

This article was downloaded by: [Aspara, Jaakko]

On: 15 June 2011

Access details: Access Details: [subscription number 938572688]

Publisher Routledge

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



Journal of Behavioral Finance

Publication details, including instructions for authors and subscription information:

<http://www.informaworld.com/smpp/title~content=t775648092>

Individuals' Affect-Based Motivations to Invest in Stocks: Beyond Expected Financial Returns and Risks

Jaakko Aspara^a; Henrikki Tikkanen^a

^a Aalto University School of Economics,

Online publication date: 10 June 2011

To cite this Article Aspara, Jaakko and Tikkanen, Henrikki(2011) 'Individuals' Affect-Based Motivations to Invest in Stocks: Beyond Expected Financial Returns and Risks', Journal of Behavioral Finance, 12: 2, 78 – 89

To link to this Article: DOI: 10.1080/15427560.2011.575970

URL: <http://dx.doi.org/10.1080/15427560.2011.575970>

PLEASE SCROLL DOWN FOR ARTICLE

Full terms and conditions of use: <http://www.informaworld.com/terms-and-conditions-of-access.pdf>

This article may be used for research, teaching and private study purposes. Any substantial or systematic reproduction, re-distribution, re-selling, loan or sub-licensing, systematic supply or distribution in any form to anyone is expressly forbidden.

The publisher does not give any warranty express or implied or make any representation that the contents will be complete or accurate or up to date. The accuracy of any instructions, formulae and drug doses should be independently verified with primary sources. The publisher shall not be liable for any loss, actions, claims, proceedings, demand or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.

Individuals' Affect-Based Motivations to Invest in Stocks: Beyond Expected Financial Returns and Risks

Jaakko Aspara and Henrikki Tikkanen

Aalto University School of Economics

The purpose of this article is to study whether an individual investor's affect towards a company causes him extra motivation to invest in the company's stock, over and beyond expected financial returns and risk. The authors examine survey data from 400 investors. They find that most investors had affect-based, extra motivation to invest in stocks, over and beyond financial return expectations. The more positive an individual's attitude towards the company was, the stronger was his extra investment motivation. Moreover, a special affective relationship that an investor may have towards a company—*affective self-affinity*—can further explain the extra investment motivation.

Keywords: Investor psychology, Individual investor, Affect, Attitude, Affective self-affinity

INTRODUCTION

Following the work of Slovic and others (e.g., Slovic, Finucane, Peters and MacGregor [2002a, 2002b, 2007], Finucane, Alhakami, Slovic and Johnson [2000], MacGregor, Slovic, Dreman and Berry [2000]), researchers in behavioral finance have been increasingly interested in the role that psychological affect plays in people's investment decisions. For instance, Statman, Fisher, and Anginer [2008] recently reported that their study subjects considered that stocks associated with strong positive affect had, paradoxically enough, both high expected returns and low risk. Ang, Chua, and Jiang [2010], in turn, demonstrate how affect can play a role in asset pricing by finding that "Class A" shares are often more highly valued than similar "Class B" shares of the same companies. Their explanation for the finding is that investors have special affect for the idea of investing in something that is A class.

Moreover, in another stream of research—one located in the interface between finance and marketing—there has been a growing interest in how individuals' affective evaluations of companies' brands and corporate images, in particular, in-

fluence their willingness to invest in those companies' stocks (Aspara and Tikkanen [2008, 2010a, 2010b, forthcoming], Frieder and Subrahmanyam [2005], Schoenbachler, Gordon and Aurand [2004]). Aspara and Tikkanen [2008] suggest that a consumer's positive attitude to a company's product or brand has positive influence on his¹ attitude towards the company itself, which in turn will positively influence his tendency to invest in the company's stock. Furthermore, Aspara and Tikkanen [2008, 2010b] even suggest that an individual's positive attitude or affect towards a company may generate such motivation to invest in the company's stock that goes beyond the motivation to maximize financial returns. This suggestion is consistent with Fisher and Statman's [1997] argument that it is no more reasonable to expect individuals to be concerned only about risk and return when constructing an investment portfolio than it is to expect them to be concerned only about cost and nutrition when deciding what to eat.

However, despite the growing research interest in the role that company affect plays in investment decisions, there have so far been no empirical studies that would examine the specific question whether one's affect towards a company elicits motivation to invest in the company's stock over and beyond the expected financial returns and risk of the stock. Consequently, the purpose of this article is to provide empirical evidence of whether and how an individuals' affect towards a company provides them extra motivation to invest in the company's stock, beyond expected financial returns.

Address correspondence to Jaakko Aspara, Aalto University School of Economics, Department of Marketing, P.O. Box 21230, FI-00076, Aalto/Helsinki, Finland. E-mail: jaakko.aspara@aalto.fi

Theoretically, our propositions build not only on the aforementioned work by Slovic et al. on the fundamental role of affect in investments but also on theories on individuals' affective identification with companies (Aspara, Olkkonen, Tikkanen, Moisander and Parvinen [2008], Aspara and Tikkanen [2010b], Bhattacharya and Sen [2003], Scott and Lane [2000]). The arguments are also supported by points made in recent behavioral finance literature, including Statman [2004] and Fama and French [2007]. As our empirical data, we analyze survey data collected from 400 individuals who had recently invested in certain companies' stocks. First, we find that most investors had certain affect-based, extra motivation to invest in those stocks, beyond the expected financial returns of the stocks. Explaining the extra investment motivation beyond the expected financial returns, we find that the more positive an individual's attitude towards the company, the stronger the extra investment motivation. Moreover, we find that a special type of affective relationship that one potentially has to a company, that is, affective self-affinity, further explains one's extra motivation to invest in the company's stock.

We also control for the effects of a set of personal characteristics of the investors, including demographics (e.g., sex, age, income, education) and specific characteristics as a stock investor (e.g., number of stocks owned, stock tracking activity). Our finding is that the personal characteristics have generally no significant effects on the strength of the link between positive affect for a company and extra motivation to invest in its stock. An exception is education, whereby university education is found to have a negative effect on one's affect-based, extra motivation to invest in a company's stock beyond its financial returns.

THEORY AND HYPOTHESES

Standard finance research traditionally assumes that investors select investments, including stocks, purely based on their expected financial return-risk profiles (Clark-Murphy and Soutar [2004]). In other words, investors are seen to have the sole motivation to select a stock that has the highest expected financial returns at a given risk level. However, as Fisher and Statman [1997] note, it is in reality no more reasonable to expect that individuals are concerned only about financial risk and return when constructing an investment portfolio than it is to expect that they are concerned only about cost and nutrition when deciding what to eat.

Recently, also the emerging literature on the role of affect in investments (Aspara and Tikkanen [2010b], MacGregor et al. [2000], Slovic et al. [2007], Statman, Fisher and Anginer [2008]) has addressed investment psychology that goes beyond rational financial considerations. This research has suggested, *inter alia*, that the images and related affective evaluations which individuals have of companies may be a major basis on which they make investment decisions.

While this work has mostly focused on the influence of affective evaluations on investors' expectations of financial performance and risk, it also provides us initial insights to the potential influence that company affect has on investment motivations beyond financial returns.

First, it is likely that given a choice between the stocks of two or more companies that have approximately similar risk-return profiles, an investor chooses the stock of the company towards which he has most positive affect, that is, which he likes most overall. Namely, images, marked by positive and negative affective feelings, guide judgments and decision making (Damasio [1994], Slovic et al. [2002a, 2002b], Zajonc [1980]), particularly when accurately judging the pros and cons of various alternatives is difficult due to their inherent complexity or complexity of information about them (see Zajonc [1980]). The investment context is a case in point: companies, their stocks and the pieces of related information are highly complex, which makes it difficult to accurately estimate the financial returns/risks (Aspara and Tikkanen [2010b] Statman, Fisher and Anginer [2008]).

Thus, lacking information about the future and being unable to form expectations of the financial returns with great accuracy, individuals are able to make only rough approximations of the return-risk profiles of stocks—and may, consequently, just choose to invest in the stock of a company they “like” (rather than in other stocks expected to have approximately similar risk-return profiles). This behavioral tendency would be a somewhat clear instance of using a mental short-cut called “affect heuristic” (e.g., Finucane et al. [2000], Slovic et al. [2002a, 2002b, 2007]). That is, using an overall, readily available affective impression as a mental decision-making shortcut can be far easier and efficient than estimating all the pros and cons of various alternatives, especially when the required judgment or decision is complex and/or one's mental resources are limited. Particularly in contemporary markets, in which thousands of stocks compete for investors' attention (Barber and Odean [2008]), any individual is likely to encounter tens or hundreds of stocks with seemingly similar financial return-risk profiles—and use the very shortcut to arrive at investment decisions partly based on affect motivation. Thus, our first hypothesis is:

Hypothesis H1: The more positive an individual's attitude towards a company, the stronger is his affect-based extra motivation to invest in the company's stock beyond its expected financial returns/risk.

Note that in the above hypothesis, we assume that an overall affective evaluation of a company manifests as one's overall attitude towards the company—an index of the strength of how much a person likes or dislikes the object (e.g., Ajzen and Fishbein [1980]). Nevertheless, an individual's affect towards a company, particularly at higher levels, may also manifest as his identification with the company or, specifically, affective self-affinity for the company.

According to Aspara et al.'s [2008] theoretization, an individual's affective self-affinity for a company is *the extent to which the individual perceives a positively affective congruence between the thing and his self/identity*. More important, an individual with an affective self-affinity relationship with a company will tend to give preferential and supportive treatment to the company and be prepared to cooperatively give more of his scarce resources to it (Aspara et al. [2008], Aspara and Tikkanen [forthcoming], see also Bhattacharya and Sen [2003], Scott and Lane [2000]). One way through which one can give such preferential and supportive treatment to a company is, in turn, through investing in its stock. Such a tendency, stemming from one's affective self-affinity for a company, can therefore be expected to generate even greater extra motivation to invest in the company's stock (beyond its financial returns) than the affect heuristic stemming from "mere" positive attitude towards the company. In fact, an individual's affective self-affinity for a company may lead him to invest in the company's stock even by consciously accepting a bit lower financial returns from the company's stock (or higher risk) than from certain others (Aspara et al. [2008]).

Thus, we anticipate that an individuals' affective self-affinity for a company may act as an additional affect-based motivation—distinct from mere positive attitude—to invest in the company's stock beyond its financial returns. Our second hypothesis is, accordingly:

Hypothesis H2: The higher an individual's affective self-affinity for a company, the stronger is his affect-based extra motivation to invest the company's stock beyond its expected financial returns/risk.

METHOD

Data Collection and Sample

To obtain data on individuals' affect-based motivations in real stock investment decisions of theirs, we pursued contact with individuals who had recently invested in certain companies' stocks. To ensure that the subjects would remember and be able to reflect on their motivations to invest in the stocks, we contacted specifically individuals for whom the investment decision was fairly recent. As fairly recent investment decisions, we considered investments that had occurred less than one and a half years ago.

As a population of interest we had such people living in (Northern) Europe that might invest some of their savings in stocks of publicly traded companies. We approached 300 individuals per four companies (1,200 in total) listed in Helsinki Stock Exchange, Finland. Notably, the Finnish stock market and investors operate on a fairly Anglo-American logic, with emphasis on shareholder value creation. Finnish investors have also been investigated in many much-cited recent studies (e.g., Grinblatt and Keloharju [2000, 2001a,

2001b]). In practice, the approached individuals were randomly sampled from a list of such stockowners of the companies who had become stockowners during the past 1.5 years; the stockholder lists were provided by the companies. The individuals were sent a survey questionnaire by mail in summer 2007, with a prepaid reply envelope. Of those sent, 438 usable questionnaires were returned, yielding a fairly good response rate of 36.5%. According to a commonly-used procedure, we controlled for nonresponse bias by comparing answers that arrived early to those that arrived late. No significant differences were found, which implies that nonresponse bias was not a serious concern. The eventual sample size was adequate for the main data analysis method used, PLS path modeling (see Chin and Newsted [1999]).

A description of the investors in our final sample, that is, individuals who had invested in the four companies addressed (A, B, C and D), is provided in Appendix A, in terms of a set of personal background variables. The background variables include gender, age, marital status, education, monthly income, total number of stocks owned and stock following activity. Unfortunately, we are unaware of any studies that would map the current characteristics of the overall population of Finnish stock investors, which means that we are unable at this time to compare the characteristics of our sample to the general stock investor population. However, the distribution of investor characteristics in our sample seems to accord to an intuitive notion of individual investors: The distribution is bent towards middle-aged (rather than very young or old), college/university educated and medium/high-income people. Most of the investors are also moderately diversified (with six or more stocks) and tend to follow their stocks at least weekly. We also analyze, in Appendix A, whether there were differences in the background variables among investors who had invested in the different companies. In most variables, no statistically significant differences are detected, which gives us further confidence in the fact that investors of the present firms come from one and same population. However, in age, monthly income and number of stocks owned, there were some differences. Company B's investors especially seemed to have somewhat higher age, average income and diversification level than others.

Study Approach and Measures

The overall study approach was to first ask the investor-respondents questions pertaining to the mental-attitudinal constructs of interest (e.g., positive attitude, affective self-affinity) by asking the respondents to recall what their attitude towards the company had been like at the time they had invested in it. Later, in the same questionnaire, the respondents were asked to self-report to what extent their motivation to invest in the stock had stemmed from their expectations about the financial returns of the stock versus their (affect-based) liking towards the company. Between the attitudinal questions and the questions about the stock investment

motivation, the respondents were asked multiple questions unrelated to the present study and its constructs.

Since our hypotheses are assumed to apply only to individuals who have positive (as opposed to negative) overall affect towards a company, we screened away from the analysis those individuals who had invested in the focal companies despite having negative affect towards the company. Consequently, 405 respondents ended up to the main analysis, while 21 (4.8%) were screened away due to nonpositive affect for the company and 12 (2.7%) for missing values concerning affect. In the main analysis on those individuals who exhibited at least some positive affect towards a company, we chose to utilize partial least squares (PLS) structural path modeling (Fornell and Cha [1994]). Among reasons to use PLS modeling rather than ordinary regression analysis is the fact that the variable distributions were skewed and did not meet the normality requirements of ordinary regression analysis (whereas PLS modeling does not require normality). PLS modeling is also less vulnerable to multicollinearity, which is favorable in the present study since positive attitude and affective self-affinity can correlate to a somewhat high degree (albeit being distinct constructs, as shown below).

Specifically, we employ SmartPLS (Ringle, Wende and Will [2005]), which allows for the simultaneous testing of hypotheses while enabling single- and multi-item measurement, as well as the use of both reflective and formative scales (Fornell and Bookstein [1982]). Our structural model contains, as the dependent variable, an individual's affect-based extra motivation to invest in the company stock beyond its expected financial returns (AFFECT-BASED EXTRA INVESTMENT MOTIVATION). As predictor latent variables, the model contains (a) one's attitude towards the company, (POSITIVE ATTITUDE TOWARDS THE COMPANY), and (b) one's affective self-affinity for the company (AFFECTIVE SELF-AFFINITY FOR THE COMPANY). We also include one main control latent variable in the model, pertaining to the investor's familiarity of the company (FAMILIARITY WITH THE COMPANY), to control for the possibility that any found effects are actually due to individuals' levels of familiarity with the companies, their products, and brands. This is because earlier research has found evidence of the fact that familiarity with and recognition of a company's products and brands has positive effect on an individual's preference and proclivity to invest the company's stock (Frieder and Subrahmanyam [2005]).

In addition, we enter into the model, as control variables, a set of variables pertaining to the investors' personal characteristics. On one hand, these variables include general demographics, such as the respondent's sex (SEX), his age (AGE), monthly income (MONTHLY INCOME) and whether the respondent had college/academic education (UNIVERSITY EDUCATION). On the other hand, the personal variables include a respondent's characteristics as a stock investor, such as the number of stocks owned by the respondent (NUMBER OF STOCKS OWNED), self-

assessment of whether one is small or large stock investor (SMALL VS LARGE INVESTOR) and whether one tracks the development of one's stocks only once in year, or monthly (MONTHLY TRACKER), weekly (WEEKLY TRACKER), or daily (DAILY TRACKER). Finally, we also include into the model indicators of the investee companies as dummy control variables in order to control the investee-company-specificity of the found effects.

Below, we detail the measures used for the main variables of the model. The scales and coding of the control variables pertaining to the personal characteristics of the respondent are presented in Appendix B.

The affect-based, extra motivation to invest in the focal company's stock, beyond its financial returns (AFFECT-BASED EXTRA INVESTMENT MOTIVATION), was measured with a reflective two-item scale. For the items, the respondent was asked:

“When you invested in [company X]’s stock, **on what basis** did you make the investment decision?”

Two scale items were obtained in response. For the first item, the respondent was asked to rate his answer to the above question on the following, 7-point scale, anchored by:

0 = “I purchased [company X]’s stock **because** considering all the investment opportunities I was aware of, I expected to obtain the absolutely best possible financial returns relative to risk from [company X]’s stock.”

...

6 = “I purchased [company X]’s stock simply **because** I liked [company X] as a company.”

For the second item, the respondent was asked to further rate his answer to the above question on similar, 7-point scale:

0 = “I purchased [company X]’s stock **because** considering all the investment opportunities I was aware of, I expected to obtain the absolutely best possible financial returns relative to risk from [company X]’s stock.”

...

6 = “I purchased [company X]’s stock **because** I had a positive attitude towards [company X].”

A subject's responses to the above two items were treated as a two-item reflective scale for AFFECT-BASED EXTRA INVESTMENT MOTIVATION. As such, the scale achieved good reliability, with alpha score of .88, average variance extracted (AVE) of .89 and composite reliability of .94.

Concerning the determinant constructs, we measured the predictor variable POSITIVE ATTITUDE TOWARDS THE

COMPANY with a reflective two-item scale. The respondent was asked:

1. "What kind of attitude did you have towards [company X]?" (anchored by $-3 =$ "very negative", $+3 =$ "very positive")
2. "Did you like the products of [company X]?" (anchored by $-3 =$ "didn't like at all", $+3 =$ "liked very much")

The reliability of this scale was good, as well, the alpha score being .81 (AVE .84; composite reliability .92). Note that the two items involved in this scale were also used in screening away from the total sample those individuals who had not exhibited positive affect towards the company in the stock of which they had invested. Specifically, the screening was done by removing from the analysis those respondents, the sum value of whose responses on the two items was zero or less. This was because the neutral point (between negative and positive affect) on both scales was zero.

Note also that even if the first predictor variable POSITIVE ATTITUDE TOWARDS THE COMPANY and the dependent variable AFFECT-BASED EXTRA INVESTMENT MOTIVATION may, at the first glance, seem to measure essentially the same thing, they actually measure substantially different things in theoretical terms, as demanded by our hypotheses. The predictor variable measures the degree of the investor's (positive) affect/attitude towards the company, while the dependent variable measures the degree to which positive affect/attitude towards the company (whatever its degree) has acted as a motivation or reason to the individual's investment decision as opposed to financial returns considerations. Thus, even if the investor had extremely positive affect/attitude towards the company, he may have had null affect-based motivation as a reason to his investment decision, while making the decision purely based on financial returns considerations—this is actually what traditionally finance research would predict. Also, it might be possible that investors' investments are motivated by affect towards the company to a totally random degree and therefore independent of the degree of their affect towards the company. In this case, positive affect might have acted as a somewhat strong motivator of an investor's investment decision even if he had only a minimal degree of positive affect towards the company. Nevertheless, our hypotheses propose expressly that the degree to which positive affect/attitude towards the company acts as a motivation or reason to the individual's investment decision (as opposed to financial returns considerations) is dependent on and correlates with the degree of that affect/attitude. To this end, our measurement variables are feasible.

AFFECTIVE SELF-AFFINITY FOR THE COMPANY, in turn, was measured with a single indicator that can be assumed to closely match the theoretical construct. Specifically,

we followed Aspara et al.'s [2008] suggestion that affective self-affinity might be measured with a verbal "identity overlap" measure. Thus, we measured the perceived overall overlap between one's self-concept and the image of the company, adapting a question used by Bergami and Bagozzi [2000]. The question was: "How well did [company X] reflect the kind of person you are?" The responses were recorded on a 7-point bipolar scale anchored by 0 (*not at all*) and 6 (*very well*).

Finally, the control variable FAMILIARITY WITH THE COMPANY was measured with a two-item reflective scale. For the two items, the respondent was asked:

1. "How well do you think you knew [company X] as a company?"
2. "How well do you think you knew the products of [company X]?"

The responses to both questions were recorded on seven-point scales, anchored by *not at all* and *very well*. The reliability of this scale was not very high, yet satisfactory for a control variable: the alpha score was .63 (AVE .70; composite reliability .82).

In general, the reliability of the reflective scales is satisfactory, as indicated by the fairly high alpha scores, AVEs and composite reliabilities. Moreover, multicollinearity between the constructs is not an issue: all correlations among latent predictor variables are less than or equal to .50 (see Table 1). Importantly, the discriminant validity of the determinant constructs is supported by the not-too-high correlations between the constructs: the correlation between POSITIVE ATTITUDE TOWARDS THE COMPANY and AFFECTIVE SELF-AFFINITY FOR THE COMPANY was .36; the correlation between POSITIVE ATTITUDE TOWARDS THE COMPANY and FAMILIARITY WITH THE COMPANY was .44; and the correlation between AFFECTIVE SELF-AFFINITY FOR THE COMPANY and FAMILIARITY WITH THE COMPANY was .32.

TABLE 1
Correlations Between the Studied Variables

Variables	1	2	3	4
1. Attitude towards the company	(0.81)			
2. Affective self-affinity (ASA) for the company	0.36	N/A		
3. Familiarity with the company	0.44	0.32	(0.63)	
4. Extra/affective investment motivation	0.52	0.36	0.39	(0.88)

Note. Cronbach's alphas appear on the diagonal for multiple-item measures.

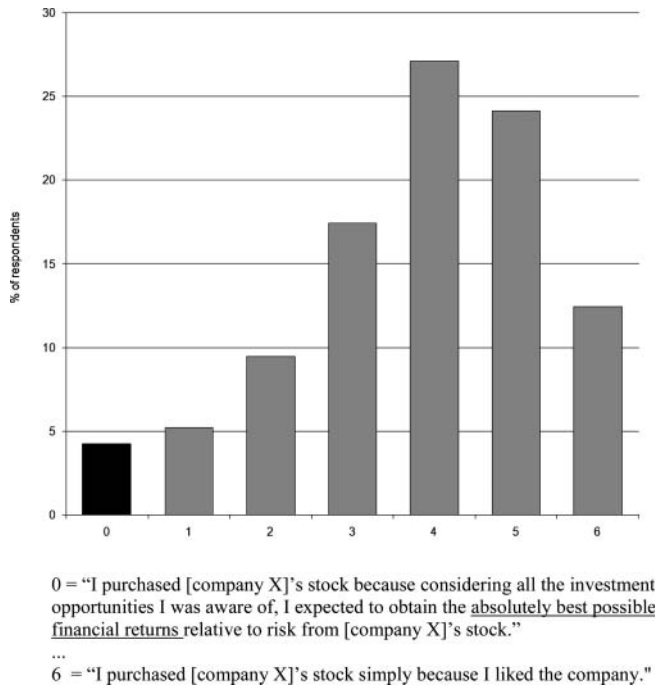


FIGURE 1 Frequency distribution of the responses to the dependent variable (AFFECT-BASED EXTRA INVESTMENT MOTIVATION).

RESULTS

Descriptive Statistics

The first step in the analysis was to screen away from the total sample those individuals who had not exhibited positive affect towards the company in which they had invested. Merely 21, or 4.9%, of 426 respondents with nonmissing values on the affect variable (POSITIVE ATTITUDE TOWARDS THE COMPANY) in fact reported having had nonpositive affect towards the company at the time of the investment decision. Even if some respondents may in retrospect exaggerate the positivity of their affect towards the company due to postdecision commitment to their investment (Bem [1972]), the low proportion of respondents who indicated nonpositive affects towards a company in which they invested provides "litmus test" kind of support for the notion that (positive) affect contributes to investment decisions.

Further descriptive statistics, relevant to our hypotheses, pertain to the scale items of the dependent variable AFFECT-BASED EXTRA INVESTMENT MOTIVATION. In contrast to the "benchmark" notion of traditional finance, that is, that only financial returns and risks matter, our hypotheses presume that individuals may have extra, affect-based motivation to invest in a company's stock beyond its expected financial returns/risk. Examining the distribution of values on the two dependent variable scale items, our presumption receives support. Figure 1 presents the frequency distribution of the answers to the first response item by those respondents who reported having had at least some positive

TABLE 2
 Impacts of the Predictor Constructs on the
 Dependent Variable affect-based extra investment
 motivation

Effect of	Path coeff.	t- value
Main predictors		
Attitude towards the company	0,455	4,46***
Affective self-affinity for the company	0,141	1,79*
Controls		
Familiarity with the company	0,211	2,88**
Sex	0,014	0,46
Age	-0,025	0,81
Monthly income	-0,013	0,42
University education	-0,081	1,89*
Number of stocks owned	-0,050	1,42
Large investor	0,061	1,50
Monthly tracker	0,162	1,48
Weekly tracker	0,166	1,23
Daily tracker	0,143	1,09
Company dummy controls		
Investee company F	0,832	2,15*
Investee company A	0,306	0,98
Investee company N	0,400	1,41
Company dummy moderators		
Attitude towards the company X Investee company F	-0,548	1,47
Attitude towards the company X Investee company A	0,002	0,01
Attitude towards the company X Investee company N	-0,127	0,56
Affective self-affinity for the company X Investee company F	0,121	1,36
Affective self-affinity for the company X Investee company A	0,071	0,98
Affective self-affinity for the company X Investee company N	0,062	0,94
Familiarity with the company X Investee company F	-0,205	1,01
Familiarity with the company X Investee company A	-0,314	1,74*
Familiarity with the company X Investee company N	-0,176	1,71*

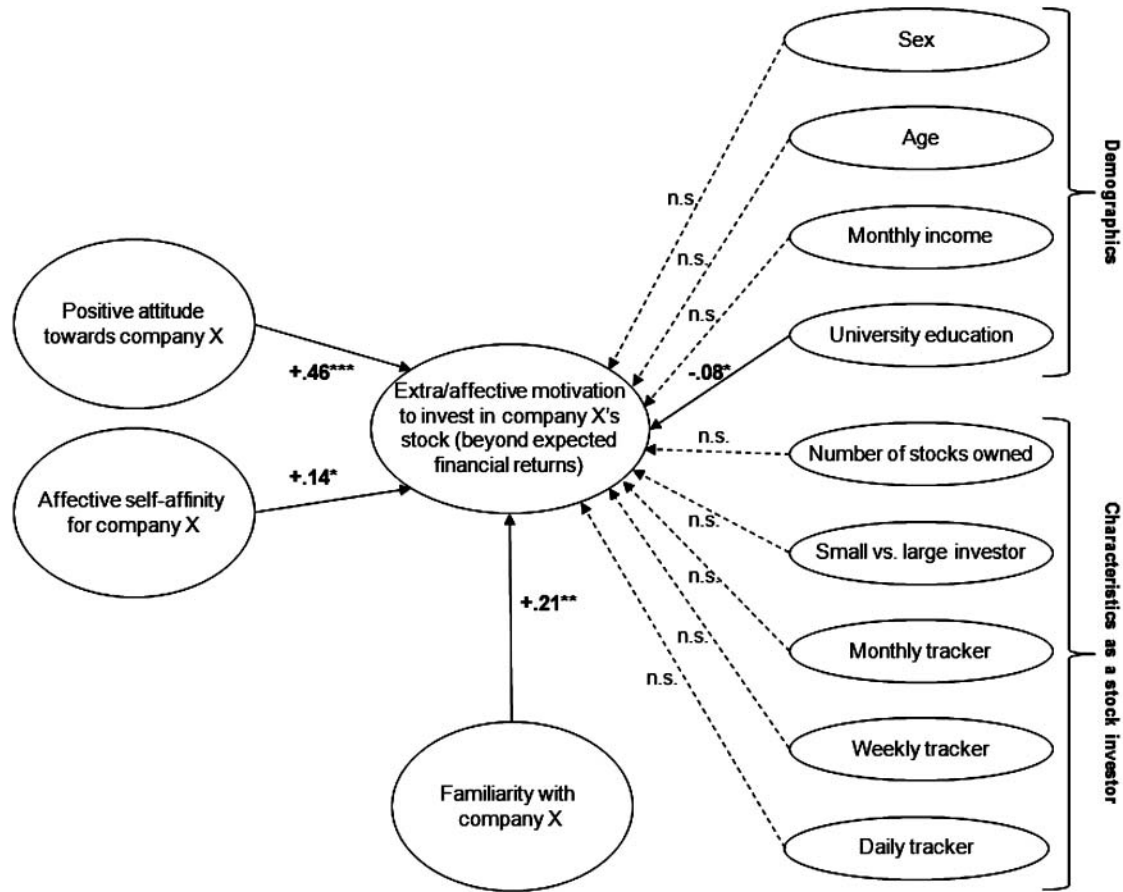
Note. *p < .05 (one-sided).

**p < .01 (one-sided).

***p < .001 (one-sided).

Notes: The t-values were calculated through a bootstrapping routine with 404 cases and 500 samples.

affect towards the company at the time of investment. As shown by the figure, only 4.3% of the investors responded according to the leftmost benchmark value, indicating that they had only a financial motivation to invest in the stock and no affect-based motivation at all. The rest, 95.7%, indicated more or less strong affect-based motivation to invest in the company's stock, beyond its expected financial returns/risk. The frequency distribution of the other response item of the dependent variable scale was highly similar to that of the first one.



Note. Significant paths noted in the figure.
 * $p < .05$
 ** $p < .01$
 *** $p < .001$
 n.s.=not significant

FIGURE 2 Results: Predictors of affect-based motivation to invest in a company's stock.

Tests of Hypotheses

Correlations between the main variables are listed in Table 1. The main results—the path coefficients and t-values of the calculated PLS model—are listed in Table 2. Figure 2 presents the final model in a simplified form, with significant paths noted. The model explains 39.3% of AFFECT-BASED EXTRA INVESTMENT MOTIVATION. In the calculated model, both of the predictor variables, POSITIVE ATTITUDE TOWARDS THE COMPANY and AFFECTIVE SELF-AFFINITY FOR THE COMPANY, have significant ($p < .05$), direct effects on the dependent variable, in support of our hypotheses. In addition, all significant parameters are in the proposed directions, providing general support for our hypotheses.

With regard to POSITIVE ATTITUDE TOWARDS THE COMPANY, we find a significant positive correlation between this predictor variable and the dependent variable

AFFECT-BASED EXTRA INVESTMENT MOTIVATION (path coefficient = .46; t statistic = 4.46; $p < .001$). This suggests, in support of hypothesis H1, that the more positive an individual's attitude or affect towards a company, the stronger is his extra, affect-based motivation to invest in the company's stock, beyond its financial returns. Nevertheless, we find also that the other affective construct, predictor variable AFFECTIVE SELF-AFFINITY FOR THE COMPANY, is positively and significantly correlated with AFFECT-BASED EXTRA INVESTMENT MOTIVATION (path coefficient = .14; t statistic = 1.79; $p < .05$). This suggests, as we propose in hypothesis H2, that an increase in affective self-affinity for a company further increases individuals' extra affect-based motivation to invest in the company's stock, beyond its financial returns.

Moreover, also the main control variable, FAMILIARITY WITH THE COMPANY, is found to have a positive

correlation with AFFECT-BASED EXTRA INVESTMENT MOTIVATION (path coefficient = .21; t statistic = 2.88; $p < .01$). However, the inclusion of this control variable does not render the coefficients of the main predictor variables insignificant, which are as reported above. This being the case, it seems to be established that whilst familiarity with a company may be one source of affect-related motivation to invest in a company's stock (Frieder and Subrahmanyam [2005]), even beyond its expected financial returns, positive attitude and affective self-affinity are distinct and together much greater sources of such extra motivation.

Examining the control variables pertaining to investors' personal characteristics, we do not find significant effects on AFFECT-BASED EXTRA INVESTMENT MOTIVATION by either investors' personal demographics or their characteristics as investors. The only exception is the personal demographic factor of education, whereby an academic degree (UNIVERSITY EDUCATION) has a significant path with negative coefficient to the dependent variable (path coefficient = $-.08$; t statistic = 1.89; $p < .05$). This hints that having university education decreases individuals' affect-based, extra motivations to invest in company stocks, beyond the expected financial returns of the stocks. The reason behind this finding might be that university education provides individuals with increased abilities to think and make decisions in a cool and analytical way, something which gets reflected in their investment decisions, too, in the form of decreased influence by affect-based motivations. However, note that an alternative reason for the finding may be that rather than altering one's actual investment decision-making abilities, university education strengthens one's tendency to give over-rationalized accounts of one's decisions *ex post*, after the decisions. The existence such a pattern might indeed explain the found effect between the variables—which were, after all, based on retrospective self-reports.

The general lack of significant effects by the personal characteristics is an interesting finding. For instance, the lack of effect by the investor's income and self-perceived size (MONTHLY INCOME, SMALL VS LARGE INVESTOR,) suggests that both small and large investors will rather similarly have affect-based extra motivations to invest in and select certain stocks. The lack of effects by investment activity (NUMBER OF STOCKS OWNED; MONTHLY TRACKING, WEEKLY TRACKING, DAILY TRACKING), in turn, suggests that both active and passive investors may similarly have affect-based stock investment motivations, whenever they happen to invest in company stocks. Furthermore, the strength of the affect-based motivations do not seem to depend on the investor's sex or age.

Finally, examining the company dummy variables, we find certain moderating company effects especially on the relationship between FAMILIARITY WITH THE COMPANY and the dependent variable AFFECT-BASED EXTRA INVESTMENT MOTIVATION. This suggests that there are likely to be certain company- and/or industry-specific factors unidentified in our model that strengthen or weaken the

impact of the control variable on individuals' affect-based motivations to invest in those companies' stocks.

DISCUSSION

Contributions to Research

While researchers' interest in the role that company affect plays in investment decisions has grown considerably (e.g., Aspara and Tikkanen [2010b], Frieder and Subrahmanyam [2005], MacGregor et al. [2000], Schoenbachler, Gordon and Aurand [2004], Statman, Fisher and Anginer [2008]), there have been no empirical studies that would examine the specific question whether one's affect towards a company elicits motivation to invest in the company's stock over and beyond the expected financial returns and risk of the stock. The contribution of our research is, hence, to provide empirical evidence of whether an individual's affect towards a company provides him extra motivation to invest in the company's stock, beyond financial return expectations.

Specifically, we found that most individuals that participated in our study and had recently invested in certain companies' stocks had had certain degree of affect-based, extra motivation to invest in those stocks beyond the expected financial returns. As an explanation to the extra investment motivation beyond the expected financial returns, we found that the more positive the attitude that individuals had towards a company, the stronger was their extra motivation to invest in its stock beyond its expected financial returns. This finding implies that the influence of company affect on investment decision making goes beyond the alleviating influence that affect (heuristic) has on information-processing challenges (MacGregor et al. [2000], Slovic et al. [2007]). The finding suggests that investors may use company affect as a shortcut for selecting a certain stock over others, when facing the inherent difficulties in estimating the exact financial return-risk profiles of alternative stocks. The finding also suggests that company affect can also lead the investor to be prepared to give up on the motivation to pursue a stock that has the absolutely optimum expected return-risk profile, that is, partially substitute motivation to invest in a likeable company for the financial returns motivation.

Moreover, we found that an additional affective relationship that one may have to a company, that is, affective self-affinity, further explained one's extra motivation to invest in a stock beyond its financial returns. This finding suggests that while a simple affect or attitude towards a company explains much of investors' extra motivation to invest in the company stock, the motivation can be further explained with the degree to which the investors feel companies to be congruent with their self-concepts or identities. Specifically, the higher the perceived congruency of a company with one's identity, the stronger affect-based extra motivation one is likely to have to invest in the company's stock, beyond its financial returns. This finding is consistent with the suggestions in earlier literature that individuals may obtain self-expressive,

emotional benefits from investing in certain stocks (e.g., Aspara and Tikkanen [2008, 2010a, 2010b, forthcoming], Beal, Goyen and Phillips [2005], Fama and French [2007], Statman [2004]). The finding also constitutes support for the propositions by Aspara et al. [2008] concerning the effects of affective self-affinity on one's investment behavior.

In general, the effects found add to the general criticism of the traditional finance utility functions that only incorporate financial risk and return to explain investor behavior and that ignore the multiplicity of human needs and the heterogeneity between individuals in satisfying these needs (Fisher and Statman [1997], Hoffmann, [2007]). Our results constitute support for the argument that most investors have preferences that go beyond expected financial returns and risk. The results also show that investors will exhibit affect-based investment motivations somewhat regardless of personal characteristics such as sex, age, income and investment activity. As an exception, the results suggest that university education may weaken the affect-based investment motivations; however, this finding might also be due to the stronger tendency of highly educated people towards giving poststratified accounts of their prior behavior and decisions.

Limitations

There are certain limitations in the present study. While the study has the methodological advantage of inquiring individuals about real investment decisions that they had recently made, the data are susceptible to some biases arising from self-reporting as well as retrospection. Specifically, the respondents might have engaged in some (self-)impression management in reflecting the motivations for their investments; also, they might not have remembered correctly their investments motivations. However, we can assume that the bias from image management efforts should result rather in understating the role of affect-based motivations than in overstating them (relative to the rational financial returns-related motivations) due to individuals' natural tendency to rationalize their behavior afterwards. This gives us confidence in the fact that the affect-based investment motivations indeed exist and may even be conservatively understated in our results. The memory problems should not be a serious concern, either, since relatively little time had passed since the investment decision (less than one and half years) at the time of inquiry.

In any case, much further research is needed in the area. Replicating our study with different companies from different industries, as well as being listed and having stockholders in different countries, will be a necessary next step for further research. Moreover, further research would ideally attempt to gather the data at the time of the investment decision, when subjects buy stocks through, for example, an Internet stock trading service. This would help to avoid potential biases inherent in retrospective methods.

Whereas the present study examined individuals' decisions to buy stocks, decisions to sell stocks also should be

explored in further research, since the dynamics of the sell decision might be different to those of the buy decision (Kahneman and Tversky [1979], Shefrin and Statman [1985]). Moreover, the effects of the predictor constructs in the present study should be studied relative to different framings of the investment decision making. For instance, the effects may differ depending on whether the investment decision is framed as a choice between buying two (or more) stocks or whether it is framed as an opportunity to buy one stock, considered alone (as in the present study) (Clark-Murphy and Soutar [2004], Jones, Frisch, Yurak and Kim [1998]).

Note also that the present study did not address the influence of an individual's negative affect towards a company on his decisions to buy/hold the company's stock. It is possible that the effects of negative company affect are simply inverse to those of positive affect. Nevertheless, this is not necessarily the case and the hypotheses concerning the influences of an individual's negative affective evaluations should be further grounded on theory and empirically tested. Furthermore, it should be noted that our propositions are meant to hold particularly for individuals that engage in non-professional stock investing—as opposed to institutional investors or professional individual investors—because the behavior non-professional individual investors has been suggested to deviate most from the rationality assumptions of traditional finance theory (e.g., Grinblatt and Keloharju [2000, 2001], Lee, Shleifer and Thaler [1991], Odean [1998], Poteshman and Serbin [2003], Wärneryd [2001]). Accordingly, the role of company affect in the decision making of professional individual investors and individuals who represent institutional investors (as fund managers) might be investigated as an additional, new stream of research. Finally, further research could employ alternative consumer research-informed methods in studying the affect-based investment motivations. The alternative methods could range from laboratory experiments to analyses of extensive field study data.

ACKNOWLEDGMENTS

The authors have received personal research grants from Jenny and Antti Wihuri Foundation and the Finnish Foundation for Share Promotion for studying themes contained in the article. The research projects StratMark and GloStra, funded by Tekes and NasdaqOMX Nordic Foundation, have also facilitated the research. Moreover, the authors are grateful to researchers Taimi Laaksonen and Nina Yppärilä for assistance in the data collection.

NOTE

1. Throughout this article, we will only use the personal pronoun "he" (or "his" or "him") when referring to individuals. We do this purely for the sake of readability, to avoid complex expressions such as "he/she" and

“his/her.” The use of “he” does not in any way suggest that the arguments would merely apply to males or that the arguments would be contingent on the gender of the individual.

REFERENCES

- Ajzen, I. and M. Fishbein. *Understanding and Predicting Social Behavior*, (1980), Englewood Cliffs, NJ: Prentice Hall.
- Aspara, J., R. Olkkonen, H. Tikkanen, J. Moisander and P. Parvinen. “A Theory of Affective Self-Affinity: Definitions and Application to a Company and its Business.” *Academy of Marketing Science Review*, 12, (2008).
- Aspara, J. and H. Tikkanen. “Interactions of Individuals’ Company-related Attitudes and Their Buying of the Companies’ Stocks and Products.” *Journal of Behavioral Finance*, 9, (2008), pp. 85–94.
- Aspara, J. and H. Tikkanen. “Consumers’ Stock Preferences Beyond Expected Financial Returns: The Influence of Product and Brand Evaluations.” *International Journal of Bank Marketing*, 28, (2010a), 193–221.
- Aspara, J. and H. Tikkanen. “The Role of Company Affect in Stock Investments: Towards Blind, Undemanding, Non-Comparative, and Committed Love.” *Journal of Behavioral Finance*, 11, (2010b), 103–113.
- Aspara, J. and H. Tikkanen. “Corporate Marketing in the Stock Market: The Impact of Company Identification on Individuals’ Investment Behaviour.” *European Journal of Marketing*, (forthcoming).
- Ang, J. S., A. Chua and D. Jiang. “Is A Better Than B? How Affect Influences the Marketing and Pricing of Financial Securities.” *Financial Analysts Journal*, 66, (2010), pp. 40–54.
- Ball, A. D. and L. H. H. Tasaki. “The Role and Measurement of Attachment in Consumer Behavior.” *Journal of Consumer Psychology*, 1, (1992), pp. 155–172.
- Barber, B. M. and T. Odean. “All That Glitters: The Effect of Attention and News on the Buying Behavior of Individual and Institutional Investors.” *Review of Financial Studies*, 21, (2008), pp. 785–818.
- Beal, D., M. Goyen and P. Phillips. “Why Do We Invest Ethically?” *Journal of Investing*, 14, (2005), pp. 66–77.
- Belk, R. W. “Three Scales to Measure Constructs Related to Materialism: Reliability, Validity, and Relationships to Measures of Happiness.” In *Advances in Consumer Research*, Kinnear, T. C. (ed.), (1984), Provo, UT: Association for Consumer Research.
- Belk, R. W. “Possessions and the Extended Self.” *Journal of Consumer Research*, 15, (1988), pp. 139–168.
- Bem, D. J. “Self-perception Theory.” In *Advances in Experimental Social Psychology*, Berkowitz, L. (ed.), (1972), New York: Academic Press.
- Bergami, M. and R. P. Bagozzi. “Self-Categorization and Commitment as Distinct Aspects of Social Identity in the Organization: Conceptualization, Measurement, and Relation to Antecedents and Consequences.” *British Journal of Social Psychology*, 39, (2000), 555–577.
- Bhattacharya, C. B. and S. Sen. 2003. “Consumer-company Identification: A Framework for Understanding Consumers’ Relationships with Companies.” *Journal of Marketing*, 67, (2003), pp. 76–88.
- Chin, W. W. and P. Newsted. “Structural Equation Modeling Analysis with Small Samples Using Partial Least Squares.” In *Statistical Strategies for Small Sample Research*, Hoyle, R. H. (ed.), (1999), Thousand Oaks, CA: Sage Publications.
- Clark-Murphy, M. and G. Soutar. “What Individual Investors Value: Some Australian Evidence.” *Journal of Economic Psychology*, 25, (2004), pp. 539–555.
- Damasio, A. R. *Descartes’ Error: Emotion, Reason, and the Human Brain*, (1994), New York: G.P. Putnam and Sons.
- Danet, B. and T. Katriel. “No Two Alike: Play and Aesthetics in Collecting.” *Play and Culture*, 2, (1989), pp. 253–277.
- Fama, E. F. and K. R. French. “Disagreement, Tastes, and Asset Prices.” *Journal of Financial Economics*, 83, (2007), pp. 667–689.
- Finucane, M. L., A. S. Alhakami, P. Slovic and S. M. Johnson. “The Affect Heuristic in Judgments of Risks and Benefits.” *Journal of Behavioral Decision Making*, 13, (2000), pp. 1–17.
- Fisher, K. L. and M. Statman. “The Mean–variance-optimization Puzzle: Security Portfolios and Food Portfolios.” *Financial Analysts Journal*, 53, (1997), pp. 41–50.
- Fornell, C. and F. L. Bookstein. “Two Structural Equation Models: LISREL and PLS Applied to Customer Exit-voice Theory.” *Journal of Marketing Research*, 19, (1982), pp. 440–452.
- Fornell, C. and J. Cha. “Partial Least Squares.” In *Advanced Methods of Marketing Research*, Bagozzi, R. (ed.), (1994), Cambridge, MA: Blackwell.
- Frieder, L. and A. Subrahmanyam. “Brand Perceptions and the Market for Common Stock.” *Journal of Financial and Quantitative Analysis*, 40, (2005), pp. 57–85.
- Grinblatt, M. and M. Keloharju. “The Investment Behavior and Performance of Various Investor Types: A Study of Finland’s Unique Data Set.” *Journal of Financial Economics*, 55, (2000), pp. 43–67.
- Grinblatt, M. and M. Keloharju. “How Distance, Language, and Culture Influence Stockholdings and Trades.” *Journal of Finance*, 56, (2001a), pp. 1053–1073.
- Grinblatt, M. and M. Keloharju. “What Makes Investors Trade?” *Journal of Finance*, 56, (2001b), pp. 589–616.
- Hoffmann, A. O. I. “Individual Investors’ Needs and the Investment Professional: Lessons from Marketing.” *The Journal of Investment Consulting*, 8, (2007).
- Jones, S. K., D. Frisch, T. J. Yurak and E. Kim. “Choices and Opportunities: Another Effect of Framing on Decisions.” *Journal of Behavioral Decision Making*, 11, (1998), pp. 211–226.
- Kahneman, D. and A. Tversky. “Prospect Theory: An Analysis of Decision Under Risk.” *Econometrica*, 47, (1979), pp. 263–292.
- Lee, C., A. Shleifer and R. Thaler. “Investor Sentiment and the Closed-end Fund Puzzle.” *Journal of Finance*, 46, (1991), pp. 75–109.
- MacGregor, D. G., P. Slovic, D. Dreman and M. Berry. “Imagery, Affect, and Financial Judgment.” *Journal of Psychology and Financial Markets*, 1, (2000), pp. 104–110.
- Odean, T. “Are Investors Reluctant to Realize Their Losses?” *Journal of Finance*, 53, (1998), pp. 1775–1798.
- Pearce, S. M. *Interpreting Objects and Collections*, (1994), London & New York: Routledge.
- Poteshman, A. M. and V. Serbin. “Clearly Irrational Financial Market Behavior: Evidence From the Early Exercise of Exchange Traded Stock Options.” *Journal of Finance*, 58, (2003), pp. 37–70.
- Ringle, C., S. Wende and A. Will. *SmartPLS Version 2.0 M2*, (2005), Hamburg, Germany: Institute for Operations Management and Organization at the University of Hamburg.
- Schoenbachler, D. D., G. L. Gordon and T. W. Aurand. “Building Brand Loyalty Through Individual Stock Ownership.” *Journal of Product & Brand Management*, 13, (2004), pp. 488–497.
- Scott, S. G. and V. R. Lane. “A Stakeholder Approach to Organizational Identity.” *Academy of Management Review*, 25, (2000), pp. 43–62.
- Shefrin, H. and M. Statman. “The Disposition to Sell Winners Too Early and Ride Losers Too Long: Theory And Evidence.” *Journal of Finance*, 40, (1985), pp. 777–790.
- Slovic, P., M. L. Finucane, E. Peters and D. G. MacGregor. “Rational Actors or Rational Fools: Implications of the Affect Heuristic for Behavioral Economics.” *Journal of Socio-economics*, 31, (2002a), pp. 329–342.
- Slovic, P., M. L. Finucane, E. Peters and D. G. MacGregor. “The Affect Heuristic.” In *Heuristics and Biases: The Psychology of Intuitive Judgment*, Gilovich, T., D. Griffin and D. Kahneman (ed.), (2002b), Cambridge, UK: Cambridge University Press.
- Slovic, P., M. L. Finucane, E. Peters and D. G. MacGregor. “The Affect Heuristic.” *European Journal of Operational Research*, 177, (2007), pp. 1333–1352.

Slovic, P., M. L. Finucane, E. Peters and D. G. MacGregor. "Rational Actors or Rational Fools: Implications of the Affect Heuristic for Behavioral Economics." *Journal of Socio-economics*, 31, (2002), pp. 329–342.

Statman, M. "What Do Investors Want?" *Journal of Portfolio Management*, 30, (2004), pp. 153–161.

Statman, M., K. L. Fisher and D. Anginer. "Affect in a Behavioral Asset Pricing Model." *Financial Analysts Journal*, 64, (2008), pp. 20–29.

Wärneryd, K. *Stock-market Psychology: How People Value and Trade Stocks*, (2001), Cheltenham, UK: Edward Elgar.

Zajonc, R. B. "Feeling and Thinking: Preferences Need No Inferences." *American Psychologist*, 35, (1980), pp. 151–175.

APPENDIX A: PERSONAL CHARACTERISTICS OF THE INVESTORS PARTICIPATING IN THE STUDY

	overall sample	company A investors	company B investors	company C investors	company D investors	chi square	p value
Gender						5.339	.149
• female	23.0%	28.6%	14.3%	25.6%	21.4%		
• male	77.0%	71.4%	85.7%	74.4%	78.6%		
Age						24.082	.020
• below 15	0.5%	.9%	.0%	.0%	.9%		
• 15–25	3.4%	1.9%	4.3%	5.8%	2.6%		
• 26–40	23.8%	29.3%	24.3%	30.2%	13.8%		
• 41–60	46.0%	37.7%	52.9%	48.8%	47.4%		
• over 60	26.2%	30.2%	18.6%	15.1%	35.3%		
Marital status						15.898	.196
• married	64.4%	67.9%	67.1%	55.8%	65.8%		
• living w/partner	16.1%	14.2%	11.4%	26.7%	12.8%		
• single	12.4%	12.3%	14.3%	10.5%	12.8%		
• divorced	4.8%	1.9%	4.3%	4.7%	7.7%		
• other	2.4%	3.8%	2.9%	2.3%	0.9%		
Education (highest)						20.895	.052
• middle school	8.3%	8.6%	7.1%	7.0%	9.7%		
• high school	5.1%	8.6%	4.3%	3.5%	3.5%		
• vocational school	12.3%	10.5%	7.1%	17.4%	13.2%		
• college/bachelor	27.7%	21.9%	20.0%	38.4%	29.8%		
• university/master	46.7%	50.5%	61.4%	33.7%	43.9%		
Monthly income						26.238	.002
• below 2000€	14.2%	18.3%	5.8%	16.1%	14.0%		
• 2000–3999€	50.0%	43.4%	39.1%	60.9%	54.4%		
• 4000–5999€	20.9%	23.1%	26.1%	17.2%	18.4%		
• over 6000€	15.0%	15.4%	29.0%	5.8%	13.2%		
Total number of stocks owned						35.111	<.0001
• 1–2 stocks	4.8%	1.0%	1.5%	12.6%	4.3%		
• 3–5 stocks	25.9%	20.0%	23.2%	35.6%	25.6%		
• 6–10 stocks	37.8%	42.9%	29.0%	34.5%	41.0%		
• over 10 stocks	31.5%	36.2%	46.4%	17.2%	29.1%		
Stock following activity						7.849	.549
• daily	39.4%	36.8%	40.0%	48.8%	34.5%		
• weekly	44.4%	47.2%	38.6%	39.5%	49.1%		
• monthly	12.7%	12.3%	15.7%	10.5%	12.9%		
• yearly or less	3.4%	3.8%	5.7%	1.2%	3.5%		

APPENDIX B: CONTROL MEASURES PERTAINING TO INVESTORS' PERSONAL CHARACTERISTICS

Variable	Measurement/question	Coding	Scale type
SEX	"Sex?"	"female" → 0 "male" → 1	Dummy/ binary
AGE	"What is your age?"	"below 15" → 0 "16–25" → 16 "26–40" → 26 "41–60" → 41 "over 60" → 60	Interval
MONTHLY INCOME	"What is your monthly income before taxes?"	"below 2000€" → 0 "2000–3999€" → 2 "4000–5999€" → 4 "over 6000€" → 6	Interval
UNIVERSITY EDUCATION	"What is your educational background?" (<i>Check.</i>) •"middle school" •"high school" •"vocational school" •"college" •"university"	if "university" checked → UNIVERSITY EDUCATION = 1	Dummy/ binary
NUMBER OF STOCKS OWNED	"How many different company stocks do you own?"	"1–2" → 1 "3–5" → 3 "6–10" → 6 "over 10" → 10	Interval
SMALL VS. LARGE INVESTOR	"What kind of investor do you consider yourself to be?" (<i>Check one.</i>) •"small investor" •"medium-sized investor" •"large investor"	if "small investor" checked → SMALL VS. LARGE INVESTOR = 1	Dummy/ binary
MONTHLY TRACKER, WEEKLY TRACKER, DAILY TRACKER	"How often do you follow the development of your stock investments?" (<i>Check one.</i>) •"daily" •"weekly" •"monthly" •"yearly or less seldom"	if "monthly" checked → MONTHLY TRACKER = 1; if "weekly" checked → WEEKLY TRACKER = 1; if "daily" checked → DAILY TRACKER = 1	3 dummy variables