THE INFLUENCE OF INVESTMENT HORIZON ON EXPECTED RETURNS AND RISK PERCEPTION: EVIDENCE FROM THE INDONESIAN MARKET

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ABSTRACT

This study analyzes the investment horizon from a behavioral point of view by examining the overall influence of different investment horizons on expected returns and risk perception in Indonesia. We used students of Master of Science, Master of Management, and Doctorate Programs at the Faculty of Economics and Business, Universitas Gadjah Mada, Indonesia as the sample in this research. Of the 217 questionnaires delivered, 172 questionnaires were completed, and hence were utilized in this study. We found that the respondents tend to overestimate the investment returns in shorter investment horizon, and tend to underestimate the expected returns in longer investment horizon. The participants tend to underestimate the long-term risk while overestimating the short-term risk. They also tend to assess lower subjective risk in longer horizon and are significantly inclined to forecast higher risk-adjusted expected returns in long investment horizon than those in short investment horizon.

JEL: G11, G15, C15

INTRODUCTION

Investment horizon can be defined as the period of time someone plans to put his or her money aside to invest (Wu, 2002). Life expectancy and pensionable age are the salient factors influencing the investment horizon. Investment horizon then determines the portfolio construction since the longer the investment horizon, the less risky the portfolio (Crabtree, Root, & Tse, 2000). Rule of thumb says that when a person grows older, he/she tends to be more risk-averse.

A vast array of research has been conducted on the influence of investment horizon on investment decisions. People at different stages of life have distinctive investment horizons and strategies. Wu (2002) divides people's life into four stages: (1) age 18 – 30 years, "getting started" investors; (2) age 30 – 45 years, "building wealth" investors; (3) age 45 – 55 years, "new horizon" investors; and (4) age 55 years and more, "nest egg" investors. She elaborates that time horizon is relevant to portfolio construction since the longer the time horizon, the more risk one can afford to take on to maximize returns, and vice versa, the shorter the time horizon, the more conservative one's investment has to be. Subsequently, Radcliffe (2002) documents that the expected sum of continuous returns increase linearly with the number of periods.

Albrecht, Maurer, and Ruckpaul (2001) examined the risk and performance of long-term stock investment in Germany. They find that both shortfall probability and shortfall expectation show a monotonously decreasing development over time. However, both risk measures have a persistent characteristic, meaning that the corresponding risk measures do not converge rapidly but rather slowly against zero, and that even for a very long horizon (30 years), the risk remains at a substantially high level. On the contrary, Siebenmorgen, Weber, and Weber (2000) find significant evidence in Germany and the United States for an underestimation of long-term risk compared to short-term risk, either volatility forecasts or subjective risk assessments. Furthermore, a similar conclusion is reported by Siebenmorgen and Weber (2000), who conducted empirical research in Germany. It is found that there are significant differences

between short-term and long-term risk perception behavior. The evidence exhibits that investors are inclined to underestimate the long-term returns and to underestimate the long-term risk likewise.

The choice of an optimal portfolio of assets is a classic problem, for both academics and practitioners. Common advice from stock market professionals is that long-term investors should invest a larger proportion in more risky assets, such as stocks, than should investors with shorter investment horizons (Booth, 2002). However, research conducted by Albrecht et al. (2001) in Germany proves that the question whether stocks dominate bonds or other less risky investments in the long run hinges on the used definition of risk. They find that the risk measure has a persistent characteristic, meaning that the corresponding risk measure does not converge rapidly but rather slowly against zero, and that even for a very long time horizon (30 years), the risk remains at a substantially high level.

The fact that the recommendations of professional advisors and "sages" are so at odds with the orthodox financial theory and that the topic is so fundamental in finance make this issue compelling to be discussed and examined. Besides, empirical research on various capital markets in the world with respect to the influence of different investment horizons on returns, risk, and investment decisions have yielded conflicting perspectives and conclusions. Hence, it is interesting to examine this phenomenon in Indonesia to find an evidence of how Indonesian investors perceive the risk and returns and consequently make investment decisions by taking their investment horizons into account.

Research Objectives

In this study, several research questions are discussed and examined: (1) Is there a difference between expected return perception in short investment horizon and that in long investment horizon for Indonesian investors? (2) Is risk perception in short investment horizon different from that in long investment horizon for Indonesian investors?

Research Benefits

Benefits to be obtained from this study's findings are: (1) the results can be harnessed to help Indonesian investors recognize their investment horizons and realize their risk and return characteristics, given the investment horizons as the frames, (2) the evidence is supposed to give recommendations for Indonesian investors of how they should allocate their funds in establishing their portfolios, both in the short horizon and in the long horizon, and (3) the results will enrich empirical evidence on this topic and may entice other researchers to further investigate these phenomena in the future.

This paper is divided into five sections. The first section is an introduction section. The second part discusses literature review and hypotheses development. Subsequently, research method is discussed in the third section. Section 4 comprises data analysis and discussion. Eventually, conclusions, implications, and suggestions are drawn in the final section.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Investment Horizon and Risk and Return

People at different stages of life have distinctive investment horizons and strategies. Wu (2002) divides people's life into four stages: (1) age 18 – 30 years, "getting started" investors; (2) age 30 – 45 years, "building wealth" investors; (3) age 45 – 55 years, "new horizon" investors; and (4) age 55 years and more, "nest egg" investors.

"Getting started" investors have the longest investment horizon, followed by "building wealth" investors, "new horizon" investors, and "nest egg" investors who have the shortest investment horizon. According to Wu (2002), time horizon is relevant to portfolio construction since the longer the time horizon, the more risk one could afford to take on to maximize returns, and vice versa. Another perspective, but almost similar to Wu (2002), is documented by Crabtree et al. (2000). They divide investment strategies into five categories, based on investors' investment horizons:

Income or principal preservation- This strategy is primarily used by retired investors who want to "live off" their investments, usually only taking the interest earned and maintaining principal. These investors may invest in corporate bonds, government bonds, utilities funds, or real estate investment trusts.

Typical conservative growth- It is generally considered by individuals whose investment horizons are between 5 and 10 years. These investors may invest in blue-chip funds (20%), corporate bonds (15%), value funds (10%), utilities funds (15%), high yield funds (15%), growth funds (15%), and equity income funds (10%).

Typical moderate growth- This type is usually used for individuals whose time horizons are 10 – 15 years. They may invest in growth funds (20%), value funds (20%), small cap value funds (20%), high yield funds (20%), and blue-chip funds (20%).

Typical aggressive growth- This strategy is purported for investors whose time frames are more than 15 years. These investors can invest in aggressive growth funds (20%), NASDAQ 100 Index funds (20%), small cap growth funds (20%), emerging market funds (20%), and international growth funds (20%).

Speculation: It is adopted by investors who strive for acquiring maximum returns without considering the risk. Derivatives securities such as options and futures are very tempting and challenging for them.

Investment decisions are supposed to be a function of expected returns, variance, and covariance structure of all investment alternatives' returns (Markowitz, 1952). However, informational constraints or bounded rationality may prevent ordinary investors from considering correlations or covariances when making portfolio allocations (Siebenmorgen et al., 2000). Nonetheless, at the very least, they should think of the expected returns and likely risk estimate on an investment. Even though investment theory reveals that risk and return have a positive relationship, existing empirical research on the time-series risk and return relation have depicted conflicting conclusions. Campbell and Hentschel (1992) and French, Schwert, and Stambaugh (1987) find that expected excess returns are positively related to its conditional variance (in Harrison and Zhang 1995). On the other hand, Breen, Glosten, and Jagannathan (1989), Campbell (1987), Fama and Schwert (1977), Glosten, Jagannathan, and Runkle (1993), Nelson (1991), and Pagan and Hong (1991) report a negative relationship between the expected excess returns and conditional volatility (in Harrison and Zhang, 1995). Harrison and Zhang (1995) conclude that analyzing the risk and return relation in longer horizon might yield sharper results, given the empirical evidence of greater return predictability in longer horizon.

In short horizon, the true long-run risk and return relation could be obscured by short-term noises, which might derive, for instance, from agents trading for portfolio rebalance and from unexpected immediate consumption. They also find a significant positive relation between the expected return and conditional volatility in the long holding interval. This result illustrates that different holding period can lead to significantly distinctive results since in the shorter interval, no meaningful risk and return relation emerges.

Subsequently, Radcliffe (2002) reveals that the expected sum of continuous returns increases linearly with the number of periods. Furthermore, if we consider variance to be a measure of risk, risk increases

linearly with the investment horizon. However, when standard deviation is deemed to be the measure of risk, the risk does not increase linearly with the investment horizon. In other words, the risk does not increase at the same rate as does the expected payoff. Hence, investors who have long investment horizons may harness a benefit of lower relative risk in the long run compared to the investors whose investment horizons are short.

Albrecht et al. (2001) examines risk and performance of long-term stock investment in Germany. It is found that both shortfall probability and shortfall expectation show a monotonously decreasing development over time and that the shortfall expectation shows a phase of increasing value only at the beginning. However, both risk measures have a persistent characteristic, showing that the corresponding risk measure does not converge rapidly but rather slowly against zero. Even for a very long time horizon (30 years), the risk remains at a substantially high level. Hence, they suggest that investment horizon does not play a big role in the risk and return measurement. Besides, investors should beware to believe that relative risk in the long-term horizon is lower than that in the short-term horizon since it hinges on the definition of the risk. On the contrary, Siebenmorgen et al. (2000) find significant evidence for an underestimation of long-term risk vis-à-vis short-term risk, either volatility forecasts or subjective risk assessments. The findings show that the participants' five-year volatility forecasts remain under the historical five-year benchmark, and risk assessments for one-year investment horizon are higher than those for five-year investment horizon.

Subsequently, Siebenmorgen and Weber (2000) conducted empirical research in Germany, and find that there is a significant difference between short-term and long-term risk perception behavior. The evidence exhibits that investors are inclined to underestimate long-term returns and also underestimate long-term risk. However, investors with long-term information tend to overestimate the expected returns compared to participants with short-term information.

Hence, predicated on the theoretical background and previous studies, two hypotheses are proposed:

H_1: There is a difference between expected return perception in short investment horizon and that in long investment horizon for Indonesian investors.

H_2: Risk perception in short investment horizon is different from that in long investment horizon for Indonesian investors.

RESEARCH METHOD

Sample

We used the students of Master of Science, Master of Management, and Doctorate Programs at the Faculty of Economics and Business, Universitas Gadjah Mada, Indonesia as the sample in this research. We delivered questionnaires to 217 students. Several rationales underlying our decision are: (1) the population has an infinite characteristic; (2) we do not have a complete list of the population; (3) compared to other types of investors, students are practitioners who capture and master the techniques of investment analysis and portfolio management; and (4) the students of Master of Management Program mostly have backgrounds of practitioners, such as brokers and investment managers, whereas those of Master of Science and Doctorate Programs are mostly academics. Hence, the combination of practitioners' and academics' views may lead to more reliable research evidence.

In order to confirm that the participants really understood the research questions, we required that the participants be students who were taking or had completed the portfolio management course.

Nevertheless, students who passed intertwined courses such as corporate finance and financial institutions management were admitted as well.

Data Collection Method

Data collected in this study comprised both primary and secondary data. As mentioned in the previous section, we distributed questionnaires to 217 respondents. The questionnaire consisted of 4 pages. On the first page, participants were requested to envisage as though they had inherited IDR1,000,000,000, and they would have invested the money (not for consumption). We then offered three investment alternatives: (1) Indonesian Composite Stock Price Index-Fund (IHSG-Fund), (2) Japanese Nikkei 225 Index-Fund (N225-Fund), and (3) U.S. Dow Jones Industrial Average Index–Fund (DJIA-Fund).

We exhibited the historical returns on those three investment alternatives. Half of the respondents got the historical annual return information, and the others were exhibited historical five-year return information. Subsequently, in depicting the historical returns, we divided the information into five informational conditions:

R+ (1): We showed the participants the names of the three investment alternatives and we also presented historical annual returns on those investments,
R+ (5): In this condition, we again presented the names of the investment alternatives, but we showed the historical five-year returns,
R- (1): The respondents did not know the names of the investment alternatives. They were labelled "Stock Fund 1", "Stock Fund 2", and "Stock Fund 3". In addition, we showed the historical one-year returns,
R- (5): Once again people did not know the real names of the investment alternatives, but they saw the historical five-year returns,
N: In this condition, we only showed the names of the investments without any historical return information.

The second page contained questions regarding the one-year investment horizon. The respondents might envisage that next year would be their pension ages, and they could not withdraw the money up to one year. We asked our participants three types of questions:

1. Market expectations by estimating a lower bound (10%-quantile), a median value (50%-quantile), and an upper bound (90%-quantile) for IDR1,000,000,000 investment in each of the investment alternatives.
2. Subjective risk assessments on each of the three risky investments. The respondents were requested to assess the risk of those three investment alternatives on a scale from 1 to 9 in which 1 means no risk and 9 refers to the highest risk.
3. Portfolio allocation offering a risk-free investment opportunity and the three risky investment alternatives. Herein, we used an artificial risk-free investment that constantly gave a guaranteed annual return of 10 percent.

No sooner did they complete filling out their answers on page 2 of the questionnaires, the participants went on opening the next page of the questionnaires in which they were not allowed to reopen page 2. Questions on page 3 resembled those on page 2 with a crucial distinction that we altered the investment horizon into the five-year investment horizon. At the time, the participants were requested to envisage that they had to invest the money but could not withdraw the money up to the next five years. We required that the respondents not use the information of other respondents' questionnaires to affirm that cognitive bias did not influence the participants' decisions.

Variables, Measures, and Data Analysis Methods

***Hypothesis 1*:** There is a difference between expected return perception in short investment horizon and that in long investment horizon for Indonesian investors

The historical returns on the three investment alternatives (IHSG-Fund, N225-Fund, and DJIA-Fund) were calculated, both one-year returns and five-year returns. We calculated the annual returns as follows:

$$R_{it} = \ln (i_{te}/i_{tb}) \quad (1)$$

R_{it} = return on investment i (i = IHSG-Fund, N225-Fund, DJIA-Fund) in year t (t = 1970-2002 for N225-Fund and DJIA-Fund, but t = 1985-2002 for IHSG-Fund),
i_{te} = value or price of investment i the end of year t,
i_{tb} = value or price of investment i at the beginning of year t.

Therefore, we obtained $R_{IHSG1985}$-$R_{IHSG2002}$, $R_{N2251970}$-$R_{N2252002}$, and $R_{DJIA1970}$-$R_{DJIA2002}$. Subsequently, we calculated the average annual returns as follows:

$$\mu i1 = \frac{\sum_{t=1970}^{2002} R_{it}}{33} \quad (2)$$

μ_{i1} = average annual return on investment i,
R_{it} = return on investment i in year t.

Equation (2) above was intended to calculate the average annual returns on N225-Fund and DJIA-Fund. However, for IHSG-Fund, we had to adjust the number of the years since we only had the historical data of IHSG from 1985.

$$\mu i1 = \frac{\sum_{t=1985}^{2002} R_{it}}{18} \quad (3)$$

μ_{i1} = average annual return on investment i (i = IHSG-Fund),
R_{it} = return on investment i (i = IHSG-Fund) in year t.

Eventually, we calculated the historical one-year return on each asset as follows:

$$R_{i1historical(point)} = e^{\mu il} - 1 \quad (4)$$

$R_{i1historical(point)}$ = historical one-year return on investment i,
e = the base of natural logarithms,
μ_{i1} = average annual return on investment i.

The method of calculating historical five-year returns on each investment alternative was analogous with that of calculating the historical one-year returns. From page 2 and page 3 of our questionnaires, we obtained the market expectations of the respondents: estimated lower bound (10%-quantile), estimated median value (50%-quantile), and estimated upper bound (90%-quantile) for IDR1,000,000,000 investment in each investment alternative. In order to examine the data, we transformed the lower bound, the median, and the upper bound value estimates of each participant on each investment alternative in

each investment horizon into the expected returns. We utilized the estimator of Pearson and Tukey applied by Siebenmorgen et al. (2000) and Siebenmorgen and Weber (2000). The formula is as follows:

$$E(R)_{ij} = 0.3\ln(Y_{ijl}^{0.1}/1{,}000{,}000{,}000) + 0.4\ln(Y_{ijm}^{0.5}/1{,}000{,}000{,}000) + 0.3\ln(Y_{iju}^{0.9}/1{,}000{,}000{,}000) \quad (5)$$

$E(R)_{ij}$ = expected return on investment i of participant j,
Y_{ijl} = lower bound estimate on investment i of participant j,
Y_{ijm} = median value estimate on investment i of participant j,
Y_{iju} = upper bound estimate on investment i of participant j.
We then found the expected return on each asset of each participant, both for one-year horizon and for five-year horizon.

Subsequently, we examined our first null hypothesis using the perceptional return bias. We used equation (6) and equation (7) below to calculate the expected return biases in one-year investment horizon and in five-year investment horizon, respectively.

$$E(R_{bias})_{ij1} = \frac{E(R)_{ij1}}{R_{i1historical(point)}} - 1 \quad (6)$$

$$E(R_{bias})_{ij5} = \frac{E(R)_{ij5}}{R_{i5historical(point)}} - 1 \quad (7)$$

$E(R_{bias})_{ij1}$ = expected return bias on investment i of participant j in one-year horizon,
$E(R_{bias})_{ij5}$ = expected return bias on investment i of participant j in five-year horizon,
$E(R)_{ij1}$ = expected return on investment i of participant j in one-year horizon,
$E(R)_{ij5}$ = expected return on investment i of participant j in five-year horizon,
$R_{i1historical(point)}$ = historical one-year return on investment i,
$R_{i5historical(point)}$ = historical five-year return on investment i.

Subsequently, we compared $E(R_{bias})_{ij1}$ to $E(R_{bias})_{ij5}$ on each investment alternative to find evidence whether $E(R_{bias})_{ij1}$ and $E(R_{bias})_{ij5}$ were from the same population. Although we had a large number of sample and that the data were in ratio scales, we decided to do the normality tests. We tested the normal distribution assumption using the one-sample Kolmogorov-Smirnov test, which resulted in an abnormality of our data. Consequently, the statistical tool utilized was a nonparametric version of paired-samples t-test, the Wilcoxon W-test.

Shefrin (2000) postulates that framing effect may lead investors to behave irrationally in making investment decisions. Hence, we examined the framing effect as well. We were motivated to know whether $E(R_{bias})_{ij}$ of participants who on page 1 of the questionnaires were given either only the names of the investment alternatives (N), only the historical returns (R-), or the names and the historical returns (R+), were the same. Kruskal-Wallis H-test, a nonparametric version of one-way ANOVA, was used to examine the framing effect. The testing was conducted on each investment alternative in both short investment horizon and long investment horizon.

Subsequently, we also wondered if $E(R_{bias})_{ij}$ of the participants who obtained historical one-year return information on page 1 of the questionnaires was the same with $E(R_{bias})_{ij}$ of the respondents who got the

historical five-year return information on page 1 of the questionnaires. Mann-Whitney U-test was used to examine this statistical informational effect. The examination was done on each investment alternative in both short investment horizon and long investment horizon.

Hypothesis 2: Risk perception in short investment horizon is different from that in long investment horizon for Indonesian investors. We firstly calculated the standard deviation of the annual returns as follows:

$$\sigma i1 = \sqrt{\frac{\sum_{t=1970}^{2002} (R\,it - \mu i1)^2}{33}} \tag{8}$$

σ_{i1} = standard deviation of annual return on investment i,
μ_{i1} = average annual return on investment i,
R_{it} = return on investment i in year t.

The equation above was used for calculating the standard deviation of the annual returns on N225-Fund and DJIA-Fund. However, for IHSG-Fund, we again had to adjust the number of the years as follows:

$$\sigma i1 = \sqrt{\frac{\sum_{t=1985}^{2002} (R\,it - \mu i1)^2}{18}} \tag{9}$$

σ_{i1} = standard deviation of annual return on investment i (i = IHSG-Fund),
μ_{i1} = average annual return on investment i (i = IHSG-Fund),
R_{it} = return on investment i (i = IHSG-Fund) in year t.
Subsequently, we calculated the historical standard deviation of one-year return on each investment using the following formula:

$$\sigma_{i1historical(point)} = \sqrt{e^{2\mu_{i1}} . (e^{\sigma_{i1}^2} - 1)} \tag{10}$$

$\sigma_{i1historical(point)}$ = historical standard deviation of one-year return on investment i,
e = the base of natural logarithms,
μ_{i1} = average annual return on investment i,
σ_{i1} = standard deviation of annual return on investment i.

The calculation of the historical standard deviation of five-year returns on each investment alternative was analogous with that of historical standard deviation of one-year returns. The participants exhibited their market expectations on page 2 and page 3 of the research questionnaires in which the market expectations were estimated in lower bound (10%-quantile), median (50%-quantile), and upper bound (90%-quantile) values for IDR1,000,000,000 investment in each investment alternative. In the testing of the first hypothesis, we found the expected returns on each asset in short and long investment horizons. In order to examine the data, we transformed the lower bound, the median, and the upper bound value estimates of each participant on each investment alternative in each investment horizon into the standard deviation forecasts of the expected returns.

$$\sigma_{ijforecast} = \sqrt{\begin{array}{l}(0.3\ln(Y_{ij}^{0.1}/1{,}000{,}000{,}000)^2 + 0.4\ln(Y_{ij}^{0.5}/1{,}000{,}000{,}000)^2 + \\ 0.3\ln(Y_{ij}^{0.9}/1{,}000{,}000{,}000)^2) - (E(R)_{ij})^2\end{array}} \quad (11)$$

$\sigma_{ijforecast}$ = standard-deviation-of-expected-return forecast on investment i of participant j,
Y_{ijl} = lower bound estimate on investment i of participant j,
Y_{ijm} = median value estimate on investment i of participant j,
Y_{iju} = upper bound estimate on investment i of participant j,
$E(R)_{ij}$ = expected return on investment i of participant j.

We then calculated the standard-deviation-of-the-expected-return forecasts of each respondent on each investment alternative, in both one-year horizon and five-year horizon. Eventually, we examined our second hypothesis using the standard deviation bias. We used equation (12) and equation (13) below to calculate the standard-deviation-on-the-expected-return biases in one-year investment horizon and in five-year investment horizon, respectively.

$$\sigma_{(bias)ij1} = \frac{\sigma_{ij1forecast}}{\sigma_{i1historical(point)}} - 1 \quad (12)$$

$$\sigma_{(bias)ij5} = \frac{\sigma_{ij5forecast}}{\sigma_{i5historical(point)}} - 1 \quad (13)$$

$\sigma_{(bias)ij1}$ = standard-deviation-of-expected-return bias on investment i of participant j in one-year horizon,
$\sigma_{(bias)ij5}$ = standard-deviation-of-expected-return bias on investment i of participant j in five-year horizon,
$\sigma_{ij1forecast}$ = standard-deviation-of-expected-return forecast on investment i of participant j in one-year horizon,
$\sigma_{ij5forecast}$ = standard-deviation-of-expected-return forecast on investment i of participant j in five-year horizon,
$\sigma_{i1historical(point)}$ = historical standard deviation of one-year return on investment i,
$\sigma_{i5historical(point)}$ = historical standard deviation of five-year return on investment i.

Our null hypothesis states that the risk perceived by investors in short investment horizon is the same as the risk perceived in the long investment horizon. We compared $\sigma_{(bias)ij1}$ to $\sigma_{(bias)ij5}$ on each investment alternative to prove whether $\sigma_{(bias)ij1}$ was significantly different from $\sigma_{(bias)ij5}$. Wilcoxon W-test was used to examine the hypothesis. We required that α or the credence level be 5 percent to be able to reject the null hypothesis.

As conducted in the examination of our first hypothesis, we examined the framing effect likewise. We applied the Kruskal-Wallis H-test to examine the framing effect on each investment alternative in both short investment horizon and long investment horizon. Moreover, Mann-Whitney U-test was again utilized to test the statistical informational effect. The examination was conducted on each investment alternative and in both investment horizons.

As mentioned in the previous part, risk perception in this study is divided into the standard deviation forecasts and the subjective risk assessments. On page 2 and page 3 of the questionnaire, not only did we request the respondents to give their market expectations, but we also asked the participants to give their subjective risk assessments on each investment alternative. The respondents assessed the risk of the three investment alternatives on a scale from 1 to 9 in which 1 means no risk and 9 refers to the highest risk.

Accordingly, we acquired the subjective risk assessments on each asset in one-year and five-year horizons. We denote the subjective risk assessment on investment i of participant j as SR_{ij}. We then made a comparison between SR_{ij1} and SR_{ij5}, where SR_{ij1} is the subjective risk assessment on investment i of participant j in one-year horizon and SR_{ij5} is the subjective risk assessment on investment i of participant j in five-year horizon. Using the Wilcoxon W-test, we desired to find evidence whether the subjective risk assessment in the short investment horizon was the same as that in the long investment horizon for each investment alternative.

In the testing of the first hypothesis, we would like to know whether the expected return bias in the short investment horizon was the same as that in the long investment horizon. Subsequently, from the second hypothesis testing, we desired to find whether the risk perception in the short investment horizon was also the same as that in the long investment horizon. It is unreasonable to talk about investment returns without considering the risk. Hence, in order to get more formal evidence, we combined those two variables, the expected returns and the standard deviation forecasts. By dividing the expected returns by the standard deviation forecasts, we obtained the risk-adjusted expected returns.

$$\text{R - a } E(R)_{ij1} = \frac{E(R)_{ij1}}{\sigma_{ij1\,forecast}} \tag{14}$$

$$\text{R - a } E(R)_{ij5} = \frac{E(R)_{ij5}}{\sigma_{ij5\,forecast}} \tag{15}$$

$\text{R-a } E(R)_{ij1}$ = risk-adjusted expected return on investment alternative i of participant j in the one-year investment horizon,
$\text{R-a } E(R)_{ij5}$ = risk-adjusted expected return on investment alternative i of participant j in the five-year investment horizon,
$E(R)_{ij1}$ = expected return on investment i of participant j in the one-year horizon,
$E(R)_{ij5}$ = expected return on investment i of participant j in the five-year horizon,
$\sigma_{ij1\,forecast}$ = standard-deviation-of-expected-return forecast on investment i of participant j in one-year investment horizon,
$\sigma_{ij5\,forecast}$ = standard-deviation-of-expected-return forecast on investment i of participant j in five-year investment horizon.

We then compared $\text{R-a } E(R)_{ij1}$ to $\text{R-a } E(R)_{ij5}$ in which the testing procedures were the same with that of the expected return biases. Risk-adjusted expected return is the main consideration for making an investment decision; hence, by analyzing the difference between the risk-adjusted expected return in short horizon and that in the long horizon, we expected to acquire a better measure of how investors consider their investment horizons in calculating the returns and the risk.

DATA ANALYSIS AND DISCUSSION

Descriptive Statistics

As elaborated in the previous chapter, we delivered the questionnaires to 217 participants. We could only find 172 questionnaires completed properly, which were used for analysis. Table 1 below exhibits the condition of questionnaires received.

Table 1: Received Questionnaires per Condition

Statistical Information	Only Names	Only Historical Information		Names and Historical Information	
		1 year	5 years	1 year	5 years
	N	R- (1)	R- (5)	R+ (1)	R+ (5)
Number of the questionnaires	41	33	26	38	34

As shown in Table 1, we received nearly an equal number of questionnaires for each condition.

Testing of the Differences of Expected Returns

Prior to testing the hypothesis, first of all we checked for the normality of the data. Although we had a large number of sample, and that the data were in ratio scales, we decided to do the normality tests using the one-sample Kolmogorov-Smirnov test. The results are exhibited in the following table.

Table 2: Normality Tests on the Expected Return Data

Variable	Kolmogorov-Smirnov Z
$E(R_{bias})_{IHSGj1}$	1.509*
$E(R_{bias})_{IHSGj5}$	1.542*
$E(R_{bias})_{N225j1}$	1.769**
$E(R_{bias})_{N225j5}$	1.567*
$E(R_{bias})_{DJIAj1}$	1.882**
$E(R_{bias})_{DJIAj5}$	1.908**
R-a $E(R)_{IHSGj1}$	1.343
R-a $E(R)_{IHSGj5}$	3.021**
R-a $E(R)_{N225j1}$	0.898
R-a $E(R)_{N225j5}$	2.527**
R-a $E(R)_{DJIAj1}$	1.034
R-a $E(R)_{DJIAj5}$	2.784**

* *significant at the credence level of 5 percent,*
** *significant at the credence level of 1 percent.*

The results in Table 2 show that almost all of the data to be examined in this research were not normally distributed. Accordingly, we used the nonparametric statistical tools to examine the hypothesis. In order to examine the first hypothesis, we compared $E(R_{bias})_{ij1}$ to $E(R_{bias})_{ij5}$ on each investment alternative using the Wilcoxon W-test to find evidence whether $E(R_{bias})_{ij1}$ and $E(R_{bias})_{ij5}$ were from the same population. The results are shown in the following table.

Table 3: Tests of the Differences between Expected Return Bias in One-year Horizon and Those in Five-year Horizon

	Variable		Mean	Median	Z
$E(R_{bias})$	One-year	IHSG-Fund	0.453965340	0.174012285	-7.480**
	Five-year	IHSG-Fund	-0.505253709	-0.607050194	
	One-year	N225-Fund	2.533902989	1.086276476	-5.483**
	Five-year	N225-Fund	0.375234457	0.134455099	
	One-year	DJIA-Fund	1.968830662	1.074539265	-7.601**
	Five-year	DJIA-Fund	-0.211784085	-0.046749800	

* *significant at the credence level of 5 percent,*
** *significant at the credence level of 1 percent.*

From the testing results depicted in Table 4, it can be seen that investors tend to overestimate the investment returns in the shorter investment horizon and tend to underestimate the expected returns in the longer investment horizon, except for the expected return on the N225-Fund that is slightly overestimated

in the long horizon. Nevertheless, the overestimation of the N225-Fund in the short investment horizon is still much higher than its overestimation in the long investment horizon. In other words, in general, five-year returns are inclined to be underestimated vis-à-vis one-year returns. The evidence prevails for all the three investment alternatives. Moreover, the differences between the expected return biases of the three assets in short investment horizon and those of the assets in long investment horizon are strongly significant for all assets. Hence, we may reject the first null hypothesis, indicating that that there is a significant difference between the expected return perception in the short investment horizon and that in the long investment horizon for Indonesian investors. The investors are inclined to overestimate the expected returns in the shorter investment horizon and tend to underestimate the expected returns in the longer horizon. Subsequently, we examined the framing effect regarding the three types of information. We would like to know whether the differences of expected return perception were influenced by the framing effect. The testing was conducted using the Kruskal-Wallis test, and the results are shown in the following table.

Table 4: Tests of Framing Effect on the Expected Return Biases

Variable			Frame N		Frame R-		Frame R+		χ^2
			Mean	Median	Mean	Median	Mean	Median	
	One-year	IHSG-Fund	0.6895	0.2986	0.8136	0.2986	0.0250	-0.0726	4.889
	Five-year	IHSG-Fund	-0.4194	-0.6124	-0.5571	-0.6556	-0.5116	-0.5954	1.733
	One-year	N225-Fund	6.0594	4.5148	2.0225	0.8531	0.9453	0.1588	26.269**
	Five-year	N225-Fund	0.9969	0.6071	0.0563	-0.0627	0.2824	-0.0166	14.079**
	One-year	DJIA-Fund	3.7899	2.6975	1.4717	0.4597	1.3390	1.0705	17.837**
$E(R_{bias})$	**Five-year**	DJIA-Fund	0.6479	0.2722	-0.0743	-0.2601	0.1978	0.0482	13.236**

* *significant at the credence level of 5 percent,*
** *significant at the credence level of 1 percent.*

From the testing results, it can be seen that the framing effect does not influence the IHSG-Fund, both in one-year horizon and in five-year horizon. However, the N225-Fund and the DJIA-Fund are significantly influenced by the framing effect. The investors tend to assess higher expected returns in N condition than in R+ and R- conditions. The possible reason for this phenomenon is that when the respondents were only given the names of the investment alternatives without any historical return information, they estimated the assets' returns using their commonsense and knowledge that Dow Jones Industrial Average and Nikkei 225 were very famous and prospective market indices as they were located in the largest and second largest economies in the world, respectively. Accordingly, due to the unavailability of historical returns, the respondents had to estimate the returns by relying on their personal judgments on the DJIA-Fund and the N225-Fund, which might include the popularity of those assets and the mindsets of respondents towards those investment alternatives.

Meanwhile, we cannot significantly find the framing effect on the IHSG-Fund. The salient reason that may elaborate the evidence is that the investors have sufficient knowledge of the Indonesian capital market and its market index, including its developments and even its historical returns, since most of the respondents have traded stocks on the Jakarta Stock Exchange. Hence, the frames, either R+, R-, or N, do not influence the investors' expected returns since the participants have had huge amount of information on the characteristics and the prospect of the market index.

We also examined the statistical informational effect on the expected return bias in which we desired to know whether the participants who were given the assets' historical annual returns on page 1 of their questionnaires estimated the same expected returns as the respondents who got the historical five-year returns on page 1 of their questionnaires. Mann-Whitney U-test was utilized, and the testing results are shown in the following table.

Table 5: Tests of Statistical Informational Effect on the Expected Return Biases

Variable			Statistical Information: Annual Returns Mean	Annual Returns Median	Five-year Returns Mean	Five-year Returns Median	U
	One-year	IHSG-Fund	0.19204	0.12191	0.60291	0.12366	2017.500
	Five-year	IHSG-Fund	-0.57148	-0.65566	-0.48552	-0.59669	1971.500
	One-year	N225-Fund	1.29271	0.18889	1.59354	0.49280	2111.500
	Five-year	N225-Fund	0.11545	-0.06274	0.25781	-0.04089	2041.000
	One-year	DJIA-Fund	0.58330	0.08748	2.36393	1.38387	1382.500**
$E(R_{bias})$	Five-year	DJIA-Fund	-0.14213	-0.25379	0.33251	0.04910	1624.500**

* *significant at the credence level of 5 percent,*
** *significant at the credence level of 1 percent.*

Except for the DJIA-Fund, both in short horizon and in long horizon, we cannot find any significant statistical informational effect on the expected return perception. For the DJIA-Fund, the respondents who acquired the historical five-year return data on page 1 of their questionnaires tended to assess higher expected returns than those who got the historical one-year returns on page 1 of their questionnaires. The possible rationale is intertwined with the data coverage. The historical annual return data encompassed the data from 1970 to 2002 whereas the data of historical five-year return only covered the period of 1970-1999. Accordingly, the historical annual return data included the period when World Trade Center tragedy occurred; consequently, the DJIA decreased sharply at the time. Hence, the participants who were given the historical five-year return data on page 1 of their questionnaires were inclined to assess higher expected returns compared to those who got the historical annual return data on page 1 of their questionnaires.

Examination of the Differences of Risk Perception

While the first hypothesis is concerned with the expected return perception, the second hypothesis is related to the bias of standard deviation perception or the bias of the risk perception. The null hypothesis postulates that the risk perception in the short investment horizon is the same with that in the long investment horizon.We tested the normality of data in the first hypothesis. Likewise, we also checked the normality of data in the second hypothesis. The following table summarizes the results.

We again found the abnormality on part of the data. Therefore, the nonparametric tests were used for examining the hypothesis. In the testing of the second hypothesis, we compared $\sigma(_{bias})_{ij1}$ to $\sigma(_{bias})_{ij5}$ in order to find whether the risk perception in the short investment horizon was the same as that in the long investment horizon. The results are as follows.

Table 6: Normality Tests on the Standard Deviation Data

Variable	Kolmogorov-Smirnov Z
$\sigma(_{bias})_{IHSGj1}$	0.659
$\sigma(_{bias})_{IHSGj5}$	1.884**
$\sigma(_{bias})_{N225j1}$	0.963
$\sigma(_{bias})_{N225j5}$	1.827**
$\sigma(_{bias})_{DJIAj1}$	0.792
$\sigma(_{bias})_{DJIAj5}$	2.127**

* *significant at the credence level of 5 percent,*
** *significant at the credence level of 1 percent.*

Table 7: Tests of the Differences between Standard Deviation Bias in One-year Horizon and That in Five-year Horizon

Variable			Mean	Median	Z
$\sigma_{(bias)}$	**One-year**	IHSG-Fund	-0.027047340	-0.019692959	-11.098**
	Five-year	IHSG-Fund	-0.683814402	-0.655886041	
	One-year	N225-Fund	0.916728247	0.923914360	-10.718**
	Five-year	N225-Fund	-0.264626891	-0.211582745	
	One-year	DJIA-Fund	2.184228816	2.259319519	-11.136**
	Five-year	DJIA-Fund	-0.010600186	0.102920467	

* *significant at the credence level of 5 percent,*
** *significant at the credence level of 1 percent.*

The evidence shows that the difference between the risk perception in the short investment horizon is significantly different from that in the long investment horizon for the three investment alternatives. Hence, we can reject the second null hypothesis. The findings indicate that the investors tend to underestimate the long-term risk while overestimating the short-term risk, except for the risk perception on IHSG-Fund that is somewhat underestimated in the short horizon. Nevertheless, the underestimation of the risk perception on the IHSG-Fund in the longer horizon is much higher than the underestimation of the IHSG-Fund's risk in the shorter horizon.

Subsequently, we checked for the framing effect on the risk perception. We would like to know whether the differences of standard deviation perception were influenced by the framing effect, which was participants were given either only the names and descriptions of the three risky investments (N), only the historical returns (R-), or the names and the historical returns (R+). The testing was conducted using the Kruskal-Wallis test.

Table 8: Tests of Framing Effect on the Standard Deviation Bias

Variable			Frame N Mean	N Median	R- Mean	R- Median	R+ Mean	R+ Median	χ^2
$\sigma_{(bias)}$	One-year	IHSG-Fund	-0.0257	-0.0139	0.0205	0.0145	-0.0667	-0.0658	0.975
	Five-year	IHSG-Fund	-0.6757	-0.6556	-0.6904	-0.6575	-0.6830	-0.6535	0.286
	One-year	N225-Fund	1.4683	1.5257	0.8413	0.8088	0.6643	0.4123	16.634**
	Five-year	N225-Fund	-0.1522	-0.1133	-0.3141	-0.2350	-0.2880	-0.2366	12.986**
	One-year	DJIA-Fund	2.9693	3.0601	1.8234	1.9143	2.0328	2.1760	15.370**
	Five-year	DJIA-Fund	0.1540	0.1994	-0.1043	-0.0011	-0.0275	0.1003	17.162**

* *significant at the credence level of 5 percent,*
** *significant at the credence level of 1 percent.*

It is very interesting to see that the findings substantiate the testing results of the framing effect on the expected return biases. While the framing effect does influence the expected return perception, where investors who received the questionnaires in N condition (only names of the assets were given) tend to overestimate the expected return on the N225-Fund and the DJIA-Fund, we also find that the framing effect significantly influences the standard deviation perception on the N225-Fund and the DJIA-Fund. The investors who received the questionnaires in N condition are inclined to estimate higher volatility forecasts than those who received the questionnaires in R+ and R- conditions.

It is possible that due to the unavailability of historical returns in N condition and because of the unfamiliarity of the respondents to the N225-Fund and the DJIA-Fund, the investors tend to be careful and anxious about the risk, especially after the World Trade Center tragedy and in the circumstances of Gulf War II. Therefore, they estimate higher risk on those funds in N condition than the risk in R+ and R- conditions.Moreover, we would like to examine whether the standard deviation biases of the participants who got the historical one-year return information on page 1 of the questionnaires were the same as those of the respondents who obtained the historical five-year return information on page 1 of the

questionnaires. Mann-Whitney U-test was utilized again to test the statistical informational effect. The testing was conducted for each investment alternative and in both investment horizons.

Table 9: Tests of Statistical Informational Effect on the Standard Deviation Bias

Variable			Statistical Information				U
			Annual Returns		Five-year Returns		
			Mean	Median	Mean	Median	
$\sigma_{(bias)}$	One-year	IHSG-Fund	-0.02950	-0.02040	-0.02500	-0.04219	2112.500
	Five-year	IHSG-Fund	-0.68400	-0.65616	-0.68911	-0.65456	2012.500
	One-year	N225-Fund	0.73946	0.68759	0.74957	0.54962	2074.500
	Five-year	N225-Fund	-0.30051	-0.23508	-0.29897	-0.23665	2126.000
	One-year	DJIA-Fund	1.5556	1.66992	2.39153	2.37725	1453.500**
	Five-year	DJIA-Fund	-0.07387	-0.00274	-0.04824	0.05789	2041.500

* *significant at the credence level of 5 percent,*
** *significant at the credence level of 1 percent.*

Table 9 above exhibits that in general, the statistical informational effect does not influence the participants' risk perception. The only significant result is prevalent for the DJIA-Fund in short investment horizon. From the testing of the statistical informational effect on the expected return biases, the investors who acquired the historical five-year return data on page 1 of their questionnaires tend to estimate higher expected returns than those who got the historical one-year returns on page 1 of their questionnaires. Hence, the possible rationale for the phenomenon is that they expect higher rate of returns subsequent to the higher risk assumed. Therefore, not only do they overestimate the expected returns, but they also overestimate the risk when they received the historical five-year return data on page 1 of their questionnaires.

We had tested the differences of risk perception in terms of standard deviation forecasts. Afterwards, we desired to examine the differences of the respondents' subjective risk assessments as a complement to the volatility forecasts. As explained in the previous chapter, we also requested the participants to give their subjective risk assessment on the three investment alternatives by choosing a number from 1 to 9 for each asset, where 1 means no risk at all while 9 indicates the highest risk. Since the data were in ordinal scales, we directly utilized the Wilcoxon test to examine the differences. We exhibit the results in Table 10 below.

Table 10: Tests of the Differences between Subjective Risk Assessments in One-year Horizon and Those in Five-year Horizon

Variable			Mean	Median	Z
	One-year	IHSG-Fund	5.9012	6.00	-6.262**
	Five-year	IHSG-Fund	5.0233	5.00	
SR	**One-year**	N225-Fund	5.6744	5.00	-8.265**
	Five-year	N225-Fund	4.6512	4.50	
	One-year	DJIA-Fund	4.4826	4.00	-5.679**
	Five-year	DJIA-Fund	3.6570	3.00	

* *significant at the credence level of 5 percent,*
** *significant at the credence level of 1 percent.*

As found in the differences of standard deviation forecasts, we find consistent results in the testing of the subjective risk assessments. The investors tend to assess lower subjective risk in the longer horizon than that in the shorter investment horizon. The differences are significant for all investment alternatives. Accordingly, this evidence substantiates the finding on the underestimation of the long-term volatility forecasts, and supports the rejection of the second null hypothesis.

In the testing of the first hypothesis, we prove that the expected return biases in the short investment horizon are significantly different from those in the long investment horizon, where the investors are

inclined to estimate higher expected returns in the short horizon than in the long horizon. From the results of the second hypothesis testing, we find that the risk perception in the short investment horizon is also significantly different from that in the long investment horizon. The participants tend to underestimate the long-term standard deviations and tend to perceive higher risk in the short horizon than in the long horizon. It is unreasonable to discuss investment returns without considering the risk. Hence, in order to get more formal evidence, we combined those two variables, the expected returns and the standard deviation forecasts. By dividing the expected returns by the standard deviation forecasts, we obtained the risk-adjusted expected returns. We then compared R-a $E(R)_{ij1}$ to R-a $E(R)_{ij5}$ in which the testing procedures were similar to that of the expected return biases. We show the results below.

Table 11: Tests of the Differences between Risk-adjusted Expected Returns in One-year Horizon and Those of in Five-year Horizon

Variable			Mean	Median	Z
	One-year	IHSG-Fund	0.242345184	0.261078810	-10.000**
	Five-year	IHSG-Fund	0.744162316	0.541177210	
R-a E(R)	**One-year**	N225-Fund	0.214124836	0.209929184	-10.697**
	Five-year	N225-Fund	0.688281852	0.558564962	
	One-year	DJIA-Fund	0.302201868	0.287518506	-10.558**
	Five-year	DJIA-Fund	0.851145105	0.602763610	

** significant at the credence level of 5 percent,*
*** significant at the credence level of 1 percent.*

The testing results in Table 11 indicate that the investors are significantly inclined to assess higher risk-adjusted expected returns in the long investment horizon than those in the short investment horizon. The first hypothesis testing finding leads us to conclude that Indonesian investors tend to give lower expected returns in the longer investment horizon. However, it must be noted that the result is not conflicted with the finding that the investors are inclined to expect higher risk-adjusted returns in the longer investment horizon. In the first hypothesis testing, the denominators were the historical expected return on the three investment alternatives whereas in the testing of the risk-adjusted expected returns, the denominators were the standard deviation forecasts.

Accordingly, the underestimation of the standard deviations really plays an important role in increasing the risk-adjusted expected returns in the long investment horizon. In other words, the underestimation of the standard deviation forecasts in the longer investment horizon is much higher than the overestimation of the expected returns in the shorter investment horizon. Hence, we may conclude that different investment horizons do exert a significant influence on the expected returns and the risk perception of Indonesian investors.

CONCLUSIONS

After examining the hypotheses and testing several effects, we find evidence as follows. First, the difference between the expected return bias in short investment horizon and that in long investment horizon is strongly significant for all assets analyzed in this study. The investors tend to overestimate the investment returns in the shorter investment horizon and tend to underestimate the expected returns in the longer investment horizon, except for the expected return on the N225-Fund that is slightly overestimated in the long horizon. Hence, the first null hypothesis is rejected, and the alternate hypothesis is substantiated.

Second, the investors are inclined to estimate much higher expected returns in N condition than in R+ and R- conditions. The framing effect does not influence the IHSG-Fund, both in one-year horizon and in five-year horizon. However, the N225-Fund and the DJIA-Fund are significantly influenced by the framing effect.

Third, except for the DJIA-Fund, both in short horizon and in long horizon, we cannot find any significant statistical informational effect on the expected return perception. For the DJIA-Fund, the investors who acquired the historical five-year return data on page 1 of their questionnaires tend to estimate higher expected returns than those who got the historical one-year returns on page 1 of their questionnaires.

Fourth, the difference between the risk perception in the short investment horizon is significantly different from that in the long investment horizon. The results are evident for the three investment alternatives. Hence, we reject the second null hypothesis. An elaboration that can be made from the findings is that the investors tend to underestimate the long-term risk while overestimating the short-term risk, except for the risk perception on IHSG-Fund that is somewhat underestimated in the short horizon. Nevertheless, the underestimation of the risk perception on the IHSG-Fund in the longer horizon is much higher than the underestimation of the IHSG-Fund's risk in the shorter horizon.

Fifth, the framing effect significantly influences the standard deviation perception on the N225-Fund and the DJIA-Fund, both in short horizon and in long horizon. The investors who received the questionnaires in N condition are inclined to estimate higher volatility forecasts than those who received the questionnaires in R+ and R- conditions.

Sixth, in general, the statistical informational effect does not influence the participants' risk perception. The only significant result is prevalent on the DJIA-Fund in short investment horizon.

Seventh, the investors tend to assess lower subjective risk in the longer horizon than that in the shorter investment horizon. The difference is significant for all investment alternatives. Accordingly, this evidence substantiates the finding of the underestimation of the long-term volatility forecasts, and supports the rejection of the second null hypothesis.

Eight, the investors are significantly inclined to estimate higher risk-adjusted expected returns in the long investment horizon than those in the short investment horizon. The underestimation of the standard deviations really plays a crucial role in increasing the risk-adjusted expected returns in the long investment horizon. In other words, the underestimation of the standard deviation forecasts in the longer investment horizon is much higher than the overestimation of the expected returns in the shorter investment horizon.

IMPLICATIONS

Based on the findings of this study, there are several implications for investment community. First,
In making investment decisions, investors should consider their investment horizons. The longer their horizons, the higher their opportunities to put their funds in riskier assets.Second, due to the tendency of the investors to be willing to assume higher portfolio risk in the longer investment horizon, the investment managers, including the mutual fund managers, should accommodate this intent. The investment professionals should recommend their investors whose investment horizons are long to invest in riskier assets while recommending their investors whose horizons are short to invest in less risky assets. Third,
this research finds that the framing effect has an influence on the expected returns, the risk perception, and the investment decisions when the investors do not well recognize the characteristics of the assets. In the situation, they hinge on personal judgments on the assets where the popularity of the assets may also affect the investors' decisions. Unfortunately, the fact shows that the popular assets do not necessarily provide higher risk-adjusted returns vis-à-vis the less popular assets. Hence, in order to minimize the framing effect in the real investing circumstances, investors should analyze the fundamentals of those assets, including their historical returns, before making investment decisions.

LIMITATIONS AND SUGGESTIONS

Research on the investment horizons is still a new study in Indonesia, and we acknowledge that this study has limitations to be improved in subsequent research. These limitations are. First, the sample used in this research is graduate students of Universitas Gadjah Mada, Indonesia. The students may come from various backgrounds, not only financial managers or investors. Hence, next researches had better use various types of investors. Second, this study does not examine the sequence effect, which is whether the investment decisions of respondents who firstly answer short-horizon questions and then answer long-horizon questions are different from the investment decisions of respondents who firstly answer long-horizon questions and then answer short-horizon questions. Therefore, future studies may accommodate this effect. Third, one of the natural weaknesses of behavioral finance is the distinction between perceptions and real actions. The perceptions given by the investors do not necessarily guarantee that the respondents will precisely conduct what they have answered in the questionnaires. Hence, bias in behavioral finance research is not impossible.

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