

## **The Effect of the Quality of Information on Overconfident Decision: The Evidence of Self Deception in Indonesian Capital Market, a Case Study in an Experimental Setting**

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### **Abstract**

Psychological research demonstrates that overconfident behavior is inclined to emerge when people encounter uncertain situations. It is presumed that some investors practice overconfident behavior in the capital market. The purpose of this study is to investigate the role of the overconfident investors in predicting the value of the securities when they receive no market information, good news, and bad news. In this quasi experimental research, the participants were grouped into two categories based on the level of their overconfidence, namely the less and the more informed investors. The result shows that the less informed investors tend to overestimate the values of the securities that produce higher prediction errors than do those more informed investors in all experimental markets except that in the presence of good news. The phenomena reflect that the less informed investors practice self deceptive behavior.

### **Introduction**

The accuracy and pace of prediction is the key to investors' achievement in gaining profits from the securities trading in the capital market. Those who are able to predict the value of the securities accurately in a relatively short time will gain the priority of a transaction in advance which will subsequently offer more opportunities for them to get a proper transaction based on the prevailed market price. If a transaction occurs, the chance to gain profit is also greater. However, it is not easy for investors to have an accurate prediction in a very short time. The limitation of cognitive capability becomes the most principal constraint in getting an accurate prediction. Therefore, there should be some efforts to reduce the risk of loss by minimizing the level of prediction errors.

Psychological research demonstrates that when people encounter a difficult problem involving the uncertainty, they tend to be so overconfident that they make more errors if it is compared to when they confront an easier problem (Fischhoff *et al.*1977; Lichtenstein *et al.*1982; Quattronne, 1982; Klayman and Ha, 1987). The securities trading in the capital market is also an activity which has immense uncertainty so that it is likely to generate overconfident behavior. Empirical research demonstrates that when investors show overconfident behavior, they tend to send a prediction value which is relatively high so it moves away from its fundamental value

which entails excessive prediction error. The failure to decrease prediction errors has put the investors in an unprofitable position (Odean, 1999; Barber and Odean, 2000; Raghurir and Das, 1999). Overconfident behavior which has generated prediction errors is proved to contribute significantly to the failure of getting profits in the capital market. Odean (1999) shows that *overconfident* investors tend to assess the accuracy of information so excessively that they are less cautious and tend to neglect the risks. Overconfident investors tend to buy (sell) the securities with exceedingly high (low) price and do the transaction so excessively that it subsequently makes them lose. Nevertheless, other empirical research also demonstrates that overconfident behavior does not always end with the transaction losses (DeLong *et al.* 1990; Hirshleifer and Luo, 2001; Gervais and Odean, 2001). According to Hirshleifer and Luo (2001), overconfident investors tend to underestimate the risk and overweigh their information and trading strategy such that they become aggressive and finally could beat the strategy of the rational ones to gain higher profits.

The phenomenon of overconfidence is a tendency for the decision makers to weigh the precision of their knowledge and information more excessive than they really do without taking available public information into account (Lichtenstein and Fischhoff, 1977; Taylor and Brown, 1988; Russo and Shoemaker, 1992). Overconfident behavior is a reflection of irrational behavior. Basically, each individual has limited cognitive capability which varies from one person to another one. The differences in this knowledge are caused by the differences in their capability in accessing information. Further, each individual also has diverse level of confidence in predicting uncertain occurrences. The combination of knowledge and confidence will determine the level of one's overconfidence which varies from one person to another person (Klayman *et al.* 1999).

The differences in the level of overconfidence will bring about the differences in interpreting and processing information which will also result in the difference of prediction performance (Kahneman and Tversky, 1973, 2001; Lord *et al.* 1979; Griffin and Tversky, 1992). The lower the level of an individual's knowledge is, the greater the tendency to be overconfident. The results of the research conducted by Lichtenstein *et al.*(1982); Fischhoff *et al.* (1977), and Lichtenstein and Fischhoff (1977) reveal that someone who is overconfident is in fact a person who does not have sufficient knowledge that makes his prediction become inaccurate. In the securities activities, overconfident behavior will make a person unconsciously increase prediction errors so that it inflicts a financial loss. This phenomenon reveals that those who practice overconfident behavior when making a prediction have basically conducted self deceptive behavior since the ability of perceiving a prediction is not appropriate with their actual ability.

Derived from facts or empirical studies, the issues or problems raised in this study involve three major qualities of information dealing with market news, namely:

1. Does the state of no market information affect the investors to conduct overconfident behavior in predicting the value of the securities?
2. Does good news affect the investors in assessing the value of the securities?
3. Does bad news affect the investors in assessing the value of the securities?

The research adopts *Self Deception Theory* (Trivers, 2004) which attempts to explain overconfident behavior in assessing the value of the securities. The theory predicts that when someone unconsciously perceives himself as having a capability above average and afterward his state of mind directs and manages this perception in such a way that tends to make him look for information supporting his behavior and neglect information which contradicts his behavior, he will be confined in the construction of false belief. It is followed by the construction of overconfident behavior which implies self deception. Trivers (2004) argues that overconfident behavior becomes apparent because people in general cannot completely control the actual ability so that each individual always thinks that he or she is better (smarter, stronger) than his or her actual condition. Accordingly, people tend to pretend that they know everything available in their surroundings even though the fact shows the opposite.

## **Review of Literature and Hypotheses**

### **Review of Literature**

The major problem faced by decision makers in an uncertain situation is that making a prediction which is based on the act of drawing a conclusion from contradictive evidences (Hogart, 1994). The decision makers are often confronted by a complicated problem and a plausible environment so that they find it hard to make an accurate decision. In dealing with uncertain situation, people are inclined to make a decision based on their confidence. According to Winkler and Murphy (1968), the level of confidence is the amount of probability which reflects one's judgment toward the accuracy of one's assessment. The determination of the probability reflects the level of one's knowledge. For those whose level of knowledge is high, the increase of their knowledge will be followed by the decrease of the probability of the accuracy of their assessment. In other words, the higher the level of knowledge is, the lower the level of confidence on the accuracy of their assessment. In contrast, for people whose level of knowledge is relatively low, the increase of their knowledge will be followed by the increase of the probability of the assessment accuracy which causes them to raise their level of confidence.

Other research also confirms that the combination of the level of someone's knowledge and confidence will determine the level of his overconfidence, which afterwards will affect the accuracy of his prediction performance (Klayman *et al.* 1999). The level of someone's overconfidence can be identified through test of calibration. Test of calibration is a procedure to examine and to get the combination of the level of knowledge and the level of confidence which construct the level of someone's overconfidence based on the questionnaire designed specifically for this purpose. The level of overconfidence is measured by the score of overconfidence, which is the average of the percentage of the level of confidence reduced by the average of percentage of the correct answers. As long as the score of overconfidence is positive, someone in this category has a tendency to behave overconfidently, while the negative score of overconfidence will classify people in this group as being under confident.

Some psychological research reveals that someone who has a relatively high score of overconfidence is a person who does not have sufficient knowledge so that it causes him to have high prediction errors which finally makes a relatively low score of prediction accuracy (Fischhoff *et al.* 1977; Lichtenstein *et al.* 1982; Lichtenstein and Fischhoff, 1977). According to Pitz (1974), people who are overconfident in general are not aware that they have limited cognitive (knowledge) capability. Since people who are overconfident normally tend to judge their knowledge as too high and tend to reduce the level of difficulties, they do not recognize uncertainty. Pitz (1974) is consistent with Russo and Schoemaker (1992). According to them, a person who is rational will realize that he has some limitations which mean that the higher the level of his knowledge is, the more aware he is of his knowledge limitation. When the level of one's knowledge is high, he tends to manage the level of his confidence in such a way that he is able to control himself in not giving high probability toward the accuracy of his judgment. This behavior will reduce the possibility of overconfident behavior. This kind of behavior does not occur in overconfident people.

Some psychological research shows that overconfident behavior becomes apparent when someone is confronted to a difficult problem dealing with uncertainty (Fischhoff *et al.* 1977; Lichtenstein *et al.* 1982). As a result, this behavior tends to be situational (Quattronne, 1982; Klayman and Ha, 1987). Psychological research also reveals that there is a tendency that people give excessive positive assessment on their own capability, which is higher than other people's capability or higher than other people's assessment toward their capability (Svenson, 1981; Taylor and Brown, 1988). Weinstein (1998) confirms the previous research that many people tend to assess themselves as having more achievement and less failure than other people. This phenomenon at least indicates that there are some people, or maybe many people,

who assess themselves as having the capability above average. As stated by Taylor and Brown (1988), the tendency of most people to perceive themselves as having the capability above average is understandable because beliefs toward personal capability is a good foundation to encourage people to gain higher achievement. Without self-confidence, someone will not achieve anything in his life. However, managing self-confidence is greatly determined by the level of knowledge. The level of someone's thinking capability in a broader sense greatly determines his level of confidence in solving the uncertainty. (Winkler and Murphy, 1968).

The capability to evaluate and interpret the information has an important role in encouraging the overconfident behavior to reveal. Psychological research shows that people tend to value excessively to the information that confirms their confidence and tend to ignore information that contradicts their confidence (Lord *et al.* 1979). Kahneman and Tversky (1973) indicate that people tend to predict intuitively by combining the distribution of impressive information with predictability. In addition, Kahneman and Tversky (2001) demonstrate that people tend to focus on singular information and ignore distributional information leading to bias prediction.

### **Hypotheses Elaboration**

In uncertain situations such as in the period of pre-opening in a capital market, the less informed investors tend to overestimate the precision of their level of knowledge and the accuracy of information so that they tend to reduce the level of difficulties of problems that they encounter. This behavior tends to result in the high prediction errors. On the contrary, the more informed investors who generally have fairly more knowledge than the less informed investors are aware that they are individuals who have limited capability and knowledge so that they tend to be careful. This behavior tends to result in moderately lower prediction error than the less informed investors. This phenomenon indicates that the less informed investors have conducted self deceptive behavior as the perception of their capability is not appropriate with the actual fact. These observations lead to the first hypothesis:

Hypothesis 1: The less informed investors perform a higher mean of prediction errors than do more informed investors in the pre-opening periods

Referring to Kahneman and Tversky (1973), when getting bad or good news, the less informed investors will produce price error higher than that of the more informed investors. Such phenomenon shows that the less informed investors implement a self deceptive behavior. This observation leads to the second and the third hypothesis:

Hypothesis 2: The less informed investors perform a higher mean of price errors than do more informed investors when the market provides good news

Hypothesis 3: The less informed investors perform a higher mean of price errors than do more informed investors when the market provides bad news

## **Methodology**

### **Design of Research**

The current research is a quasi experimental research with two groups of pretest-post test design (Isaac and Michael, 1985; Christensen 1988; Cook and Campbell, 1979). The research design belongs to a 3x2 mixed design, which is a combination of between and within subject design. Between subject design will compare the mean of prediction errors between two groups of investors having different level of overconfidence (the less and the more informed investors) in three different market settings due to implemented treatments. Within subject design will compare the mean of prediction errors of the same subjects in three different market settings due to the treatments using repeated measure design. Through this repeated measure design, the same participants are repeatedly given different treatments (see the experimental condition in Appendix 1).

### **Samples**

The samples of this research involved 30 students of Magister of Manajemen and Magister of Sains Program at The Gadjah Mada University majoring in finance and accounting who had taken or had been taking Advanced Finance Management, Portfolio Theory and Finance Management Seminar and International Finance Management as well.<sup>1</sup> They had no previous experience in taking part in the securities trading activities. Since the samples of the investors were taken from one population (students of the master degree program) and their characteristics were known, the grouping of samples was conducted based on the similarity of their characteristics. Therefore, the grouping was based on a matching technique to classify samples based on the same level of overconfidence which was done using test of calibration referring to Klayman *et al.* (1999) with some modification adjusted to the Indonesian setting. According to the matching technique, the investors were classified into three categories, namely the less informed investors, the more informed investors and the moderate investors. In order to answer the research questions, this research design only deal with the the less and the more informed investors. Nevertheless,

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<sup>1</sup> Magister Manajemen Program is a local master degree program in management and Magister of Sains Program is a local master degree program in economics at Gadjah Mada University, Yogyakarta, Indonesia

those three groups of investors participated in the securities trading to produce the appropriate market price.

### **The Trading**

The three groups of investors trade the securities in computerized markets similar to the Bloomfield *et al.* (1999). In this artificial trading, each investor predicted the values of the underlying securities as their fundamental ones derived from values of real world securities.<sup>2</sup> There were 36 different kinds of securities traded in 12 trading rounds each of which implemented in 3 trading sessions. The real names of the securities were hidden and symbolized into specific numbers to eliminate the bias due to the reputations of the represented companies.

The prevailed markets in this research reflected those as in the Jakarta Stock Exchange, in which a pre-opening market was implemented prior to the main trading sessions to capture the market price that would become a barometer of the expected price of the majority of market players in every single trading day. The pre-opening market in this research took place in about 5 minutes such that all investors were required to deliver their orders representing the numbers of securities they wanted to buy or sell at predicted values of the securities. In this sense, all investors determined and delivered the fundamental values of three different securities in every trading session based on the previous available market prices (see Appendix 2). As the market prices occurred in a trading session, the investors had to move together to the next one. In the following trading sessions, all investors received other manipulated information. In addition, short selling was not allowed. In order to motivate the investors to trade seriously, cash rewards were available for the three winners based on their profits.

### **Treatment**

This experimental research was implemented by exercising three different kinds of treatments. In this research, the experimenter manipulated the information to observe its effects on the price and prediction error. The treatments deal with different kinds of information that entered into the market which might influence the way the investors determine the values of the securities. Those treatments consist of the state of no market information, the good news and the bad news. In the first treatment, resembling the pre-opening trading session in Jakarta Stock Exchange, all investors had to predict the value of the securities based on the prevailed market prices that

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<sup>2</sup> The fundamental value of the securities was generated from the price book value approach, following Bernard (1994).

According to Bernard (1994), the value of securities is determined by its rate of return on equity (ROE), growth of the ROE, book value and growth of book value.

took place in the previous closing trading day. Thus, in this pre-opening market, all investors did not have any market information when they predicted the value of the securities. In the second treatment, the information categorized as good news was obtained by referring to the previous research results which included the stock repurchasing, the buying recommendation from securities analysts (Daniel *et al.* 1998), bonus to the managers (Teoh *et al.* 1998), political and economical situation (Stickel, 1995). In the third one, information categorized as bad news included the initial public offering, selling recommendation (Daniel *et al.* 1998), the failure to avoid tax payment (Teoh *et al.* 1998) and the increase of interest of loans (Stickel, 1995). It is expected that the treatments would bring different effects on the prediction and price error to both the less and the more informed investors as they had different level of knowledge and confidence.

### Variable Measurement

The causal relationship in the current research is that overconfident behavior affects the prediction errors. Therefore, the dependent variable in the research was the prediction errors. The prediction errors showed the level of uncertain prediction produced by the less and the more informed investors when carrying out securities trading which was shown in ratio. In the pre-opening sessions, the prediction error was measured by the difference between predicted value of the securities and its fundamental value which was shown in ratio (Bloomfield *et al.* 1999). In the main trading sessions, the prediction error was labeled as price error measured by the difference between the bid/ask price and the fundamental value, shown in ratio.

$$a. \quad \text{Prediction error} = \frac{(\text{Predicted value} - \text{Fundamental value})}{\text{Fundamental value}}$$

Fundamental value

$$b. \quad \text{Price error} = \frac{(\text{Bid/ask price} - \text{Fundamental value})}{\text{Fundamental price of stock}}$$

The independent variable in the research was overconfident behavior measured by the score of overconfidence obtained from the test of calibration, referring to Klayman *et al.* (1999). The score of overconfidence had two levels, namely the high level of overconfidence represented by the behavior of the less informed investors and the low level of overconfidence represented by the behavior of the more informed investors.

The design of this current research is different from Bloomfield *et al.* (1999) and neither is Ang and Schwarz (1985). Bloomfield *et al.* (1999) classified the investors into two groups, namely the more informed investors representing investors who receive three different information signals and the less informed investors



representing investors who receive single information signal. There was a bias in this classification since the researchers did not identify the level of knowledge of the participants before providing the signal of information as a treatment. In this current research, thirty participants were classified into three groups of ten participants based on their score of overconfidence which can be obtained by conducting test of calibration referring to Klayman *et al.* (1999). Those three groups participated in securities trading activities so that the market price reflected the expected price of the majority market players. This current research design had demonstrated the natural setting of securities trading, although the analysis only covered the less and the more informed investors. Ang and Schwarz (1985) classified the investors into two groups based on their level of risk aversion. Among 70 participants, the top and the bottom of 12 participants were selected to join in a simulation of stock trading. According to this design, the market was represented by those two groups of investors, ignoring the investors who stood in the middle of those two groups who should have participated in the securities trading. Thus, their research findings lose their normative or natural setting of the securities trading.

## **Results and Discussion**

### **Prediction and Price Errors**

Pre-opening session was the earliest trading in each trading period so that it may involve the greatest uncertainty since the market did not provide any information available for all investors. The uncertainty would trigger the overconfident behavior to emerge. When participating in the pre-opening sessions, the less informed investors tended to overestimate the precision of their knowledge and information so that they tended to make more mistakes in the three pre-opening sessions reflected by the prediction errors as shown in panel A, B and C of Table 1. The test shows that the means of prediction errors of the less informed investors are significantly different from the more informed investors. It implies that the less informed investors show higher means of prediction errors than do those more informed investors in those three pre-opening markets. This phenomenon indicates that less informed investors have practiced self deceptive behavior since the ability of perceiving a prediction is not appropriate with their actual ability. When all investors get the signal of good news (panel E in Table 1), the difference of price error between the less and the more informed investors is not significant. On the other side, when they get the signal of bad news (panel G in Table 1), the difference of price error between the less and the more informed investors is significant.

## Discussions

### Experiment 1: The effect of “the state of no market information” on the prediction errors

When there is no available information such as in the three pre-opening sessions as shown in Panel A, B and C in Table 1, all investors will anticipate this uncertain situation through the conviction of their knowledge and confidence. Since the less informed investors perceive themselves as having precise knowledge and accurate information, they are inclined to produce the mean of prediction errors higher than do those more informed investors in all pre-opening sessions. This finding supports Hypothesis 1. This phenomenon also proves that the less informed investors conduct self deceptive behavior because they assess their knowledge and information excessively (more than the actual fact).

Table 1. Summary of test of the mean of prediction and price errors

Prevailed Markets	N		Mean of		Standard		<i>P-Value*</i>
	Total		Prediction (Price)		Deviation		
	Prediction		Errors				
	LII <sup>1</sup>	MII <sup>2</sup>	LII	MII	LII	MII	
A. The first pre-opening market	65	65	-2,2511	-1,6694	0,97368	0,83512	0,000
B. The second pre-opening market	65	65	-2,4375	-1,5882	0,89945	0,72495	0,000
C. The third pre-opening market	65	65	-2,8949	-2,0935	1,06742	1,00245	0,000
D. The absence of good news	65	65	-2,7345	-2,1388	1,24788	1,02810	0,004
E. The presence of good news	65	65	-2,7458	-2,5711	1,24681	1,32009	0,439
F. The absence of bad news	65	65	-2,4648	-1,8206	1,00663	0,76579	0,000
G. The presence of bad news	65	65	-2,1911	-1,6626	0,88265	0,66045	0,000

\* = significance values

LII<sup>1</sup> = Less Informed Investors

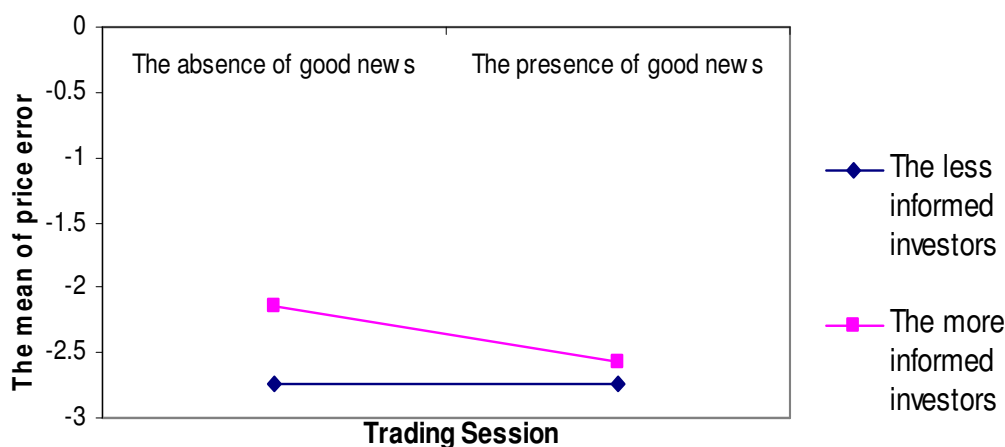
MII<sup>2</sup> = More Informed Investors

### Experiment 2: The effect of good news on price errors

Considering the states of the absence and the presence of good news settings (as shown in panel D and E, Table 1), this research found that when the market provides

signal of good news, the more informed investors reduce their accuracy of prediction in such a way that results in a higher price error than that of the previous session under the absence of good news setting. Therefore, the error line moves downwards, see figure 1. On the contrary, the signal of good news does not change the mean of the price error of the less informed investors so that the error line does not change, either. Thus, the good news causes the difference of price errors between those two groups of investors becomes narrower and statistically not significant, see panel E in Table 1. This finding does not confirm Hypothesis 2.

On the other hand, the fact demonstrates that when getting good news, the less informed investors do more selling transactions than purchase transactions.<sup>3</sup> In other words, when the signal of good news comes into the market, the less informed investors tend to have “net sale” transactions, not “net purchase” transactions. This behavior is contradictory to the self deception behavior. According to the hypothesis of self deception, people tend to buy the securities when getting incentive of good news. The less informed investors sell more securities in the session of good news since they have strong beliefs that they will gain benefit by selling their profitable securities they bought in the previous trading sessions. In other words, they sell more securities to realize the profits and to reduce the risk of price changes. They also believe that when the market reflects positive sentiment due to the good news, their net sale transactions will not harm their wealth.<sup>4</sup>



**Figure 1.** The mean of price errors of the more and the less informed investors in trading session based on the absence and the presence of good news

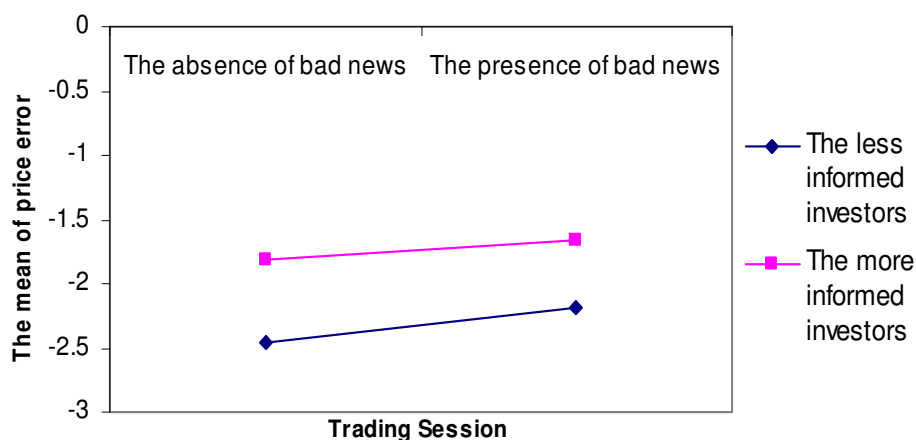
<sup>3</sup> Some empirical research shows that overconfident behavior tends to sell “the winner” or the profitable securities and keep “the loser” or the unprofitable securities (Barber and Odean, 1999; Odean, 1998; Shefrin and Statman, 1985; Harris, 1988).

<sup>4</sup> According to the result of current research, the less informed investors gain profit when the market delivers good news. Such kind of data is not shown in this paper

### Experiment 3: The effect of bad news on price errors

The current research also proves that when the market gets the signal of bad news, the less and the more informed investors improve their prediction accuracy so that they produce the mean of price errors lower than the previous trading session before they have got the bad news, see panel F and G in Table 1. This causes the lines of price errors to move upwards as shown in Figure 2.

In Figure 2, before getting bad news, the less informed investors demonstrate the higher mean of price errors than do more informed investors which is reflected in the position of the lower line of price errors. This phenomenon shows that the less informed investors conduct self deceptive behavior. If it is observed thoroughly, when bad news comes into the market, the less informed investors demonstrate their overconfidence by reducing mean of price errors in a higher proportion than those more informed investors. This causes the difference of price errors between those two groups of investors becomes narrower and statistically significant, see panel G in Table 1. It also implies that when the market provides the signal of bad news, the less informed investors perform a higher mean of price errors than do more informed investors, leading to Hypothesis 3.



**Figure 2.** The mean of price errors of the more and the less informed investors in trading session based on the absence and the presence of bad news

### Conclusion

The current experimental research has focused on the role of the overconfident behavior in determining and assessing the value of securities after getting certain treatments. The research findings demonstrate that the less informed investors are inclined to assess the precision of their knowledge and information excessively so that they produce a higher mean of prediction and price errors than do more informed investors in all the experimental market sessions, except that in the market session of

good news. The phenomenon indicates that the less informed investors conduct self deceptive behavior.

### **Implication**

The research findings in general demonstrate that the level of prediction and price errors reflects someone's overconfidence level. Those who have high level of overconfidence (represented by the less informed investors) are proved to have a tendency to produce higher mean of prediction errors than those whose level of overconfidence is low (represented by the more informed investors). Therefore, the investors and other securities analysts need to be aware since the overconfident behavior tend to emerge when they deal with uncertainties, especially in the pre-opening market. The research findings suggest that among those experimental markets, pre-opening market shows the greatest market risk reflected by the greatest difference of prediction error between the less and the more investors.

It will be a good idea to improve the accuracy of the prediction through the training program for managing confidence or other type of program which guides the analysts to acquire and learn the appropriate learning process. This will help them reduce their level of overconfidence. The important message that can be drawn from this research is that low level of knowledge would trigger the overconfident behavior to emerge. This finding confirms the previous ones (Fischhoff *et al.* 1977; Lichtenstein *et al.* 1982; Winkler and Murphy, 1968). Therefore, the decision makers need to increase and develop their knowledge to improve the quality of their judgments to achieve better solutions.

The research may give theoretical contributions in that it offers a new perspective of price discovery, especially in the pre-opening market, which is highly affected by overconfident behavior reflecting self deceptive behavior. This new perspective is supported by a relatively new theory of finance, namely Behavioral Finance. Therefore, this relatively new theory of finance is not necessarily being confronted with the efficient market theory. The paradigm of behavioral finance and efficient market are complementary to one another. The combination of both theories may result in a comprehensive solution. In addition, besides the overconfident behavior, further research topics may elaborate many other irrational behavior practiced in the stock market such as heuristics, herding phenomena, phenomena "sell the winner and keep the loser" etc.

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Appendix 1. Experimental Conditions

Market Conditions	Prediction or Price Error	
	Level of Overconfidence High	Level of Overconfidence Low
No Treated Market (No information available) (Pre-Opening Periods and Main trading Periods)	High	Low
<b>Hypothesis 1</b>		
Treated Market (The treatment was implemented in the form of good news in the Main Trading Periods)	High	Low
<b>Hypothesis 2</b>		
Treated Market (The treatment was implemented in the form of bad news in the Main Trading Periods)	High	Low
<b>Hypothesis 3</b>		

Appendix 2. Experimental Design

Trading Period	Trading Round	Pre-Opening Period			Main Trading Period								
		No Treatment			No Treatment			Treatment					
I		Session 1 (Pre-opening1_1)			Session 2								
	1	S-1	S-2	S-3	S-1	S-2	S-25						
	2	S-4	S-5	S-6	S-4	S-5	S-6						
	3	S-7	S-8	S-9	S-7	S-8	S-23						
	4	S-10	S-11	S-12	S-10	S-11	S-12						
II		Session 1 (Pre-opening2_1)			Session 2			Good News			Bad News		
	5	S-13	S-14	S-15	S-13	S-14	S-26	S-13	S-14	S-26			
	6	S-16	S-17	S-18	S-16	S-17	S-29				S-16	S-17	S-29
	7	S-19	S-20	S-21	S-19	S-20	S-21	S-19	S-20	S-21			
	8	S-22	S-23	S-24	S-22	S-23	S-14				S-22	S-23	S-14
III		Session 1 (Pre-opening3_1)			Session 2			Bad News			Good News		
	9	S-25	S-26	S-27	S-25	S-26	S-1	S-25	S-26	S-1			
	10	S-28	S-29	S-30	S-28	S-29	S-30				S-28	S-29	S-30
	11	S-31	S-32	S-33	S-31	S-32	S-33	S-31	S-32	S-33			
	12	S-34	S-35	S-36	S-34	S-35	S-36				S-34	S-35	S-36
Prediction Error							Price Error						

Note: S-i = The market value of the securities i

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