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It's a Matter of Principle: The Role of Personal Values in Investment Decisions

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ABSTRACT. We investigate the role of personal values in an investment decision in a controlled experimental setting. Participants were asked to choose an investment in a bond issued by a tobacco company or a bond issued by a non-tobacco company that offered an equal or sometimes lower yield. We then surveyed the participants regarding their feelings toward tobacco use to determine whether these values influenced their investment decision. Using factor analysis, we identified investment- and tobacco-related dimensions on which participants' responses tended to load. Two of these factors, relating to the societal impact of investment decisions and the health effects of tobacco, were highly significant in determining whether participants selected a tobacco or non-tobacco related investment. More importantly, we found that when the rate of return on a tobacco-related investment exceeds the rate of return on an investment not involving tobacco by 1%, the intensity of participant concerns about the societal effects of their investment decisions was especially important in determining investment choices. This finding indicates that traditional wealth-maximization approaches, which do not consider the personal values of the investor, omit an important factor that affects investment decisions.

KEY WORDS: investment, personal values, socially responsible investing

Traditional approaches to asset valuation often assume investors act with a goal of maximizing wealth (Shefrin, 2005; Tetlock and Mellers, 2002). These approaches typically view personal values of the investor as irrelevant (Beal et al., 2005; Markowitz, 1959). Alternative views suggest that investors may be motivated by a sense of well being (Auger et al., 2003; Cullis et al., 1992; Gao and Schmidt, 2005) or the desire to facilitate social change (Beal et al., 2005).

Proponents of alternative investment choice models cite the shift of funds into "socially responsible" and "ethical" investments as evidence that individuals seek investments consistent with their personal values (Beal and Goyen, 1998; Social Investment Forum, 2008). The Social Investment Forum (2008) claims 11% of all assets ($25.1 trillion) under professional management have an orientation toward social responsibility.[1] The degree of interest in socially responsible investing (SRI) is likely to increase over the next few years. Gevlin (2007) found that 41% of sampled investors planned to add socially responsible investments to their portfolio over the next 3 years.

While previous studies identify characteristics and attitudes of socially responsible investors, specific factors that influence the investment decision are not well understood (McLachlan and Gardner, 2004). The purpose of this study is to determine the role of personal values in an investment decision. We utilize a controlled experimental setting in which participants are asked to choose between investing in a bond issued by a tobacco company and a bond issued by a non-tobacco company. We manipulate the yield of the non-tobacco company's bond to levels equal to or lower than the yield of the tobacco company's bond. We then investigate whether personal values regarding tobacco use influence the choice between two investment alternatives. We find that within a simulated investment decision, investors are sensitive to both financial and non-financial factors when making an investment decision. Most importantly, we find that in this experimental setting, the investment decision was significantly affected by the interaction between differences in rates of investment return and the personal values of the investor.

Background

The development of socially responsible investing (SRI)

The beginnings of SRI are attributed to the Religious Society of Friends who, in 1758, asked their members to refrain from doing business with organizations that bought or sold humans (Schueth, 2003). Likewise, in 1770s, Methodists discouraged their members from participating in businesses that harmed the health of workers (Wesley, 1872). During the 1950s, trade unions influenced pension fund managers to make investments consistent with union positions, and in the 1960s, it became evident that more mutual fund managers were incorporating moral issues in their investment decisions (Malkiel and Quandt, 1971). In the 1900s, equity funds were founded to accommodate the religious requirements of the Islamic community (Hussein and Omran, 2005) and a growing environmental movement (Fowler and Hope, 2007).

The term ''socially responsible investing'' and ''ethical investing'' became popular in the 1990s and refers to the consideration of corporate responsibility and societal concerns in investment decisions. During this time, investment managers developed the technique of ''screening,'' the practice of identifying companies that meet certain ethical criteria (Michelson et al., 2004).[2]

Recent literature suggests the degree to which an investor is influenced by personal values can be measured on a continuum that ranges from a strictly ethical orientation to a strictly financial orientation (Hummels and Timmer, 2004). However, McLachlan and Gardner (2004) note that classifying investors is difficult because existing literature is not consistent regarding how to identify a ''socially responsible investor.'' Studies attempting to identify consistent demographic patterns associated with SRI have, in fact, yielded inconsistent results. Rosen et al. (1991) found that socially oriented investors tend to be white-collar workers who are younger and better educated, but lower-salaried, than other investors. On the other hand, more recent studies (McLachlan and Gardner, 2004; Williams, 2007) did not find investors in socially responsible mutual funds to be demographically different than investors in conventional funds.

To date, studies have classified investors as socially responsible based on a general inclination toward non-specific social issues. Such studies ignore three aspects of social responsibility. First, these studies do not consider the multitude of social issues that face investors. For example, socially responsible investors may consider some or all of the following issues important: the environment, alcohol, tobacco, genetic engineering, gaming, weapons, labor relations, and animal testing. Webley et al. (2001) and Lewis and Mackenzie (2000b) used participation the Friends Provident fund to classify investors as ''ethical'' or conventional. That fund utilizes an investment strategy which considers a wide range of ethical issues such as sustainable lifestyles, quality of life, the environment, energy efficiency, human rights, employment practices and more. However, socially responsible investors might differ as to the specific issues about which they feel strongly. For example, an individual investor might be opposed to investing in companies that harm the environment, but not feel strongly about investments related to gaming.

Second, socially responsible investors might differ in the intensity of their feelings regarding a single social issue (Hummels and Timmer, 2004). For example, an investor who moderately opposes the use of alcohol might choose to not invest in companies that produce alcoholic beverages. A second investor with a stronger opposition to alcohol consumption might deny capital to retailers that sell alcoholic beverages as well as manufacturers who produce alcoholic beverages. Given the wide range of issues that may or may not be important to individual investors' personal value systems, it becomes extremely difficult to construct a portfolio that is consistent with all the values embraced by an individual investor or to design a mutual fund that appeals to a broad spectrum of investors with varied value systems.

Third, investors considered to be socially responsible vary in their degree of financial commitment. Mackenzie and Lewis (1999) find that few socially responsible investors are willing to commit their entire portfolio to socially oriented investments. In fact, investors classified as ''ethical investors'' in one study averaged only 28.35% of ''ethical holdings'' in their total portfolio (Webley et al., 2001).

Motivations of socially responsible investing

Past studies cite three motivations for socially responsible investments (Beal et al., 2005). These are a desire to achieve return, a desire to affect social change, and a desire for personal satisfaction.

Return on investment

A theoretical argument is sometimes made that socially responsible investors must be willing to accept a lower rate of return. The lower rate of return is sometimes referred to as an ''ethical penalty'' (Michelson et al., 2004; Tippet, 2001) and is attributed to increased fund management costs as well as higher costs incurred by socially responsible companies as they attempt to monitor and maintain their socially responsible status. In fact, research has shown that most socially responsible investors are not willing to reduce their holdings in socially responsible investments upon the discovery that they yield lower returns (Lewis and Mackenzie, 2000a; Webley et al., 2001).

An alternative theory suggests socially responsible investments yield higher returns because greater awareness of socially desirable behavior makes these firms more attractive (Cullis et al., 1992). Others believe that since these firms are subject to greater scrutiny, they typically operate in a more efficient manner (Schwartz, 2003). Surprisingly, Gevlin (2007) finds that more than half of investors expect socially responsible investments to be less risky and to have better returns than other investments.

Most research comparing investment returns finds very few differences between conventional and socially responsible investments.[3] Statman (2000) compares the Domini Social Index[4] and the S&P 500 Index between 1990 and 1998 and finds similar volatility and returns in both. Likewise, returns for socially responsible and conventional mutual funds tend to be statistically indistinguishable (Bauer et al., 2005; Benson et al., 2006; Shank et al., 2005). Interestingly, one study found that the primary reason for indistinguishable returns is that the composition of investments in socially responsible funds did not differ significantly from that of the general market (Bello, 2005).

On the other hand, there is significant anecdotal evidence supporting an ethical penalty. The California Public Employees' Retirement System (CalPERS), the largest pension fund in the US, claims to have foregone $400 million by screening potential investments in countries that violate human rights. The California State Teachers Retirement System (CalSTRS) claims that avoiding tobacco investments reduced potential investment gains by $1 billion. CalSTRS recently announced that they will no longer avoid tobacco stocks (Palmeri, 2008).

Social change

A second motivation for investing in socially responsible corporations is the potential for influencing social change. Investors, for example, might expect that withholding capital from corporations that harm the environment could cause these corporations to institute more environmentally friendly business practices.

Although socially responsible investors may seek to change business practices, research indicates that shareholder-based social change is minimal (Beal et al., 2005). Klonoski (1986) notes that investors, while technically owners, are often unable to influence decision making within a corporation. Haigh and Hazelton (2004) find that because they represent an insufficient share of the market, even managers of socially responsible mutual funds are not effective at social change. In fact, findings indicate that instances of shareholder success in changing corporate policy have been limited to highly visible companies that have currently newsworthy business operations (Graves et al., 2001; Rehbein et al., 2004). Interestingly, socially responsible investors seem resolved to their limited ability to make change. Lewis and Mackenzie (2000b) find that most socially responsible investors prefer a passive approach to investing, in which investors utilize mutual funds that filter socially inappropriate investments, rather than active investment, in which ownership rights are utilized to lobby for change.

Personal satisfaction

Investigating personal satisfaction with regard to investing is difficult because individuals derive satisfaction in many different ways. For example, an

investor might be interested in investing in the gaming industry because he or she enjoys gambling and is familiar with the industry participants. Conversely, another investor might find gambling ethically improper and would not be comfortable investing in a mutual fund that includes gaming stocks in its portfolio.

Evidence suggests that a broad range of non-economic factors affects the investment decision (Jeffrey, 2006; Nagy and Obenberger, 1994). Beal et al. (2005) find that fewer than half of investors sampled consider wealth maximization to be the most important factor in an investment decision. Similarly, Sparkes (1998) finds that 35% of investors would invest ethically, even if returns were slightly lower than comparable conventional funds. Lewis and Mackenzie (1999) asked socially responsible investors generalized questions regarding their willingness to hold socially responsible investments given ex post evidence of investment return. They found most (94.8%) would not shift funds away from socially responsible funds if the return were two percentage points lower and that only 35.8% would reduce socially responsible investments if the return were five percentage points lower.

While research supports the idea that socially responsible investors are willing to accept a lower return, there is no specific evidence regarding what kind of values influence a specific type of investment. For example, certain values might entice a socially responsible environmentalist to invest in a "green" fund; however, that same fund might have little appeal to a socially responsible investor focused on values related to pacifism.

Methodologies for investigating personal values in investment decisions

Previous studies investigating the role of personal values in investment decisions have used two approaches. First, studies have compared financial aspects of socially responsible and conventional mutual funds. Bollen (2007) measures the demand for socially responsible investments by observing the flow of cash into these funds. Others studies observe differences in diversification (Bello, 2005) and return (Bauer et al., 2005; Benson et al., 2006; Shank et al., 2005). While these studies provide insight into collective behavior regarding socially responsible investment, they are subject to certain limitations. First, such studies do not provide an understanding of individuals' investment decision-making processes. Second, they are subjected to a variety of confounding influences. For example, these studies are unable to control for economic conditions or changes in the portfolios of the mutual funds studied.

Another method for investigating the role of ethics in investment decisions is to survey investors to determine their attitudes and demographic characteristics. Studies utilizing this method typically sample those who either request a prospectus of a socially responsible mutual fund (Beal et al., 2005) or are existing investors of a fund promoting social responsibility (Beal et al., 2005; Lewis and Mackenzie, 2000a, b; McLachlan and Gardner, 2004; Williams, 2007). These studies identify attitudes and characteristics that distinguish socially responsible investors from conventional investors. However, they are limited in the ability to determine whether socially responsible investors engage in different decision processes than investors in conventional funds. Again, these studies are conducted in environments with potentially confounding variables. In some cases, investors may select socially responsible mutual funds for reasons other than personal values. For example, these funds may be selected because they provide higher returns, incur lower management fees, or offer better portfolio diversification.

Studies that survey actual investors in socially responsible and conventional mutual funds are also limited because investors are classified in a strictly dichotomous manner as either socially responsible or conventional.[5] Mutual funds are typically classified as socially responsible based on positions regarding a wide variety of social issues, including environmental considerations and vice avoidance.[6] Investors seeking environmentally friendly investments might have significantly different personal values than those seeking investments that are free of "vice." Further, investors' definitions of "vice" may vary widely.

Sandberg (2007) stresses that understanding SRI requires observation of consistency between personal values and a potential investment. Previous studies provide initial insight regarding this relationship when investor classes are defined broadly and investors are observed collectively. However, a more

thorough understanding of this relationship might be gained by observing the degree of consistency between individuals' personal values and their investment choices in a controlled environment.

We attempt to gain a better understanding of SRI by using methodologies not previously employed in studying SRI. Specifically, we utilize an experimental design in which participants make an investment decision under controlled conditions. To remove the effects of confounding variables, we limit the investment opportunities, hold investment ratings constant, and specify expected returns. We also simplify participant perceptions regarding social responsibility by examining a *single* ethical issue, tobacco use.

We seek insight regarding two research questions. The first question is similar to those investigated by previous studies, but is examined using different methodology:

RQ 1: Do personal values influence investment decisions?

In previous studies, this question has been investigated by (1) observing differences in investment activities of conventional and socially responsible funds or (2) determining whether the personal characteristics of those who invest in conventional funds differ from those who invest in socially responsible funds. In this study, we attempt to directly observe causality between personal values and investments. We ask participants to choose between an investment in a tobacco company's bond or a non-tobacco company's bond. We next ask the participants about their views regarding a single social issue (the use of tobacco). Finally, we estimate the extent to which these views affect their investment decisions.

We purposely constrained the social content surrounding the investment decision to one issue, tobacco use. Our intent was to overcome limitations in previous studies in at least two ways. First, participants included in previous studies invested in funds that attempt to address multiple social and ethical issues. It is unclear whether investors are attracted to these funds because of the conglomeration of social issues rather than a specific issue addressed by the fund. Narrowing the investment decision to one social issue permitted us to assess values related to that particular issue, measure the effect on the investment decision, and eliminate the noise associated with multiple issues.

Second, we recognized that individuals might have varying strengths of beliefs regarding multiple aspects of a social concern (Hummels and Timmer, 2004). For example, regarding tobacco use, we suspected that the intensity of an individual's beliefs about the use of tobacco in public places could differ substantially from the intensity of beliefs related to the health effects of tobacco. Narrowing the investment choice to a single social concern permitted the investigation of the multiple aspects of one social issue.

Our second research question relates to the interaction between personal values and financial opportunities:

RQ 2: How do personal values interact with financial opportunities when individuals make investment decisions?

To investigate this question, we vary the returns in an experimental investment choice. The yield on the bond of the non-tobacco company is manipulated to be equal to or lower than the yield on the tobacco company's bond. Specifically, we are interested in how feelings regarding tobacco might combine with higher rates of return on the tobacco-related bond to influence the investment decision process.

Research design

In this experiment, participants were asked to make a hypothetical investment based on two actual investment opportunities. One of the investments was a bond issued by a tobacco company.[7] The other investment was a bond issued by a company that produces specialty steels and alloys (the "non-tobacco company"). After choosing between the two investments, each participant responded to two follow-up surveys regarding his or her investment preferences and opinions about tobacco-related issues, respectively.

Task

Participants were given the opportunity to make a hypothetical $10,000 investment in the bonds of one

of two actual companies. The $10,000 investment would be part of a well-diversified $250,000 portfolio. One of the two bonds had been issued by a tobacco company, while the other bond was issued by a non-tobacco company. Both bonds matured approximately several years from the date of the experiment and paid semi-annual interest over that period of time. Both bonds also had similar levels of risk indicated by identical ratings of BBB by Standard and Poor's, a leading credit rating agency. Participants were provided with information regarding each bond issue, such as the interest rate, maturity date, credit rating, and the use of the bond proceeds. They were also provided with a one-page summary of the issuing company by Value Line that included information such as the nature of the company's business, prospects for the near future (including risks), and 10–15 years worth of financial data.[8]

We utilized a 1×3 between-subjects design, in which the difference in bond yield served as the independent variable, and the investment decision was the dependent variable. Each participant was randomly assigned to one of three experimental treatments. We manipulated the yields on the bond of the non-tobacco company so that these yields differed between treatments. In the first treatment, the yields provided by the two bonds were identical. Since the bonds matured within 2 months of one another and they were both rated identically (BBB) by Standard and Poor's, the choice in this condition was between essentially equivalent investments.[9] In the second and third treatments, we reduced the yield on the non-tobacco company bond to levels that were 50 basis points (one half of a percent) lower and 100 basis points (a full percentage point) lower, respectively, than the yield on the bond of the tobacco company.[10] Our intent was to allow participants to consider, under various rate differential scenarios, their personal values regarding investing in a tobacco manufacturing company. The instruction page for the decision task is presented in the Appendix, along with the bond descriptions.[11]

In general, the investment choices in this experiment differed in only two ways. First, the investments differed regarding the use of the bond proceeds. The proceeds of the tobacco company bond would be used for facilities related to the manufacturing of tobacco products. The proceeds of the non-tobacco bond would be used to expand steel and alloy producing facilities. Second, the investment choices differed in yield (except in the first treatment which served as a control).

On the same day the participants made the investment decision, they were asked to complete the first of two follow-up surveys, the "investment survey." The intent of this survey was to determine the role played by financial considerations in the participants' decision-making processes. The survey consisted of 14 items that individuals might consider when making an actual investment decision, such as risk, cash flow, earnings, and use of proceeds (identified in the Appendix). Prior to use, the survey was piloted with individuals who had extensive experience making actual investment decisions of this nature.

When completing the investment survey, participants were asked to consider investments in general rather than the specific investment they had just made. The survey asked the participant to rate each item on a five-point scale from "Very Important" to "Not Very Important" with regard to an investment decision.

After making their investment choices, participants responded to a second follow-up survey, the "tobacco survey." The purpose of the tobacco survey was to assess participants' personal values regarding the use of tobacco. The survey consisted of eight items relating to medical, legal, and societal aspects of tobacco use (see Appendix). In addition, the survey asked about the participants' personal tobacco use. We delayed the delivery of this survey to decrease the association with the investment decision.

Participants

Our participants consisted of 235 undergraduate and graduate business students at two large public universities. The experiment and follow-up surveys were delivered in class, and participation was voluntary, non-compensated, and anonymous.[12] All participants had taken classes that would familiarize them with bond instruments as an investment choice. Responses provided by 19 of the participants were unusable due to failure to answer one or more questions used in our analysis. Therefore, our sample

comprised 216 participants who provided answers to all of the questions.

Table I contains demographic data for our participants. The participants in our sample are predominantly male (57.9%). A majority of participants were between 21 and 25 years in age (81.5%). Only 10.6% of our participants describe themselves as current (consistent or casual) tobacco users,[13] and 79.2% indicate they have never used tobacco.[14]

Analysis and results

Descriptive statistics and initial data analysis

Each participant was presented with one of three scenarios (treatments) in which he or she decided between investing in a bond issued by a tobacco company or a bond issued by a non-tobacco company. The yield to maturity of the non-tobacco bond differed in each treatment. In all three treatments, the tobacco company bond offered a yield to maturity of 6.731% and both bonds shared the same credit rating. In Treatment 1, the non-tobacco bond offered the same yield to maturity. An investor evaluating the two potential investments based on rates of return and credit ratings might view the two investments in Treatment 1 with indifference.

The non-tobacco company bond offered a lower yield to maturity than the tobacco company's bond in Treatment 2 and in Treatment 3. The spread between the two bonds' yields was 50 basis points (0.5%) in Treatment 2 and 100 basis points (1%) in Treatment 3. Sandberg (2007) notes that understanding SRI entails observation of consistency between personal values and investment. The latter two treatments were intended to test whether investors whose personal values were inconsistent with tobacco use would be willing to sacrifice return to obtain consistency between their investment choice and their personal values. Table II presents data on the investment choices of participants in each treatment.

When the returns offered by the two bonds were equal (Treatment 1), 47 of 73 investors (64.4%) chose the non-tobacco bond. The subtraction of 0.5% or 1% of return from the non-tobacco company's bond results in movement away from that company's bond, as 71 of 143 (49.7%) participants in Treatments 2 and 3 chose the tobacco company's bond.

In summary, the results presented in Table II indicate that a sizable number of participants in each treatment found each of the two investment alternatives attractive. Even when the non-tobacco bond was at a yield disadvantage, relative to the tobacco bond, almost half the participants chose the non-tobacco bond. This suggests that some participants might have been willing to sacrifice yield to invest in a manner consistent with their values. The factor analysis and logistic regression presented below allowed us to better isolate the extent to which financial concerns and personal values, as well as interactions between such factors, influenced participant decisions in our study.

Factor analysis

We perform an exploratory factor analysis to identify common factors captured in responses to debriefing questions the participants answered. We use principal components factor analysis with varimax rotation to identify constructs that potentially influence an investment choice. Each construct is identified by combining responses to two or more questions answered by our participants, facilitating creation of a reasonably parsimonious model of the investment decision process.

We include in our factor analysis questions from both the investment survey and tobacco survey presented in the Appendix. Our analysis identified five logical constructs based on combinations of responses to questions answered by our participants. The factors are identified in Table III. We omit loadings with absolute values of 0.40 or below from Table III.[15] Each resulting factor had a Cronbach alpha statistic of >0.60, indicating reasonable reliability among items within each factor.

Three of the five identified factors reflect financial aspects of investment analysis. The variables that load on the first factor, *Corp Data*, represent participants' responses to questions about the importance they attach to corporate performance and financial trends when making investment decisions. Participants with high values for *Corp Data* consider financial statement figures and trends relatively important when making investment decisions. Participants with high values for *Risk* and *Repay* also place high importance on what might be thought of as traditional investment

TABLE I

Participant demographics

	n	%
Panel A: Participants included in the study		
Surveys distributed	235	
Surveys with missing data	19	
Included in analysis	216	
Panel B: Gender		
Male	125	57.9
Female	91	42.1
Total	216	100.0
Panel C: Age		
21–25	176	81.5
26–30	24	11.1
31–35	6	2.7
36–40	4	1.9
41–45	2	0.9
46–50	2	0.9
51–56	1	0.5
56–60	1	0.5
Total	216	100.0
Panel D: Tobacco use		
Consistent user	7	3.2
Casual user	16	7.4
Former user	22	10.2
Never used	171	79.2
Total	216	100.0

considerations. Participants with high values for the factor labeled *Risk* prefer investments that they feel exhibit low levels of risk, offer high degrees of safety, and are suitable for conservative investors. Participants who exhibit high values for the *Repay* factor are also concerned about investment safety in that they seek investments in bonds of companies they believe have the ability to meet principal and interest payments.

The two other identified factors relate to personal values regarding the use of the investment proceeds or the use of tobacco. These factors represent less traditional considerations with respect to potential investments. Participants with high scores for the *Health* factor are likely to believe tobacco is linked to significant health problems and that tobacco products are both addictive and unsafe. Before he or she decides to make an investment, a participant with a high score on the *Society* factor considers whether the proceeds from that investment will be used in a manner that, in his or her opinion, benefits society.[16]

Logistic regression

The experimental decision entailed a dichotomous choice, whether to invest a hypothetical $10,000 in the bonds of a tobacco company or a non-tobacco company. Since this dichotomous choice variable is the dependent variable in our study, we employ logistic regression to identify variables that explain participants' investment choices.

TABLE II

Investment selection by rate differential

Treatment	Rates	Rate differential[a]	Investment selection		Total
			Tobacco	Non-tobacco	
1	Tobacco – 6.731% Non-tobacco – 6.731%	0	26 (35.6%)	47 (64.4%)	73 (100.0%)
2	Tobacco – 6.731% Non-tobacco – 6.231%	0.5%	39 (54.9%)	32 (45.1%)	71 (100.0%)
3	Tobacco – 6.731% Non-tobacco – 5.731%	1%	32 (44.4%)	40 (55.6%)	72 (100.0%)
		Total	97 (44.9%)	119 (55.1%)	216 (100.0%)

[a]The rate differential refers to the excess of the tobacco company bond's yield over the yield offered by the non-tobacco company's bond.

TABLE III

Factor analysis of investment decision predictors' (varimax rotation)

Item	Description	Factor 1 (Corp Data)	Factor 2 (Health)	Factor 3 (Risk)	Factor 4 (Society)	Factor 5 (Repay)
I 8	The investment has higher than average revenue projections for the next several years	0.770				
I 12	The investment has higher than average earnings projections for the next several years	0.724				
I 10	The investment has higher than average cash flow projections for the next several years	0.724				
I 9	The investment has demonstrated high rates of cash flow growth in the past 5–10 years	0.671				
I 11	The investment has demonstrated high rates of earnings growth in the past 5–10 years	0.605				
I 4	The investment has recently reported results that were significantly better than expected.	0.536				
I 7	The investment has demonstrated increased revenue growth in the past 5–10 years	0.526				
T 5	Tobacco products are not safe to use		0.755			
T 2	Tobacco use is responsible for a significant portion of health problems in our society		0.743			
T 3	Significant medical problems are strongly linked to tobacco use		0.708			
T 4	Tobacco use potentially leads to addictive behavior		0.656			
T 1	Tobacco use should be eliminated in public places		0.498			
I 5	The investment has lower risk compared to the market in general			0.820		
I 1	The investment has a high degree of safety			0.746		
I 6	The investment is suitable for conservative investors			0.624		
I 14	The investment proceeds will be used in a way that I find productive				0.866	
I 13	The investment proceeds will be used in a way that benefits society.				0.850	
I 3	The investment is likely to repay the principal at maturity					0.830
I 2	The investment has the ability to meet interest payments					0.801
	Eigen value	3.154	2.523	2.011	1.552	1.388
	Cronbach alpha	0.779	0.693	0.644	0.787	0.609

This table presents factor patterns generated by a principal components analysis with varimax rotation for 19 of the questions from the investment and tobacco questionnaires. Factor loadings with absolute values under 0.40 are omitted to enhance readability ($N = 216$).

We utilized two models in our analysis. The purpose of the initial logistic regression model was to identify which of the six factors the participants considered important in making their investment decision. The initial model also included demographic variables relating to gender and education. After identifying the most important factors from the initial model, we employ those factors in a second

model that includes treatment conditions and interaction effects. Our initial logistic regression model is represented by Eq. 1.

$$P(\textit{Invest Choice}) = \lambda_0 + \lambda_1\ \textit{Corp Data} + \lambda_2\ \textit{Health} + \lambda_3\ \textit{Risk} + \lambda_4\ \textit{Society} + \lambda_5\ \textit{Repay} + \lambda_6\ \textit{Gender} + \lambda_7\ \textit{Age} + \varepsilon, \quad (1)$$

in which *Invest Choice* = 1 if the participant chose the non-tobacco company's bond, 0 if the participant chose the tobacco company's bond, *Corp Data* = factor score representing importance to participant of corporate performance data in an investment decision, *Risk* = factor score representing the importance to participant of risk factors in an investment decision, *Repay* = factor score representing the importance to participant of the ability of a borrower to repay the interest and principal of debt instrument, *Health* = factor score representing participant's agreement with statements indicating that tobacco has adverse effect on heath, *Society* = factor score representing importance to participant that the proceeds from his or her investment are used in a manner that is productive or benefits society, *Gender* = 1 if the participant was male, 0 if the participant was female, *Age* = 1 if the participant's age is over 25, 0 if the participant's age is 25 or under.

The results of the initial logistic regression are presented in Table IV. Wealth-maximizing models of investment choice suggest that investors make investment decisions based on strategies for maximizing wealth (Shefrin, 2005; Tetlock and Mellers, 2002). None of the three factors related to what might be termed a "traditional" investment strategy (*Corp Data*, *Risk*, and *Repay*) is significant in predicting investment choice using the model in Eq. 1.[17]

The two variables relating to personal values regarding tobacco use, *Society* and *Health*, were statistically significant in explaining the investment choice. *Society* is highly significant ($p < 0.0001$) in determining whether a non-tobacco investment was selected instead of a tobacco investment. Participants with high values on this factor are especially concerned about the societal implications and productive use of the proceeds from their investments. The significance of the variable *Society* in the initial model indicates that this aspect of personal values played an important role in many participants' decisions. A one-unit increase in the value of *Society* is associated with an increase of slightly more than 1.3 times in the odds of a participant choosing the non-tobacco bond over the tobacco bond.[18] Strong beliefs about the negative health effects associated with tobacco use (*Health*) were also significantly ($p = 0.039$) related to the investment selection with higher scores on this factor increasing the likelihood of choosing the non-tobacco bond. Neither of the demographic factors (*Gender* and *Age*) considered in Eq. 1 was significant in predicting the participants' investment choices.[19]

In order to answer our second research question, which asks whether values interact with financial opportunities, we investigated interaction effects between the treatment conditions in our survey and the factors identified in our factor analysis. Initially, we ran a model (results not presented) including interactions of each of the five factors (*CorpData*, *Health*, *Risk*, *Society*, and *Repay*) with two treatment variables (*Treatment* 2 and *Treatment* 3). In that model (not presented), the following interactions were significant: *Society* and *Treatment* 2 ($p = 0.098$); *Society and Treatment* 3 ($p = 0.033$); *Repay* and *Treatment* 3 ($p = 0.082$). None of the interactions between the treatment variables and *Corp Data*, *Health*, or *Risk* were significant. Next, a model (results not presented) including interactions of both treatment variables with *Repay* and *Society* was run. The treatment interactions with *Society* remained statistically significant, but neither of the treatment interactions with *Repay* was significant. Therefore, our final model included *Treatment* 2, *Treatment* 3, *Health* (based on its significance in Table IV), *Society*, and interactions of the treatment conditions with *Society* as predictors. *Treatment* 1, the treatment in which the interest rates associated with the bonds were equal, was used as a control condition. The final model is represented below as Eq. 2 and its results are presented in Table V.[20]

$$P(\textit{Invest Choice}) = \lambda_0 + \lambda_1\ \textit{Treatment}\ 2 + \lambda_2\ \textit{Treatment}\ 3 + \lambda_3\ \textit{Health} + \lambda_4\ \textit{Society} + \lambda_5\ \textit{Treatment}\ 2^{*}\textit{Society} + \lambda_6\ \textit{Treatment}\ 3\ ^{*}\textit{Society} + \varepsilon, \quad (2)$$

in which *Invest Choice* = 1 if the participant chose the non-tobacco company's bond, 0 otherwise; *Treatment* 2 = 1 if the non-tobacco bond's yield exceeded the tobacco bond's yield by 0.5%,

TABLE IV

Logistic regression of choice between tobacco and non-tobacco investments

$P(Invest\ Choice) = \lambda_0 + \lambda_1\ Corp\ Data + \lambda_2\ Health + \lambda_3\ Risk + \lambda_4\ Society + \lambda_5\ Repay + \lambda_6\ Gender + \lambda_7\ Age + \varepsilon$

Variable	λ	Standard error	Wald statistic	Significance	% Change in odds[a]
Corp Data	−0.237	0.151	2.473	0.116	−21.1
Health[#]	0.315	0.152	4.280	0.039	37.0
Risk	−0.015	0.151	0.010	0.922	−1.5
Society[*]	0.858	0.172	24.746	0.000	135.8
Repay	0.066	0.152	0.191	0.662	6.9
Gender	0.447	0.316	2.000	0.157	56.4
Age	−0.214	0.382	0.315	0.575	−19.3
Constant	0.013	0.245	0.003	0.959	−98.7
n		216			
χ^2		36.232			
Cox and Snell (Pseudo) R^2		0.154			

Invest Choice = 1 if the participant chose the non-tobacco company's bond, 0 if the participant chose the tobacco company's bond; *Corp Data*, factor score representing importance to participant of corporate performance data; *Risk*, factor score representing the importance of risk factors in participant's investment decision; *Repay*, factor score representing the importance to the participant of the ability of a borrower to repay the interest and principal of debt instrument; *Health*, factor score representing participant's agreement with statements indicating that tobacco has adverse effect on heath; *Society*, factor score representing importance to participant that the proceeds from his or her investment are used in a manner that is productive or benefits society; *Gender* = 1 if the participant was male, 0 if the participant was female; *Age* = 1 if the participant's age is over 25, 0 if the participant's age is 25 or under.

[a]The percentage change in odds is equal to $(\exp(B) - 1)^*100$. This value is the percentage change in odds that the participant chooses the non-tobacco investment when the value of the predictor variable changes by one unit.

[#], [*] Significant at the 0.05 and 0.01 levels, respectively.

0 otherwise; *Treatment* 3 = 1 if the non-tobacco bond's yield exceeded the tobacco bond's yield by 1.0%, 0 otherwise; *Health* = factor score representing participant's agreement with statements indicating that tobacco has adverse effect on heath; *Society* = factor score representing importance to participant that the proceeds from his or her investment are used in a manner that is productive or benefits society.

The results presented in Table V indicate that *Health*, the factor reflecting the extent to which a participant believes smoking presents health hazards, is a significant ($p = 0.058$) predictor of investment choice in this experimental setting. Higher loadings on the *Health* factor are associated with a higher probability of choosing the non-tobacco bond. In a finding more directly bearing on our second research question, we detected a significant interaction effect between *Treatment* 3, the condition in which the tobacco bond's yield exceed the non-tobacco bond's yield by a full point, and *Society*, the factor indicating the extent to which a participant considers the effects of his or her investment on society. Thus, when the yield difference between the bonds grows to a full point, the importance of a participant's concerns about the societal implications of his or her investment grows. In other words, as the opportunity cost of investing in accordance with one's values grows, the strength of those values takes on added importance. The most important implication of this finding is that, when returns on investments with socially undesirable characteristics exceed returns on socially responsible investments, the strength of investors' personal values becomes particularly important in determining their investment choices.[21]

TABLE V

Logistic regression of choice between tobacco and non-tobacco investments

$P(Invest\ Choice) = \lambda_0 + \lambda_1\ Treatment\ 2 + \lambda_2\ Treatment\ 3 + \lambda_3\ Health + \lambda_4\ Society + \lambda_5\ Treatment\ 2^{*}Society + \lambda_6\ Treatment\ 3^{*}Society + \varepsilon$

Variable	λ	Standard error	Wald statistic	Significance	% Change in odds[a]
Treatment 2^	−0.732	0.363	4.061	0.044	−51.9
Treatment 3	−0.482	0.373	1.669	0.196	−38.3
Health#	0.299	0.158	3.605	0.058	34.9
Society#	0.406	0.225	3.245	0.072	50.1
Treatment 2*Society	0.527	0.381	1.907	0.167	69.3
Treatment 3*Society^	0.914	0.425	4.619	0.032	149.5
Constant^	0.614	0.254	5.864	0.015	84.8
n		216			
χ^2		40.923			
Cox and Snell (Pseudo) R^2		0.173			

Invest Choice = 1 if the participant chose the non-tobacco company's bond, 0 otherwise; *Treatment* 2 = 1 if the non-tobacco bond's yield exceeded the tobacco bond's yield by 0.5%, 0 otherwise; *Treatment* 3 = 1 if the non-tobacco bond's yield exceeded the tobacco bond's yield by 1.0%, 0 otherwise; *Health*, factor score representing participant's agreement with statements indicating that tobacco has adverse effect on heath; *Society*, factor score representing importance to participant that the proceeds from his or her investment are used in a manner that is productive or benefits society.

[a]The percentage change in odds is equal to $(\exp(B) - 1)^{*}100$. This value is the percentage change in odds that the participant chooses the non-tobacco investment when the value of the predictor variable changes by one unit.

#,^ Significant at the 0.10 and 0.05 levels, respectively.

Implications, extensions, and limitations

This study expands existing research by utilizing a unique experimental approach to determine the effects of values on an investment decision. Previous research classified an investor dichotomously as ethically minded (or not) according to whether they participated in a socially responsible mutual fund (e.g., Lewis and Mackenzie, 2000b; Webley et al., 2001). This research measures the personal values held by the investor in a multi-faceted way. In addition, previous studies did not observe investor behavior within a particular investment decision. In this experiment, participants were presented with investment choices related to specific instruments and monetary amounts. As such, we were able to directly relate specifically held values to an investment decision.

We identify two important conclusions in this study. First, consistent with studies that used a non-experimental approach we found that investors consider personal values in addition to financial factors in choosing investments. These results are consistent with previous studies that utilized different methodologies (see Beal et al., 2005 and Sparkes, 1998 who survey existing and potential investors of socially responsible funds).

Second, we found that personal values interact with expected rates of return to determine an investment choice. If a tobacco-related investment offered a rate of return that was 1% greater than a non-tobacco investment, the propensity to choose a non-tobacco investment was highly dependent on the participant's concern about the societal implications of his or her investment.

The results of this study have implications for both investment decision-making and social responsibility literatures. First, much of the literature pertaining to investment incorporates financial factors only. This study lends additional support to utilizing non-financial data in investment decision-making models.

Second, literature concerning SRI has typically classified investors dichotomously as socially responsible or not. We found that SRI can relate to a single issue, such as tobacco use, and that classifying

an investor based on a variety of values may not be realistic. In addition, we found that investors differed in their opinions regarding tobacco use over a wide range. Accordingly, the dichotomous classification of socially responsible investors is potentially an oversimplification. Future studies would likely benefit by measuring social responsibility on a continuous, rather than a dichotomous, scale.

Awareness that individuals are more likely to seek investment opportunities consistent with their personal values has practical implications in two areas. First, conventional mutual funds tend to emphasize financial aspects of the funds. Evidence that some investors incorporate social values in the investment decision should potentially motivate mutual fund managers who seek these investors to create greater awareness of the criteria for selecting fund investments. Second, this study confirmed previous findings that socially oriented investors are willing to accept lower returns. Corporate executives should consider the possibility that creating an awareness of socially desirable behavior can reduce the cost of capital.

Our experiment is subject to several limitations. Consideration of these limitations could provide opportunities for future research. The participants in our investments were arguably younger than the "typical" investor. While some studies have found youth to be one factor that distinguishes socially responsible investors (Rosen et al., 1991), others have not found demographic differences (McLachlan and Gardner, 2004; Williams, 2007). However, the fact that we find a clear link between the importance participants place on the effects of their investments on society and their investment choices does not rule out the possibility that there might be important generational differences in the manner in which personal values affect investment choices. Future research might attempt to answer the question of whether younger investors attach more weight than older investors to personal values when making investment decisions.[22] In addition, the participants in our experiment utilized hypothetical funds in the investment choice. Potentially, the use of personal wealth could affect the results.

We purposely simplified the investment decision in this study to isolate key variables. The investment decision in this experiment consisted of a choice between two relatively uniform bonds, except for the intended use of the proceeds. Actual investment decisions are likely more complex than the choice required in this experiment. Actual investment decision processes might involve other factors that we held constant, such as greater variation in risk, capital gains, dividends (in the case of stock), and tax consequences. As a result, the generalizability of our results is limited in this regard.

Likewise, the experiment in the study addresses an investment decision that addresses a single social issue, tobacco use. The findings that the investment decision regarding a tobacco-related bond is affected by beliefs regarding the social impact of smoking are, of course, not generalizable to other investment decisions that are influenced by the context of other social influences.

Finally, future research may benefit by employing different investment vehicles. In particular, investment in common stock might affect the results since that type of investment represents ownership and could heighten the stakes with regard to social responsibility.

Notes

[1] The industry reports an 18% growth rate from 2005 to 2007 of 18%, increasing from $2.29 trillion in 2005 (Social Investment Forum, 2008).

[2] Negative screening refers to eliminating investments that do not have certain criteria, while positive screening includes those that meet established criteria.

[3] An exception would be Hussein and Omran (2005) who found that Islamic funds yield economically and statistically significant positive abnormal returns from 1996 to 2003.

[4] The Domini family of mutual funds invests in securities based on certain social responsibility criteria.

[5] Definitions of social responsibility lack both specificity and consistency (McLachlan and Gardner, 2004). Shank et al. (2005) note that "there are as many perspectives of social responsibility investing as there are options for investors."

[6] See http://www.socialinvest.org/resources/mfpc/screening.cfm for summaries of screens for socially motivated funds.

[7] We considered several issues in selecting a tobacco corporation as an investment choice. First, to maintain realism, we wanted actual companies with actual bond issues. Second, we wanted the corporation to participate in an industry that inspired a wide range of opinions. While some consider tobacco to be a staple product,

others consider the product harmful. As opposed to other social issues, we believed that tobacco use had a longer history of scientific study that enabled individuals to form an educated opinion regarding the issue. Third, we desired a corporation that *purposefully* engaged in the controversial social activity as their primary business. In this scenario, the tobacco company sold bonds specifically to expand tobacco production.

[8] Value Line is an independent provider of information and analyses regarding corporate investments to subscribers. Value Line was not particularly sanguine about either company's near-term prospects. Value Line's comments about one of the companies' stocks noted that it expected that stock to "lag the market in the year ahead." Value Line's commentary on the other company's shares stated that they "are not particularly appealing."

[9] We asked participants to offer open-ended comments regarding what influenced their choice of investments. In no case was length of maturity mentioned.

[10] In the first condition, both bonds yielded 6.731%. In the second and third conditions, the yield on the non-tobacco company's bond was lowered to 6.231 and 5.731%, respectively.

[11] The descriptions of the bonds in the other two treatments were identical to the description presented in Appendix, except for the non-tobacco bond's effective yield, which was varied for each treatment.

[12] Approval for use of human subjects was received by both co-authors from their respective universities.

[13] This compares to a US average of 20.8% smokers of adults aged 18 and over (Center for Disease Control, 2008, p. 57) and to 19% among college students (Johnston et al., 2008). Lower rates are potentially explained by the data being collected in parts of the US that does not produce tobacco. Additionally, subjects may have understated their smoking status due to a social desirability bias (Nunnaly and Bernstein, 1994, pp. 382–384).

[14] Chi-square tests indicate that demographic factors are not associated with investment choices made by subjects in this study.

[15] Kachigan (p. 252) lists 0.3, 0.4, and 0.5 as values most often used as lower bounds in practice. Our lower bound falls in the middle of this range. Similar results were found by using higher loading criteria.

[16] We considered whether investment preferences expressed by subjects in Treatment 3 resulted from values that were distinctly different from subjects included in Treatments 1 and 2. We performed a *T* test of the means for each factor for subjects in each treatment. These tests revealed no difference between the factor means for the subjects in each treatment. The results increase the likelihood that investment choice was motivated by the treatment or the values held by the individual subject, rather than differences in the values between particular subsamples.

[17] This finding should not be interpreted to mean that concerns about corporate performance or risk are not important considerations in a number of investment decisions. The insignificance of these factors in this experiment was likely due to the similarity of the risk and performance levels of the companies issuing bonds in this experiment.

[18] This variable's value ranges from −3.18 to 2.19 in our sample. Due to the factor analysis techniques used to construct this variable, its mean is zero and its standard deviation is 1.0.

[19] We were also interested whether tobacco users (consistently or casually) might be more inclined invest in a tobacco producing company. Inclusion of this variable in the model in Table IV had some influence on the levels of significance, primarily related to the independent variable related to health. We conducted *T* tests of the factor means to determine whether tobacco users differed in any of the values determined in Table III. The *T* test revealed that tobacco users differed with regard to one factor, Factor 2 which relates to health. Smokers were less likely to believe that tobacco use is linked to medical problems, leads to addictive behavior, and that tobacco is not safe to use. We determined that a significant degree of collinearity existed between Factor 2 (Health) and a dummy variable related to whether or not the participant used tobacco and did not use the tobacco use variable in further analysis.

[20] The results of the interaction models that are not presented are available from the authors upon request.

[21] It might be argued that more significant results might be found had we included a treatment with a even greater yield differences (e.g., 1.5%). While that might be the case, we felt that similar bond ratings would not have been maintained under wider rate differences. In other words, in an actual financial market a company such as the non-tobacco company used in this study with a rate of 5.231% would likely be perceived as having less risk and carry a higher bond rating.

[22] We attempted to determine whether those of investing age (presumed to be 26 years and over) had values (as measured by the resulting factors) that differed from younger participants. *T* tests of factor means of the divided sample revealed no significant differences between factor means of older and younger participants. While a population of "seasoned investors" would have been preferable for this experiment, there is some assurance that those of investing age had similar views regarding investment and tobacco use as their younger counterparts.

Appendix: Experimental instrument and follow-up questionnaire summary

Experimental instrument summary

Instructions: You have been given $10,000 to invest. The investment will be part of a $250,000 portfolio that you personally own. Currently, your portfolio is well diversified and is earning a return that meets your intended goals.

The conditions of the investment are:

- You must invest the entire $10,000.
- The investment must be in a fixed-rate bond of one company described below.
- Please carefully consider the reasons for making your investment. We will ask you about the reasons for your choice after you make your selection.

Carefully review the attached analyst's descriptions for the corporations. When you have finished indicate the corporate bond that you would purchase.

Investment choices:

First follow-up survey

The first follow-up survey was administered immediately after the experiment. Subjects indicated whether they considered the item to be very important (5), important (4), unsure or Neutral (3), less important (2), or not important (1).

	The investment
I1	Has a high degree of safety
I2	Has the ability to meet interest payments
I3	Is likely to repay the principal at maturity
I4	Has recently reported results that were significantly better than expected
I5	Has lower risk compared to the market in general
I6	Is suitable for conservative investors
I7	Has demonstrated increased revenue growth in the past 5–10 years
I8	Has higher than average revenue projections for the next several years
I9	Has demonstrated high rates of cash flow growth in the past 5–10 years
I10	Has higher than average cash flow projections for the next several years
I11	Has demonstrated high rates of earnings growth in the past 5–10 years
I12	Has higher than average earnings projections for the next several years
I13	Proceeds will be used in a way that benefits society
I14	Proceeds will be used in a way that I find productive

Bond Issuer	Reynolds American, Corp.	Carpenter Technology, Corp.
Maturity date	6/1/2018	4/20/2018
Yield to maturity rate	6.731%	6.731%[a]
Bond Rating	BBB	BBB
Use of proceeds	The net proceeds from the sale of these bonds may include the repayment and refinancing of outstanding debt, additions to working capital, capital expenditures or the financing of possible acquisitions or business expansion. *Note*: Proceeds of past bond issues with this description have been primarily used to expand tobacco producing facilities	The net proceeds received by the company from the sale of the debentures offered hereby will be used for general corporate purposes. *Note*: Proceeds of past bond issues with this description have been primarily used to expand steel and alloy producing facilities
Other	Sold at 107.632; $204.90 accrued interest; $387.50 semiannual interest payments; 10,000 at maturity	Sold at 101.93; $345.60 accrued interest; $349.50 semiannual interest payments; 10,000 at maturity

[a]In one of the three treatments, the rate on the Carpenter Technology Corp. bond was 6.731%. In the second and third treatments, this rate was changed to 6.231 and 5.731%, respectively.

Second follow-up survey

The second follow-up survey was administered a few weeks after the experiment. Subjects indicated whether they strongly agree (5), agree (4), unsure or neutral (3), disagree (2), or strongly disagree (1).

T1	Tobacco use should be eliminated in public places.
T2	Tobacco use is responsible for a significant portion of health problems in our society.
T3	Significant medical problems are strongly linked to tobacco use
T4	Tobacco use potentially leads to addictive behavior
T5	Tobacco products are not safe to use

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