Open access • Journal Article • DOI:10.2139/SSRN.1341076

Low Risk and High Return – Affective Attitudes and Stock Market Expectations

Alexander Kempf, Christoph Merkle, Alexandra Niessen-Ruenzi

Institutions: University of Cologne, Aarhus University, University of Mannheim

Published on: 11 Jun 2012 - Social Science Research Network

Topics: Risk–return spectrum and Stock market

Kempf, Alexander; Merkle, Christoph; Niessen-Ruenzi, Alexandra

Working Paper

Low risk and high return: Affective attitudes and stock market expectations

CFR Working Paper, No. 09-10 [rev.]

Provided in Cooperation with:
Centre for Financial Research (CFR), University of Cologne

Suggested Citation: Kempf, Alexander; Merkle, Christoph; Niessen-Ruenzi, Alexandra (2012) : Low risk and high return: Affective attitudes and stock market expectations, CFR Working Paper, No. 09-10 [rev.], University of Cologne, Centre for Financial Research (CFR), Cologne

This Version is available at:
http://hdl.handle.net/10419/70122

CFR-Working Paper NO. 09-10

Low Risk and High Return – Affective Attitudes and Stock Market Expectations

A. Kempf • C. Merkle • A. Niessen-Ruenzi

centre for Financial Research
Look deeper

Low Risk and High Return - Affective Attitudes and Stock Market Expectations

Alexander Kempf, Christoph Merkle and Alexandra Niessen-Ruenzi*

June 2012

Abstract

This experimental study investigates the impact of affective attitudes on risk and return estimates of stocks. Participants rate well-known blue-chip firms on an affective scale and forecast risk and return of the firms' stock. We find that positive affective attitudes lead to a prediction of high return and low risk, while negative attitudes lead to a prediction of low return and high risk. This bias increases with participants' confidence in their ratings and decreases with financial literacy. Firm characteristics such as a firm's marketing expenditures and the strength of its brand have a positive impact on its affective rating.

Keywords: Affective Attitudes, Risk and Return Expectations, Behavioral Finance, Affect Heuristic

JEL-Classification Codes: D80, G02, G11

*Kempf: Department of Finance and Centre for Financial Research (CFR), University of Cologne, Albertus-Magnus Platz, 50923 Koeln, Germany, kempf@wiso.uni-koeln.de, Merkle and Niessen-Ruenzi: Department of Finance, University of Mannheim, 68131 Mannheim, Germany, chmerkle@mail.uni-mannheim.de, niessen@bwl.uni-mannheim.de. We thank seminar participants at the FMA 2009 European conference, the IMEBE 2009 conference, the DGF 2009 conference, the University of Mannheim, and the University of Cologne for valuable comments. We also thank the editor John Doukas and two anonymous referees for very helpful comments. The authors acknowledge research support from the Centre for Financial Research at the University of Cologne. All errors are our own.

Low Risk and High Return - Affective Attitudes and Stock Market Expectations

Abstract

This experimental study the impact of affective attitudes on risk and return estimates of stocks. Participants rate well-known blue-chip firms on an affective scale and forecast risk and return of the firms' stock. We find that positive affective attitudes lead to a prediction of high return and low risk, while negative attitudes lead to a prediction of low return and high risk. This bias increases with participants' confidence in their ratings and decreases with financial literacy. Firm characteristics such as a firm's marketing expenditures and the strength of its brand have a positive impact on its affective rating.

Keywords: Affective Attitudes, Risk and Return Expectations, Behavioral Finance, Affect Heuristic

JEL-Classification Codes: D80, G02, G11

1 Introduction

Standard finance theory predicts that rational investors trade off a stock's risk and expected return leading to a positive correlation of risk and expected return in equilibrium (Sharpe 1964). This prediction is based on rational investors who judge risk and return of a stock solely based on fundamental information in the context of a market model. However, several empirical papers suggest that individual investors expect a negative correlation of a stock's risk and return (Shefrin 2001, Kaustia, Laukkanen, and Puttonen 2009, Amromin and Sharpe 2010, Weber, Weber, and Nosić 2012). In this paper, we investigate whether affective attitudes towards a firm can explain these biased expectations.

We adopt a relatively broad definition of the term *affect* which includes both, emotions as *affective states* and attitudes as *affective dispositions* (cp. Clore and Gasper 2000). Affect thus encompasses immediate experiences of feelings and emotions, the associated channels of mental processing, and the resulting attitudes towards objects.[1] The opposite term to affect is cognition, which comprises the reason-based evaluation of situations and objects. Psychologists and neuroscientists emphasize the outstanding role of affect in information processing and decision making (Frijda 1986, Ekman and Davidson 1994, Damasio 1994, LeDoux 1996). They argue that affect influences all stages of information processing and decision making, partly without conscious awareness of this influence.

In a financial setting, where investors are supposed to evaluate the risk and return prospects of assets, affective attitudes are likely to get involved, in particular when assets represent companies towards which affective attitudes are likely to exist. The way affect operates in this context can be best described by an *affect heuristic*, which maintains that people form a global perception of an object based on their affective attitude and derive judgments and expectations about this object from this perception (Finucane, Alhakami, Slovic, and Johnson 2000, Slovic, Finucane, Peters, and MacGregor 2004). A positive affective attitude towards a company generates an expectation of high return and low risk for its stock, while a negative affective attitude towards a company leads to a stock market expectation of low return and high risk. Thus, in contrast to standard finance theory, the affect heuristic predicts a negative correlation of risk and expected return. Since risk and return expectations are commonly regarded as the main determinants of asset allocation decisions, the affect heuristic can thus severely bias investors' portfolios.

[1] In our experimental setting we will mostly refer to "affective attitudes towards companies".

The main contribution of this paper is to investigate, whether affective attitudes towards a company have an impact on how a person estimates risk and return of the company's stock. Furthermore, we analyze whether the impact of affective attitudes on risk and return expectations depends on financial literacy of investors and their confidence in evaluating a firm. Finally, we explore whether the management of a firm can actively influence which affective attitudes investors have for this firm.

We analyze the impact of affective attitudes on risk and return estimates in an experimental setting. Participants in the experiment provide their affective evaluation of companies on a semantic differential scale (Osgood, Suci, and Tannenbaum 1957), a standard tool in psychology to elicit affective attitudes. Participants are further asked to predict future risk and return of these company's stock. They also get access to fundamental information about the companies to prevent that an affective response in the estimation of returns is merely due to a lack of information.

Our results show that affective attitudes have a strong impact on participants' risk and return estimates. Positive ratings lead to an estimation of high expected return and at the same time low risk. In contrast, negative ratings produce the opposite prediction of low expected return and high risk. The estimates provided in the experiment clearly violate the predictions of standard finance theory and suggest the presence of a bias in expectation formation. The results hold no matter whether the affective ratings are elicited before or after the risk and return estimation, i.e. we find that an immediate activation of affective reactions before the risk and return estimations is not necessary for affect to have an impact on these estimations.

We also find that our results are stronger for participants with lower financial literacy. This suggests that participants with higher financial literacy are at least partly able to cognitively correct their affective attitude when confronted with the estimation task. Furthermore, the results are stronger for participants who indicate that they feel confident in evaluating the firm. Confidence thus contributes to a more affectively driven evaluation. Finally, we explore which firm characteristics determine its affective rating among participants. We find that views on company image, brand and products carry over to investment expectations. This result supports Fehle, Tsyplakov, and Zdorovtsov (2005), who argue that firms can use advertising to impact investor behavior.

There are two important implications arising from our findings. First, our results imply that investors who are subject to an affect heuristic potentially overweight stocks which they evaluate positively because they believe these stocks to be more profitable and less risky than the average investment. At the same time, these investors might ignore negatively evaluated stocks, which in combination leads to insufficient diversification of their portfolio holdings. Underdiversification of individual investors' portfolios has been shown frequently (Grinblatt and Keloharju 2001, Anderson 2007, Kumar and Goetzmann 2008), and might at least partly be caused by affective attitudes towards stocks. As firms are rated similarly across participants, our results might also have an impact on aggregate stock returns. Specifically, the literature on investor sentiment suggests that stocks with positive affective attitudes should have higher returns in the short term and then mean revert afterwards (Baker and Wurgler 2006). Our results confirm that this might indeed be the case. Second, our results imply that firms with a positive affective rating might attract a different shareholder clientele than firms with a negative affective rating. We show that financially illiterate participants are particularly prone to the affect heuristic, which is in line with the general finding that especially individual investors are often subject to behavioral biases (Barberis and Thaler 2003). This might have important consequences for firms since a firm's shareholder structure might determine which policies it can adopt (Hartzell and Starks 2003, Graham and Kumar 2006).

Our study builds on the growing literature on the importance of emotions and affective attitudes for economic decision making (Elster 1998, Loewenstein 2000, Loewenstein, Hsee, Weber, and Welch 2001) and particularly financial decision making (Goetzmann and Zhu 2005, Subrahmanyam 2008). For instance Loewenstein, Hsee, Weber, and Welch (2001) and Hirshleifer (2001) lay down a conceptual foundation of the impact of emotions on financial decision making. Our results empirically support the views expressed in this literature by showing that affective attitudes play an important role in the estimation of a stock's risk and return. Further we extend the literature on the impact of the affect heuristic on information processing. MacGregor, Slovic, Dreman, and Berry (2000) introduced the affect heuristic into finance and show that affect is important for evaluating classes of securities, especially when fundamental information is scarce. Our paper illustrates that affect is important for the evaluation of individual stocks even if fundamental information is available. Statman, Fisher, and Anginer (2008) find that stock returns of firms which are rated as popular in the Fortune magazine survey are subsequently low. Our direct experimental test on how

the affect heuristic influences risk and return expectations provides an explanation for these findings: Stocks with a positive affective rating are attractive to investors, who expect that these stocks deliver high returns at low risk. This leads to overpricing of these stocks and eventually lower returns in the future.

2 Affect and financial decision making

The concept of an affect heuristic is embedded into dual process theories of information processing. In this framework two parallel systems are simultaneously active in reacting to incoming stimuli (Epstein 1994, Kahneman 2003). System 1 works unconsciously by images, associations and experiences. It is often linked to affect and emotion and it processes information rapidly, automatically, and without much effort (Epstein 1994, Slovic, Finucane, Peters, and MacGregor 2004). System 2 is rather affect neutral and represents the reason-based, analytic mode of human information processing. It works self-aware, deliberately, and relatively slow.

The affect heuristic is a strategy how people derive judgments from the immediate affective impression, which is provided by system 1. It works by tagging objects, for example companies, with affective cues (Finucane, Alhakami, Slovic, and Johnson 2000, Slovic, Finucane, Peters, and MacGregor 2004). When a decision task involves these companies, the cues and the associated images and feelings are retrieved. The rapid availability of affective tags supports easy and effective decision making, but at the same time it is subject to biases especially for complex decision problems. Taken together, the cues and associations represent an affective attitude towards the company. These affective discriminations are independent of a prior cognitive evaluation and can also be interpreted in terms of liking or disliking a company (Zajonc 1980). The task of system 1 thus is to produce an initial impression of "good" vs. "bad", or "like" vs. "dislike", respectively, associated with a company.

In a next step, this global affective attitude serves as a source for judgments about more specific attributes of the company in question, for example the performance of its stock. Similarly to other heuristics, the affect heuristic is applied to simplify judgment and decision processes, in this case by avoiding effortful computations involving all determinants of a company's stock return. However, it may lead to the wrong conclusion that a company, which one likes or has a positive affective attitude to, automatically makes a good investment. As

a further consequence, expectations are highly correlated with the valence of the affective impression; a positive affect will, for example, suggest a company stock to promise high returns by bearing little risk. Therefore, the affect heuristic can explain why investors expect a negative correlation between a stock's risk and return.

Within the two-system view it is the role of system 2 to control and correct the initial responses by system 1; but whether this happens depends both on internal (intelligence, affective state) as well as external factors (time-pressure, incentives). Participants' understanding of financial markets thus determines whether they are able to detect and correct biases in their evaluations, which is why we expect a crucial role of financial literacy for the estimation of a stock's risk and return. It is unlikely though that the cognitive system can completely offset affective influences on judgment.

3 Experimental Design

The experiment consists of two parts, an affective rating task and an estimation of risk and returns, both for a sample of German blue chip stocks. We restrict ourselves to the thirty largest and most famous German companies that are comprised in the Xetra DAX30 stock market index, to make sure that our German student participants know the companies behind these stocks and possess an affective attitude towards the stocks.

3.1 Measurement of Affective Attitudes

We use a semantic differential scale to measure affective attitudes. Osgood, Suci, and Tannenbaum (1957) introduced this scale as an attitude scale, and it was later applied to affect (Ajzen 1988, Bradley and Lang 1994). The semantic differential scale asks a person to rate an object on a seven-point rating scale which displays at its ends two bipolar adjectives. We use the following four bipolar word pairs: good/bad, interesting/boring, strong/weak, and active/passive. With this choice we restrict the amount of adjective pairs to an experimentally tractable number and still cover the three main dimensions of a semantic differential scale (Osgood, Suci, and Tannenbaum 1957): evaluation (good/bad, interesting/boring), potency (strong/weak), and activity (active/passive). As we are primarily interested in participants' affective attitudes towards *individual* firms, we apply a separate semantic differential scale

to each firm in our sample. Similar to our study, MacGregor, Slovic, Dreman, and Berry (2000) make use of the semantic differential scale as a measurement approach in the context of the affect heuristic. The approach differs from other common methods in research on the impact of emotions, for example to induce positive or negative affective states by showing participants pictures or movies (cp., e.g., Polivy 1981). We cannot use such techniques, as this would lead to a general positive or negative affective state influencing risk and return estimations of *all* firms.

We randomly assign participants into two groups, a treatment and a control group. In general, it is assumed that the above described mental processes are at work permanently, and that an object will automatically activate affective attitudes associated with it (Bargh, Chaiken, Govender, and Pratto 1992). In judgments of financial expectations, the mere name of a stock will arguably provide sufficient affective associations to operate the affect heuristic. However, an additional activation by engaging in a reflective process about affective attitudes may facilitate their retrieval (for a discussion cp. Fazio, Sanbonmatsu, Powell, and Kardes 1986). To test for an effect of affective activation preceding the estimation of risk and return, treatment group and a control group of the experiment are characterized by a variation of the order of the tasks. Our treatment group first observes the name and logo of a company and provides its affective attitude towards this company (the logo is used as an additional affective trigger). Subsequently, the treatment group is asked to predict risk and return of the firm's stock. Then, the next company is rated. In contrast, our control group starts with risk and return predictions for all companies. Only afterwards, the control group provides the affective rating for each company one after another. This design allows us to analyze whether an immediate activation is needed for affective attitudes to become salient and to influence risk and return estimations.

An example of the affective rating stage of the experiment is shown by a screenshot of the actual experimental interface in Figure 1.

— Please insert FIGURE 1 approximately here —

Each firm is represented by its name and company logo (in the example the utility company E.ON), and participants are asked to rate firms along the four adjective pairs. A rating value further left on the scale indicates a more positive affective evaluation (we

identify "good", "interesting", "strong" and "active" as the positively connoted notions). The order in which the firms are presented in the experiment was randomly assigned.

3.2 Measurement of Risk and Return Expectations

Before providing risk and return estimations, participants can choose if they want to retrieve fundamental information on a firm. To make sure that the amount of information corresponds to real-life data, we give participants the same fundamental information as it is provided by online news services like Yahoo!Finance. For example, participants observe a firm's return on assets, its debt to equity ratio and its price earnings ratio.[2]

The option to first view fundamental information about a firm before submitting the risk and return estimates was chosen in 96% of all cases. We therefore conclude that participants regard the fundamentals as informative for the estimation task. Participants are allowed to check fundamental information as long as they like. On average, they take 32 seconds to process the information. The participation rate and the time span do not substantially decline in the course of the experiment. Participants proceed to the risk and return estimation by clicking an "ok"-button. The experimental interface of the risk and return estimation is shown in Figure 2.

— Please insert FIGURE 2 approximately here —

Glaser, Langer, Reynders, and Weber (2007) and Dave, Eckel, Johnson, and Rojas (2010) show that people often fail to provide reasonable numerical return and risk estimates. As a result, point estimates of risk and return are very noisy. To account for this estimation problem, we do not ask participants to provide point estimates but we rather elicit risk and return estimates for each stock on a five point scale ranging from "far below average" to "far above average" compared to the average DAX30 company. Using five point scales to elicit risk and return estimates also facilitates incentivizing participants to undertake the risk and return estimation carefully.

The relevant time period for expectations is indicated as twelve month ahead. We further require to submit risk and return estimates for the twelve months period preceding the

[2] A screenshot of all firm fundamentals provided to participants in our experiment can be found in Appendix A.

experiment, as we are interested in how well participants are informed about past return and risk, and which relationship they assume between past and future values. In addition, participants are asked how confident they feel in judging the stock's risk and return.

This procedure is repeated for all companies. At the end of the experiment, participants answer a demographic questionnaire and complete a test for financial literacy. This literacy test allows us to control for differences in participants' knowledge and experience with respect to financial markets that could be important for the task at hand. We use the financial literacy test developed by van Rooij, Lusardi, and Alessie (2011), because this test was designed specifically to study the impact of financial literacy on financial decision making. The set of questions used in this test can be found in Appendix B. In our experiment, we used a translation of the questions into German language.

Treatment and control group in our experiment differ in the ordering of the affective rating and the risk and return estimation of a stock. Participants of the treatment group first provide their affective evaluation, then have access to fundamental information about the firm and are finally asked to predict future risk and return of its stock. In contrast, participants of the control group first have access to fundamental information about the firm and are then asked to predict future risk and return of its stock. Affective ratings of the control group are elicited only after they have estimated all stocks' future risk and return.

3.3 Incentives and Compensation

We follow the tradition of laboratory experiments in economics and pay participants a performance-based bonus depending on the accuracy of their risk and return estimations, as well as a show-up fee. Since these estimations are not provided as point estimates but on a five point interval scale, participants have a fair chance to achieve a high accuracy, which should motivate them to carefully undertake the risk and return estimation task.

We use two benchmarks to measure the accuracy of participants' estimations. Their estimates for past risk and return of a stock i, $Est.PastRisk_{i,j}$ and $Est.PastReturn_{i,j}$, are benchmarked against the realized risk and return of that stock, $PastRisk_i$ and $PastReturn_i$, over the past twelve months. For example, if a participant estimates that a stock's risk was "above average" relative to the average DAX30 company over the past twelve months, this

estimate would be considered correct if the stock's standard deviation of returns over the past twelve months was indeed in the second highest quintile of standard deviations among DAX30 constituents. Realized risk and return data come from Datastream.

Regarding future risk and return estimates, it is more difficult to find a benchmark against which participants' estimations can be compared. It was not feasible to postpone the payoffs until the actual outcomes had materialized. We decided to use analysts forecasts as the most straightforward benchmark, as these forecasts represent an expert opinion about the prospect of companies and their stocks. Thus, if a participant estimates that a firm's future risk will be "above average" relative to the average DAX30 company over the next twelve months, this estimate would be considered correct if the same estimation is provided by the median analyst. In our analysis, we use median analyst forecasts of all DAX30 companies. To make analyst forecasts comparable to participants' estimations in our experiment, we use analyst forecasts of a firm's risk and return that are also expressed relatively to the average DAX30 company. These relative forecasts are directly provided by analysts and taken from the Factset/JCF database. We only use forecasts that are made for the same time period, i.e. the next twelve months following the date of the experiment.

We find that analyst forecasts indeed show a significantly positive risk-return correlation (correlation coefficient: 0.43, $p<0.02$). However, they may of course be subject to biases as well. Nevertheless, we think that they represent the best available benchmark of forecasts to incentivize participants at the time of the experiment. Furthermore, even if participants in the experiment find it difficult to match analysts' expectations, this should be uncritical to their motivation, which has been shown to be only weakly affected by monetary incentives in experiments (Camerer and Hogarth (1999)).[3]

The experiment took about 80 minutes. At the end of the experiment, participants receive an outcome dependent pay of 0.40 Euro per correct estimation as well as a show-up fee of 2.50 Euro. On average, participants earn about 13 Euro in the experiment. While some participants perform well in the estimation task (the maximum payout in the experiment is 21.30 Euro), there are also participants who perform poorly (the minimum payout is 9.30 Euro).

[3]Note that most experiments in psychology do not use monetary incentives at all except for lump sum payments.

4 Descriptive Statistics

The experiment was run in the Laboratories for Economic Research at the University of Cologne in December 2007. In total, we recruited 248 participants from undergraduate as well as graduate classes at the University of Cologne for our experiment. The experiment was programmed and conducted with the software z-Tree (Fischbacher 2007). Panel A of Table 1 provides summary statistics of participants' demographic characteristics and of the results of the financial literacy test.

— Please insert TABLE 1 approximately here —

Out of 248 recruited participants, 61% are male and 39% are female. The mean age of participants is 24 years with a range from 19 to 42 years. The majority of participants studies business administration or economics (76%), the average number of semesters studied is 5.2, ranging from one semester to a maximum of 19 semesters. Regarding financial literacy, the average number of correct answers is 7.33 out of 11, which is almost twice as high as the number of correct answers that would be obtained by answering the multiple-choice questions randomly. This indicates that participants in our experiment have a reasonable understanding of financial markets. Furthermore, the number of right answers covers the complete range from 0 to 11 which suggests that the financial literacy test is well suited to differentiate between financial literate and illiterate participants in our experiment. With respect to demographics and financial literacy, our treatment group and control group are very similar (not reported).

4.1 Affective Ratings

Panel B of Table 1 provides descriptive statistics of all affective ratings along the semantic differential scales. The total number of ratings is 7440 which corresponds to 248 participants times 30 companies. On average, participants rate the companies favorably. Means range from 4.66 to 4.98, which is significantly above the middle point of the rating scale at four (the differences are significant at the 1% level for all categories). To check whether the variation of ratings results solely from variation across individuals, we calculate standard deviations for every single participant. These are on average between 1.3 and 1.5 for the

individual adjective pairs (not reported). This indicates that participants do not rate all companies similarly, but have specific affective attitudes towards companies. Therefore, it is important that we elicit firm-specific ratings in contrast to simply manipulating positive or negative affective states across all firms in our experiment.

Panel C of Table 1 shows correlations between ratings for different adjective pairs within the semantic differential scale. Correlation coefficients among these ratings are all significantly positive and range between 0.53 and 0.69. Participants do distinguish between the different bipolar word pairs but ratings are in the same direction along all dimensions. These pooled values over the whole sample are reflected by similar correlations for the ratings of individual participants. Cronbach's α of inter-rating reliability is high (0.86). This measure shows that the ratings share a common underlying construct so that an aggregation of the individual measures is justified. Given the high correlations and high Cronbach's α, we define an aggregated variable $AR_{i,j}$ for participant j's affective rating for a specific firm, i. Affective rating $AR_{i,j}$ is defined as the mean of the four individual ratings obtained from the semantic differentials. A value of 7 denotes an extremely positive affective attitude, while a value of 1 denotes an extremely negative affective attitude. The mean $AR_{i,j}$ in our sample is 4.8. The aggregation leads to a slightly reduced standard deviation of $AR_{i,j}$ (1.3) compared to the individual ratings.

By principal component analysis (PCA) we check whether equal weighting of the ratings is efficient in capturing most of the variance present in the underlying ratings. The first component of the PCA yields almost identical weights compared to the simple average. An aggregated measure based on PCA is almost perfectly correlated with $AR_{i,j}$ (0.99). We thus refrain from defining an alternative variable and rely on $AR_{i,j}$ as an indicator of participants' affective attitude towards a company. Figure 3 shows the mean value of $AR_{i,j}$ for all DAX30 companies.

— Please insert FIGURE 3 approximately here —

There is a strong variation of affective ratings across the DAX30 companies. For example, participants have a positive affective attitude towards companies such as BMW, VW, Adidas and Deutsche Bank, while they have a negative affective attitude towards companies like Hypo Real Estate, Infineon and Munich-Re. Participants rate a given firm similarly,

which suggests that there are common factors which drive the affective rating of a firm.[4] Furthermore, it can be seen from Figure 3 that our treatment group tends to evaluate firms similarly to our control group, but ratings are generally higher (the difference amounts to 0.26) for the treatment group than for the control group. A two-sample t-test shows that this difference is statistically significant at the 1% level (t-statistic: 8.94). One potential reason for this finding is that our treatment group evaluates companies before any fundamental information about a firm is revealed so that their initial (positive) affective response might have a stronger impact on their affective ratings than those of our control group.

4.2 Risk and Return Estimates

We now turn to the analysis of participants' risk and return estimates. Table 2 displays summary statistics of risk and return estimates.

— Please insert TABLE 2 approximately here —

Panel A of Table 2 shows the distribution of risk and return estimates by reporting the number of observations for each realization on the estimation scale. This scale contains five categories, i.e. we assign values from 1 to 5 to the categories "far below average", "below average", "average", "above average" and "far above average" in comparison to the average DAX30 company. Column 1 of Panel A contains the mean value for each estimate; columns 2-6 display the number of ratings for each category. The observed distribution of participants' estimates is bell-shaped instead of evenly distributed, i.e. participants are biased towards the midpoint of the scale. This behavior is consistent with a central tendency bias which states that people avoid extreme response categories unless they are very sure (Poulton 1973).

We do not observe a tendency to positive estimates as we did for the affective rating. All means are close to 3, which is the midpoint of the scale. The standard deviations are around 1.1 for all estimates and only slightly less when calculated on individual level (not reported). Overall, participants seem to be well calibrated in estimating risk and return and do exhibit distinct variation in their expectations across firms.

[4] Unreported results show that standard deviations on the firm level are in general smaller than across the whole sample.

Panel B displays the correlations between risk and return estimates. The negative correlation between expected return and risk (-0.33) is the most striking result as financial theory clearly postulates a positive correlation. Note that in the experiment the question for risk specifies that risk is to be interpreted as the variance of returns while the theoretical relationship between expected return and risk refers to systematic risk rather than total variance. Specifically, we used the following question in the experiment to elicit participants' risk estimations: "How risky (where risk should be estimated based on the firm's stock's return variance) do you estimate this firm to be over the next 12 months relative to all other firms of the DAX30?" Participants then had to provide their answer on a five point scale as described above. We specified risk as total variance, because previous work such as Dorn and Huberman (2005) shows that the relevant risk measure for private investors is variance rather than systematic risk. Therefore, the concept of variance should be better known among our participants than the concept of systematic risk.[5]

Results in Panel B also show that correlations between estimates about the past and predictions about the future are high (0.66 for return and 0.71 for risk estimates). Participants obviously expect the future to be similar to the past. This tendency to extrapolate stock returns from the past to the future has already been documented by Fisher and Statman (2000).

In Panel C, we contrast these findings with the empirical risk-return relationship between all stocks used in our analysis. This allows us to relate participants' expectations of a negative risk-return correlation to realized market data. If risk and returns of the stocks used in our analysis are indeed negatively correlated, participants' expectations might be derived from observations they made at the stock market and thus should be uncorrelated to their affective attitudes towards a firm. The empirical literature on the variance-return relationship is mixed (for a discussion, see Poon and Taylor 1992, Subrahmanyam 2010). It has documented both, positive as well as negative correlations between variance and return of stocks (Masset and Wallmeier 2010). We compute cross-sectional correlations between realized returns, variance, systematic and unsystematic risk of all stocks used in our analysis during the year of and the year before the experiment (i.e. 2006-2007). Systematic risk is defined as the beta of a stock. We calculate beta by regressing a firm's stock return on

[5]If participants in our experiments were able to differentiate between variance and systematic risk, it still would require some very special assumptions about betas to render our results consistent with classic capital market theory. Moreover, it is empirically disputed whether idiosyncratic risk might be priced as well (for different views see, e.g., Ang, Hodrick, Xing, and Zhang 2006, Fu 2009).

the market return. The volatility of the error term in this regression is our measure of unsystematic risk.[6] Our results suggest that the correlation between stock returns and all components of risk is positive. The positive relation between variance and returns is also statistically significant at the 1% level.[7] Therefore, we conclude that the negative correlation of risk and return as expected by participants in our experiment (Panel B) is unlikely to be driven by empirical correlations observed at the German stock market.

From the financial literacy questionnaire, we know that the majority of our participants has a reasonable knowledge about financial markets. Therefore, we now study whether the negative correlation between expected return and risk is mitigated by financial literacy.

— Please insert FIGURE 4 approximately here —

Figure 4 indeed illustrates that the negative correlation between risk and expected return decreases with higher financial literacy among participants. However, it is still negative for the highest financial literacy scores. Participants' estimation patterns differ remarkably from the expectations of professional analysts that serve as our benchmark. Analysts expect risk and return to be positively correlated (0.43, $p<0.02$). This result suggests that analysts use different evaluation techniques or process information differently than participants in our experiment. With respect to our treatment and control groups, we do not find any significant differences in return expectations. However, participants of the treatment group expect that firms are less risky than participants of the control group (the difference is statistically significant at the 1% level). The resulting risk-return correlation is slightly more negative for the treatment group (cp. also section 5.4).

[6]Specifically, we regress each firm's daily stock returns on a constant and on daily returns of the MSCI Germany index over a two year horizon from 2006 to 2007. Data on stock returns and the MSCI Germany are obtained from Datastream.

[7]As a robustness check, we follow Ang, Hodrick, Xing, and Zhang (2006) and examine the relation between volatility and future returns, rather than the contemporaneous correlation between volatility and returns. Specifically, we first compute each company's monthly return standard deviation and then sort firms into monthly volatility quintiles based on their return standard deviation. In the next step, we compute equal weighted returns for each volatility quintile over the subsequent month on a rolling basis. The results (unreported) show that stocks with high volatility in the previous month $m-1$ tend to have higher returns in the current month m than stocks with low volatility. However, this difference is not statistically significant. This result holds no matter whether we look at a time period of ten years, five years, or two years before the experiment took place.

5 The Impact of Affective Attitudes on Risk and Return Estimates

5.1 Affective Attitudes and Individual Estimations

We now analyze whether the affective attitude towards a firm has an impact on risk and return expectations regarding its stock. Figure 5 graphs the mean values for the return and risk estimates depending on the affective rating and shows that a positive affective rating (higher values on the semantic scale) is associated with high expected return and low risk estimates. The opposite holds for negative affective ratings, i.e. these ratings are associated with low expected return and high risk estimates. This pattern clearly indicates a role of affective attitudes in judging a firm's investment prospects.

— Please insert FIGURE 5 approximately here —

Table 3 provides correlations between the affective rating and past and future risk and return estimates. The first column contains correlations for all participants in our experiment. The second and third column contain correlations for the treatment group and for the control group, respectively. Differences between treatment and control group are computed in column four.

— Please insert TABLE 3 approximately here —

All correlations between affective ratings and estimates for risk and return are significant and have the expected sign, i.e. affective ratings and return estimates are positively correlated while affective ratings and risk estimates are negatively correlated. There is a slight difference between the treatment and control group in the experiment. The absolute correlation between affective rating and estimates is consistently higher for the treatment group over all subratings. However, Fisher's transformation test (which is commonly used to test whether two correlation matrices are significantly different from each other) only shows significance at the 10% level for two of the four correlations. Thus, the effect of an immediate activation of affective attitudes before risk and return estimations, seems to be rather small. This finding suggests that affective attitudes are permanently present in

participants' decision making process and not limited to situations of affective arousal or activation.

We now turn to a multivariate analysis of the risk and return estimates to control for other factors which might have an impact on the estimation in addition to the affective rating. Our analysis is based on the following regression equation:

$$\begin{aligned} Expected\,Return_{i,j} &= \beta_1 AR_{i,j} + \beta_2 PastReturn_i + \beta_3 PastRisk_i + \beta_4 FinLit_j^{high} \\ &+\beta_5 FinLit_j^{med} + \beta_6 Confidence_{i,j}^{high} + \beta_7 Demographic \\ &Characteristics_j + \beta_8 FirmCharacteristics_i + \varepsilon_{i,j}. \end{aligned} \quad (1)$$

$Expected\,Return_{i,j}$ denotes participant j's return estimate for firm i on a five point scale ranging from "far below average" to "far above average". The affective rating, $AR_{i,j}$, is the aggregated affective rating of participant i for firm j as defined in Section 3.

In addition, we include several control variables. First, correlation results in Table 2 suggest that expectations might be driven by prior information and beliefs that participants have about a company. Therefore, we control for past risk and return of the firm's stock, $PastReturn_i$ and $PastRisk_i$, by including its realized return and return standard deviation over the past twelve months.

Second, we add financial literacy into the regression equation since participants' knowledge about financial markets might have an impact on their risk and return estimates. Consequently, they should provide different estimates than financially illiterate participants. We measure financial literacy by two dummy variables. The first one, $FinLit_j^{high}$, is equal to one if participants gave 9 or more correct answers in the financial literacy test, and zero otherwise. The second one, $FinLit_j^{med}$, is equal to one for 6 to 8 correct answers in the test, and zero otherwise. The base case that is skipped from the regression is low financial literacy with 5 or less correct answers.[8]

Third, Grinblatt and Keloharju (2001) provide evidence that the belief to know a firm very well influences expectations and increases biases in stock holdings (like, e.g., home bias). Thus, we include confidence, $Confidence_{i,j}^{high}$, measured as a dummy variable indicating participant j's confidence in her risk and return estimates for firm i. It takes a value of one

[8]Our results are robust if we use a median cut-off for financial literacy instead of measuring high and medium financial literacy separately (not reported).

if a participants rated her confidence lower or equal to three on a scale ranging from one (very high confidence) to five (very low confidence), and zero otherwise.

Finally, we control for demographic variables such as participants' age (in years), a dummy variable indicating participants' gender and the number of semesters studied. We also control for all firm characteristics that were part of the information provided to participants except those which had to be excluded for collinearity reasons.

We perform an ordered logistic regression as the dependent variable attains five values on a discrete scale. Standard errors are clustered at the firm level. Panel A of Table 4 shows the result of this regression. In column 1 the affective rating is included as the sole explanatory variable. The coefficient is significantly positive, i.e. positive affective attitudes lead to higher expected returns, while negative affective attitudes lead to lower expected returns. This confirms the pattern which we already observed in Figure 5. In column 2 we include a stock's realized return and risk as additional explanatory variables. The coefficient for the affective rating remains significantly positive. The positive coefficient for realized returns suggests that participants expect stocks with past high returns to also perform well in the future. Companies that were risky in the past are expected to yield low returns in the future.

— Please insert TABLE 4 approximately here —

In the next step, we add dummy variables indicating participants' financial literacy and their confidence in evaluating a firm. We also add participants' age (in years), number of semesters studied, and a gender dummy variable (column 3). We still find a positive and significant coefficient for the affective rating. Furthermore, we find that financial literacy as well as confidence exert a direct effect on return expectations. Financially literate participants seem to be more cautious in their return estimates. In contrast, participants expect higher returns for firms they feel confident to evaluate. This is in line with findings of Kilka and Weber (2000), who interpret confidence as an indicator for familiarity. Regarding the impact of demographic characteristics, we find no significant influence of age, gender and number of semesters studied.

In column 4, we include firm characteristics as additional control variables. Results show that the impact of affective attitudes on expected returns is still significantly positive. Thus, the affective rating does not just proxy for positive fundamentals but has a significant

influence on expected returns even after controlling for fundamental information.[9] With respect to firm characteristics, we find that participants expect significantly higher returns for firms with a high price-earnings ratio, firm that pay dividends, larger firms, and firms with lower book values and lower debt ratio. We also add a measure of information asymmetry to rule out ambiguity aversion or information as possible explanations of our results.[10] Specifically, we include the number of analyst recommendations per firm, $ACov_i$.[11] It has been shown that analyst coverage reduces information asymmetry (Barth, Kasznik, and McNichols 2001). Results in column 4 show that analyst coverage has no significant impact on future return estimates. Thus, ambiguity aversion can be ruled out as an explanation for our findings.

In column 5, we interact participants' affective rating with a dummy variable, $Treat_j$, which is equal to one if participant j is assigned to the treatment group, and zero otherwise. This allows us to investigate whether the impact of affective attitudes on expected returns is stronger for participants who first provided their affective ratings before estimating a firm's expected stock return and riskiness. Our results suggest that this is indeed the case. We find that the impact of affective attitudes on return estimates is significantly stronger for the treatment group than for the control group.

In Panel B, we run a specification with individual fixed effects to make sure that our results are not driven by certain individuals having consistently high or low estimates. For the sake of brevity, we only report results on our main variable of interest, $AR_{i,j}$. We find that the coefficient is always significantly positive, i.e. positive affective attitudes lead to higher expected returns, while negative affective attitudes lead to lower expected returns. Taken together, the positive and significant impact of affective ratings on expected returns is robust to all model specifications in Table 4.

In a parallel approach to the analysis for expected returns, we now estimate equation 1 with participants' risk estimates as the dependent variable. The other variables are defined as before; results are presented in Table 5.

[9] With respect to the other control variables, the inclusion of fundamentals changes the result for realized return and risk, which is intuitive as many of the provided variables comprise aspects of realized return and risk so that the coefficients for realized return and realized risk now only capture the residual effect that is not reflected by the other firm specific variables.

[10] We thank an anonymous referee for suggesting this analysis to us.

[11] Data on analyst recommendations is obtained from I/B/E/S.

— Please insert TABLE 5 approximately here —

Column 1 shows that affective ratings are significantly negatively related to risk estimates. In column 2 we include a stock's realized return and various measures of a stock's riskiness as additional explanatory variables. As pointed out earlier, participants in our experiment are asked to estimate a stock's riskiness based on its variance relative to all other stocks of the index. However, it is possible that participants have other definitions of risk in mind or are not able to differentiate between different types of risk (as suggested by Dorn and Huberman 2005). Therefore, we include several risk measures in our analysis: a firm's realized return standard deviation, $PastRisk_i$, its systematic risk, $Beta_i$, its worst daily stock return over the past twelve months, $WorstDaily_i$, its skewness ($Skewness_i$), kurtosis ($Kurtosis_i$), and its debt ratio ($DebtRatio_i$). Our results show that a stock's realized volatility is not significant, while a stock's systematic risk has a significantly positive impact on participants' risk estimates. Companies with less worse daily returns are expected to be less risky, while companies with high beta, skewed returns, and companies with a high debt ratio are expected to be more risky in the future. It seems that despite the question format being formulated in terms of variance, a more general understanding of risk is reflected in the estimates of participants. Apart from risk, the negative coefficient for realized returns suggests that participants expect stocks with high past returns to be less risky in the future. Most importantly, the coefficient on the affective rating remains significantly negative.

Our results also hold if we add financial literacy, confidence and demographic characteristics of participants (column 3). Results in column 2 and 3 indicate that high realized risk leads to higher risk estimates. This finding is in line with previous work suggesting that people tend to chase trends when predicting future risk and return of a stock (Hommes, Sonnemans, Tuinstraa, and de Velden 2008). Furthermore, participants with high financial literacy expect firms to be more risky. Finally, confidence is negatively related to risk estimates which is consistent with an interpretation of confidence as a familiarity proxy. Firms that are felt more familiar are perceived to be less risky.

In column 4, we again add fundamental information about a firm. We find that firms are perceived as more risky if they do not pay dividends, if they have low cash-flows, if they are small or if they have a high book value. With respect to our measure of information asymmetry, $ACov_i$, we find a marginally positive impact of analyst coverage on participants' risk estimations.

Results in column 5 show that the results are stronger for participants' of the treatment group (column 5), however, the effect is only marginally significant at the 10% level. Our results remain very similar in a model with individual fixed effects (Panel B). They clearly show that the more positive the affective attitude towards a firm, the less risky the firm's stock is perceived.[12]

5.2 Mitigating Effects: Financial Literacy and Confidence

Our results show that affective attitudes have a strong impact on participants risk and return estimates. In the following, we assess whether confidence in evaluating a firm and financial literacy mitigate the impact of affective attitudes on risk and return estimates. Therefore, we re-estimate equation (1) including interactions of $AR_{i,j}$ with the financial literacy dummies and the dummy variable for high confidence in evaluating a firm. One could argue that investors with lower financial literacy scores are more likely to rely on their affective attitudes, because they do not know how to process fundamental information about the firm and are unaware of the risk-return trade-off in financial markets. In this case system two is unlikely to correct the initial response of the affective system. Ganzach (2000) provides evidence that investors are more prone to derive risk and return of an asset from their affective evaluations if they are unfamiliar with the asset. The interaction between participants' affective ratings and their self-reported confidence in evaluating the firm serves to test this relation, as we interpret confidence as a proxy for familiarity (in line with Kilka and Weber 2000). Results are presented in Table 6.

— Please insert TABLE 6 approximately here —

Table 6 shows that the influence of affective attitudes on expected return and risk remains statistically significant at the 1% level. This result holds if we include individual characteristics (Columns 1 and 3) or individual fixed effects (Columns 2 and 4). Regarding interactions of affective ratings with financial literacy, we find that financial literacy mitigates the impact of affective attitudes for risk estimates, while it has no impact on

[12]Ordered logistic regressions preclude a direct analysis of the magnitude of the coefficients. To get an impression of the economic significance of the effect we additionally estimate equation (1) with OLS. The results (not reported) indicate that a one point higher affective rating goes along with a shift of about 0.17 slots on the five-point estimation scale for expected returns. The effect for expected risk is about 0.10.

return estimates. This finding suggests that financially literate participants are more able to correct an affective bias in their risk estimation, while financially illiterate participants rely mainly on their affective attitudes when estimating the riskiness of a stock.

Interestingly, the results are even stronger for participants who indicate that they are confident in evaluating a stock. This becomes apparent in the coefficient of the interaction term and the affective rating, $AR_{i,j} \times Confidence_{i,j}^{high}$, which is significantly positive for expected return as the dependent variable and significantly negative for expected risk as the dependent variable. Including individual fixed effects also yields a significant interaction term for future return estimates (Column 2), while the interaction term for future risk estimates is negative, but insignificant (Column 4).

Relating these findings to the two system view of information processing (Epstein 1994, Kahneman and Frederick 2002), people seem to rely more on their affective attitudes as a decision heuristic when they feel confident to evaluate a company. For these companies affective cues are more readily available and the need to fall back on cognitive resources is less pronounced.

However, as an alternative to feeling better informed about or more familiar with a company, overconfidence may drive these results. While we cannot fully exclude this possibility, two findings support our interpretation of rating confidence as a familiarity proxy. First, we estimate a regression where investor's self reported confidence is the dependent variable and several firm characteristics are included as independent variables. Results (not reported) suggest that confidence increases with higher past returns, a stronger brand, higher marketing expenditures, lower distance, higher media coverage, and lower information asymmetry (i.e. higher analyst coverage). Thus, expressed confidence is particularly high for companies for which information, proximity, or attachment is strong. Second, we look at differences in confidence estimates of male and female participants for the same company. As previous studies suggest that men are more overconfident than women (see e.g. Barber and Odean 2001), we should observe differences in confidence ratings of male and female participants if overconfidence was an issue in our experiment. However, two sample t-tests and a Mann Whitney test (not reported) show that there are no significant differences in confidence estimates of female and male participants in our experiment.

5.3 Affective Attitudes and Risk-Return Correlations

So far, we analyzed return expectations and risk expectations separately. It is likely that the positive impact of affective attitudes on return expectations and their negative impact on risk expectations in combination produce a negative risk-return correlation. To confirm this, we compute for each participant the individual correlation between risk and return estimates, $Corr_j$. We then relate these correlations to the strength of the affective influence that we obtained in the previous regressions and to several control variables. The strength of the affective influence is calculated as follows: For each participant, we estimate equation 1 with expected return and expected risk as dependent variables, respectively. Since the regression is estimated on the level of participants, we drop demographics and financial literacy as control variables. From these regressions, we gather two individual beta coefficients for the impact of $AR_{i,j}$ on the risk and return estimation. We then define $AR\_Coefficient_j$ as the average of the absolute values of these coefficients. This variable represents the strength of the affective influence on expectations. Finally, we estimate the following regression:

$$\begin{aligned} Corr_j &= \alpha + \beta_1 AR\_Coefficient_j + \beta_2 FinLit_j^{high} + \beta_3 FinLit_j^{med} \\ &\quad + \beta_4 Confidence_j + \beta_5 Age_j + \beta_6 Gender_j + \beta_7 Semesters_j + \varepsilon_j. \end{aligned} \tag{2}$$

To control for participants' personal characteristics we include age, gender, and the number of semesters studied defined as in the previous regressions. Given the findings of the previous section, we also include financial literacy and confidence as control variables. Financial literacy is defined as in the previous regressions, while confidence is measured as participant $j's$ average confidence across all firms, $Confidence_j$. This modification is necessary since unlike before there is no cross-section of firms in this regression. We are aware of the fact that we use a regression coefficient as dependent variable in this specification. Under the assumption that the error terms in the first stage regression are independent and identically distributed, this will induce unsystematic noise in our regression which biases us against obtaining a statistically significant result. Results are provided in Table 7.

— Please insert TABLE 7 approximately here —

Our results in column (1) show that the correlation of risk and return is the more negative, the stronger affective attitudes have influenced participants' risk and return expectations in the estimation task. Thus, our results demonstrate that intra-personal expectations of high risk and low return (and vice versa) are indeed driven by the degree of affect in expectation formation. Our finding thus supports the idea of people using an affect heuristic when they evaluate risk and return of stocks. Their overall affective attitude towards a stock governs the risk and return estimation of this stock (reflected by $AR\_Coefficient$), which in turn results in a negative risk-return correlation.[13]

Including control variables into the regression does not alter our main result. The introduction of personal characteristics (column 2) additionally yields a significantly positive coefficient on the number of semesters. In column 3, we include financial literacy and confidence in the regression. We find a pronounced impact of financial literacy working against an expected negative correlation between risk and return. The higher participants' financial literacy, the more positive is the correlation of expected risk and return. This finding supports the view that knowledge about financial markets mitigates biases in financial decision making such as the affect heuristic. Confidence contributes to a negative risk-return-correlation. Those, who feel more confident in evaluating a firm and thus more competent to judge risk and return of stocks, exhibit a stronger bias.

5.4 Differences between Treatment and Control Group

To study whether affective attitudes must be activated immediately before participants' risk and return estimations to be effective, we now analyze differences between our treatment and control groups. Participants of the treatment group first provide their affective rating of a firm. Second, they have access to fundamental information about the firm. Finally, they are asked to predict future risk and return of the firm's stock. In contrast, participants of the control group first have access to fundamental information about the firm and are then asked to predict future risk and return of the firm's stock. Affective ratings of firms are elicited only after participants of the control group have estimated *all* stocks' future risk and return.

[13] Note that the negative value of β_1 representing $AR\_Coefficient$ in Table 7 does not follow automatically from the results in Tables 4 and 5 as the data contain a double cross-section of participants and firms.

As shown in Table 3, we find higher correlations between affective ratings and risk and return estimates for the treatment group than for the control group over all subratings. Our multivariate results from tables 4 and 5 show a similar picture: The interaction between affective attitudes and the treatment dummy is significantly positive for return estimates and significantly negative for risk estimates. We thus observe a stronger affective influence on return and risk estimates for the treatment group than for the control group. Prior activation might facilitate access and retrieval of affective attitudes and increase their vividness which could explain these effects.

However, the main effect of affective attitudes on risk and return estimates is present for both groups, and it is always larger in magnitude than the additional treatment effect. For the resulting risk-return correlations we find no significant differences between the two groups (the correlation is -0.335 for the treatment group and -0.316 for the control group). This also holds in a multivariate setting as reported in column 4 of Table 7, where we find no significant treatment effect. We conclude that, while the effect is slightly stronger for the treatment group than for the control group, the general result holds independent of the order of experimental tasks.

These results can be explained within the framework of the two-system view, which suggests that the affective system and reason-based system operate jointly and in parallel. Affective influences on information processing are always present independent of an immediate activation. They are incorporated in the evaluations of both groups and consequently lead to a significant impact of the affective rating on return and risk expectations of participants for both groups. This result supports the view of LeDoux (1996) and Kahneman (2003), who argue that affect plays a permanent role in decision making.

6 Determinants of a Firm's Affective Rating

In this section we examine whether managers can actively influence what type of affective attitudes emerge towards their firm. This is an important question since our previous results suggest that risk and return estimations of the firm's stock are influenced by investors' affective attitudes. Therefore, we now relate the affective rating of a firm to several variables that we believe to form affective attitudes towards this firm as well as several control variables:

$$
\begin{aligned}
AR_{i,j} \;=\; & \alpha + \beta_1 PastReturn_i + \beta_2 PastRisk_i + \beta_3 Distance_i + \beta_4 Size_i \\
& + \beta_5 Marketing_i + \beta_6 Brand_i + \beta_7 MktRf_i + \beta_8 BookToMarket_i \\
& + \beta_9 FinLit_j^{high} + \beta_{10} FinLit_j^{med} + \beta_{11} Confidence_{i,j}^{high} + \\
& \beta_{12} DemographicCharacteristics_j + \beta_{13} FirmCharacteristics_i + \varepsilon_{i,j}. \quad (3)
\end{aligned}
$$

Fehle, Tsyplakov, and Zdorovtsov (2005) suggest that marketing actions can be used to influence investor behavior. Furthermore, experiences with a firm's products are likely to influence investors' affective attitudes and presumably also carry over to financial expectations. We consider two variables related to consumer attitudes, i.e. marketing expenditures and brand value of a firm. Marketing expenditures are a direct means to alter the perception of a product and indirectly of a firm (Grullon, Kanatas, and Weston 2004). We receive marketing expenditures, $Marketing_i$, as reported by the mass media from Nielsen Media Research and scale it by total assets of a firm. We further include a brand value dummy, $Brand_i$, as brands are an indicator of perceived product quality and long term bonding to a firm (Bagozzi, Gopinath, and Nyer 1999) and may affect investing (Frieder and Subrahmanyam 2005). The brand value dummy is set equal to one if the brand of a firm is included in the Business Week Top 100 list of brand value, and zero otherwise.

In addition, we include a firm's distance to Cologne and its size as control variables. The largest firms of DAX30 and firms that are close to Cologne (where the experiment took place) are likely to be known best among participants (Grinblatt and Keloharju 2001). Therefore, these firms might have a higher (positive or negative) absolute affective rating. $Distance_i$ is measured as the distance in kilometers between the firm's headquarter and Cologne. $Size_i$ is measured by total assets of the firm.

Barberis, Shleifer, and Vishny (1998) show that a stock's past return and risk are likely to influence affective attitudes towards a firm. While high past return and low past risk lead to a positive evaluation of stocks, low past return and high past risk lead to a negative evaluation of stocks. We therefore include a stock's return, $PastReturn_i$, and risk, $PastRisk_i$, over the past twelve months as control variables. Since our previous results illustrate the importance of financial literacy and confidence for the impact of affective attitudes on risk and return

estimates, we also include $FinLit_j^{high}$, $FinLit_j^{med}$, $Confidence_{i,j}^{high}$ into our regression. They are defined as in the previous regressions.

According to Baker and Wurgler (2006), growth stocks are often viewed as "glamor stocks" and are preferred by sentiment investors. We thus include a firm's book-to-market value in the regression, which together with size and past returns also represents characteristics assumed to explain asset returns. Finally, we control for demographic characteristics of participants, since affective attitudes have been shown to vary considerably between gender and different age groups (Costa Jr., Terracciano, and McCrae 2001, Gross, Carstensen, Pasupathi, Tsai, Skorpen, and Hsu 1997). We also include firm characteristics as in the previous regressions. Results are presented in Table 8.

— Please insert TABLE 8 approximately here —

Our findings in column 1 indicate that high realized returns lead to a positive affective perception of a firm, while low realized returns have a negative impact on affective attitudes towards a firm. For risk we observe a reverse relationship, yet not significant.

Results in column 2 show that the brand dummy and marketing expenditures both exert a positive effect on affective attitudes, i.e. companies with high marketing expenditures and those owning a valuable brand are viewed more favorably. The effect is also economically significant. For example, a firm with a valuable brand has all else equal a 0.6 point higher affective rating on the 7-point-scale. This finding is in line with Figure 3 where companies producing consumer goods or offering services to consumers lead the list of the most popular firms. Their marketing and brand names create positive affective dispositions that spill over to stock market expectations. In addition to marketing expenditures and brand values, firms are viewed affectively more positively if they are geographically closer to participants and larger. A firm headquartered in Munich (distance=500km) has a 0.7 point lower affective rating than a firm headquartered in Cologne.

Our results also show that confidence and affective attitudes reinforce each other (column 3 and 4). A firm for which participants are confident in their evaluation is on average rated 0.4 points higher on the attitude scale. We do not find a significant impact of financial literacy on the general affective attitudes towards companies. This finding is intuitive as it suggests that affective attitudes are always present and that they only play a less important role in risk and return estimations of participants with high financial literacy. Furthermore,

gender has a significant impact on the affective rating of a firm, i.e. women rate companies more positively. We find a slightly positive coefficient on size and a negative coefficient on book-to-market value. Together with the positive coefficient on past returns, one might argue that people like large firms, growth stocks, and recent winners.[14]

Overall, the results of this section indicate that firm characteristics such as a firm's marketing expenditures and the strength of its brand determine its affective rating. Thus, a firm can actively influence its affective rating e.g. by its marketing expenditures. We now turn to an analysis of how our results might potentially impact prices at the stock market.

7 Implications for Equity Valuations

So far, our results suggest that affective attitudes lead to a negative correlation between participants' risk and return estimations. As participants in our study operate in a laboratory environment, one concern is that they might have different expectations in a real world setting. However, several studies support the presence of a negative correlation between investors' risk and return expectations (Shefrin 2001, Kaustia, Laukkanen, and Puttonen 2009, Amromin and Sharpe 2010, Weber, Weber, and Nosić 2012) using survey data obtained from representative households, financial analysts, or private investors. In addition, Hoffmann, Post, and Pennings (2010) and Merkle and Weber (2011) show that investors act based on their expectations and that trading activity as well as portfolio characteristics are related to their personal expectations. Thus, we are confident that there is no difference in participants' risk and return estimations depending on whether these estimations are elicited in a laboratory or in the real world. Most importantly, in contrast to previous studies, we show that affective attitudes are an important driver of risk and return expectations. One implication of our results is that emotionally influenced investors are likely to primarily invest in stocks for which they expect high future returns accompanied by low future risk. At the same time, they are likely to put less weight on or even ignore stocks with the opposite characteristics. This will lead to a bias in the portfolios of these investors and might explain under-diversification often observed with private investors

[14] As a robustness test we control for factor loadings of a Carhart (1997) four-factor model, instead of using beta, size, and book-to-market as firm characteristics. We do not find a significant impact of a firm's four factor loadings on affective ratings.

(Anderson 2007). The affect heuristic may thus have negative consequences for individual investing.

In the next step, we analyze whether the affect heuristic is strong enough to also have an impact on aggregate investment behavior. Therefore, we now link our results to stock market data to assess whether they are relevant for real world equity valuations. It can be seen from Figure 3 that participants' risk and return estimates are not independent, i.e., some companies are especially liked while others are despised. As these differences are not driven by fundamental information about a stock, they should lead to price patterns similar to the ones observed in the investor sentiment literature (Fisher and Statman 2000, Baker and Wurgler 2006). More specifically, we would expect that stocks with positive affective attitudes should have higher returns in the short term and then mean revert afterwards, while an opposite pattern should be observed for stocks with negative affective attitudes.

To test this conjecture, we first regress each firm's excess stock returns over the risk-free rate on Jensen (1968) 1-factor model, a Fama and French (1993) 3-factor model, or a Carhart (1997) 4-factor model,

$$RetRf_{i,t} = \alpha + \beta_1 \cdot MktRf_t + \beta_2 \cdot HML_t + \beta_3 \cdot SMB_t + \beta_1 \cdot MOM_t + \varepsilon, \tag{4}$$

where $RetRf_{i,t}$ ($MktRf_t$) denotes a firm's stock return (the market return) less the risk-free rate. Further, HML_t represents the return of a difference portfolio of high versus low book-to-market stocks, SMB_t the return of a difference portfolio of small versus large stocks, and MOM_t the return of a difference portfolio of past winner versus past loser stocks.[15] As the experiment was run in the last quarter of 2007, we estimate factor loadings from the beginning of the last quarter in 2007 to the end of the second quarter in 2008 using monthly observations.[16]

In the next step, we use a firm's factor loadings to compute the alpha of a firm for the quarter in which the experiment took place as well as for the subsequent two quarters. We

[15] Data on the Fama and French (1993) factors for Germany are obtained from the Centre of Financial Research: www.cfr-cologne.de.

[16] As we measure participants' affective attitudes at one point in time, i.e. in December 2007, we do not extend our analysis beyond this time period. The lack of time series variation in our measure of affective attitudes might otherwise lead to too much noise in our estimations, especially after the collapse of Lehman and the following turmoil at the stock market which unfolded in September 2008 and subsequent months.

then regress alphas on a firm's average affective rating across all participants. Results are presented in Table 9.

— Please insert TABLE 9 approximately here —

Our results are broadly in line with the literature on investor sentiment which suggests that returns of sentiment stocks increase in the short term and then reverse subsequently (see Baker and Wurgler (2006)). While we do not find a significant result for raw-returns, we find that alphas of firms associated with positive affective attitudes are significantly higher in the first quarter after the experiment. Subsequently, alphas of these firms reverse in the second quarter after the experiment. However, this result is economically weak, suggesting that a one standard deviation increase in affective attitudes (1.3) amounts to higher alphas of about 12 basis points in the first quarter after the experiment, while it amounts to lower alphas of about 11 basis points in the second quarter after the experiment. This finding at least provides some support for the notion that shared affective attitudes are also reflected in equity valuations.

8 Conclusion

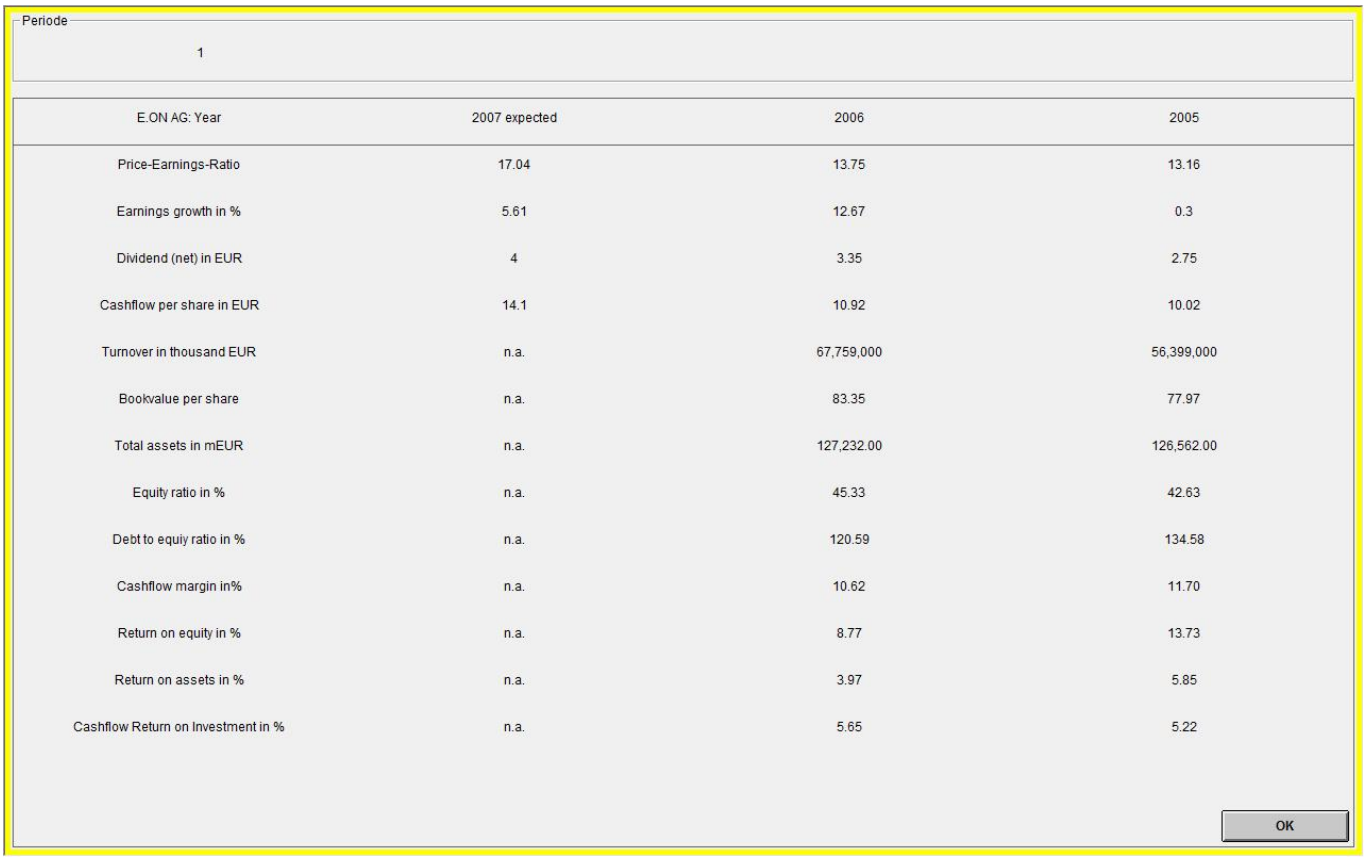
This study provides evidence that affective attitudes play an important role in estimating risk and expected return of stocks. We show that positive affective attitudes lead to higher return expectations and at the same time to lower risk expectations. We obtain opposite findings for negative affective attitudes. The results stand in stark contrast to capital market theory according to which risk and expected return are positively correlated.

An explanation for our findings is that participants are subject to an affect heuristic when providing their estimates. Instead of evaluating risk and return of a stock separately based on fundamental information about the firm, participants seem to derive their expectations from their global affective appraisal of the firm. Companies that are perceived to be good are expected to deliver high return and low risk, while companies that are perceived to be bad are expected to deliver low return and high risk. This effect decreases with financial literacy and increases with confidence in evaluating a firm. We find that the effect is strong enough to be reflected in stock returns over the next two quarters after the experiment

took place. Specifically, stock returns of firms with positive affective attitudes are higher than stock returns of firms with negative affective attitudes in the quarter following the experiment. This pattern then reverses in the subsequent quarter.

It is important to mention that our results are subject to some caveats that arise from the experimental framework on which the analysis is based. First, as with every experimental study, it is unclear whether the observed behavior of participants in the laboratory corresponds to investors' behavior in the real world. To make sure that the situation in the laboratory is similar to a real world situation, the type of information provided to participants closely follows the presentation format of public news sources. Furthermore, surveys of retail investors in various countries over various time horizons confirm that that they in general expect a negative correlation of a stock's future risk and return. Our paper suggest that the affect heuristic is one explanation for this finding. Second, our results are obtained for large and well-known stocks and it is unclear whether they also hold for smaller stocks for which affective attitudes might be less pronounced. However, the findings on confidence even suggest that the impact of emotions will be stronger for real-world investors. While in the experiment participants were confronted with thirty companies they might not be invested in, investors deal with stocks that they consider to buy or that they already own. Investors become more confident to evaluate firms in their portfolio and the affective influence on her risk and return expectations is therefore likely to increase.

Appendix A



Periode

1

E.ON AG: Year	2007 expected	2006	2005
Price-Earnings-Ratio	17.04	13.75	13.16
Earnings growth in %	5.61	12.67	0.3
Dividend (net) in EUR	4	3.35	2.75
Cashflow per share in EUR	14.1	10.92	10.02
Turnover in thousand EUR	n.a.	67,759,000	56,399,000
Bookvalue per share	n.a.	83.35	77.97
Total assets in mEUR	n.a.	127,232.00	126,562.00
Equity ratio in %	n.a.	45.33	42.63
Debt to equiy ratio in %	n.a.	120.59	134.58
Cashflow margin in%	n.a.	10.62	11.70
Return on equity in %	n.a.	8.77	13.73
Return on assets in %	n.a.	3.97	5.85
Cashflow Return on Investment in %	n.a.	5.65	5.22

OK

Notes: Example of a screen shown to participants to provide fundamental information about the firm E.ON AG. The variables were originally shown in German language and have been translated into English for this figure.

Appendix B

No.	Questions on Financial Literacy	Possible Answers
1	What is the main function of the stock market?	forecast earnings/ provide high returns/ platform for buyers and sellers/ none of these/ don't know
2	Which is true? If someone buys shares of a company...	...he owns a part of the company/ ...he has lent money to the company/ ...he is liable for the debt of the company/ none of these/ don't know
3	Which of the following is true?	If you invest in a mutual fund, you cannot call in your money for the first year/ Mutual funds can invest in different types of securities, e.g. stocks and bonds/ Mutual funds pay a guaranteed yield, which depends on their past performance/ none of these/ don't know
4	Which is true? If someone buys bonds of a company...	...he owns a part of the company/ ...he has lent money to the company/ ...he is liable for the debt of the company/ none of these/ don't know
5	Viewed over a long time period (e.g. 10-20 years), which investment usually earns the highest return?	savings account/ bonds/ stocks/ don't know
6	Which investment has in general the highest variability over time?	savings account/ bonds/ stocks/ don't know
7	If an investor divides his money among several investments, then the risk of total loss...	increases/ decreases/ remains the same/ don't know
8	True or false? If you buy a bond with maturity in 10 years, then you have to pay a fine when selling after 5 years.	true/ false/ don't know
9	True or false? Stocks are usually more risky than bonds.	true/ false/ don't know
10	True or false? The stock of a company usually delivers a safer return than an equity fund.	true/ false/ don't know
11	If the interest rate rises, then the price of a bond should...	increase/ decrease/ remain the same/ none of these/ don't know

Notes: This table presents all questions used in our financial literacy test developed by van Rooij, Lusardi, and Alessie (2011). The set of questions was translated into German language for our experiment.

References

Ajzen, I., 1988, *Attitudes, Personality, and Behavior*. Dorsey Press, Chicago.

Amromin, G., and S. A. Sharpe, 2010, "From the Horses Mouth: How are Investors Expectations of Risk and Return Affected by their Views of the Business Cycle?," Working Paper.

Anderson, A., 2007, "All Guts, No Glory: Trading and Diversification among Online Investors," *European Financial Management*, 13, 448–471.

Ang, A., R. J. Hodrick, Y. Xing, and X. Zhang, 2006, "The cross-section of volatility and expected returns," *Journal of Finance*, 61, 259–299.

Bagozzi, R. P., M. Gopinath, and P. U. Nyer, 1999, "The Role of Emotions in Marketing," *Journal of the Academy of Marketing Science*, 27, 184–206.

Baker, M., and J. Wurgler, 2006, "Investor Sentiment and the Cross-Section of Stock Returns," *Journal of Finance*, 61(4), 1645–1680.

Barber, B. M., and T. Odean, 2001, "Boys Will Be Boys: Gender, Overconfidence, And Common Stock Investment," *Quarterly Journal of Economics*, 116, 261–292.

Barberis, N., A. Shleifer, and R. Vishny, 1998, "A Model of Investor Sentiment," *Journal of Financial Economics*, 49, 307–343.

Barberis, N., and R. Thaler, 2003, "A Survey of Behavioral Finance," in *Handbook of the Economics of Finance*, ed. by G. Constantinides, and R. Stulz, pp. 1053–1128, North-Holland, Amsterdam.

Bargh, J. A., S. Chaiken, R. Govender, and F. Pratto, 1992, "The Generality of the Automatic Attitude Activation Effect," *Journal of Personality and Social Psychology*, 62(6), 893–912.

Barth, M. E., R. Kasznik, and M. F. McNichols, 2001, "Analyst Coverage and Intangible Assets," *Journal of Accounting Research*, 39, 1–34.

Bradley, M. M., and P. J. Lang, 1994, "Measuring emotion: The self-assessment manikin and the semantic differential," *Journal of Behavior Therapy and Experimental Psychiatry*, 25, 49–59.

Camerer, C. F., and R. M. Hogarth, 1999, "The Effects of Financial Incentives in Experiments: A Review and Capital-Labor-Production Framework," *Journal of Risk and Uncertainty*, 19, 7–42.

Carhart, M. M., 1997, "On Persistence in Mutual Fund Performance," *Journal of Finance*, 52, 57–82.

Clore, G. L., and K. Gasper, 2000, "Some affective influences on belief," in *Emotions and Beliefs: How Feelings Influence Thoughts*, ed. by A. S. Manstead, and S. Bem, pp. 10–44, Cambridge University Press, Cambridge.

Costa Jr., P. T., A. Terracciano, and R. R. McCrae, 2001, "Gender Differences in Personality Traits Across Cultures: Robust and Surprising Findings," *Journal of Personality and Social Psychology*, 81, 322–331.

Damasio, A. R., 1994, *Descartes' Error - Emotion, Reason and the Human Brain*. Putnam, New York.

Dave, C., C. C. Eckel, C. Johnson, and C. Rojas, 2010, "Eliciting Risk Preferences: When is Simple Better?," *Journal of Risk and Uncertainty*, 41, 219–243.

Dorn, D., and G. Huberman, 2005, "Talk and Action: What Individual Investors Say and What They Do," *Review of Finance*, 9, 437–481.

Ekman, P., and R. Davidson, 1994, *The Nature of Emotion*. Oxford University Press, Oxford.

Elster, J., 1998, "Emotions and Economic Theory," *Journal of Economic Literature*, 36, 47–74.

Epstein, S., 1994, "Integration of the Cognitive and the Psychodynamic Unconscious," *American Psychologist*, 49, 709–724.

Fama, E. F., and K. R. French, 1993, "Common Risk Factors in the Return on Bonds and Stocks," *Journal of Financial Economics*, 33, 3–53.

Fazio, R. H., D. M. Sanbonmatsu, M. C. Powell, and F. R. Kardes, 1986, "On the Automatic Activation of Attitudes," *Journal of Personality and Social Psychology*, 50(2), 229–238.

Fehle, F., S. Tsyplakov, and V. Zdorovtsov, 2005, "Can Companies Influence Investor Behaviour through Advertising? Super Bowl Commercials and Stock Returns," *European Financial Management*, 11, 625–647.

Finucane, M., A. Alhakami, P. Slovic, and S. M. Johnson, 2000, "The Affect Heuristic in Judgments of Risks and Benefits," *Journal of Behavioral Decision Making*, 13, 1–17.

Fischbacher, U., 2007, "z-Tree: Zurich toolbox for ready-made economic experiments," *Experimental Economics*, 10, 171–178.

Fisher, K., and M. Statman, 2000, "Investor Sentiment and Stock Returns," *Financial Analysts Journal*, March/April, 16–23.

Frieder, L., and A. Subrahmanyam, 2005, "Brand Perceptions and the Market for Common Stock," *Journal of Financial and Quantitative Analysis*, 40, 57–85.

Frijda, N. H., 1986, *The Emotions*. Cambridge University Press, Cambridge.

Fu, F., 2009, "Idiosyncratic risk and the cross-section of expected stock returns," *Journal of Financial Economics*, 91, 24–37.

Ganzach, Y., 2000, "Judging Risk and Return of Financial Assets," *Organizational Behavior and Human Decision Processes*, 83, 353–370.

Glaser, M., T. Langer, J. Reynders, and M. Weber, 2007, "Framing Effects in Stock Market Forecasts: The Difference Between Asking for Prices and Asking for Returns," *Review of Finance*, 11, 325–357.

Goetzmann, W. N., and N. Zhu, 2005, "Rain or Shine: Where is the Weather Effect?," *European Financial Management*, 11, 559–578.

Graham, J. R., and A. Kumar, 2006, "Do Dividend Clienteles Exist? Evidence on Dividend Preferences of Retail Investors," *Journal of Finance*, 61, 1305–1336.

Grinblatt, M., and M. Keloharju, 2001, "How Distance, Language, and Culture Influence Stockholdings and Trades," *Journal of Finance*, 56, 1053–1073.

Gross, J. J., L. L. Carstensen, M. Pasupathi, J. Tsai, C. G. Skorpen, and A. Y. C. Hsu, 1997, "Emotion and Aging: Experience, Expression, and Control," *Psychology and Aging*, 12, 590–599.

Grullon, G., G. Kanatas, and J. P. Weston, 2004, "Advertising, Breadth of Ownership, and Liquidity," *Review of Financial Studies*, 17, 439–461.

Hartzell, J. C., and L. T. Starks, 2003, "Institutional Investors and Executive Compensation," *Journal of Finance*, 58, 2351–2374.

Hirshleifer, D., 2001, "Investor Psychology and Asset Pricing," *Journal of Finance*, 56, 1533–1597.

Hoffmann, A. O. I., T. Post, and J. M. E. Pennings, 2010, "How Severe Was the Impact of the Financial Crisis on Individual Investor Perceptions and Behavior?," Working Paper.

Hommes, C., J. Sonnemans, J. Tuinstraa, and H. V. de Velden, 2008, "Expectations and Bubbles in Asset Pricing Experiments," *Journal of Economic Behavior and Organization*, 67, 116–133.

Jensen, M. C., 1968, "The Performance of Mutual Funds in the Period 1955-1964," *Journal of Finance*, 23, 389–416.

Kahneman, D., 2003, "Maps of Bounded Rationality: Psychology for Behavioral Economics," *The American Economic Review*, 93, 1449–1475.

Kahneman, D., and S. Frederick, 2002, "Representativeness revisited: Attribute substitution in intuitive judgment," in *Heuristics and Biases: The Psychology of Intuitive Judgement*, ed. by Gilovich, Griffin, and Kahneman. Cambridge University Press, New York, pp. 49–81.

Kaustia, M., H. Laukkanen, and V. Puttonen, 2009, "Should Good Stocks Have High Prices or High Returns?," *Financial Analysts Journal*, 65, 55–62.

Kilka, M., and M. Weber, 2000, "Home Bias in International Stock Return Expectations," *Journal of Behavioral Finance*, 1, 176 – 192.

Kumar, A., and W. N. Goetzmann, 2008, "Equity Portfolio Diversification," *Review of Finance*, 12, 433–463.

LeDoux, J. E., 1996, *The Emotional Brain*. Simon and Schuster, New York.

Loewenstein, G. F., 2000, "Emotions in Economic Theory and Economic Behavior," *The American Economic Review*, 90, 426–443.

Loewenstein, G. F., C. K. Hsee, E. U. Weber, and N. Welch, 2001, "Risk as Feelings," *Psychological Bulletin*, 127, 267–286.

MacGregor, D. G., P. Slovic, D. Dreman, and M. Berry, 2000, "Imagery, Affect, and Financial Judgment," *Journal of Psychology and Financial Markets*, 1, 104–110.

Masset, P., and M. Wallmeier, 2010, "High-Frequency Investigation of the Interaction between Volatility and DAX returns," *European Financial Management*, 16, 327–344.

Merkle, C., and M. Weber, 2011, "Do Investors Put Their Money Where Their Mouth Is? Stock Market Expectations and Trading Behavior," Working Paper.

Osgood, C. E., G. Suci, and P. Tannenbaum, 1957, *The Measurement of Meaning*. University of Illinois Press, Urbana.

Polivy, J., 1981, "On the Induction of Emotion in the Laboratory: Discrete Moods or Multiple Affect States?," *Journal of Personality and Social Psychology*, 41, 803–817.

Poon, S.-H., and S. J. Taylor, 1992, "Stock returns and volatility: An empirical study of the UK stock market," *Journal of Banking and Finance*, 16, 37–59.

Poulton, E. C., 1973, "Unwanted Range Effects from Using Within-Subject Experimental Design," *Psychological Bulletin*, 80, 113–121.

Sharpe, W. F., 1964, "Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk," *Journal of Finance*, 19, 425–442.

Shefrin, H., 2001, "Do Investors Expect Higher Returns From Safer Stocks Than From Riskier Stocks?," *The Journal of Psychology and Financial Markets*, 2, 176–181.

Slovic, P., M. L. Finucane, E. Peters, and D. G. MacGregor, 2004, "Risk As Analysis and Risk As Feelings: Some Thoughts About Affect, Reason, Risk, and Rationality," *Risk Analysis*, 24, 311–322.

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

Subrahmanyam, A., 2008, "Behavioural Finance: A Review and Synthesis," *European Financial Management*, 14, 12–29.

——— , 2010, "The Cross-Section of Expected Stock Returns: What Have We Learnt from the Past Twenty-Five Years of Research?," *European Financial Management*, 16, 27–42.

van Rooij, M., A. Lusardi, and R. Alessie, 2011, "Financial Literacy and Stock Market Participation," *Journal of Financial Economics*, 101, 449–472.

Weber, M., E. U. Weber, and A. Nosić, 2012, "Who takes risk and why: Determinants of changes in investor risk taking," *The Review of Finance*, forthcoming.

Zajonc, R. B., 1980, "Feeling and Thinking - Preferences Need No Inferences," *American Psychologist*, 35(2), 151–175.

Table 1: Summary Statistics

Panel A: Participants								
	mean	stdv	median	min	max			
Gender	0.61	0.49	1	0	1			
Age	23.52	3.03	23	19	42			
Field of study	0.76	0.43	1	0	1			
Semester	5.23	3.57	5	1	19			
Financial literacy	7.33	2.54	8	0	11			
Panel B: Affective Rating								
	mean	7	6	5	4	3	2	1
good/bad	4.84	1007	1750	1690	1761	684	333	215
interesting/boring	4.66	1109	1465	1537	1614	851	586	278
strong/weak	4.98	1241	1753	1657	1700	688	275	126
active/passive	4.73	998	1508	1611	1894	845	409	175
Panel C: Correlations								
	good/bad		int./boring		strong/weak		active/passive	
good/bad	1.000							
interesting/boring	0.64***		1.00					
strong/weak	0.61***		0.58***		1.00			
active/passive	0.53***		0.64***		0.69***		1.00	

Notes: Panel A of this table shows demographic characteristics of the participants in the experiment. Gender is a dummy variable (male=1, female=0), age is measured in years. Field of study is a dummy variable (business administration or economics=1, all remaining fields of study=0), and semester is number of semesters studied. Financial literacy is number of correct answers in the financial literacy test which comprises 11 questions. Panel B shows the mean and frequencies of the ratings on a seven-point-scale with 1 representing the rating most closely to the negative adjective (i.e. bad, boring, weak, passive) and 7 representing the rating most closely to the positive adjective (i.e. good, interesting, strong, active). Panel C shows pairwise correlations between the four semantic differential scales. *** 1% significance.

Table 2: Risk and return estimates and realizations

Panel A: Risk and return estimates						
	mean	1	2	3	4	5
Est.Past Return	3.01	843	1679	2208	1978	732
Expected Return	3.05	603	1712	2472	2043	600
Est. Past Risk	2.94	612	2147	2342	1719	620
Expected Risk	2.94	604	2102	2425	1738	571

Panel B: Correlations of estimates				
	Expected Return	Expected Risk	Est. Past Return	Est. Past Risk
Expected Return	1.00			
Expected Risk	-0.33^{***}	1.00		
Est.Past Return	0.66^{***}	-0.25^{***}	1.00	
Est.Past Risk	-0.26^{***}	0.71^{***}	-0.30^{***}	1.00

Panel C: Correlations of realizations				
	Stock Ret.	Variance	Syst. Risk	Unsyst. Risk
Stock Ret.	1.00			
Variance	0.54^{***}	1.00		
Syst. Risk	0.31^{*}	0.59^{***}	1.00	
Unsyst. Risk	-0.14	0.50^{***}	0.07	1.00

Notes: Panel A of this table shows the mean of the risk and return estimations, and the frequencies on the five-point-scale with 1 representing "far below average" and 5 "far above average". Panel B shows pairwise correlations between the four different risk and return estimates. Panel C shows correlations between realized returns, variance, systematic and unsystematic risk of all stocks used in our analysis in the year and the year before the experiment took place. *** 1% significance, * 10% significance.

Table 3: Correlations between Affective Rating and Estimates

	AR			
Estimates	Total	Treatment (T)	Control (C)	Difference (T-C)
Est. Past Return	0.175^{***}	0.190^{***}	0.162^{***}	0.028
Expected Return	0.202^{***}	0.219^{***}	0.187^{***}	0.032^{*}
Est. Past Risk	-0.112^{***}	-0.123^{***}	-0.097^{***}	0.026
Expected Risk	-0.128^{***}	-0.143^{***}	-0.108^{***}	0.036^{*}

Notes: This table shows correlations between the aggregated rating, *AR*, and the risk and return estimates broken down by treatment and control group. Differences between treatment and control group are tested for significance using Fisher's transformation. *** 1% significance, ** 5% significance, * 10% significance.

Table 4: Multivariate results: Expected return

Panel A	(1)	(2)	(3)	(4)	(5)
$AR_{i,j}$	.296	.250	.233	.247	.217
	(.058)***	(.044)***	(.049)***	(.028)***	(.034)***
$PastReturn_i$		2.131	2.119	.303	.294
		(.384)***	(.383)***	(.479)	(.477)
$PastRisk_i$		–12.719	–12.666	25.348	25.453
		(7.545)*	(7.586)*	(6.126)***	(6.108)***
$FinLit_j^{med}$			–.147	–.151	–.157
			(.057)***	(.063)**	(.063)**
$FinLit_j^{high}$			–.191	–.230	–.226
			(.068)***	(.076)***	(.076)***
$Confidence_{i,j}^{high}$			.266	.348	.360
			(.083)***	(.063)***	(.064)***
Age_j			–.009	–.010	–.008
			(.007)	(.008)	(.008)
$Gender_j$			–.062	–.039	–.041
			(.061)	(.063)	(.063)
$Semesters_j$			.012	.011	.008
			(.008)	(.009)	(.008)
PE_Ratio_i				.037	.037
				(.009)***	(.009)***
$EarningsGrowth_i$				.003	.003
				(.003)	(.003)
$Dividends_i$				.569	.571
				(.146)***	(.146)***
$CashFlow_i$				.004	.004
				(.003)	(.003)
$Bookvalue_i$				–.012	–.012
				(.005)**	(.005)**
$TotAssets_i$				.000	.000
				(.000)**	(.000)**
$DebtRatio_i$				–.070	–.070
				(.011)***	(.011)***
ROE_i				.007	.007
				(.015)	(.015)
$ACov_i$				–.002	–.002
				(.001)	(.001)
$Treat_j$					–.453
					(.174)***
$AR_{i,j} \times Treat_j$					.070
					(.034)**
Obs.	7440	7440	7440	6944	6944
Pseudo R^2	0.014	0.049	0.051	0.072	0.072
Panel B	(1)	(2)	(3)	(4)	(5)
$AR_{i,j}$	.341	.284	.262	.287	.243
	(.073)***	(.059)***	(.064)***	(.036)***	(.041)***
Obs.	7440	7440	7440	6944	6944
Pseudo R^2	0.036	0.073	0.075	0.103	0.103

Notes: Panel A of this table shows results of the following ordered logistic regression:
$ExpectedReturn_{i,j} = \beta_1 AR_{i,j} + \beta_2 PastReturn_i + \beta_3 PastRisk_i + \beta_4 FinLit_j^{high} + \beta_5 FinLit_j^{med} + \beta_6 Confidence_{i,j}^{high} + \beta_7 DemographicCharacteristics_j + \beta_8 FirmCharacteristics_i + \beta_{10} Treat_j + \beta_{11} AR_{i,j} \times Treat_j \varepsilon_{i,j}$.
Expected return of firm i as estimated by participant j is regressed on the affective rating, $AR_{i,j}$, realized return, $PastReturn_i$, realized risk, $PastRisk_i$, dummy variables indicating high and medium financial literacy, $FinLit_j^{high}$ and $FinLit_j^{med}$, and a dummy variable indicating participants' confidence in evaluating the firm, $Confidence_{i,j}^{high}$. $Treat_j$ is a dummy variable equal to one if participant j is assigned to the treatment group, and zero otherwise. The vector of demographic variables includes: Age_j, $Gender_j$, and number of semesters studied, $Semesters_j$. Firm characteristics (as of 2006) include: price earnings ratio (PE_Ratio_i), earnings growth ($EarningsGrowth_i$), dividend payments ($Dividends_i$), cash flow ($CashFlow_i$), bookvalue ($Bookvalue_i$), total assets ($TotAssets_i$), debt ratio ($DebtRatio_i$), return on equity (ROE_i), and analyst coverage ($ACov_i$). Regressions in Panel B additionally contain individual fixed effects. Standard errors clustered at firm level in parentheses. *** 1%, ** 5%, and * 10% significance.

Table 5: Multivariate results: Expected risk

Panel A	(1)	(2)	(3)	(4)	(5)
$AR_{i,j}$	−.185	−.154	−.138	−.117	−.081
	(.042)***	(.030)***	(.032)***	(.025)***	(.036)**
$PastReturn_i$		−.819	−.794	.106	.107
		(.356)**	(.355)**	(.209)	(.210)
$PastRisk_i$		−8.218	−8.388	−17.402	−17.421
		(7.223)	(7.227)	(5.787)***	(5.805)***
$WorstDaily_i$		−25.618	−25.431	−4.410	−4.386
		(12.579)**	(12.626)**	(8.143)	(8.158)
$Beta_i$		.559	.563	.427	.427
		(.220)**	(.219)**	(.249)*	(.249)*
$Skewness_i$		.808	.796	.391	.389
		(.337)**	(.339)**	(.327)	(.328)
$Kurtosis_i$		−.026	−.022	−.091	−.090
		(.059)	(.059)	(.038)**	(.038)**
$DebtRatio_i$		.018	.018	.063	.063
		(.008)**	(.008)**	(.006)***	(.006)***
$FinLit_j^{med}$			.098	.098	.090
			(.061)	(.066)	(.067)
$FinLit_j^{high}$			.177	.182	.175
			(.077)**	(.084)**	(.085)**
$Confidence_{i,j}^{high}$			−.236	−.262	−.253
			(.069)***	(.062)***	(.064)***
Age_j			−.006	−.005	−.004
			(.009)	(.010)	(.009)
$Gender_j$			.069	.063	.061
			(.042)*	(.047)	(.047)
$Semesters_j$			−.006	−.006	−.006
			(.006)	(.007)	(.007)
PE_Ratio_i				.005	.005
				(.007)	(.007)
$EarningsGrowth_i$				−.003	−.003
				(.002)	(.002)
$Dividends_i$				−.238	−.237
				(.064)***	(.064)***
$CashFlow_i$				−.005	−.005
				(.002)***	(.002)***
$Bookvalue_i$				.006	.006
				(.002)***	(.002)***
$TotAssets_i$				−.000	−.000
				(.000)***	(.000)***
ROE_i				.006	.006
				(.009)	(.009)
$ACov_i$				.002	.002
				(.001)*	(.001)*
$Treat_j$					.254
					(.174)
$AR_{i,j} \times Treat_j$					−.067
					(.039)*
Obs.	7440	7440	7440	6944	6944
Pseudo R^2	0.006	0.026	0.028	0.028	0.028
Panel B	(1)	(2)	(3)	(4)	(5)
$AR_{i,j}$	−.218	−.179	−.163	−.141	−.103
	(.052)***	(.035)***	(.037)***	(.027)***	(.037)***
Obs.	7440	7440	7440	6944	6944
$Pseudo\ R^2$	0.035	0.056	0.058	0.065	0.065

Notes: Panel A of this table shows results of the following ordered logistic regression: $ExpectedRisk_{i,j} = \beta_1 AR_{i,j} + \beta_2 PastReturn_i + \beta_3 PastRisk_i + \beta_4 RiskMeasures_i + \beta_5 FinLit_j^{high} + \beta_6 FinLit_j^{med} + \beta_7 Confidence_{i,j}^{high} + \beta_8 DemographicCharacteristics_j + \beta_9 FirmCharacteristics_i + \beta_{10} Treat_j + \beta_{11} AR_{i,j} \times Treat_j + \varepsilon_{i,j}$.
Expected risk of firm i as estimated by participant j is regressed on the affective rating, $AR_{i,j}$, realized return, $PastReturn_i$, realized risk, $PastRisk_i$, and additional risk measures including a firm's market beta ($Beta_i$), worst daily returns over the past year ($WorstDaily_i$), as well as its stock returns' skewness and kurtosis. Further controls are dummy variables indicating high and medium financial literacy, $FinLit_j^{high}$ and $FinLit_j^{med}$, and a dummy variable indicating participants' confidence in evaluating the firm, $Confidence_{i,j}^{high}$. The vector of demographic variables includes: Age_j, $Gender_j$, and number of semesters studied, $Semesters_j$. Firm characteristics (as of 2006) include: price earnings ratio (PE_Ratio_i), earnings growth ($EarningsGrowth_i$), dividend payments ($Dividends_i$), cash flow ($CashFlow_i$), bookvalue ($Bookvalue_i$), total assets ($TotAssets_i$), debt ratio ($DebtRatio_i$), return on equity (ROE_i), and analyst coverage ($ACov_i$). $Treat_j$ is a dummy variable equal to one if participant j is assigned to the treatment group, and zero otherwise. Regressions in Panel B additionally contain individual fixed effects. Standard errors clustered at firm level in parentheses. *** 1%, ** 5%, and * 10% significance.

Table 6: Interaction effects of financial literacy and confidence

	$ExpectedReturn_i$		$ExpectedRisk_i$	
	(1)	(2)	(3)	(4)
$AR_{i,j}$	.147	.183	-.181	-.226
	(.046)***	(.052)***	(.057)***	(.070)***
$PastReturn_i$	.368	.362	.040	.044
	(.461)	(.477)	(.256)	(.274)
$PastRisk_i$	24.876	26.328	-8.327	-8.186
	(6.794)***	(6.964)***	(4.508)*	(4.858)*
$AR_{i,j} \times FinLit_j^{high}$	-.004	-.005	.156	.168
	(.050)	(.056)	(.059)***	(.072)**
$AR_{i,j} \times FinLit_j^{med}$	.028	.056	.117	.126
	(.046)	(.050)	(.054)**	(.073)*
$FinLit_j^{high}$	-.201		.156	
	(.257)		(.283)**	
$FinLit_j^{med}$	-.284		.462	
	(.231)		(.262)*	
$AR_{i,j} \times Confidence_{i,j}^{high}$	.152	.134	-.079	-.056
	(.035)***	(.036)***	(.039)**	(.046)
$Confidence_{i,j}^{high}$	-.391	-.063	.104	-.138
	(.203)*	(.226)	(.208)	(.240)
$DemographicCharacteristics_j$	Yes	No	Yes	No
$IndividualFE_j$	No	Yes	No	Yes
$FirmCharacteristics_i$	Yes	Yes	Yes	Yes
Obs.	6944	6944	6944	6944
$Pseudo\ R^2$	0.072	0.103	0.025	0.061

Notes: Column (1) of this table shows results of the following ordered logit regression: $Expected\,Return_{i,j} = \beta_1 AR_{i,j} + \beta_2 PastReturn_i + \beta_3 PastRisk_i + \beta_4 AR_{i,j} \times FinLit_j^{high} + \beta_5 AR_{i,j} \times FinLit_j^{med} + \beta_6 FinLit_j^{high} + \beta_7 FinLit_j^{med} + \beta_8 AR_{i,j} \times Confidence_{i,j}^{high} + \beta_9 Confidence_{i,j}^{high} + \beta_{10} DemographicCharacteristics_j + \beta_{11} FirmCharacteristics_i + \varepsilon_{i,j}$. We relate the future return of firm i as estimated by participant j, $Expected\,Return_{i,j}$, to the affective rating, $AR_{i,j}$ and interaction terms of the affective rating with the degrees of financial literacy, $FinLit_j^{high}$ and $FinLit_j^{med}$, as well as confidence, $Confidence_{i,j}^{high}$. We also include the confidence and financial literacy dummies, realized return, $PastReturn_i$, and realized risk, $PastRisk_i$. In addition, we control for the previously described demographic variables and firm characteristics. In column (2) we add individual fixed effects and drop individual characteristics j. In column (3) we use expected risk estimates, $Expected\_Risk_{i,j}$, instead of expected return estimates as the dependent variable. Column (4) again contains individual fixed effects instead of individual characteristics j. Standard errors are reported in parentheses and are clustered at the firm level. *** 1% significance, ** 5% significance, * 10% significance.

Table 7: Impact of sensitivity to affect on risk and return correlations

$Corr_j$	(1)	(2)	(3)	(4)
$AR\_Coefficient_j$	-.418	-.496	-.485	-.489
	(.171)**	(.170)***	(.169)***	(.169)***
$FinLit_j^{high}$			.163	.162
			(.061)***	(.061)***
$FinLit_j^{med}$			.135	.133
			(.055)**	(.055)**
$Confidence_j$			-.119	-.113
			(.068)*	(.070)
Age_j		.006	.008	.008
		(.010)	(.011)	(.011)
$Gender_j$		-.071	-.041	-.041
		(.046)	(.049)	(.049)
$Semesters_j$		.015	.010	.010
		(.008)*	(.008)	(.008)
$Treat_j$				-.020
				(.044)
Constant	-.222	-.388	-.486	-.483
	(.042)***	(.222)*	(.239)**	(.239)**
Obs.	246	246	246	246
R^2	0.028	0.071	0.105	0.105

Notes: This table shows results of the following OLS regression:

$$\begin{aligned} Corr_j &= \alpha + \beta_1 AR\_Coefficient_j + \beta_2 FinLit_j^{high} + \beta_3 FinLit_j^{med} \\ &\quad + \beta_4 Confidence_j^{high} + \beta_5 Age_j + \beta_6 Gender_j + \beta_7 Semesters_j + \beta_8 Treat_j + \varepsilon_j. \end{aligned}$$

$Corr_j$ denotes each participant's estimated correlation between expected risk and return. $AR\_Coefficient_j$ is computed as the average of the absolute values of β_1 in regression 1 for expected risk and return as dependent variables. $Confidence_j$ is the average confidence of a individual j in the estimation task. All other variables are defined as in the previous tables. *** 1% significance, ** 5% significance, * 10% significance.

Table 8: Determinants of affective rating

	(1)	(2)	(3)	(4)
$PastReturn_i$	0.594	0.406	0.401	0.325
	(0.31)*	(0.20)**	(0.18)**	(0.29)
$PastRisk_i$	–4.295	–1.881	–1.095	–3.093
	(4.78)	(2.42)	(2.49)	(5.30)
$Distance_i$		–0.002	–0.001	–0.001
		(0.00)***	(0.00)**	(0.00)
$Size_i$		0.001	0.001	0.000
		(0.00)*	(0.00)	(0.00)
$Marketing_i$		389.364	416.014	504.979
		(103.53)***	(126.33)***	(124.67)***
$Brand_i$		0.665	0.559	0.499
		(0.17)***	(0.20)***	(0.24)*
$MktRf_i$			–0.018	0.156
			(0.18)	(0.21)
$BookToMarket_i$			–0.290	–0.284
			(0.11)**	(0.21)
$FinLit_j^{high}$			0.025	0.035
			(0.04)	(0.04)
$FinLit_j^{med}$			–0.001	0.002
			(0.04)	(0.05)
$Confidence_{i,j}^{high}$			0.387	0.397
			(0.04)***	(0.03)***
Age_j			0.009	0.007
			(0.01)	(0.01)
$Gender_j$			0.210	0.197
			(0.05)***	(0.05)***
$Semesters_j$			0.006	0.006
			(0.01)	(0.01)
$FirmCharacteristics_i$	No	No	No	Yes
R^2	0.018	0.127	0.141	0.146
Observations	7440	7440	7192	6696

Notes: This table shows results of the following OLS regression:
$AR_{i,j} = \alpha + \beta_1 PastReturn_i + \beta_2 PastRisk_i + \beta_3 Distance_i + \beta_4 Size_i + \beta_5 Marketing_i + \beta_6 Brand_i + \beta_7 MktRf_i + \beta_8 BookToMarket_i + \beta_9 FinLit_j^{high} + \beta_{10} FinLit_j^{med} + \beta_{11} Confidence_{i,j}^{high} + \beta_{12} Age_j + \beta_{13} Gender_j + \beta_{14} Semesters_j + \beta_{15} FirmCharacteristics_i + \varepsilon_{i,j}$.
We relate participants' affective ratings, $AR_{i,j}$, to the firm's marketing expenditures, $Marketing_i$, an indicator variable for the strengths of its brand, $Brand_i$, as well as the distance of a firm from Cologne in kilometers, $Distance_i$. $Size_i$, is measured by total assets of the firm. Furthermore, we include a firm's realized return, $PastReturn_i$, and realized risk, $PastRisk_i$. We also include a firm's loading on market risk $MktRf_i$, and its book-to-market value $BookToMarket_i$. We include dummies for participants' confidence in evaluating a firm and financial literacy defined as in the previous regressions. As further control variables we use participants' demographic characteristics such as age, gender, and semesters studied. We control for the same firm characteristics, $FirmCharacteristics_i$, as in the previous tables. Standard errors are reported in parentheses and are clustered at the firm level. *** 1% significance, ** 5% significance, * 10% significance.

Table 9: Implications for Equity Valuations

Coefficient on $AR_{i,j}$	t=2007 Q4	t=2008 Q1	t=2008 Q2
	(1)	(2)	(3)
Raw Returns$_t$	0.01	2.563	-3.003
	(1.56)	(1.81)	(2.02)
1-Factor Alpha$_t$	1.08	3.219	-2.950
	(1.56)	(1.46)**	(1.44)**
3-Factor Alpha$_t$	1.673	3.357	-2.942
	(1.56)	(1.33)**	(1.34)**
4-Factor Alpha$_t$	1.856	3.106	-2.484
	(1.50)	(1.35)**	(1.33)*
Observations	90	90	90

Notes: This table shows results of the following OLS regression: $Alpha_i = \alpha + \beta_1 AR_i, j + \varepsilon_i$. A firm's $Alpha_i$ is obtained from estimating a Jensen (1968) 1-factor model, a Fama and French (1993) 3-factor model, or a Carhart (1997) 4-factor model, respectively. standard errors are reported in parentheses. *** 1% significance, ** 5% significance, * 10% significance.

Figure 1: Semantic differential scale

Notes: Example of a screen shown to participants to measure their affective attitudes towards a firm. Translation: The following screen deals with the company (trademark E.ON). Please evaluate the company by means of the following scale: good/bad, interesting/boring, strong/weak, active/passive. Would you like to access fundamental data of the company? Yes/No.

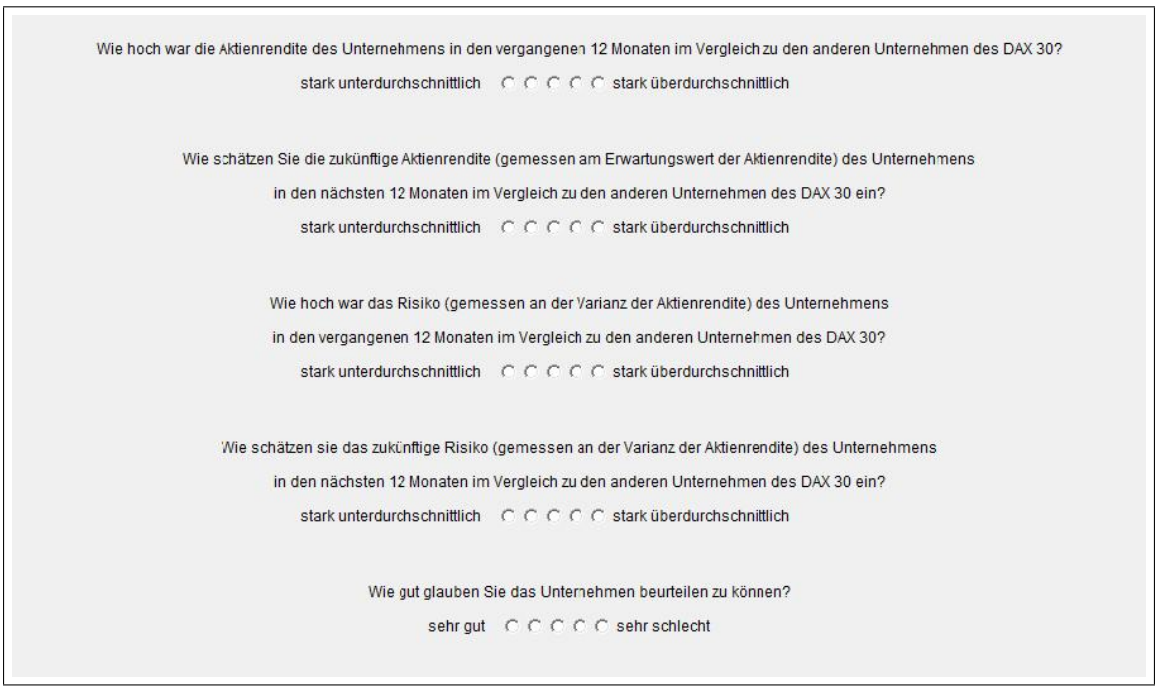


Figure 2: Risk and return estimations

Notes: Screenshot of the questionnaire used to collect participants' risk and return estimates. The first two questions ask how participants rate past and future return of the respective firm relative to all firms included in the DAX30 index. The third and fourth question ask how participants rate past and future risk of the respective firm relative to all firms included in the DAX30 index. Past and future risk and return estimates referred to a twelve month window. The last question asks how well the participant perceives to be able to judge the company. Answers range on a five-point scale from "far below average" to "far above average" for the first four questions and from "very good" to "very bad" for the last question.

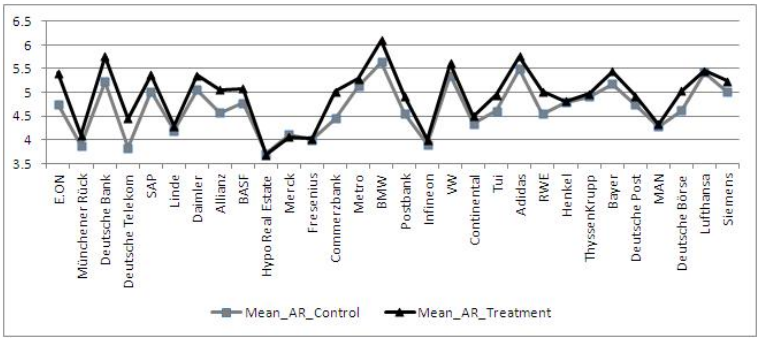


Figure 3: Mean affective attitude per firm

Notes: This figure displays the mean affective rating AR for all firms included in the DAX30 index. The black line represents the mean affective rating for all participants belonging to our treatment group. The grey line represents the mean affective rating for all participants belonging to our control group.

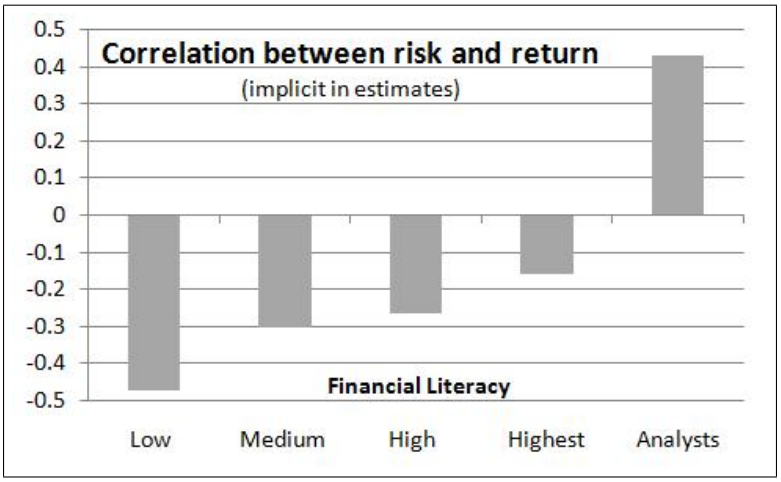


Figure 4: Risk and return estimates of participants and analysts

Notes: This figure displays the correlation between risk and return estimates for subsamples of different financial literacy. Low, medium and high financial literacy are defined as in the regression equations, highest financial literacy represents a subgroup of people answering all financial literacy questions correct. Consensus data on analyst forecasts is obtained from Factset/JCF. Analyst forecasts are also made relative to the average DAX30 company and cover the same time period as forecasts made by participants in the experiment.

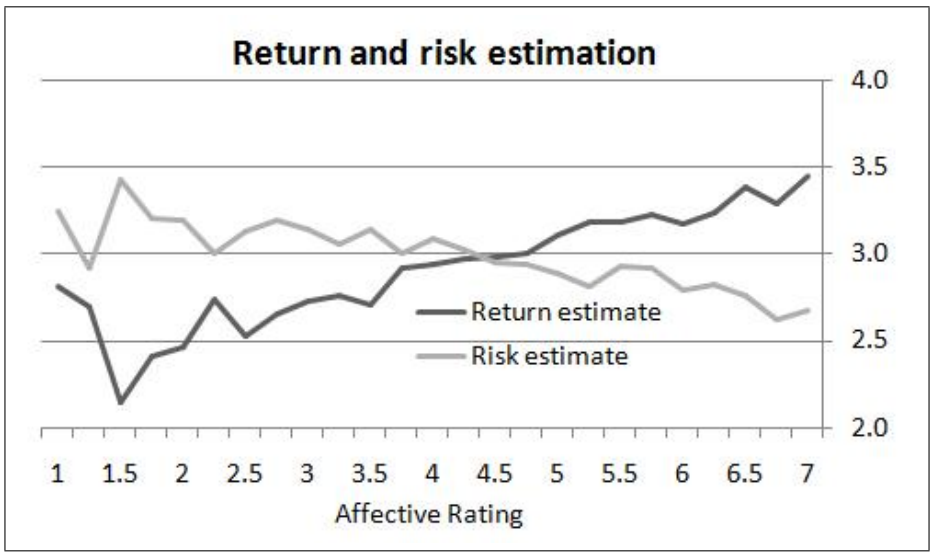


Figure 5: Risk and return estimates depending on affective attitudes

Notes: This figure illustrates the relation between affective ratings and risk and return estimates. The y-axis represents participants' risk and return estimations relative to the DAX30 index ranging from 1 (low risk/return) to 5 (high risk/return). The x-axis represents participants' affective ratings ranging from 1 (very negative) to 7 (very positive).

CFR Working Paper Series

centre for financial research cologne

CFR working papers are available for download from **www.cfr-cologne.de**.

Hardcopies can be ordered from: centre for financial research (CFR), Albertus Magnus Platz, 50923 Koeln, Germany.

2012

No.	Author(s)	Title
12-06	A. Kempf, A. Pütz, F. Sonnenburg	Fund Manager Duality: Impact on Performance and Investment Behavior
12-05	R. Wermers	Runs on Money Market Mutual Funds
12-04	R. Wermers	A matter of style: The causes and consequences of style drift in institutional portfolios
12-03	C. Andres, A. Betzer, I. van den Bongard, C. Haesner, E. Theissen	Dividend Announcements Reconsidered: Dividend Changes versus Dividend Surprises
12-02	C. Andres, E. Fernau, E. Theissen	Is It Better To Say Goodbye? When Former Executives Set Executive Pay
12-01	L. Andreu, A. Pütz	Are Two Business Degrees Better Than One? Evidence from Mutual Fund Managers' Education

2011

No.	Author(s)	Title
11-16	V. Agarwal, J.-P. Gómez, R. Priestley	Management Compensation and Market Timing under Portfolio Constraints
11-15	T. Dimpfl, S. Jank	Can Internet Search Queries Help to Predict Stock Market Volatility?
11-14	P. Gomber, U. Schweickert, E. Theissen	Liquidity Dynamics in an Electronic Open Limit Order Book: An Event Study Approach
11-13	D. Hess, S. Orbe	Irrationality or Efficiency of Macroeconomic Survey Forecasts? Implications from the Anchoring Bias Test
11-12	D. Hess, P. Immenkötter	Optimal Leverage, its Benefits, and the Business Cycle
11-11	N. Heinrichs, D. Hess, C. Homburg, M. Lorenz, S. Sievers	Extended Dividend, Cash Flow and Residual Income Valuation Models – Accounting for Deviations from Ideal Conditions
11-10	A. Kempf, O. Korn, S. Saßning	Portfolio Optimization using Forward - Looking Information

11-09	V. Agarwal, S. Ray	Determinants and Implications of Fee Changes in the Hedge Fund Industry
11-08	G. Cici, L.-F. Palacios	On the Use of Options by Mutual Funds: Do They Know What They Are Doing?
11-07	V. Agarwal, G. D. Gay, L. Ling	Performance inconsistency in mutual funds: An investigation of window-dressing behavior
11-06	N. Hautsch, D. Hess, D. Veredas	The Impact of Macroeconomic News on Quote Adjustments, Noise, and Informational Volatility
11-05	G. Cici	The Prevalence of the Disposition Effect in Mutual Funds' Trades
11-04	S. Jank	Mutual Fund Flows, Expected Returns and the Real Economy
11-03	G.Fellner, E.Theissen	Short Sale Constraints, Divergence of Opinion and Asset Value: Evidence from the Laboratory
11-02	S.Jank	Are There Disadvantaged Clienteles in Mutual Funds?
11-01	V. Agarwal, C. Meneghetti	The Role of Hedge Funds as Primary Lenders

2010

No.	Author(s)	Title
10-20	G. Cici, S. Gibson, J.J. Merrick Jr.	Missing the Marks? Dispersion in Corporate Bond Valuations Across Mutual Funds
10-19	J. Hengelbrock, E. Theissen, C. Westheide	Market Response to Investor Sentiment
10-18	G. Cici, S. Gibson	The Performance of Corporate-Bond Mutual Funds: Evidence Based on Security-Level Holdings
10-17	D. Hess, D. Kreutzmann, O. Pucker	Projected Earnings Accuracy and the Profitability of Stock Recommendations
10-16	S. Jank, M. Wedow	Sturm und Drang in Money Market Funds: When Money Market Funds Cease to Be Narrow
10-15	G. Cici, A. Kempf, A. Puetz	The Valuation of Hedge Funds' Equity Positions
10-14	J. Grammig, S. Jank	Creative Destruction and Asset Prices
10-13	S. Jank, M. Wedow	Purchase and Redemption Decisions of Mutual Fund Investors and the Role of Fund Families
10-12	S. Artmann, P. Finter, A. Kempf, S. Koch, E. Theissen	The Cross-Section of German Stock Returns: New Data and New Evidence
10-11	M. Chesney, A. Kempf	The Value of Tradeability
10-10	S. Frey, P. Herbst	The Influence of Buy-side Analysts on Mutual Fund Trading
10-09	V. Agarwal, W. Jiang, Y. Tang, B. Yang	Uncovering Hedge Fund Skill from the Portfolio Holdings They Hide
10-08	V. Agarwal, V. Fos, W. Jiang	Inferring Reporting Biases in Hedge Fund Databases from Hedge Fund Equity Holdings
10-07	V. Agarwal, G. Bakshi,	Do Higher-Moment Equity Risks Explain Hedge Fund

	J. Huij	Returns?
10-06	J. Grammig, F. J. Peter	Tell-Tale Tails
10-05	K. Drachter, A. Kempf	Höhe, Struktur und Determinanten der Managervergütung-Eine Analyse der Fondsbranche in Deutschland
10-04	J. Fang, A. Kempf, M. Trapp	Fund Manager Allocation
10-03	P. Finter, A. Niessen-Ruenzi, S. Ruenzi	The Impact of Investor Sentiment on the German Stock Market
10-02	D. Hunter, E. Kandel, S. Kandel, R. Wermers	Endogenous Benchmarks
10-01	S. Artmann, P. Finter, A. Kempf	Determinants of Expected Stock Returns: Large Sample Evidence from the German Market

2009

No.	Author(s)	Title
09-17	E. Theissen	Price Discovery in Spot and Futures Markets: A Reconsideration
09-16	M. Trapp	Trading the Bond-CDS Basis – The Role of Credit Risk and Liquidity
09-15	A. Betzer, J. Gider, D.Metzger, E. Theissen	Strategic Trading and Trade Reporting by Corporate Insiders
09-14	A. Kempf, O. Korn, M. Uhrig-Homburg	The Term Structure of Illiquidity Premia
09-13	W. Bühler, M. Trapp	Time-Varying Credit Risk and Liquidity Premia in Bond and CDS Markets
09-12	W. Bühler, M. Trapp	Explaining the Bond-CDS Basis – The Role of Credit Risk and Liquidity
09-11	S. J. Taylor, P. K. Yadav, Y. Zhang	Cross-sectional analysis of risk-neutral skewness
09-10	A. Kempf, C. Merkle, A. Niessen-Ruenzi	Low Risk and High Return – Affective Attitudes and Stock Market Expectations
09-09	V. Fotak, V. Raman, P. K. Yadav	Naked Short Selling: The Emperor`s New Clothes?
09-08	F. Bardong, S.M. Bartram, P.K. Yadav	Informed Trading, Information Asymmetry and Pricing of Information Risk: Empirical Evidence from the NYSE
09-07	S. J. Taylor , P. K. Yadav, Y. Zhang	The information content of implied volatilities and model-free volatility expectations: Evidence from options written on individual stocks
09-06	S. Frey, P. Sandas	The Impact of Iceberg Orders in Limit Order Books
09-05	H. Beltran-Lopez, P. Giot, J. Grammig	Commonalities in the Order Book
09-04	J. Fang, S. Ruenzi	Rapid Trading bei deutschen Aktienfonds: Evidenz aus einer großen deutschen Fondsgesellschaft
09-03	A. Banegas, B. Gillen, A. Timmermann, R. Wermers	The Performance of European Equity Mutual Funds

09-02	J. Grammig, A. Schrimpf, M. Schuppli	Long-Horizon Consumption Risk and the Cross-Section of Returns: New Tests and International Evidence
09-01	O. Korn, P. Koziol	The Term Structure of Currency Hedge Ratios

2008

No.	Author(s)	Title
08-12	U. Bonenkamp, C. Homburg, A. Kempf	Fundamental Information in Technical Trading Strategies
08-11	O. Korn	Risk Management with Default-risky Forwards
08-10	J. Grammig, F.J. Peter	International Price Discovery in the Presence of Market Microstructure Effects
08-09	C. M. Kuhnen, A. Niessen	Public Opinion and Executive Compensation
08-08	A. Pütz, S. Ruenzi	Overconfidence among Professional Investors: Evidence from Mutual Fund Managers
08-07	P. Osthoff	What matters to SRI investors?
08-06	A. Betzer, E. Theissen	Sooner Or Later: Delays in Trade Reporting by Corporate Insiders
08-05	P. Linge, E. Theissen	Determinanten der Aktionärspräsenz auf Hauptversammlungen deutscher Aktiengesellschaften
08-04	N. Hautsch, D. Hess, C. Müller	Price Adjustment to News with Uncertain Precision
08-03	D. Hess, H. Huang, A. Niessen	How Do Commodity Futures Respond to Macroeconomic News?
08-02	R. Chakrabarti, W. Megginson, P. Yadav	Corporate Governance in India
08-01	C. Andres, E. Theissen	Setting a Fox to Keep the Geese - Does the Comply-or-Explain Principle Work?

2007

No.	Author(s)	Title
07-16	M. Bär, A. Niessen, S. Ruenzi	The Impact of Work Group Diversity on Performance: Large Sample Evidence from the Mutual Fund Industry
07-15	A. Niessen, S. Ruenzi	Political Connectedness and Firm Performance: Evidence From Germany
07-14	O. Korn	Hedging Price Risk when Payment Dates are Uncertain
07-13	A. Kempf, P. Osthoff	SRI Funds: Nomen est Omen
07-12	J. Grammig, E. Theissen, O. Wuensche	Time and Price Impact of a Trade: A Structural Approach
07-11	V. Agarwal, J. R. Kale	On the Relative Performance of Multi-Strategy and Funds of Hedge Funds
07-10	M. Kasch-Haroutounian, E. Theissen	Competition Between Exchanges: Euronext versus Xetra
07-09	V. Agarwal, N. D. Daniel, N. Y. Naik	Do hedge funds manage their reported returns?

07-08	N. C. Brown, K. D. Wei, R. Wermers	Analyst Recommendations, Mutual Fund Herding, and Overreaction in Stock Prices
07-07	A. Betzer, E. Theissen	Insider Trading and Corporate Governance: The Case of Germany
07-06	V. Agarwal, L. Wang	Transaction Costs and Value Premium
07-05	J. Grammig, A. Schrimpf	Asset Pricing with a Reference Level of Consumption: New Evidence from the Cross-Section of Stock Returns
07-04	V. Agarwal, N.M. Boyson, N.Y. Naik	Hedge Funds for retail investors? An examination of hedged mutual funds
07-03	D. Hess, A. Niessen	The Early News Catches the Attention: On the Relative Price Impact of Similar Economic Indicators
07-02	A. Kempf, S. Ruenzi, T. Thiele	Employment Risk, Compensation Incentives and Managerial Risk Taking - Evidence from the Mutual Fund Industry -
07-01	M. Hagemeister, A. Kempf	CAPM und erwartete Renditen: Eine Untersuchung auf Basis der Erwartung von Marktteilnehmern

2006

No.	Author(s)	Title
06-13	S. Čeljo-Hörhager, A. Niessen	How do Self-fulfilling Prophecies affect Financial Ratings? - An experimental study
06-12	R. Wermers, Y. Wu, J. Zechner	Portfolio Performance, Discount Dynamics, and the Turnover of Closed-End Fund Managers
06-11	U. v. Lilienfeld-Toal, S. Ruenzi	Why Managers Hold Shares of Their Firm: An Empirical Analysis
06-10	A. Kempf, P. Osthoff	The Effect of Socially Responsible Investing on Portfolio Performance
06-09	R. Wermers, T. Yao, J. Zhao	Extracting Stock Selection Information from Mutual Fund holdings: An Efficient Aggregation Approach
06-08	M. Hoffmann, B. Kempa	The Poole Analysis in the New Open Economy Macroeconomic Framework
06-07	K. Drachter, A. Kempf, M. Wagner	Decision Processes in German Mutual Fund Companies: Evidence from a Telephone Survey
06-06	J.P. Krahnen, F.A. Schmid, E. Theissen	Investment Performance and Market Share: A Study of the German Mutual Fund Industry
06-05	S. Ber, S. Ruenzi	On the Usability of Synthetic Measures of Mutual Fund Net-Flows
06-04	A. Kempf, D. Mayston	Liquidity Commonality Beyond Best Prices
06-03	O. Korn, C. Koziol	Bond Portfolio Optimization: A Risk-Return Approach
06-02	O. Scaillet, L. Barras, R. Wermers	False Discoveries in Mutual Fund Performance: Measuring Luck in Estimated Alphas
06-01	A. Niessen, S. Ruenzi	Sex Matters: Gender Differences in a Professional Setting

2005

No.	Author(s)	Title
05-16	E. Theissen	An Analysis of Private Investors´ Stock Market Return Forecasts

05-15	T. Foucault, S. Moinas, E. Theissen	Does Anonymity Matter in Electronic Limit Order Markets
05-14	R. Kosowski, A. Timmermann, R. Wermers, H. White	Can Mutual Fund „Stars“ Really Pick Stocks? New Evidence from a Bootstrap Analysis
05-13	D. Avramov, R. Wermers	Investing in Mutual Funds when Returns are Predictable
05-12	K. Griese, A. Kempf	Liquiditätsdynamik am deutschen Aktienmarkt
05-11	S. Ber, A. Kempf, S. Ruenzi	Determinanten der Mittelzuflüsse bei deutschen Aktienfonds
05-10	M. Bär, A. Kempf, S. Ruenzi	Is a Team Different From the Sum of Its Parts? Evidence from Mutual Fund Managers
05-09	M. Hoffmann	Saving, Investment and the Net Foreign Asset Position
05-08	S. Ruenzi	Mutual Fund Growth in Standard and Specialist Market Segments
05-07	A. Kempf, S. Ruenzi	Status Quo Bias and the Number of Alternatives - An Empirical Illustration from the Mutual Fund Industry
05-06	J. Grammig, E. Theissen	Is Best Really Better? Internalization of Orders in an Open Limit Order Book
05-05	H. Beltran-Lopez, J. Grammig, A.J. Menkveld	Limit order books and trade informativeness
05-04	M. Hoffmann	Compensating Wages under different Exchange rate Regimes
05-03	M. Hoffmann	Fixed versus Flexible Exchange Rates: Evidence from Developing Countries
05-02	A. Kempf, C. Memmel	Estimating the Global Minimum Variance Portfolio
05-01	S. Frey, J. Grammig	Liquidity supply and adverse selection in a pure limit order book market

2004

No.	Author(s)	Title
04-10	N. Hautsch, D. Hess	Bayesian Learning in Financial Markets – Testing for the Relevance of Information Precision in Price Discovery
04-09	A. Kempf, K. Kreuzberg	Portfolio Disclosure, Portfolio Selection and Mutual Fund Performance Evaluation
04-08	N.F. Carline, S.C. Linn, P.K. Yadav	Operating performance changes associated with corporate mergers and the role of corporate governance
04-07	J.J. Merrick, Jr., N.Y. Naik, P.K. Yadav	Strategic Trading Behaviour and Price Distortion in a Manipulated Market: Anatomy of a Squeeze
04-06	N.Y. Naik, P.K. Yadav	Trading Costs of Public Investors with Obligatory and Voluntary Market-Making: Evidence from Market Reforms
04-05	A. Kempf, S. Ruenzi	Family Matters: Rankings Within Fund Families and Fund Inflows
04-04	V. Agarwal, N.D. Daniel, N.Y. Naik	Role of Managerial Incentives and Discretion in Hedge Fund Performance
04-03	V. Agarwal, W.H. Fung, J.C. Loon, N.Y. Naik	Risk and Return in Convertible Arbitrage: Evidence from the Convertible Bond Market
04-02	A. Kempf, S. Ruenzi	Tournaments in Mutual Fund Families

04-01	I. Chowdhury, M. Hoffmann, A. Schabert	Inflation Dynamics and the Cost Channel of Monetary Transmission

centre for financial research
cfr/university of cologne
Albertus-Magnus-Platz
D-50923 cologne
Fon +49(0)221-470-6995
Fax +49(0)221-470-3992
kempf@cfr-cologne.de
www.cfr-cologne.de