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Endress, Tobias and Gear, Tony (2015) Stock Prices: Are Intuitive or Deliberate Persons Better Forecasters? *Economics and Sociology*, 8 (4). pp. 43-50. doi:10.14254/2071-789X.2015/8-4/3

Official URL: <http://dx.doi.org/10.14254/2071-789X.2015/8-4/3>

DOI: 10.14254/2071-789X.2015/8-4/3

EPrint URI: <https://eprints.glos.ac.uk/id/eprint/2975>

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Endress, Tobias and Gear, Tony (2015). *Stock Prices: Are Intuitive or Deliberate Persons Better Forecasters?* *Economics & Sociology*, 8 (4), 43-50. ISSN 2071789X

Published in *Economics & Sociology*, and available online at:

http://www.economics-sociology.eu/?365,en_stock-prices-are-intuitive-or-deliberate-persons-better-forecasters-

We recommend you cite the published version.

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Received: June, 2015
1st Revision: October, 2015
Accepted: December, 2015

DOI: 10.14254/2071-789X.2015/8-4/3

JEL Classification: D70,
G11, G17, M51

Keywords: Forecasting, decision-making, financial economics, equity predictions, stock trading.

STOCK PRICES: ARE INTUITIVE OR DELIBERATE PERSONS BETTER FORECASTERS?

ABSTRACT. When it comes to financial decision-making like predicting stock price movements, it would be conceivable that rational people had an advantage over intuitive people. An experiment was conducted to test this hypothesis. Participants of the experiment provided repeated estimates for different shares and it was expected that rational people would end up with more ‘correct’ answers than intuitive people. Additionally, all participants of the experiment (N=59) completed a PID scale questionnaire (Betsch, 2004; Schunk & Betsch, 2006) to evaluate their preferences for deliberate or intuitive decision-making. The PID scale provided four categories to group people according to their preferences. In summary, it was concluded that intuitive people were slightly, but not significantly, better with financial decision-making than were rational people. A higher significance was observed from a direct comparison of the four PID categories. Predictions of PID-S-plus participants were significantly more accurate.

Introduction

The effect of intuitive and deliberate approaches to decision making is a field that is of interest not only within academia, but also for business and many other fields (like politics, prosecutors). In the influential and well perceived book “Heuristics and Biases – The Psychology of Intuitive Judgement (Gilovich, Griffin, & Kahneman, 2002) are a few chapters that are focused to a large extend on the effects of intuition on decision making (e.g., Tversky, & Kahneman, 2002; Tetlock, 2002). However, there are still numerous unanswered questions regarding the effects of intuitive and deliberate decision making approaches. In the same book you can read a chapter on financial analysts’ decision making witch concludes with the observation that financial analyst are not always rational and ends with the question: “After all, are not these practitioners the very same “smart money” that is supposed to keep markets rational?” (De Bondt, & Thaler, 2002). In the following years many researchers contributed to gain a better understanding on the effects of intuition, conscious analysis and rationality on the decision making and forecasting quality (e.g., Acker, 2008; Harteis, & Gruber, 2008; Aczel, Lukacs, Komlos, Aitken & others, 2011). Nevertheless, it appears that there are many

uncertainties' in this field. A particularly vivid example might be the observation that the role of intuition in recruiting process of experts and managers is an ongoing discussion in academic literature. Taneja & Arora (2015) suggest "the use of reliable and validated tests to measure managerial inventiveness". This paper aims to contribute in this context and presents some preliminary results of individual decision-making behaviour from an online experiment. The underlying assumption was that in the context of financial decision-making like predicting stock price movements, it would be conceivable that rational people had an advantage. An experiment was conducted to test this hypothesis. Participants of the experiment provided repeated estimates for different shares and it was expected that rational people end up with more 'correct' answers than intuitive people. This experiment was part of an online experiment with several groups. The purpose of the overall study was to investigate and to understand the group decision-making process of Internet communities that focus on stock trading, based on predicting share movements and prices (like Marketocracy or sharewise) (Endress, 2015; Endress & Gear, 2013). Several studies have already been conducted to assess the quality of the resulting recommendations from financial analysts (Bolliger, 2004; Clement, 1999; Fleischer, 2005; Stanzel, 2007) and there is a huge body of literature concerning economic forecasting (Elliott & Timmermann, 2013) and company valuation (e.g., Damodaran, 2006; Koller & McKinsey and Company, 2010; Ryan, 2007). But it is a fact that, by now, these studies show little evidence that it is possible to generate predictions that create, in the long run and after transaction costs, profits higher than the market average (Malkiel, 2007; Stanzel, 2007).

1. Experiment Design and Data Analysis

The experiment was performed with three lay groups totalling 49 participants, and two expert groups totalling ten financial analysts and other stock market professionals. The forecasts were benchmarked with actual market prices as well as with each other, over ten e-Delphi cycles (ten weeks). The field experiment was conducted following an e-Delphi (Dalkey & Helmer-Hirschberg, 1962; Lindqvist & Nordänger, 2007) approach. Each e-Delphi cycle in this experiment consisted of a first stage for data collection of predictions. Generally, these data were compiled and distributed back to the group, but to measure the effect, some groups were set up without a feedback loop. In a second round, participants were able to provide different responses. The groups of the experiment were purposely selected and structured as follows:

1. Analyst Group (AG) with a group size of 5 participants.
2. e-Delphi-Group (EDG) with a group size of 21 participants.
3. Interactive Group (IG) with a group size of 7 participants.
4. Non-Feedback Group (NFG) with a group size of 21 participants.
5. Professional Investors Group (PG) with a group size of 5 participants.
6. Single Expert/ Financial Analyst (Expert).

The three groups of lay people followed slightly different approaches. The lay people e-Delphi-Group (EDG) followed an e-Delphi process (see *Figure 1*). The interactive group followed basically the same process but additionally had the opportunity to communicate with the other group members. The third group, the non-feedback group (NFG), also followed the same process, but there was no feedback from other group members available to them. These settings were supposed to allow a comparison of the influence of group feedback on the decision-making process. Preliminary findings of the group results have been presented already (e.g., Endress, 2014, 2015; Endress & Gear, 2013). However, the individual decision-making of the participants was also part of the analysis. An analysis of the individual prediction performances compared with the individual characteristics of the participants, as

established before the experiment, were planned to identify attributes that might influence prediction quality. The results of the experiment suggest that the preference for intuition and/or deliberation (PID score) is such an attribute. The analysis presented in this paper is focused on the results from the individuals as compared with their corresponding PID scores.

Both groups, AG and PG; overall ten professionals, were from four different financial services companies with offices in Germany. All individuals of the professional groups were highly qualified and had access to several professional investment information services (e.g., Bloomberg, Thomson Reuters, industry reports, in-house research material). The first group of professionals, the Analyst Group, consisted of five financial analysts with many years of industry experience. In the group results of the AG are all the forecasts from the analysts, including forecasts for stocks within and outside their professional coverage. The Single Expert results are a subset of these forecasts, but only where the expert had active coverage of the stock as well. In the AG, all group participants worked as individuals and there were no group results or any other feedback provided during the run. The second group of Financial Professionals (PG) consisted of investment professionals including portfolio managers, equity traders, or salespersons. The PG followed an e-Delphi approach similar to the EDG.

Undecided voting results – that is, for equal numbers of forecasts for “up” and “down” – were excluded. Missing votes from single experts were also excluded.

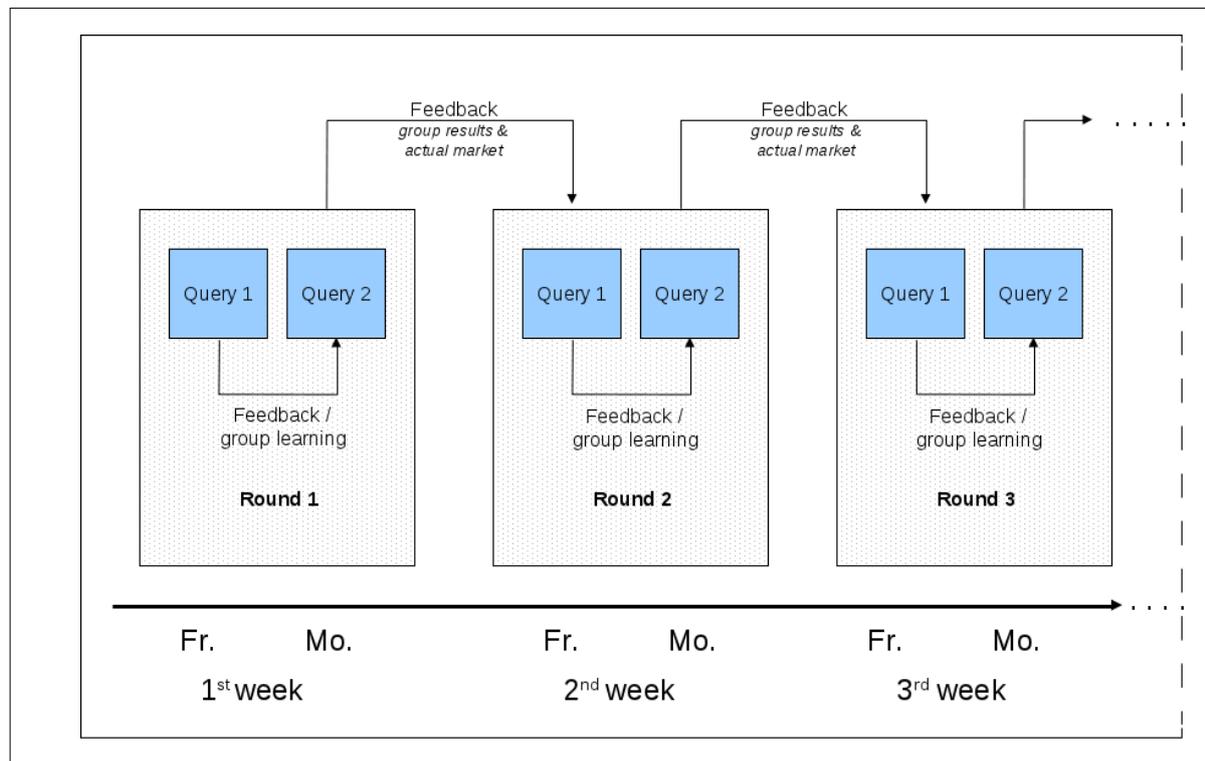


Figure 1. Group process within one round and between rounds from group as well as actual market results (Fr = Friday and Mo = the following Monday).

The market environment during the experiment was diverse. The shares of the experiment were selected from four different companies in four different sectors: consumer goods (Adidas, Bloomberg code: ADS GY Equity), construction (HeidelbergCement, Bloomberg code: HEI GY Equity), utilities (RWE, Bloomberg code: RWE GY Equity), technology (Siemens, Bloomberg code: SIE GY Equity), and industry (ThyssenKrupp, Bloomberg code: HEI GY Equity). Each participant was asked to provide an estimation of the

movement (up or down) over a one-week, one-month, and three-month period for every share as well as to enter a stock price prediction (in percent up or down) for a three-month period. The different stock also had different price movements during the examination period: while some stocks went mostly up (Adidas +36.56%, HeidelbergCement +43.04%) others were going down (RWE -12.4%, ThyssenKrupp -8.67%) or showed a sideward tendency and no clear direction (Siemens +5.18%).

2. PID Preference Assessment of the Participants

To understand more about the group decision-making process, it might be helpful to understand more about the decision-making process of the individual group participants as well. In order to gain more understanding of the individual decision-making process, an individual assessment of the participants was done for all participants of the experiment. This assessment included age, gender, education level, profession, and decision-making type. While the questions about age, gender, education level, and profession are quite easy to answer, the question about the decision-making type is not easy to address for each participant. An approach to address this question was developed by Cornelia Betsch (2004; Schunk & Betsch, 2006; Traufetter, 2009). She created and tested a questionnaire (see appendix) to determine the preference for intuition and/or deliberation of persons (PID). An assessment of all participants was proposed to help to understand the reasons for particular predictions and to ensure that the three groups were equally diverse in terms of the assessed criteria.

The following analysis shows the preliminary results from the individual decision-making of the participants according to their respective PID scores. The PID scale provides four categories to group people according to their preferences. There are people with a preference for deliberate decisions (PID-D), people with a preference for deliberate intuitive (PID-I), and people with situational, varying preferences, whereas people either have a preference for both intuitive and deliberate decision-making (PID-S plus) strategies or without a preference for any strategy (PID-S minus).

Table 1. Results and Distribution of PID-Scores from the Participants

	AG	EDG	IG	NFG	PG	ALL
PID-I	0	5	1	4	1	11
PID-D	4	6	3	7	2	22
PID-S plus	1	3	2	3	0	9
PID-S minus	0	7	1	7	2	17
Sum	5	21	7	21	5	59

Additionally, it could be observed that within the professional groups, even more PID-D scores are found. Six of the participating professionals scored as PID-D, two as PID-S minus, and only one as PID-I and one as PID-S plus.

3. Comparison of PID-D and PID-I Scores

The overall accuracy of people with a preference for deliberate decision-making was 50.9% and the overall accuracy of people with a preference for deliberate decision-making was 51.5% (see Table 2). Apparently, this is not a very significant difference. This direct comparison of PID-D and PID-I prediction quality tested with a Chi-Square test resulted in a Chi-square of 0.189 and $p\text{-value}=0.66$.

Table 2. Comparison of PID-D and PID-I Scores

	Participants	Correct	Wrong	Sum	Percentage of correct answers
PID-D	22	2610	2514	5124	50.9%
PID-I	11	1320	1245	2565	51.5%

4. Comparison of All Predictions Grouped by PID Scale Score

More interesting than the comparison of PID-I and PID-D scores might be a comparison that includes all PID-types and in particular, the result that a preference for both intuitive and deliberate decision-making strategies (PID-S plus) leads to significantly better predictions (see *Table 3*). This direct comparison of all four categories' predictions quality was tested with a Chi-Square test resulting in a Chi-square of 10.084 and $p\text{-value}=0.018$. These results are in a way affirmative of the explanatory scheme from Philip Tetlock (2005) and his interpretation of the metaphor of “the hedgehog and the fox.” In his analysis, the aggregated success rate of the fox's predictions was considerably better compared with hedgehog's, and he states that, “Foxes were not especially likely to endorse particular substantive positions on rationality, level of analysis, macroeconomics, or foreign policy” (Tetlock, 2005, p. 106). Perhaps, it is an advantage for forecasters to apply multiple, i.e., deliberate and intuitive, strategies.

Table 3. Comparison of All Predictions Grouped by PID-Scale Score

	Participants	Correct	Wrong	Sum	Percentage of correct answers
PID-D	22	2610	2514	5124	50.9%
PID-I	11	1320	1245	2565	51.5%
PID-S minus	17	2098	1967	4065	51.6%
PID-S plus	9	1082	883	1965	55.1%

Synopsis and Conclusion

Following the hypothesis that rational people have an advantage, it would be expected that rational people end up with the highest number of correct answers. In summary, it can be concluded that this hypothesis is not supported by the data gathered with the experiment. However, the data gathered with the experiment indicated that intuitive people might have a slight advantage in terms of prediction quality. This means that an inverted version of the hypothesis would be correct: Intuitive people are better with financial decision-making compared with rational persons. This is supported by the data, although the data are not significant in a direct comparison of PID-I and PID-D results at a level of significance of .05. A higher significance could be observed for the direct comparison of all four categories. Predictions of PID-S-plus participants are apparently of significantly higher accuracy. Still, these findings are from an experiment with a limited number of participants and should be repeated with a larger sample size and in different settings. Further research might be helpful to gain a better understanding of possible limitations and the underlying mechanisms.

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Appendix

Preference for Intuition and Deliberation (PID): An Inventory for Assessing Affect- and Cognition-Based Decision-Making

Instructions: Please answer the following questions about your life in general. Your answers should correspond to the way you generally make decisions. Circle the number that best represents your opinion. 1 means that you very much disagree; 5 means that you very much agree.

Question Nr.	German Version	English Translation	Preference
1	Bevor ich Entscheidungen treffe, denke ich meistens erst mal gründlich nach.	Before making decisions, I first think them through.	Preference for deliberation
2	Ich beobachte sorgfältig meine innersten Gefühle.	I listen carefully to my deepest feelings.	Preference for intuition
3	Bevor ich Entscheidungen treffe, denke ich meisten erst mal über meine Ziele nach, die ich erreichen will.	Before making decisions, I usually think about the goals I want to achieve.	Preference for deliberation
4	Bei den meisten Entscheidungen ist es sinnvoll sich ganz auf sein Gefühl zu verlassen.	With most decisions, it makes sense to completely rely on your feelings.	Preference for intuition
5	Ich mag Situationen nicht, in denen ich mich auf meine Intuition verlassen muss.	I don't like situations that require me to rely on my intuition.	Preference for intuition
6	Ich denke über mich nach.	I think about myself.	Preference for deliberation
7	Ich schmiede lieber ausgefeilte Pläne, als etwas dem Zufall zu überlassen.	I prefer making detailed plans rather than leaving things to chance.	Preference for deliberation
8	Ich ziehe Schlussfolgerungen lieber aufgrund meiner Gefühle, Menschenkenntnis und Lebenserfahrung.	I prefer drawing conclusions based on my feelings, my knowledge of human nature, and my experience of life.	Preference for intuition
9	Bei meinen Entscheidungen spielen Gefühle eine große Rolle.	My feelings play an important role in my decisions.	Preference for intuition
10	Ich bin perfektionistisch.	I am a perfectionist.	Preference for deliberation
11	Wenn ich meine Entscheidungen rechtfertigen muss, denke ich vorher besonders gründlich nach.	I think about a decision particularly carefully if I have to justify it.	Preference for deliberation
12	Wenn es darum geht, ob ich anderen vertrauen soll, entscheide ich aus dem Bauch heraus.	When it comes to trusting people, I can usually rely on my gut feelings.	Preference for intuition
13	Ich nehme bei einem Problem erst mal die Daten und Fakten auseinander, bevor ich mich entscheide.	When I have a problem I first analyse the facts and details before I decide.	Preference for deliberation
14	Ich denke erst nach bevor ich handle.	I think before I act.	Preference for deliberation
15	Ich mag lieber gefühlsbetonte Personen.	I prefer emotional people.	Preference for intuition
16	Ich denke über meine Ziele und Pläne stärker nach als andere Personen.	I think more about my plans and goals than other people do.	Preference for deliberation
17	Ich bin ein sehr intuitiver Mensch.	I am a very intuitive person.	Preference for intuition
18	Ich mag emotionale Situationen, Diskussionen und Filme.	I like emotional situations, discussions, and movies.	Preference for intuition

Note. Inventory for Assessing Affect- and Cognition-Based Decision-Making. Adapted from "Präferenz für Intuition und Deliberation (PID) [Preference for Intuition and Deliberation (PID): An Inventory for Assessing Affect- and Cognition-Based Decision-Making]" by C. Betsch, 2004, p. 183.