

Individual Investor Behavior Analysis in Investment Asset Allocation Using the Analytical Hierarchy (AHP) Method

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ABSTRACT: *Investment decision is an important financial activity to be carried out for investment actors because it has direct involvement in making benefits for the future of the resources owned by investors nowadays. Investment decisions can help in allocating investment capital in the most effective way and ensuring that the returns obtained are the best returns. However, the facts showed that investors are often affected by psychological bias such as determining factors that influences their preferences and investment decisions. This research was conducted with the aim to analyze at investor preferences in the allocation of their investment assets. This study uses a quantitative approach, types of explanatory research, Analytical Hierarchy Process (AHP) techniques, survey methods, by distributing questionnaires to 100 respondents to the technique of taking samples of non-probability sampling. The results of the study shows that most respondents prefer stocks as their investment alternative when allocating assets.*

KEY WORD: *Investor Preferences, Analytical Hierarchy Process, Asset Allocation*

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I. INTRODUCTION

Investment decision is an important financial activity to be carried out for investment actors. Because investment has a direct involvement in making future benefits from other current resources (Bodie& Marcus, 2008), investors are required to make investment decisions that combine consistently acceptable levels of risk with anticipated benefits (Winchester, Huston & Finke, 2011). In addition, volatile market conditions also require investors to develop their investment strategies (Chen et al., 2011). Therefore, investment decisions can help in allocating investment capital in the most effective way and ensuring that the returns obtained are the best returns.

The Indonesian market can be said as a heaven for investors to invest, both foreign investors and local investors. The reason is because Indonesia is one of the most potential markets in the Asian region and investment growth in Indonesia increase until 2018. This statement is supported by datas on Investment Realization Development that has been processed and published by the Investment Coordinating Board (BKPM). The development of investment in Indonesia has always increased over time. Until the second quarter period (April-June) in 2018, investment realization has reached Rp 176.3 trillion. This number increased by 3.1% when compared to the same period in 2017, which amounted to Rp. 170.9 trillion. The BKPM also noted an increase in Indonesia's ranking in the world's main investment goals in 2016-2018, referring to UNCTAD in 2017. Indonesia reach four positions up from the previous survey, which in 2014-2016. In addition, it was also noted that the number of individual investors (single investor identification / SID) increased by 14.7% from 2016 to July 2017 with number of 894,116 to 1,025,414. Indonesian Central Securities Depository (KSEI) revealed that this amount is a consolidated number of SID consisting of shareholders, mutual funds, bonds, and other securities registered at KSEI. This is a new record in Indonesian capital markets because the number of investors has exceeded 1 million.

In investment activities, there are various forms of assets that available. Referring to Chen et al. (2011), there are four types of major asset instruments that are widely invested, such as stocks, bonds, mutual funds, and foreign currencies. In a survey conducted by Schrodgers titled Schrodgers Global Investor Study, the main priority of global investors when having income is investment and this also happens in Indonesia. Schrodgers' survey shows that the types of investments that are considered attractive by Indonesian investors are property and stocks, as well as bonds and mutual funds. The survey shows that 21% of investors are interested in stocks, bonds and mutual funds. Meanwhile, 19% of Indonesian investors choose to invest in their own businesses.

The Financial Services Authorization (OJK) summarizes the increase in trade in various types of investments such as bonds, stocks and mutual funds. Data shows that there was bonds trading for 3,649 times in 2016, up to 3,842 times in 2017. For stock trading, the data shows that there were 1,946,284 stock sales in 2016

and there was a significant increase in the following year which was 2,913,246 times. Furthermore, the mutual fund trading recapitulation data also shows a definite increase from year to year where in 2016 there was a trade of 1425 times, followed by 2017 at 1495 times.

Table 1. Recapitulation of Trade in Bonds, Shares and Mutual Funds in Indonesia in 2013-2017

Asset	2013	2014	2015	2016	2017
Bonds	1.878	2.837	3.399	3.649	3.842
Stocks	1.391.968	1.327.015	1.459.101	1.946.284	2.913.246
Mutual funds	794	894	1091	1425	1495

From the explanation above, it can be seen that the number of Indonesian people who carry out investment activities increases. This was supported by a statement from the Financial Services Authorization (OJK) which said that the interest of Indonesian people to invest had increased, as seen from the number of investors who also experienced significant growth. Of course, the increase in the number of investors is driven by promising benefits that will be obtained from investment activities in the future. Investors hope to get a commensurate return. To do this, investors must plan in advance what capital they have to invest. Moreover, alternative assets available in the capital market also vary. Therefore, it is necessary to think and consider from investors when investing and allocating their assets.

But in practice, the decisions made by investors do not always run smoothly and in accordance with expectations that expected by them. This is influenced by how and their behavior in the process of determining the best and appropriate decisions. Financial theorists argue that investors do not always act rationally, but rely on psychological bias (Barberis&Thaler, 2003; Ritter, 2003). This psychological bias is well explained in the study of behavioral finance.

Chen et al. (2011) states that there are factors that influence investor behavior in investing. Factors such as the market environment, the amount of investment invested (expected amount), the expected return rate, risk tolerance, and the type of investment product (product type) are general references and considerations for investors to allocate assets so that these factors are taken into consideration in investing. The factors above can lead to preference investors, namely the attraction or tendency to choose asset instruments for certain reasons. Therefore, this study aims to analyze the behavior of individual investors in the allocation of investment assets. For further information, this research will be conducted using the Analytical Hierarchy Process (AHP) technique to analyze what factors are most influential in investment decisions and how investors prefer to allocate their assets. The objective of the research is to analyze and compare investor preferences between stocks, mutual funds, bonds, and foreign currency based on market environment factors, investment needs and investment goals.

II. LITERATURE REVIEW

This part gives the relevance of the research objective and answers main research questions in this study. In order to compare preference investors, the paper is going to use the factors that can directly or indirectly affects the investor's preference in investment asset allocation. The variables taken to represent the factors are Behavioral Finance, Investment Decision and Asset Allocation Theory.

Behavioral Finance

Behavioral Finance is a relatively new field of science that deals with the influence of psychology on financial practitioner behavior and its subsequent impact on the stock market (Sewell, 2007). According to Statman (2008), behavioral finance is a framework that adds several parts contained in the finance standards and replaces them with other parts. Behavioral finance describes how the behavior of investors and managers; this theory describes the results of interactions between investors and managers in financial and capital markets, and this theory regulates how more effective behavior for investors and managers. Meanwhile, according to Shefrin (2002), behavioral finance is defined as a rapidly developing area that is associated with the influence of psychology on the behavior of financial practitioners such as investors.

Taking a perspective from the perspective of psychology, behavioral finance tries to understand humans as the way a psychologist understands humans. According to Ricciardi and Simon (2000), behavioral finance tries to understanding more deeply to the factors of investor reasons including rational aspects and how the degree of these aspects influences the investment decision process.

Statman and Caldwell (1987) describe four main elements that form the behavioral finance theory, namely: 1) a person's behavior in accordance with prospect theory, 2) behavior evaluation in accordance with prospect theory, 3) regret aversion, and 4) self control. Refractive errors made by investors when they want to make investment decisions are influenced by their psychological factors such as emotions, prejudice, and so on. Another thing that affects is that the information in the market that not delivered properly to investors. These errors can make a very large losses on the financial market. Therefore, these errors cannot be ignored. The

collapse of the stock market (market crash) is one of the consequences of this ignorance. These facts make behavioral finance a very relevant topic today. That way, practitioners become more aware of the abilities and knowledge that guides them in decision making.

Investment Decision

Avram et al. (2009) define investment universally as an expenditure made now to generate profits in the future. An investor must invest so they can be able to develop and survive in a competitive market. At present, the issue regarding investment decisions is discussed and handled by international institutions such as the World Bank, European Commission, European Bank for Reconstruction and Development, and so on. They are people who formulate specific methodologies for managing investment decisions (Avram et al., 2009). In Indonesia, investment decisions are discussed and handled by institutions such as the Investment Committee and investment managers from various securities.

Investment decision is an art to overcome complicated situations (Jahanzeb et al., 2012). Investment decision is a cognitive process for choosing alternatives among several possible alternative scenarios. A person cannot make decisions just by relying on his personal resources. Decision-making without certain plans can be fair to investors, but may not end with good results. With the proper investment decision, investors can conduct a thorough process to examine and evaluate various alternative options available. It is important to understand that investors must have the ability to get the best results from their investments in today's competitive global perspective.

Investment decision is approached by the theory of economic behavior with subdiscipline behavioral finance, such as how investors make decisions without perfect information, analyze risks and uncertainties from the perspective of decision makers. Through a behavioral finance approach, it can be described how investors are different in understanding and reacting to available information. Since investment is involved in making benefits and benefits in the future from assets, money and resources currently owned (Bodie & Marcus, 2008), investors are required to make an investment decision that combines acceptable levels of risk consistently with the benefits can be anticipated (Winchester, Huson & Finke, 2011). When making an investment decision and building a portfolio, investors need to consider risk tolerance, the level of returns, market conditions and other constraints. In the context of investment risk, the outcome of investing can be in the form of profit or loss of money, or it can be in the form of losing an asset and so on (Virlics, 2013).

Asset Allocation Theory

The asset allocation is widely seen as one of the most important investment decisions, and there is no debate at this point (Estrada, 2015). Previously, there had been a long-standing debate, both in practice and in the academic world, regarding the relative importance of asset allocation, the selection of security (market selection) and market timing. Starting with Brinson et al. (1986), which argues that investment policy (asset allocation) is far more important than an investment strategy (security selection and market timing). Previous research has broadly discussed the relative benefits of the three portfolio constructions.

After a long debate, both practitioners and academics finally agreed that asset allocation is one of the most important decisions made by investors. However, there are various kinds of opinions about how to make this decision. Of the many approaches proposed, some are technical, some are simple, and many of them are.

Hypothesis

This study aims to test the hypothesis in this research, where the hypothesis is connected with the research objectives. Referring to the previous research of Chen et al. (2011), where the hypothesis in the study said that the Analytical Hierarchy Process (AHP) method can determine investor preferences in the allocation of investment assets. Thus, there are two types of hypotheses in this study, namely Null Hypothesis (H₀) and Acceptable Hypothesis (H₁):

H₀ = The AHP method can not provide the results from the analysis of the selection of suitable asset alternatives based on asset allocation criterias/ factors and can not give priority to investors in determining their asset allocation.

H₁ = The AHP method can provide the results from the analysis of the selection of suitable asset alternatives based on asset allocation criterias/ factors and can give priority to investors in determining their asset allocation.

III. METHODOLOGY

To analyze investor preferences in the allocation of investment assets, questionnaires will be distributed to respondents who were being samples of this study. The samples in this study are individual investors who conduct investment activities consistently and periodically to one or more capital market instruments such as stocks (stocks), mutual funds (mutual funds), bonds (bonds), or money markets/foreign exchange (foreign

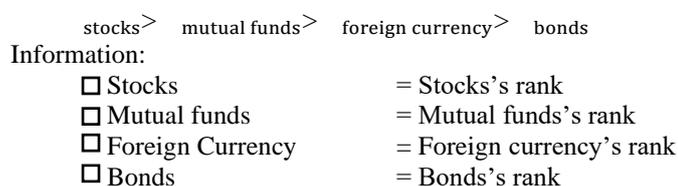
currency) in minimum investment period of one year. The distribution of research questionnaires was conducted offline and online. The distribution of the online questionnaire using Google Form media. Meanwhile, the offline questionnaire was distributed around the University of Indonesia area to lecturers and students of the UI and Standard Chartered Bank that located in Standard Chartered Tower, Jakarta. The sampling technique used is non-probability sampling which is purposive sampling, where the samples that taken in this research has certain considerations.

To prove the consistency of the questionnaire used in this study, questionnaire were distributed to 30 respondents as a pre-test. After that, the consistency of the answers from 30 respondents will be tested refers to Consistency Ratio (CR) belong to Saaty's (1980). If $CR \leq 0.1$, then the answers from the respondents have been consistent and accountable.

The datas were collected from October 23, 2018 to November 17, 2018 through the distribution of offline and online research questionnaires to 100 responses to analyze investor preferences in the allocation of investment assets and the factors that most influenced them in making investment decisions. Data will be processed by referring to the Analytical Hierarchy Process (AHP) method triggered by Saaty (1980). Software used in processing data in this study is Expert Choice decision making software 11.

Research Model

This study refers to previous research conducted by Chen et al (2011). Based on the research, the analytical method used is the Analytical Hierarchy Process (AHP) method. The method is used to show how investors prefer alternative assets (stocks, bonds, mutual funds, and foreign currencies) and see what factors are most important to investors when they allocate assets. Three factors / criteria used are the market environment (market environment), investment needs (investment need), and investment goals (investment goals). The research model for this AHP method is:

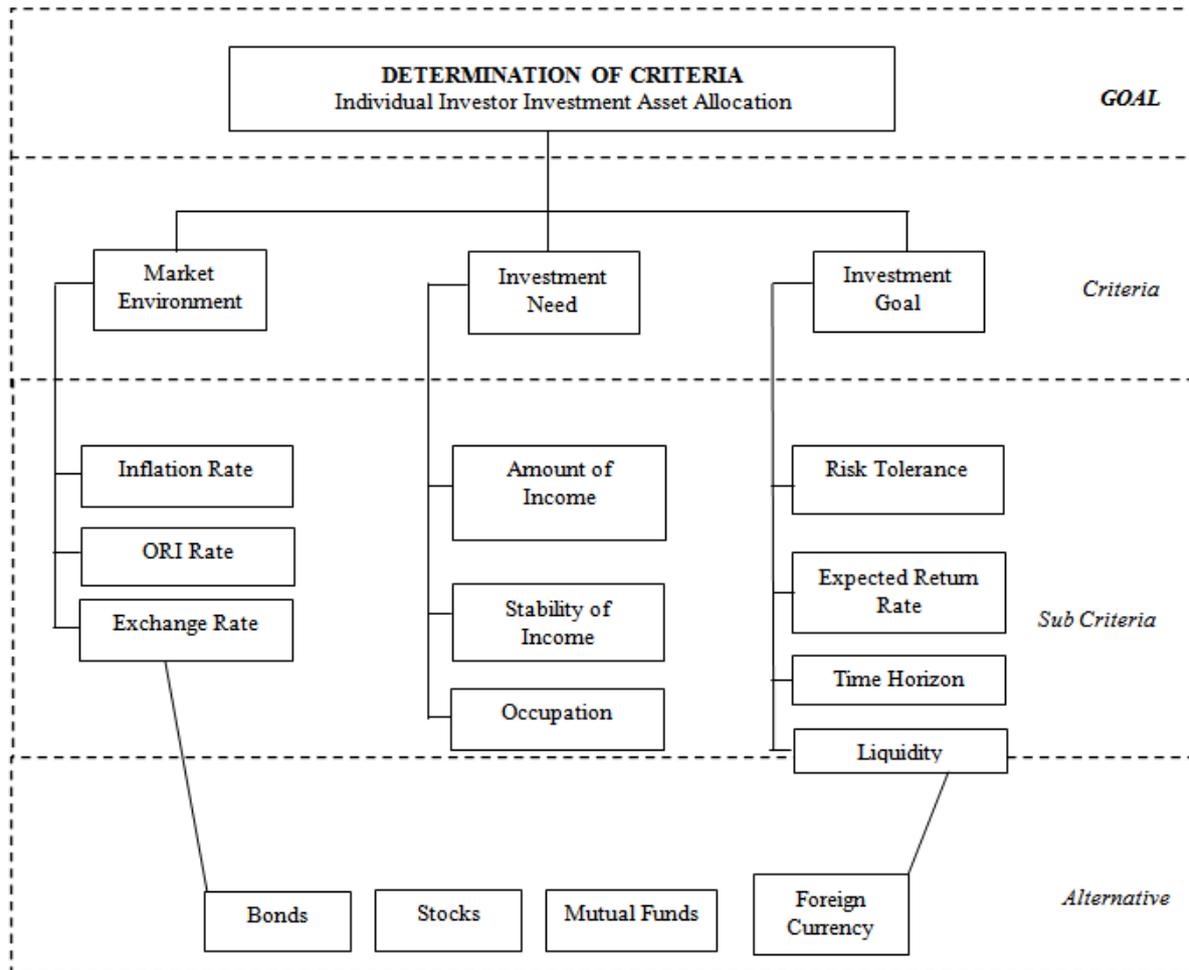


Under each investment criterion, different alternative investment ratings (four assets, namely stocks, mutual funds, foreign currencies and bonds) obtained based on the sample of investor responses use a pairwise comparison rating scale. This rating is expressed in terms of weight. Finally, the overall weight for alternative investment will be calculated to determine the capital allocated by the investor for the alternative (according to his preferences).

Analytical Hierarchy Process (AHP) Model

Determination of the criteria and sub-criteria in this study refers to the asset allocation factors / criteria of Chen et al. (2011) and Le (2008). Criteria in the study of Chen et al. (2011) refers to literature and business reports for previous asset allocation belongs to Yang (2005) and Wang (2008). These criteria are the market environment, investment amount, expected return rate, risk tolerance, and product type. Whereas in Le's (2008) study, there were three criteria that were used as references. These criteria are investment goals, financial need and level of sophistication. Then, elaboration of the two journals was conducted to determine the criteria in this study. This study took all the criteria in the study of Chen et al. (2011), such as the market environment, investment amount, expected return rate, risk tolerance, and product type. Next, this research took several criteria from Le (2008) 's study which were suitable for collaborating with the criteria of Chen et al. (2011), such as investment goals and financial need. Investment goals in Le's (2008) study already have sub-criteria, such as level of expected return, risk tolerance, time horizon, and liquidity. Le (2008) criteria and sub-criteria will be suitable to be elaborated by factors belonging to Chen et al. (2011), such as risk tolerance and expected return rate. Furthermore, for Le (2008) 's financial need criteria, it would also be suitable if the criteria elaboration with the criteria belonging to Chen et al. (2011), such as the investment amount. Below is the hierarchy model in this study based on the elaborated criterias from Chen et al. (2011) and Le (2008) :

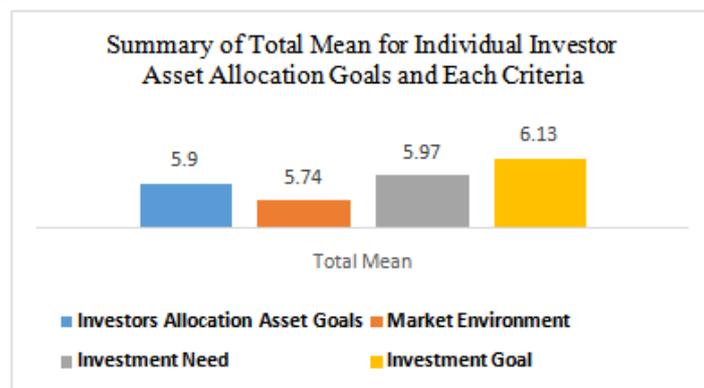
Figure 1. Hierarchy Model for Determining Individual Investor Behavior Criteria in the Investment Asset Allocation



IV. RESULT AND DISCUSSION

After calculating all the total mean of individual investor investor asset allocation and each criterion of individual investor asset allocation, the figure below will summarize and show which criteria have the highest mean. From the summary, it can be seen that the criteria for investment objectives have the highest mean when compared to the market environment and the investment needs of 6.13. This figure shows that investment objectives are considered to be slightly stronger by investors than the other two investment criteria, namely investment needs and market environment.

Figure 2. Summary of Total Mean for Individual Investor Asset Allocation Goals and Each Criteria



After calculating *mean* of each criterion, then the criterias will be calculated using the Analytical Hierarchy Process (AHP) with Expert Choice 11. Data in the AHP calculation in this study is using priority scale with a range from 1 to 9 which is filled by 100 respondents. Priority scale obtained from 100 respondents then will be processed by entering one by one into the hierarchy column criteria and sub criteria found in Expert Choice 11. Then, pairwise comparison is arranged to find out how much weight from each criterion, sub criteria and investment alternatives.

The following are the results of the calculation of each of the existing criteria. Table 2 shows the value of Consistency Ratio (CR) obtained by Investor Individual Asset Allocation criteria, such as the market environment, investment need and investment goal is 0.01. Adjusting to the provisions of Consistency Ratio, if the CR value is ≤ 0.1 , then the paired comparisons in this study can be accepted and consistent. From all the criteria's weights, investment goals get the greatest weight and occupy the top position when compared to the other two criterias, which means that investment goals are considered the most important factors by individual investors in their investment asset allocation rather than market environment (market environment) and the need for investment (investment need).

Table 2. Each Criteria's Value

No	Criteria	Value
1	Market Environment (A)	0.181
2	Investment Needs (B)	0.336
3	Investment Goals (C)	0.483
Consistency Ratio : 0.01		

Table 3 shows the value of the Consistency Ratio (CR) obtained by the sub-criteria of the market environment is 0.00005, thus indicating that the pairing comparison matrix between sub-criteria is in the market environment criteria, such as inflation, ORI interest rates and the rupiah exchange rate is acceptable and consistent. From the three sub-criteria results indicate that the rupiah exchange rate gets the largest weight and occupy the top position when compared to the ORI interest rate and inflation rate. This indicates that individual investors in this study are very concerned about the rupiah exchange rate in allocating assets and consider it as the most important thing when investing.

Table 3. Value of Sub-Criteria in Market Environment Criteria

No	Sub Criteria	Value
1	Inflation Rate (A1)	0.307
2	ORI Rate (A2)	0.238
3	Exchange Rate (A3)	0.455
Consistency Ratio : 0.00005		

Table 4 shows that the Consistency Ratio (CR) obtained by the sub criteria of the investment need is 0,00027, indicating that the pairing comparison matrix between sub criteria on the investment need criteria is the type of work, the amount of income and the stability of income is acceptable and consistent. From the three sub-criterias results indicate that the amount of income gets the highest weight and occupy the top position when compared to the type of work and the stability of income.

Table 4. Value of Sub-Criteria in Investment Needs Criteria

No	Sub Criteria	Value
1	Occupation (B1)	0.094
2	Amount of Income (B2)	0.474
3	Stability of Income (B3)	0.432
Consistency Ratio : 0.00027		

Table 5 shows the value of Consistency Ratio (CR) obtained by the sub-criteria of the investment goal (investment goal) is 0,00031 thus indicating that the pairwise comparison matrix between sub criteria in the

investment goal criteria is liquidity, risk tolerance, expected return, and time horizon are acceptable and consistent. From the four sub-criterias results indicate that the expected return gets the highest weight and occupies the top position when compared with liquidity, risk tolerance and time horizon.

Table 5. Value of Sub-Criteria on Investment Goals Criteria

No	Sub Criteria	Value
1	Liquidity (C1)	0.156
2	Risk Tolerance (C2)	0.199
3	<i>Expected Return</i> (C3)	0.438
4	<i>Time Horizon</i> (C4)	0.207
Consistency Ratio : 0.00031		

Furthermore, from the calculation of all existing criteria and sub-criterias for alternative investment stocks, bonds, mutual funds, and foreign currency, tabel below is the results of alternative recapitulation that the most dominant and become investor preferences in allocate investment assets.

Table 6. Summary of Alternative Investment Value in Each Sub-Criteria

No	Sub Criteria	Alternative			
		Stocks (I1)	Mutual Funds (I2)	Bonds (I3)	Foreign Currency (I4)
1	Inflation rate (A1)	0.288	0.292	0.228	0.192
2	ORI rate (A2)	0.279	0.251	0.287	0.182
3	Exchange rate (A3)	0.284	0.293	0.196	0.227
4	Occupation (B1)	0.388	0.322	0.161	0.128
5	Amount of income (B2)	0.390	0.309	0.154	0.147
6	Stability of income(B3)	0.357	0.320	0.181	0.141
7	Liquidity (C1)	0.363	0.266	0.137	0.235
8	Risk tolerance (C2)	0.198	0.364	0.256	0.182
9	Expected return(C3)	0.501	0.225	0.135	0.139
10	Time horizon(C4)	0.419	0.293	0.154	0.134

It is seen that stocks are in the first rank from almost all existing sub-criteria (6 sub-criteria of a total of 10 sub-criteria). Stocks become alternative investment assets chosen by individual investors based on the sub criteria of type of work, total income, stability of income, liquidity, expected return, and time horizon. Furthermore, mutual funds become the second most alternative asset chosen by individual investors after shares (3 sub-criteria of a total of 10 sub-criteria). The 3 sub criteria are inflation rate, rupiah exchange rate and risk tolerance. The third rating is obtained by bonds, where individual investors tend to choose bonds to be used as alternative investments when faced with ORI interest rates. For the money market / foreign exchange itself it seems that it has not become the right investment alternative for individual investors to be allocated to their assets.

Based on all existing criteria and sub-criteria, this study obtained the final calculation results that individual investors tend to choose stocks (0.359) as an alternative investment in their asset allocation compared to other assets such as mutual funds (0.292), bonds (0.182), and money markets / foreign exchange (0.164). When compared with the reference journal of Chen et al. (2011), the results of this study have the same final results for the first rank investment alternatives, that is stocks. Meanwhile, the final results for the second rank are also the same as Chen et al's reference journal, that is mutual funds. However, there are differences in the third and fourth ranks. The final results in Chen et al's research show that the third rank is the money market /

foreign exchange and the fourth rank is bonds. However, the final results in this study are the opposite of the results of Chen et al's research where the third rank is bonds and the fourth is money market / foreign exchange.

Discussion

Although investor preferences between the reference journals belonging to Chen et al and this study are the same, that is stocks, there are differences in the circumstances of the background conditions. Chen et al's research was conducted at the start of the 12th Taiwanese presidential election. Both in terms of political campaigns and the impact of the economic downturn that occurred due to the global financial crisis have added unknown variables to the Taiwan market. Taiwanese investors prefer trading strategies as their short-term investment method. They tend to ignore the transaction costs charged when they trade stocks because this strategy has been a great success since 1995 (Khandani and Lo, 2007 in Chen et al, 2011). The implication of the results of Chen et al's research is that Taiwanese investors who conduct regular trading turns out to like stocks, or they can be too overconfident. This indicates that there is a strong risk-seeking behavior from Taiwanese investors, which is consistent with the results of prior studies (Shu et al, 2005; Barber et al, 2006; and Chang, 2008 in Chen et al, 2011).

Meanwhile, the period of this study was also encouraged by political years. It's just that what distinguishes it from the journal owned by Chen et al. is if the research period is carried out at the beginning of the presidential election, then this research is in the pre-presidential period of 2018. Entering 2018, although there is potential for political events during 2018 it is indicated that it will become a sentiment that influences the direction of the stock market. at present the political event does not have a significant impact on the stock market. Furthermore, domestic economic growth in 2018 is also better than 2017 where economic growth is estimated to be at the level of 5.3%. This economic growth was driven by the Asian Games event where Indonesia hosted the Southeast Asian sports event. In addition, the existence of regional elections held in 2018 also contributes to Indonesia's economic growth. The two events above have a positive impact on consumption performance. The next factor is the potential of Indonesia to get a rating improvement from the S & P in mid-2018, where previously Fitch Ratings has boosted Indonesia's rating up from BBB- to BBB with a stable outlook on December 21, 2017. This has a positive impact on global liquidity flows and Indonesia is still become an attractive place to invest.

In the previous year in 2017, the stock market was in a conducive combination, causing global financial markets, especially the stock market to advance. One of them is the Indonesian stock market, which during the year 2017, the JCI was able to record returns of 19.99%. The JCI achievement was able to surpass the performance of stock indices in a number of regions, such as Taiwan (15.01%), Thailand (13.66%), Malaysia (9.45%), and China (6.55%). These factors indicate that the stock market throughout 2018 will continue its positive performance so as to attract the interest of individual investors to choose stocks as a profitable investment instrument for them.

V. CONCLUSION AND RECOMMENDATION

This study aims to analyze and compare preference investors between stocks, mutual funds, bonds, and foreign currency based on market environment factors, investment needs and investment goals. From the results of data processing carried out in this research, it can be concluded that the majority of respondents choose stocks as an alternative investment from the other three investment alternatives. This is in line with the factors that most influence and are considered important by investors when allocating their assets, that is the investment goal with sub-criteria the expected rate of return also gets the highest weight among the sub-criteria of other investment objectives. There are also suggestions that can be made for further research using mixed method techniques, where researchers can further deepen the analysis by including in-depth interviews with parties that have influence in investment activities and with investors. It aims to assess more and broader information. Then, research is done by adding other investment alternatives such as real estate, derivatives, and so on. This is because many Indonesian people also like to invest in property, such as real estate.

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