

## Worse Than Chance? Performance and Confidence Among Professionals and Laypeople in the Stock Market

Gustaf Törngren and Henry Montgomery

*In two studies, stock market professionals ( $N_1 = 22$ ,  $N_2 = 21$ ) and laypeople ( $N_1 = 29$ ,  $N_2 = 34$ ) provided thirty-day forecasts for twenty stocks and estimated the size of their own errors as well as their own and the other group's mean errors. Both groups predicted that the errors made by professionals would be half the size of the errors made by laypeople. In reality, the errors of both groups were about the size predicted for the laypeople. Participants also estimated their ability to pick the best performing stock from two options. Both groups proved to be overconfident. Professional predictions were only successful 40% of the time, a performance below what could be expected from chance alone. Self reports and correlations between forecasts and price movements suggested that the professionals based their predictions on specific information of the stocks without sufficient awareness of the unreliability of this information, while the laypeople used simple heuristics based on previous price movements.*

During the recent worldwide stock market turbulence, fortunes were rapidly made and just as rapidly lost. The great majority of participants did not anticipate either the magnitude or the pace of these events. The bewilderment has been hard to hide.

This paper addresses two questions raised by more than a few people in the aftermath: "How much do stock market professionals really know about the future development of stock prices, and how much do they think they know?" We first discuss psychological findings concerning expert judgments and experts' and laypeople's confidence in their own judgments.

### Expert Judgment

People often turn to experts for guidance in coping with complex and uncertain decision environments, especially those that could affect their standard of living such as financial decision making. Although theoretical and empirical questions have been raised about the efficacy of predicting fluctuations in the stock market, a small but generously compensated industry is engaged in providing investors with analysis and advice aimed at differentiating winners from losers. This assumes that an expert's knowledge helps investors make better judgments and more accurate predictions, resulting in greater return on investment.

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Research on expertise in general, however, does not fully confirm this assumption. A simple linear model can often provide more accurate predictions than experts are able to (Grove and Meehl [1996]). Moreover, simple and basic training can provide non-experts with sufficient knowledge to perform at the same level as experts (Camerer and Johnson [1991]).

On the other hand, experts use information more efficiently (Shanteau and Stewart [1992]). Because experts are experienced in recognizing patterns, they are able to analyze problems without using cognitively more costly mental calculations. This apparent contradiction has been labeled the "process-performance paradox," and the question has been "how can experts know so much but perform so badly?" (Camerer and Johnson [1991]).

Studies assessing financial analyst predictions often give a rather gloomy picture of their validity. As early as the 1930s, Cowles [1933] showed how stocks recommended by a number of financial services in the years between 1928 and 1932 were outperformed by the average common stock. This trend continues today. De Bondt [1991] analyzed the results of a longitudinal study (1952-1987), and found that the experts could have improved their results by using historical means instead of specific evaluations. Similarly, Malkiel [1999] found that, from 1988 to 1998, the average equity mutual fund in the U.S. had a 3.3% lower average annual return than the Standard & Poor's index during the same period.

### Overconfidence

The degree of confidence people have in the correctness of their judgments and predictions is cru-

cially important in judgment and decision processes. Researchers on human judgment consistently find discrepancies between individuals' subjective probability estimates and the relevant objective probabilities. Typically, calibration between the two is poor. Moreover, participants' actual performance is generally lower than what they expected. So their confidence level tends to be higher than their actual performance would warrant.

This tendency toward *overconfidence* has been found in both laboratory and naturalistic settings. Studies have typically examined people's confidence in their ability to answer general knowledge questions (Fischhoff, Slovic, and Lichtenstein [1977], Keren [1988]), but similar results have also been found in financial settings (Lichtenstein and Fischhoff [1977], Russo and Schoemaker [1992]).

Studies that examine professionals in their decision-making environment produce a split picture as to the level of overconfidence. Experienced estate agents (Northcraft and Neale [1987]), physicians (Christensen-Szalanski and Bushyhead [1981], Detmer, Fryback, and Gassner [1978]), and business managers making forecasts of such economic indicators as input/output prices (Aukutsionek and Belianin [2001]) have all been shown to make biased probability judgments that are poorly calibrated.

Other studies, however, have shown that some experts provide well calibrated judgments. Bridge players predicting making contracts (Keren [1997]), experienced weather forecasters (Murphy and Winkler [1984]), and horse race bettors (Johnson and Bruce [2001]) have all proven their ability to make realistic predictions about the accuracy of their judgments.

Certain factors have been shown to contribute to overconfidence. According to Bradley [1981], people with a high degree of perceived expertise in the area of a general knowledge question are likely to have unrealistically high expectations of the probability of answering correctly. Davies, Lohse, and Kotterman [1994] found that more information, even when redundant, boosted the degree of overconfidence among finance students predicting stock market fluctuations. Olsen [1997] found that professional investment managers tended to overestimate probabilities of outcomes that were positive to the respondent and to underestimate undesired outcomes, which we refer to as *desirability bias*. Cultural differences (Yates, Lee, and Shinotsuka [1996]) and gender (Estes and Hosseini [1988]) have also been shown to influence overconfidence levels.

The cause of these effects has been the subject of an intense debate during the past ten years. Until the early 1990s, cognitive bias was the dominant explanation for the overconfidence phenomenon. In this account, miscalibration is a result of cognitive biases that occur as a byproduct of the heuristics used in the information processes underlying people's judgments.

More recently, however, proponents of ecological models have challenged this approach (see Gigerenzer, Hoffrage, and Kleinbölting [1991], Juslin [1994], and Björkman [1994] for examples). These models view heuristics differently, as a "fast and frugal" way of using the structure of information in its own decision environment to make reasonable judgments and decisions under realistic conditions. An example of a "fast and frugal" heuristic is *recognition*, which implies the inference of higher values to objects that are recognized (Gigerenzer et al. [1999]). Tested as a stock-picking device, it was actually proven quite "frugal." Portfolios based solely on company recognition by foreign laypeople actually outperformed professionally managed funds and the market index (Gigerenzer et al. [1999]). However, in a replication of this study conducted during a period of bearish market behavior (rather than the bull market that prevailed during the original study), the results were reversed (Boyd [2001]).

Despite the criticism by proponents of the ecological approach, the concept of overconfidence is still on the judgment and decision making agenda. Recent studies in naturalistic settings (Aukutsionek and Belianin [2001]), as well as experimental studies designed to avoid the problems of underrepresentation, have still reported overconfidence (Brenner et al. [1995], Griffin and Tversky [1992]).

This article continues the small volume of research on perceived and actual accuracy in predictions of stock prices (see, e.g., Davies, Lohse, and Kotterman [1994], Olsen [1997], and De Bondt [1991]). Contrary to previous research, we compared professional judgments with laypeople judgments, and we asked our participants to estimate their own group's accuracy as well as the other group's accuracy. Although many studies suggest that professionals do not outperform laypeople who use simple strategies (Grove and Meehl [1996]), there seems to be a lack of research on how these two groups perceive their own accuracy and the accuracy of the other group.

It seems reasonable that the market would work more efficiently if laypeople and professionals could judge each other's predictive abilities more accurately. Overconfidence can cause excessive trading, which can be risky to financial well being (Barber and Odean [2000]). To better understand the background of the two groups' performance with respect to their actual and perceived accuracy, we explored how each group makes predictions. Professionals often use information that (more or less erroneously) supports their identity as experts, such as specific information about stocks.

## Method

We conducted two studies: a thirty-day study that ended on March 10, 2001, and a replication that took

place between March 8 and April 7, 2002. All the participants in both studies submitted their contributions on the same day, which was vital because stock prices change continuously. Study 1 was based on twenty-two stock market professionals and twenty-nine laypeople. Study 2 was based on twenty-one stock market professionals and thirty-four laypeople.

"Stock market professionals" were defined as people that regularly and on a professional basis engage in the evaluation of and/or investment in stocks. This includes portfolio managers, analysts, brokers, and investment counselors. One person at each company was contacted by the author, informed about the study, and asked to find colleagues with working duties who fulfilled the criteria. With one exception, all the professionals were men, and they had a mean experience of twelve years.

The laypeople were undergraduate students in psychology at Stockholm University. In Study 1, six participants were male and twenty-three were female. In Study 2, ten participants were male and twenty-four were female. It is likely that most of the professionals in Study 1 also took part in Study 2 (uninformed of the results of Study 1), while the laypeople were not the same in the two studies.

The questionnaire used twenty stocks from well-known blue-chip companies (Ericsson, Volvo, etc.) and from a broad spectrum of industries listed on the Stockholm stock exchange. Participants were given the name, industry, and monthly percent price change for each stock for the previous twelve months and asked to predict the rate of change for the share price over the next thirty days. They also picked one of two stocks shown on each page that they expected to perform better during the same period, and they estimated the probability (between 50%-100%) that they would choose the best performing stock. Participants rated on a ten-point scale the extent to which they used each of four strategies (previous monthly results, other knowledge, intuition, or guessing), with "not at all" and "to a very high degree" as extremes. Finally, participants estimated the mean errors of their own predictions (in percent), as well as the collective mean errors of the professionals and laypeople.

## Results

We calculated mean values for both groups to illustrate the participants' own expectations and their expectations for the two groups. Table 1 shows significant differences between the professionals' and the laypeople's estimates of their mean errors:  $t(43) = 3.22, p < 0.05$  (Study 1);  $t(52) = 4.39, p < 0.05$  (Study 2). Thus, the stock market professionals had higher expectations than the laypeople about their ability to make accurate predictions. Clearly these expectations were not warranted.

The differences in performance, displayed in the actual mean errors, were small but marginally significant in Study 1,  $t(46) = 2.29, p < 0.05$ . Interestingly, both groups shared the erroneous belief that the professionals would produce better results.

Table 1 also shows a good consistency between the estimations of participants' own performance and the estimated performance of other group members. Furthermore, both professionals and laypeople seem to agree with the expected performances of the two groups.

The predictions made by stock market professionals were negatively correlated to the actual outcomes in both studies. The correlations,  $-0.17$  in Study 1 and  $-0.16$  in Study 2, were significant:  $t(20) = -2.75, p < 0.5$ , and  $t(20) = -2.25, p < 0.5$ . For laypeople, no correlation was noted. Respondents as a whole were too optimistic when predicting stock prices. In Study 1, the average estimation for the twenty stocks was  $+1.9\%$  by the professionals and  $+2.9\%$  by the laypeople. In reality, the stocks lost  $-3\%$  during the thirty days. In Study 2, the estimations were  $+2.8\%$  by the professionals and  $+3.3\%$  by the laypeople. The actual outcome was  $-6.6\%$ .

In estimating their ability to pick the winner between two stocks, the participants were again too optimistic. The laypeople were moderately overconfident, predicting a 58% rate of correctness in Study 1 and 59% in Study 2. The actual rate was closer to 50%, which could be the result of chance alone. But the professionals displayed an even higher degree of overconfidence, rating their probabilities of success at 63% in Study 1 and 67% in Study 2.

Remarkably, as Table 2 shows, the performance of stock market professionals is repeatedly worse than the performance of laypeople:  $t(44) = -1.85, p < 0.10$  (Study 1);  $t(52) = -2.81, p < 0.05$  (Study 2). In addition, their performance was below the 50% expected from chance alone:  $t(20) = -2.63, p < 0.05$  (Study 1);  $t(20) = -2.90, p < 0.05$  (Study 2). The best calibration occurred when participants estimated their probabilities of having chosen the best performing stock to be in line with chance. Higher confidence judgments did not reflect more correct predictions for either the professionals or for the laypeople.

Finally, participants were asked to rate the extent to which they used four strategies to make their judgments. Not surprisingly, as Table 3 shows, the experts perceived that they used strategies based on expert knowledge. The laypeople reported that they were mainly guessing:  $t(48) = -3.50, p < 0.05$  in Study 1;  $t(53) = -7.51, p < 0.05$  in Study 2 (significance levels denote the differences between professionals and laypeople). They also reported looking at previous results for the stocks:  $t(49) = -4.38, p < 0.05$  in Study 1;  $t(53) = -2.81, p < 0.05$  in Study 2. The professionals, however, considered knowledge (other than monthly performance over the last twelve months) as the most important influence when making

**Table 1.** *Estimated and Actual Mean Errors in Percent for Stock Price Predictions*

|                                    | Study 1   |               | Study 2   |               |
|------------------------------------|-----------|---------------|-----------|---------------|
|                                    | Laypeople | Professionals | Laypeople | Professionals |
| Estimated error in own predictions | 8.67      | 4.71          | 12.7      | 5.33          |
| Estimated error of professionals   | 4.3       | 5             | 5.78      | 6.8           |
| Estimated error of laypeople       | 8         | 8.74          | 12.27     | 12.55         |
| Actual error                       | 10.84     | 9.84          | 11.61     | 11.37         |

**Table 2.** *Calibration Data on Probability Estimations of Picking the Better Performing Stock Out of Two*

| Rated probability | Study 1    |               | Study 2    |               |
|-------------------|------------|---------------|------------|---------------|
|                   | Laypeople  | Professionals | Laypeople  | Professionals |
| 0.50–0.59         | 0.50 (147) | 0.50 (80)     | 0.49 (193) | 0.33 (52)     |
| 0.60–0.69         | 0.48 (49)  | 0.37 (75)     | 0.63 (62)  | 0.40 (63)     |
| 0.70–0.79         | 0.49 (43)  | 0.39 (41)     | 0.57 (45)  | 0.48 (49)     |
| 0.80–0.89         | 0.60 (10)  | 0.00 (9)      | 0.56 (26)  | 0.35 (25)     |
| 0.90–0.99         | 0.61 (8)   | 0.33 (3)      | 0.37 (11)  | 0.45 (22)     |
| 1.00              | — (0)      | 0.29 (7)      | — (0)      | — (0)         |
| Mean prob. rating | 0.58       | 0.63          | 0.59       | 0.67          |
| Mean correctness  | 0.50       | 0.40          | 0.52       | 0.40          |

Note: Figures in parentheses denote the number of estimations behind the mean in each cell.

**Table 3.** *Reported Use of Judgment Strategies*

|                          | Study 1   |               | Study 2   |               |
|--------------------------|-----------|---------------|-----------|---------------|
|                          | Laypeople | Professionals | Laypeople | Professionals |
| Previous month's results | 5.93      | 2.75          | 6.24      | 3.32          |
| Other knowledge          | 3.95      | 6.55          | 3.65      | 7.60          |
| Intuition                | 5.84      | 4.91          | 5.50      | 6.00          |
| Guessing                 | 6.70      | 3.79          | 7.62      | 3.14          |

Note: Values represent ratings on a scale from 1–10, where 1 = “not at all,” and 10 = “to a very high degree.”

their judgments:  $t(48) = 3.65, p < 0.05$  in Study 1;  $t(53) = 6.43, p < 0.05$  in Study 2.

Further analysis of the forecasts showed that the laypeople were influenced by the historical price movements of the stocks. More specifically, the results of the past month apparently served as an anchor for their extrapolations. This was shown as a positive correlation between predictions and stock results for the past month across stocks in both studies: The mean correlations were 0.18 and 0.28, respectively. Both mean correlations differed significantly from zero:  $t(28) = 2.01, p < 0.05$  and  $t(33) = 4.72, p < 0.05$ . This was not true for the professionals, and the differences were significant:  $t(50) = -2.07, p < 0.05$  in Study 1;  $t(54) = -2.77, p < 0.05$  in Study 2.

### Discussion

Our results indicate clear differences between stock market professionals and laypeople. However, the two groups did not differ clearly with respect to

forecast accuracy. Both groups expected the professionals to outperform the laypeople by a large margin, but the professionals made as many errors as the laypeople. When participants estimated their probabilities of success in picking a winner between two stocks, the tendency was the same. Both groups were overconfident, but the professionals overestimated their ability by a greater margin.

In addition to being more overconfident than laypeople, the professionals' performance was significantly worse than the 50% correctness rate expected from chance alone. Furthermore, there was no apparent connection between certainty of having picked the right stock and actual success for either group.

In expressing their perceived use of different judgment strategies, the two groups differed. Professionals mainly relied on knowledge, while the laypeople based their judgments primarily on chance and on the previous monthly results.

It seems clear that the benefits of experience and knowledge, which professionals ostensibly have greater access to, are overrated. Our results

suggest that professionals do not have advantages over laypeople. It is possible, however, that the judgments participants were required to make here did not fully correspond to real-life investment decisions. This might help explain the exaggerated expectations laypeople had for professionals, but surely the professionals should have been able to ascertain whether their backgrounds would help them gain greater accuracy.

Our results agree with prior research that expertise (Bradley [1981]) and access to information (Davies, Lohse, and Kotterman [1994]) can result in overconfidence. The results show that professionals perceived their judgments as having been based mainly on "knowledge." It seems reasonable that basing predictions on "knowledge" would generate higher levels of confidence than "guessing," the primary strategy used by laypeople.

Another factor previously shown to contribute to professional investor overconfidence is the *desirability bias* (Olsen [1997]). For stock market professionals, bull markets are desirable because they offer the possibility of receiving higher bonuses, and research has suggested that optimism can be career-promoting (Hong and Kubik [2003]). These factors contribute to the recognized surplus of recommendations to "buy" versus "sell" (Carleton, Chen, and Steiner [1998]).

One of our most intriguing findings is the low level of correctness when professionals were required to pick a winner from two stocks. The results suggest that a chimpanzee, a symbol of randomness in economic contexts, could have outperformed the stock market professionals in this study. And chimps do not possess cognitive advantages. On the contrary, the repeated and significant deviations from the 50% level of correctness predicted by chance as well as the significant (negative) correlations between the professionals' predictions and the outcomes suggest that the professionals did use some common judgment strategies.

We attempted to determine whether the professionals' predictions were correlated with the volatility of the stocks or other industry variables, but no clear-cut evidence was found.

One possible explanation for our results (which was not ruled out by our study) is that the high expectations on the performance of the professional could have been fulfilled under different circumstances, as both studies were carried out under bear market conditions (falling stock prices). It would be interesting to examine the results under bull market conditions.

In summary, despite the ecologically realistic settings, both groups displayed overconfidence, and it was most evident among the stock market professionals. The results suggest that the information-based predictions of the professionals did not outperform the simple heuristics used by laypeople.

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