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An Analysis of Private Investors´ Stock Market Return Forecasts

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Abstract: We analyze data on stock index forecasts made by private investors. The implied returns calculated from these forecasts exhibit negative skewness and excess kurtosis. Past returns have a positive impact on the implied returns, consistent with investors expecting positive momentum. Females are less optimistic than males, but their forecasts have higher standard deviation. Consistent with the weekend effect, implied returns from estimates entered on weekends are significantly lower than those entered on weekdays. Implied returns are not consistently related to the weather conditions on the day the forecast was made.

JEL classification: G14

Keywords: Behavioral Finance; Weekend effect; Weather effect

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1 Introduction

Interest in the behavioral foundations of price formation in stock markets has increased dramatically in recent years. This is due to at least two reasons. First, empirical research has uncovered a host of so-called anomalies, patterns in stock returns that appear to be at odds with the efficient markets paradigm (see Malkiel, 2003 and Schwert, 2002 for recent, though critical, surveys). Second, experimental research in both economics and psychology has identified numerous behavioral "biases" leading to behavior that is inconsistent with expected utility maximization (see Daniel, Hirshleifer and Teoh, 2002, Glaser, Nöth and Weber, 2004, and Hirshleifer, 2001).

Documenting that the traditional models fail to fully explain price formation is one issue, identifying those factors that do is a completely different issue. Though the behavioral finance literature has documented a variety of systematic patterns in both individual behavior and pricing patterns, it is still a long way to a full understanding of the factors that drive investment behavior and stock prices.

The present paper makes a contribution in that direction. We analyze investor estimates of the DAX index value at the end of 2003. These estimates have been elicited by comdirect, a German online broker. From April 10 through June 16, 2003, visitors of the company's website could enter their forecasts. More than 10,000 estimates were accumulated during that period. We use these estimates to investigate into the determinants of the individual expectations. Our results document surprising similarities between the estimates on the one hand and regularities usually found in stock and index returns on the other hand. The implied annualized returns calculated from the forecasts are not normally distributed. Rather, the distribution exhibits negative skewness and excess kurtosis. Past one and two week returns have a positive impact on the implied annualized returns. This is consistent with an expectation of positive stock market momentum. Estimates entered by female investors are less optimistic (i.e., implied returns are lower) but have higher standard deviation than those entered by male respondents.

We further document that implied returns from estimates entered on weekends are significantly lower than those entered on week days. This finding corresponds to the well-documented observation that returns over the weekend are lower than those during weekdays (the weekend effect, French, 1980). Finally, inspired by recent empirical evidence (Cao and Wei, 2002, Hirshleifer and Shumway, 2003, Saunders, 1993) we analyze whether the implied returns are affected by the prevailing weather conditions but do not find evidence of a consistent relation.

Our paper relates to previous work on stock-market related forecasts.[1] Much of this research deals with analyst or "expert" forecasts and biases detected therein (see De Bondt, 1991 and the survey in Daniel, Hirshleifer and Teoh, 2002). Although private investors' expectations are of paramount importance for their trading behavior and the process of price formation, surprisingly little research has been devoted to this issue. Some papers have analyzed the formation of expectations experimentally, often in an attempt to test the rational expectations hypothesis (see, for example, Bloomfield and Hales, 2002, Williamson, 1987).

The paper that comes closest to ours is De Bondt (1993). He analyzes four data sets, three of which were obtained by eliciting students' forecasts of the Dow and the S&P index in a classroom experiment. The fourth data set consists of a sentiment indicator constructed from a weekly mail survey among private investors conducted by the American Association of Individual Investors. The results indicate that private investors appear to be trend followers. In the classroom experiments subjects also had to report confidence intervals for the index. These intervals are asymmetric around the point forecast, implying that subjects expect skewed return distributions.

Our research differs in a number of important ways from De Bondt (1993). First, the number of respondents in our data set is much higher. Second, De Bondt does not test for gender effects, nor does he analyze whether day-of-the-week effects or weather effects can be detected in the data.

The remainder of the paper is organized as follows. In section 2 we briefly describe the data set. The empirical results are collected in section 3, section 4 offers concluding remarks.

2 The Data Set

With more than 500,000 customers comdirect is the largest German online brokerage firm. It is itself a listed company. As noted in the introduction, comdirect invited visitors of its website to enter their forecasts of the DAX index value at the year end 2003. To provide incentives lots were drawn for 10 DVD players among the participants. Furthermore, it was announced that, at the end of the year, lots would be drawn for a bottle of Champagne among those participants with the best forecast.

Besides their forecast, participants had to enter their name, sex, and contact information. On a voluntary basis, they could indicate whether they are customers of comdirect and they could allow comdirect to send them product information.

Estimates could be entered from April 10 through June 16, 2003. A total of 10,112 investors participated. We discarded 50 observations (0.49%). In one case, the recorded entry day was wrong[2] and the estimate could thus not be matched with the DAX value at the time of entry. We further eliminated all estimates predicting an index value below 500. Although this cut-off value is arguably somewhat arbitrary, most of these records are likely to be caused by typing errors. The index values in the sample period were in the range 2,700 - 3,250. Estimates like 274 or 337 are thus likely to be due to a missing digit. This interpretation is supported by the observation that there are only 7 forecasts (0.07%) in the range 500-1000 (as compared to 30 in the range 1-500). Finally, we discarded 19 observations with forecasted index values between 9,501 and 9,999 (the highest admissible value). We do not consider these to be serious estimates. This is corroborated by two facts. First, 18 of these 19 forecasts predict an index value of 9,999. Second, there is only one estimate in the range 9,000-9,500 (and 5 in the range 8,001-9,000), as compared to 19 in the range 9,501-9,999.

Alternatively, we repeated our analysis after exclusion of all observations with an implied return larger than 0.8 or smaller than -0.8. The cut-off value of 0.8 was chosen because the largest observed absolute annual DAX return was -0.8005. This annual return was observed when the internet bubble burst and was thus in fresh memory when the forecasts we analyze were made. Restricting the sample in this way reduces the number of observations by 186 (1.8%) but does not qualitatively affect the results. We therefore only report the results for the full sample described above.

Our data set contains each individual forecast, the entry date and the sex of the investor. We matched each forecast with the value of the DAX index at the close of the previous trading day, the (close-to-close)return over the previous trading day and the return over the one and two weeks prior to the entry date.

Of course, many estimates are entered during the trading day. The investors entering these forecasts thus had access to more timely information than the previous day's closing value. As we only know the entry day, we are not able to control for this enlarged information set. Therefore, in order to ensure to use only information available at the time of entry, we decided to use the previous day's closing value in our analysis. To check the robustness of the results, we repeated the whole analysis using the DAX value at 9.15 a.m. on the day the forecast was entered. The results are very similar, suggesting that our conclusions are insensitive to the matching procedure.

The forecasts themselves are not comparable since they are entered on different days. We therefore transform each forecast into an implied annualized return:

$$\hat{r}_{i,t} = \ln\left(\frac{F_{i,t}}{DAX_{t-1}}\right) \cdot \frac{360}{T_t} \qquad (1)$$

F_{it} is the forecast entered by investor i on day t. DAX_{t-1} is the closing value of the DAX index on the trading day prior to day t. T_t is the number of days from day t to the year end.

Some caveats are in order. First, the participants are not necessarily a random sample from the population of private investors. This is, however, a qualification that also applies to most previous studies using either forecasts elicited from students (as in De Bondt, 1993) or forecasts made by a group of "experts" (as in De Bondt, 1991). Second, we should note that it cannot be ruled out that an individual investor entered more than one forecast, possibly using different names. Third, there is almost no cost of making a wrong (or even nonsensical) forecast. Such forecasts add noise to the data and will render statistical inference difficult. Figure 1 provides evidence that the variability of the forecasts is indeed huge. Therefore, we can not expect to obtain high explanatory power in regressions aimed at explaining the forecasts.

Insert Figure 1 about here

3 Empirical Results

Panel A of Table 1 presents descriptive statistics for the index level forecasts. The mean of the forecasts is 3,475.4. The variability of the forecasts is very large, as is evidenced by the high standard deviation. Index level forecasts are entered on different days and are thus not comparable. We therefore turn to the implied annualized returns described in Panel B of Table 1. 88.3% of the respondents expect a positive return over the forecast horizon. The mean implied return is 22.67% and the median is 23.99%. Both figures are far higher than usual estimates of expected returns on the stock market. These very optimistic views may be a response to the 2001 and 2002 bear markets. This interpretation, if correct, would indicate that private investors expect long-term reversals in the stock market.

The implied return distribution exhibits patterns that are characteristic for actual stock returns - the distribution is negatively skewed (skewness -1.21) and fat-tailed (kurtosis 11.2). Based on a Jarque-Bera test the null hypothesis of normality is strongly rejected.

<u>Insert Table 1 about here</u>

Out of the 10,062 participants, 2,215 (22%) were female and 7,847 male. Men appear to be more optimistic. The proportion of male respondents expecting a positive return is higher (89.1% as opposed to 85.4%), and the mean implied return from the male forecasts is 23.01% as opposed to 21.48% for the female forecasts. In contrast, the standard deviation of the implied returns is higher for the female participants (0.287 as compared to 0.259). Both distributions exhibit negative skewness and excess kurtosis.

In Table 2 we test whether the documented differences between the distributions are statistically significant. We first test for equality of the means. The t-statistic is 2.39, indicating that implied returns calculated from male respondents' forecasts are indeed more optimistic than those obtained from female respondents' forecasts. This conclusion is corroborated by the results of the Wilcoxon test for equality of the median (z-statistic 3.69). The standard deviations are also different from each other. Both the F-statistic and the Brown-Forsythe statistic indicate significance of the difference. The latter test statistic is more robust under non-normality (Brown and Forsythe, 1974, Conover, Johnson and Johnson, 1981).

We finally test whether the implied returns obtained from female and male respondents' forecasts come from the same distribution. We use a χ^2 homogeneity test with 10 bins. The result, shown in the last column of Table 2, indicates that the null hypothesis of equal distributions is easily rejected.[3]

Insert Table 2 about here

The finding that male respondents' forecasts are more optimistic and have lower variance complements the results of Barber and Odean (2001), Dorn and Huberman (2002), and Kilka and Weber (2000). Barber and Odean document that male investors trade more aggressively and earn lower returns than female investors. They argue that these results are caused by male investors being more overconfident. Dorn and Huberman find that retail investors actively buying and selling stocks are more likely to be young, male, and that they consider themselves to be more knowledgeable than the average investor. Kilka and Weber ask German and US business students both about their competence in estimating stock return distributions and about their estimates for the German and the US stock market. They find that German students feel more competent in making judgments about the German market, and vice versa for US students. Interestingly, the students make more optimistic forecasts for the market they feel more competent about, i.e., both groups of students are, on average, more optimistic for their respective home markets.[4] Our finding that the forecasts made by male investors (who, according to Barber and Odean, are more overconfident than female investors) are more optimistic and less dispersed is consistent with the results of Kilka and Weber.

In the next step we analyze whether the individual forecasts depend on realized returns in the days before the forecast was made. To that end, we regress the implied returns on the returns on the previous trading day (calculated from the closing values of the DAX on days t - 1 and t - 2), the return of the previous week (but excluding the previous day to avoid multicollinearity) and the return in the week before. As we have documented that implied returns calculated from male and female respondents' forecasts differ, we include a dummy variable D_{male} taking on the value 1 for male forecasters. The regression model thus is

$$\hat{r}_{i,t} = \gamma_0 + \gamma_1 r_{t,prev.day} + \gamma_2 r_{t,one\,week} + \gamma_3 r_{t,two\,weeks} + \gamma_4 D_{Male,i,t} + \varepsilon_{i,t} \tag{2}$$

The model was estimated using OLS with White heteroscedasticity-consistent standard errors. In a supplementary regression we allowed the slope coefficients for male and female forecasters to be different. Based on a Wald test the null hypothesis of equal slopes was not rejected. We therefore only present the model with slopes restricted to being equal.

We have documented earlier that the standard deviations of male and female forecasters are significantly different. To account for this known source of heteroscedasticity we also estimate the model using weighted least squares (WLS). We used the reciprocal values of the standard deviations of male and female forecasters, respectively, as weights.

The results are shown in Table 3. They are very similar for the OLS and the WLS regression. The explanatory power of the independent variables is low, as is evidenced by very low R^2s. This comes as no surprise given the huge variability of the individual forecasts documented earlier. The return of the previous trading day has a negative, though insignificant, impact on the forecast. The returns over the previous one and two weeks, on the other hand, have a positive and statistically significant impact on the implied returns. This is consistent with the expectation of positive stock market momentum that has also been documented by De Bondt (1993). The gender dummy has a positive coefficient. This corresponds to our earlier finding that male forecasters are more optimistic.

Insert Table 3 about here

Columns 3 and 4 of Table 3 show the results of separate regressions for female and male participants. The results are fully consistent with those discussed above.

One anomaly that has been documented for quite a number of markets and time periods is the day-of-the-week effect, i.e., the observation that average daily returns differ by the day of the week. More specifically, it has been found that the weekend return (i.e., the return from the close on Friday to the opening on Monday) is lower than the daily returns during the week (Arsad and Coutts 1997, Franses and Paap 2000, French, 1980, Keim and Stambaugh, 1984, Lakonishok and Smidt, 1988, Rogalski, 1984). There have been a variety of (modestly successful) attempts at explaining this phenomenon (e.g. Abraham and Ikenberry, 1994, Bhattacharya et al. 2003, Chang, Pinegar and Ravichandran, 1998, Coutts and Hayes 1999, Damodaran, 1989, Penman, 1987).

In the sequel we analyze whether we can identify a day-of the-week effect in our data set. Table 4 shows the implied returns calculated from forecasts entered on different days of the week. It is apparent that forecasts entered on Saturdays and Sundays are less optimistic than those entered on other days. The F statistic for a test of the null hypothesis of equal means is 5.46, significant at better than the 1% level. Excluding the weekend and testing whether there are any differences in the forecasts entered between Monday and Friday yields an insignificant test statistic of only 0.97. We can thus conclude that the only significant difference is between the weekend on the one hand and the other days of the week. This is corroborated by the last column of Table 4. A comparison of the implied returns calculated from weekday entries and weekend entries yields a highly significant t-statistic.

Insert Table 4 about here

The results reported in Table 4 suggest that the weekend effect has explanatory power for the variation in the implied return. We therefore repeat our earlier regression analysis but now include a weekend dummy. The results are shown in Table 5. As expected, the coefficient on the dummy variable is negative and highly significant, thus confirming the result that forecasts entered during the weekend are less optimistic. All other results remain unchanged, with the only exception that the gender dummy now just falls short of being significant at the 5% level.

Insert Table 5 about here

Note that our findings are not necessarily in contradiction to the results of studies that have shown that the weekend effect has weakened in recent years (e.g., Schwert, 2002). It is possible that the weekend effect does no longer show up in index or stock level returns because "smart money" investors make use of any arbitrage opportunity. However, when interpreting the weekend effect just documented, one caveat is in order. We can not rule out the possibility that respondents accessing the website of comdirect on a weekend are different from the pool of all respondents and that these differences (rather than a genuine weekend effect) drive the results.

Several recent empirical studies have documented that stock returns are consistently affected by the weather conditions. Saunders (1993) documents that less cloud cover is associated with higher returns[5] and Cao and Wei (2002) find that temperature is related to stock returns. Similarly, Hirshleifer and Shumway (2003) document a relation between morning sunshine and stock returns. They also provide a discussion of the psychological literature linking weather conditions, mood, and decision making. Kliger and Levy (2003) shed light on this link by documenting that risk preferences are related to the prevailing weather conditions.

Given this empirical evidence we analyze whether the weather conditions have an impact on the forecasts made by the respondents in our data set. One impediment to such an analysis is that we do not know where the individual respondents live, nor do we know at what time of the day a forecast has been made. We are therefore forced to use a variable capturing average daily weather conditions in Germany. We proceed as follows. On its website (www.dwd.de), the "Deutscher Wetterdienst" provides daily averages for 43 weather stations in Germany. We choose eight stations situated in large German cities[6] We obtaine data on four variables, namely,

1. the average daily temperature,
2. the sunshine period, measured in hours per day,
3. rain, measured in mm/day and
4. cloud cover, measured in eights at hourly intervals and then averaged over the day.

We then average the daily values from the eight stations to obtain our measure of the weather conditions in Germany.

Table 6 presents the results of a descriptive analysis. We have sorted the days of the sample period in four groups according to the quartiles of the weather variables. The table reports average implied returns for the four groups and the Anova F-statistic for a test of the null hypothesis of equal means.

<u>Insert Table 6 about here</u>

The average daily temperature is apparently unrelated to the implied returns. For the other three variables we do find significant differences in the mean implied returns across quartiles. The relation is, however, non-monotonic. Including dummy variables for the weather condition quartiles in equation (2) (results not shown) yields the same conclusion. Given the non-monotonicity of the impact and the lack of a reasonable explanation for such a non-monotonic relation, we do not interpret the results as evidence of a consistent weather effect.

Note that this result is not necessarily in contrast to the empirical evidence alluded to above. Krämer and Runde (1997) analyze the relation between weather conditions in Frankfurt and stock returns in Germany and conclude that no systematic relationship exists. Goetzmann and Zhu (2003) document that the trading activity of retail investors is unaffected by the local weather conditions.[7] Our result that there is no consistent relation between the expectations of German retail investors and the weather is consistent with this evidence.

4 Summary and Conclusion

In this paper we make use of a data set containing more than 10,000 stock index forecasts made by private investors. Our objective is to, first, find variables that determine these forecasts and, second, analyze whether systematic patterns found in stock market returns are also detected in our forecast data.

To make forecasts made on different dates comparable we analyze implied returns rather than the forecasted index levels. The implied returns exhibit negative skewness and excess kurtosis, as do "real" stock returns. Consistent with stock market momentum we find that past one and two week returns have a positive impact on the implied returns. We further document that estimates entered by female respondents are less optimistic but have higher standard deviations than those entered by male respondents. Consistent with the weekend effect, we find that implied returns from estimates entered on weekends are significantly lower than those entered on weekdays. Finally, we analyze whether the implied returns are affected by the prevailing weather conditions but do not find evidence of a consistent relation.

The results reported in this paper suggest that some of the patterns observed in stock returns may be related to the way investors form expectations about stock returns. To further investigate into this issue is a promising avenue for future research.

References

Abraham, A., Ikenberry, D. (1994) The Individual Investor and the Weekend Effect, Journal of Financial and Quantitative Analysis, 29, 263--277.

Arsad, Z. and A. Coutts (1997): Security Price Anomalies in the London International Stock Exchange: A 60 Year Perspective. Applied Financial Economics 7, 455--464.

Barber, B., Odean, T. (2001) Boys Will Be Boys: Gender, Overconfidence and Common Stock Investment, Quarterly Journal of Economics, 116, 261--292.

Bhattacharya, K., N. Sarkar and D. Mukhopadhyay (2003): Stability of the Day of the Week Effect in Return and in Volatility at the Indian Capital Market: A GARCH Approach With Proper Mean Specification. Applied Financial Economics 13, 553--563.

Bloomfield, R., Hales, J. (2002) Predicting the Next Step of a Random Walk: Experimental Evidence of Regime-Shifting Beliefs, Journal of Financial Economics, 65, 397--414.

Brown, M., Forsythe, A. (1974) Robust Tests for the Equality of Variances, Journal of the American Statistical Association, 69, 364--367.

Cao, M., Wei, J. (2002) Stock Market Returns: A Temperature Anomaly, Working Paper, University of Toronto, August.

Chang, E., Pinegar, M., Ravichandran, R. (1998) US Day-of-the-Week Effects and Asymmetric Responses to Macroeconomic News, Journal of Banking and Finance, 22, 513--534.

Conover, W., Johnson, M., Johnson, M. (1981) A Comparative Study of Tests for Homogeneity of Variances With Applications to the Outer Continental Shelf Bidding Data, Technometrics, 23, 351--361.

Coutts, A. and P. Hayes (1999): The Weekend Effect, the Stock Exchange Account and the Financial Times Industrial Ordinary Shares Index: 1987-1994. Applied Financial Economics 9, 67--71.

Damodaran, A. (1989) The Weekend Effect in Information Releases: A Study of Earnings and Dividend Announcements, Review of Financial Studies, 2, 607--623.

Daniel, K., Hirshleifer, D., Teoh, S. H. (2002) Investor Psychology in Capital Markets: Evidence and Policy Implications, Journal of Monetary Economics, 49, 139--209.

De Bondt, W. (1991) What Do Economists Know About the Stock Market? , Journal of Portfolio Management, Winter, 84--91.

De Bondt, W. (1993) Betting on Trends: Intuitive Forecasts of Financial Risk and Return International Journal of Forecasting, 9, 355--371.

Dorn, D., Huberman, G. (2002) Who Trades? , Working Paper, Columbia University, November.

Frankel, J., Froot, K. (1987) Using Survey Data to Test Standard Propositions Regarding Exchange Rate Expectations, American Economic Review, 77, 133--153.

Franses, Ph. and R. Paap (2000): Modelling Day-of-the-Week Seasonality in the S&P 500 Index. Applied Financial Economics 10, 483--488.

French, K. (1980) Stock Returns and the Weekend Effect, Journal of Financial Economics, 8, 55--69.

Glaser, M., Nöth, M., Weber, M. (2004) Behavioral Finance, Forthcoming in: Koehler, D., Harvey, N. (Eds.), Blackwell Handbook of Judgment and Decision Making, Blackwell, Cambridge, MA, chapter 26.

Goetzmann, W., Zhu, N. (2003) Rain or Shine: Where Is the Weather Effect? , NBER Working Paper 9465, January.

Hirshleifer, D. (2001) Investor Psychology and Asset Pricing, Journal of Finance, 56, 1533--1597.

Hirshleifer, D., Shumway, T. (2003) Good Day Sunshine: Stock Returns and the Weather, Journal of Finance, 58, 1009--1032.

Huberman, G. (2001) Familiarity Breeds Investment, Review of Financial Studies, 14, 659--680.

Ito, T. (1990) Foreign Exchange Rate Expectations: Micro Survey Data, American Economic Review, 80, 434--449.

Keim, D., Stambaugh, R. (1984) A Further Investigation of the Weekend Effect in Stock Returns, Journal of Finance, 39, 819--835.

Kilka, M., Weber, M. (2000) Home-Bias in International Stock Return Expectations, Journal of Psychology and Financial Markets, 1, 176--193.

Kliger, D., Levy, O. (2003) Mood-Induced Variation in Risk Preferences, Journal of Economic Behavior & Organization, 52, 573--584.

Krämer, W., Runde, R. (1997) Stocks and the Weather: An Exercise in Data Mining or Yet Another Capital Market Anomaly, Empirical Economics, 22, 637--641.

Lakonishok, J., Smidt, S. (1988) Are Seasonal Anomalies Real? A Ninety-Year Perspective, Review of Financial Studies, 1, 403--425.

Lovell, M. (1986) Tests of the Rational Expectations Hypothesis, American Economic Review, 76, 110--124.

Malkiel, B. (2003) The Efficient Market Hypothesis and its Critics, Journal of Economic Perspectives, 17, 59--82.

Rogalski, R. (1984) New Findings Regarding Day-of-the-Week returns over Trading and Non-Trading Periods: A Note, Journal of Finance, 39, 1603--1614.

Penman, S. (1987) The Distribution of Earnings News over Time and Seasonalities in Aggregate Stock returns, Journal of Financial Economics, 18, 199--228.

Saunders, E. (1993) Stock Prices and Wall Street Weather, American Economic Review, 83, 1337--1345.

Schwert, W. (2002) Anomalies and Market Efficiency, Working Paper, University of Pennsylvania, October.

Wang, Ch. (2003): Investor Sentiment, Market Timing, and Futures Returns. Applied Financial Economics 13, 891--898.

Williams, A. (1987) The Formation of Price Forecasts in Experimental Markets, Journal of Money, Credit and Banking, 19, 1--18.

Table 1: Descriptive Statistics

The table shows descriptive statistics for the index level forecasts (Panel A) and the implied annualized returns calculated from these forecasts (Panel B).

Panel A: Index level forecasts

	n	mean	median	standard deviation	skewness	kurtosis
full sample	10,062	3,475.42	3,463.50	575.43	0.784	11.3792
female	2,215	3,470.38	3,447.00	638.71	1.681	16.3224
male	7,847	3,476.85	3,472.00	556.30	0.398	8.7257

Panel B: Implied returns

	n	prop. of positive returns	mean	median	standard deviation	skewness	kurtosis
full sample	10,062	88.3%	0.2267	0.2399	0.2654	-1.2084	11.2033
female	2,215	89.1%	0.2148	0.2281	0.2873	-0.8713	10.6069
male	7,847	85.4%	0.2301	0.2427	0.2588	-1.3259	11.3451

Table 2: Descriptive Statistics - Tests for Equality

Columns 1 through 3 of the table show the mean, median and standard deviation of the implied returns calculated from the forecasts of female and male respondents, respectively. The last row reports the test statistic for a test of equality of the mean (t-test), the median (Wilcoxon test), and the variance (F-test and Brown-Forsythe statistic), respectively. The last column displays the result of a χ^2 homogeneity test. The null hypothesis states that implied returns from female and male respondents' forecasts are drawn from the same distribution. An asterisk indicates significance at the 5% level or better.

	Test for equality of				
	mean	median	standard deviation		distribution
female	0.2148	0.2281	0.2873		
male	0.2301	0.2427	0.2588		
test statistic	2.386*	3.693*	F:	1.233*	41.574*
			Brown-Forsythe:	15.469*	

Table 3: Expectations Formation: Regression Results

The table shows results of a regression of the implied returns on past DAX index returns and a gender dummy taking on the value 1 for male respondents. t-values are given in parentheses. They are based on heteroscedasticity-consistent standard errors whenever a White test indicated that heteroscedasticity was present. The term “weighted” indicates that the coefficient estimates were obtained using weighted least squares, the weights being the reciprocal value of the standard deviation of the implied returns calculated from female and male respondents’ forecasts, respectively.

	all; n = 10,062		female n = 2,215	male n = 7,847
	unweighted	weighted		
constant	0.2010 (25.68)	0.2014 (26.37)	0.1922 (15.26)	0.2187 (36.34)
return previous day	-0.1948 (1.03)	-0.1962 (1.03)	-0.1660 (0.37)	-0.2041 (0.99)
return previous week	0.3282 (2.58)	0.3220 (2.58)	0.4850 (1.61)	0.2885 (2.09)
return last-to-previous week	0.2113 (2.89)	0.2053 (2.86)	0.3568 (2.09)	0.1731 (2.16)
gender	0.0154 (2.28)	0.0154 (2.28)		
R^2	0.002	0.005	0.002	0.001

Table 4: Day-of-the-Week Effects

Columns 1 and 2 of the table show average implied returns by day of the week. The last row reports the Anova F-statistic of a test of the null hypothesis of equal means. The last column reports average implied returns for forecasts made on weekdays and during the weekend, respectively. The last row reports the F-statistics and the t-statistic of a test of the null hypothesis of equal means. An asterisk indicates significance at the 5% level or better.

	Day-of-the-week effects	Saturdays and Sundays excluded	Weekend effect
Monday	0.2295	0.2295	
Tuesday	0.2434	0.2434	
Wednesday	0.2344	0.2344	0.2346
Thursday	0.2262	0.2262	
Friday	0.2376	0.2376	
Saturday	0.2097		0.2024
Sunday	0.1967		
Anova F statistic / t statistic	5.46*	0.9731	5.24*

Table 5: Weekend Effect: Regression Results

The table shows results of a regression of the implied returns on past DAX index returns, a gender dummy taking on the value 1 for male respondents and a weekend dummy taking on the value 1 whenever the forecast was entered on a Saturday or Sunday. t-values are given in parentheses and are (for the unweighted regression) based on heteroscedasticity-consistent standard errors. The term “weighted” indicates that the coefficient estimates were obtained using weighted least squares, the weights being the reciprocal value of the standard deviation of the implied returns calculated from female and male respondents’ forecasts, respectively.

	n = 10,062	
	unweighted	weighted
constant	0.2113 (25.96)	0.2119 (26.11)
return previous day	-0.2130 (1.13)	-0.2137 (1.14)
return previous week	0.3394 (2.67)	0.3335 (2.64)
return last-to-previous week	0.1809 (2.46)	0.1743 (2.38)
gender	0.0133 (1.96)	0.0132 (1.95)
weekend	-0.0310 (5.00)	-0.0315 (5.09)
R^2	0.004	0.007

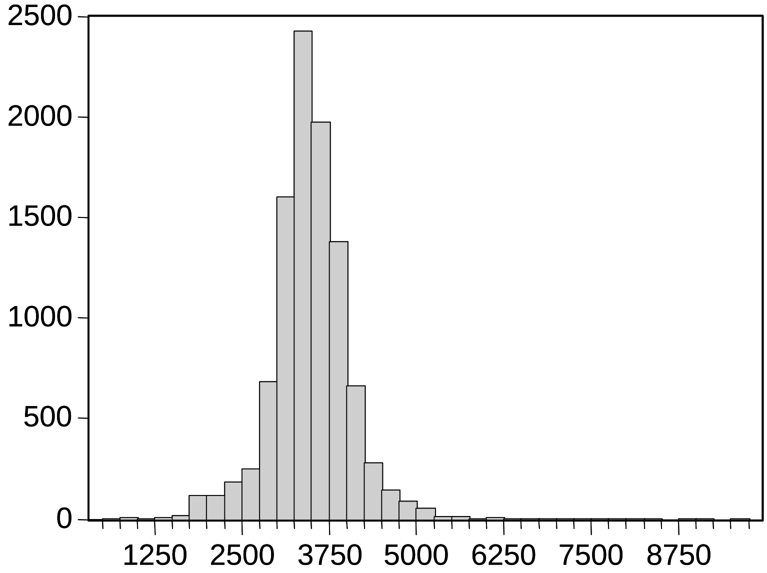
Table 6: Weather Effects

The table shows average implied returns for forecasts made on days with different weather conditions. The days of the sample period are sorted into quartiles according to the weather conditions. The first row indicates which weather variable is used and how the quartiles are formed. The last row reports the Anova F-statistic of a test of the null hypothesis of equal means. An asterisk indicates significance at the 5% level or better.

Quartile	temperature (Q1 = lowest)	rain (Q1 = least)	sunshine (Q1 = least)	cloud cover (Q1 = least)
Q1	0.2251	0.2270	0.2120	0.2373
Q2	0.2302	0.2276	0.2300	0.2149
Q3	0.2329	0.2409	0.2173	0.2330
Q4	0.2245	0.2074	0.2381	0.2148
Anova F-statistic	0.451	4.664*	4.878*	5.151*

Figure 1:

The figure shows a histogram of the forecasts in the sample.



[1] Besides, there is a quite substantial literature analyzing expectations implicit in survey data. See, for example, Frankel and Froot (1987) and Ito (1990) for research on exchange rate expectations and Lovell (1986) for a survey of other related research. Other papers analyze sentiment measures that are not derived from survey data. For an example see Wang (2003) who analyzes a sentiment indicator derived from positions in the futures market.

[2] The record indicated that the estimate was entered in the year 2010.

[3] The test result is insensitive to the way the data are grouped into bins. The table shows the result obtained when making the number of observations (both female and male) equal across bins. Using equidistant classes instead also leads to a clear rejection of the null hypothesis.

[4] Huberman (2001) argues that this may be one cause for the home bias in equity investments.

[5] Krämer and Runde (1997) replicate Saunders' analysis using data from the German stock market. They conclude that no systematic relationship between stock returns and the local weather in Frankfurt exists.

[6] The cities are Berlin, Dresden, Düsseldorf, Frankfurt, Hamburg. Karlsruhe, Munich and Stuttgart.

[7] They suggest that market makers or news providers might cause the weather effect.

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