PSYCHOLOGICAL BIASES IN INVESTMENT DECISIONS: AN EXPERIMENTAL STUDY OF MYOPIC BEHAVIOR IN DEVELOPING CAPITAL MARKETS

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ABSTRACT

This paper attempts to analyze the psychological biases that affect investors in making risky investment decisions based on the theory of Myopic Loss Aversion (MLA). The data were obtained from two sources (students and stock investors) which in turn were manipulated by two types of treatment (frequent and infrequent), using a mixed design of between-within subjects with a 2 x 2 factorial. The experimental result showed the consistency of the two groups of participants to the theory of the MLA. Analysis of the gender showed that the boldness levels of the male participants and female participants in the group of investors were the same, while in the student group, gender showed a significant influence. Other findings included a "shock-effect" experienced by the participants during the experiment.

Keywords: behavioral finance, myopic loss aversion, frequent-infrequent, gender, and shock-effect

INTRODUCTION

Standard financial theories generally assume that investors behave rationally. They are deemed able to maximally utilize and process any available information, but the psychological factors tend to be ignored. This fact triggers to the development of the behavioral finance theory which tries to analyze the psychological biases, which receive 'less attention' in the standard financial theories. The topic raised in this article also leads to the behavioral finance theory. The analysis is focused on the investors' behavior in the process of making decisions for risky investment based on the theory of myopic loss aversion (MLA) presented by Benartzi & Thaler (1995).

Experimental research to examine Benartzi & Thaler's MLA theory (1995) is still RARE. Gneezy & Potters (1997) and Haigh & List (2005) used two types of treatment in their experiments, *frequent* (F) and *infrequent* (I) treatment to examine the MLA theory. Treatment F allowed participants to conduct evaluation on their trading results periodically (in a relatively short-term period), while treatment I allowed the participants to evaluate their trading results in a relatively longer period.

Haigh & List (2005) used Treatment I and Treatment F adopted from Gneezy & Potters (1997) to examine the MLA theory. Their empirical study found that the behavior professional group consistent with the MLA

theory. In addition, their consistency level was higher than that among students. Indirectly, their findings supported Gneezy & Potters' study (1997).

Based on the previous empirical, it is assumed that in emerging markets the behavior of the experienced group and that of the inexperienced in making investment decision are also consistent with the MLA theory. The experienced group's consistency is assumed to be higher that of the inexperienced. Gender-wise, the two groups of participants are predicted to show different behavior (in terms of their boldness level) when making decision on risky investment. These assumptions have provided strong motivation for the present researchers to conduct this study.

This study reexamines Benartzi & Thaler's MLA theory (1995) by adopting Treatments I and F and to check the possible difference of behavior (in terms of their bold-ness level) between the experienced group (the professionals) and the inexperienced one (the non-professionals) in the process of making investment decisions in developing emerging market. To observe the phenomena, two groups of participants (the experienced and the inexperienced) were involved in this study.

This paper is organized into five parts. The first starts with the background and the purpose of this study, which are followed by a review of literature and hypotheses development. The research method follows and the discussion of the results is next. The last part presents several conclusions, the research limitations, and the suggestions for future research.

REVIEW OF LITERATURE AND HYPTHESIS DEVELOPMENT

Myopic Loss Aversion (MLA)

The choice to invest in more secure assets by ignoring a higher return rate is a capital market phenomenon which is difficult to be explained with an economic model and has been puzzling researchers up to the present. Therefore, in financial theories, the equity risk premium is also often called the equity pre-mium puzzle (Siegel & Thaler, 1997). Mehra & Prescott (1985) analyzed the phenomenon of the equity premium puzzle with stock and bond returns. Their empirical finding only showed that the level of high-risk aversion could be used to explain why most investors prefer to invest in bonds. Later, Benartzi & Thaler (1995) combined two behavior con-cepts, namely loss aversion (Kahneman & Tversky, 1979) and mental accounting (Thaler, 1985) into what is later called myopic loss aversion (MLA) to develop a theoretical foundation in observing the equity premium puzzle.

The different levels of risk aversion among individuals are a behavioral factor that presented by Kahneman & Tversky (1979) in the Prospect theory, which they later call loss aversion. A person is called loss averse (Kahneman & Tversky, 1979: 279) is s/he does not like a symmetrical (50:50) bet. Fur-ther, Kahneman & Tversky (1979) and Star-mer (2000) add that the concept of loss aver-sion is equivalent to the utility function, where one is more concerned with loss than gain. Thaler (1999) explains that in general indi-viduals' feeling of *pain* when losing 100 dollars is stronger than their feeling of *joy* when acquiring 100 dollars.

In addition to the loss aversion theory, the MLA theory also adopts the Mental Account-ing theory of Richard Thaler (Pompian, 2006; Haigh & List, 2005). Mental accounting the-ory itself can be interpreted as a set of eco-nomic agents' cognitive actions in managing, evaluating, and maintaining their financial activities (Thaler, 1999). Pompian (2006) states that mental accounting refers to the activities of coding, categorizing, and evaluat-ing financial decisions. Further, Barberis & Huang (2001) explain that mental accounting drives individuals to consider and evaluate their financial transactions.

The more often an account is evaluated, the more careful an individual is in making next decisions. The high frequency of evaluation on the investment in risky assets will increase investors' dissatisfaction to their investment returns (Haigh & List, 2005). This is because the riskier assets might have less optimal performance in a short-term period. Therefore, a lower evaluation frequency has the potentials to drive investors to allocate bigger investment in riskier assets than in less risky assets. Investors will experience myopic loss aversion if they evaluate their investment returns in terms of gain and loss separately upon receiving certain information (Haigh & List, 2005).

Gneezy & Potters's study (1997) has revealed the behavioral difference between students who frequently receive feedback and those who receive feedback infrequently in making investment decisions. Their experiment showed the students' consistency with the MLA theory. Haighand List's research (2005) also revealed the consistence of CBOT professionals and future traders to the MLA theory. The review of literature and the previous researchers' empirical research support the following first two hypotheses formulated to test the MLA theory.

H_1: The inexperienced participants are bolder in making decisions for risky investment when receiving the infrequent treatment than when receiving the frequent treatment.

H_2: The experienced participants are bolder in making decisions for risky investment when receiving the infrequent treatment than when receiving the frequent treatment.

This study also tries to reveal the possible behavioral difference between the two groups of participants in the process of making decisions for risky investments. List's study (2002, 2003, and 2004) showed that there was a decrease in the market anomaly in the aspect of

investment decision-making particularly among market-experienced economic agents. The finding supported the opinion that there was a possible behavioral difference between professionals and non-professionals in making decisions for risky investment (Haigh & List, 2005).

Further, Haigh & List (2005) stated that there was a possible significant behavioral difference between an experiment whose subjects were professionals and an experiment whose subjects were students (as found in Gneezy & Potters's research, 1997). These studies indicate that the inclusion of an inexperienced group (such as students) as participants to represent an experienced group (such as stock investors) in an experiment might lead to a less optimal result because of the possible biases (Szalanski & Beach, 1984; Bonner & Pennington, 1991; Frederick & Libby, 1986 in Haigh & List, 2005).

The description above shows that the behavior of economic agents with sound market experience will be different from that of those without sound market experience. The difference is predicted to be reflected in their decision making for risky investment. The empirical argumentation above supports the following two hypotheses:

H_{3a}: In the process of making decisions of risky investment, when given the frequent treatment, the experienced group's behavior is different from that of the inexperienced.

H_{3b}: In the process of making decisions of risky investment, when given the infrequent treatment, the experienced group's behavior is different from that of the inexperienced.

The different level of risk aversion according to various researchers is influenced by other factors, such as the investors' gender. Several empirical findings on the level of risk aversion due to the gender factor have been

presented by Cohn *et al.* (1975) and Watson & McNaughton (2007). Their empirical findings show that in general female investors have a higher level of risk aversion than male investors. Meanwhile, Save-Soderbergh (2003), as reported in Watson & McNaughton (2007) stated that the proportion of women choosing to invest in the risky superannuation-fund (a kind of pension fund) is lower that of men.

Further, Felton *et al.* (2003) states that at least there are two reasons why female investors have a higher level of risk aversion than male investors. The first is biological. Based on Zuckerman's study (1994), Watson & McNaughton (2007) state that women produce more *monoamine-oxidase* enzyme than men. This enzyme reduces the level of sensation search and at the same time limit their freedom when making risky decisions.

The second reason is the socio-cultural aspect, which makes men bold in making risky decisions. Byrnes (1998) states that during their childhood girls tend to be more closely monitored by parents than boys so that in their adulthood they are less bold in making risky decisions. Based on the empirical findings above, it is assumed that gender influences individuals in making risky investment decisions. This argumentation supports the development of the last two hypotheses, which are as follows:

H_{4a}: Among the experienced group, male investors have a lower level of risk-aversion than female investors.

H_{4b}: Among the inexperienced group, male investors have a lower level of risk aversion than female investors.

RESEARCH METHOD

This research manipulated four experiment conditions with a 2x2 within-between (with two groups of participants: the experienced and the inexperienced, and two types of treatment: frequent and infrequent). The population of this experiment was all undergraduate students of Management Department of a university in Pontianak who had passed the Financial Management course and all stock investors in security firms in West Kalimantan.

The selection of the experiment subjects was based on certain criteria and then they were randomized. For the inexperienced group, the criteria were: (1) being an active student of the regular class of a management department with a passing grade for the Financial Management course, and (3) having never taken a simulation or having no experience in trading stocks, options, indexes, and other derivatives in any securities firm, and having never joined *any investor club*. For the experienced group, the criteria were: (1) being a registered stock investor of a security firm in West Kalimantan, and (2) having experience of at least one year in stock trading.

The sample of each participant groups consisted of 40 subjects: 20 females and 20 males. The number of the experiment subjects was 80 (40 per cell), which is considered adequate because according to Myer and Hansen (2001) the number of experiment subjects should be at least 15 to 20 for each treatment group.

The experiment techniques in this research referred to the research conducted by Gneezy & Potters (1997) and Haigh & List (2005) with some modification. The treatment was categorized into two types: Treatment F (with trading result evaluation conducted after each round) and Treatment I (with trading result evaluation conducted after three rounds). The participants were given an initial capital of 100 units at the beginning of every round.

In Treatment F, the subjects were given nine trading rounds, each of which offered 100 capital units with different rates for the two different participant groups. The rate for the inexperienced group was 1 to 1, which means

that one hundred rupiahs was worth 1 unit, while for the experienced group the rate is 2 to 1, which means that two hundred thousand rupiahs was worth 1 unit. The difference was to accommodate the returns obtained by investors in the stock market (Haigh & List, 2005). The gain or loss of the participants was determined by the correct choice of the letters to be shown (X, Y, and Z).

A participant was declared to be a winner if the chosen letter (X, Y, or Z) was the same as the one shown to them. Therefore, a participant's winning probability was a third (or thirty three present), while the losing probability was two thirds (or 67 percent).When a participant lost, s/he would lose all possessions, but when the chosen letter was in line with the shown one, s/he would be a winner and would be entitled to receive 2.5 times the amount s/he bet. At the end of each round, the participants had to calculate and record their trading results in the trading form.

In treatment I, the participants were only able to evaluate their trading results per three rounds (one trading block). The participants were given three trading blocks, each of which consisted of three trading rounds. In the beginning of each round, every participant was given an initial capital of 100 units, with different rates for the inexperienced group and the experienced. The main difference in Treatment I was that the participants were obliged to offer a bet per three rounds (one trading block) simultaneously.

The evaluation on the participants' gain or loss was conducted at the end of every trading block. After all participants offered their bets,

at the end of the first block (namely at the end of the third round) there were three letters shown consecutively, the first of which was for the first round, the second for the second round, and the third for the third round. Afterwards, the participants calculated the results of their bets in the first block. The same procedure took place up to the third block (rounds 7–9). The gain or loss rule applied in Treatment I was the same as that for Treatment F. The time allocated for Treatment F was approximately 30 minutes, while for Treatment I it was approximately 45 minutes. The time allocated for the experiment was designed to be less than one hour to prevent participants' boredom. To minimize the participants' interaction and learning effects, the experiment was divided into four different sessions

The testing of the MLA theory (using a within-subject design) was conducted with a *paired-samples t-test.* Meanwhile, to test the possibility of different behavior (as reflected in the amount of the bet) —specifically for the between-subject design—an independent-sample t-test was employed. Next, to test the effect of the gender variable on each participant group a non-parametric Mann-Whitney test was conducted. In the data analysis, the SPSS and Eviews software programs were used.

RESULTS AND DISCUSSION

Table 1 presents the result of the normality test on the observation samples used in this research. As seen in the table, in general the normality assumption for the four groups was met in the analyses with different methods (*liliefors, shapiro-wilk,* and *JB-test)*, with the

Table1. Results of Normality Tests

Participant Group	Liliefors		Shapiro-Wilk		Jarque-Bera	
	Statistics	Sig.	Statistics	Sig.	Statistics	Sig.
Inexperienced (*Frequent*)	0.112	0.200	0.964	0.226	0.229	0.892
Inexperienced (*Infrequent*)	0.100	0.200	0.954	0.101	2.030	0.362
Experienced (*Frequent*)	0.120	0.148	0.982	0.754	0.613	0.736
Experienced (*Infrequent*)	0.105	0.200	0.984	0.820	0.759	0.684

sig. value above 0.05. Therefore, the next analysis to test the MLA theory was legitimately conducted, the results of which can be seen in Table 2.

Table 2 shows that the inexperienced group participants averagely bet 55.464 units when receiving Treatment F, while when given Treatment I their boldness increased and their bet average was 64.553 units. The increase was also observed among the experienced group. When receiving Treatment F, their bet average was 48.125 units, and it drastically increased to 72.956 units when receiving treatment I. From the paired sample t-test, it was shown that the increase was statistically significant at 5% (0.017) for the inexperienced group and 1% (0.000) for the experienced. The statistical analysis results in general support H1 and H2.

The two groups of participants in Table 2 showed consistency with the MLA theory when making decisions on risky investment. This finding also indicates that the experi-

enced group showed a higher level of consistency with the MLA theory than the inexperienced. This is shown in the lower average of the experienced group, which was only 48.125 units when they received Treatment F.

The different level of significance between the experienced and the inexperienced needs more exploration. For this purpose, a simulation was conducted by dividing the two groups' experiment results when receiving Treatment F into three trading blocks, which was in line with the model of Treatment I.

After each block was tabulated, a paired-sample t-test was conducted to identify which different behavior had triggered the different levels of significance in the two groups of participants. The results of the statistical analysis in each trading block are presented in Table 3.

In the above table, it is shown that there was no significant difference between the experienced group and the inexperienced one. Though the absolute trading value average

Table 2. MLA Theory Analysis Results

Group	Treatment	*Mean* (Unit)	Standard Deviation	*Sig.*
Inexperienced	*Frequent* *Infrequent*	55.464 64.553	26.140	0.017
Experienced	*Frequent* *Infrequent*	48.125 72.956	18.379	0.000

Table 3. Results of Inter Per-Block Trading Treatment Analysis

| Group	Treatment	Block	*Mean* (Unit)	Standard Deviation	*Sig.*
Inexperienced	*Frequent* *Infrequent*	1 1	57.075 60.742	26.906	0.197
	Frequent *Infrequent*	2 2	55.425 62.692	28.705	0.059
	Frequent *Infrequent*	3 3	53.892 70.225	30.290	0.001
Experienced	*Frequent* *Infrequent*	1 1	48.616 72.317	20.076	0.000
	Frequent *Infrequent*	2 2	47.008 72.583	19.665	0.000
	Frequent *Infrequent*	3 3	48.750 73.967	18.760	0.000

when receiving Treatment I was higher than when receiving Treatment F, statistically the participants' boldness in making decisions for risky investment under the two different treatments did not show any significant difference.

In the third trading block, namely the last three rounds before the experiment was completed, the above table shows that there was a change of trading behavior among the inexperienced participants. When receiving Treatment F, the participants showed an increasing degree of aversion, where the trading value average decreased from 57.075 units in the first block to 53.892 units in the third block. Meanwhile, when receiving Treatment I, there was a reversed change of behavior, where the investors' risk tolerance was increasing in the last three rounds. In this third block, the trading value average increased from 60.742 units to 70.225 units. The decrease of the trading value average under Treatment F and the increase of the trading value average under Treatment I in the third block showed statistically significant differ-

ence at the significance level of 1%.

The behavior change among the inexperienced group participants in the third block made the analysis result for H_1 significant at the level of 5%. This analysis result showed that the inexperienced participants showed a behavior change in the last three rounds of the experiment, which is consistent with the MLA theory

In the experienced group, the significance level at 1% was observed in all trading blocks and the trading value average did not fluctuate much. In Treatment F, the trading value averages in the first, second, and third blocks were respectively 48.616 units, 47.008 units, and 48.750 units. A similar observation was found when receiving Treatment I, where the trading value averages of the first, second, and third blocks were respectively 72.317 units, 72.583 units, and 73.967 units. Therefore, the consistency with the MLA theory was shown since the beginning of the trading at a higher level of significance. This research result supports the experiments conducted by Gneezy &
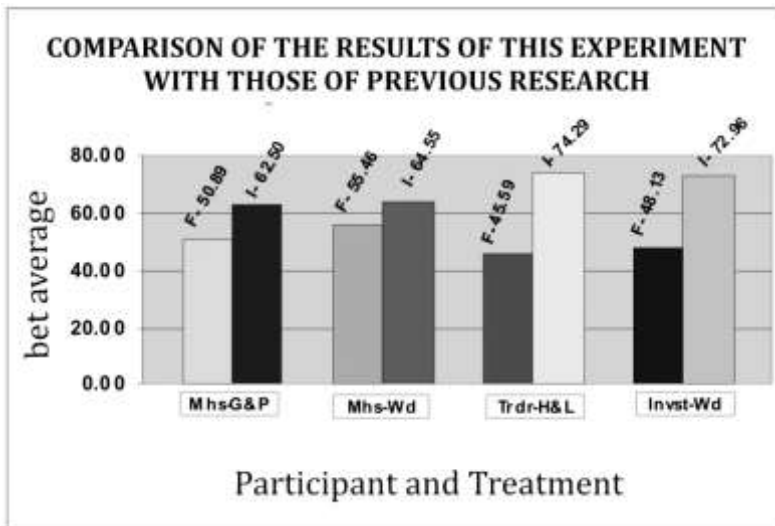
Notes:
Mhs-GandP	:	Gneezy & Potters' Research (1997).
Trdr-HandL	:	Haigh & List's Research (2005).
Mhs/Invst-Wd		The Present Writers' Research
F / I	:	*Frequent* Treatment and *Infrequent* Treatment

Figure 1. The Comparison of the Results of this Experiment with those of Previous Research

Potters (1997) and Haigh & List (2005). The comparison of the results of this experiment with previous MLA research is presented in the following Figure 1.

To test the possible difference of behavior between the two groups, the trading results of the two groups (under Treatment F and also under Treatment I) were compared, whose results are shown in Table 4.

In the analysis results presented in Table 4, it is shown that when receiving Treatment F the inexperienced group had a trading value average of 55.464 units. Meanwhile, for the experienced Treatment F made them more sensitive to loss, where their trading value average was 48.125 units, lower than that of the inexperienced. Statistically, the difference was close to the significance level of 10%. Under Treatment I, the trading value average of the inexperienced was 64.553 units. For the experienced, their trading value average was

much higher (namely 72.956 units). The statistical test showed that the difference between the averages of the two groups was significant at the level of 5%. In general, the analysis results shown in Table 5 show that the two different groups were significantly different in the process of making decisions for risky investment both under Treatment F and Treatment I, which also supports H_{3a} and H_{3b}.

To further explore the results of the analyses for the two hypotheses, a simulation by dividing the nine trading rounds in Treatment F into three trading blocks in Treatment I was conducted. After the trading value average per block was obtained, an independent sample t-test was performed, whose results can be observed in Table 5.

In the analysis, it is shown that under Treatment F for the first and second blocks there was a significant difference of behavior between the two groups of participants at the

Table 4. Analysis of Trading Behavior between the Two Groups of Participants

Treatment	Group	*Mean* (Unit)	Standard Deviation	*Sig.*
Frequent	Inexperienced	55.464	16.007	0.054
	Experienced	48.125	17.567	
Infrequent	Inexperienced	64.553	17.305	0.013
	Experienced	72.956	11.389	

Table 5. Results of Inter-Group Analysis per Trading Block

Treatment	Group	Block	*Mean* (Unit)	Standard Deviation	*Sig.*
Frequent	Inexperienced	1	57.075	15.079	0.030
	Experienced	1	48.617	18.856	
	Inexperienced	2	55.425	16.879	0.034
	Experienced	2	47.008	18.021	
	Inexperienced	3	53.892	17.116	0.189
	Experienced	3	48.750	17.615	
Infrequent	Inexperienced	1	60.742	21.270	0.004
	Experienced	1	72.317	11.755	
	Inexperienced	2	62.692	21.235	0.012
	Experienced	2	72.583	11.393	
	Inexperienced	3	70.225	19.365	0.313
	Experienced	3	73.967	12.910	

significance level of 5%. However, in the third trading block, the test did not yield any significant difference between the two groups because the trading value average of the inexperienced consistently decreased from 57.075 units and 55.425 units in the first and second blocks to 53.892 units in the third block. Meanwhile, the trading value averages of the inexperienced group were quite stable, with respectively 48.617 units, 47.008 units, and 48.750 units for each trading block.

The statistical insignificance in the third trading block eventually influenced the overall analysis for the trading value averages of all 9 rounds of Treatment F. This made the statistical test results close to the significance level of 10% (see Table 5). The last three rounds made the inexperienced participants more conservative in making trading decisions so that they tended to keep their endowment by reducing their trading values.

In Treatment I, it is shown that the trading value averages of the inexperienced fluctuated much. In the first trading block, their trading value average was 60.742 units, but in the second and third blocks their trading value averages increased to 62.692 units and 73.967 units. The biggest increase took place in the last trading block. For the experienced, the trading value average was seen not to have changed (it was relatively stable). This was shown by their trading value averages per trading block, which were respectively 72.317 units, 72.583 units, and 73.967 units.

The behavioral change among the inexperienced participants in the third block caused the statistical test in the block to be insignificant. The result of this analysis shows that in the third trading block there was no statistically significant difference between the two groups. The increasing averages of the inexperienced group in the third block shows a spontaneous behavioral change, which might have been caused by the worry of the closing of the trading. The inexperienced group demonstrated consistency with the MLA the-

ory in the third trading block since they made more bets than in the preceding two blocks. In other words, there was an increase of the risk tolerance degree among the inexperienced participants in the last trading block.

This analysis also shows that the experienced group demonstrated *myopic loss aversion* throughout the experiment, starting from round 1 to round 9. This was shown in the relative stability of their trading value averages from block to block (for both treatments). Meanwhile, the inexperienced group demonstrated a rather different behavior. Their consistency with the MLA theory was observed only in the last rounds before the completion of the experiment, as shown in the sharp fluctuations of their trading value averages in the third block for the two different treatments. This finding supports the argumentation presented by Haigh & List (2005).

The Gender Factor

Several empirical findings have shown that in general, females have a higher risk aversion than males (Watson & McNaughton, 2007; Feltton *et al.* 2003; Cohn *et al.* 1975; Riley & Chow, 1992). Considering this fact, the present researchers are concerned with the gender variable.

To test whether males are bolder in making decisions for risky investment than females, a Mann-Whitney statistical test was conducted. The results of this non-parametric test are presented in Table 6.

The above table shows that the statement that males are bolder in taking risk than females was only significant for the inexperienced group both for Treatment F and Treatment I (and therefore supports H_{4b}). Meanwhile, among the experienced participants, males do not show higher risk tolerance than females for both treatments (which means that it does not support H_{4a}).

The insignificance of the test result among the experienced participants is assumed to

Table 6. The Gender in Making Decisions for Risky Investment

Treatment (Group)	Gender	N	Z Value	Sig.
Frequent (Inexperienced)	Male Female	20 20	-3.084	0.001
Infrequent (Inexperienced)	Male Female	20 20	-1.894	0.029
Frequent (Experienced)	Male Female	20 20	-0.230	0.409
Infrequent (Experienced)	Male Female	20 20	-0.555	0.290

have been influenced by other non-experimental variables. Benzion and Yagil (2003) found the reversed relationship between the wealth level and the risk aversion level. In their research, the richer the subjects were, and the lower their risk aversion was. Other researches also have shown a similar relationship: the lower a person's income, the higher the aversion risk (Bajtelsmit & Vanderhei, 1997; Hinz *et al.* 1997 cited in Watson & McNaughton, 2007).

Jaggia and Thosar (2000) states that there is a negative relationship between age and risk-taking boldness. This is supported by Watson & McNaughton (2007), who state that a relatively more mature age makes investors tend to select less risky types of investment and vice versa.

The experiment conducted by Riley & Chow (1992) showed that investors with lower formal education usually select more conservative investments though their incomes are comparable to investors with higher formal education. The results of this research are also supported by the research of Dwyer *et al.* (2001), which found that the control of investors' education resulted in increasingly lower influence to the choice of risky investments.

The empirical findings above show that the gender factor is not the only non-experimental variable affecting the process of making decisions for risky investment. Other non-experimental variables, such as the income level, age, and education level, indirectly influence individuals in making decisions for risky investment. Some of the variables were not controlled in this experiment, which might have made the insignificance of the statistical test results among the experienced participants.

The analysis produced stronger results when applied to the inexperienced participants as shown in the significance level. The inexperienced participants consisted of undergraduate students of the regular class who were relatively of the same age. In addition, they did not big incomes because usually they had no job yet (or only part-time jobs, if any) because they had to take courses both in the morning and in the afternoon (even in the evening for some). They were selected from undergraduate students of the same department, so they had homogenous formal education. Therefore, taking students as the samples indirectly controlled several non-experimental variables, such as the income level, age, and formal education level.

Homogeneity is assumed to have been the cause of the significance of the test results among the inexperienced. The finding also

shows that gender is not the only non-experimental variable which deserves attention in research related to investors' risk aversion. The trading value averages of the male and female participants are shown in the following Figure 2.

Shock Effect

Barberis & Huang (2001) state that loss aversion happens when investors are more sensitive to loss than to gain. Their empirical findings show that if investors suffer a loss after making a gain the feeling of 'pain' caused by the loss will be less. The pain will be more felt if they suffer from a loss in the first transaction, which makes them sensitive in the next transactions. This shows that psychologically they are influenced by the loss caused by their first transaction. This empirical finding supports Thaler and Johnson's opinion (1990), as stated in Thaler (1999) about his MBA student experiment (see Thaler, 1999).

To relate this present research to Barberis & Huang's findings (2001), a detailed analysis was conducted on the participants who had losses and gains in the first round. The present researchers separated the (inexperienced and experienced) participants who had losses from those who had gains in the first round specifically for Treatment F only. This was done because in Treatment I the transaction was conducted per three rounds (one trading block), which made it more likely for the participants to have gains and also losses in their first trading block.

From the observation, it was found that 26 participants of the inexperienced group suffered losses in the first round, while the other 14 had gains. Meanwhile, among the experienced 25 participants suffered losses and the other 15 had gains in the first round. The trading value averages of the participants with losses and those with gains in Treatment F in the first round are presented in Figure 3.

As shown in the figure, the participants' behavior was in line with what was revealed by Barberis & Huang (2001). The participants losing in the first round generally reduced their trading value in the second round, while among the participants with gains in the first round tended to increase their trading value in the second round.

The participants in the inexperienced group who suffered a loss in the first round (F-Mhs (K)) generally decreased their trading
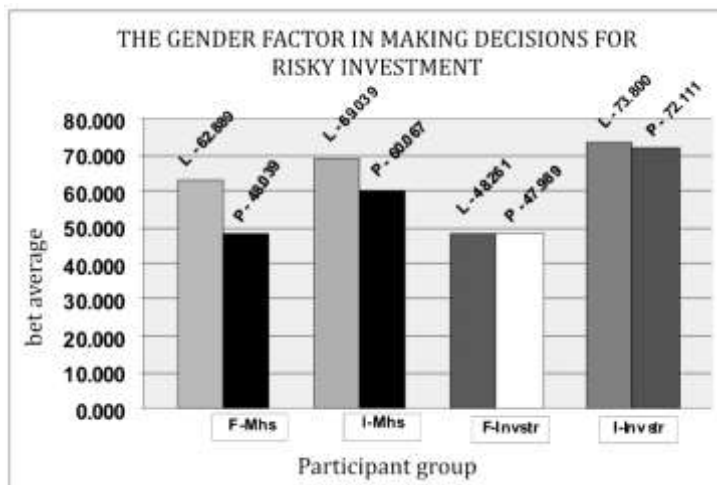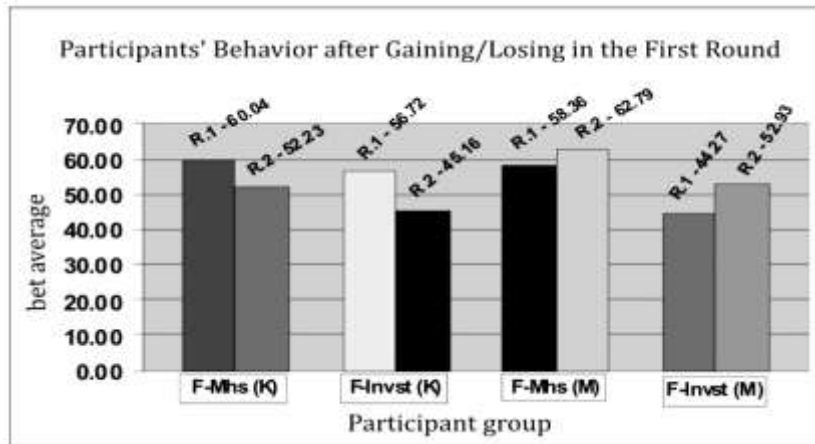

Figure 2. The Gender Factor in Making Decisions for Risky Investment

Notes: R.1/R.2   : Round 1 / Round 2
F-Mhs/F-Invst : Treatment F(Student Group)and Treatment F(Investor Group)
M/K   : Gain / Loss

Figure 3. Participants' Behavior after Gaining/Losing in the First Round

value average in the second round. Their trading value average in the first round was 60.04 units, but after losing in the first round, their average decreased to 52.23 units or by 7.81 units. Similarly, this also happened among the experienced participants. Their trading value average in the first round was 56.72 units. But after losing in the first round, it decreased to 45.16 units or by 11.56 units. The decrease was bigger than that among the inexperienced participants (which was 3.75 units lower).

Another phenomenon was observed among the participants winning in the first round. Among the inexperienced, their trading value average was 58.36 units, but after having a gain in the first round, it increased to 62.79 units or by 4.43 units. Meanwhile, for the experienced participants, their trading value average in their first round was 44.27 units, but it increased to 52.93 units or by 8.66 units after winning in the first round. The increase was 4.23 units higher than that among the inexperienced participants.

This happened because psychologically the participants were affected by the loss/gain from the first transaction, which drove them to decrease/decrease their trading value in the

next transaction. The loss and the gain gave the participants a shock effect which psychologically influenced them. This finding indirectly supports the opinion of Thaler & Johnson (Thaler, 1999).

The results of the analysis are also consistent with the loss aversion theory. Their sensitivity to loss was higher than that to gain. When they suffered a loss, they tended to make more conservative investment by decreasing their investment value. (The inexperienced participants' trading value average decreased by 7.81 units, while for the experienced participants the average decreased by 11.57 units). Meanwhile, when winning a gain, the increase of the trading value was not as big as the decrease of their investment value when suffering a loss.

Among the inexperienced participants, their trading value average increased by 4.43 units, while for the experienced it increased by 8.66 units. The results of this analysis also underscore the loss aversion theory on the different weighting for a loss and a gain. The analyses on the next following rounds were not conducted because the game accumulation for several rounds might result in more gains

and more losses so that participants will no longer experience any 'shock effect'.

CONCLUSION

The results of this experiment show that the two groups of participants demonstrated consistency with the MLA theory. From the nine trading rounds, the experienced group demonstrated the consistency since the onset of the experiment, whereas the inexperienced group's consistency was observed only in the last three rounds before the completion of the experiment. This finding shows that the experienced group's consistency with the MLA theory was higher than the inexperienced group's.

The next analysis dealt with the possible different behavior of the two different groups of participants in the process of making decisions for risky investment. The analysis results show that when receiving Treatment F the two groups behaved differently, which was statistically significant at the level of 10%. Further exploration shows that the significance value which was close to 10% was affected by the inexperienced group's consistency in the last three rounds before the completion of the experiment.

This study also studied the gender factor. The analysis results for the inexperienced group show that males were bolder in making decisions for risky investment than female. Meanwhile, for the experienced group the results show that there was no significant difference between males and females in their boldness in making investment decisions. The reviews on the previous research show that decision making for risky investment is also influenced by investors' education level, trading experience, income level, and age. This experiment also observed the presence of 'a shock effect'. This effect results from the participants' evaluation on the first transaction result (gain/loss) conducted under Treatment F by the participants in both the experienced and inexperienced groups.

RESEARCH LIMITATIONS AND FURTHER RESEARCH

This study used virtual endowment so that what is at stake in the trading is not the real cash. This condition might have potentially reduced the participants' perception of risk so that the use of real capital through a field experiment deserves consideration. In addition, this experiment has not included non-experimental variables, such the participants' education level, income level, age, and trading experience. Therefore, future research needs to consider those variables.

The discussion in this article is only a small portion of the problems observed in behavioral finance. Therefore, sound exploration is needed to develop this study discipline with the collaboration between practitioners and academicians by considering the aspect of investment psychology. In that way, it is expected that future financial research will not just answer the question "*what*" but also the question "*why*" so that the research results can be implemented in the real world.

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