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Financial Reporting
Research Group

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by

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Abstract

This paper examines the effect of environmental information on the investment decisions of investors. The motivation for the experimental design applied in this study is that unless actual decision making is observed, the potential usefulness of environmental information (or lack thereof) cannot be taken for granted. The study is based on an experiment where groups of investors (varied by experience) were asked to make investment allocation decisions based on financial information and on supplementary environmental information (varied between cases). As an investment allocation decision (varied by investment horizons) the groups were asked to allocate funds to two companies based on the available information. The findings suggest that environmental information has the potential to influence investment allocation decisions. The findings also suggest that the influence of environmental information on investment allocation decisions is mitigated by the variables considered explicitly in this study, i.e., the investment horizon (varied as short and long) and investor experience (varied as novice and experienced investor). It is concluded that because allocation decisions are multifaceted problems, mixed results related to the influence of environmental information should be expected.

Keywords: Environmental reporting; environmental disclosures; allocation; decision making; investment horizon; investors; experiment.

1. Introduction

The aim of the present study is to shed light on the value creation potential of environmental reporting by introducing a controlled experimental setting for investment allocation decision making when faced with varying amounts of environmental information. Recent research suggests that motivations for corporate environmental disclosure are plentiful (O' Dwyer et al. 2005b; Cormier et al. 2005; Solomon & Lewis 2002; Moneva et al. 2000). Cormier et al. (2005) propose that the potential costs of environmental disclosure for a company should be understood in light of the benefits to society. Variations in disclosure policy are found to be contextually based on such factors as risk, ownership, fixed assets age and firm size (Cormier et al. 2005, p. 32). Hassel et al. (2005) examine the value relevance of environmental performance and find that companies rated highly in terms of environmental performance are not, *ceteris paribus*, highly valued by investors. They suggest that the explanation might be a "cost concern", which is an explanation at odds with other studies favouring a value creation explanation (Hassel et al. 2005, p.56). "Value creation" is based on the assumptions that good environmental performance creates value and that environmental disclosures are actually rewarded by decision makers and seen as sufficiently significant to be included as decision criteria. Some evidence seems to indicate that investors see environmental performance as more important today than earlier, judging from e.g. the emergence of sustainable investment funds and sustainable

investment methods (Koellner et al. 2005; CMA 2005; Earl & Clift 1999), the emergence of investment related indexes such as the Dow Jones Index for Sustainable Development¹, attention of accounting standard setters to environmental performance (Internal Auditor 2006) and the linking of environmental management with creation of long term corporate value (Figge 2005).

An often debated issue is the actual importance of environmental and social information to investor decision making. One element of this debate is whether investors get all the information they need about the environmental performance of the company to make informed investment decisions (Lydenberg 2005; CMA 2005; Lee & Hutchison 2005; IIRC 2004; IIRC 1992). This information deficiency argument has been used to demand increased disclosures of environmental information by companies (Araya 2003). This is based on the assumptions that good environmental performance is actually rewarded and reduces business risks and that investors find this reward improvement/risk reduction significant enough to include it as a decision criterion. But is that the case? This is the question that is examined in this paper. The motivation for the experimental design applied in this study is that unless actual decision making is observed instead of indirect measures, e.g. eliciting opinions of self-assessed decision usefulness, the potential usefulness of environmental information (or lack thereof) cannot be taken for granted.

¹ <http://www.sustainability-indexes.com/>. Accessed 25-05-2006.

The study is based on an experiment where groups of investors (varied by experience) were asked to make investment allocation decisions based on financial information and on supplementary environmental information (varied between cases). As an investment allocation decision (varied by investment horizons) the groups were asked to assign funds to the two companies based on the available information. The difference between the groups was then measured to elicit how environmental information affected the decision making. The investors were also asked to rate the decision relevance of the different types of information presented in the information material supplied to them.

The findings presented in this study suggest that environmental information has the potential to influence investment allocation decisions. The findings also suggest that the influence of environmental information on investment allocation decisions is mitigated by the variables considered explicitly in this study, i.e., the investment horizon (varied as short and long) and investor experience (varied as novice and experienced investor)². It is concluded that because allocation decisions are multifaceted problems, mixed results related to the influence of environmental information should be expected.

² A paper based on another set of findings collected in this study has been accepted for publication in *Business Strategy and the Environment*. These findings relate to the effect of different types of environmental disclosures (i.e., qualitative vs. quantitative) on investment allocation decisions among the group of novice investors (students).

The paper is organized as follows. The next section discusses environmental disclosures and investments including several prior studies in this area. Section 3 describes the methodology of the study. Section 4 presents the results of the study and section 5 concludes on the findings.

2. Social and Environmental Disclosures and Decision Making

This section is subdivided into two sections. In the first section we present and discuss the practice of environmental disclosures by companies including various theoretical explanations and characteristics of current disclosing practice. In the second section we look at prior studies in relation to the methodologies used in examining the effects of environmental disclosures.

2.1 Explaining the Need for Environmental Disclosures

Several frameworks have been proposed for analyzing corporate disclosures to external decision makers. One framework, based in part on Arnold & Sutton (1997), is presented in figure 1. The basic premise of this framework is that the use of accounting information – including corporate environmental and social performance information – occurs through individuals and/or groups fulfilling institutionally embedded roles. These individuals and groups belong to a specific company, a specific NGO or a spe-

cific investor community and their interactions are therefore conditional upon these institutional contexts and the related contextual factors.

>Insert Figure 1: Disclosing Decision Relevant Information <

Disclosure, in our context, is represented by the authorized public release of corporate environmental and social performance information and the processes leading up to this event. In the current study this means a separate report or information section containing information about this performance aspect of the company. The use of this information is represented by the use of environmental and social information to support economic, political or social processes such as decision making by investors or in government policy. In the current study it means the use of environmental information by economic actors – i.e., investors – to arrive at a particular investment decision.

The framework also separates the effects of environmental disclosures from disclosure practices and uses. These effects could include e.g. changes in share price, improved quality of the environment or changes in some user preferences (see later).

Focusing on environmental disclosure processes and practices in figure 1, there is no overview available of the number of companies worldwide that disclose their social and environmental performance. Rikhardsson (1997)

estimated that in 1996 there were approximately 1000 companies reporting on their social environmental performance through free-standing reports either voluntarily or within the European Union Environmental Management and Auditing Scheme (EMAS). Today, recent surveys of environmental reporting practices in various countries and industries as well as new environmental reporting legislations in various countries would indicate that this number is significantly higher (Llena et al. 2006; Stanwick & Stanwick 2006; KPMG 2005; Freedman & Jaggi 2005; Business in the Environment 2004; Thompson & Zakaria 2004; Rikhardsson et al. 2002, Krut & Moretz 2000). In Denmark and in the Netherlands approximately 1000 and 300 companies respectively produce mandatory free-standing environmental reports and currently there are approximately 4600 EMAS certified sites required to produce an EMAS environmental statement³. Norway and Sweden have implemented legal requirements for environmental reporting that although not as far reaching as those in Denmark and the Netherlands, oblige companies to include certain disclosures in corporate annual reports (Nyquist 2003; Perrini 2005). Judging from the surveys cited above as well as dedicated websites such as those of GreenBiz⁴, there is also a significant level of voluntary social and environmental reporting. Conservatively, the total number of obligatory and voluntary free-standing social and environmental reports being produced worldwide might thus be in the range of 8,000 – 10,000 reports. Some sources (Osborne 2005) estimate that the total number of companies dis-

³ http://europa.eu.int/comm/environment/emas./index_en.htm. Accessed 25-05-2006.

closing some sort of environmental information might be around 85,000. It should be noted that although this is not a significant part of all registered companies worldwide, this number includes some of the world's largest companies that have significant impact on national and global economic, social and environmental developments.

Some companies have to comply with environmental reporting legislation, but why do companies voluntarily report on their environmental and social performance? Different theories have been used to explain this, for instance legitimacy theory (Mobus 2005; Freedmann & Patten 2004; Wilmhurst & Frost 2000; Patten 1992), stakeholder management theory (O'Dwyer et al. 2005a; Cormier et al. 2004; Collison et al. 2003; Clarkson 1995) and corporate marketing and communication theory (Hasseldine et al. 2005; Hooghiemstra 2000). However, the framework applied in the present study is the "decision usefulness" explanation based on an agency theory framework. This framework is based on the assumption that users of information assign usefulness criteria to the information disclosed to them: the more useful the information, the higher the value placed on the information (see Healy & Palepu 2001 for a review of empirical disclosure literature). In the context of environmental disclosures, environmental reporting is conducted because various stakeholders require additional information for their decisions different to that available in financial reports and other company communication (Power 1991).

⁴ <http://www.greenbiz.com>. Accessed 20/5 2006.

2.2 Different Methodologies in Prior Studies for Assessing the Effects of Social and Environmental Disclosures

Two main types of methodologies have been applied in the literature, focusing on the use and impact of the disclosed information as shown in figure 1. One type includes the market reaction studies or capital market studies where the reaction of investors is measured by evaluating stock market variables (e.g. price or risk) in connection with social and environmental performance disclosures (for an overview see e.g. Margolis & Walsh 2001; Mathews 1996; Ullmann 1985). These studies focus on assessing the overall market reaction to disclosures of social and environmental performance information, measured by changes in stock price, investment levels, risk assessment etc. The results of these studies are contradictory (e.g. Hassel et al. 2005). Some have documented a positive relationship between disclosures and the measured variables – i.e., more (positive) disclosures are associated with positive reactions from the market (Al-Tuwaijri et al. 2003; Anderson & Frankle 1980, Belkaoui 1976, Preston 1978). Others have documented no market reaction to these types of disclosures (Murray et al. 2006; Freedman & Jaggi 1982) or even found signs of a negative market reaction (Hassel et al. 2005; Ingram & Frazier 1983).

Capital market studies differ regarding the variables tested, companies examined, time periods focused on and contextual influences during these

periods. This might be one reason why there is no definite conclusion regarding the effect of social and environmental performance disclosures to investors, nor the direction of the effect. However, judging from the above studies, environmental and social disclosures may affect user behaviour in some situations.

The other type of research methodology that has been applied to study effects of social and environmental disclosures is survey based decision experiments, i.e. the focus is on the person who is actually deciding on investment in the company in question, based on what information this person has regarding the investment choice.

Hendricks (1976) and Belkaoui (1980) are examples of early studies employing this methodology. Hendricks' experiment focused on human resource accounting and showed that stock investment decisions were affected by the inclusion of this information in conventional accounting information. Belkaoui investigated whether the investment decision by an external user would be different if pollution abatement costs were disclosed and whether decisions would vary depending on the occupation of the decision maker. Generally, the results showed that the various accounting treatments for pollution control information had an effect on investment decisions. Previous experience and occupation group of the decision maker seemed to influence the use and effect of disclosures. The effect was most significant with bankers and in some cases accountants

whereas students did not perceive the importance of the pollution abatement cost information at all.

Another experiment study is reported in Milne & Chan (1999) and Chan & Milne (1999). They assessed the decision behaviour of financial analysts (investment analysts and accountants) when presented with information packages with and without voluntary narrative social disclosures. Using control groups their main conclusion was that narrative social performance information does not have an impact on short term investment strategies but has some significance for longer term investment strategies.

Although the evidence from these studies is somewhat inconclusive, there is reason to believe that individual investors, in some cases anyway, value supplementary information positively and reward the companies that disclose this type of information, at least when it comes to long term investments. Furthermore, there seems to be a difference between varying levels of experience where professionals decide differently from e.g. students.

The study reported in the following focuses on the use and analysis of environmental information. The basic aim is to assess the actual importance of environmental information for investment allocation investment deci-

sions given different investment horizons as well as different education and experience levels of investors.

3. The Methodology of the Study

In this section we present the methodology adopted in this study. The methodology is that of an experimental design: as in most experiments this means that some of the experimental subjects were influenced in some way while other subjects were not. How this design is reflected in our study is described below. In the first subsection, the basic experimental manipulation is introduced. The second subsection presents the content of the applied research instrument, and in the third subsection the processes of subject selection and randomization are disclosed in more detail. In the last subsection, the hypotheses development and operational measurements are described.

3.1 The Basic Experimental Manipulation

Designing an experiment is based on choices which can impact both measurement and interpretability. The first choice is that the participant necessarily must be unaware of the “manipulation”, i.e., the fact that the information content of the assigned cases is not identical. Therefore, a between-subjects design (see e.g. Field & Hole 2002 for a definition) was chosen, so as that even the possibility of learning effects resulting from task repetition was eliminated. The method was chosen even though a

somewhat common misconception about experimentation is that people are manipulated. This however has nothing to do with the nature of experiments. Kerlinger (1979, 84) states: "Manipulation in experiments simply and always means doing different things to different groups; the manipulation reflects one or more independent variables". The research instrument was designed in two versions (see below), thus allowing two levels of the independent variable representing environmental information.

The second choice was to include a within-subjects (Field & Hole 2002) variable in order to be able to measure potential decision differences related to short term vs. long term investment horizons. Finally, a choice was made to examine potential differences between levels of experience in relation to investment decisions. In this paper, we report on differences dividing the subjects into two main categories, i.e., into relatively inexperienced "novices" vs. experienced investment decision makers termed "investors". This allows us to measure differences in the information processing on the basis of experience with investment allocation decision making.

3.2 The Research Instrument

The research instrument was constructed so as to provide a reasonably realistic basis for an investment allocation decision. The instrument was divided into two parts:

Part A: A several pages long description of two companies between which a predetermined sum of money had to be divided (i.e., the investment allocation decision).

Part B: A questionnaire with three elements

- 1) Background information on the participating subjects
- 2) The investment allocation decision – both long term and short term
- 3) Debriefing questions on the relative importance of different parts of the information provided, questions on the use of financial and non-financial information for decision making in general and validation questions on the sufficiency of the information provided for the actual investment allocation decision.

Part A was developed based on information provided by two actual companies in their quarterly reports. The identity of the companies was disguised so as to prevent any prior knowledge of the companies impacting the final investment allocation decisions. The disguise consisted of both changing financial data and company background. The financial data were changed into other levels while still maintaining the original relationships. The industry and the company background were also changed in order to hinder such prior knowledge effects. No effort was made to calibrate the information to make the companies equally desirable. The control group

in the experiment (see later) was intended to provide information on such potential differences in the relative desirability of the two companies.

The information content of the descriptions was similar for each of the two companies to be assessed for the investment allocation decision, namely:

1. Summary information traditionally found at the beginning of most company quarterly reports
2. Main financial figures and ratios year to date for the first three quarters of the year (i.e., a nine month overview)
3. Discussion of accounting aspects
4. Revenue developments in the period
5. Investment descriptions and information for the reporting year
6. Environmental issues such as environmental management systems and environmental performance (if included – see table 1)
7. Currency developments and risks
8. Expectations for the future
9. Five year comparison of main financial figures and ratios.

In part B there were several questions aimed at capturing background variables such as age, gender, education and experience. Also included were questions (a five point Likert scale) regarding the overall value placed by the respondent on different supplementary information types

regarding investment decisions, both short and long term. The supplementary information asked about was related to social reports, environmental reports, intellectual capital reports, ethical statements, Health & Safety reports and value reports. Part B also included several questions aimed at assessing the sufficiency of the information material for the investment decision.

Based on the set of financial and non-financial information, the manipulations in the experimental design were set up as described in table 1. The motivation for the design was that unless actual decision making was observed, the potential usefulness of environmental information (or lack thereof) should not be taken for granted. Thus each subject had to make an investment allocation decision by assigning an amount to company Alpha and to another company named either Beta (no environmental information) or Gamma (with environmental information). The manipulation of information content was provided by cues adding both qualitative and quantitative information on environmental issues as the difference between Beta and Gamma. All other information in Beta and Gamma was the same. It should be noted that the environmental information was presented and calibrated to show an overall positive environmental performance over a 5 year period. As such it included information that is traditionally disclosed by companies (Rikhardsson et al. 2002) regarding their environmental management systems, commitment to the environment and performance indicators such as energy efficiency, waste generation

and compliance status. The conscious choice for the direction of the information was made in order to examine the possible value of environmental information in a context free of negative connotations. The argument was that a negative direction (bad news scenario) could have created possible demand effects in the case material. The direction of the information was validated by 5 external persons with expertise in environmental reporting, i.e., confirming the direction as being primarily positive.

>Insert Table 1: Manipulation in the Research Design. <

The research instrument was designed and tested in several stages to minimize participation fatigue due to the time needed to complete the questionnaire and to secure the best possible level of realism of the investment allocation decision. Before administering the final version of the research instrument, a pilot test was run on a group of potential subjects to validate the design.

3.3 Subject Selection and Randomization

A process of *random assignment* of case versions was initiated to avoid systematic errors and secure replicability. In effect, one of the great strengths of experiments is that randomization can be used. Kerlinger (1979, p. 92) even argues that "it is the only defensible method invented to increase the probability of the validity of experiments and the inferences made from

them by increasing the probability of “equality” of experimental groups in all possible independent variables”.

In choosing the subjects for this experiment, the experience level was to a certain degree used as a selection criterion. One of the requirements of the case material was that the participants had to possess prior knowledge of interpreting financial and non-financial business reports. Hence, two groups of subjects were approached. The group of subjects termed “*novices*” was graduate business students. Generally they are characterized by having an understanding of corporate communication requirements and the availability of financial as well as non-financial information for investor decision making but no practical experience (Belkaoui 1980). The instrument was administered at the end of a joint course in advanced financial accounting for finance graduates and management accounting graduates. Students are not relevant subjects (surrogates) for all empirical research areas, but for certain tasks involving information processing and decision making, college students make decisions that approximate those made by the rest of the general population (see Ashton and Kramer 1980). Using students to study behaviour in experiments is widespread in business studies (Gordon et al. 1986; Kagel & Levin 2001; Gillette et al 2003; Dilla & Steinbart 2005). Here we used graduate business students as a benchmark (termed novices) in order to ferret out potential differences in different types of investors (i.e., investor groups). The other group of subjects termed “*investors*”, was subjects characterized by having personal

experience with investment allocation decisions especially in the form of self-managed pension portfolios or in professional business contexts. The instrument for this group was administered at an investor meeting under the same type of conditions as for the other group. The investor group was more heterogeneous in terms of educational background and in level of theoretical insight related to financial and non-financial business reports.

Hence, the hypotheses development (described below) reflects a research design which is a 2*2*2 experimental design with two levels of environmental information, two different investment horizons and two different investor groups. This is summarized in table 2.

>Insert Table 2: Overview of the Experimental Design for Investment Allocation Decisions. <

3.4 Hypotheses Development and Operational Measurements

The research design allows the joint consideration of three sets of hypotheses, which are formalized in this section. The hypotheses may all be considered in relation to a single operational measure. As explained above the first company is the same in all investment allocation decisions, while the information is varied in relation to the second company (i.e., Beta or Gamma). Hence, the operational measurement of the investment allocation decision is best captured by looking at the proportion of the amount invested in the second company as compared to the total amount in-

vested. The investment allocation decision is set up such that DKK 50,000 has to be divided between two companies. If DKK 20,000 is assigned to Alpha (company C_1) and DKK 30,000 is assigned to Beta (company C_{21}), the ratio will be 3 to 5 or 0.6. Accordingly, the operational measure will be a ratio which is comparable and allows us to test the hypotheses presented below.

The Investment Horizon Hypothesis

The first set of hypotheses reflects the consideration of possible differences in information use for short term and long term investment allocation decisions. Based on prior findings, there is no reason to expect that the information basis for short term investment allocation decisions should be the same as the information basis for long term decisions. In the present context a one year horizon was chosen as a relevant separation between short term and long term. The subjects were asked to allocate the amount under two different investment strategies and register their decisions separately. The first investment decision was defined as short term with time spans up to 1 year while the other was defined as a long term investment decision with time spans from 1 to 5 years.

The short term decision was intended to measure behaviour given more speculative profit motives while the other was intended to measure behaviour given long term share ownership. While different investor types arguably have different timeframes (private vs. professional investors,

day traders vs. venture capital investors etc.), the distinction between short term and long term was chosen to reflect the periodical manner in which environmental information is typically provided.

Reduction of the uncertainty about the future earning power of a company may be based on a mix of the different informational items assessed by the investor. For the present investment allocation decision, the subjects might decide to rely on different factors depending on the investment horizon, and hence there would be no expectation of the direction of difference in the ratio for short term vs. long investments in the second company:

$$\frac{I_{C_{2i}}^{S,j}}{I_{C_1}^{S,j} + I_{C_{2i}}^{S,j}} = \frac{I_{C_{2i}}^{L,j}}{I_{C_1}^{L,j} + I_{C_{2i}}^{L,j}}$$

The null hypothesis is stated as the following.

H1: There is no difference between the relative amounts allocated to the second company (C_{2i} , where $i=1$ is Beta and $i=2$ is Gamma) when comparing the long term (L) and short term (S) investment allocation decisions.

An examination of the H1 hypothesis will provide insight into the value of the information processing of the investment allocation decision makers.

Further, it is possible to subdivide the hypothesis to examine whether environmental information will amplify or mitigate any directional effects caused by the investment horizon. Parallel to the reported findings by Milne & Chan (1999), companies that disclose environmental information may be rewarded, at least when it comes to long term investments.

The Experience Hypothesis

The second set of hypotheses considers possible differences in information processing among different categories of investors. The benefit of making different types of information available may reflect that not all information is used (to the same extent) by all investment allocation decision makers. Hence, such differences are proxied by isolating two seemingly homogenous groups and comparing their investment allocation decisions. The absence of value of environmental information for making such decisions has been argued (i.e., the mixed findings presented in section 2). If such an argument holds across different types of information processors, the argument becomes stronger. If, on the other hand, differences are found, then an argument could be made for the potential value of the information. Such an argument could be extended to include possible changes in information usefulness over time (i.e., differences in information processing for different investor groups).

$$\frac{I_{C_{2i}}^{t,N}}{I_{C_1}^{t,N} + I_{C_{2i}}^{t,N}} = \frac{I_{C_{2i}}^{t,E}}{I_{C_1}^{t,E} + I_{C_{2i}}^{t,E}}$$

The hypothesis is set up as the following null hypothesis.

H2: There is no difference between the relative amounts allocated to the second company (C_{2i} , where $i=1$ is Beta and $i=2$ is Gamma) when comparing novice (N) and experienced (E) investment allocation decision makers.

An examination of the H2 hypothesis will provide insight into the value of the information processing of the investment allocation decision makers. Further, it is possible to subdivide the hypothesis to examine whether environmental information will amplify or mitigate any directional effects caused by the experience level of the investors.

The Environmental Information Hypothesis

If the information related to the environment is regarded as positive information which provides added value, then our expectation is that the investor will assign a relatively larger portion of the investment amount to the company when more environmental information is available. If we expect the environment information to be of no importance, the investment allocation decisions will be the same in the two different situations:

$$\frac{I_{C_{21}}^{t,j}}{I_{C_1}^{t,j} + I_{C_{21}}^{t,j}} = \frac{I_{C_{22}}^{t,j}}{I_{C_1}^{t,j} + I_{C_{22}}^{t,j}}$$

Hence, the null hypothesis for the investment allocation decision is:

H3: For the investment allocation decision there is no difference between the relative amounts allocated to the second company (where C_{21} is Beta and C_{22} is Gamma) reflecting the content of environmental information.

The operational measure for the information content variable is the relative amount invested in company two (the case manipulation). Hence, a positive relation would be measured as a directional effect of the environmental information. The ratio of the amount invested in the second company in relation to the total investment would be higher for Gamma (C_{22}) than for Beta (C_{21}):

$$\frac{I_{C_{21}}^{t,j}}{I_{C_1}^{t,j} + I_{C_{21}}^{t,j}} < \frac{I_{C_{22}}^{t,j}}{I_{C_1}^{t,j} + I_{C_{22}}^{t,j}}$$

When both investment horizon ($t = S$ or L) and experience level ($j = N, E$ or all subjects) are introduced as possible explanatory factors this hypothesis could be subdivided into 6 separate hypotheses.

In the next section we present the findings regarding the testing of the hypotheses H1 to H3 as well as additional findings where the use and relative importance of information for investment purposes are examined.

4. Results

This section is divided into four subsections. First we present the subject group compositions and provide descriptive statistics for the investment allocation decisions. In the second subsection findings related to the three hypotheses are presented using General Linear Modelling (GLM) analyses on averaged decisions. In the third subsection we examine the individual investment allocation decisions using univariate analyses and present findings based on the subjects' self-assessed use of information. Finally, the last subsection examines the subjects' assessment of the sufficiency of the provided information in relation to the investment allocation decisions, thus providing information in regard to a validation of the decision scenario provided in the case descriptions.

4.1 Subject Group Compositions and Descriptive Statistics

In total 98 participants completed the questionnaire with their investment allocation decisions and answers to questions regarding their use of information. The composition of the subjects is presented in table 3. The cross table indicates that the novice subjects for obvious reasons are younger on average than the experienced investors.

>Insert Table 3: Crosstabulation of Subjects Based on Age and Experience Group<

Table 4 provides the descriptive statistics for the relative amount invested in the second company across investment horizon, experience groups and case manipulations (companies). Hence, the 98 subjects, which made both a long term and a short term investment decision, may be subdivided into 35 investors and 63 novices, and into 50 subjects considering Beta as the second company (without environmental information) and 48 subjects considering Gamma as the second company (with environmental information).

>Insert Table 4: Descriptive Statistics for the Ratio Allocated to the Second Company Across Investment Horizons, Experience Groups and Case Manipulations (Companies).<

Initially, it could be noted that the subjects consistently prefer to invest a larger amount in Alpha than the second company (Beta or Gamma respectively). This is not of further concern because the levels are not interesting in themselves. We are looking at differences in relative amounts invested in the second company – i.e., the difference between Beta and Gamma.

According to the descriptive statistics in table 4, the direction of the independent variable is confirmed across all cells. A larger relative amount is consistently allocated to the second company when this is Gamma (including environmental information) than when this is Beta (without environmental information). This is an initial validation of the positive direction of the new information provided in the Gamma case. Overall 32.5% is invested in Beta vs. 37.8% in Gamma in the long term. In the short term, an increase from 43.2% to 52.3% may be noted when comparing Beta and Gamma. The direction of the differences also holds for each of the subject groups identified in the study; however, as visually demonstrated in figures 3 and 4, the relationships are not uniform.

>Insert Figure 2: Means for Ratio Invested in Company Without (Beta) and With (Gamma) Environmental Information by Investors in Short Term and Long Term.<

>Insert Figure 3: Means for Ratio Invested in Company Without (Beta) and With (Gamma) Environmental Information by Novices in Short Term and Long Term.<

Figure 2 indicates that the experienced investors are more affected by the environmental information for the short term decision than for the long term decision. In comparison it should be noted that the parallel lines in figure 3 indicate that the novices are almost equally affected by the envi-

ronmental information for the two decisions, however at different levels. Hence, these initial observations suggest that some interaction effects might play a role in explaining the potential role of the environmental information provided to the subjects. In the next subsection we provide an examination of the potential main and interaction effects suggested by these observations.

4.2 GLM Analyses on Averaged Decisions

The investment allocation decision measures were analyzed in a 2*2*2 analysis of variance (ANOVA) with investment horizon (ratio second long term vs. ratio second short term) as a within-subject factor and company (Beta without environmental information vs. Gamma with environmental information) and experience group (investor vs. novice) as between subjects factors. The GLM procedure available in SPSS was applied because of its flexibility in terms of model design and the availability of test options. The general limitation of the GLM procedure in terms of testing for simple effects (univariate analysis) is addressed in the next subsection.

In order to compute a within-subjects effect, the applied GLM procedure transformed the within-subject variable into an averaged variable. The repeated measure in this instance is the individual subject's long and short term ratio decisions respectively. This allows for a transformation of the original variables into single degree of freedom tests of the null hypothesis. Because GLM does not have to average multiple single degree of

freedom tests to get an overall test of the effect, the assumptions about the correlations between the transformed variables being zero and the variances of the transformed variables being equal are not pertinent. Because there is only one degree of freedom for these effects, only the linear effect contrast is shown in table 5.

>Insert Table 5: Tests of Within-Subjects Contrasts (Long Term Vs. Short Term Decision).<

>Insert Table 6: Tests of Between-Subjects Effects (Experience Group and Case Manipulation).<

The ANOVA yielded a significant main effect for the investment horizon measure, $F(1, 94) = 9.197, p < .005$, and no significant interaction between the time horizon and the case and experience group variables, see table 5. The implication of rejecting **H1** is that the subjects make different decisions depending on the investment horizon. The absence of interaction effects of the within-subjects measure indicates that this is a consistent finding across experience groups and across case manipulations. Accordingly, it is appropriate to interpret any significant main effects in the between-subjects design, see table 6.

It should be noted that the univariate tests of the between-subjects effects are made on the transformed within-subjects variable called "average". The ANOVA yielded a significant main effect for the experience group with $F(1, 94) = 5.5, p = 0.021$, thus rejecting **H2**. The ANOVA also yielded a seemingly marginal main effect for the case manipulation (**H3**) with $F(1,94) = 3.8, p = 0.056$. However, the latter effect should be considered to be stronger in light of the confirmed directional effect of the environmental information (the consistent, positive difference in the ratio measures, which suggests an added investment in Gamma as compared to Beta, see table 4 for descriptive statistics). Hence, the significance level of the one-sided test is actually half of the reported two-sided level, namely $p = 0.028$. The implications are that both between-subjects variables should be considered when trying to explain decision making behaviour. In relation to the averaged measure for the individual subject's investment behaviour, the two between-subjects variables do not interact (i.e., the reported F-value for this interaction is 0.047, see table 6).

Using the GLM analyses on the averaged measures, all three null hypotheses are rejected. The implications are that the second company is favoured more: for the short investment horizon, by the experienced investors and when environmental information is presented by the company. The findings further suggest that the results are not carried by interaction effects. Hence, the measured influence of environmental infor-

mation is not exclusively tied to one of the experience groups and/or one of the investment horizons.

In the next subsection, the separate allocation decisions are examined through univariate analyses. This changes the focus of the analysis from the decision behaviour to the individual decisions of the subjects. Hence the separate investment allocation decision becomes the unit of analysis.

4.3 Univariate Analyses of Separate Investment Decisions

This section is subdivided in accordance with the two investment allocation decisions made by each of the participants in the experiment. First we examine the short term investment allocation decisions and the information use related to these. Second we repeat the analysis in relation to the long term decisions.

Short Term Investment Allocation Decisions

In this section we report on the findings of the univariate tests of the between-subjects effects when tested on the dependent variable for the short term decision (ratio second short). Initially it should be noted that the second company is favoured more in the short term (overall average of 47.7%) than in the long term (overall average of 35.1%), see table 4 for descriptives. The average amount assigned to Beta in the short term

is 43.2%, while the amount assigned to Gamma is more than half the allocated amount, namely 52.3%.

In contrast to the averaged variable examined in the previous section, the ANOVA presented in table 7 did not yield a significant main effect for the experience group variable with $F(1, 94) = 1.1$, $p = 0.290$, hence suggesting similar decision making by the two groups in the short term. The importance of environmental information is confirmed by the marginal main effect for the case manipulation with $F(1, 94)$, $p = 0.080$, which is significant at the 5% level ($p = 0.040$) when interpreted as a one-sided directional test as suggested in the previous section. When comparing the two experience groups graphically (see figure 4), the investors seem to react more to the environmental information provided in the Gamma case, but as already stated the difference between the experience groups is not significant.

>Insert Table 7: ANOVA with Short Term Decision Measured by Ratio Second Short as Dependent Variable.<

>Insert Figure 4: Means for Short Term Ratio Invested in Company Without (Beta) and With (Gamma) Environmental Information by Experience Group.<

The subjects were also prompted for an assessment of the relative importance of various sources of information for the short term decisions. Hence, the subjects were asked to value the information contained in the headlines of the company descriptions. Table 8 provides descriptive statistics for each of the information categories, valued on a five point Likert-scale with 1 as not important and 5 as very important.

>Insert Table 8: Importance of Information Sources for Short Term Decisions by Experience Group.<

As can be seen in table 8, the information sources most highly valued for the short term decision are the nine month overview, revenue and income information together with management expectations. Independent samples t-tests on the differences between investors and novices suggest a high level of agreement, i.e., non-significant differences on 6 of 9 information sources, see table 8, last column. It is noticeable that the largest (significant) differences include information on employees, management expectations and environmental information. For the three information sources, the investors place higher value on these in terms of importance than the novices. In relation to the importance of the environmental information this is especially interesting because this self-assessed importance does not translate to a difference between the experience groups in relation to the actual short term investment allocation decision, see above.

Long Term Investment Allocation Decisions

In this section we report on the findings of the univariate tests of the between-subjects effects when tested on the dependent variable for the long term decision (ratio second long). The ANOVA presented in table 9 yield a significant main effect for the experience group variable with $F(1, 94) = 6.4$, $p = 0.013$. This is in accordance with the finding for the averaged variable, hence suggesting that the difference in decision making by the two groups is related to the long term decision (in contrast to the absence of this phenomenon in the short term).

>Insert Table 9. ANOVA With Long Term Decision Measured by Ratio Second Long as Dependent Variable.<

>Insert Figure 5: Means for Long Term Ratio Invested in Company Without (Beta) and With (Gamma) Environmental Information by Experience Group.<

The importance of environmental information is not confirmed by the ANOVA presented in table 9. Actually, the main effect of the case manipulation is $F(1, 94) = 1.1$, $p = 0.305$ (0.153 as one-sided directional test). The interaction effect of case and experience group is not significant either. When examining the two experience groups separately, it is clear that the novices react more to the environmental information in the long term than the investors. The differences are demonstrated graphically in figure 5. Although not reported in separate tables it can be noted that the

significance levels obtained from directional tests on the two separate groups are $p = 0.06$ for novices and $p = 0.423$ for investors, hence illustrating the non-significant, but still somewhat larger importance assigned to the environmental information in the long term by the novices.

The subjects were also prompted for an assessment of the relative importance of various sources of information regarding long term investments, see table 10.

>Insert Table 10: Importance of Information Sources for Long Term Decisions by Experience Group. <

As can be seen in table 10, the information most highly valued for the long term decision is the information on income, on investment level, the five year comparative figures and on information on management expectations for future periods. The findings from the independent samples t-tests suggest that only one information source is considered significantly different in importance at the 1% level, namely the information on investment level, which is assigned a higher value by the novices in relation to the long term decision, see table 10, last column. It is noticeable that the direction of the differences suggests that the investors value most of the information sources more than the novices (except information on investment and management expectations). In relation to the self-assessed importance on environmental information, both experience groups assess

this information as neutral (means around 3 for both groups) and this indication is consistent with the absence of informational impact on the actual long term decisions as reported above.

4.4 Validation of the Research Instrument

The subjects were also asked whether the information provided in the company descriptions was sufficient. The sufficiency was measured on a five point Likert scale with 1 as completely insufficient and 5 as completely sufficient. According to the findings provided in table 11, both investors and novices indicate that the amount of information on the different issues was sufficient (above 3 for most types).

> Insert Table 11: Means for Importance and Sufficiency of Information Sources for Investment Allocation Decisions. <

Table 11 is broken up in accordance with the case manipulations. It is highly noticeable that the information provided in the company descriptions is assessed differently when comparing the Alpha-Beta investment allocation decision with the Alpha-Gamma decision. The assessment of sufficiency is higher for investors and novices when provided with the Alpha-Gamma material where more environmental information is available. In total, these findings provide a validation on the research instrument regarding the information content of the company descriptions provided as a basis for the investment allocation decisions.

5. Discussion and Conclusions

The findings presented in the previous section suggest that environmental information has the potential to influence investment allocation decisions.

The motivation for the experimental design applied in this study is that unless actual decision making is observed instead of indirect measures, e.g. eliciting opinions of self-assessed decision usefulness, the potential usefulness of environmental information (or lack thereof) should not be taken for granted. Whether environmental information in itself creates value or is indicative of cost consumption by the company, is a contextual question. The findings in the study suggest that the interpretation is also dependent on the eye of the beholder – here the investor.

The 2*2*2 experimental design was tested using GLM analyses on the averaged measures, hence testing H1 to H3 at the subject level. All three null hypotheses were rejected. The implications in relation to the particular investment allocation decision are that the second company was favoured more: for the short investment horizon, by the experienced investors and when environmental information was presented by the company. The findings further suggest that the results are not carried by interaction effects. Hence, the measured influence of environmental information is not exclusively tied to one of the experience groups and/or one of the investment horizons.

When the unit of analysis was shifted from the subject to the individual decision, the finding on influence from environmental information is consistent across experience groups for the short term investment allocation decision. Both groups seem to react to the environmental information offered in the scenario; the experienced investors a bit – but not significantly – more. This is indicated by the absence of an interaction effect between the two between-subjects variables examined in the study.

When the unit of analysis was shifted to the long term decision, the influence from environmental information decreased to a non-significant level. This result seems to be partly carried by a less reaction to the environmental information from the experienced investors. Hence one interpretation is that the investors are displaying other decision behaviour in the long term than the novices. This is in line with the observed significant difference between investment allocation levels for the long term. Another interpretation could be that experienced investors have a different (shorter) investment horizon than the novices. This may provide an explanation for the contrast between our findings and prior research which indicates that companies that disclose environmental information may be rewarded, at least when it comes to long term investments. The latter is only in accordance with our findings for novice investors.

The influence of supplementary and environmental information has been examined by previous capital market and experimental studies with mixed results. It is important to interpret the contributions of this study in that context. The difference in findings related to the individual decision makers (averaged decisions) and the findings related to the separate decisions as units of analysis could suggest that mitigating factors are present in this study too.

Mitigating factors considered explicit in the design of this study include the direction and type of environmental information, i.e., primarily positive environmental information presented in both qualitative and quantitative form in the case material. Another factor relates to the relative importance of a particular information item in light of the competition for the attention of the decision makers. The applied experimental design aims to eliminate (or at least reduce) a potential demand effect related to the particular nature of environmental information, i.e., by placing the investment allocation decision in a context of different types of decision relevant financial information items. The findings presented in this study suggest that the influence of environmental information on investment allocation decisions is also mitigated by the variables considered explicitly in this study, i.e., the investment horizon (varied as short and long) and investor experience (varied as novice and experienced investor).

The limitations of this study are closely related to the experimental method. The strength is also the weakness. Setting up the case material introduces complexity while only a few factors can be examined simultaneously. The direction of environmental evidence can be negative, positive or mixed. Hence, absence of reaction to environmental information can be explained by lack of relative importance as compared to other informational items of financial and non-financial nature. A reaction to environmental information can be either positive (e.g. risk reduction consequence) or negative (e.g. cost signal) in relation to the specific economic problem of the decision maker. The obvious conclusion is that because allocation decisions are multifaceted problems, mixed results related to the influence of environmental information should be expected.

The importance of distinguishing between different investment horizons and between different levels of experience suggests new venues for further examination of the value of environmental information. Further studies could be aimed at the potential influence of environmental information on investment allocation decisions in the contexts of investment styles, investor types, information processing capabilities, decision aids and experience levels. Further studies could also benefit from examining differences between private and professional investors, i.e., identifying important messages on both the potential applicability and appliance of reported environmental information for investment allocation decision making purposes.

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Figures and Tables

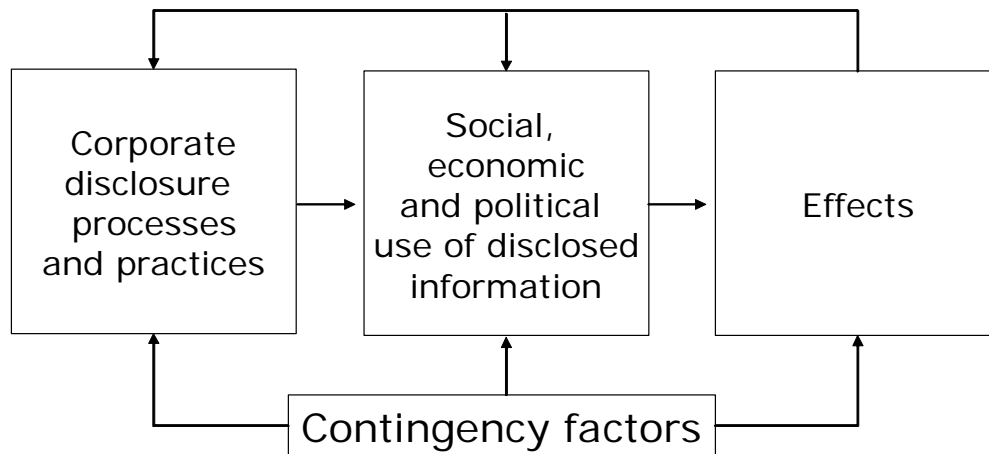


Figure 1: Disclosing Decision Relevant Information

Case versions	"Clean" – no environmental information	Environmental information
First company	Alpha (C ₁)	Alpha (C ₁)
Second company	Beta (C ₂₁)	Gamma (C ₂₂)
Variable manipulation	Control group/benchmark	The difference between Beta and Gamma is explained by three cues: 1) a recent ISO certification is mentioned in the company introduction, 2) elaboration on environmental condition as part of statement on company affairs and 3) a table with quantitative information on environmental issues

See appendix 1 for a description of the actual cues used in the experiment.

Table 1: Manipulations in the Research Design

	The environmental information variable Between subjects	
Allocation decisions	“Clean” no environmental information	Environmental information
Novices (Not- experienced) Within subjects (Long, Short)	$I_{C_1}^{L,N}$ vs. $I_{C_{21}}^{L,N}$	$I_{C_1}^{L,N}$ vs. $I_{C_{22}}^{L,N}$
	$I_{C_1}^{S,N}$ vs. $I_{C_{21}}^{S,N}$	$I_{C_1}^{S,N}$ vs. $I_{C_{22}}^{S,N}$
Investors (Experienced) Within subjects (Long, Short)	$I_{C_1}^{L,E}$ vs. $I_{C_{21}}^{L,E}$	$I_{C_1}^{L,E}$ vs. $I_{C_{22}}^{L,E}$
	$I_{C_1}^{S,E}$ vs. $I_{C_{21}}^{S,E}$	$I_{C_1}^{S,E}$ vs. $I_{C_{22}}^{S,E}$

Table 2: Overview of the Experimental Design for Investment Allocation Decisions

Age * Experience Group Crosstabulation

Count

		Experience group		Total
		Investor	Novice	
Age	below 26	1	46	47
	26-35	3	17	20
	36-45	7	0	7
	46-55	11	0	11
	56-65	7	0	7
	above 65	6	0	6
Total		35	63	98

Table 3: Crosstabulation of Subjects Based on Age and Experience Group

Descriptive Statistics

	Experience group	Company	Mean	Std. deviation	N
Ratio Second Long	Investor	Beta	.4270	.25226	20
		Gamma	.4467	.33989	15
		Total	.4354	.28849	35
	Novice	Beta	.2563	.18689	30
		Gamma	.3470	.25737	33
		Total	.3038	.22936	63
	Total	Beta	.3246	.22908	50
		Gamma	.3781	.28582	48
		Total	.3508	.25849	98
Ratio Second Short	Investor	Beta	.4400	.33935	20
		Gamma	.6067	.32616	15
		Total	.5114	.33935	35
	Novice	Beta	.4267	.24202	30
		Gamma	.4848	.30733	33
		Total	.4571	.27750	63
	Total	Beta	.4320	.28171	50
		Gamma	.5229	.31504	48
		Total	.4765	.30045	98

Table 4: Descriptive Statistics for the Ratio Allocated to the Second Company Across Investment Horizons, Experience Groups and Case Manipulations (Companies)

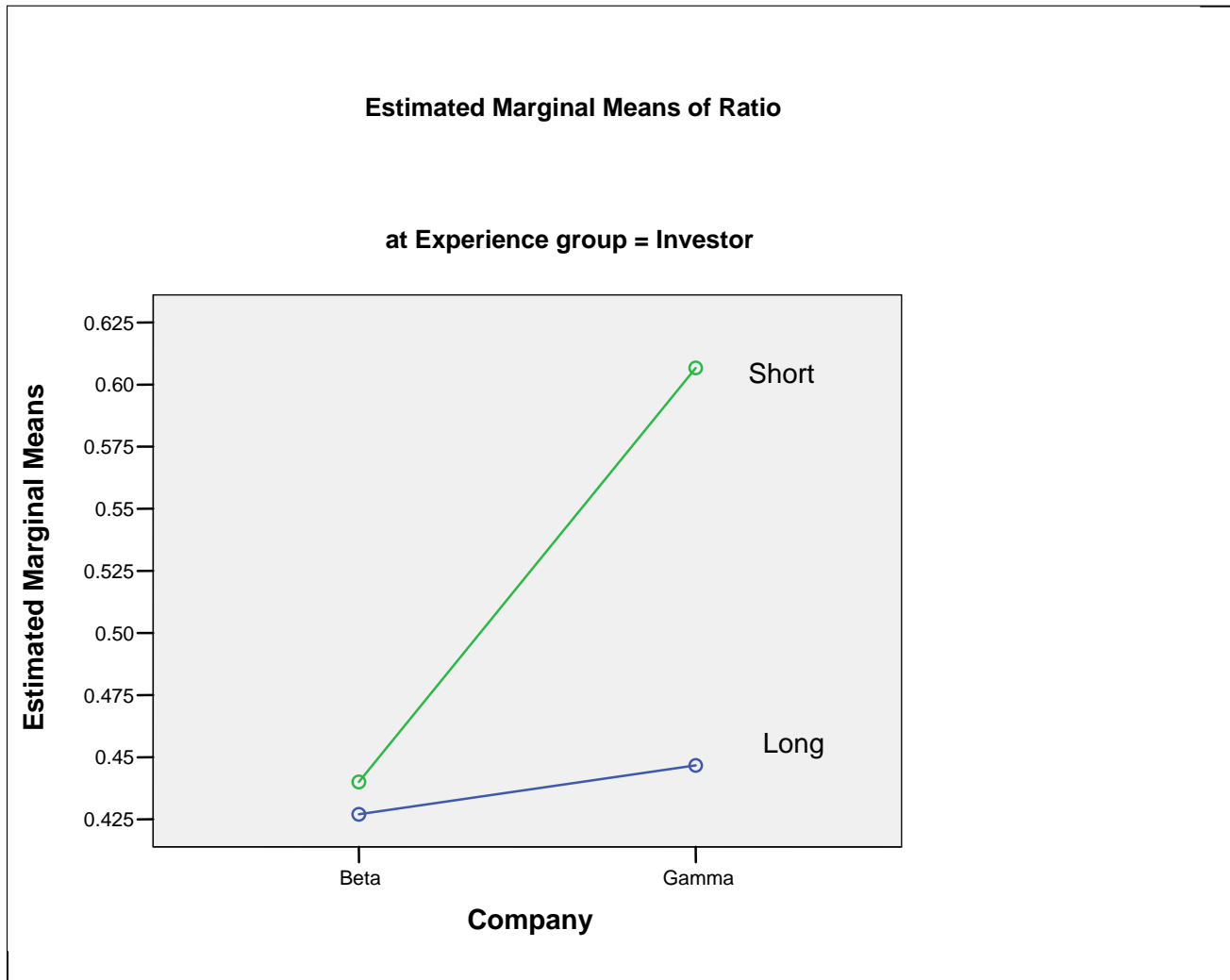


Figure 2: Means for Ratio Invested in Company Without (Beta) and With (Gamma) Environmental Information by Investors in Short Term and Long Term

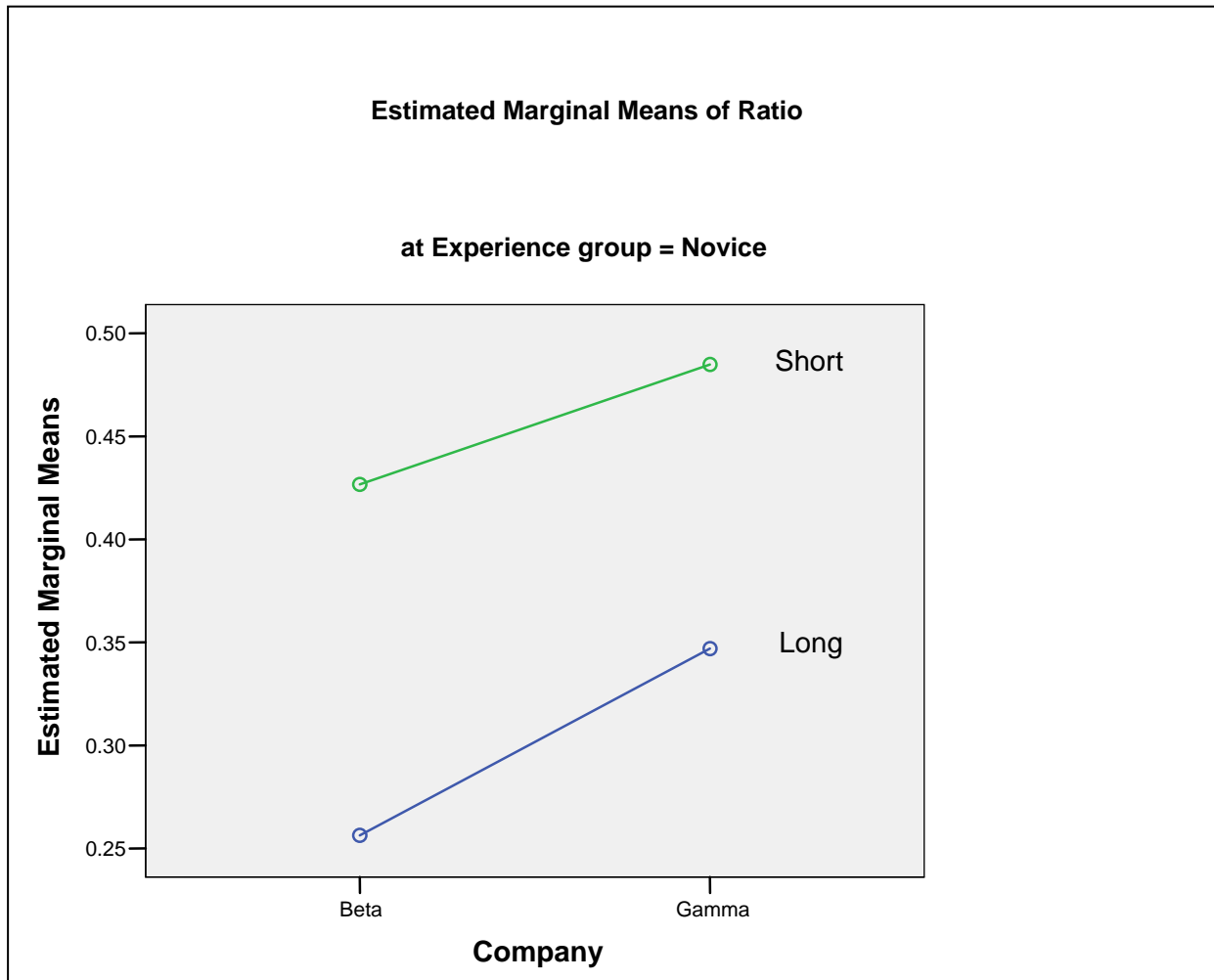


Figure 3: Means for Ratio Invested in Company Without (Beta) and With (Gamma) Environmental Information by Novices in Short Term and Long Term

Tests of Within-Subjects Contrasts

Measure: ratio

Source	Horizon	Type III sum of squares	df	Mean square	F	Sig.
Horizon	Linear	.642	1	.642	9.197	.003
Horizon * experience	Linear	.051	1	.051	.726	.396
Horizon * case	Linear	.036	1	.036	.521	.472
Horizon * experience * case	Linear	.089	1	.089	1.279	.261
Error(horizon)	Linear	6.564	94	.070		

Table 5: Tests of Within-Subjects Contrasts (Long Term Vs. Short Term Decision)

Tests of Between-Subjects Effects

Measure: ratio

Transformed variable: average

Source	Type III sum of squares	df	Mean Square	F	Sig.
Intercept	32.723	1	32.723	394.671	.000
Experience	.456	1	.456	5.500	.021
Case	.311	1	.311	3.757	.056
Experience * case	.004	1	.004	.047	.829
Error	7.794	94	.083		

Table 6: Tests of Between-Subjects Effects (Experience Group and Case Manipulation)

Tests of Between-Subjects Effects

Dependent variable: ratio second short

Source	Type III sum of squares	df	Mean square	F	Sig.
Corrected model	.358(a)	3	.119	1.334	.268
Intercept	21.267	1	21.267	238.031	.000
Case	.280	1	.280	3.138	.080
Experience	.101	1	.101	1.134	.290
Case * experience	.065	1	.065	.731	.395
Error	8.398	94	.089		
Total	31.010	98			
Corrected total	8.756	97			

a R squared = .041 (Adjusted R squared = .010)

Table 7: ANOVA with Short Term Decision Measured by Ratio Second Short as Dependent Variable

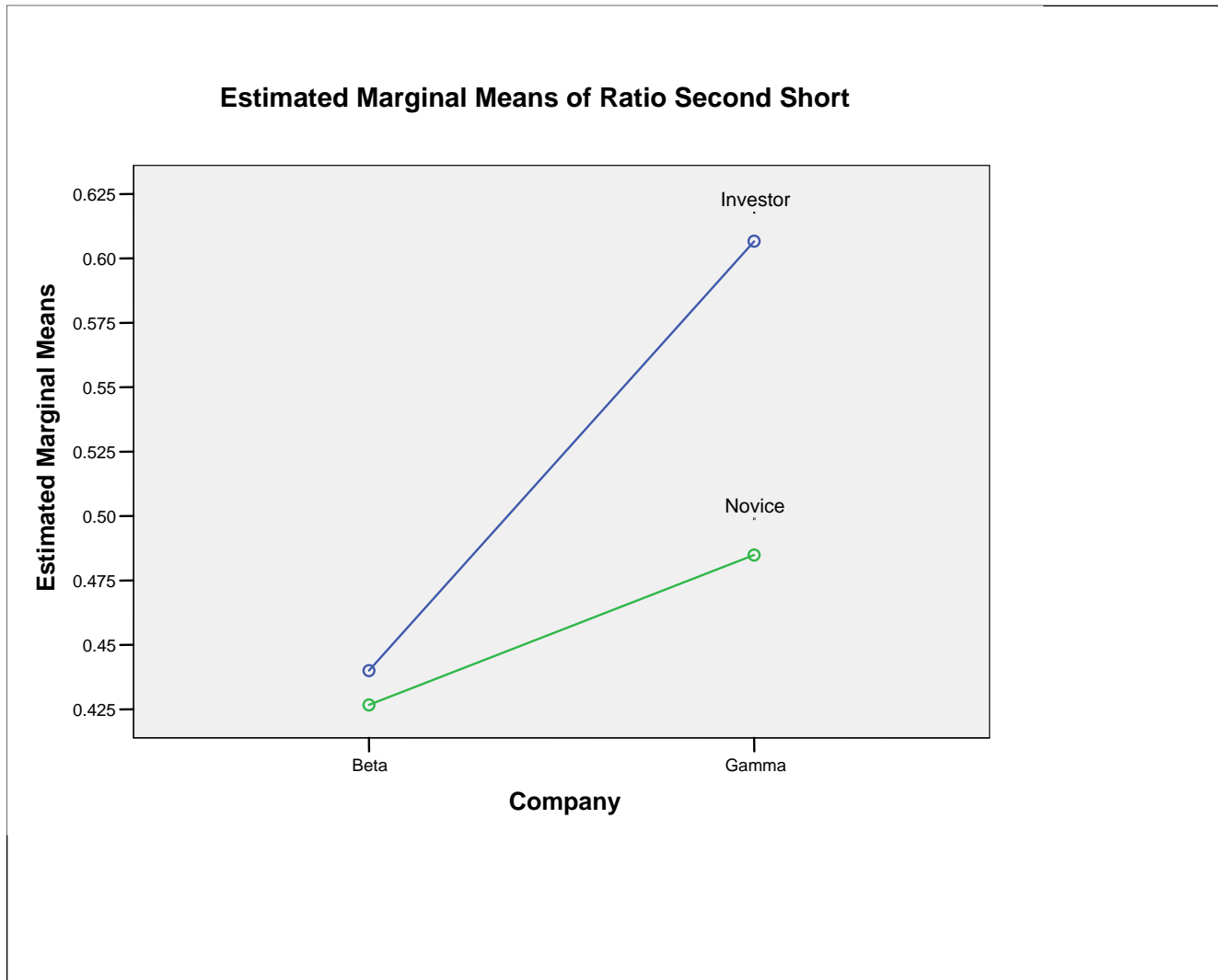


Figure 4: Means for Short Term Ratio Invested in Company without (Beta) and with (Gamma) Environmental Information by Experience Group

Group Statistics

	<i>Experience group</i>	<i>N</i>	<i>Mean</i>	<i>Std. deviation</i>	<i>Std. error mean</i>	<i>Sig. difference</i>
Info Short 9 months	Investor	34	4.118	1,066	0.183	-
	Novice	63	4.349	0.919	0.116	
Info Short Revenue	Investor	34	3.941	1.127	0.193	-
	Novice	63	3.905	0.911	0.115	
Info Short Income	Investor	34	4.559	0.991	0.170	-
	Novice	63	4.476	0.820	0.103	
Info Short Investment	Investor	34	3.324	1.224	0.210	-
	Novice	63	3.381	1.237	0.156	
Info Short Environment	Investor	34	2.824	1.242	0.213	+
	Novice	63	2.302	1.010	0.127	
Info Short Employees	Investor	34	2.971	1.267	0.217	++
	Novice	63	2.238	0.856	0.108	
Info Short Currency	Investor	34	3.118	1.225	0.210	-
	Novice	63	2.841	1.382	0.174	
Info Short Expectations	Investor	34	4.118	1.175	0.201	+
	Novice	63	3.444	1.305	0.164	
Info Short 5 years	Investor	34	3.588	1.328	0.228	-
	Novice	63	3.413	1.131	0.142	

+ Significance level 5%; ++ Significance level 1%.

Table 8: Importance of Information Sources for Short Term Decisions by Experience Group

Tests of Between-Subjects Effects

Dependent variable: ratio second long

Source	Type III sum of squares	df	Mean square	F	Sig.
Corrected Model	.522(a)	3	.174	2.746	.047
Intercept	12.099	1	12.099	190.853	.000
Case	.067	1	.067	1.064	.305
Experience	.405	1	.405	6.395	.013
Case * experience	.028	1	.028	.441	.508
Error	5.959	94	.063		
Total	18.542	98			
Corrected Total	6.481	97			

a R squared = .081 (Adjusted R squared = .051)

Table 9: ANOVA with Long Term Decision Measured by Ratio Second Long as Dependent Variable

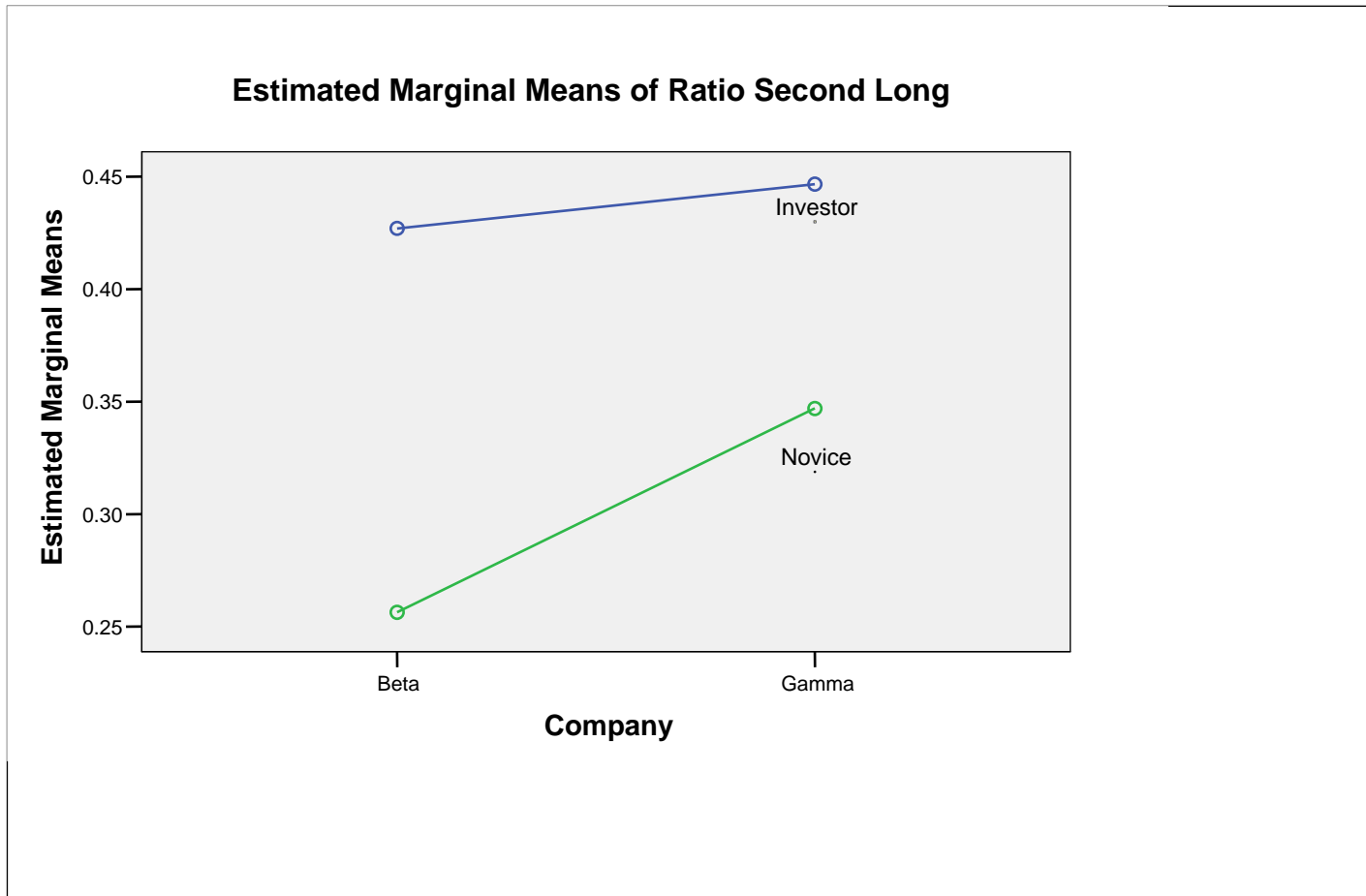


Figure 5: Means for Long Term Ratio Invested in Company Without (Beta) and With (Gamma) Environmental Information by Experience Group

Group Statistics

	<i>Experience group</i>	<i>N</i>	<i>Mean</i>	<i>Std. deviation</i>	<i>Std. error mean</i>	<i>Sig. difference</i>
Info Long 9 months	Investor	34	3.794	0.845	0.145	-
	Novice	63	3.762	0.893	0.112	
Info Long Revenue	Investor	34	3.853	1.132	0.194	-
	Novice	63	3.524	0.965	0.122	
Info Long Income	Investor	34	4.441	0.613	0.105	-
	Novice	63	4.190	0.840	0.106	
Info Long Investment	Investor	33	3.758	0.792	0.138	-
	Novice	63	4.365	0.885	0.112	
Info Long Environment	Investor	33	3.152	1.064	0.185	++
	Novice	63	2.873	1.143	0.144	
Info Long Employees	Investor	34	3.147	1.184	0.203	(+)
	Novice	63	2.683	1.090	0.137	
Info Long Currency	Investor	34	3.118	1.008	0.173	(+)
	Novice	63	2.746	1.031	0.130	
Info Long Expectations	Investor	34	4.206	1.038	0.178	-
	Novice	63	4.492	0.878	0.111	
Info Long 5 years	Investor	34	4.088	1.138	0.195	-
	Novice	63	4.143	1.060	0.134	

(+) Significance level 10%; ++ Significance level 1%.

Table 10: Importance of Information Sources for Long Term Decisions by Experience Group

Alpha-Beta	Investor			Novice		
	Importance long term	Importance short term	Sufficiency	Importance long term	Importance short term	Sufficiency
Info Long 9 months	3.91	3.95	3.52	3.87	4.40	3.70
Info Revenue	3.91	3.90	3.67	3.47	4.07	3.50
Info Income	4.55	4.38	3.52	4.17	4.50	3.47
Info Investment	3.76	3.24	3.10	4.40	3.20	2.83
Info Environment	3.33	2.86	2.90	2.77	2.40	2.97
Info Employees	3.45	3.24	3.05	2.60	2.30	3.00
Info Currency	3.18	3.14	3.10	2.60	2.70	2.93
Info Expectations	4.09	3.86	3.05	4.60	3.33	2.77
Info 5 years	4.18	3.71	3.62	4.10	3.40	3.53

Panel A: Importance and Sufficiency for the Alpha-Beta Allocation Decision

Alpha-Gamma	Investor			Novice		
	Importance long term	Importance short term	Sufficiency	Importance long term	Importance short term	Sufficiency
Info 9 months	3.87	4.47	3.53	3.67	4.30	3.45
Info Revenue	3.93	4.07	3.27	3.58	3.76	3.24
Info Income	4.40	4.80	3.60	4.21	4.45	3.09
Info Investment	3.87	3.60	3.47	4.33	3.55	3.00
Info Environment	2.93	2.87	3.27	2.97	2.21	3.30
Info Employees	2.87	2.80	3.27	2.76	2.18	3.03
Info Currency	3.13	3.20	3.07	2.88	2.97	2.88
Info Expectations	4.40	4.47	3.53	4.39	3.55	2.91
Info 5 years	4.07	3.47	3.60	4.18	3.42	3.21

Panel B: Importance and Sufficiency for the Alpha-Gamma Allocation Decision

Table 11: Means for Importance and Sufficiency of Information Sources for Investment Allocation Decisions

Appendix 1: Environmental Information Included in the Information Material

	Company 1	Company 2
Introduction	<p>Alpha: The production constantly works to minimize the environmental impact of the company and is also presently implementing environmental management in accordance with the ISO 14001 Standard.</p>	<p>Beta: The company mission is to supply high-quality plastic products at low prices and with a high degree of environmental consideration.</p> <p>Gamma: The company mission is to supply high-quality plastic products at low prices and with a high degree of environmental consideration. The development continues and the environmental management system of the group was certified in accordance with ISO 14001 at the start of 2003.</p>
Qualitative environmental information	<p>Alpha: No major investments related to environmental issues are foreseen for the immediate future.</p>	<p>Beta: The following environmental policy is pursued in order to minimize the environmental impact: "In order to ensure compliance with the laws and regulatory requirements, Company Beta has listed a number of target areas involving health and safety as well as the external environment."</p> <p>Gamma: For many years Gamma Ltd. has worked on reducing production-related environmental impact. We continuously focus on creating shareholder value, but when doing so, we also focus on complying with the company's environmental policy and the laws and regulations in force.</p> <p>Within the past five years we have invested in a smoke filtration system and implemented a number of health and safety improvements. We are proud to announce that our environmental management system was certified according to the ISO 14001 Standard last year. The implementation of the environmental management system has been an important initiative that has involved employees in all parts of the company. The environmental management system consists of an environmental policy, targets for our environmental initiatives and an audit system to ensure that the company lives up to its targets. Our target areas for the coming year are: reduction of airborne emissions, increased noise control and the carrying out of environmental audits in all production units.</p> <p>Gamma Ltd. encourages the active participation of all employees in the environmental work and also for the next period it will ensure that adequate resources are available for reaching the company's targets for the environmental area.</p>
Quantitative environmental information	<p>Alpha: No</p>	<p>Beta: No Gamma: Yes (see appendix 2)</p>

Appendix 2: Quantitative Environmental Information

Environmental impact	Target 2003/04	2002/03	2001/02	2000/01
Resource consumption				
Raw materials	131,300 ton	129,332 ton	134,234 ton	123,323 ton
Electricity	114,000 MWh	119,345 MWh	123,287 MWh	126,987 MWh
Heating oil	54,000 litres	53,878 litres	53,343 litres	52,345 litres
Emissions				
CO2 emission	92,200 ton	95,465 ton	98,629 ton	101,589 ton
Heavy metals	0.1 ton	1.2 ton	1.4 ton	1.8 ton
Reusable waste	12.0 ton	10.0 ton	9.0 ton	10.0 ton
Waste to landfill	1,200 ton	1,189 ton	1,467 ton	1,562 ton
Other				
Environmental costs (DKK)	21 million	18 million	14 million	7 million
Non-compliance incidents	0	0	1	2
Complaints from neighbours	0	1	2	3

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- R-2006-02 Claus Holm & Pall Rikhardsson: Experienced and Novice Investors: Does Environmental Information Influence on Investment Allocation Decisions?
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