see Cohen et al., 2011), this may not be universal across all disclosure types and levels. Further, according to our results, with few exceptions, shareholders do *not* value disclosure differently across firms in different industries (we investigate mining versus sports apparel). Finally, we find no evidence that shareholders value social and environmental disclosures more in cases where investors are aware of these firms having prior social or environmental issue/concerns. It is worth noting that where we do not find evidence of differences, these 'non-results' should not be treated as conclusive evidence, as there could be several alternative explanations. Our 'non-results' could indeed be the subject of future studies.

To the best of our knowledge, shareholder *willingness to pay* for financial, social, and environmental disclosures has not been previously examined in this way. Our findings make important contributions to the disclosure valuation literature, building upon, and offering useful insights to the prior archival, survey and experimental studies mentioned above. In terms of practical contributions, our findings should be of interest to firms and regulators. For firms, providing voluntary disclosures imposes costs on shareholders, such as making proprietary information known and thereby diminishing competitive advantage (Friedman, & Miles, 2001; Milne, & Chan, 1999). Prior research highlighted shareholders do find non-financial disclosures useful, if provided (e.g., Chan & Milne, 1999; Holm & Rikhardsson, 2008;

Liyanarachchi & Milne, 2005; Milne & Chan, 1999; Milne & Patten, 2002; Rikhardsson & Holm, 2008). We demonstrate, however, that such universal application can potentially be refined. For example, we find shareholders to be highly interested in receiving more than the minimum level of environmental disclosure. However, they do not seem as interested in above the average level of environmental disclosure, nor social disclosure. Our findings appear supportive of prior studies which highlight firm non-financial disclosure decisions to be multidimensional and driven by numerous forces (e.g., Cormer, Magnan & van Velthoven, 2005).

The remainder of this paper is ordered as follows: prior literature; theory and hypothesis development; methods; results; further analysis; and finally, the conclusion, including limitations and avenues for future research.

2. Prior literature

Christensen, Hail and Leuz (2018) highlight that while the economic argument for lower required returns in the presence of greater financial disclosures is fairly clear, our understanding of whether investors value non-financial information in the same material way has not reached a similar level of maturity. It is also unclear what lower than the average level of disclosure implies. Agency theory suggests that firm managers voluntarily provide information in order to reduce uncertainty among shareholders, allowing them to reassess financial prospects of the firm upwards, thereby ensuring that managers maximize their employment prospects and incentive pay (Healy & Palepu, 2001). In other words, the firm's provision of information reduces agency costs and the likelihood of adverse selection. There is growing consensus that sustainability matters are important and that firms should actively address such issues (Bebbington, Russell, & Thomson, 2017; Deegan, 2017; Helfaya, Whittington, & Alawattage, 2019).

Non-financial disclosures, such as environmental and social information, are *fundamentally* different in nature to financial disclosures. Financial disclosures relate directly to financial consequences, whereas social and environmental disclosures focus on risks and rewards, which may or may not translate to financial outcomes (Richardson & Welker, 2001). Firms that disclose more information are more highly valued – that is, shareholders are willing to accept lower (require higher) investment returns for firms with more (less) comprehensive voluntary disclosures because more information allows for better forecasts of cash flows and risks.

2.1. Survey studies

Survey studies examined the extent to which non-financial (social and environmental) information was used by shareholders. Deegan and Rankin (1997) found that 72 percent of Australian shareholders view environmental information as material, implying its use in investment decision-making. Milne and Chan (1999) and Solomon and Solomon (2006) review early shareholder surveys (1970s and 1980s) and show that shareholders had little interest in environmental disclosure at that stage—but this changed from the 1990s because individual shareholders started to demand environmental disclosure. De Villiers and van Staden (2010) report high levels of interest in environmental disclosures among individual shareholders in the U.S., U.K., and Australia, including claims by respondents that they use (or would use, if provided) these disclosures in investment decision-making. However, this study falls short of exploring whether financial and social disclosures are more/less popular among shareholders than environmental disclosures. De Villiers and van Staden (2011a) find that individual shareholders (in the U.S., U.K., and Australia) are favorable to make such disclosures compulsory, and de Villiers and van Staden (2012) show similar results for individual New Zealand shareholders. Survey research by Radley Yeldar (2012) documents that shareholders in the U.S. use voluntary non-financial disclosures provided by firms in their investment

decision-making. Nonetheless, a major weakness of these types of surveys is that shareholder respondents are not required to think of the cost/benefit implications in terms of their investment returns by asking for additional information. Hence, they could see corporate disclosure as costless to themselves. Therefore, they are likely to request all kinds of information available without considering any cost/benefit of returns analysis implication, which could potentially explain their positive attitudes towards obtaining information about almost anything. In addition, and importantly, these surveys are unable to examine the disclosure trade-offs shareholders are willing to make. That is, their WTP for disclosure was unknown and unknowable.

2.2. Experimental studies

In experimental settings, studies investigated whether and how analysts and individual shareholders react to non-financial information in investment decision-making (e.g., Chan & Milne, 1999; Holm & Rikhardsson, 2008; Liyanarachchi & Milne, 2005; Milne & Chan, 1999; Milne & Patten, 2002; Rikhardsson & Holm, 2008). These experiments show that environmental (or social) information matters to shareholders in all those countries where these experiments were conducted, i.e., U.S., France, Japan, Sweden and New Zealand. However, they do not explore the trade-offs shareholders place on financial, environmental or social disclosures.

2.3. Archival studies

Archival studies provide insights on whether and how shareholders care about non-financial disclosures. One line of research examines market reactions to environmental disclosures back in the 1980s and 1990s (e.g., Blacconiere & Patten, 1994; Patten & Nance, 1999; Shane & Spicer, 1983). More recent studies were conducted and report that additional non-financial disclosure is associated with positive economic outcomes for firms. Cahan et al. (2016), for example, found a positive association between firm value and corporate social

responsibility (CSR) disclosure for those disclosures which were unexpected, but not for the expected components. Other studies have linked non-financial disclosures with lower cost of capital (Dhaliwal, et al., 2011), lower analyst forecast dispersion (Dhaliwal, et al., 2012; Zhou, Simnett, & Green, 2017) and higher share price (Clarkson, et al., 2013; de Klerk & de Villiers, 2012; de Klerk, de Villiers, & van Staden, 2015; de Villiers & Marques, 2016).

Alternatively, studies have found a negative relation or no relation with firm economic outcomes. For example, Richardson and Welker (2001) found that social disclosure increased firm cost of capital, and therefore decreased firm value. Cho et al. (2015) found a negative relation between CSR disclosure and firm value but did not find any significant association between either CSR disclosure or social disclosure and firm value. Archival studies therefore provide mixed evidence that shareholders value non-financial disclosure, but they have also been unable to provide a direct measure for shareholders' disclosure preferences and trade-offs.

2.4. Summary

Prior literature documents that shareholder respondents in survey demand corporate non-financial disclosures; shareholder respondents in experiments change their investment decisions based on non-financial disclosures; and that archival studies provide mixed evidence on the relation between non-financial disclosure and firm economic outcomes. However, it was impossible to determine the extent to which shareholders make *trade-offs* between the various financial and non-financial elements where they must effectively pay for disclosure. While there have been calls for research to examine these trade-offs (e.g., Haji & Anifowose, 2016; Simnett & Huggins, 2015), we are unaware of the existence of any published research to date.

3. Theory and hypotheses development

3.1. Willingness to pay for departures from the average level of disclosure

Agency theory suggests that shareholders with insufficient available information assume the worst outcome and protect their interests by lowering their share valuation of the firm, therefore being prepared to offer to purchase the shares for less (Healy & Palepu, 2001). Commonly this is referred to as adverse selection, "which leads investors with less information to price-protect or exit the market to reduce losses that would arise from trading with more informed investors" (Barth, et al., 2017, p. 47), and implies that shareholders are prepared to pay more for shares in firms that disclose more than the average level because they are better able to assess future cash flows and their associated risk profile. Following this argument, shareholders would be indifferent about investing in either of two companies that are identical in forecast cash flows and risk profile. However, when one provides more disclosure (allowing for a more accurate assessment of future cash flows and risk) the shares are priced higher to reflect the quality and quantity difference in information provided (Beyer, Cohen, Lys, & Walther, 2010; Verrecchia, 2001 for a review). Clarkson et al. (2013) provide supporting evidence, finding that stock prices are higher for firms with environmental disclosure that signal a proactive environmental strategy.

Furthermore, should the forecasted investment returns of the firm that provide the disclosure be lower than the average level—for example because it is costly to provide such disclosure—then shareholders would lower the amount they are willing to pay for the shares. Therefore, there must be a point where shareholders are prepared to pay the same amount for the shares in both companies—one that provides little disclosure and the other that provides more information at the expense of a lower return. As such, shareholders should be willing to pay more (less) for a company that discloses higher (lower) than the average level of value-relevant information. Hypothesis 1 reflects this expectation:

H1: *Shareholders are willing to pay more (less) for above (below) the average level of disclosure.*

3.2. Value placed on changes in financial versus non-financial disclosure

Although shareholders increasingly demand that firms report non-financial information in order to ease their decision-making process (Oliver, Vesty, & Brooks, 2016; Reverte, 2015), there is a growing divide between theory and practice on how much they value non-financial disclosure (Bernardi & Stark, 2016; Rensburg & Botha, 2014; Stubbs & Higgins, 2014). Financial disclosure directly relates to financial consequences, whereas social and environmental disclosure deals more with information around risks and rewards that may or may not be translated into financial terms. Whereas social and environmental disclosure provide information that helps assess future financial prospects, financial disclosure has the advantage of addressing financial prospects more directly, as well as being (psychologically) seen as more definite and objective in nature. Although it does not explore the value of information, Cohen et al.'s (2011, p. 109) survey of retail shareholders reveals a preference for economic information over corporate social responsibility information: "When respondents were asked to indicate the specific types of information they had the greatest interest in using in the future, economic performance indicators such as market share, customer satisfaction, and product innovation information were predominant". This leads to our second hypothesis:

H2: *Shareholders value changes in financial disclosure more than changes in social or environmental disclosure.*

3.3. Value placed on changes in disclosure across firms operating in different industries

Information related to environmental performance is more likely to affect future financial rewards in the case of firms operating in environmentally sensitive industries (Cho & Patten, 2007). For example, environmental disclosures of an oil and gas firm are likely to have more financial consequences than that of a bank. Therefore, shareholders will be more interested in the environmental disclosures of firms operating in environmentally sensitive

industries because such disclosures have a greater potential to influence investment returns (Patten, 1992). In addition, the literature provides consistent evidence that social and environmental disclosures are more value-relevant in the case of sensitive industry firms (e.g., Cahan, et al., 2016; de Klerk & de Villiers, 2012; de Klerk, et al., 2015; de Villiers & Marques, 2016). This leads to our third hypothesis:

H3: *The value placed by shareholders on changes in disclosure varies across firms operating in different industries*.

3.4. Value placed when firm has a known prior social or environmental issue

Shareholders demand disclosures from firms with known social and environmental issues. They expect managers to provide information about the measures and actions taken to ameliorate any future cash flow effects and the magnitude of risks leading to costly incidents (de Villiers & van Staden, 2011b). However, shareholders also want disclosures from other firms within an industry (Maletta & Zhang, 2012) dealing with similar matters so that they are able to assess whether these other firms are prone to the same risks. Prior research provides evidence that the industry generally responds with additional information. For example, after the Exxon Valdez Alaskan oil spill (Patten, 1992) and the BP Gulf of Mexico oil spill (Summerhays & de Villiers, 2012). Our final hypothesis is therefore stated as:

H4: *Shareholders do not value changes from the average level of disclosure differently depending on whether a firm has a known prior social or environmental issue.*

4. Methods

4.1. Participants

Experienced retail shareholders' preferences are elicited using data from a choice-based conjoint experiment. In collaboration with the New Zealand Shareholders Association Inc. (NZSA®), which has approximately 950 individual members, and is the most active shareholder advocacy group in New Zealand, we recruited a sample of active investors. The chairman of the NZSA® sent an email to all members requesting them to click on a link to access and

complete the experimental task aimed at examining the disclosure trade-offs shareholders were prepared to make. Sixty-five respondents completed the experiment in its entirety. We discarded incomplete responses to ensure that we only include respondents' views that fully understood and engaged with the experiment. The resulting response rate of 6.84% (65/950) appears to be in line with response rates reported for other large-scale surveys of investors (between 3.90% and 6.98%) (see e.g., Dorn & Sengmueller, 2009; Glaser & Weber, 2007; Hoffmann & Post, 2016, 2017; Hoffmann, Post, & Pennings, 2013; McCahery, Sautner, & Starks, 2016; Riedl & Smeets, 2017). The target audience members are presumably busy and face difficulty taking time out of their schedules to participate. An advantage of choice-based conjoint with repeated choices is that each additional choice set evaluation adds to the total sample of choices. Each respondent in our sample evaluated 12 choice sets, which provides us with a total of 780 choices between investments for statistical analysis.

4.2. Survey instrument

The survey instrument consisted of two sections. The first section comprised of questions seeking to identify the demographic characteristics of the respondents—namely, gender, age, and job title. The second section began with an explanation of the hypothetical choice scenario. The survey instrument is reproduced in Appendix A.

Respondents were told pre-choice that the purpose is to focus on the corporate disclosure preferences and trade-offs of shareholders regarding financial, social and environmental disclosure. The experimental setting for respondents was conditioned by reference to a situation involving a series of hypothetical investments in one of two firms. This conditioning scenario was developed from initial pilot studies with respondents, and it was intended to mirror the real-life investment circumstances in which many shareholders currently find themselves.

4.3. Choice attributes and levels

Four attributes were selected: (1) financial disclosure; (2) social disclosure; (3) environmental disclosure; and (4) cost/benefit of disclosure. These attributes represent the independent variables, which varied across alternatives in order to observe the impact on disclosure preferences. Agency theory suggests that firm managers voluntarily provide a greater amount of information in order to reduce uncertainty among shareholders (Healy & Palepu, 2001). For the disclosure variables, in the current study we follow this sentiment and focus on the *amount of disclosure*. Respondents were conditioned pre-choice that "All of the firms currently disclose the average amount of financial, social, and environmental information for their sector" (see Appendix A). Therefore, low disclosure represents a loss of information and high disclosure represents a gain of information relative to the average level. Hence, we align with convention and estimate effects using as a baseline the average utility, identifying positive utility effects to be "high", and negative utility effects to be "low".

A pilot study demonstrated the feasibility of our financial, social and environmental disclosure attributes as comprising of three levels being low, average, and high. In choice-modelling, each of these attributes are referred to as being ordinal qualitative attributes, which assume that some natural order exists among the levels, but that it is not possible to determine the distances between these objects (Hensher, et al., 2005). An interesting observation is how this approach relates to some studies which have evaluated the quality of integrated reporting (includes non-financial disclosure) coverage using modifications where a score up to or beyond a maximum of 2 have been used (e.g., Bernardi & Stark, 2016; Stent & Dowler, 2015).

The attribute pertaining to investment returns (i.e., cost/benefit of disclosure) is used to calculate the WTP estimates, this attribute was assigned a total of seven levels. Three levels each side of the mid-point 0 percent return, each in 2 percent increments. The cost/benefit of disclosure variable was expressed as a percentage change to earnings and dividends (i.e.,

earnings/dividend yield). A positive percentage means that earnings and dividends will increase with the predefined levels of disclosure specified. A negative percentage means that earnings and dividends will decrease. For example, respondents were informed pre-choice that (1) 5% cost means that both earnings and dividends will decrease by 5% after the new disclosures as specified are made, so if it was $100 before, it would be $95 after the new disclosures; and (2) 5% benefit means that both earnings and dividends will increase by 5% after the new disclosures as specified are made, so if it was $100 before, it would be $105 after the new disclosure.[3]

In designing the attributes and their levels, we adhered to Carlson and Bond (2006) who determined that decision-makers: (a) need to make spontaneous decisions when they *see the levels* of attributes describing investment alternatives in the choice task; and (b) require only a minimal amount of information pre-choice *about the levels* (assuming they have reasonable knowledge of the attributes). To facilitate spontaneity, the levels of an attribute must be discrete to limit the degree of interpretation/subjectivity (Wallenius et al., 2008). Qualitative feedback obtained during the pilot phase indicated participants to view the chosen disclosure labels of low, average, and high, as both discrete and intuitive. Similarly, this was true for the cost/benefit of disclosure attribute. Respondents were provided with short but informative explanations for each of these *pre-choice* levels (see Appendix A). A further factor we took into consideration in the design choice is that where choice tasks are made too complex, respondents ignore information (Alho, 2017). A design that is understandable to participants is preferable, particularly because an implicit assumption in the behavioral model of random utility (used in choice experiments) is that an individual pays attention to all attributes in the choice situations (Lancaster, 1966, McFadden, 1974).

[3] The effect of disclosure on value may be more likely via the discount rate than through future earnings or cash flows. Earnings/dividends was chosen for convenience in line with accepted practice in choice modeling (see Carlson and Bond, 2006).

To improve choice realism and still extract the maximum amount of information from each decision-maker in accordance with the number of attributes, levels and other experimental characteristics, the attribute levels appeared with nearly equal frequency in the experimentally designed choice tasks (Addelman, 1962) and the latter were all systematically allocated to respondents according to an experimental plan (Bunch, Louviere, & Anderson, 1996).

An explanation of the types of the attributes and their levels is provided in Table 1, which also presents a description of the four companies that respondents were asked to imagine they already own shares.

[Insert TABLE 1 about here]

4.4. Task and choice-set design

In a choice-based conjoint study, the analyst presents respondents with a series of choice tasks typically containing two choice alternatives. The attributes and levels of the alternatives vary systematically according to a predefined experimental plan. Faced by each predefined choice task the decision-maker selects the alternative (e.g., A or B) offering them the greatest expected utility. In compensatory decision strategies an individual trades-off an alternative with a higher value of a desirable attribute for an alternative with lower value of another.

We created the hypothetical investment scenarios (i.e., choice sets) using a Bayesian *D*-error minimizing design with dummy coded variables obtained with Ngene software (ChoiceMetrics, 2017). The basic principle behind the Bayesian approach is to allow for some uncertainty around the prior values of the utility parameter to be estimated (Ferrini & Scarpa, 2007; Kessels, Goos & Vandebroek, 2006; Kessels, Jones, Goos, & Vandebroek, 2011; Sandor & Wedel, 2001). Specifically, the type of Bayesian efficient design we employ is called *D*-error minimizing because it allows the researcher to formally incorporate uncertainty about information available a-priori. It does so by means of a specific probability distribution of

values for the unknown parameters so as to minimize the probability of average error and thus increase both the reliability and the statistical power of the analysis (Bliemer, Rose, & Hess, 2008).[4] It generates a statistically efficient fraction of the full factorial design, which given its size ($3^2 3^2 3^2 7^2$=35,721 combinations) cannot be completed by a practical sample of respondents. In essence, what a *D*-error minimizing design does is to allocate levels to the attributes defining trade-offs across alternatives in the choice tasks in a manner that maximizes the expected information or, equivalently, that minimizes the expected variance. It does so by using an iterative algorithm that searches for the combination of investment profiles that minimizes the expected determinant of the asymptotic variance-covariance matrix. One example choice task is provided in Appendix B. In our empirical study each respondent completed a total of twelve choice tasks.

4.5. Empirical models

Expectations are computed based on the assumed prior distributions, which are derived partly on theoretical considerations (e.g., some attribute levels are bad and hence have negative impacts on utility or negative betas, others are good), and partly on pre-existing empirical data, in our case those from a pilot. The design used for the pilot was orthogonal in the difference and it was administered to 27 respondents and 324 choice tasks.[5] The pilot data was analyzed using a conditional logit model. Point estimates were then used as prior means and standard errors as prior standard deviations in the derivation of the *D*-error minimizing design used in the field study. Main effects results of the pilot study are available in Appendix C.

Decision-makers are assumed to be rational utility maximizers and therefore capable of selecting from each set of mutually exclusive alternatives the one with the greatest utility

[4] A number of different measures of design efficiency have been proposed in the literature (e.g., Huber & Zwerina, 1996) all of which have been derived from the work of McFadden (1974) on random utility theory and are summarized in a number of sources (e.g., Hensher, et al., 2005; Louviere, et al., 2000; Train, 2003).

[5] Since utility models can only be identified using a baseline, rather than orthogonality on the attribute levels, we use orthogonality on the differences between levels. Please refer to Ngene manual (see ChoiceMetrics, 2017).

(Marschak, 1960; Thurstone, 1927).[6] However, the analyst does not observe all sources of influence on the utility derived by the decision-maker from each available alternative. It is assumed that utility from the j^{th} alternative is a function of an observed or systematic component V_j (indirect utility) and a random component u_j. While the latter is known to the respondent, it remains unknown and unobservable to the analyst, who assumes it to be random (hence, "random utility theory"). Note the dependent variable y_j under choice-based conjoint is discrete, taking the value of one for the chosen alternative and zero otherwise. We use here the standard assumption of an unobservable random utility component u_j distributed i.i.d. Extreme Value Type I (or Gumbel) to obtain the probability of choice of the j^{th} alternative to be logit, conditional on the vector of utility coefficients β:

$$\Pr(Y_j = j) = \frac{\exp(\beta' x_j)}{\sum_i \exp(\beta' x_i)}, \qquad (1)$$

where β is the respondent vector of k indirect utility coefficients, and x_i is a conformable vector of attribute levels describing the i^{th} investment alternatives (McFadden, 1974), and the subscript i denotes generic alternatives. While equation (1) constitutes the standard choice probability of the conditional logit model, it assumes that all respondents in the sample are preference-clones, in that all respondents share the same value of β. This assumption has long since been recognized as bearing low credibility. Since the seminal papers by Revelt and Train (1998) and Train (1998), in order to capture variation of β across respondents, it has been advocated the use of mixed logit models for repeated choices. These models see the collection of choices made within the sequence by the same respondent as being conditional on one particular realization of β, indexed by respondent as β_n, and different from the realization that govern the decisions in sequences of choices by other respondents. As such the probability of

[6] Retail shareholders are expected to have requisite knowledge of environmental and social issues due to their exposure. For example, the majority of large listed companies' news articles pertain to social (39%) and environmental (29%) issues (Capelle-Blancard & Petit, 2019). Furthermore, stock exchange announcements through the online trading platforms retail shareholders typically use contain disclosures pertaining to environmental and social issues.

the sample of T choices in the sequence by a respondent becomes a product of T joint logits because of independence, but sharing the same respondent-specific β_n vector:

$$\Pr(Y_n) = \prod_{t=1}^{T=12} \frac{\exp(\beta_n{}' x_j)}{\sum \exp(\beta_n{}' x_i)}, \qquad (2)$$

The sample likelihood becomes a mixture of logits across sequences and the mixing function is the distribution of random β_n across respondents is defined here as $f(\mu, \Omega)$, where μ is the mean value of the vector of random utility coefficients β_n and Ω is its variance-covariance. So, the sample likelihood is:

$$\mathcal{L}(Y_n, \dots, Y_N) = \prod_{n=1}^{N=65} \int_{\beta} \Pr(Y_n) f(\mu, \Omega) d\,\beta. \qquad (3)$$

In estimation the task becomes that of identifying estimates of parameters of the mixing distribution μ, Ω rather than the β_n after assuming a suitable form for $f(\mu, \Omega)$. For parsimony, to reduce the space of the parameters in need of estimation, rather than the full variance-covariance matrix Ω, it is customary to estimate its Choleski factor L, taking advantage of the relation $\Omega = \mathrm{LL}'$, and the fact that it is lower-triangular. From the Ω matrix one can derive correlations across random coefficients, which are informative.

While fixed coefficients logit models are estimated from sample data using maximum likelihood and converge in few iterations because of the global concavity of the log-likelihood function, mixed logit require simulated maximum likelihood (Train 2003) and it takes longer. All estimations here were conducted in Stata, mixed logit estimates were obtained using the "mixlogit" package written by (Hole, 2007) and using 500 Halton draws. Details are available from the authors.

Suppose, for example, that the values of β_n are a-priori believed to be distributed normally, with a vector of means μ and matrix of variance Σ, then the D_b error would be:

$$D_b\, error = \int \left[\det\left(\Omega(\beta, x_{ij}) \right) \right]^{1/k} N(\mu, \Sigma) d\,\beta \qquad (4)$$

We used a D_b-error minimizing design centred on the asymptotic distributions of the model estimated on the pilot study responses obtained with the software Ngene v.1.1. In practice this design allocates levels in x_{ji} such that the expectation of the determinant is very low. The underlying goal of this method is to generate an optimal design which can provide accurate assessments of participants' preferences (Kessels, Goos & Vandebroek, 2006; Kessels, Jones, Goos, & Vandebroek, 2011; Sandor & Wedel, 2001; Vermeulen, Goos, Scarpa, & Vandebroek, 2011). Specifically, to inform our design, we obtained empirically informed priors (means and standard deviations of utility coefficients) from an initial qualitative study and a subsequent pilot study of the choice elicitation tasks conducted on 27 respondents. Given the initial ignorance on the parameter values, the pilot study results demonstrated the feasibility of the choice elicitation method as only one effect resulted insignificant. At each stage the experimental instrument was improved to ensure that all new feedback, information and refinements were included in the final version, and that such information could be communicated with ease to the respondents. The final version included choice alternatives, which described differing share investment scenarios. Respondents traded-off and chose alternatives from repeated choices according to their decision rules or underlying utility functions, which arose from the attributes of the alternatives.

4.6. Utility specification and willingness to pay

The multinomial logit model form (see McFadden, 1974) was adopted for estimating the aggregate preferences of the respondents. The systematic component of utility v_i, is specified as a linear additive function of the coefficients β and attributes x. The utility coefficients, β's, of the conditional logit retrieve the aggregate preferences of decision-makers. Formally, with k attributes v_i is decomposed as:

$$v_i = \beta_1 x_{i,1} + \ldots + \beta_k x_{i,k}. \quad (5)$$

Equation (5) is the classic form of multinomial logit indirect utility in which the β's are fixed coefficients and the model retrieves decision-makers' aggregate preferences. This specification implies decision-makers have the same preferences in aggregate.

In the model specification, we leave out *Fin_Avg*, *Soc_Avg*, and *Env_Avg*, as they act as meaningful baselines to identify utility changes brought about by higher or lower levels of each dimension. So, no coefficients are generated for these baseline attribute levels. The basic utility formula for the generic alternative i in the multinomial logit model specification is therefore:[7]

$$u_i = \beta_1 Fin\_L_i + \beta_2 Fin\_H_i + \beta_3 Soc\_L_i + \beta_4 Soc\_H_i + \beta_5 Env\_L_i + \beta_6 Env\_H_i + Cost_i + \varepsilon_i$$

Equation (6) highlights that the derivation of marginal WTP is obtained by computing the marginal rate of substitution between money and any other factor of the utility function, moving along the disutility curve:

$$dU = 0 = \frac{\partial U}{\partial x_k} dx_k + \frac{\partial U}{\partial x_\$} dx_\$ \rightarrow \frac{dx_k}{dx_\$} = -\frac{\beta_k}{\beta_\$} = WTP_k \qquad (6)$$

5. Results

5.1. Respondent demographics

Table 2 provides details of the information collected from participants in connection with their gender, age and job title. As shown, the majority of the sample were male (84.6%), retired (51.5%), and over the age of 50 (90.8%). According to the NZSA®, this is representative of the demographics of their membership base and of individual shareholders in general. For example, in a survey of Australian, U.K., and U.S. members of shareholders' associations, de Villiers and van Staden (2010) reported that 74-94% were male, 90-92% were 50 years or older, and that most respondents were retired.

[Insert TABLE 2 about here]

[7] A test on the linearity of the cost of disclosure attribute is not possible because the experimental design is derived with this assumption. As a consequence, the individual effects of the various cost levels are not all independently identified by the design, but they are under numerical coding of this variable.

5.2. Willingness to pay for departures from the average level of disclosure (H1)

Table 3 provides details of the various discrete choice multinomial logit estimates used to test the hypotheses. They provide the utility parameter estimates, remembering that we leave out the average levels for all three types of disclosure financial *(Fin)*, social *(Soc)*, and environmental *(Env)*. The average was chosen to act as baselines to identify utility changes consistent with gain (high levels, *_H*) versus loss (low levels, *_L*) asymmetry. The first four columns report the fixed coefficient estimates (with clustered standard errors by respondent), while the last two report the mixed logit estimates.

For H1, the null is that estimates of WTP, which in linear-in-the-coefficient utility models can be derived using equation (6) are insignificantly different from zero. Such hypotheses can be tested by deriving the sampling distribution of WTP_k by means of any of the available approximations for functions of maximum likelihood coefficients. We will use the Delta Method here.

Table 3, Model 1 reports the main effects of a conditional logit model, while Table 4 presents the implied WTP estimates for Model 1 with fixed utility coefficients (conditional logit). These provide key insights with regard to the objective of estimating shareholders willingness to pay for changes from the average level of disclosure.

[Insert TABLE 3 about here]

Regarding financial disclosure, the base model (Model 1, Table 3) highlights that shareholders find negative utility in companies providing lower than the average level *(coef. -0.664, $p < 0.001$)*, and positive utility in higher than the average level of financial disclosure *(coef. 0.476, $p < 0.001$)*. Table 4 indicates that shareholders are willing to pay more for above the average level of financial disclosure *(coef. 3.70 percent, $p < .001$)*, and less for below the average level of financial disclosure *(coef. -5.16 percent, $p < .001$)*. In order to test the difference between above average and below average financial disclosure, we perform an

untabulated test similar to Model 1 in Table 3. As expected, the difference is highly significant *(coef. 1.140, p < 0.001)*. In further corroborating evidence, note that the 95% confidence intervals for above average and below average financial disclosure in Table 4 do not overlap. H1 is therefore supported for financial disclosure.

For social disclosure (Table 3, Model 1) shareholders derive no significant utility when companies provide lower than *(coef. -0.117, p > 0.05)* or higher than *(coef. 0.0682, p > 0.05)* the average level of social disclosure. This is confirmed by the coefficients in Table 4 being insignificant *(p > 0.05)*. In order to test the difference between above average and below average social disclosure, we perform an untabulated test similar to Model 1 in Table 3. The difference is not significant *(coef. 0.185, p > 0.05)*. In further corroborating evidence, note that the 95% confidence intervals for above average and below average social disclosure in Table 4 overlap. Therefore, there is no support for H1 regarding social disclosure. These results appear consistent with Cho et al. (2015) who did not find any significant relation between social disclosure and firm value.

Results for environmental disclosure (Table 3, Model 1) indicate that shareholders derive negative utility when companies provide lower than the average level of environmental disclosure *(coef. -0.422, p < 0.001)*. Table 4 is supportive as it exhibits a significant WTP coefficient of -3.28 percent *(p < .01)*. In order to test the difference between above average and below average environmental disclosure, we perform an untabulated test similar to Model 1 in Table 3. As expected, the difference is highly significant *(coef. 0.454, p < 0.001)*. In further corroborating evidence, note that the 95% confidence intervals for above average and below average environmental disclosure in Table 4 do not overlap. This means that shareholders require higher investment returns (i.e., payment) when firms provide below the average level of environmental disclosure. Stated in the positive, this confirms that shareholders are willing to forfeit returns, i.e. pay more, for above the minimum level of environmental disclosure.

Shareholders, however, do not derive significant utility when firms move from average to higher than average levels of environmental disclosure *(coef. 0.0323, p > .05)*. Hypothesis 1 is therefore supported for the differences between lower than average levels of environmental disclosure and average disclosure, and lower and higher levels of environmental disclosure, but not for the difference between average and higher than average levels of disclosure. To the best of our knowledge, no prior study has demonstrated shareholders' willingness to pay for environmental disclosure.

[Insert TABLE 4 about here]

5.3. Value placed on changes in financial disclosure are more than non-financial disclosures (H2)

We organize the test for H2 based on the null, which can be tested by imposing equality constraints across financial coefficients and social and environmental coefficients. There are various ways to impose these constraints. Since these are all nested restrictions, a likelihood ratio test can be conducted for each.[8] Rejection of the restrictions in combination with an estimate of the unrestricted model that supports the hypothesis represents evidence supporting this hypothesis.

In Table 3, Model 1, both utility coefficients for changes in financial disclosures (i.e., *Fin_L* -0.664; *Fin_H* 0.476) are larger than any of the coefficients for social or environmental disclosures. In addition, both financial disclosure levels are highly statistically significant ($p < 0.001$), whereas *Soc_L, Soc_H* and *Env_H* are all statistically insignificant. Amongst non-financial attributes, the only significant change from the average level of disclosure is *Env_L* ($p < 0.001$).

In terms of WTP estimates (Table 4) it is apparent that at least for the point estimates, the estimated compensation for lower than the average level of environmental disclosure (-3.28

[8] In choice modelling there is a category of models called "nested logit models", but this is not our context.

percent) is less than its financial disclosure equivalent (-5.16 percent). Tests of equality of the magnitude of the effects were conducted by placing restrictions on Model 1 (pair-wise, all three, only for losses and only for gains) and all were rejected. We conclude that we can reject the null of effects of the same magnitude and that the data corroborate H2 for this pair.

In order to investigate the full gamut of financial versus non-financial disclosure pairs, there is an alternative way to proceed. With a utility function defined to evidence gain-loss asymmetry, this hypothesis can be tested in the direction of loss from the average disclosure levels, as well as from the direction of gains above the average level. In both cases we focus on the difference between WTP for changes in levels:

1) H_0: $WTP_H^{fin} - WTP_H^{soc/env} > 0$ versus H_1: $WTP_H^{fin} - WTP_H^{soc/env} \leq 0$

2) H_0: $WTP_H^{soc/env} - WTP_H^{fin} > 0$ versus H_0: $WTP_H^{soc/env} - WTP_H^{fin} \leq 0$

This can be tested using the delta method to obtain approximate confidence intervals around the differences since these involve functions of maximum likelihood coefficient estimates. Using Stata®, such approximations can be obtained post estimation using the command "nlcom". Results are in Table 5. Of the four pairs, when independently tested, three are positive and significantly different from zero at more than 95% confidence, whereas the fourth (*Fin_L-Env_L*) is not significant (i.e., $p > 0.05$). Of course, one can also test these hypotheses jointly, but the confidence that all four of these pairs will be jointly positive in a random sample would decrease. For example, we tested the null of all four and it only has a p-value of 0.39. So, when tested jointly, it can be rejected only with a confidence of 61%, which is still quite high, considering it is an outcome involving three different events.

[Insert TABLE 5 about here]

Results using the delta method hence corroborate H2 for three of the four pairs. The notable exception, however, is for the *Fin_L-Env_L* ($p > .01$) pair. Interpretation on this pair is that when comparing a shift from low to the average level of financial and environmental

disclosure, shareholders are willing to pay *equally* for these. While Cohen et al. (2011) indicated that shareholders have a preference for economic (i.e., financial) information, our finding here suggests that this may not be universal across all disclosure types and levels. Furthermore, we offer insight to what Christensen, Hail and Leuz (2018) highlight as an underlying deficiency in the literature regarding whether investors value non-financial information in the same material way as financial disclosures.

5.4. Value placed on changes in disclosure across firms operating in different industries (H3)

Testing of this hypothesis is done on the null basis; interaction terms between utility coefficients for change of disclosure and industry in which firms operate have no statistically significant effects. Rejecting the null will corroborate H3.

Table 3 highlights all interaction terms with the industry indicator for Sport Apparel (*SportApp*) have been included in Model 3, but three are dropped in Model 4 as this restriction cannot be rejected. So per Model 4, *Env_H* ($p < 0.01$) is significant. Hence, for this level of disclosure, the value placed by shareholders does differ for firms operating in the Sport Apparel industry, which is supportive of H3. Expanding on the result, shareholders are more willing to pay for environmental disclosure in a sports apparel firm compared to a mining firm. We first thought this was a somewhat counterintuitive result, mining firms, for example, might be expected to have greater environmental issues than sports apparel. However, one line of reasoning might be that because mining firms have relatively well-known environmental issues, our experienced retail shareholders might well be familiar with these and hence price them in readily. Alternatively, environmental issues in sports apparel may be harder for these shareholders to understand, meaning they are more willing to pay for them. Some support in the literature can be found for this line of conjecture. Islam and Deegan (2010), for example, highlight that large sports apparel companies such as Nike and Hennes & Mauritz face significant concerns regarding negative media attention, which motivates their provision of

positive corporate environmental disclosures. Another study by Birkey et al. (2018) found investors to be significantly more likely to have negative reactions to issues in the public interest, such as those in the environmental domain, especially for apparel and footwear retailers, relative to other types of retailer.

5.5. Value placed when firm has a known prior social or environmental issue (H4)

The null hypothesis is that interaction terms between utility coefficients and firms with a known prior social and environmental issue have no statistically significant effects. It is rejected when these effects are found significant and if so then H4 is corroborated. The interaction terms with the dummy variable *Issue* are always insignificant in the full sample regression (Table 3, Model 2). This finding provides support for H4. That is, shareholders do not value the provision of disclosure differently depending on whether the firm has a known prior social or environmental issue. This is surprising, e.g. we would expect an investor to be more interested in the environmental disclosures of a firm that is a known environmental offender, because this could involve a risk of negative financial consequences. However, this finding could be an artifact of our experimental design and future research could revisit this matter.

6. Further analysis

6.1. Gain-loss asymmetry and framing effects

While logic would suggest there should be no difference between shareholders' willingness to pay for above the average level disclosure or to receive for below the average level, prospect theory highlights that this may not be true if there are framing effects present in the experimental method (Kahneman & Tversky, 1979). Specifically, avoiding a loss can be subconsciously regarded as more valuable than securing a gain, despite identical expected values (Kahneman & Tversky, 2000). Therefore, framing disclosure as a loss (i.e., below the

average level) or gain (i.e., above the average level) should cause these changes (loss or gain) to be valued differently by investors.

Framing effects can be tested by estimating nested models with the equality restrictions imposed, paying attention to the sign reversals imposed by the different directions of change from the average level of disclosure. These can be tested separately for each attribute and jointly, giving rise to a series of gradually more restrictive tests (3 independent, 3 in pairs and one with all three). Table 6 reports the results based on a null hypothesis (i.e., that gains are equal to losses), as can be seen, in all instances there are no grounds for rejection as all have a probability greater than 5% (i.e. $p > .05$). Hence, shareholders' willingness to pay/receive is not different for more than the average level of disclosure (gain) than for less than the average level of disclosure (loss). Based on these results, it is our contention that framing effects do not pose a severe threat to the validity of our findings.

[Insert TABLE 6 about here]

6.2. Preference heterogeneity in disclosure taste sensitivity

A limitation of Models 1-4 (Table 3) is that preference heterogeneity among shareholders cannot be tested. Logit models utilize conventional maximum likelihood tests and restrictions involved are at the boundary of the range of values for the coefficients of interest (one should test the null of all standard deviations being equal to zero, which is a boundary condition and asymptotic properties of tests do not hold). Relaxing the fixed coefficient models (Models 1-4 in Table 3) allows for preference heterogeneity to be examined. Models 5 and 6 (Table 3) are mixed logit, which imply a mean and a measure of dispersion (e.g., standard deviation), rather than a single estimate applicable to all shareholders.

The best way to visualize the implication of moving from a fixed logit model to one that allows for heterogeneity of taste across individuals is to compare the implied probability forecasts for various choice contexts. We focus on the probability of choice when one

alternative is kept fixed at a bundle with all disclosure at the average levels. We compute the probability forecast for each of the cases in which one disclosure is moved to another level, and we do so at each of the cost levels, and for the fixed coefficient and the mixed coefficient models. The forecasts are reported in Figure 1; as can be seen the range of forecasts is always larger for the mixed logit than the conditional logit with fixed coefficients.

[Insert FIGURE 1 about here]

To provide evidence of preference heterogeneity we rely on the values of the Akaike (AIC) and Bayesian information criteria (BIC) for the mixed logit models, which are lower than their fixed coefficient counterparts. Model 5 is the analog of Model 1 in terms of utility structure and the favorite in terms of BIC, while Model 6 is the analog of Model 3, and the favorite in terms of AIC. We note that both Models 5 and 6 were obtained with a constrained Choleski matrix in which the elements resulting insignificant at 10% were constrained to zero. This reduced the number of parameters, for example with 13 restrictions in the Choleski matrix of Model 6, the degrees of freedom reduced from 34 in the model with a full matrix, to 21. This involved a decrease in log-likelihood of only 2.89 (398.96 - 396.07), which is well within the non-rejection region.

From the Choleski estimates one can derive a variance-covariance matrix of the jointly normal random coefficients ($V=LL'$), as well as their correlation. These are reported in Table 7, with the covariance in the upper triangular section and correlation in the lower triangle. Obviously, with a sparse Choleski matrix one derives a sparse covariance and correlation matrix, with only five off-diagonal significant elements in our case.

Substantively, the strongest correlations are found in the taste for higher and lower than the average level of financial disclosure, which is negative (-0.91). This means that if an experienced retail shareholder is randomly chosen from the population, and this person is attracted to high (low) financial disclosure, they are likely not attracted to low (high) financial

disclosure. Second in order of strength, but with a positive correlation (0.80) is that between lower than average levels of environmental and social disclosure. The interpretation here is similar, i.e., if randomly chosen from the population, if a shareholder is attracted to high (low) environmental and social disclosure, they are likely not attracted to low (high) environmental and social disclosure. The other three only show moderate correlation, never exceeding 0.6. Looking at the diagonal, the largest variance in taste intensity is found for shareholders with a preference for higher than the average level of financial disclosure (2.02) followed by lower than average financial (1.37) and environmental disclosure (1.25).

[Insert TABLE 7 about here]

7. Conclusion

We perform a choice-based conjoint experiment to determine the willingness of investors to pay for disclosures made by the firms they invest in, assessing financial, environmental, and social disclosures in a way that require trade-offs. Their willingness to pay is assessed by offering differing combinations of the three kinds of disclosure and investment returns. Our data consists of the 780 choices between such combinations made by 65 retail shareholders. In general terms, our findings indicate that shareholders are willing to forfeit returns in order to gain access to more disclosure. More specifically, we provide evidence that shareholders are *willing* to pay for financial disclosure and for environmental disclosure. We do *not* find evidence that shareholders are willing to pay for social disclosure. This latter finding should be treated with caution, as such a 'non-result' could be due to matters related to our experimental design.

We also investigate whether shareholders value changes in financial disclosure more than changes in social or environmental disclosure. Here we find that when comparing financial and environmental disclosure, shifting from a low level of disclosure to an average level are of *equal* value to shareholders. This suggests that while previous research evidence shows

shareholders prefer economic (i.e., financial) information over non-financial information (see Cohen et al., 2011), this may not be universal across all disclosure types and levels. Further, according to our results, with few exceptions, shareholders do not value disclosure differently across firms in different industries (mining versus sports apparel). Finally, we find no evidence that shareholders value social and environmental disclosures more in cases where investors are aware of these firms having prior social or environmental issue/concerns. Again, these 'non-results' should not be seen as conclusive evidence, as it could potentially be ascribed to matters related to our experimental design. In fact, these 'non-results' could be further explored in future studies.

Limitations

Findings of this study are subject to certain limitations. Fundamental to the results reported are the type of participants surveyed, experienced retail investors, who were recruited from the NZSA®. An advantage of this sample is that it is representative of the demographics of the NZSA®'s membership base and of individual shareholders in general, however, a disadvantage is that this sample may not be representative of the audience that has the most WTP for social and environmental disclosures. While some countries such as South Africa, have mandatory non-financial disclosures, in most jurisdictions such disclosures remain largely voluntary and unregulated. The point is that this may be keeping other types of investors out of the equity markets. If so, then the analysis reported in the current study may be considered a conservative test of shareholders' WTP for social and environmental disclosures.

Another aspect of the current study is its explicit focus on the amount of disclosure (e.g., low and high, versus the average baseline). No explicit inference was made in the experimental materials to the quality of disclosure, but it should be borne in mind that respondents might have made such an inference. However, had respondents perceived a higher

level of disclosure as not having any quality implications, or alternatively a lower quality, this would have worked against us finding a result.

Limitations also stem from the design choices we made. With regard to the attributes, their wording, and their levels, interpretation of the magnitudes of returns that investors are willing to pay for disclosure are interpretable only within confounds of our constructed research setting. Hence, the magnitude of the WTP effects reported in the current study are an artefact of the controlled and hypothetical conditions. As is the case in any decision experiment (such as this), the aim is to capture respondents' behavioral changes. The extent to which such behavior would be repeated in an actual decision situation will always be open for debate; the contrived nature of experiments limits how far findings of the current study can be generalized.

Due to considerations of time and length of survey completion, and to minimize the problem of respondent fatigue, controls were excluded from the results reported because they were found insignificant when included. To give a sense of the number of potential controls available, in a review of 580 articles published in the somewhat related field of organizational behavior, Bernerth and Aguinis (2016) identified more than 3,500 controls. A randomized laboratory experiment has the advantage of controlling for potential confounders. Kenny (1979, p. 1) highlights that randomization of assignment is "the backbone of experimental inference". Randomization "controls infinite potential confounders-including those unknown to the experimenter-by creating pre-experimental equivalence." (Eden 2017, p. 96). From a methodological perspective, use of a randomized experimental approach is thus advantageous because it helps to provide a reasonable level of assurance regarding internal and external validity (Eden 2017). Despite the advantages a randomized laboratory experiment has in controlling for potential confounders, there is still a possibility that an unknown potential confounder affected the findings.

Avenues for future research

At its core, results of the current study relate best to a voluntary disclosure environment. However, a number of stock exchanges around the world have moved to emphasize the importance of integrated reporting, which involves the disclosure of similar non-financial information. Listed firms on the Johannesburg Stock Exchange in South Africa, for example, are required to 'apply or explain' their adoption of integrated reporting (Sierra-García, Zorio-Grima, & García-Benau, 2015). In that context, disclosure of integrated reporting information is non-voluntary, which could bring a potentially different set of costs and benefits (Prado-Lorenzo & Garcia-Sanchez, 2010). Further research examining the value shareholders attach to different forms of disclosure within the presence (and absence) of integrated reporting regulation would therefore appear a worthy area for further inquiry.

Another avenue for future research would be to focus on the effect of the different legal systems in which companies operate. Firms operating in an institutional setting where there is strong coercive and regulatory pressure are likely to act more responsibly and adequately report their own behavior, typically where there is a well-developed legal system aimed at protecting stakeholders (Campbell, 2006). A country's legal system can have an impact on the creation and publication of a broad range of financial and non-financial information and this can in turn affect decision-making of various stakeholders (Frías-Aceituno, Rodríguez-Ariza, & García-Sánchez, 2013). Hence, the current study's findings should not be generalized too broadly and further research is called to examine the impact of different regulatory disclosure regimes on the trade-offs shareholders are willing to make for disclosure.

Relating back to the financial and non-financial information disclosures made under the integrated reporting framework, it is important to bear in mind that this has been developed specifically with corporations in mind (de Villiers, et al., 2014) and while the providers of financial capitals (such as shareholders) are identified as the primary users of integrated reports,

research has shown that companies often consider satisfying other stakeholders' information needs (Holder-Webb, Cohen, Nath, & Wood, 2009; KPMG, 2013). For example, firms may use integrated reporting disclosures in order to reduce reputational risk by providing a greater level of transparency concerning a firm's impact and commitment toward social and environmental matters (Steyn, 2014). It would be worthwhile to conduct research exploring the trade-offs non-shareholder stakeholders make and/or as well as taking a non-corporate perspective. Integrated reports, for example, are often adopted by other types of organization (Simnett & Huggins, 2015). Overall, this research is beneficial in identifying and establishing the credibility and relevance of the financial, social and environmental information contained in corporate reports.

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APPENDIX A – Experimental demographic questions and task scenario

Part A: Demographics

1. What is your gender? Male/Female/Other (please specify)
2. What was your age at your last birthday? _____ (please specify)
3. What is your job title? _____ (please specify)

Part B: Task scenario

Investors require corporate disclosures to ensure they have adequate information to base their investment decisions on. We are interested in the disclosure trade-offs shareholders would be willing to make, if they had the choice.

Accordingly, we will provide you with two different disclosure options to choose between. We'll ask you to make this kind of choice twelve times. The level of financial, social, and environmental information firms you own shares in disclose will be varied. You should answer as if you own shares in these firms. Because disclosure can be costly in terms of direct cost and loss of competitive advantage, or beneficial in terms of a market reassessment of future prospects, we will tell you the cost/benefit of the disclosure options offered to you in the form of increased/decreased earnings and dividends.

Disclosure options:

Financial information	Low	Minimum required by regulations.
	Average	Average financial disclosure for the firm's industry sector.
	High	Additional financial disclosure around future growth opportunities, and changes to the risk profile of the firms' future cash flows.
Social information	Low	Minimum required by regulations.
	Average	Average social disclosure for the firm's industry sector.
	High	More social disclosure, including specific information that would allow you to form an opinion regarding 1) the financial implications, and 2) the social implications, of any current or potential social issues, such as bad work conditions in the supply chain, e.g. sweatshop conditions, child labour, etc.
Environmental information	Low	Minimum required by regulations.
	Average	Average environmental disclosure for the firm's industry sector.
	High	More environmental disclosure, including specific information that would allow you to form an opinion regarding 1) the financial implications, and 2) the environmental implications, of any current or potential environmental issues, such as toxic releases, biodiversity, rehabilitation, slime dam failure, etc.

Cost/benefit of disclosure:

Expressed as a percentage change to earnings and dividends. A positive percentage means that earnings and dividends will increase with the levels of disclosure specified. A negative percentage means that earnings and dividends will decrease. E.g.:

- 5% cost means that both earnings and dividends will decrease by 5% after the new disclosures as specified are made, so if it was $100 before, it would be $95 after the new disclosures.
- 5% benefit means that both earnings and dividends will increase by 5% after the new disclosures as specified are made, so if it was $100 before, it would be $105 after the new disclosure.

Firms owned:

Imagine that among your portfolio of share investments, you own shares in the following four firms:

1. MineEnvIssue: a mining firm, of average size, profitability, dividend yield and risk for the sector, except that the firm has some bad environmental performance issues.
2. MineNoIssue: a mining firm, of average size, profitability, dividend yield and risk for the sector, and as far as is known, good environmental performance.
3. SportSocIssue: a high-growth apparel/sportswear firm, of average size, profitability, dividend yield and risk for the sector, except that the firm has some sweatshop issues in its supply chain.
4. SportNoIssue: a high-growth apparel/sportswear firm, of average size, profitability, dividend yield and risk for the sector, and as far as is known, good social performance, i.e. no known sweatshop issues in its supply chain.

In summary:

Name	**MineEnvIssue**	**MineNoIssue**	**SportSocIssue**	**SportNoIssue**
Industry	mining	mining	apparel/sportswear	apparel/sportswear
Growth	steady	steady	high	high
Size	average	average	average	average
Profitability	average	average	average	average
Dividend yield	average	average	average	average
Risk	average, except for known bad environmental performance issues	average, and no known environmental performance issues	average, except for known sweatshop issues in their supply chain	average, and no known issues with their supply chain

All of the firms currently disclose the average amount of financial, social, and environmental information for their sector.

APPENDIX B – Example choice task

You already own shares in the following companies. Please choose the disclosure and cost-benefit alternative you prefer from the following two options:

	Mine_No_Issue (A)	Mine_No_Issue (B)
Financial disclosure	Average	high
Environmental disclosure	High	Low
Social disclosure	High	Low
Cost/benefit of disclosure	6% benefit	6% benefit

Your choice is: Choose alternative A □ Choose alternative B □

APPENDIX C – Discrete choice multinomial logit estimates for the pilot study

	Main Effects
Fin_Avg	0.646****
	(3.00)
Fin_H	0.976****
	(3.11)
Soc_Avg	0.181
	(0.560)
Soc_H	0.963****
	(3.44)
Env_Avg	0.619****
	(2.42)
*Env*_H	1.895****
	(5.74)
Cost	0.268****
	(2.73)
N	324
Adj.pseudo R^2	0.2124
AIC/N	358.02

|*t*|-statistics in parentheses **** $p < 0.001$

TABLE 1. The attributes, levels, and descriptions of the experiment

Attribute	**Levels**	**Description of level**
Financial disclosure	Low	Minimum required by regulations.
	Average	Average for firms in the industry.
	High	Additional disclosure around future growth, risk, cash flow.
Social disclosure	Low	Minimum required by regulations.
	Average	Average for firms in the industry.
	High	Additional disclosure around financial and social implications of current and potential social issues.
Environmental disclosure	Low	Minimum required by regulations.
	Average	Average for firms in the industry.
	High	Additional disclosure around financial and environmental implications of current and potential environmental issues.
Cost/benefit of disclosure	+6%, +4%, +2%, 0, -2%, -4%, -6%	Expressed as a percentage change in earnings and dividends.
Company	**Industry**	**Description of company**
MineEnvIssue	Mining	Average, except for bad environmental performance issues.
MineNoIssue	Mining	Average, and as far as is known, no environmental performance issues.
SportSocIsssue	Apparel/sportswear	Average, high-growth, some sweatshop issues in its supply chain.
SportNoIssue	Apparel/sportswear	Average, high-growth, no known sweatshop issues.

TABLE 2. Respondents' demographics

Gender	**N**	**%**
Male	55	84.6
Female	10	15.4
Age		
Below 35	0	0
35-49	6	9.2
50-64	29	44.6
65 and above	30	46.2
Job Title		
Retired	35	51.5
Director	12	17.6
Manager	12	17.6
Accountant	2	2.9
Engineer	1	1.5
Other	3	4.4

TABLE 3. Logit and mixed logit estimates with average disclosure as the baseline

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	Fixed coefficient logit				Random coefficient logit	
	Main effects	x issue	x SportApp1	x SportApp2	MXLApp1	MXLApp2
Fin_L	-0.664**	-0.760**	-0.968**	-0.962**	-1.143**	-1.699**
	(-5.89)	(-4.65)	(-5.77)	(-5.84)	(-5.11)	(-5.67)
Fin_H	0.476**	0.454*	0.449	0.450	0.840**	0.802
	(4.02)	(2.77)	(2.54)	(2.55)	(3.39)	(2.49)
Soc_L	-0.117	-0.0375	-0.216	-0.145	-0.150	-0.210
	(-0.99)	(-0.22)	(-1.20)	(-1.21)	(-0.73)	(-0.98)
Soc_H	0.0682	0.0101	0.114	0.0725	0.165	0.182
	(0.61)	(0.06)	(0.71)	(0.64)	(1.10)	(1.06)
Env_L	-0.422**	-0.374	-0.407	-0.438**	-0.636*	-0.699*
	(-3.39)	(-2.09)	(-2.20)	(-3.48)	(-2.73)	(-2.82)
Env_H	0.0323	-0.0920	-0.306	-0.331	0.186	-0.265
	(0.26)	(-0.52)	(-1.66)	(-2.05)	(0.93)	(-1.03)
Cost	0.129**	0.125**	0.134**	0.135**	0.226**	0.251**
	(4.11)	(3.94)	(4.25)	(4.28)	(4.71)	(4.85)
Interactions						
Fin_L_iss/app		0.170	0.559	0.562		0.951*
		(0.76)	(2.44)	(2.52)		(3.08)
Fin_H_iss/app		0.0159	0.0407	0.0456		0.127
		(0.07)	(0.17)	(0.19)		(0.38)
Soc_L_iss/app		-0.143	0.126			
		(-0.60)	(0.52)			
Soc_H_iss/app		0.125	-0.0889			
		(0.56)	(-0.39)			
Env_L_iss/app		-0.112	-0.0528			
		(-0.45)	(-0.21)			
Env_H_iss/app		0.244	0.634	0.685***		0.809**
		(1.00)	(2.55)	(3.51)		(2.85)
Log-lik	-466.81	-464.42	-455.83	-456.31	-411.52	-399.16
AIC	947.6	954.8	937.7	932.6	851.0	834.3
BIC	985.1	1024.4	1007.2	986.1	926.0	930.7

|*t*|-statistics in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Note: sports apparel measured against mining, *_iss/app* abbreviates Issue/SportApp.

TABLE 4. WTP estimates and approximate st. errors (delta method)

WTP	Coef.	Std. Err.	z	P>|z|	95% C.I.	
Fin_L	-5.16	1.42	-3.62	<0.001	-7.95	-2.37
Fin_H	3.70	1.31	2.82	0.005	1.13	6.27
Soc_L	-0.91	0.94	-0.96	0.336	-2.75	0.94
Soc_H	0.53	0.87	0.61	0.542	-1.17	2.23
Env_L	-3.28	1.25	-2.63	0.009	-5.72	-0.83
Env_H	0.25	0.95	0.26	0.792	-1.61	2.11

TABLE 5. Differences in WTP estimates

Delta	Estimate	St.Err.	*z*	*p*>|*z*|	95% c.i.	
Fin_H-Soc_H	3.17	1.49	2.12	0.03	0.24	6.09
Fin_H-Env_H	3.45	1.50	2.30	0.02	0.51	6.39
Fin_L-Soc_L	4.25	1.52	2.79	0.01	1.26	7.24
Fin_L-Env_L	1.88	1.21	1.55	0.12	-0.50	4.26

TABLE 6. Nested models with equality restrictions

Restrictions	chi-sq	deg. of fr.	Pr. > chi-sq	Decision[A]
1	0.88	1	0.349	cannot reject
2	0.06	1	0.809	cannot reject
3	3.11	1	0.078	cannot reject
1&2	0.91	2	0.635	cannot reject
1&3	3.52	2	0.172	cannot reject
2&3	3.11	2	0.212	cannot reject
1&2&3	3.52	3	0.318	cannot reject

Restrictions: 1) *Fin_L = -Fin_H*, 2) *Soc_L = -Soc_H*, 3) *Env_L=-Env_H*

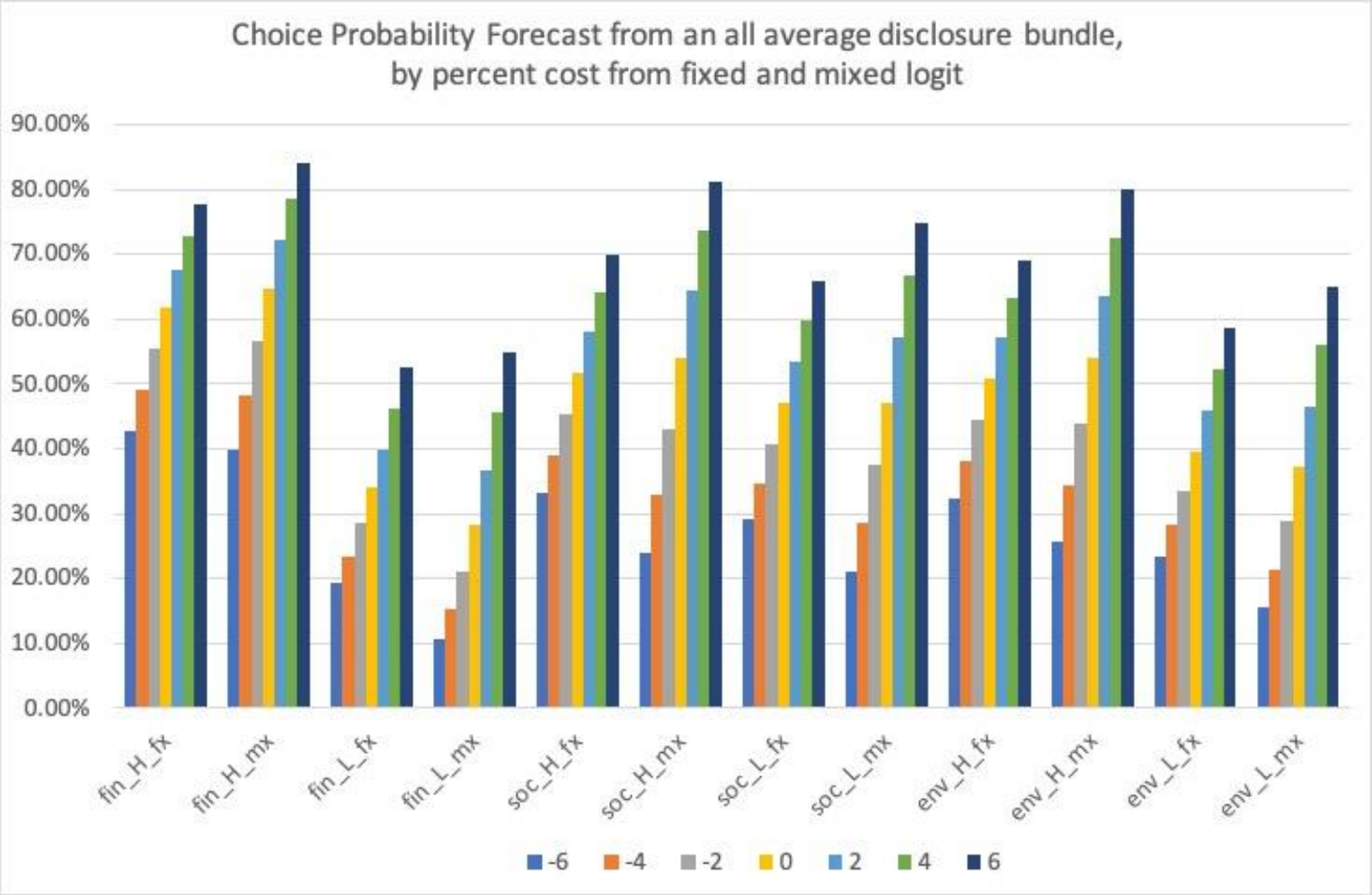
[A] $p > 0.05$

TABLE 7. Var-covariance (in **bold** fonts) and correlations sparse matrices

	Fin_L	*Fin_H*	*Soc_L*	*Soc_H*	*Env_L*	*Env_H*
Fin_L	**1.37**	**-1.52**	---	---	**0.78**	---
Fin_H	-0.91	**2.02**	---	---	**-0.87**	**0.54**
Soc_L	---	---	**0.87**	---	**0.84**	---
Soc_H	---	---	---	**0.42**	---	---
Env_L	0.60	-0.55	0.80	---	**1.25**	---
Env_H	---	0.41	---	---	---	**0.86**

As implied by Cholesky estimates (Model 6). Diagonal matrix reports variances.

FIGURE 1.


Choice Probability Forecast from an all average disclosure bundle,
by percent cost from fixed and mixed logit
90.00%
80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
fin_H_fx
fin_H_mx
fin_L_fx
fin_L_mx
soc_H_fx
soc_H_mx
soc_L_fx
soc_L_mx
env_H_fx
env_H_mx
env_L_fx
env_L_mx
-6
-4
-2
0
2
4
6