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Which proportion of SR investments is enough?
A survey-based approach

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Abstract   This article examines the determinants of the optimal percentage that private investors seek to invest in a socially responsible (SR) way when forming their portfolio. By conducting a global online survey in English, German and French, we find indications that it is sufficient for the majority of investors to have a certain amount of their budget invested sustainably. Accordingly, the optimal proportion tends to be lower the higher the available investment volume is. In addition, the non-financial utility derived from SR investments appears to be independent of the form of financing the investor provides. Moreover, the results show that well-educated women and slightly younger persons seek to invest a higher percentage of their portfolio socially responsibly.

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1 Introduction

This paper addresses the question of the optimal proportion of socially responsible (SR) investments investors wish to hold in their portfolio. SR investments are not only chosen on the basis of financial considerations but also due to personal values and ethics. While several studies attempt to explain by socio-demographic characteristics why some investors care more about non-financial issues in their asset allocation decision (e.g., Rosen et al. 1991; Haigh 2008; Berry and Junkus 2013), to our knowledge, no study examines the determinants of the desired percentage to be invested socially responsibly. To this end, we conduct a global online survey in English, German and French among private investors. The results reveal that the majority of investors is satisfied, if a certain amount of capital is invested sustainably. Hence, the optimal proportion of SR investments is not only influenced by the available investment volume, but also linked to the perception of benefits that individuals derive from the socially responsible attribute.

In traditional finance, it is assumed that individuals make their investment decisions only on the basis of financial considerations such as return, risk and liquidity (e.g., Markowitz 1952; Tobin 1958; Sharpe 1964; Lintner 1965). During the last decades, a new investment behavior, known as sustainable, ethical or socially responsible investing (SRI), has emerged and increasingly attracts attention both in the practitioner and academic literature. In this article, the terms sustainable, ethical and socially responsible are used as synonyms. SRI is generally considered as the inclusion of personal values and other non-financial concerns—often structured into social, environmental, ethical and corporate governance issues—in the investment process. While ethical investing has ancient origins in Jewish, Christian, and Islamic traditions, the roots of the modern SRI development can be found in the political climate of the 1960s (Renneboog et al. 2008). A comprehensive overview of the existing literature on SRI is provided by von Wallis and Klein (2014).

Research in terms of individuals who adopt SRI—generally referred to as socially responsible (SR) investors or ethical investors—attempts to profile them by socio-demographic characteristics. The generally accepted view is that well-educated and less wealthy women or young adults are concerned about SR issues in the investment decision to a higher degree. Several studies such as Beal and Goyen (1998), Rosen et al. (1991), Tippet and Leung (2001), Beal et al. (2005), Schueth (2003), Haigh (2008), Nilsson (2008), Nilsson (2009), Junkus and Berry (2010), Cheah et al. (2011) and Pérez-Gladish et al. (2012) confirm this point of view. On the contrary, McLachlan and Gardner (2004) and Williams (2007) find little evidence that ethical investors differ in demographics compared to their conventional counterparts.

Since investment decisions are driven by individual attitudes, beliefs and preferences, it is not easy to explain investor behavior. It is generally assumed that individuals seek to optimize their welfare by choosing a portfolio which balances return and risk according to individual preferences (e.g., Friedman and Savage 1948; Sharpe 1964). However, the practice of SRI shows that a growing number of

investors not only takes financial considerations into account but also cares about non-financial impacts of their investments. While Nilsson (2008) and Brimble et al. (2013) conclude that financial performance and risk are the most influential factors in any investment choice for both conventional and SR investors, several studies indicate that investment decisions appear to be influenced by non-monetary or ethical objectives as well. In a controlled experimental setting, Pasewark and Riley (2010) find that investors appear to be sensitive equally to financial and to non-financial factors in the investment decision process. This implies that the investment decision is significantly driven by both the interaction between differences in financial performance and the investors' personal values. This finding is also supported by Pérez-Gladish et al. (2012) who show that ethical investors are financially aware even if they also seek non-financial benefits.

The psychological study by Mackenzie and Lewis (1999) reveals that SR investors pursue mixed motives and neither attempt to maximize their wealth nor their moral commitment. Webley et al. (2001) report that ethical investors have the need to invest their money in ways that are consistent with their personal values. This also implies that they are generally committed to their SR investments, even if they perform poorly or are ethically ineffective. However, the questionnaire survey of 1146 SR investors in the UK, conducted by Lewis and Mackenzie (2000a), reveals that these preferences are unrelated to the proportion which is invested socially responsibly. Thus, they suggest that there is no straightforward trade-off between a person's values and their desired expected financial return.

Furthermore, several studies show that many SR investors mix their portfolio with SR and conventional investments (Mackenzie and Lewis 1999; Lewis and Mackenzie 2000a; Webley et al. 2001; Lewis 2001). This result implies that it appears to be sufficient to invest a certain amount to achieve social or ethical objectives which are pursued by implementing SRI. While some literature examines the determinants for the probability of investing socially responsibly (e.g., Junkus and Berry 2010; Dorfleitner and Utz 2014) and for the amount that is invested socially responsibly (e.g., Nilsson 2008; Bauer and Smeets 2015), to date, no study exists which addresses the issue of the optimal percentage of SR investments in a portfolio. Beal et al. (2005) provide evidence that SR investors gain non-financial benefits from the social attribute of their investments. Similarly, Bollen (2007) comes to the conclusion that SR investors derive utility from owning securities of sustainably managed companies. Hence, the question arises whether SR investors would invest their whole portfolio in a socially responsible way due to the additional sustainable benefits, if appropriate investment possibilities existed. In this regard, another question that has not yet been addressed by the literature is whether the non-financial utility increases proportionally with the amount invested socially responsibly. In addition, it is of interest, whether investors perceive benefits from the socially responsible attribute irrespective of the form of financing through which they participate in the firm.

The core aim of this study is to examine the influential factors that determine the investors' desired optimal percentage of SR investments, which we synonymously also call the optimal SR level or proportion in this article. To this end, we conducted an online survey. Our results provide empirical evidence that the majority of

investors is satisfied regarding their non-financial or ethical ambitions if a certain amount of their budget is invested sustainably. Hence, the main determinant of the proportion invested socially responsibly is the individual perception regarding the benefits through SRI which is also related to, among other variables, the available investment volume. Therefore, individuals with higher investment volume seek to invest a lower optimal percentage in their portfolio ethically.

The remainder of this paper is structured as follows: The research questions of this study are developed in Sect. 2. Next, we describe the sample collection strategy and the questionnaire design. Section 4 contains the sample description and the preliminary data analysis. The empirical methodology and the results are presented in Sect. 5, which is followed by a conclusion in Sect. 6.

2 Research questions

This section develops hypotheses on the preferences and the behavior of investors in the context of SRI. The main purpose of this study is to determine the influential factors for the optimal proportion of SR investments. In this regard, a related issue is the non-financial utility that investors derive from SR investments. Another aspect concerns the investors' perception of the allocation of corporate social performance (CSP) to a firm's financial structure. While corporate social responsibility (CSR) is generally defined as corporate commitments and decisions relating to environmental, social, ethical and corporate governance considerations, CSP denotes the evaluation of a company in this field.

2.1 The non-financial utility and the optimal proportion

The classical portfolio theory incorporates the three investment objectives return, risk and liquidity (e.g., Markowitz 1952; Tobin 1958; Acharya and Pedersen 2005). However, several studies suggests that investment decisions appear to be not only determined by these financial considerations, but also by non-financial aims (e.g., Pasewark and Riley 2010; Pérez-Gladish et al. 2012). Lewis and Mackenzie (2000a) report that the preferences for ethical investments are price inelastic with respect to losses and elastic with respect to gains. By analyzing the dynamics of cash flows in SR mutual funds, Bollen (2007) finds evidence that cash flows into the funds are more sensitive to lagged positive returns than the cash flows into conventional funds. On the contrary, lagged negative returns have a weaker influence on cash outflows from SR funds compared to the conventional counterpart. Similar results are supported by Benson and Humphrey (2008), who show that SRI fund flows are less sensitive to financial returns than those of conventional funds.

While financial utility is obtained by high financial performance and low variation in returns, these results indicate that investors derive non-financial utility from investing socially responsibly. In order to measure the non-financial benefits, Bollen (2007) suggests a bi-attributive utility function in which both financial and non-financial utility can be obtained. This model predicts that investors are more likely to keep poorly performing SR mutual funds than conventional funds, as they

get non-financial benefits. In this context, the question arises whether non-financial utility increases linearly with the amount that is invested in a socially responsible way. As shown by Lewis and Mackenzie (2000a), most SR investors do not have their entire portfolio invested socially responsibly, but only to an average share of 31 %. Hence, we assume that investors consider their non-monetary ambitions to be satisfied if a certain amount is invested socially responsibly. This leads to the following hypothesis concerning the non-financial utility.

Hypothesis H1 A certain amount of capital invested socially responsibly is sufficient to achieve the non-monetary or ethical objectives that an investor pursues by adopting SRI.

The hypothesis implies that the non-financial or ethical ambitions are satisfied, if a definite sum of their available budget is invested sustainably. This indicates the existence of a saturation point of the non-financial utility that would lead to a lower optimal proportion of SR investments if the available investment volume was higher. If this is the case, the probability of doubling the amount that is invested in SR products, if the investment volume is doubled, would be higher the lower the investment volume is. The reason is, that the required amount that is desired to be invested sustainably has not been reached yet. Hence, investors who seek a higher optimal level, are more willing to double the amount invested socially responsibly under the assumption that their budget is double the amount. In addition, we check hypothesis H1 directly by asking the investors whether their non-financial or ethical ambitions are satisfied, if a certain amount of their budget is invested socially responsibly. We assume that a perception of saturation in terms of the non-monetary benefits influences the optimal proportion of SR investments negatively. Thus, under the assumption of the validity of hypothesis H1, the available investment volume and the perception of a saturation in terms of the non-financial utility are assumed to influence the optimal SR level negatively, while the willingness to double the sustainable invested amount has a positive impact.

2.2 Other influential factors on the optimal SR level

Additionally to hypothesis H1, we propose the following hypotheses regarding other possible determinants of the proportion of SR investments that investors seek, as this is the main purpose of this study:

Hypothesis H2a A positive perception with regard to risk and return of SR investments has a positive impact on the optimal SR level.

Hypothesis H2b The more important financial considerations are, the lower the optimal SR level is.

Hypothesis H2c Implementing non-monetary or ethical objectives by SRI affects the optimal SR level positively.

Hypotheses H2a and H2b refer to financial considerations. These hypotheses are motivated in several ways. As noted by Brimble et al. (2013), financial performance is the most influential factor in the investment decision-making process. The authors

analyze the actual factors that drive investment decisions by surveying 322 individuals regarding their investment attitudes and an asset allocation experiment. The results indicate that both ethical and conventional investors regard financial criteria as more important than SR issues. Similarly, McLachlan and Gardner (2004) find no significant differences between the two investor groups in terms of the importance of financial returns. Beyond that, Dorfleitner and Utz (2014) report a large interest in high financial returns among SR investors. In fact, some studies indicate that SR investors are not willing to waive a considerable amount of financial return in favor for non-financial benefits (Rosen et al. 1991; Sandberg and Nilsson 2011).

Nilsson (2008) concludes that the subjective perception of financial return and risk are the core decision-making determinants in any investment choice. This is also supported by Jansson and Biel (2011b) who suggest that private investors are influenced by beliefs concerning returns in the long run. Furthermore, Jansson and Biel (2011a) report that conventional and ethical investors have similar beliefs about the financial performance of SR investments which perform worse in the short term but slightly better than conventional investments in the long run. Nilsson (2008) finds that about 25 % of the 563 respondents perceive a worse performance of SR products compared to conventional investments, whereas more than half of the respondents believe in similar returns and 20 % suppose that sustainable investments outperform their conventional counterparts. However, these results are different from those of Lewis and Mackenzie (2000a) who report a greater percentage of ethical investors assuming that SR investments have a lower return. Thus, investors who do not belief in a superior financial performance of SR investments and regard financial issues to be more important than non-monetary aspects at the same time, are supposed to have a smaller optimal level of SR investments. In contrast, we assume that investors who perceive SR products to be less risky and, respectively, having higher returns compared to conventional investments in the long run seek for a higher optimal SR level. Hypothesis H2c implies that individuals who implement their non-financial or ethical ambitions by SRI would aim for a higher proportion of SR products in their entire portfolio compared to those who choose other options such as donations for this purpose.

2.3 The allocation of CSP

Another interesting issue is whether investors derive non-monetary benefits from a firm's CSP irrespective of the sort of financing (equity, debt) with which they are involved in a sustainable company or project. From a business ethics perspective, one can argue that being the owners, the shareholders of a company are indeed in charge of the social responsibility of the firm (Schaefer 2008). Following this argument, one can attribute the social responsibility of a company rather to its shareholders than to its bondholders. If investors follow this view, they should not be indifferent between debt or equity investments concerning the CSP. However, from the viewpoint of an entity approach, the value of a company's assets is attributed partly to debt and partly to equity capital. The CSP can be seen as an additional non-monetary asset, which is appreciated by the investors through lower

cost of capital (Goss and Roberts 2011; Ghoul et al. 2011). However, since debt as well as equity costs of capital are lowered by a strong CSP, one can argue that both forms of capital share a part of the non-monetary asset. This second argument suggests that individuals assess their participation in a company's CSP independently of the form of financing. Summarizing, there is no clear prior concerning this question. Nevertheless, we propose the following hypothesis, without a clear expectation of confirming it.

Hypothesis H3   Investors do not perceive a difference in their participation of a company's CSP if they compare equity and debt financing.

3 Research design

3.1 Sample collection

In addressing the issue of this study, we conducted an open online-survey for private investors that was available in English, German and French. Before the questionnaire was released, a pre-test on a small number of experimentees was carried out. The questionnaire was presented as a survey about sustainability in the investment context. It took on average 10 min to complete the survey. As an incentive in order to recruit respondents we offered awards for participating in terms of the realization of social projects that are linked to a certain amount of completed questionnaires. We gathered our sample by placing the link to our survey on capital-market and SRI related websites or message boards and in newsletters for SRI. Furthermore, we also asked asset managers and investment advisors to make their customers aware of the survey. The survey was online during the period from February 2013 to early 2014.

3.2 Questionnaire development

The questionnaire is designed to capture an individual's perception regarding the non-financial benefits derived from investing socially responsibly and possible influential factors on the desired optimal proportion of SR investments.

Some former studies (e.g., Lewis and Mackenzie 2000a; Webley et al. 2001) differentiate SR and conventional investors ex ante by asking the participants of their questionnaire whether they have already invested in SR products. Generally, there is no valid approach on how to differentiate between SR and conventional investors. Since SR investments may also attract conventional investors, it does not mean that the involvement of SR investment products in one's individual portfolio signalizes an SR investor (Cheah et al. 2011). Different from Wins and Zwergel (2014), who compare ethical investors, conventional investors and those who are generally interested in SRI, we are primarily interested in whether the respondents are driven by social, ecological or ethical principles in their decision-making process. In the spirit of Williams (2007) we identify SR investors by asking the participants whether sustainable and social responsible considerations ever had an influence on their investment decision. Respondents who stated that a company's or

a project's demonstrated social responsibility has had an influence at least once or that they have considered it and will buy or sell as a result in the near future are indicated as SR investors. The remaining participants, who stated that their investment decision has never been driven by social or ethical issues, are referred to as non-SR investors in this study. These participants are generally denoted as conventional investors, even though (a large) part of them can be assumed to be interested in SR investments as the survey was presented to raise questions about sustainability aspects in the investment choice.

The survey contains further 21 questions which are categorized as follows: (1) attitudes, beliefs and estimations of investors with regard to SRI; (2) investment behavior and preferences towards SRI; (3) socio-demographic information.

3.3 Attitudes, beliefs and estimations of investors towards SRI

The first part comprises eight questions related to the participants' attitudes to, motives to and estimations of SRI. To begin with, we asked the respondents which notion of sustainability in an investment context they have and why it matters to them. Since non-monetary or ethical aims can be implemented in several ways, we also asked the participants in which way they implement their personal values. This question is, in particular, relevant to hypothesis H2c.

With regard to hypothesis H2a, we were interested in whether a positive notion regarding financial aspects of SR investments is also an incentive, besides non-monetary motivations, to invest in a socially responsible way. We therefore asked the participants about the reasons why sustainability matters to them in their investment decision.

While Haigh (2008) and Pérez-Gladish et al. (2012) show that social aspects are most important to investors, Rosen et al. (1991) and Berry and Junkus (2013) find that environmental considerations are the main indicators for both SR and non-SR investors in order to identify SR corporate behavior. Following these studies we asked the participants to indicate three of the most important factors referring to social, environmental, ethical and corporate governance issues to determine corporate social responsibility. In order to check hypothesis H2b, the respondents also had the option of financial considerations in terms of sustaining returns in the long run (in the sense of purely financial sustainability) among ten possible answer choices.

According to Berry and Junkus (2013), investors prefer the inclusion strategy by rewarding companies who feature positive SR policies to the exclusionary screen. Since the estimation of firms according to certain SR criteria would probably be both intricate and time-consuming, several institutions specialized in sustainability research and analysis have emerged, who offer measures and indicators on CSP which are often referred to as environmental, social and corporate governance (ESG) scores. We asked therefore the investors whether these standardized sustainability ratings are sufficient to make a decision. Furthermore, the necessary information depth to form an assessment of a firm's sustainability and the time horizon for an information update was relevant. Finally, it was of interest whether individuals believe that SRI actually has an effect. Hence, we asked the respondents

if ethics and sustainability standards could have prevented or at least reduced the financial crises of the previous years (e.g., U.S. housing crisis, euro crisis, European sovereign debt crisis).

3.4 Behavior and preferences in terms of SRI

The second part, which contains five questions, targets different aspects concerning the investment behavior and preferences towards SRI. These questions particularly address the hypotheses H1 and H3.

Since the main aim of this study is to examine the factors that affect the desired proportion of SR investments, we asked the participants which percentage of their available investment volume they would like to invest sustainably. As a gap between supply and demand may exist (e.g., Bollen 2007; Dorfleitner and Utz 2014) and some investors may not know the composition of their portfolio precisely, we do not ask for the actual percentage that is invested socially responsibly but for the optimal proportion.

As SR investors appear to derive non-financial utility from SR investments (Lewis and Mackenzie 2000a; Bollen 2007), we check hypothesis H1 indirectly as described in Sect. 2 by posing the hypothetical question whether the respondents would double the amount that is invested sustainably according to the preferred optimal SR proportion if their investment volume was double the amount. We also asked the investors directly whether they would consider their non-monetary or ethical ambitions to be satisfied if a certain amount was invested sustainably.

To clarify hypothesis H3 we asked whether the participants would estimate their non-monetary or ethical motivations to be satisfied regardless of the form of financing they provided for a certain company. We asked the participants to answer this question by disregarding risk and return preferences. In addition, we posed the question of which asset class the respondents prefer as SR investments.

3.5 Socio-demographic profile

The last part is concerned with socio-demographic characteristics. There are some studies attempting to explain differences in the SR invested amount (Nilsson 2008), differences in investors' attitudes (Nilsson 2009), the determinants for SRI (Junkus and Berry 2010) and the willingness to sacrifice financial returns in favor of satisfying SR objectives (Dorfleitner and Utz 2014) by socio-demographic factors. Following these studies we wish to explore whether differences in investment behavior and in investors' preferences as described above are driven by demographic factors such as gender, age, education and investment volume. Moreover, some researchers such as Eriksen and Kvaløy (2010), Chakravarty et al. (2011), Andersson et al. (2013) and Pollmann et al. (2014) find that the risk-taking behavior of individuals differs between investment decisions made with their own money and with other people's money. Thus, we are interested in whether the participants make their decisions only on behalf of themselves or also on behalf of others. Under the assumption that an individual whose investment choice affects other persons (i.e., family members, as only private investors were questioned) decide differently, we also asked for the number of persons living in the household.

4 Data and preliminary analysis

4.1 Sample description

After filtering out questionnaires with a too short process time or with inconsistent answers, the data sample includes 381 respondents in total. 70.08 % of them have completed the German-language questionnaire, 21 % the English-language and 8.92 % the French-language ones. The survey was conducted in cooperation with an asset manager based in the German-speaking region with a large number of clients with above-average wealth. Thus, the fact that the majority of participants opted for the German-language version is an indication that the survey has attracted many of these. The French-speaking participants have been acquired mostly through French and Canadian message boards whereas a greater part of the English-speaking respondents were gathered through capital-market and SRI related websites, newsletters and message boards. We identified 181 of the respondents as actual SR investors while 200 are either only interested in SRI or conventional investors. As participants may not be able to answer all the questions of the survey, some values are missing in the data set. The descriptive statistics in terms of the demographic features of our sample are shown in Table 1, which outlines nine of 22 survey questions. The results of further eight questions are presented in Sect. 4.2 and the remaining five can be found in the appendix.

The respondents of the complete sample are predominantly male and well educated. The average age is 39.68. The majority are in a relationship or married and do not have to take family members into account in their investment decision. Furthermore, most of the participants live in Europe and have an available investment volume below 500,000 Euro. In order to consider any demographic differences between actual SR investors and non-SR investors in the data set, we perform a χ^2 test and a rank correlation Goodman–Kruskal γ test for both investor groups. The results show no significant differences in most demographic characteristics. SR investors tend to make investment decisions not only for themselves, but also on behalf of others to a higher degree compared to non-SR investors. In addition, a higher percentage of non-SR investors live in small households. In terms of demographic characteristics, the data samples of the two investor groups are therefore largely comparable.

The main purpose of this study is to examine empirically influential factors for the optimal level of SR investments. Before presenting the main results in Sect. 5, we commence with the descriptive results of the survey and the variables that are relevant to the main regression analysis.

4.2 Descriptive data analysis

This section presents the descriptive results of the remaining relevant questions that are used in this paper. All important variables or abbreviations and the corresponding questions of the survey are shown in Table 2.

Table 3 reports the descriptive results regarding the ways respondents implement their non-monetary or ethical objectives and the motivation for using SR criteria in

Table 1 Demographic characteristics of the survey sample

Description	Variable name and value	SR investor (in %)	Non-SR investor (in %)	Total (in %)	χ^2	Goodman–Kruskal γ
Gender						
Female	Female = 1	28.74	27.27	27.98	0.096	0.036
Male	Female = 0	71.26	72.73	72.02	(0.757)	(0.310)
Age						
<20	Age (metric)	1.15	2.19	1.68	8.849	0.124
20–29		25.29	33.88	29.69	(0.124)	(1.662)
30–39		22.41	22.95	22.69		
40–49		22.99	15.85	19.33		
50–59		20.11	14.21	17.09		
60–69		6.90	7.65	7.28		
≥70		1.15	3.28	2.24		
Education						
University graduate	Un = 1	76.80	72.00	74.28	1.144	0.126
Not university graduate	Un = 0	23.20	28.00	25.72	(0.285)	(1.080)
Marital status						
Relationship/married	Mar = 1	73.26	70.11	71.63	0.433	0.077
Single/divorced/widowed	Mar = 0	26.74	29.89	28.37	(0.510)	(0.661)
Household size						
	1		15.47	23.00	19.42	
2	House	30.39	34.00	32.28	5.621	0.179**
3–4	(metric)	35.36	28.50	31.76	(0.132)	(2.350)
>4		18.78	14.50	16.54		
Inv. decision						
On behalf of others	Dep = 1	40.88	30.00	35.17	4.936**	0.235**
For oneself	Dep = 0	59.12	70.00	64.83	(0.026)	(2.301)
Inv. volume						
<500,000	Volume = 1	56.91	44.50	50.39	1.506	−0.196
>500,000	Volume = 2	11.60	13.50	12.60	(0.220)	(−1.255)
N.A.		31.49	42.00	37.01		
Residence						
Europe		85.96	81.56	83.71	3.952	−0.136
North America		8.19	14.53	11.43	(0.139)	(−0.984)
Rest		5.85	3.91	4.86		
Total		47.51	52.49	100.00		

This table presents the demographic characteristics of the survey sample divided by SR investors and non-SR investors. The χ^2 test and the Goodman–Kruskal γ test are based on the two investor groups. The p values and, respectively, z statistics are in parentheses

** indicates a significance level of 5 %

Table 2 Variable overview

Abbreviations or variable names	Exact wording of the questions and answer options
Reasons	Why does sustainability matter to you?
PersValues	Because of my personal values and ethics
FeelGood	Means doing good while investing
Society	Due to the increasing importance of sustainability in society
FinSustain	Sustainability doesn't matter to me, unless in a purely financial sense
Religion	Based on religious views
HighReturn	Sustainable investments have higher returns in the longer run
LowRisk	Sustainable investments are less risky than conventional investments, but they give the same return in the longer run
	Sustainable investments have a somewhat lower return than conventional investments, but they are less risky
Implementation	Non-monetary or ethical objectives can be implemented in several ways. In which way do you implement yours?
Donation	Charitable donations
SRI	Investing in sustainably-run firms or projects that are in line with my personal values
Voluntary	Voluntary work in social organizations
Voting right	Exertion of voting rights
SR issues	Which of the following factors are most important in determining whether a company's behavior can be considered sustainable?
Economizing	Economizing
Pollution	Reduction of pollution and waste
Human right	Human rights
RenewEn	CO_2-emission reduction and renewable energy
Product	Product innovation and responsibility
Employee	Personnel policies
Financial	Purely financial sustainability
Board	Independent executive board and supervisory body
Charity	Efforts for non-profit purposes
Cooperative	Cooperativeness (Transparent cooperation with (local) regulatory authorities.)
Opt. level	If investment possibilities exist that are in line with your non-monetary or ethical objectives, which percentage of your available investment volume (exclude owner-occupied property) would you invest sustainably?
Willingness to double	If your investment volume was double the amount, which percentage would you then invest sustainably?
Same amount	The same amount
Double the amount	Double the amount
More than double the amount	More than double the amount
Saturation	Are your non-monetary or ethical ambitions satisfied if a certain amount is invested sustainably?

Table 2 continued

Abbreviations or variable names	Exact wording of the questions and answer options
Yes	Yes, if the investment perfectly fits my notion of sustainability
No, linear utility	No, double the amount invested sustainably is twice as satisfying
No, declining benefits	No, the more the better, but the additional benefit declines
Possible category	You have found a sustainably managed company whose objectives are in line with your non-monetary or ethical objectives. How do you assess your share of this company's sustainability with respect to the financing form (stock, bond, mutual fund)?
All categories	All investment categories are possible
Stocks	I would only choose stocks of this company
Bonds	I would only choose bonds of this company
Funds	I would invest indirectly in this company through SR mutual funds
Preferred category	Which asset class do you prefer if you focus on your sustainable investments?

This table presents all survey items that are used in this paper with the exception of questions regarding socio-demographic characteristics

Table 3 Implementation of non-monetary objectives and reasons for SRI

	N	%	Gender		Age		Education	
			χ^2	Goodman–Kruskal γ	χ^2	Goodman–Kruskal γ	χ^2	Goodman–Kruskal γ
Implementation								
Donation	204	53.54	7.831***	0.327***	6.212	0.118	0.012	0.013
SRI	163	42.78	3.270*	0.209*	9.096	0.097	0.865	0.111
Voluntary	121	31.76	0.211	0.057	7.721	0.038	0.618	0.101
VotingRight	58	15.22	3.728*	−0.351*	19.707***	0.412***	1.011	−0.155
Reasons								
PersValues	173	45.41	7.761***	0.317***	11.104*	−0.019	2.340	0.180
FeelGood	147	38.58	7.864***	0.319***	10.120	−0.157**	0.038	0.024
Society	98	25.72	0.367	0.080	6.867	−0.038	0.003	0.007
FinSustain	64	16.80	11.542***	−0.612***	16.710**	0.291***	0.633	−0.120
HighReturn	62	16.27	0.026	−0.026	11.312*	−0.163	0.091	0.049
LowRisk	61	16.01	0.224	0.073	6.006	−0.027	0.292	0.089
Religion	11	2.89	0.396	0.197	5.829	−0.035	1.640	0.561
OtherReason	10	2.62	0.021	0.050	7.849	0.205	1.096	−0.325

This table shows the total number and the percentage of responses regarding the implementation of non-monetary and ethical objectives (Implementation) and the reasons for investing socially responsibly (Reasons). Due to multiple answers, the percentage of the responses does not sum up to 100 %. The influence of gender, age and education in a bivariate analysis is presented by the χ^2 statistics and the Goodman–Kruskal γ

***, ** and * indicate a significance level of 1, 5 and 10 %

Table 4 The most important issues in SRI

SR issues	N	%	Order in %			Gender		Age		Education	
			1	2	3	χ^2	γ	χ^2	γ	χ^2	γ
Economizing	197	51.71	21.52	18.11	12.07	4.872	−0.097	23.707	−0.014	2.329	−0.123
Pollution	194	50.92	12.60	22.83	15.49	1.315	−0.026	23.236	0.033	1.542	0.068
HumanRight	163	42.78	24.93	8.14	9.71	28.529***	0.440***	24.317	−0.235***	3.049	0.086
RenewEn	146	38.32	14.44	11.29	12.60	9.212**	0.258***	16.926	−0.016	7.140*	0.243**
Product	113	29.66	4.72	11.81	13.12	12.914***	−0.415***	20.875	0.129*	2.307	0.009
Employee	111	29.13	2.36	12.60	14.17	2.243	0.115	16.286	−0.050	2.629	0.035
Financial	73	19.16	12.34	2.62	4.20	13.038***	−0.453***	22.169	0.228***	3.480	−0.178
Board	49	12.86	2.10	4.72	6.04	0.331	−0.047	23.389	0.213**	4.461	−0.285**
Charity	17	4.595	0.52	1.57	2.36	4.460	−0.072	21.457	0.262	4.352	−0.088
Cooperative	15	3.94	0.52	0.52	2.89	1.191	−0.129	10.659	−0.357*	1.980	−0.185

This table presents the total number and the percentage of responses in terms of the most important issues in SRI. The fourth, fifth and sixth column reports the percentage of responses according to the first, second and third most important factors. Due to multiple answers, the percentage of the responses does not sum up to 100 %. The influence of gender, age and education in a bivariate analysis is presented by the χ^2 statistics and the Goodman–Kruskal γ

*** indicates a significance level of 1 %

the investment decision. As the participants were allowed to choose more than one possible answer, the percentages of the responses does not sum up to 100 %. The majority tends to donate and to invest their money socially responsibly. The reasons for SRI are mainly personal values and ethics as well as the feeling of doing good while investing. In order to consider the influence of demographics such as gender, age and education we apply the χ^2 test and the Goodman–Kruskal γ test in a bivariate analysis. The results show that providing donations and SRI are preferred by women while men and older investors prefer to choose active engagement [as denoted by Lewis and Mackenzie (2000b)] by exercising their voting right. The belief in high financial performance or low risk of SR investments is for about 24 % of the participants an incentive to invest sustainably. About one-sixth of all participants, who tend to be men and older, state that sustainability only matters in the purely financial sense. Religious reasons are of subordinate importance.

With respect to the most important issues in terms of SRI, as shown in Table 4, environmental aspects such as economizing in the sense of the economical use of resources and the reduction of pollution and waste are most frequently chosen. This is in line with the survey results of Rosen et al. (1991) who asked participants about the essential factors to determine SR corporate behavior. Similarly, Berry and Junkus (2013) show that both SR investors and non-SR investors consider environmental issues to be most important. While women and younger investors care more about human rights, product innovation and responsibility is taken seriously by men and older persons. The issue of renewable energy is relevant for women and the better educated. Comparable to the results of Table 3, the notion of purely financial sustainability is associated with SRI mostly by men and older investors in our data sample.

When considering the questions about preferences and perceptions towards SRI, significant differences between SR investors and non-SR investors are revealed in the bivariate analysis as reported in Table 5. At first glance, a substantial proportion of the non-SR investors have not answered the corresponding questions due to a possible lack of interest in investing socially responsibly. However, account should also be taken that respondents who were not sure about the questions are also not included in the evaluation. While most respondents in both investor groups perceive a satisfaction of their non-monetary or ethical objectives if a certain amount is invested sustainably, the high ambition of the SR investor subset to invest socially responsibly is characterized by a higher optimal proportion of SR investments. On this account, the participants were offered possible answers regarding the desired SR level in ten percentage steps up to more than 60 %. The last choice is selected by only 31.06 % of the SR investors and 15.91 % of the non-SR investors. For the sake of clarity and an easier statistical treatment, we aggregate the options in three categories as reported in Table 5. The large majority of SR investors would invest at least 20 % of their available volume in a socially responsible way, whereas more than half of the non-SR investors prefer to have less than 20 % of SR investments in their portfolio. Similarly, about two thirds of the SR investors, compared to less than half of non-SR investors, are willing to invest at least double the amount socially responsibly if their investment volume is double the amount.

Table 5 The optimal SR level, the perception of a saturation and the willingness to double

Description	SR investor		Non-SR investor		Total		χ^2	Goodman–Kruskal γ
	N	%	N	%	N	%		
Opt. level								
<20 %	33	20.50	73	55.30	106	36.18	39.776***	0.546***
20–50 %	64	39.75	36	27.27	100	34.13	(0.000)	(7.473)
>50 %	64	39.75	23	17.42	87	29.69		
	161	100.00	132	100.00	293	100.00		
Saturation								
Yes	84	59.57	60	58.82	144	59.26	0.014	0.016
No, declining benefits	28	19.86	32	31.37	60	24.69	(0.906)	(0.118)
No, linear utility	29	20.57	10	9.80	39	16.05		
	141	100.00	102	100.00	243	100.00		
Willingness to double								
Double the amount	86	52.76	60	41.10	146	47.25	11.283***	0.374***
More than double the amount	24	14.72	11	7.53	35	11.33	(0.001)	(3.689)
Same amount	53	32.52	75	51.37	128	41.42		
	163	100.00	146	100.00	309	100.00		

This table presents the total number and the percentage of responses regarding the optimal proportion of SR investments the participants seek, the perception of a saturation towards the non-monetary utility and the willingness to double the amount that is invested socially responsibly if the investment volume was double the amount. The columns SR investor and non-SR investor report the absolute amount and percentage of responses in each subgroup. The χ^2 test and the Goodman–Kruskal γ test are based on the two investor groups. The p values and, respectively, z statistics are in parentheses

*** indicates a significance level of 5 %

Concerning the question of the dependence of non-financial benefits on the form of financing, the descriptive results as shown in Table 6 reveal that more than half of the investors estimate their participation in a firm's CSR as independent if risk and return preferences are disregarded. Almost a fifth of the participants obtain non-financial utility only through stocks of a certain sustainable company and a minority has the opinion that this is only possible by investing in funds or bonds. With regard to the preferred form of SR investments, stocks and funds are the securities favored by over half of the participants in each case.

5 Results

This section presents the regression results which are utilized to research the hypotheses. The main aim of this study is to determine empirically the variables that influence the optimal proportion of SR investments. It also involves the matter of the marginal non-monetary utility that individuals derive from the additional

sustainably invested amount. For this purpose, we conduct multivariate analyzes on the data sample.

In order to test hypothesis H1 and the hypotheses H2a–H2c as described in Sect. 2, we use different sets of variables to estimate a series of ordered logit models. The dependent variable is the desired proportion of SR investments. The ordered categorical variable *Level* here represents three groups of optimal SR level as reported in Table 5:

$$\text{Level}_i = \begin{cases} 1 : <20\% \text{ of SR investments,} \\ 2 : 20 - 50\% \text{ of SR investments,} \\ 3 : > 50\% \text{ of SR investments.} \end{cases}$$

We received a total of 293 answers regarding the desired optimal proportion of SR investments. None of the participants who would not adopt SRI or cannot answer this question are included in the evaluation. Due to missing values in the independent variables, the highest number of observations is 275 in the ordered logit regression analysis.

As several studies (e.g., Sutter 2009; Eriksen and Kvaløy 2010; Andersson et al. 2013) provide evidence of the fact that investment decisions made on behalf of others differ from choices that individuals make for themselves, it is also interesting to investigate whether such a difference also occurs in the choice of the optimal SR proportion. Thus, we add the number of persons that are affected by the investment decision, and demographic information such as gender, age, education and marital status (see Table 1), to the set of controls in all regression models. The variable is defined as $\text{Decision}_i = \text{Dep}_i \cdot (\text{House} - 1) + 1$, whereby $\text{Dep}_i = 1$ denotes the case if investment decisions are also made on behalf of others and House expresses the household size. To reflect the significant differences in the optimal proportion of SR investments between the two investor groups as reported in Table 5, we also include the dummy SRinv as a control variable, whereby $\text{SRinv}_i = 1$ defines an SR investor.

All variables are defined as dummies with the exception of *Age* (metric) and the two ordered categorical variables *Volume* (see Table 1) as well as Financial (see Table 4) of which the latter reflects the importance of securing financial return in the long run and is defined in the following way.

$$\text{Financial}_i = \begin{cases} 0 : \text{respondents who did not choose this option,} \\ 1 : \text{respondents who chose this option in the 3rd position,} \\ 2 : \text{respondents who chose this option in the 2nd position,} \\ 3 : \text{respondents who chose this option in the 1st position.} \end{cases}$$

The required variables to represent the perceived saturation of ethical goals through SRI (Sat) and the willingness to double the amount of SR investments (Double) to check hypothesis H1 are also defined as dummies. Although both variables originally comprise three categories, we summarize two similar response possibilities. This means that participants who are at least willing to double the amount of SR investments, if the available capital is doubled, are covered by $\text{Double}_i = 1$, which consequently also includes those who would invest more than double the amount. Analogously, if no saturation of the non-financial utility is perceived (no matter whether the utility is linearly or declines), the variable is defined as $\text{Sat}_i = 0$,

Table 6 Possible and preferred form of SR investments

Investment type	Possible		Preferred	
	N	%	N	%
All categories	183	64.21		
Stocks	54	18.95	147	51.58
Funds	35	12.28	146	51.23
Bonds	13	4.56	93	32.63
Saving account			60	21.05
Closed investments			3 0	10.53
Participation certificates			13	4.56

This table presents the total number and the percentage of responses regarding the investment type which are considerable for SRI and, respectively, which are actually preferred by the participants. The numbers in the third column are based on the responses of the 285 participants who had answered the question on the possible SR investment type. Due to multiple answers in terms of the preferred form of SR investments, the percentage of responses does not sum up to 100 %

otherwise $Sat_i = 1$ holds. The results of the ordered logistic regression analysis are presented in Table 7.

5.1 The non-financial utility and the optimal level of SR investments

We check hypothesis H1 both indirectly by model 1 and model 2, and directly by model 3 as described in Sect. 2. Model 1 includes besides all control variables the demographic information about the available investment volume. Since this information is not provided by almost 40 % of our survey sample, the inclusion of Volume would lead to a notable reduction of the number of observations. Thus, it is omitted in the remaining regressions.

The negative coefficient of Volume indicates that the desired optimal proportion of SR investments tends to be lower for investors with high investment volumes. Moreover, the positive coefficient of the Double dummy in model 2 reveals that the willingness to invest at least double the amount if the investment volume was double the amount is positively related to the optimal SR level. The results affirm indirectly the assumption that the non-financial utility derived from investing socially responsibly does not increase linearly with the invested amount. This is also supported by model 3 which shows that investors who perceive a satisfaction regarding their sustainable and ethical objectives, if a specific sum of their available volume is invested socially responsibly, target a lower level of SR investments. Hence, based on our survey data, hypothesis H1 can be confirmed.

In order to investigate further drivers of the optimal proportion of SR investments that investors seek, we create the models 4–6, besides the regression models 1–3, to check the hypotheses H2a, H2b, and H2c. While the coefficient of LowRisk is positive, the variable HighReturn is negatively related to the optimal SR level in model 4. Investors who believe that SR investments are not as risky as conventional investments tend to seek a higher SR level in their portfolio. However, the same connection does not apply to a positive perception regarding the financial return of

Table 7 Regression results on the optimal level of SR investments

	H1			H2a	H2b	H2c
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Volume	−0.614*** (−2.73)					
Double		0.855*** (3.25)				
Sat			−0.734** (−2.56)			
Financial perception						
HighReturn				−0.532* (−1.76)		
LowRisk				0.592** (1.98)		
SR issues						
Financial					−0.626*** (−4.04)	
Implementation						
SRI						0.701** (2.50)
Donation						0.258 (1.05)
Voluntary						−0.259 (−0.97)
VotingRight						0.181 (0.53)
Controls						
Female	1.028*** (2.84)	0.570** (2.14)	0.363 (1.18)	0.581** (2.23)	0.477* (1.82)	0.475* (1.77)
Age	−0.021* (−1.80)	−0.024** (−2.50)	−0.022** (−2.19)	−0.030*** (−3.37)	−0.025*** (−2.78)	−0.033*** (−3.57)
Univ	0.133 (0.37)	0.022 (0.07)	0.041 (0.13)	0.007 (0.03)	0.023 (0.08)	−0.002 (−0.01)
Mar	−0.444 (−1.19)	−0.138 (−0.47)	−0.447 (−1.33)	−0.150 (−0.53)	−0.131 (−0.46)	−0.036 (−0.13)
Decision	0.172 (1.51)	0.097 (1.04)	0.124 (1.22)	0.097 (1.03)	0.096 (1.05)	0.092 (0.96)
SRinv	1.701*** (5.49)	1.449*** (5.59)	1.444*** (4.86)	1.509*** (5.95)	1.394*** (5.52)	1.179*** (4.13)
N	192	261	199	275	275	275

This table presents the results of the ordered logit analysis. The dependent variable is the ordered categorical variable Level that reflects the optimal proportion of SR investments: $Level_i = 1$ for those who would invest less than 20 % of their volume socially responsibly; $Level_i = 2$ for those who would invest 20–50 % of their volume socially responsibly and $Level_i = 3$ for those who would invest more than 50 % of their volume socially responsibly. The definitions of the independent variables in the first column are provided in Tables 1, 2, 3, 4 and 5. The t statistics are in parentheses

***, ** and * indicate a significance level of 1, 5 and 10 %

SR investments. Therefore hypothesis H2a is only partially supported. It should be noted that only SR investors believe in a superior financial performance of SR investments. Model 5 provides evidence that investors who regard a sustainable yield retention to be more important than SR considerations, which however cannot be achieved by SR investments, are more likely to seek for a lower optimal socially responsible invested percentage. Furthermore, the positive coefficient of the SRI dummy shows that individuals who claim to implement their non-monetary or ethical objectives by SRI would also choose a higher proportion of SR investments. Hence, both hypothesis H2b and H2c are confirmed.

In view of the influence of demographic variables, women and slightly younger persons are in most regression models more likely to seek a higher optimal proportion of SR investments. The Female variable is not significant in model 3 since more women than men perceive a satisfaction of their non-monetary objectives by investing a certain amount socially responsibly. Due to significant differences between the two investor groups in terms of the desired optimal proportion of SR investments, as reported in Table 5, the SRinv dummy strongly influences the dependent variable positively in all regression models. The control variable Decision representing the number of persons who are affected by the investment decision of the respondent has a positive, but not significant coefficient, which may be explained by the fact that more SR investors make investment decisions on behalf of others compared to the subset of non-SR investors, as discussed in Sect. 4.

5.2 The allocation of CSP

As described in Sect. 4.2, irrespective of the method of financing, the majority of the respondents perceives the participation in a firm's CSP in the same way for debt

Table 8 Multinominal logistic regression on the possible category of SR investments

Preferred form of SR investments	Possible category of SR investments					
	Stocks		Funds		Bonds	
Stocks	1.899***	(0.000)	−1.870***	(0.000)	−1.373*	(0.058)
Equity funds	−1.329***	(0.002)	0.833**	(0.048)	−1.678**	(0.047)
Mixed funds	−0.221	(0.655)	1.067**	(0.011)	0.190	(0.789)
Bonds	−1.364***	(0.004)	−0.532	(0.266)	2.340***	(0.002)
Saving account/deposits	0.245	(0.578)	0.319	(0.522)	−0.189	(0.794)
Closed Inv.	−1.733	(0.107)	−1.105	(0.181)	−14.900	(0.989)
Participation certificate	0.044	(0.970)	−15.320	(0.991)	−14.550	(0.994)
Constant	−1.700***	(0.000)	−1.667***	(0.000)	−2.786***	(0.000)

This table presents the results of the multinominal logistic regression analysis on the possible category of SR investments. The comparison group consists of the 183 respondents who would assess their contribution to a socially responsible company in the same way for equity or debt investments, as reported in Table 6. The columns two till four contain the group of investors who perceive their non-financial or ethical objectives to be satisfied only by investing in stocks, funds or bonds. The rows list the preferred form of SR investments. The total number of observations is 285. The p values are in parentheses

***, ** and * indicate a significance level of 1, 5 and 10 %

or equity investments if risk and return considerations are disregarded. The remaining participants who state that this would be only possible by investing either in stocks, funds or bonds appear to prefer this form of investment to a higher degree. In order to approve this supposition, a multinominal logit regression is conducted on the survey data. The comparison group is presented by those investors who would consider every method of financing to adopt SRI. The result, as reported in Table 8, confirms the assumption. Participants who consider only stocks in order to achieve their non-monetary or ethical goals also have a significantly higher preference for stocks as SR investments than the comparison group. The same applies to the respondents who would only consider bonds or funds as the appropriate type of security for their SR objectives. Hence, they generally favor these investment categories to a higher extent. Hypothesis H3 can therefore be confirmed. This implies that the majority of investors derive non-financial benefits from the SR attribute in the same way for debt or equity investments.

6 Conclusion

This paper analyzes the determinants of the optimal percentage that investors seek to invest socially responsibly. The desired proportion of SR investments reflects in some way the commitment of an individual to non-financial and ethical objectives in the investment choice. In particular, the perception of benefits that investors derive from the degree of sustainability of the securities has a big impact on the optimal SR level. For many individuals, a certain amount that is invested socially responsibly appears to meet their needs regarding personal values and ethics in the issue of investing. Thus, the optimal proportion of SR investments varies depending on the available investment volume. The empirical analysis of the survey shows that investors with a higher volume tend to be satisfied by a lower percentage of their portfolio invested socially responsibly. Furthermore, the additional non-financial utility that individuals derive from SR investments does not depend on the type of security, may it be equity or debt. Beyond that, individuals who implement their non-monetary aims mainly by SRI, compared to other methods such as donations or voluntary work, also choose a higher SR level. In contrast, investors who state that financial objectives are more important than non-monetary issues have a lower optimal proportion of SR investments. In addition, we find in our survey sample that women and slightly younger persons are more likely to seek a higher optimal percentage that is invested sustainably.

The results provide evidence that a saturation of the non-financial utility exists for the majority of investors. While the absolute financial return scales naturally with the amount of capital that is invested in securities, the same assumption of linearity does not apply to the non-financial utility. Hence, a representation of individual preferences with regard to socially responsible aims in the investment choice by terms of a utility function or a similar concept is a promising problem for further research.

Appendix: Remaining results

The following tables present the remaining results of the survey. The table headings contain the wording of the questions. The columns SR investor and non-SR investor report the percentage of answers in each subgroup whereas the last column presents the percentage of answers of the entire sample (Tables 9, 10, 11, 12, 13).

Table 9 The term 'sustainability' is very broad and difficult to define. Which aspects fit your notion of sustainability (in an investment context)?

	SR investor	Non-SR investor	Total
Design of living and economic manner, so that the people of today's and future generations meet their needs	85.64	71.50	78.22
The personal responsibility of each individual for his or her actions, especially towards the community and environment	67.40	57.00	61.94
The human development in permanently changing environments and living conditions	36.46	31.50	33.86
Community objectives are more important than the maximization of personal goals	35.91	28.50	32.02
Long-term return (purely financial sustainability)	23.20	21.50	22.31
Philosophical approach	8.29	7.00	7.61
Religious belief	3.31	3.00	3.15

Due to multiple answers, the percentage of responses does not sum up to 100 %

Table 10 Are standardized sustainability ratings by specialized institutions sufficient to determine whether an individual or a mutual fund investment is sustainable?

	SR investor	Non-SR investor	Total
Yes	11.05	13.50	12.34
No	51.93	43.50	47.51
I do not know	37.02	43.00	40.16

Table 11 A local assessment of foreign investments is not always feasible or incurs high costs. Which information should be taken into consideration to form an assessment of its sustainability?

	SR investor	Non-SR investor	Total
A pure evaluation of secondary information is adequate (e.g., internet, journals and interviews)	17.68	17.50	17.59
Sending a questionnaire to the concerned company	4.42	1.50	2.89
Questionnaire and call for information	11.60	8.00	9.71
Local assessments are indispensable	45.30	45.50	45.41
I do not know	20.99	27.50	24.41

Table 12 Financial markets are changing fast. It is not always possible to assess each proposed investment with respect to its compliance with sustainability. In terms of the compliance of sustainability, within which time horizon is a review reasonable?

	SR investor	Non-SR investor	Total
One month	14.36	7.00	10.50
Three months	24.86	18.00	21.26
Six months	28.73	21.50	24.93
I do not know	32.04	53.50	43.31

Table 13 Do you think that the major financial crisis in recent years (US housing crisis, euro crisis, and European sovereign debt crisis) could have been prevented or at least reduced by adhering to ethics and sustainability standards?

	SR investor	Non-SR investor	Total
Yes	72.16	42.86	56.99
No	15.34	43.92	30.14
I do not know	12.50	13.23	12.88

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