

Investing in stocks: The influence of financial risk attitude and values-related money and stock market attitudes

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Received 10 September 2004; received in revised form 21 July 2005; accepted 29 July 2005

Available online 6 October 2005

Abstract

This study examined the influence of financial risk attitude, money attitudes (achievement, power, obsession, budget), negative ethical stance toward the stock market, income, and gender on willingness to invest in stocks. Data were collected from a representative mail survey conducted in Switzerland ($N = 1569$). Structural equation modeling procedures were used to test the regression model. In a first step, the model was explored in an initial random sample and cross-validated in an additional random sample. In a second step, multi-group analyses were carried out across the following four groups: (1) men who have an investment account ($n = 392$), (2) women who have an investment account ($n = 213$), (3) men who do not have an investment account ($n = 466$), and (4) women who do not have an investment account ($n = 421$). The results show that the measurement models of the latent variables across groups were partially invariant. In all four groups, financial risk attitude was a significant positive predictor, and viewing the stock market as unethical a significant negative predictor, of willingness to invest in stocks. Income was a significant positive predictor for men with an investment account, and the money attitude budget was a significant negative predictor for men and women who do not have an investment account. In contrast, achievement had no significant influence on willingness to invest in stocks in any group.

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JEL classification: D81; G10

SycINFO classification: 3920

Keywords: Investing in stocks; Financial risk attitude; Ethical stance toward the stock market; Money attitudes; Gender

1. Introduction

Private investment in shares and securities has risen in importance in recent years. More and more people invest their money in stocks. One reason is the need to secure income for retirement (Clark-Murphy & Soutar, 2004; Dreman, Johnson, MacGregor, & Slovic, 2001). With the current societal developments in the industrialized countries, individuals are supposed to take increased personal responsibility for their retirement incomes. The population is becoming increasingly older, whereas the percentage of the working population is in continual decline. This is straining the financing of the social security systems of most governments. One possible way of taking personal responsibility is investing in shares and securities. For this reason, it is of great interest to find out what factors promote or inhibit investing on the stock market. The goal of the present study is to identify relevant factors that can affect people's willingness to invest in stocks.

Various studies have been conducted on the psychology of investing (Wärneryd, 2001). A number of relevant psychological factors have been found: beliefs, preferences, and psychological biases (Daniel, Hirshleifer, & Teoh, 2002; De Bondt, 1998; Hilton, 2001; Kahneman & Riepe, 1998), locus of control (McInish, 1982), affect associated with industries (MacGregor, Slovic, Dreman, & Berry, 2000), social unacceptability of firms that are perceived as creating risks to health, safety, and the environment (Fischhoff, Nadai, & Fischhoff, 2001), attitude toward saving (Euwals, Eymann, & Borsch-Supan, 2004), and risk attitude (Carducci & Wong, 1998; Morse, 1998; Tigges, Riegert, Jonitz, Brengelmann, & Engel, 2000; Wärneryd, 1996; Wood & Zaichkowsky, 2004). To date, however, little is known about the influence of values-related money attitudes and ethical stance toward the stock market on decisions to purchase stock. People invest in stock in the expectation that they will make profits and increase their capital. It seems plausible to assume that the meaning that people ascribe to money will also have an influence on their willingness to invest in stocks. Private investors also make stock purchasing decisions with ethical considerations in mind (Webley, Lewis, & Mackenzie, 2001; Winnett & Lewis, 2000). In the present study, we investigate the extent to which – in addition to financial risk attitude, which is the most important psychological factor – values-related attitudes toward money and the stock market influence decisions to invest in stocks.

2. Theoretical background

2.1. Financial risk attitude

A number of empirical studies have demonstrated that people who are prepared to take risks buy stocks more often than less risk-oriented persons (Clark-Murphy & Soutar, 2004; Tigges et al., 2000; Wärneryd, 2001; Wood & Zaichkowsky, 2004). Wärneryd

(2001) provides an overview of these studies. Whereas no or little correlation has been found between general risk attitude and risky investment choices by individual investors (Morse, 1998; Wärneryd, 1996), there is a significant correlation between the more specific investment risk attitude, which captures the risk propensity in investing, and the riskiness of investment portfolios (Wärneryd, 1996). This is in accord with the hypothesis that risk taking is domain specific (Weber, Blais, & Betz, 2002). In addition, people with high incomes (Cicchetti & Dubin, 1994; Grable, Lytton, & O'Neill, 2004) and men (Grable et al., 2004; Weber et al., 2002) have more positive attitudes toward financial risk taking than people with lower incomes and women.

Investing in the stock market holds out the promise of opportunities for financial gains. Still, most people do not invest in stocks, putting their money instead into savings accounts or real estate (Gunnarsson & Wahlund, 1997). According to Prospect Theory's model of risky choice (Kahneman & Tversky, 1979; Tversky & Kahneman, 1992), this is to be expected because most people show risk aversion rather than risk seeking when there is a chance to make gains. Chances of making gains are evaluated as too uncertain due to the seeming unpredictability of future stock market developments.

Based on the empirical studies reviewed, our present investigation starts out from the following hypothesis.

Hypothesis 1: Financial risk attitude has a positive influence on willingness to invest in stocks.

2.2. Money attitudes

Money attitudes are the different meanings and values that individuals associate with money. A number of definitions and instruments to capture money attitudes have been developed. Tang (1993) developed a Money Ethic Scale (MES) consisting of an affective (money is good, money is evil), a cognitive (money represents achievement, power, freedom), and a behavioral (budget, handle money carefully) component. Capturing the cognitive and the behavioral dimension, Lim and Teo (1997) developed a combined, parsimonious scale using items from existing scales developed by Furnham (1984), Tang (1992), and Yamauchi and Templer (1982).

Extensive, and in part contradictory, findings are reported in the literature on the influence of demographic variables on money attitudes. Men were found to be more obsessed with money than women (Furnham, 1984) and more likely to use money as a tool to influence and impress others (Lim & Teo, 1997; Lim, Teo, & Loo, 2003; Tang & Gilbert, 1995), whereas women were found to engage in financial planning more often (Lim et al., 2003; Tang, 1993). People with lower incomes were found to be more obsessed with money and more likely to use money for power than people with higher incomes (Furnham, 1984). Some studies found people with lower incomes to be more likely to budget their money carefully (Tang, 1993; Tang & Gilbert, 1995); others observed the opposite (Roberts & Sepulveda, 1999). Studies on the correlation between money attitudes and economic and political values showed that people with a positive money attitude also tended to have high economic values (Tang, 1995). Money attitudes have also been examined in connection with various money behaviors, such as saving (Canova, Manganelli Rattazzi, & Webber, 2005; Gunnarsson & Wahlund, 1997; Watson, 2003) and credit card use (Hayhoe, Leach, & Turner, 1999; Hayhoe, Leach, Turner, Bruin, & Lawrence, 2000; Roberts & Jones, 2001; Tokunaga, 1993).

Little research has been conducted to date on the influence of values-related money attitudes on willingness to invest in stocks. People invest in stocks in the expectation of financial gains and growth of their capital. Increasing their assets is at the same time the most important goal in life for people with high money obsession. Accumulation of money is seen as a reflection of intelligence, achievement, and power as well. We suspect that people with high money obsession and the belief that money is an expression of achievement, intelligence, and power will view investing in stocks as an efficient means of achieving their goals. The financial gains provide a way of implementing their money-related goals and values. Starting from these considerations, we examine the values-related money attitudes achievement, obsession, and power, and we test the following predictions.

Hypothesis 2: Achievement will positively influence willingness to invest in stocks.

Hypothesis 3: Obsession will positively influence willingness to invest in stocks.

Hypothesis 4: Power will positively influence willingness to invest in stocks.

Budget, the behavioral component of attitude toward money, is expected to have a negative influence. This component reflects people's savings habits and careful handling of money (Lim & Teo, 1997). It implies a need for financial security. Since stock investments are connected with uncertainty, people who have a marked need to handle their money carefully will avoid investing in stocks.

Hypothesis 5: The money attitude budget will negatively influence willingness to invest in stocks.

2.3. *Ethical stance toward the stock market*

In economics, increasing attention is being given to the ethical dimension. Studies are demonstrating reciprocity and fairness, trust and cooperation in economic behavior (Fehr & Gächter, 1998). The affective component of money attitude contains the moral meaning that people ascribe to money, or, in other words, their view that money is good or evil (Tang, 1993). Looking at money as something good is correlated with a positive attitude toward the Protestant work ethic (Tang & Gilbert, 1995). In that view, money has a positive meaning if it is earned through conscientious work. It has a negative meaning if excessive love of money leads to unethical behavior (Tang & Chiu, 2003).

That the ethical dimension also plays a role in the investment decisions is shown by “socially responsible investing,” or “ethical investing”: “Ethical Investment involves holding portfolios of financial instruments, typically shares held via unit trust, which avoid ‘bad’ such as armaments, tobacco, or alcohol or promote ‘goods,’ especially environmental responsibility” (Winnett & Lewis, 2000). Empirical studies show that “ethical investors” buy stock in companies based on their moral convictions and on whether they deem corporate behavior to be ethically acceptable, and they invest in companies that obtain their approval even if the predicted gains are lower (Webley et al., 2001). These decision makers thus take into consideration not only expected risk and return when making investment decisions, but also ethical concerns.

To our knowledge, the impact on investing behavior of the ethical stance toward the stock market has yet to be investigated. As outlined above, in the affective component of money attitude, people think that money is ‘good’ or money is ‘evil’, and this assessment plays a role in financial decisions. We therefore assume that people also judge the stock market, where shares are traded for the purpose of making money, according to ethical

aspects. We assume further that this ethical judgment influences investment decisions. People who view profiting from the market as unethical or unfair will invest less in stocks. They will prefer other forms of investment in order to make profits.

Hypothesis 6: Negative ethical stance toward the stock market will negatively influence willingness to invest in stocks.

3. Method

3.1. Participants

To gather the data for the present study, we conducted a questionnaire survey by mail in the German- and French-speaking parts of Switzerland. The questionnaire, with cover letter, was sent to a random sample of addresses from the telephone book. The front page of the questionnaire and the letter requested that the questionnaire be filled out by the person in the household who was older than 18 and had the next birthday coming up. Some time later, we sent out a reminder letter. Finally, all people who had not returned the questionnaire were sent the questionnaire a second time. The questionnaire was completed and returned by 1569 persons. The response rate for German-speaking Switzerland was 40.4% ($n = 964$), and for the French-speaking part 32.2% ($n = 605$).

Forty-three percent ($n = 667$) of the respondents were women, and 57% ($n = 894$) were men. Eight respondents did not report their sex. The mean age was 47.54 ($SD = 16.1$). Eight persons did not report their age. Six percent of the respondents ($n = 90$) had no income, and 10% ($n = 156$) had less than 2000 Swiss francs income per month, 37% ($n = 571$) had between 2000 and 4999, 31% ($n = 470$) between 5000 and 7999, 9% ($n = 142$) between 8000 and 10999 and 7% ($n = 104$) had more than 11000 Swiss francs income per month. Thirty-six respondents did not report their income. Forty-one percent of the respondents ($n = 622$) have an investment account, and 59% ($n = 904$) do not have an investment account. Forty-three respondents did not indicate whether or not they had an investment account.

3.2. Questionnaire

To assess willingness to invest in stocks, negative ethical stance toward stock market, and financial risk attitude, new items were formulated (see Table 2). To tap the cognitive components of money attitude – obsession, achievement, and power – two items for each, respectively, from the relevant scales by Lim and Teo (1997) were used, and for achievement and obsession one new item for each was constructed, adapted from Lim and Teo (1997). The behavioral component budget was captured using three items from the relevant scale by Lim and Teo (1997) and one newly formulated item. In addition to the sociodemographic variables, the questionnaire also tapped monthly income (six categories, from no income to 11,000 CHF or more).

3.3. Data analysis

The postulated hypotheses were tested using a regression model with the dependent variable willingness to invest in stocks and the independent variables financial risk attitude

(hypothesis 1), the money attitudes obsession, power, and achievement (hypotheses 2–4), budget (hypothesis 5), and negative ethical stance toward the stock market (hypothesis 6). Income was included in the regression model as a control variable. We chose a confirmatory approach and implemented structural equation modeling procedures. Parameters were estimated using the EQS program (Bentler, 2004). To test measurement models and models of causal relations, there are various procedures and criteria for determining model fit (Byrne, 1993, 1994a, 1994b; Cheung & Rensvold, 2002; Tang & Chiu, 2003; Vandenberg & Lance, 2000). Like other authors (such as Epitropaki & Martin, 2004), we conducted the data analysis in two steps: (1) exploratory analyses and cross-validation and (2) multi-group analyses (Byrne, 1993, 1994a, 1994b). Assessment of model fit was based on the Comparative Fit Index (CFI), the residual values, the root mean square error of approximation (RMSEA, Bentler, 1990), and the meaningfulness of the model (Hu & Bentler, 1995).

Missing values were replaced using a data imputation procedure based on multiple linear regression analysis. Variables referring to a particular latent variable were used as predictors of the missing value estimates of these variables. Questionnaires by persons that did not report sex and income or did not indicate whether they had an investment account were not included in the analyses. After eliminating these respondents, 1,492 persons were included for data analysis.

3.3.1. *Exploratory analyses and cross-validation*

The data were divided randomly into two samples using the SPSS option for selecting cases for a random sample that allows specification of an approximate percentage of cases. The option makes an independent pseudo-random decision for each case. Specifying 50% in advance, 48% percent of the total cases were selected in sample 1, the calibration sample ($n = 712$), and 52% were selected in sample 2, the validation sample ($n = 780$).

In the calibration sample, we first tested the measurement models of all of the theoretical constructs and then tested the theoretically postulated regression model. If the models did not fit well, the model was re-specified. The Lagrange Multiplier Test (LM test) was used to identify additional parameters that would significantly improve the fit. Adjusting models is a controversial topic, because it implies a more exploratory than confirmatory approach. However, model modifications are not a problem if the new model is cross-validated (Byrne, 1993, 1994a, 1994b; Epitropaki & Martin, 2004). In the validation sample, therefore, the measurement model and the latent regression model were cross-validated by means of nested model comparisons.

3.3.2. *Multi-group analyses*

The distribution of men and women in the group of people who have an investment account differed significantly from the group with no investment account ($\chi^2_{(1)} = 22.11$, $p < 0.01$, $n = 1492$). To avoid confounding the results of the two groups, with and with no investment account, with sex, we conducted multi-group analyses across the following four groups: (1) men who have an investment account ($n = 392$), (2) women who have an investment account ($n = 213$), (3) men who have no investment account ($n = 466$), and (4) women who have no investment account ($n = 421$).

Starting out from the model confirmed by means of cross-validation, the model was first tested for each of the four groups separately. Then the multi-group analyses were carried out in four steps, testing in each successive step a more highly constrained hypothesis:

(1) In the first model, the baseline model, the models for all four groups were included in the analysis simultaneously; (2) in the second model, the invariance of the item measurement across groups was tested. Therefore, factor loadings were constrained to be equal. This step tests whether the content of the items was perceived in the same way in all four groups. Before carrying out the third and fourth steps, redundant covariances and causal paths were identified for each group separately using the Wald test (W test). The Wald test ascertains whether sets of parameters, specified as free in the model, could in fact be simultaneously set to zero without substantial loss in model fit (Byrne, 1994b). Finally, covariances and causal paths that were common to more than one group were tested for their invariance across the relevant groups (Byrne, 1994a, 1994b). Therefore, in addition to the constrained factor loadings, in model 3 the common covariances and in model 4 the common causal paths were constrained to be equal across groups. A non-significant change in chi-square statistics would provide support for generalizability across groups. Since the four models are nested, the difference in χ^2 between the models could be used to assess the change in fit of the model (Byrne, 1993, 1994a, 1994b).

4. Results

4.1. Exploratory analyses and cross-validation

4.1.1. Exploratory analyses in the calibration sample ($n = 712$)

The first model with the latent dependent variable willingness to invest in stocks and the latent independent variables financial risk attitude, the money attitudes (obsession, power, achievement, and budget), negative ethical stance toward the stock market, and income did not yield a good fit to the data ($\chi^2(203) = 566.31$, $p < 0.001$), (CFI = 0.89, RMSEA = 0.05). But inspection of the correlations between the latent variables revealed a very high correlation between the factors obsession and power ($r = 0.53$, $p < 0.001$, $n = 712$), achievement and obsession ($r = 0.85$, $p < 0.001$, $n = 712$), and achievement and power ($r = 0.75$, $p < 0.001$, $n = 712$). Correlations as high as these between latent factors indicate content redundancy, because they approach or exceed the recommended 0.85 ceiling for latent factor correlations (Epitropaki & Martin, 2004; Kline, 1998). A high correlation between obsession and achievement is plausible according to the theory; in a study by Tang (1992) the items from Lim and Teo's, 1997 obsession dimension ("money is the most important goal in my life") and the items from Lim and Teo's, 1997 achievement dimension ("money is a symbol of success") loaded on one factor that Tang called achievement. For this reason, we also combined achievement and obsession into one dimension named achievement. In order to reduce the number of items, we excluded the item with the smallest loading ($a = 0.43$). But the resulting new model did not show better fit ($\chi^2(189) = 558.06$, $p < 0.001$), (CFI = 0.89, RMSEA = 0.05). Because there was also a high correlation between the new factor achievement and the dimension power ($r = 0.60$, $p < 0.001$, $n = 712$), we combined these and excluded the item with the smallest loading ($a = 0.24$). The fit of this modified model was significantly better ($\Delta\chi^2(14) = 86.56$, $p < 0.05$; $\chi^2(175) = 471.50$, $p < 0.001$), (CFI = 0.91, RMSEA = 0.049). The multivariate LM test, however, showed that a correlation between the error terms of two items of the dependent latent variable willingness to invest in stocks ("When I hear the word stocks, my first thought is possible losses" (item 1.4 in Table 2).), ("The uncertainty of whether the markets will rise or fall keeps me from buying stocks" (item 1.3 in Table 2).)

as free parameter rather than fix would lead to a model that better fits the data. Relaxing this parameter seems to be justified due to the content of the items. Both of the items, as compared to the other items of the scale, address the aspect of losses. The modified model with the corrected error terms was significantly better ($\Delta\chi^2(1) = 28.72$, $p < 0.05$) and had a good fit ($\chi^2(174) = 442.78$, $p < 0.001$) (CFI = 0.92, RMSEA = 0.047).

4.1.2. Cross-validation in the validation sample ($n = 780$)

In the second random sample, the fit of the model to the data was even better ($\chi^2(174) = 433.12$, $p < 0.001$), (CFI = 0.93, RMSEA = 0.044). The better goodness-of-fit indicates high validity of the model. The cross-validation was then carried out in four steps, testing in each successive step a more highly constrained hypothesis. In Model 1, the baseline model, the models of both random samples were included in the analysis simultaneously. In Model 2, factor loadings were additionally constrained to be equal. Model 3 maintained equality constraints on the factor loading parameters and, in addition, constrained the factor covariances and one covariance between two error terms so they were group invariant. Model 4 constrained the causal paths to be group invariant (Byrne, 1994a). Since the four models are nested, the difference in χ^2 between the models could be used for assessing the change in the fit of the model. Table 1 shows the analyses of the four nested models.

The analyses show total invariance (factors, factor loadings, common covariances, and causal paths) between the two random samples. Table 2 shows the standardized factor loadings for each item as well as Cronbach's Alpha of the scales for the whole sample ($\chi^2(174) = 484.58$, $p < 0.001$), (CFI = 0.92, RMSEA = 0.048). The regression model explains 50% of the total variance of the dependent variable, willingness to invest in stocks.

4.2. Multi-group analyses

To compare means across the four groups ((1) men who have an investment account ($n = 392$), (2) women who have an investment account ($n = 213$), (3) men who have no investment account ($n = 466$), and (4) women who have no investment account ($n = 421$)), two-factor analyses of variance were carried out. To compare the measurement and regression models across groups we used multi-group analyses for testing invariance (Byrne, 1993, 1994a, 1994b; Epitropaki & Martin, 2004). Table 3 shows the means of all factors as well as monthly income for the four groups.

4.2.1. Two-factor analysis of variance

A 2 (men/women) \times 2 (investment account/no investment account) ANOVA was conducted for each variable. For willingness to invest in stocks, ANOVA yielded a significant main effect for having an investment account ($F(1, 1488) = 144.47$; $p < 0.001$). The main

Table 1
Overall fit indices for test of invariance across two random samples

Model tested	χ^2	df	CFI	$\Delta\chi^2$	Δ df
Model 1 (baseline model)	875.9	348	0.92		
Model 2 (invariant factor loadings)	893.36	363	0.92	17.46	15
Model 3 (invariant covariances)	907.63	374	0.92	14.27	11
Model 4 (invariant causal path)	908.69	379	0.92	1.06	5

Table 2
Alpha and standardized factor loadings of whole sample

Latent factor and related items	Factor loadings
<i>1. Willingness to invest in stocks ($\alpha = 0.76$)</i>	
1. Stock markets are unpredictable, which is why I would never invest in stocks*	0.76
2. I would invest a larger sum of money in stocks	0.69
3. The uncertainty of whether the markets will rise or fall keeps me from buying stocks*	0.64
4. When I hear the word “stocks”, the term “possible loss” comes to mind immediately*	0.57
<i>2. Achievement ($\alpha = 0.71$)</i>	
1. Increasing my affluence is one of my most important goals (new, adapted from Lim and Teo, 1997, achievement)	0.70
2. Money is the most important goal in my life (Lim & Teo, 1997, obsession)	0.69
3. High income is something to be proud of (new, adapted from Lim and Teo, 1997, achievement)	0.61
4. Money is a symbol of success (Lim & Teo, 1997, achievement)	0.45
5. I firmly believe that money can solve all of my problems (Lim & Teo, 1997, obsession)	0.42
6. Money gives you autonomy and freedom (Lim & Teo, 1997, power)	0.40
<i>3. Budget ($\alpha = 0.66$)</i>	
1. I am proud of my ability to save money (Lim & Teo, 1997, budget)	0.74
2. It is more satisfying to save than to spend money	0.66
3. I prefer to save money because I'm never sure when things will collapse and I'll need money (Lim & Teo, 1997, budget)	0.50
4. I budget my money very well (Lim & Teo, 1997, budget)	0.42
<i>4. Negative ethical stance toward the stock market ($\alpha = 0.72$)</i>	
1. Stock market profits are not fair	0.79
2. It is not ethical to make money on the stock market	0.68
3. The stock market is nothing other than a big gambling casino	0.58
4. It is unethical to make money without working for it	0.56
<i>5. Financial risk attitude ($\alpha = 0.62$)</i>	
1. I am willing to take financial risks in order to substantially increase my assets	0.80
2. In money matters, I tend to be willing to take risks	0.76

* Item was recoded.

effect for sex of the respondent was not significant ($F(1, 1488) = 2.92$, ns), and the interaction term was not significant ($F(1, 1488) = 1.20$, ns). People with investment accounts have a higher willingness to invest in stocks than persons who do not have investment accounts. This result indicates that the measurement instrument for capturing willingness to invest in stocks is valid.

For negative ethical stance toward the stock market, there was a significant main effect for having an investment account ($F(1, 1488) = 58.63$, $p < 0.001$) and for sex ($F(1, 1488) = 8.45$, $p = 0.004$); the interaction term was not significant ($F(1, 1488) = 1.08$, ns). People who have no investment account and men view trading in the stock market as more unethical than persons who have an investment account and women.

For the factor budget, ANOVA yielded no significant effect for sex ($F(1, 1488) = 0.85$, ns) and having an investment account ($F(1, 1488) = 1.80$, ns) and no significant interaction ($F(1, 1488) = 0.002$, ns). The four groups do not differ significantly in the factor budget.

For the money attitude achievement, ANOVA yielded a significant main effect for sex ($F(1, 1488) = 20.83$, $p < 0.00$). The main effect for having an investment account was not

Table 3

Means and standard deviations of all factors and percentages of income for all groups

	Men with investment account (<i>n</i> = 392)	Women with investment account (<i>n</i> = 213)	Men with no investment account (<i>n</i> = 466)	Women with no investment account (<i>n</i> = 421)	Total (<i>n</i> = 1492)
Investment in stocks	3.23 (1.01)	3.08 (1.05)	2.52 (0.93)	2.49 (1.01)	2.78 (1.0)
Achievement	3.06 (0.65)	2.89 (0.70)	3.00 (0.78)	2.80 (0.74)	2.94 (0.73)
Budget	3.47 (0.76)	3.43 (0.72)	3.41 (0.88)	3.37 (0.86)	3.42 (0.82)
Negative ethical stance toward the stock market	2.74 (0.96)	2.65 (0.89)	3.20 (0.96)	2.99 (0.95)	2.94 (0.97)
Financial risk attitude	2.38 (0.99)	1.96 (0.91)	1.79 (0.86)	1.64 (0.81)	1.92 (0.94)
<i>Income</i>					
None	1.8%	10.3%	4.9%	8.8%	6.0%
Less than CHF 2000	2.0%	8.9%	6.9%	20.0%	9.6%
CHF 2000–4999	15.8%	44.1%	39.3%	51.1%	37.1%
CHF 5000–7999	41.1%	27.2%	36.1%	18.1%	31.0%
CHF 8000–10999	20.2%	6.1%	8.8%	1.7%	9.4%
CHF 11000 or more	19.1%	3.3%	4.1%	5%	6.9%
Total	100%	100%	100%	100%	100%

significant ($F(1, 1488) = 3.59$; *ns*). The interaction was not significant ($F(1, 1488) = 0.18$, *ns*). As found by other studies, money is thought to represent achievement, success, and power more by men than by women (Furnham, 1984; Lim & Teo, 1997; Lim et al., 2003; Tang, 1995).

For financial risk attitude, ANOVA yielded a significant main effect for sex ($F(1, 1488) = 34.72$, $p < 0.001$) and having an investment account ($F(1, 1488) = 89.08$, $p < 0.001$) and a significant interaction effect ($F(1, 1488) = 7.54$, $p = 0.006$). People who have an investment account and men are more willing to take financial risks than people with no investment account and women, whereby the difference between men and women who have an investment account is greater than between men and women who have no investment account.

4.2.2. Multi-group analyses

The invariance of the measurement model of the latent variables and the regression model was tested in succeeding steps across the four groups. The model for each group was first tested separately. Table 4 shows the results for each group.

The model's fit to the data was good for men who have an investment account ($CFI = 0.93$). For women the goodness-of-fit of the model was insufficient ($CFI = 0.87$). The multivariate LM test identified various parameters that could have contributed to improved fit. However, the suggested modifications could not be justified in a meaningful way, so the changes were not made. The model fit for men with no investment account ($CFI = 0.89$) and women with no investment account ($CFI = 0.89$) was also less than acceptable. In both groups the multivariate LM test identified the same covariances as parameters that could result in significantly improved fit. The covariance of the error terms of two items of the scale measuring negative ethical stance toward the stock market

Table 4

Overall fit indices for separate subgroup analyses

Group	χ^2	df	CFI	RMSEA	Explained variance (%)
Men with investment account	304.68**	174	0.93	0.044	59
Women with investment account	294.97**	174	0.87	0.057	44
Men with no investment account	362.48**	173	0.89	0.050	
Covariance E4.1, E4.2	348.97**	174	0.91	0.047	28
Women with no investment account	354.62**	174	0.89	0.050	
Covariance E4.1, E4.2	325.66**	173	0.90	0.046	30

Note. CFI = comparative fit index; RMSEA = root-mean-square error of approximation.

** $p < 0.001$.

“It is not ethical to make money on the stock market” (item 4.2 in Table 2) and “Stock market profits are not fair” (item 4.1 in Table 2) is plausible with regard to content, as both items, in comparison to the other two items of the scale, tap the ethical aspect in the narrow sense of fairness and ethics. Including this covariance in the model resulted in a significantly better and adequate model fit for men with no investment account ($\Delta\chi^2(1) = 13.6$, $p < 0.001$; CFI = 0.91) and for women with no investment account ($\Delta\chi^2(1) = 28.3$, $p < 0.001$; CFI = 0.90). These four models were used as a baseline model in the multi-group analyses.

Next, three nested model comparisons were carried out. In Model 1, the baseline model, the four models were tested together. In Model 2, factor loadings were additionally constrained to be equal. Model 3 maintained equality constraints on the factor loading parameters and, in addition, constrained the common latent factor covariances to be group invariant, and Model 4 constrained the common causal paths to be group invariant across groups (Byrne, 1994a). The comparison of Model 1 (baseline model with all four groups) and Model 2 (invariant factor loadings across all four groups) yielded a significantly worse fit for Model 2 ($\Delta\chi^2(45) = 69.74$, $p < 0.01$). The measurement model is thus not invariant across the four groups. For this reason, it was necessary to determine the source of the non-equivalence of the item measurement. To identify the partial invariance, therefore, the groups were compared pairwise (Byrne, 1993). Table 5 shows the results of the multi-group analyses.

4.2.2.1. Invariance of the measurement model. The invariance of the measurement model was tested by means of comparing Model 1 (baseline model of two particular groups) and Model 2 (factor loadings of the two particular groups were constrained to be equal). In the measurement model the loading on one factor was not the same for men with an investment account and men with no investment account (see Table 5, comparison C2: $\Delta\chi^2(15) = 26.3$, $p < 0.05$; CFI = 0.92). For men with an investment account, the factor loading of the item “In money matters, I tend to be willing to take risks” (item 5.2 in Table 2) on the factor financial risk attitude ($a = 0.67$) was significantly higher ($p < 0.01$) than for men with no investment account ($a = 0.30$). The same invariance was shown between women with an investment account and men with no investment account (F2: $\Delta\chi^2(15) = 30.91$, $p < 0.05$; CFI = 0.89). For women with an investment account, the factor loading of the item “In money matters, I tend to be willing to take risks” (item 5.2 in Table 2) on the factor financial risk attitude ($a = 0.60$) was also significantly higher ($p < 0.01$) than for men with no investment account ($a = 0.30$). A further difference resulted between

Table 5

Tests for invariance of item measurement, common covariances, and causal paths across pairwise group comparisons

	Model tested	χ^2	df	CFI	Model comparison	$\Delta\chi^2$	Δdf
A	<i>Men with investment account and women with investment account</i>						
1	Model 1 (baseline model)	599.65	348	0.91			
2	Model 2 (invariant factor loadings)	613.31	363	0.91	2 vs. 1	13.66	15
3	Model 3 (partial invariant covariances with A ^{**} , B; R, NE; INC, R; E1.4, E1.3 invariant)	616.83	367	0.91	3 vs. 2	3.52	4
4	Model 4 (partial invariant causal paths with INV, R; INV, NE invariant)	617.37	369	0.91	4 vs. 3	0.054	2
B	<i>Men with no investment account and women with no investment account</i>						
1	Model 1 (baseline model)	674.63	346	0.90			
2	Model 2 (invariant factor loadings)	693.43	361	0.90	2 vs. 1	18.8	15
3	Model 3 (partial invariant covariances A, B; A, R; B, NE; R, NE; E1.4, E1.3; E4.1, E4.2)	698.26	367	0.90	3 vs. 2	4.86	6
4	Model 4 (partial invariant causal paths with INV, B; INV, R; INV, NE)	700.04	370	0.90	4 vs. 3	1.78	3
C	<i>Men with investment account and men with no investment account</i>						
1	Model 1 (baseline model)	653.64	347	0.92			
2	Model 2 (invariant factor loadings)	679.97	362	0.92	2 vs. 1	26.33*	15
3	Model 2a (partial invariant factor loadings with item 5.2 variant)	672.53	361	0.92	2a vs. 1	18.89	14
4	Model 3 (partial invariant covariances A, B; R, NE; A, R; B, INC; E1.4, E1.3)	686.48	366	0.92	3 vs. 2a	13.95*	5
5	Model 3a (partial invariant covariances A, B; R, NE; A, R; B, INC)	679.17	365	0.92	3a vs. 2a	6.64	4
6	Model 4 (partial invariant causal paths INV, R; INV, NE)	685.86	367	0.92	4 vs. 3a	6.69*	2
7	Model 4a (partial invariant causal paths INV, NE)	679.47	366	0.92	4a vs. 3a	.30	1
D	<i>Men with investment account and women with no investment account</i>						
1	Model 1 (baseline model)	630.34	347				
2	Model 2 (invariant factor loadings)	660.19	362	0.91	2 vs. 1	29.85*	15
3	Model 2a (partial invariant factor loadings item 2.6 variant)	652.49	361	0.92	2a vs. 1	22.15	14
4	Model 3 (partial invariant covariances A, B; R, NE; E1.4, E1.3)	669.21	364	0.92	3 vs. 2a	16.72*	3
5	Model 3a (partial invariant covariances A, B; E1.4, E1.3)	659.99	363	0.92	3a vs. 2a	7.5*	2
6	Model 3b (partial invariant covariances A, B)	653.02	362	0.92	3b vs. 2a	.53	1
7	Model 4 (partial invariant causal paths INV, R; INV, NE)	654.35	364	0.92	4 vs. 3b	1.35	2
E	<i>Women with investment account and women with no investment account</i>						
1	Model 1 (baseline model)	620.63	347	0.89			
2	Model 2 (invariant factor loadings)	641.29	362	0.89	2 vs. 1	20.16	15
3	Model 3 (partial invariant covariances A, B; R, NE; E1.4, E1.3)	647.25	365	0.89	3 vs. 2	5.96	3
4	Model 4 (partial invariant causal paths INV, R; INV, NE)	650.92	367	0.89	4 vs. 3	3.67	2

Table 5 (continued)

	Model tested	χ^2	df	CFI	Model comparison	$\Delta\chi^2$	Δdf
F	<i>Women with investment account and men with no investment account</i>						
1	Model 1 (baseline model)	643.94	347	0.89			
2	Model 2 (invariant factor loadings)	674.85	362	0.89	2 vs. 1	30.91*	15
3	Model 2a (partial invariant factor loadings with item 5.2 variant)	667.37	361	0.89	2a vs. 1	23.43	14
4	Model 3 (partial invariant covariances A, B; R, NE; B, R; E1.4, E1.3)	673.36	365	0.89	3 vs. 2a	5.99	4
5	Model 4 (partial invariant causal paths INV, R; INV, NE)	681.10	367	0.89	4 vs. 3	7.73*	2
6	Model 4a (partial invariant causal paths INV, NE)	673.44	366	0.89	4a vs. 3	0.08	1

* $p < 0.05$.

** INV (invest) = willingness to invest in stocks; A = money attitude achievement; B = money attitude budget; R = financial risk attitude; NE = negative ethical stance toward the stock market; INC = income; E1.4, E1.3 = covariance of the error terms of the two items on the factor willingness to invest in stocks; E4.1, E4.2 = covariance of the error terms of the two items on the factor negative ethical stance toward the stock market.

the measurement model of men with an investment account and women with no investment account (D2: $\Delta\chi^2(15) = 29.85$, $p < 0.05$; CFI = 0.91). For men with an investment account, the factor loading of the item “Money gives you autonomy and freedom” (item 2.6 in Table 2) on the factor achievement ($a = 0.78$) was significantly higher ($p < 0.01$) than for women with no investment account ($a = 0.40$).

Besides the invariance of these three factor loadings, no further invariances were revealed in the measurement model. The measurement models, with the exception of three pairwise variant factor loadings, are thus predominantly group-invariant. However, it should be noted that because of the poor model fit for women with an investment account, all comparisons with this group also showed poor goodness-of-fit.

4.2.2.2. Invariance of the covariances. Table 6 shows for each group the significant covariances as correlations between the latent independent variables and between the error terms of two items on the factor willingness to invest in stocks (E1.4, E1.3) and two items on the factor negative ethical stance toward the stock market (E4.1, E4.2).

All not significant covariances were identified in each group separately as redundant using the Wald test. The covariances that were significant in more than one group and the significant covariances between the error terms were tested in pairwise group comparisons using the comparison of Model 3 and Model 2 (Byrne, 1994a). The results are also shown in Table 5. The common covariances between men with an investment account and women with an investment account (A3), men with no investment account and women with no investment account (B3), women with an investment account and women with no investment account (E3), and women with an investment account and men with no investment account (F4) prove to be invariant between the two groups compared.

Three of the pairwise common covariances were not invariant across groups. Table 5 shows that in the comparison of men who have an investment account with men who

Table 6

Correlations among independent latent factors and among error terms (standardized solution of the baseline model with four groups)

	Men with investment account <i>n</i> = 392	Women with investment account <i>n</i> = 213	Men with no investment account <i>n</i> = 466	Women with no investment account <i>n</i> = 421
Achievement (A), budget (B)	0.48*	0.52*	0.45*	0.34*
Achievement (A), negative ethical stance (NE)	−0.24*	−0.14	−0.10	0.06
Achievement (A), financial risk (R)	0.33*	0.10	0.20*	0.18*
Achievement (A), income (INC)	0.06	0.16	−0.05	0.11
Budget (B), negative ethical stance (NE)	0.08	−0.12	0.15*	0.23*
Budget (B), financial risk (R)	−0.10	−0.19	−0.17*	−0.08
Budget (B), income (INC)	−0.15*	−0.10	−0.14*	−0.00
Negative ethical stance (NE), financial risk (R)	−0.45*	−0.44*	−0.28*	−0.30*
Negative ethical stance (NE), income (INC)	−0.24*	−0.13	−0.16*	−0.06
Financial risk (R), income (INC)	0.18*	0.34*	−0.04	0.06
Error term on willingness to invest (E1.4, E1.3)	0.18*	0.19*	0.33*	0.30*
Error term on negative ethical stance (E4.1, E4.2)	–	–	0.40*	0.44*

* $p < 0.05$.

do not have an investment account, Model 3 yielded a significantly worse fit (Model 3 vs. Model 2a, $\Delta\chi^2(5) = 13.95$, $p < 0.05$; CFI = 0.92). Inspection of the probabilities of the constraints revealed that the covariance of the error terms of both items on the factor willingness to invest in stocks (E1.4, E1.3) differed significantly between the two groups ($p < 0.01$). Although the covariance is significant in both groups, it is significantly lower ($\Delta r = 0.15$, $p < 0.01$) for men with an investment account ($r = 0.18$, $p < 0.05$, $n = 392$) than for men with no investment account ($r = 0.33$, $p < 0.05$, $n = 466$).

Two further variant covariances were found when comparing men with an investment account and women with no investment account (Table 5, D4). Model 3 yielded a significantly worse fit (Model 3 vs. Model 2a, $\Delta\chi^2(3) = 16.72$, $p < 0.05$; CFI = 0.92). Inspection of the probabilities of the constraints revealed that the covariance of the error terms of both items on the factor willingness to invest in stocks (E1.4, E1.3) also differed significantly between the two groups ($p < 0.01$). Although the covariance is significant in both groups, for men with an investment account ($r = 0.18$, $p < 0.05$, $n = 392$) it is significantly smaller ($\Delta r = 0.12$, $p < 0.01$) than for women with no investment account ($r = 0.30$, $p < 0.05$, $n = 421$). The negative covariance between financial risk attitude and negative ethical stance toward the stock market also differed. For men with an investment account ($r = -0.45$, $p < 0.05$, $n = 392$) the difference was significantly higher ($\Delta r = 0.15$, $p < 0.01$) than for women with no investment account ($r = -0.30$, $p < 0.05$, $n = 421$). All of the remaining common covariances were invariant between the groups compared. Only the covariance between achievement and budget was invariant across all of the four groups.

4.2.2.3. Invariance of causal paths. Table 7 shows the causal paths (and the variance explained by the model) for all four groups. The invariance of the causal paths was tested by means of comparison of Model 4 and Model 3 (see Table 5), again in pairwise comparisons of the groups. The common causal paths between men with an investment account and women with an investment account (A4), men with no investment account and women with no investment account (B4), women with an investment account and women with no

Table 7

Causal paths with willingness to invest in stocks as dependent variable (standardized solution of the baseline model with four groups) and variance explained by the model

	Men with investment account <i>n</i> = 392	Women with investment account <i>n</i> = 213	Men with no investment account <i>n</i> = 466	Women with no investment account <i>n</i> = 421
Income	0.24*	−0.12	−0.03	0.07
Achievement	−0.03	−0.11	−0.15	−0.01
Budget	−0.07	−0.02	−0.18*	−0.25*
Financial risk	0.51*	0.54*	0.29*	0.34*
Negative ethical stance	−0.26*	−0.25*	−0.26*	−0.18*
Explained variance	59.4%	44.4%	28.0%	29.9%

* $p < 0.05$.

investment account (E4), and women with an investment account and men with no investment account (F5) proved to be invariant.

Two causal paths were not invariant. Table 5 shows that Model 4 yielded a significantly worse fit (Model 4 vs. Model 3a, $\Delta\chi^2(2) = 6.69$, $p < 0.05$; CFI = 0.92) for the comparison of men with an investment account and men with no investment account (C6). The causal path of financial risk attitude on willingness to invest in stocks was significantly higher ($\Delta b = 0.22$, $p = 0.01$) for men with an investment account ($b = 0.51$, $p < 0.05$) than for men with no investment account ($b = 0.29$; $p < 0.05$). The same causal path was also variant between women with an investment account and men with no investment account (F5, Model 4 vs. Model 3, $\Delta\chi^2(2) = 7.73$, $p > 0.05$; CFI = 0.89). The causal path of financial risk attitude on willingness to invest in stocks was significantly higher ($\Delta b = 0.25$, $p < 0.01$) for women with an investment account ($b = 0.54$, $p < 0.05$) than for men with no investment account ($b = 0.29$, $p < 0.05$).

In sum, in all four groups financial risk attitude was a significant positive predictor and negative ethical stance toward the stock market was a significant negative predictor of willingness to invest in stocks. This confirms hypotheses 1 and 6 in this study. The effect of negative ethical stance toward the stock market on willingness to invest in stocks was invariant across groups. The effect of financial risk attitude was significantly stronger for men and women with an investment account than for men with no investment account. Besides that, for men with an investment account, income was a significant positive predictor, and for men and women with no investment account, the money attitude budget was a significant negative predictor. Hypothesis 5 could thus be confirmed only for men and women with no investment account; it did not hold for men and women with an investment account. The money attitude achievement was not significant in any group; hypotheses 2, 3, and 4 had to be rejected.

5. Discussion

The goal of the present study was identification of factors that promote or inhibit investing in stocks. Two important factors could be identified: financial risk attitude and negative ethical stance toward the stock market. The variance analysis comparison across the groups showed that people who have an investment account are more willing to take financial risks and do not consider trading on the stock market to be as unethical

as people who have no investment account do. But the regression analyses indicate that the two factors are important also within the groups. Financial risk attitude and negative ethical stance toward the stock market were significant predictors of willingness to invest in stocks in all four groups. The effect of financial risk attitude was the strongest for men and women who have an investment account. A high willingness to take financial risks is thus the most important factor in the decision to buy stocks.

Earlier studies have already shown the importance of a propensity for risk-taking (Clark-Murphy & Soutar, 2004; Grable et al., 2004; Wärneryd, 1996, 2001; Weber et al., 2002; Wood & Zaichowsky, 2004). But to our knowledge, the importance of ethical judgment of the stock market in the decision to buy stocks had not yet been demonstrated. The present study shows that the opinion that making profits on the stock market is unethical, unfair, and the result of gambling and speculation is related to the view that making money without earning it through work is unethical. All of the aspects load on the same latent factor. This allows the conclusion to be drawn that portfolio gains are viewed as unethical because they are seen as acquired not by means of work or achievement. It is interesting that this ethical stance promotes or inhibits willingness to invest in stocks depending on the direction of this stance. The moral demand that money should be earned through work and achievement, and not through gambling and speculation, thus deters people from investing their money in stocks. It is remarkable that this is true not only for people who do not have an investment account, but also for people who have an investment account.

An interesting finding is that the values-related money attitude achievement does not play a role. Here there is no difference between people who have or do not have an investment account, nor was achievement a relevant predictor in any of the four groups. People do not invest in stocks because of a marked obsession with money or because they are motivated to acquire money as an expression of achievement or power. Perhaps the potential gains on the stock market are seen as too uncertain to serve as a means for achieving increased affluence as the most important goal in life or as an expression of achievement and power. Budget and saving considerations only play a role for people who do not have an investment account. These persons apparently associate stock investments with careless handling of money.

The positive effect of income on willingness to invest in stocks that was demonstrated by earlier studies (Cicchetti & Dubin, 1994; Grable et al., 2004) could be found in this study only for men with an investment account. While women with an investment account showed this same tendency, the effect was not significant. For men and women who do not have an investment account, income was not decisive in their decision not to buy stocks.

Some limitations of this study must be mentioned. It is a cross-sectional study. The assumed direction of causality could also, especially in people who have an investment account, go in the opposite direction. It could be that they do not view the stock market as unethical or unfair *because* they invest in stocks, and not the other way around. In future research a longitudinal study would provide more clarity about this question. A further limitation of the study is the less than acceptable fit of the model ($CFI = 0.87$) for women who have an investment account. Although, with the exception of income, the results for that group agree with the results for men with an investment account, they should be interpreted with caution due to the poor model fit. In future studies it will be important to investigate how the model fit can be improved for women who have an investment account.

Finally, the measurement model is partially invariant across groups. The fact that item 5.2 differentiates between men and women who have an investment account and men who

do not have an investment account and that item 2.6 differentiates between men who have an investment account and women who do not raises the question of whether the item is perceived differently or if these results are an artifact of our data. As the content of item 2.6 does not seem open to different interpretations, we attribute this finding to idiosyncrasies associated with the data. However, in the case of item 5.2, it is theoretically conceivable that, for risk attitude, people who have an investment account weight financial risk-seeking more heavily than people who do not have an investment account. Nevertheless, in the stringent tests of all latent variables, the measurement model does not differ across all other groups in all factor loadings. This speaks for the generalizability of the measurement model, with the limitations of partial invariance mentioned above.

The covariances are also partially invariant across groups. Men and women who do not have an investment account weight the aspect of loss common to the two items of willingness to invest in stocks more heavily than men who have an investment account. The fact that for people who do not have an investment account the loss aspect has a greater influence on perception of stocks is plausible with regard to content. The more negative association between negative ethical stance toward the stock market and financial risk attitude for men and women with an investment account as compared to men with no investment account is also plausible with regard to content. Both a positive stance toward the stock market and a positive financial risk attitude are expressions of a more positive perception of the stock market by people who have an investment account.

The partial invariance in the measurement and the regression (covariances and causal paths) models is thus theoretically plausible. More important, however, is the observation that the commonalities of the measurement and regression models across groups are predominant, and for this reason the groups can be viewed as comparable.

The findings thus point to the advantages of a confirmatory approach also for regression models. In normal regression models, invariance of the measurement model is assumed but not tested. The confirmatory approach allows identification of the extent of partial invariance and a test of its plausibility as to content. This allows a decision as to the extent to which the groups are comparable (Byrne, 1994a, 1994b). A further advantage is the handling of correlations between independent variables. Normal regression analysis assumes that the independent variables do not correlate. Existing correlations are allowed in the model with a confirmatory approach.

The present study uncovered the most important predictors – financial risk attitude, ethical stance toward the stock market, and income – for men who invest in stocks. For a study with a random sample of the total population, an explained variance of 59% of the total variance of the dependent variable is remarkably high. Financial risk attitude and ethical stance toward the stock market also prove to be relevant predictors of the decision to invest in stocks for people who do not have an investment account. However, the small proportion of explained variance indicates that future studies will have to investigate still other factors that may deter people from investing in stocks.

The identification of factors that inhibit or promote investing in stocks is of high practical relevance. Of the participants in this study, 60% do not have investment accounts. Financial risk attitude and negative ethical stance toward the stock market yield starting-points for encouraging people to invest in stocks and thus to take greater personal responsibility for their retirement incomes. The development of investment products tailored to the desires of people with a need for security can also motivate risk-averse persons to invest in stocks.

Furthermore, conveying knowledge in the area of shares and securities should not be neglected. Laypersons normally have little formal knowledge on the functions of the economy, in particular on those related to fiscal issues (Bastounis, Leiser, & Roland-Levy, 2004). Early on in people's lives, learning about economic and fiscal issues in school could work against misleading ideas that equate stock investments with gambling and speculation instead of with calculated risk.

References

- Bastounis, M., Leiser, D., & Roland-Levy, C. (2004). Psychosocial variables involved in the construction of lay thinking about the economy: Results of a cross-national survey. *Journal of Economic Psychology*, 25(2), 263–278.
- Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin*, 107, 238–246.
- Bentler, P. M. (2004). *EQS 6 structural equations program manual*. Encino, CA: Multivariate Software, Inc.
- Byrne, M. B. (1993). The Maslach burnout inventory: Testing for factorial validity and invariance across elementary, intermediate and secondary teachers. *Journal of Occupational and Organizational Psychology*, 66, 197–212.
- Byrne, M. B. (1994a). Burnout: Testing for the validity, replication, and invariance of causal structure across elementary, intermediate, and secondary teachers. *American Educational Research Journal*, 31(3), 645–673.
- Byrne, M. B. (1994b). *Structural equation modeling with EQS. Basic concepts, applications and programming*. Thousand Oaks, CA: Sage.
- Canova, L., Manganelli Rattazzi, A. M., & Webley, P. (2005). The hierarchical structure of saving motives. *Journal of Economic Psychology*, 26(1), 21–34.
- Carducci, B. J., & Wong, A. S. (1998). Type A and risk taking in everyday money matters. *Journal of Business and Psychology*, 12(3), 355–359.
- Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling*, 9(2), 233–255.
- Cicchetti, C. J., & Dubin, J. A. (1994). A microeconomic analysis of risk aversion and the decision to self-insure. *The Journal of Political Economy*, 102(1), 169–186.
- Clark-Murphy, M., & Soutar, G. N. (2004). What individual investors value: Some Australian evidence. *Journal of Economic Psychology*, 25, 534–555.
- Daniel, K., Hirshleifer, D., & Teoh, S. H. (2002). Investor psychology in capital markets: Evidence and policy implications. *Journal of Monetary Economics*, 49, 139–209.
- De Bondt, W. F. M. (1998). Behavioural economics: A portrait of the individual investor. *European Economic Review*, 42, 831–844.
- Dreman, D., Johnson, S., MacGregor, D., & Slovic, P. (2001). A report on the March 2001 investor sentiment survey. *The Journal of Psychology and Financial Markets*, 2, 126–134.
- Epitropaki, O., & Martin, R. (2004). Implicit leadership theories in applied settings: Factor structure, generalizability, and stability over time. *Journal of Applied Psychology*, 89, 293–310.
- Euwals, R., Eymann, A., & Borsch-Supan, A. (2004). Who determines household savings for old age. Evidence from Dutch panel data. *Journal of Economic Psychology*, 25(2), 195–211.
- Fehr, E., & Gächter, S. (1998). A report on the March 2001 investor sentiment survey. *European Economic Review*(42), 845–859.
- Fischhoff, B., Nadai, A., & Fischhoff, I. (2001). Investing in Frankenfirms: Predicting socially unacceptable risks. *The Journal of Psychology and Financial Markets*, 2, 100–111.
- Furnham, A. (1984). Many sides of the coin: The psychology of money usage. *Personality and Individual Differences*, 5(5), 501–509.
- Grable, J., Lytton, R., & O'Neill, B. (2004). Projection bias and financial risk tolerance. *The Journal of Behavioral Finance*, 5(3), 142–147.
- Gunnarsson, J., & Wahlund, R. (1997). Household financial strategies in Sweden: An exploratory study. *Journal of Economic Psychology*, 18(2–3), 201–233.
- Hayhoe, C. R., Leach, L., & Turner, P. R. (1999). Discriminating the number of credit cards held by college students using credit and money attitudes. *Journal of Economic Psychology*, 20(6), 643–656.
- Hayhoe, C. R., Leach, L. J., Turner, P. R., Bruin, M. J., & Lawrence, F. C. (2000). Differences in spending habits and credit use of college students. *Journal of Consumer Affairs*, 34(1), 113–133.

- Hilton, J. D. (2001). The psychology of financial decision-making: Application to trading, dealing, and investment analysis. *The Journal of Psychology and Financial Markets*, 2, 37–53.
- Hu, L. T., & Bentler, P. M. (1995). Evaluating model fit. In R. H. Hoyle (Ed.), *Structural equating modelling* (pp. 76–99). Thousand Oaks, CA: Sage.
- Kahneman, D., & Riepe, M. W. (1998). Aspects of investor psychology. *The Journal of Portfolio Management*, 52–65.
- Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica*, 47, 263–291.
- Kline, P. (1998). *The new psychometrics: Science, psychology, and measurement*. Florence, KY: Taylor & Francis.
- Lim, V. K. G., & Teo, T. S. H. (1997). Sex, money and financial hardship: An empirical study of attitudes towards money among undergraduates in Singapore. *Journal of Economic Psychology*, 18(4), 369–386.
- Lim, V. K. G., Teo, T. S. H., & Loo, G. L. (2003). Sex, financial hardship and locus of control: An empirical study of attitudes towards money among Singaporean Chinese. *Personality and Individual Differences*, 34(3), 411–429.
- MacGregor, D., Slovic, P., Dreman, D., & Berry, M. (2000). Imagery, affect, and financial judgment. *Journal of Psychology and Financial Markets*, 1(2), 104–110.
- McInish, T. H. (1982). Individual investors and risk-taking. *Journal of Economic Psychology*, 2, 125–136.
- Morse, W. C. (1998). Risk taking in personal investments. *Journal of Business and Psychology*, 13(2), 281–288.
- Roberts, J. A., & Jones, E. (2001). Money attitudes, credit card use, and compulsive buying among American college students. *Journal of Consumer Affairs*, 35(2), 213–240.
- Roberts, J. A., & Sepulveda, C. J. (1999). Demographics and money attitudes: A test of Yamauchi & Templer's (1982) money attitude scale in Mexico. *Personality and Individual Differences*, 27(1), 19–35.
- Tang, T. L. P. (1992). The meaning of money revisited. *Journal of Organizational Behavior*, 13(2), 197–202.
- Tang, T. L. P. (1993). The meaning of money: Extension and exploration of the money ethic scale in a sample of university students in Taiwan. *Journal of Organizational Behavior*, 14, 93–99.
- Tang, T. L. P. (1995). The development of a short money ethic scale: Attitudes toward money and pay satisfaction revisited. *Personality and Individual Differences*, 19(6), 809–816.
- Tang, T. L. P., & Chiu, R. K. (2003). Income, money ethic, pay satisfaction, commitment, and unethical behavior: Is the love of money the root of evil for Hong Kong employees? *Journal of Business Ethics*, 46(1), 13–30.
- Tang, T. L. P., & Gilbert, P. R. (1995). Attitudes toward money as related to intrinsic and extrinsic job-satisfaction, stress, and work-related attitudes. *Personality and Individual Differences*, 19(3), 327–332.
- Tigges, P., Riegert, A., Jonitz, L., Brengelmann, J., & Engel, R. R. (2000). Risk behavior of East and West Germans in handling personal finances. *The Journal of Psychology and Financial Markets*, 1, 127–134.
- Tokunaga, H. (1993). The use and abuse of consumer-credit—application of psychological theory and research. *Journal of Economic Psychology*, 14(2), 285–316.
- Tversky, A., & Kahneman, D. (1992). Advances in prospect theory: Cumulative representation of uncertainty. *Journal of Risk and Uncertainty*, 297–323.
- Vandenberg, R. J., & Lance, C. E. (2000). A review and synthesis of measurement invariance literature: Suggestions, practices, and recommendations for organizational research. *Organizational Research Methods*, 3(1), 4–70.
- Wärneryd, K. E. (1996). Risk attitude and risky behavior. *Journal of Economic Psychology*, 17, 749–770.
- Wärneryd, K. E. (2001). *Stock-market psychology: How people value and trade stocks*. Cheltenham (UK): Edward Elgar.
- Watson, J. J. (2003). The relationship of materialism to spending tendencies, saving, and debt. *Journal of Economic Psychology*, 24(6), 723–739.
- Weber, E. U., Blais, A. R., & Betz, N. E. (2002). A domain-specific risk-attitude scale: Measuring risk perceptions and risk behaviors. *Journal of Behavioral Decision Making*, 15(4), 263–290.
- Webley, P., Lewis, A., & Mackenzie, C. (2001). Commitment among ethical investors: An experimental approach. *Journal of Economic Psychology*, 22(1), 27–42.
- Winnett, A., & Lewis, A. (2000). “You’d have to be green to invest in this”: Popular economic models, financial journalism, and ethical investment. *Journal of Economic Psychology*, 21(3), 319–339.
- Wood, R., & Zaichkowsky, J. L. (2004). Attitudes and trading behavior of stock market investors: A segmentation approach. *The Journal of Behavioral Finance*, 5, 170–179.
- Yamauchi, K. T., & Templer, D. I. (1982). The development of a money attitude scale. *Journal of Personality Assessment*, 46(5), 523–528.