FINANCIAL RISK TOLERANCE ANALYSIS OF INDONESIAN RETAIL INVESTORS

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Abstract

Purpose: This study aims to analyze how risk tolerance of Indonesian retail investors is based on sociodemographic characteristics and also related to the multidimensional risk. Due to the different characteristics of investors, turn out to become different levels of risk tolerance for each individual investor, hence considering investor's sociodemographic factors is very important in assessing risk tolerance.

Methodology: This study used quantitative analysis. The random sampling was obtained from the sample cohorts, which consist of the Indonesian retail investor club. Data was collected through an online survey and gathered 407 respondents. Then, the data was analyzed by using PLS with Smart-PLS 3.0 software.

Result: Our findings showed that the most of socio-demographic variables such as age, gender, marital status, education, and income affected the financial risk tolerance, whereas ethics do not affect financial risk tolerance. And risk capacity partially mediated socio-demographics on financial risk tolerance.

Application: The investor and financial advisers would use this analysis in assessing risk tolerance and determining the best type of investment and best suits the risk preference of investors.

Novelty: To the best our knowledge, this study is pretty scarce. Not like the previous studies, this research also use an advanced method which explores variables interdependency. This research is the first one in Indonesia, which compiles socio-demographic variables. And also it is an enriched empirical and literature manner.

Keywords: Financial Risk Tolerance, Indonesian Retail Investor, Multidimensional Risk, Partial Least Square, Socio-Demographic.

INTRODUCTION

Market volatility makes investors need to be careful in making investment decisions. Investors will be faced with uncertainty, where the possibility of an investment outcome is not in line with expectations or even become a loss. Investors will not only take advantage of investments but also consider the possible risks to be faced from investments (Leon & Aprilia, 2018). This economic event, as represented by stock market price, can influence risk tolerance (Rabbani et al., 2017). Hatch et al. (2018) also found that financial risk tolerance tends to increase when the stock returns increase and vice versa.

According to Bannier and Neubert (2016), financial risk tolerance is generally defined as the greatest value of uncertainty and a person's willingness to accept risks in making financial decisions. Risk tolerance is also a fundamental reason in financial planning models, investment suitability analysis, and consumer decision frameworks (Spicka, 2020). Dhiman and Raheja (2018) say that one's risk tolerance is a very strong predictor in investment decision making. For this reason, it is very important to assess individual risk tolerance before making an investment decision.

Research on financial risk tolerance in developing countries such as Southeast Asia has also not been diverse, mostly only testing financial risk tolerance with the influence of socio-demographic factors. Research conducted in Malaysia by Duasa and Yusof (2013) and Rahman (2019) in assessing risk tolerance on single asset ownership in Malaysia, using risk tolerance as the dependent variable and socioeconomic factors as an independent variable. Another study conducted by Chuan et al. (2012) and Rahman et al. (2019) on urban Chinese communities in Malaysia by testing risk tolerance based on two demographic factors, namely: (1) non-financial demographics: age, gender, and education, (2) financial demographics: financial knowledge and financial satisfaction. Research was also conducted in Indonesia by Putra et al. (2016) by testing financial risk tolerance as an independent variable to pick out investment decisions. Other research was also conducted by Leon and Aprilia (2018), who assessed risk tolerance based on gender characteristics.

Research Gap and objectives of the study

Based on the current studies, it can be seen that there is a research gap, whereas research on financial risk tolerance by combining sociodemographic and multidimensional risk factors has never been done before on respondents in Southeast Asian Countries especially Indonesia. Furthermore, research on financial risk tolerance by looking at sociodemographic characteristics and also related to the multidimensional risk.
factors also needs to be updated from the data, because these factors are not constant and adjust to current conditions and situations, especially from the age factor, whereas at the time of this study, the age of the Indonesian investor is dominated by a young age. Investor demographic data in Indonesia is currently dominated by men (59.13%), aged 21-30 years (39.72%), with the employment status of private employees (58.27%) and educated bachelor (51.42%) (Press Release: Berita KSEL, 2018). Based on the above research gap the author proposed to analyze how risk tolerance of Indonesian retail investors is based on sociodemographic characteristics and also related to the multidimensional risk. Due to the different characteristics of investors turn out to become different levels of risk tolerance for each individual investor, hence considering investor's sociodemographic factors is very important in assessing risk tolerance.

LITERATURE REVIEW

Risk tolerance is the inverse of risk aversion, which is an economic term that depicts a person’s hesitancy to accept a choice that has an uncertain payoff when a choice with a more certain outcome is available (Grable, 2016; Shin & Kim, 2018; Wahl & Kirchler, 2019). In the domain of financial decision making, financial risk tolerance is generally defined as the maximum amount of uncertainty a person is willing to accept when making financial decisions (Pinjisakikool, 2018). The financial risk tolerance also affects the way people invest their resources for short-term and long-term goals, such as saving for purchases of goods or retirement savings.

Mathematically, risk tolerance is the opposite of risk aversion (Schooley & Worden, 2016), which can be described through utility theory. Utility theory is the main approach used by researchers to illustrate how risk tolerance is conceptually linked to risk-taking behavior (Grable, 2016; Bouchouicha & Vieider, 2019). This theory was developed by Von Neumann and Morgenstern in 1947 (Dorfleitner & Nguyen, 2017) where they stated that consumers should choose the choice with the highest expected results. In its most basic form, utility theory assumes that consumers are rational and their risk preferences remain constant. Thus, consumers must make the same risk choices (trade-offs) depending on the situation or event (Grable, 2016; Lawrenson & Dickason-Koeppen, 2020). Consumer utility functions are usually considered to resemble constant functions relative to risk aversion utilities (Payne et al., 2019; Ellman & Hurkens, 2019). According to that, risk tolerance is the opposite of the economic concept of risk aversion, so that when risk aversion increases, risk tolerance decreases. The more a person is reluctant to take risks, the more he is willing to pay to avoid risk (Steen, 2018).

Risk preference

Risk preference is defined as the tendency of an individual to choose risky options (Mata et al., 2018; Milroth et al., 2020). There are three types of investors' risk preference, namely:

- Aggressive, are those who want to expect the maximum return from their investment. They are more daring and also not too problematic with the existing risk (risk seeker/risk lover).
- Moderate (Neutral), are those who still want to invest with risk, but they prefer to invest in the type of investment that is not too risky (risk Indifference/risk-neutral).
- Conservatives are those who feel uncomfortable with risk. They are more averse to choosing the type of high-risk investment (risk averter).

Risk tolerance

Risk tolerance is the inverse of risk aversion, which is an economic term that depicts a person's hesitancy to accept a choice that has an uncertain payoff when a choice with a more certain outcome is available (Grable, 2016). In the domain of financial decision making, financial risk tolerance is generally defined as the maximum amount of uncertainty a person is willing to accept when making financial decisions (Davies & Brooks, 2014; Bannier & Neubert, 2016; Rahman, 2019).

The financial risk tolerance also affects the way people invest their resources for short-term and long-term goals, such as saving for purchases of goods or retirement savings. It is reasonable to expect that people with various levels of risk tolerance must act differently when making investment decisions, with those who have high-risk tolerance (aversion to low risk) to invest more aggressively (Grable, 2016).

Utility theory

Mathematically, risk tolerance is the opposite of risk aversion (Schooley & Worden, 2016), which can be described through utility theory. Utility theory is the main approach used by researchers to illustrate how risk tolerance is conceptually linked to risk-taking behavior (Grable, 2016; Aydemir & Aren, 2017). This theory was developed by Von Neumann and Morgenstern in 1947 (Dorfleitner & Nguyen, 2017), where they stated that consumers should choose the choice with the highest expected results. In its most basic form, utility theory assumes that consumers are rational and their risk preferences remain constant. Thus, consumers must make the same risk choices (trade-offs) depending on the situation or event (Grable, 2016; Chen et al., 2013). Consumer utility functions are usually considered to resemble constant functions relative to risk aversion utilities.
risk aversion so that when risk aversion increases, risk tolerance decreases. The more a person is reluctant to take risks, the more he is willing to pay to avoid risk (Irandoust, 2017).

Sociodemographic factors

A person's risk tolerance has a significant impact on the way individuals make decisions, so it is important to have a conceptual understanding of the factors that influence risk tolerance (Spicka, 2020; Nguyen et al., 2019). Putra et al. (2016) found that the higher the level of risk tolerance owned by individuals, the investment decision making would be more daring to choose the type of investment that has a higher risk, for example, real assets. However, the lower the level of individual risk tolerance, the individual will be more careful in choosing low-risk investment types such as investing in a bank account. The difference in risk tolerance can be due to differences in age, career status, socioeconomic, income, wealth, and the term of the income prospect (Jung et al., 2018; Holzhauer et al., 2016).

Several research results reveal that several demographic, socioeconomic, psychosocial, and other factors are generally considered to be related to financial risk tolerance (Hemrajani & Sharma, 2020; Thanki & Baser, 2019). Furthermore, sociodemographic factors tend to be more accessible to financial advisors and researchers due to the lack of specifications and standardization of the size of other predisposing factors in large databases (Tavor & Garya-Tal, 2016; Orovsky-Berman & Litwin, 2019; Zhu, 2019). Investor’s sociodemographic need to be considered in analyzing risk tolerance because, in investment decision making, investors often involve more than one individual. Individuals who have different knowledge, expertise, and experience can be involved throughout the investment process, from planning, monitoring, to coordinating investment plans.

Multidimensional risk

Nobre et al. (2018) classify risk tolerance into four multidimensional components of risk into a model called riskPACK which consists of (1) risk propensity referring to the idea of objective risk, that is, the exchange between risk and return that a person is willing to accept; (2) risk attitude refers to the notion of subjective risk, namely the emotional ability to deal with uncertainty; (3) risk capacity is determined by the current economic situation and income prospects and (4) risk knowledge refers to an individual's understanding of risk and the exchange of risks and returns. Further research by Khan (2017) found that financial risk tolerance can be measured in only two dimensions; risk attitudes and risk capacity.

Risk attitude refers to the willingness to incur monetary risk (Nobre et al., 2018). Risk attitude tries to measure risk perception and reward from an investor's perspective. Risk Attitude is categorized as a psychological attitude and is more difficult to measure than risk knowledge and risk capacity, which are related to the economic and financial position of individuals (Han et al., 2019; Quan & Tang, 2018). Some researchers define risk attitude as "risk-taking behavior" (Oehler & Wedlich, 2018; Necker & Ziegelmeier, 2016; Kannadhasan, 2015). Necker and Ziegelmeier (2016) define risk attitude as risk-taking behavior, which is measured through two dimensions, namely speculative risk, and risk control. Speculative risk can be described as a strength that shows an individual's tendency toward the risk-taking side, while risk control is a balancing force that shows an individual's tendency towards a risk-averse side (Chavalri & Raj, 2016).

Also, risk capacity is the individual financial ability to incur risks (Khan, 2017; Huzdik et al., 2014; Metzger & Fehr, 2017). Risk capacity is also defined as how much risk a client can take (Grabre & Lyons, 2018). Grabre and Lyons (2018) explained that the concept of "being able to take" must have a specific goal in mind and given a context. It is impossible to measure "able to take" unless we have it. Indicators in measuring risk capacity according to Nobre et al. (2018) include (1) Portfolio goals and constraints, such as time horizon, current income needs, capital preservation, growth, tax minimization, competing objectives, (2) Income, such as the amount and stability, (3) Expenses, such as fixed versus discretionary, amount relative to income, (4) Balance sheet, such as net worth, assets (diversification, asset allocation, risk exposure in various assets), liabilities (amount, time frame and debt structure), (5) Financial obligations, such as family, contractual, retirement, (6) Insurance coverage, such as medical, disability, life, long-term care, property and casualty, liability, business/ professional.

Hypothesis development

- Age and financial risk tolerance

Several studies have found a negative relationship between age and risk tolerance (Nobre et al., 2016; Awais et al., 2016; Chiang & Xiao, 2017). Bayar et al. (2020) found that financial risk tolerance decreases with age (negative relationship) because, for those approaching retirement age, their risk tolerance will be lower compared to younger ones. This is also because older individuals have less time to recover from financial losses due to investment risks. While other studies have found that there is a positive relationship between age and risk tolerance (Celikkol et al., 2017; Kubilay & Bayrakdaroglu, 2016) because younger individuals tend to have limited financial resources to bear short-term losses. However, risk tolerance has a non-linear effect on those around 55 years of age (Mahdyan et al., 2017). Thus, the hypothesis proposed is as follows:
H1: There is an effect of age on the investor's financial risk tolerance.
- Gender and financial risk tolerance

Research generally suggests that risk tolerance is influenced by gender. Several studies have found that women have a lower risk tolerance than men (Montford & Goldsmith, 2016; Dickason & Ferreira, 2018; Shusha, 2017). Fisher and Yao (2017) show that women are more tolerant of risk than men. On average, women have lower net worth than men. Shusha (2017) also found that women accumulate less wealth than men all the time mainly due to lower risk tolerance for women. Thus, the hypothesis proposed is as follows:

H2: There is an effect of gender on investor’s financial risk tolerance.
- Education and financial risk tolerance

Previous research found a significant relationship between education level and financial risk tolerance (Kannadhasan et al., 2016; Fisher, 2020; Mohan & Singh, 2017). Education level has a positive relationship on risk-taking behavior, individuals with higher education are more willing to take risks compared to those who have low education (Kannadhasan et al., 2016). In turn, those who are better educated can increase their financial knowledge and are better equipped to analyze various potential investment opportunities themselves. This will increase their confidence and willingness to take more risks than others (Anbar & Eker, 2019). Thus, the hypothesis proposed is as follows:

H3: There is an effect of education level on investor’s financial risk tolerance.
- Marital status and financial risk tolerance

Chatterjee et al. (2017) identify that single individuals who are not married are more risk-tolerant than married individuals. Chatterjee et al. (2017) clarify that married individuals tend to take greater risks because they share more income and double capital from individuals married who might encourage them to invest in risk assets. Research from Dickason and Ferreira (2019) also Kannadhasan et al. (2016) found that single individuals have a higher risk tolerance than married individuals. This might be because married individuals feel more responsible for any losses on risky investments (Subramaniam & Athiyaman, 2016). Thus, the hypothesis proposed is as follows:

H4: There is an effect of marital status on the investor's financial risk tolerance.
- Income and financial risk tolerance

Income is a related factor that is considered to have a positive correlation with risk tolerance (Ryack & Sheikh, 2016; Magendans et al., 2016). This is based on the hypothesis that richer individuals can more easily bear losses due to risky investments so that income has a positive relationship with financial risk tolerance (Subramaniam & Athiyaman, 2016). According to Koekemoer and Ferreira (2019), high-income people and billionaires take greater risks compared to those on low incomes. Investment managers have concluded that an increase in the level of income causes an increase in the level of risk tolerance. Thus, the hypothesis proposed is as follows:

H5: There is an effect of income on the investor's financial risk tolerance.
- Ethnic groups and financial risk tolerance

Ansar et al. (2019) suggest that subcultures, which can be represented by race or ethnicity, will influence preferences of risk. Ethnic represents the history and shared values of a group and, as such, must influence financial preferences. Differences in cultural values and socialization between different racial/ethnic groups will also influence preferences such as risk aversion and willingness to take risks (Ying-Jia, 2017) thus, race and ethnicity must influence risk avoidance and willingness to take the risk. Thus, the hypothesis proposed is as follows:

H6: There is an effect of ethnic group on investor's financial risk tolerance.
- Risk attitude and financial risk tolerance

Saurabh and Nandan (2018) state that a high-risk attitude indicates that the individual has a high financial risk tolerance, and vice versa, individuals with a low-risk attitude indicate that the individual has a low financial risk tolerance. Park and Yao (2016) tested the relationship of risk attitude, which is proxied as risk aversion to financial risk tolerance through online lottery selection experiments. The study provides results that risk tolerance and risk avoidance have a harmonious relationship. A person's risk tolerance score is an important predictor of their risk attitude in a lottery selection experiment. By developing previous research, researchers want to test whether a person's risk attitude also influences risk tolerance, or in other words, whether someone is risk-averse. Risk) has a low-risk tolerance, and someone who is a risk seeker (risk seeker) has a high-risk tolerance or vice versa. Thus, the hypothesis proposed is as follows:
H7: There is an effect of risk attitude on investors' financial risk tolerance.

- Risk capacity and financial risk tolerance

Kices (2018) found that while risk capacity is all about the financial aspects of an individual's ability to sustain risk, risk tolerance measures the abstract ability of individuals to deal with risk emotionally, or behaviorally. Because risk tolerance evaluates an individual's willingness to take risks, this variable has absolutely nothing to do with risk capacity, whether the individual has large assets or limited assets on the balance sheet. Kices (2018) recommends considering risk capacity and risk tolerance in the financial risk assessment process. Saurabh and Nandan (2018) state that high-risk capacity indicates that the individual has a high financial risk tolerance, and vice versa, individuals with low-risk capacity indicate that the individual has tolerance low financial risk. Based on existing research, this research will examine the effect of risk capacity on financial risk tolerance, with the initial assumption that someone with a high-risk capacity has a high-risk tolerance, and someone with a low-risk capacity has a low-risk tolerance or vice versa. Thus, the hypothesis proposed is as follows:

H8: There is an effect of risk capacity on the investor's financial risk tolerance

- Sociodemographic Factors and Financial Risk Tolerance with Risk Attitude Mediation

The influence of economic and demographic variables on risk attitudes has been documented before, finding that risk attitudes decrease as age increases (Amari et al., 2020), and lower risk attitudes for women than men (Trautmann & van de Kuijen, 2018). Kannadhasan (2015) tested the risk attitude (financial risk behavior) on sociodemographic factors, namely gender, age, occupation, and income. The results of the study, among others, showed that women had a lower financial risk behavior than men. This is because women have a longer life expectancy, and show greater responsibility for their families, and have lower lifetime income potential, and so on. This emphasizes the need for women to be educated to enable them to use risk wisely in ensuring adequate results to meet their financial needs. Risk attitude has also been investigated for sociodemographic variables, namely marital status, but the relationship with marital status is more controversial and the literature has not reached a uniform result (Amari et al., 2020).

Other studies on sociodemographic with risk attitude also provide results that the level of education is not significant on risk behavior (Kannadhasan, 2015; Leon & Aprilia, 2018). This is possible because of the very subjective nature of investors. Usually, they may be highly competitive people, using education, to increase their competitive advantage over others in choosing investment options and thus avoiding risk-taking behavior (Kannadhasan, 2015). Sociodemographic factors that will be tested are age and sex, based on previous research. Sociodemographic factors will be tested directly against risk attitude, and sociodemographic factors will also be mediated by risk attitude to be tested against financial risk tolerance. Thus, the hypotheses proposed are as follows:

H9: There is an effect of age on risk attitude.
H10: There is an effect of gender on risk attitude.
H11: There is an indirect effect of age on investors' financial risk tolerance which is mediated by risk attitude.
H12: There is an indirect effect of gender on investors' financial risk tolerance which is mediated by risk attitude.

- Sociodemographic Factors and Financial Risk Tolerance with Risk Capacity Mediation

Risk capacity can be measured factually or objectively (Zakaria et al., 2017). There are certain elements, objective factors, of an individual financial plan that have an impact on the risk assessment process. Wealth, future wealth, time horizon, and the amount of insurance coverage are examples of some of the main components of risk capacity. These factors are very important for the risk assessment process because they provide an element of certainty (Zakaria et al., 2017). Sociodemographic variables such as age (or length of time until retirement) and income are generally seen in the literature as a determinant of risk capacity and need to be taken into account in the assessment process. In general, financial practitioners believe that younger people have a high-risk capacity objectively because of the traditionally low ratio of financial assets to total wealth (Zanella, 2015). Younger people must invest a large part of their wealth in stocks, diversifying their total wealth, regardless of their attitude level. As they age, the value of their human capital decreases, but the financial portfolio grows. To maintain a constant risk exposure over time, younger people must incorporate riskless assets into their financial portfolios (Zanella, 2015). Previous research also indicated that risk capacity is related to financial risk tolerance, so in this study, risk capacity will also act as an intervening variable between sociodemographic factors and financial risk tolerance. Sociodemographic factors that will be tested are the age and income variables that have been supported by previous research, with the following research hypotheses:

H13: There is a direct effect of age on risk capacity
H14: There is a direct effect of income on risk capacity
H15: There is an influence of age on investors' financial risk tolerance which is mediated by risk capacity

H16: There is an effect of income on investors' financial risk tolerance which is mediated by risk capacity

METHODOLOGY

Population and sample

The population used in this study are all Investors in Indonesia, based on KSEI data totalling 1,613,165 investors (as of December 26, 2018). This amount represents the number of consolidated Single Investor Identification (SID) consisting of investors in Shares, Debt Securities, Mutual Funds, Government Securities (SBSN) and other Securities registered at KSEI, with a composition of 851,662 SIDs that have Stock assets, 988,946 SIDs have assets Mutual Funds and 195,119 SID own State Securities assets (Press Release: Berita Pers KSEI, 2018).

The sample in this study was 407 Indonesian investors active in the community of stocks and also from non-communities (general investors). The sampling technique uses the Slovin formula, which produces a minimum sample size of 400 samples.

- Research instruments

In this study, a questionnaire trial (questionnaire) was used, which was expected to be used as a measurement of research used to achieve truth or approach truth. For analysis, the questionnaire will use the following measurements:

- Nominal Scale, to measure gender variables (X2) and Marital Status (X4).
- Ordinal Scale to measure the variables of age (X1), level of education (X3), income (X5), and ethnicity (X6)
- Risk Tolerance Scale to measure the Risk Capacity (Y2) and Risk Tolerance (Z) variables
- Likert scale to measure the Risk Attitude (Y1) variable.

Classification of variables for the structural equation model

The formulation of the measurement model depends on the direction of the relationship between the latent variable and the manifest variable. In the case of structural equation modelling, there are two measurement models, namely the reflective measurement and formative measurement models. The selection of constructs based on reflection or formative models depends on the priority of the causal relationship between indicators and latent variables. While the formative measurement scale, if the indicator causes latent variables and cannot be exchanged among themselves, then it is called formative. In general, these formative indicators can have positive, negative, or even nonexistent correlations with each other. Regarding the explanation above, in this study indicators on the research variables are distinguished between formative and reflective as follows:

| Variables with Formative Indicators | Variables with reflective Indicators |
|-------------------------------------|-------------------------------------|
| Age (X1)                            | Risk Attitude (Y1)                  |
| Gender (X2)                         | Risk Capacity (Y2)                  |
| Education (X3)                      | Risk Tolerance (Z)                  |
| Marital Status (X4)                 |                                     |
| Income(X5)                          |                                     |
| Ethnic (X6)                         |                                     |

Source: Data processed

SEM testing is done by using a variance-based structural equation test or better known as Partial Least Square (PLS) using SmartPLS 3.2.8 software.

Researchers use Partial Least Square (PLS) because PLS can analyze at the same time latent variables formed with reflective indicators and formative indicators that are not possible to run in CB-SEM. The structural model, and the overall model are evaluated to ensure the constructed model.
Table 2: Evaluation of the PLS modelling

| Criteria                  | Evaluation                                                                 |
|---------------------------|-----------------------------------------------------------------------------|
| Convergent Validity       | Factor Loading of each indicator > 0.50                                     |
|                           | See the value of cross-loading. It is expected that each indicators of       |
|                           | variables has a higher loading for each latent variable measured in         |
| Discriminant Validity     | proportion to the indicator for the other latent variable                   |
|                           | Composite Reliability > 0.70 Average Variance Extracted > 0.5              |
|                           | Cronbach Alfa > 0.07                                                       |
| Construct Reliability     | Formative Measurement Model                                                 |
|                           | The lower the value of the PLS weight, the less significant the Variable    |
|                           | Variance inflation factor (VIF) < 10                                       |
| Significance of outer     | Structural Model                                                            |
| Weights                   | R² = 0.67 is Good Model                                                     |
| Multicollinearity         | R² = 0.33 is Moderate Model                                                 |
| Coefficient Determination | R² = 0.19 is Weak Model                                                     |
|                           | Q-square > 0                                                                |
|                           | F² = 0.02 is small effect size                                              |
| Predictive Relevance      | F² = 0.15 is medium effect size                                             |
| Effect Size               | F² = 0.35 is large effect size                                              |
| Size and significance of  | Original Sample positive (+) = Positive relation                           |
| path coefficients         | Original Sample negative (-) = Negative relation                           |
|                           | T statistic > T table : Accepted alternative hypothesis                     |
|                           | P values < 0.05 : Level of significance                                     |

**Source:** Data processed

RESULT/FINDINGS

Statistic Descriptive

Descriptive statistical analysis is used to describe phenomena or characteristics of data distribution in the form of frequency values, a measure of central tendency, dispersion, and measure of shape. In this study, the characteristics of respondents such as age, gender, education level, marital status, income, and ethnicity were tested as independent variables in the form of respondents’ sociodemographic variables. Statistical descriptive test results on the respondent’s sociodemographic variables are as follows:

Table 3: Descriptive statistics of sociodemographic variables

| Sociodemographic Variables | frequency | Percentage |
|----------------------------|-----------|------------|
| Age                        |           |            |
| < 24 years old             | 33        | 8.1        |
| 24 - 39 years old          | 202       | 49.5       |
| 40 - 59 years old          | 160       | 39.2       |
| 60 - 73 years old          | 12        | 2.9        |
| Total                      | 407       | 100        |
| Gender                     |           |            |
| Man                        | 249       | 61.2       |
| Woman                      | 158       | 38.8       |
| Total                      | 407       | 100        |
| Education                  |           |            |
| High School/ Equivalent    | 55        | 13.5       |
| Diploma/ Equivalent        | 49        | 12         |
| Bachelor Degree/ Equivalent| 238       | 58.5       |
| ≥ Masters/ Posgraduate     | 65        | 16         |
| Total                      | 407       | 100        |
| Marital                    |           |            |
| Single                     | 136       | 33.3       |
| Status                     |           |            |
| Married                    | 255       | 62.5       |
| Widow/ divorced            | 16        | 3.9        |
Based on the table above, it is known that the age of respondents is dominated by the age of 24-39 years (49.5%), then 39.2% of respondent are 40 - 59 years, 8.1% of respondents are less than 24 years, while the remaining 12 respondents (2.9%) are 60 - 73 years. Respondents were also dominated by the male (61.2%) and 39.8% of respondent are female. Based on the level of education, 58.5% of respondents have Bachelor's degree/ equivalent, 16% of respondents have Masters degree/postgraduate, 13.5% of respondents finish high school, and the remaining 49 respondents (12%) have a Diploma degree. Based on marital status, the majority of respondents were married (62.5%) and 33.3% of respondents were single and the remaining 3.9% of respondents were widowed/divorced. Based on income, most respondents have income levels of Rp. 20,000,000 - Rp. 50,000,000 as many as 113 respondents (28%), income levels of Rp. 10,000,000 - Rp. 20,000,000 as much as 106 respondents (26%), income levels of Rp. 5,000,000 - Rp. 10,000,000 with 103 respondents (25.1%), and income levels below Rp. 5,000,000 in 66 respondents (16.2%), and 25.1% of respondent have income levels above Rp. 50,000,000 per month from all sources. Statistically, it can also be explained that the majority of respondents are Javanese (36.4%), Batak (7.1%), Melayu (19.4%), other ethnic groups in Indonesia (21.6 %), descendants (Chinese, Indian, Arabic, etc.) are 17 respondents (4.2%), and the remaining 46 respondents (11.3%) come from mixed ethnic.

Furthermore, statistical descriptions for risk attitude, risk capacity, and risk tolerance are also performed. Based on the measurement scale of the three variables, then to describe the results of the respondents' answers, the average respondent's answers to the questionnaire are first determined with the categories arranged through the following intervals:

| Interval Score | Variable Criteria |
|----------------|-------------------|
| 1.00 – 1.80    | Very Low          |
| 1.80 – 2.60    | Low               |
| 2.60 – 3.40    | Moderate          |
| 3.40 – 4.20    | High              |
| 4.20 – 5.00    | Very High         |

**Source:** Data processed

Thus the respondents' responses to the variables of risk attitude, risk capacity, and risk tolerance are as follows:

| Indicators | Frequency |
|------------|-----------|
| RA1        | 16 61 78 187 65 | 1445 3.55 |
| RA2        | 8 63 86 182 68 | 1460 3.59 |
| RA3        | 7 87 85 188 40 | 1388 3.41 |
| RA4        | 11 63 56 235 42 | 1455 3.57 |
| RA5        | 5 61 97 192 52 | 1446 3.55 |
| RA6        | 9 74 84 192 48 | 1417 3.48 |

**Source:** Data processed
The results of the study on 407 respondents showed that the majority of respondents stated Agree to the statement submitted or amounted to 43.6%, and 22.2% of respondents stated Neutral, 17.6% of respondents stated disagree, 14.3% of respondents stated strongly agree, and the remaining 2.3% of respondents stated strongly disagree. Based on the table above, it can be seen that the lowest interval from the Risk Attitude variable is 3.26 on the RA10 indicator (Safe return on investing is not so important to me) and the highest average interval is 3.79 on the RA7 indicator (I see risk as an opportunity to make money).

An overall average value of the variable is 3.50 which is in the range of high intervals, so it can be interpreted that the average respondent in this study has a high-risk attitude. Descriptive statistics on respondents’ responses to the Risk Capacity variable can be seen in the following table:

Table 6: Descriptive statistics of risk capacity variables

| Indicators | 1   | 2   | 3   | 4   | 5   | Score Total | Mean |
|------------|-----|-----|-----|-----|-----|-------------|------|
| RC1        | 38  | 114 | 77  | 173 | 5   | 1214        | 2.98 |
| RC2        | 14  | 47  | 186 | 133 | 27  | 1333        | 3.28 |
| RC3        | 12  | 22  | 77  | 273 | 23  | 1494        | 3.67 |
| RC4        | 7   | 41  | 141 | 200 | 18  | 1402        | 3.44 |
| RC5        | 30  | 48  | 67  | 187 | 75  | 1450        | 3.56 |
| RC6        | 1   | 28  | 106 | 232 | 40  | 1503        | 3.69 |
| RC7        | 10  | 49  | 89  | 191 | 68  | 1479        | 3.63 |
| RC8        | 44  | 84  | 50  | 184 | 45  | 1323        | 3.25 |
| RC9        | 20  | 120 | 129 | 132 | 6   | 1205        | 2.96 |
| RC10       | 85  | 105 | 68  | 121 | 28  | 1123        | 2.76 |
| % Total    | 6.41| 16.17| 24.32| 44.86| 8.23| Total Mean 3.32 |

Source: Data processed

The results of the study on 407 respondents showed that 44.86% of respondents gave answers that reflected high-risk capacity, 24.32% of respondents gave answers that reflected moderate/low risk capacity, 16.17% of respondents gave answers that reflected low-risk capacity, 8.23% of respondents gave answers that reflected very high-risk capacity, and the remaining 6.41% of respondents gave answers that reflected very low-risk capacity. Based on the results of the table above, it can be seen that the lowest interval of the Risk Capacity variable is 2.76 on the RC10 indicator (Which of the following describe your situation and your family's dependents) and the highest average interval of 3.69 on the RC6 indicator (How do you compare your debt to your income). An average value of all variables is 3.32, which is in the range of moderate intervals, so it can be interpreted that the average respondent in this study has a moderate risk capacity. Descriptive statistics on respondents’ responses to the Risk Tolerance variable can be seen in the following table:

Table 7: Descriptive statistics of risk tolerance variables

| Indicators | 1 | 2 | 3 | 4 | 5 | Score Total | Mean |
|------------|---|---|---|---|---|-------------|------|
| RT1        | 24| 170| 66| 146| 1 | 1151        | 2.83 |
| RT2        | 7 | 45| 192| 122| 41| 1366        | 3.36 |
| RT3        | 33 | 89| 77| 156| 52| 1326        | 3.26 |
| RT4        | 11| 92| 147| 155| 2 | 1266        | 3.11 |
| RT5        | 21| 65| 137| 177| 7 | 1305        | 3.21 |
| RT6        | 14| 88| 145| 116| 44| 1309        | 3.22 |
The results of research on 407 respondents showed that 30.74% of respondents gave answers that reflected high-risk tolerance, 29.84% of respondents gave answers that reflected moderate risk tolerance, 24.38% of respondents gave answers that reflected low-risk tolerance, 8.63% of respondents gave answers that reflected very low-risk tolerance, and the remaining 6.42% of respondents gave answers that reflected very high-risk capacity. Based on the results of the table above, it can be seen that the lowest interval of the Risk Tolerance variable is 2.39 on the RT9 indicator (With the same assumptions as above. How would you feel if the value of your portfolio investment fell by 50%?) And the average interval the highest is 3.36 on the RT2 indicator (When compared to others who have the same financial and socioeconomic status, how do you assess your ability to tolerate stress due to financial problems?). An average value of all variables is 3.02, which is in the range of moderate/moderate intervals, so it can be interpreted that the average respondent in this study has a moderate risk tolerance.

**Structural equation modelling result**

Structural Equation Model Analysis in this study uses smartPLS 3.2.8. Researchers use Partial Least Square (PLS) because PLS can analyze at the same time latent variables formed with reflective indicators and formative indicators that are not possible to run in CB-SEM. After all, an unidentified model will occur. Analysis using PLS can be done through outer model evaluation and inner model evaluation.

Measurement of reflective model

- **Convergent Validity**

For convergent test validity, the factor loading value is used. Reflective size is said to be high if it correlates more than 0.70 with the construct that is to be measured. However, for the initial stage of research, the development of a measurement scale of loading values 0.50 to 0.70 is considered sufficient. Based on the results of processing with smartPLS 3.2.8, the loading factor values are as follows:

| Indicators | Loading | Indicators | Loading | Indicators | Loading |
|------------|---------|------------|---------|------------|---------|
| RA1        | 0.621   | RC1        | 0.592   | RT1        | 0.633   |
| RA10       | 0.687   | RC3        | 0.579   | RT2        | 0.820   |
| RA11       | 0.797   | RC4        | 0.767   | RT3        | 0.734   |
| RA2        | 0.767   | RC5        | 0.732   | RT4        | 0.717   |
| RA3        | 0.828   | RC7        | 0.738   | RT5        | 0.702   |
| RA4        | 0.679   | RC8        | 0.769   | RT6        | 0.853   |
| RA5        | 0.770   | RC9        | 0.753   | RT7        | 0.857   |
| RA6        | 0.782   |           |         | RT8        | 0.790   |
| RA7        | 0.652   |           |         | RT9        | 0.704   |
| RA8        | 0.791   |           |         |            |         |
| RA9        | 0.785   |           |         |            |         |

*Source: Data processed*

In the table above it can be seen that all indicators already have a loading factor value above 0.05, meaning that the variable meets the required convergent validity and can do further data processing.

- **Discriminant validity**

The discriminant validity test aims to test items/indicators of two constructs that should not be highly correlated and know whether the variable is unique and able to capture phenomena that can be measured and to find out how far the construct is different from the other constructs. Discriminant validity can be known from the value of cross loading by comparing the correlation of indicators with latent variables that must be greater than the correlation between indicators with other latent variables. Based on the results of testing with smartPLS version 3.2.8, the results of cross loading are as shown in the table

| Indicators | Loading |
|------------|---------|
| RA1        | 0.621   |
| RA10       | 0.687   |
| RA11       | 0.797   |
| RA2        | 0.767   |
| RA3        | 0.828   |
| RA4        | 0.679   |
| RA5        | 0.770   |
| RA6        | 0.782   |
| RA7        | 0.652   |
| RA8        | 0.791   |
| RA9        | 0.785   |

*Source: Data processed*
below. From the table below it can be seen that the entire value of the indicator cross loading to the construct is greater than the other constructs, which means the variables in the study can be said to have adequate discriminant validity.

Table 9: Cross loading

|         | Risk Attitude | Risk Capacity | Risk Tolerance |
|---------|---------------|---------------|----------------|
| RA1     | 0.621         | 0.362         | 0.504          |
| RA10    | 0.687         | 0.527         | 0.622          |
| RA11    | 0.797         | 0.386         | 0.600          |
| RA2     | 0.767         | 0.374         | 0.558          |
| RA3     | 0.828         | 0.497         | 0.681          |
| RA4     | 0.679         | 0.427         | 0.487          |
| RA5     | 0.770         | 0.459         | 0.580          |
| RA6     | 0.782         | 0.417         | 0.557          |
| RA7     | 0.652         | 0.212         | 0.450          |
| RA8     | 0.791         | 0.416         | 0.640          |
| RA9     | 0.785         | 0.461         | 0.712          |
| RC1     | 0.432         | 0.592         | 0.513          |
| RC3     | 0.348         | 0.579         | 0.333          |
| RC4     | 0.445         | 0.767         | 0.512          |
| RC5     | 0.315         | 0.732         | 0.401          |
| RC7     | 0.473         | 0.738         | 0.468          |
| RC8     | 0.418         | 0.769         | 0.522          |
| RC9     | 0.364         | 0.753         | 0.445          |
| RT1     | 0.466         | 0.482         | 0.633          |
| RT2     | 0.638         | 0.534         | 0.820          |
| RT3     | 0.603         | 0.401         | 0.734          |
| RT4     | 0.622         | 0.601         | 0.717          |
| RT5     | 0.583         | 0.470         | 0.702          |
| RT6     | 0.683         | 0.469         | 0.853          |
| RT7     | 0.684         | 0.559         | 0.857          |
| RT8     | 0.593         | 0.480         | 0.790          |
| RT9     | 0.500         | 0.432         | 0.704          |

Source: Data processed

- Construct Reliability

Construct reliability is done by looking at the value of composite Reliability, AVE, and Cronbach’s Alpha. Variables that have a good reliability construct must fulfil the following requirements: composite reliability value > 0.7, Average Variance Extracted value (AVE) > 0.5, and Cronbach alpha value > 0.7. The results of construct reliability testing using SmartPLS 3.2.8 software are presented in the table 10.

Based on the table below, it can be seen that the Cronbach’s alpha value for each study variable is above 0.7, the composite reliability value of the three variables is also above 0.7, and the AVE value for the three variables is above 0.5 so that it can be concluded that all reflective variables have a level of high reliability one.

Table 10: Construct reliability and validity

|         | Cronbach's | Composite | Average Variance |
|---------|------------|-----------|------------------|
|         | Alpha      | Reliability | Extracted (AVE) |
| Risk Attitude | 0.919      | 0.931     | 0.554            |
| Risk Capacity  | 0.832      | 0.874     | 0.502            |
| Risk Tolerance | 0.907      | 0.924     | 0.578            |

Source: Data processed
Measurement of the formative model

- Significance of outer weights

This test is done by looking at the value of the weight (weight) of each indicator compared to one another to determine the indicator that provides the largest contribution in a construct. The significance of the weight value is performed by the bootstrapping procedure on the smartPLS 3.2.8 application, with the results shown in the following table:

| Variable            | Original Sample (O) | Sample Mean (M) |
|---------------------|---------------------|-----------------|
| Age                | 1.000               | 1.000           |
| Education          | 1.000               | 1.000           |
| Gender             | 1.000               | 1.000           |
| Income             | 1.000               | 1.000           |
| Status             | 1.000               | 1.000           |
| Ethnic             | 1.000               | 1.000           |

Source: Data processed

In the table above it can be seen that all indicators weight their respective constructs so that the measurement of weights can be said to be significant.

- Multicollinearity

The multicollinearity test aims to test whether the regression model found a correlation between independent variables, multicollinearity test is done by looking at the value of VIF (Variance Inflation Factor). If the VIF value of each indicator is not more than 10, it is said that there is no multicollinearity between the indicators, which means that the multicollinearity assumption is fulfilled. The results of smartPLS 3.2.8 processing show the VIF value as in the following table:

| Variable            | VIF    | Variable            | VIF    |
|---------------------|--------|---------------------|--------|
| Age                 | 1.000  | Income              | 1.000  |
| Education           | 1.000  | Marital Status      | 1.000  |
| Gender              | 1.000  | Ethnic              | 1.000  |

Source: Data processed

Based on the above table, it can be seen that the VIF value of all indicators <10 so that it can be concluded that there is no multicollinearity between the indicators of the variables in the study.

Structural model

- R-square ($R^2$

R-square value explains the contribution of exogenous variables to endogenous variables. Chin (1998) categorizes the R-square results into three categories, namely > 0.67 included in the strong category, 0.33 - 0.67 included in the moderate category, and 0.19 - 0.33 included in the weak category. R-square results in this study.

| Variable          | R Square | R Square Adjusted | Explanation |
|-------------------|----------|-------------------|-------------|
| Risk Attitude     | 0.079    | 0.075             | Weak        |
| Risk Capacity     | 0.397    | 0.394             | Moderate    |
| Risk Tolerance    | 0.712    | 0.706             | Strong      |

Source: Data processed

Based on the above table, it can be seen that the R-square value of Risk Attitude is 0.079, which means that the contribution given by exogenous variables Age and gender to the Risk Attitude variable is 7.9%, while 92.1% is influenced by other variables in outside the model. R-square value on risk capacity is 0.397, which means that the gender and income variables influence 39.7% of the risk capacity variable and the remaining 60.3% is influenced by other variables outside the model. R-
square value on the endogenous variable Risk Tolerance of 0.712 implies that all exogenous variables namely age, gender, education level, marital status, income, ethnicity including risk attitude and risk capacity contribute 71.2% of influence to the variable risk tolerance, and the remaining 28.8% is influenced by other variables outside the model.

- **Q-Square (Q²)**

Q-square is used to measure how well the observational values generated by the model and also the estimated parameters. Analysis of the Q-square value is the same as R-Square analysis, where the higher the Q-square, the model can be said to be better or more fit. A Q-square value greater than 0 (zero) indicates that the model is said to be good enough, while the Q-square value less than 0 (zero) indicates that the model lacks predictive relevance. The results of the calculation of the Q-Square value in this study are as follows:

\[ Q^2 = 1 - [(1-R^21) (1-R^22) (1-R^23)] \]

Based on the calculation above, a Q-square value of greater than 0 (zero) is obtained, which is 0.831 so that the predictions made by the model are considered to be relevant. This also shows the amount of diversity of research data that can be explained by the research model is 83.1%, and the remaining 16.9% is explained by other factors that are outside this research model.

- **F-Square (F²)**

In PLS analysis, the f-square value indicates the partial effect of each predictor variable on endogenous variables. The value of f square obtained can then be categorized in the category of small influence (f square = 0.02), moderate effect (f square = 0.15) and large effect (f square = 0.35). The following f-Square values for each variable:

| Variables      | Risk Attitude | Risk Capacity | Risk Tolerance | Explanation                                    |
|----------------|---------------|---------------|----------------|-----------------------------------------------|
| Age            | 0.055         | 0.082         | 0.010          | Small effect on risk attitude, risk capacity and risk tolerance |
| Gender         | 0.032         | 0.012         |                | Small effect on Risk Attitude and Risk Tolerance |
| Education      | 0.021         |               |                | Small effect on risk tolerance               |
| Marital Status | 0.010         |               |                | Small effect on risk tolerance               |
| Income         | 0.264         | 0.029         |                | Moderate effect on risk capacity and a small effect on risk tolerance |
| Ethnic         | 0.000         |               |                | Small effect (Almost nothing) on risk tolerance |
| Risk Attitude  | 0.794         |               |                | Big effect on risk tolerance                  |
| Risk Capacity  | 0.092         |               |                | Small effect on risk tolerance               |

**Source:** Data processed

Based on the above table, the results show that risk attitude is the biggest variable influencing risk tolerance, and age is the biggest variable influencing risk attitude. At the same time, income is the biggest variable influencing risk capacity.

**Hypothesis Test**

Hypothesis testing is done to see the effect of an independent variable on the dependent variable. To find out whether there is an effect of each variable, the bootstrapping method is performed on smartPLS 3.2.8. Bootstrapping will produce a path coefficient table (path coefficient) for testing the direct effect and the Specific Indirect Effect table for testing the indirect effect. In the path coefficient, there are original sample values, t-statistics, and p-values that will be used in hypothesis testing.

The original sample value is used to see the direction of the relationship from testing the hypothesis if the original sample shows a positive value means that the direction is positive, and if the original sample value is negative means the direction is negative. T-statistics are used to show significance. The t-statistic value compared to the t-table value. In this research, the
hypothesis has no direction so a two-tailed test is performed. Two-way test t-table value using an infinite t-table of 1.960 with an error rate of 5%. So if t statistic >1.960, then the hypothesis is accepted, and if t statistic <1.960, then the hypothesis is rejected.

P-values are used to test the significance of the influence of the hypothesized variable. If the p-value <0.05, then the independent variable is said to affect the dependent variable. Conversely, if the p-value >0.05 then the independent variable is said to not affect the dependent variable.

The results of the path analysis model through the bootstrapping method are as follow

![Figure 1: Framework analysis model](image)

Source: Source of the image is based on bootstrapping

Based on Figure 1, it shows that the hypothesis testing in this study is divided into several equations. The first equation is to see the direct effect of the independent variable on the dependent variable. The second equation is to see the indirect effect of independent variables on the dependent variable through intervening variables. Hypothesis test results of direct influence are based on the path coefficient through the bootstrapping menu on smartPLS 3.2.8 above as in the table below.

| Hypothesis | Variable | Original Sample t-Statistics p-values | Explanation | Decision |
|------------|----------|--------------------------------------|-------------|----------|
| H₁ | Age → Risk Tolerance | 0.071 | 2.140 | 0.033 | Significant (positive) | Hypothesis Accepted |
| H₂ | Gender → Risk Tolerance | -0.061 | 2.146 | 0.032 | Significant (negative) | Hypothesis Accepted |
| H₃ | Education → Risk Tolerance | -0.086 | 2.622 | 0.009 | Significant (negative) | Hypothesis Accepted |
| H₄ | Marital Status → Risk Tolerance | -0.062 | 2.016 | 0.044 | Significant (negative) | Hypothesis Accepted |
| H₅ | Income → Risk Tolerance | 0.121 | 3.267 | 0.001 | Significant (positive) | Hypothesis Accepted |
| H₆ | Ethnic → Risk Tolerance | 0.002 | 0.095 | 0.924 | Not Significant | Hypothesis Rejected |
| H₇ | Risk Attitude → Risk Tolerance | 0.601 | 22.408 | 0.000 | Significant (positive) | Hypothesis Accepted |
After testing the direct effect on the variables studied, the indirect effect test is then performed by looking at the specific indirect effect through the bootstrapping method on the smartPLS version 3.2.8 application with the results as shown in the table below:

Table 16: Hypothesis test for indirect effects

| Hypothesis | Variable | Original Sample | T Statistics | P Values | Explanation | Decision |
|------------|----------|-----------------|-------------|----------|-------------|----------|
| \( H_{11} \) | Age \( \rightarrow \) Risk Attitude \( \rightarrow \) Risk Tolerance | 0.135 | 5.118 | 0.000 | Significant (positive) | Hypothesis Is Accepted |
| \( H_{12} \) | Gender \( \rightarrow \) Risk Attitude \( \rightarrow \) Risk Tolerance | -0.104 | 3.460 | 0.001 | Significant (positive) | Hypothesis Is Accepted |
| \( H_{15} \) | Age \( \rightarrow \) Risk Capacity \( \rightarrow \) Risk Tolerance | 0.065 | 4.125 | 0.000 | Significant (positive) | Hypothesis Is Accepted |
| \( H_{16} \) | Income \( \rightarrow \) Risk Capacity \( \rightarrow \) Risk Tolerance | 0.116 | 5.282 | 0.000 | Significant (positive) | Hypothesis Is Accepted |

**Source:** Data processed

**DISCUSSION/ANALYSIS**

- There is a significant effect of age on investor risk tolerance

\( H_1: \) There is an effect of age on investors' financial risk tolerance.

The result of the path coefficient in the form of an original sample is positive (+), which indicates that increasing one's age will increase the person's risk tolerance. However, because age and risk tolerance cannot be calculated as a percentage, it can be assumed that as the investor ages or the older he gets, the person is happier with the risk, and therefore the risk tolerance increases and we accepted \( H_1 \).

The results of this study are in line with previous research (Celikkol et al., 2017; Kubilay & Bayrakdaroglu, 2016) which found a positive relationship between age and risk tolerance because younger individuals tend to have limited financial resources to bear short-term losses so that risk tolerance is lower. Older investors have spent a long time accumulating wealth to improve their financial capabilities so that they become more economically stable and more able to bear more risk.

Older investors are usually also more experienced, so they are more confident when making investment decisions that have a greater risk than younger investors.

- There is a significant effect of gender on investor risk tolerance
**H2:** There is an effect of gender on investor’s financial risk tolerance.

The influence of the sex variables shows that the differences in sex will affect the level of risk tolerance. The result of the path coefficient in the form of an original sample is known to be negative (-), which indicates that sex differences on one side increase the risk and the other side can reduce the risk. In this study, sex is measured on a nominal scale (1 = male; 2 = female), so it can be explained that the higher risk tolerance is for the smallest scale (ie 1 for men), and the lower risk tolerance is for the largest scale (i.e. 2 for women), and we may accept H2.

Some previous studies also found that men have a higher risk tolerance than women (Montford & Goldsmith, 2016; Dickason & Ferreira, 2018; Shusha, 2017). Thus the results of this study are in line with previous studies. Women tend to be more careful in making investment decisions; they consider all relevant factors because they are more oriented in detail, they want to read and know more about financial decisions while men are more confident in investment decisions (Fisher & Yao, 2017; Shah & Bhatt, 2013).

Men tend to be more rash in making decisions, so they are more willing to take risks without first considering their impact on the future. Whereas men usually prefer challenges, they are happy with investments that are quite risky and challenging. Evidenced by the more men who like gambling compared to women, although in this case, the investment is not merely gambling, the tendency of such male behavior becomes a consideration that men are more risk-tolerant than women.

- There is a significant effect of education on investor risk tolerance

**H3:** There is an effect of education on investors’ financial risk tolerance.

The result showed that the influence of education level variables shows that differences in education level affect one's risk tolerance level. The results of the path coefficient in the form of the original sample are known to be negative (-), which indicates that the higher the education the investor takes, the lower the level of risk tolerance of the investor. Vice versa, for investors with low education, their risk tolerance is even higher and we may not reject H3.

In this study, the education level of respondents was only tested to the extent of formal education, so that the level of higher education does not guarantee that their knowledge of financial literacy is better than those with low education. Risk knowledge is not only obtained from formal education benches but investors' experience and research regarding trade-off return and risk. In Indonesia, an understanding of financial literacy, especially in terms of investing, is not yet a compulsory school curriculum. Then the interpretation of the findings needs to be emphasized that risk tolerance tends to be lower for those who have a high formal education but tends to be high for those who have lower formal education.

This can also be caused that the higher level of education, the greater the knowledge and understanding, but because education here is only formal education, then their understanding is only limited to academic understanding, that high returns produce high risks. They do not understand how to manage risk and how to invest optimally. So the risk for them only means a red light sign that they should avoid as much as possible. This is then their risk tolerance is getting lower. This is also possible because of the very subjective nature of investors. Usually, they may be highly competitive people, using education, among others, to increase their competitive advantage over others in choosing investment options and thus avoiding risk-taking behavior (Kannadhasan, 2015).

- There is a significant effect of marital status on investor risk tolerance

**H4:** There is an effect of marital status on investors' financial risk tolerance.

Based on the results of hypothesis testing using SmartPLS 3.2.8 as in Table 15, a negative original sample value is obtained, which indicates that there is an adverse relationship between marital status and financial risk tolerance. In this study, marital status is measured on a nominal scale (1 = single; 2 = married, 3 = widowed/widowed/divorced), so it can be explained that the higher risk tolerance is for the smallest scale (ie 1 for single), and tolerance the lower risk is for the largest scale (i.e. 3 for widows/widowers / divorced). This finding is in line with the proposed hypothesis; thus we accepted H4. Based on this analysis, it is known that the risk tolerance of investors who are still single is greater than investors who are married or have been married.

The finding in this study is in line with the results of the research of Dickason and Ferreira (2019), Kannadhasan et al. (2016), and Chatterjee et al. (2017) which state that single individuals who are not married are more tolerant of risk than married individuals because individuals single people tend to take greater risks because they share more income and double capital from married individuals who might encourage them to invest in risk assets.

Single investors, in addition to not yet having dependents in the family, they also have full access to their capital. They might maximize the use of their capital in the short term to make risky investments before they finally decide to change status. Single people are responsible only to themselves, and therefore they do not have both the moral and material burden to make risky investments, so their tolerance for risk is higher.
- There is a significant effect of income on investor risk tolerance

$H_5$: There is an effect of income on investors' financial risk tolerance.

The significant influence of income on risk tolerance implies that the difference in income level can affect the level of risk tolerance. The path coefficient results obtained a positive original sample value, which indicates a positive and aligned relationship direction between income variables and risk tolerance variables and we may not reject $H_5$. The result means that the higher the investor's income, the higher the investor's risk tolerance. Vice versa, the lower the investor's income, the lower the risk tolerance.

The findings in this study are in line with the results of research by Ryack and Sheikh (2016) and Magendans et al. (2016) which state that income is a related factor that is considered to have a positive correlation with risk tolerance. This finding is based on the assumption that wealthier individuals can more easily bear losses due to risky investments and they can recover financially faster. Individuals with minimal wealth must carefully consider the losses they can afford and what financial resources they can use in making risky investment choices so that their risk tolerance is lower.

- There is a significant effect of ethnic groups on investor risk tolerance

$H_6$: There is an effect of ethnic groups on investors' financial risk tolerance.

The results of hypothesis testing in Table 15 show that there is no effect of ethnicity on risk tolerance. The absence of ethnic groups' influence on financial risk tolerance can be interpreted to mean that any ethnicity inherent in investors does not affect the investors related to risk tolerance. It is possible that the risk tolerance between investors with the Javanese ethnic group will be the same as the Batak tribe, and cannot show a lower or higher level of risk tolerance between one ethnic group and another ethnic group. The path coefficient results show a negative original sample value which indicates that the direction of the relationship built between the two variables is opposite and we may not accept $H_6$. In this study, ethnic groups use nominal scales that do not indicate levels, because we cannot rank ethnic groups with one another, so conclusions for the relationship between these two variables are difficult to make.

Researchers assume that ethnic groups can represent a person's culture, especially in interacting and behaving in conducting economic activities, because the researchers at the beginning assume that ethnicity can affect one's tolerance in bearing risks. But the results of this study prove that ethnicity does not have a significant effect on risk tolerance. This means the investor's culture, how he behaves daily or how the habits he adopts are not necessarily the identity of the investor's ethnicity but are also influenced by parenting and family environment. Many people with Javanese identity but behave as Javanese in their daily lives (for example, in the assumption of the general public, Javanese people tend to have higher manners and prudence) even though they were raised by Javanese families. Thus ethnic groups only become an identity, not a basic culture that forms patterns of habits and behavior, especially amid the advancement of modern culture today and the inclusion of foreign cultural elements.

- There is a significant effect of risk attitude on investor risk tolerance

$H_7$: There is an effect of risk attitude on investors' financial risk tolerance.

The finding of hypothesis testing using SmartPLS 3.2.8 as in Table 15 shows that there is a significant influence of risk attitude on risk tolerance. Thus it can be interpreted that changes in the level of risk attitude can affect a person's level of risk tolerance. The result of path coefficient shows a positive original sample value, which indicates a positive relationship between the risk attitude and risk tolerance variables. The higher the level of investor risk attitude, the risk tolerance of investors also increases, and the lower the risk attitude of investors, the risk tolerance of investors is also low. This finding indicates that risk attitude has a greater influence on risk tolerance than risk capacity and we cannot reject $H_7$.

The results of this study are in line with research Saurabh and Nandan (2018) which states that a high-risk attitude indicates that the individual has a high financial risk tolerance, and vice versa, individuals with low-risk attitudes indicate that the individual has a low financial risk tolerance. Risk attitude or risk attitude is also interpreted as risk-taking behavior, where when someone is willing to take more risks, then that person is also willing to assume more risk. Investors who are willing to make investments with a risk level of 5% must be prepared also bear investment risks of 5% so that the risk behavior of investors must be in line with risk tolerance so that investors do not overconfidence in investing, which in turn can lead to higher risks and beyond the limits that can be borne.

By understanding their risk behavior, investors can also plan investments better. For example, an investor tends to behave risk-averse, when he is faced with the choice to invest with low returns and low risks or high returns and high risks, he prefers the first choice. But along with his ability to adapt to the risks he encounters, the risk tolerance may increase so that for him the low risk becomes too low, and he can adjust to make investments that have a slightly higher risk, which means the return is also higher than before.
- There is a significant effect of risk capacity on investor risk tolerance

\[ H_8: \text{There is an effect of risk capacity on investors' financial risk tolerance.} \]

The results of hypothesis testing in Table 15 show that there is a significant influence of risk capacity on investor risk tolerance. The influence of risk capacity indicates that changes in the level of risk capacity can affect the level of risk tolerance and we accepted \( H_8 \). However, both risk capacity and risk tolerance are behaviors that are difficult to measure mathematically, and the changes may also be different for each person. So the conclusion that can be made is that the higher the risk capacity, the risk tolerance will increase slightly higher than the risk capacity.

The findings in this study are in line with research by Saurabh and Nandan (2018) which states that high-risk capacity indicates that the individual has a high financial risk tolerance, and vice versa, individuals with low-risk capacity indicate that the individual has a low financial risk tolerance.

It can be interpreted that a risk capacity is several risks that are "able" taken by someone, while risk tolerance is some risks that "want" taken by someone. So that "desire" and "ability" must be balanced so that investors can minimize the impact of risks that are beyond their control. In this study, risk capacity is measured through several dimensions such as time horizon, income, debt, financial obligations, and insurance. These aspects show the person's subjective ability to decide on an investment choice that contains risk. It's important to understand your ability to assume risks before investing, especially to ensure that investor risk matches investment risk. It also means that investors need to take the time to understand how much risk is in the investment and how to maximize the capacity available to increase investment returns that are not free from investment risk.

- There is a significant effect of age on risk attitude

\[ H_9: \text{There is a direct effect of age on risk attitude.} \]

Based on the results of hypothesis testing using SmartPLS 3.2.8 as in Table 15, a positive original sample value, which indicates that there is a positive relationship between the age variable and risk attitude. Statistical t-value indicates a significant direct effect between age on risk attitude. This result is in line with the proposed hypothesis; thus we may not reject hypothesis 9 (\( H_9 \)).

Based on the results of the analysis, it can be concluded that the higher a person's age, the higher the person's behavior towards risk. This is also in line with hypothesis one which states that the higher a person's age, the higher one's risk tolerance. Thus it can be said that the character of respondents in this study tends to have risk-averse behavior for those who are young, and more and more to take risks for those who are elderly. This is finding in line with research by Amari et al. (2020) where risk behavior has a higher risk for those aged around 55 years and over.

- There is a significant effect of gender on risk attitude

\[ H_{10}: \text{There is a direct effect of gender on risk attitude.} \]

Based on the results in Table 15, a negative original sample value indicates that there is a negative relationship between the sex variables and the risk attitude variable. In this study, gender was measured by a nominal scale (1 = male; 2 = female), so it can be explained that the higher risk attitude is for the smallest scale (i.e. 1 for men), and the lower risk attitude is for the largest scale (i.e. 2 for women). This result is consistent with the proposed hypothesis thus we accepted hypothesis 10 (\( H_{10} \)).

Refer to the above analysis, it is concluded that men have a higher risk attitude than women. This finding is in line with Kannadhasan's study (2015), which found that women have lower risk behaviors than men. This is because women have a longer life expectancy, show greater responsibility for their families, and have lower lifetime income potential, and so on. This emphasizes the need for women to be educated to enable them to use risk wisely in ensuring adequate results to meet their financial needs.

- There is a significant effect of age on risk tolerance mediated by risk attitude

\[ H_{11}: \text{There is an indirect effect of age on investors' financial risk tolerance which is mediated by risk attitude.} \]

Based on the results of hypothesis testing using SmartPLS 3.2.8 as in Table 16, a positive original sample value indicates that there is a positive relationship between the variables tested. Statistical t-value also indicates a significant indirect effect between age on risk tolerance through risk attitude. This finding is in line with the proposed hypothesis, thus we accepted hypothesis 11 (\( H_{11} \)).

Hypothesis test results reinforce hypothesis one (H1), where age affects directly to risk tolerance and hypothesis Nine where age also affects risk attitude; thus it can be concluded that risk attitude can carry out its function as an intervening variable between ages against risk tolerance. This research is a development of previous theories related to demographic factors and
risk multidimensions towards risk tolerance, so it can be said that the hypothesis test in this study adds to the contribution of new theories, that risk demographics factors also indirectly have an influence on risk tolerance through risk attitude mediation. In this study, it can be concluded that the higher the age of the respondent, the higher the risk behavior the respondent has and this increase is in line with the higher the risk tolerance of the respondent as well. Vice versa, younger respondents, have low-risk behavior, and therefore their risk tolerance is also low.

- There is a significant effect of gender risk tolerance mediated by risk attitude

**H12:** There is an indirect effect of gender on investors' financial risk tolerance which is mediated by risk attitude.

Based on the results of hypothesis testing using SmartPLS 3.2.8 as in Table 16, a negative original sample value indicates that there is a negative relationship between the variables tested. Statistical t-value shows a significant indirect effect between sex on risk tolerance through risk attitude. Thus we may not reject the H12. Hypothesis test results strengthen hypothesis two (H2), where gender negatively influences risk tolerance, and hypothesis ten (H10) where gender also negatively influences risk attitude. Thus, risk attitude can carry out its function as an intervening variable between sexes towards risk tolerance. This research is a development of the previous theory related to demographic factors and risk multidimensional of risk tolerance, so it can be said that the hypothesis testing in this study adds to the contribution of new theories, that gender also indirectly has an influence on risk tolerance through risk attitude mediation.

From an evolutionary perspective, gender differences related to risk attitudes depart from the understanding that men and women have developed various strategies to maximize their gene fitness. Women have maximized reproductive success with stable investments and low-risk returns in childcare efforts. On the contrary, men have increased their resources and, therefore, the ability to attract women by engaging in riskier activities with higher expected returns (Chadi & Jirjahn, 2019). Thus, differences in risk attitude (risk attitude) appear to be significantly influenced by genetic variation (Leon and Aprilia, 2018).

In this study it can be concluded that men have more risky behavior than women, hence their level of risk tolerance is also high. Conversely, women exhibit less risky behavior so their risk tolerance levels are lower.

- There is a significant effect of age on risk capacity

**H13:** There is a direct effect of age on risk capacity.

Hypothesis testing using SmartPLS 3.2.8 as in Table 15, a positive original sample value shows that there is a positive relationship between the variables of age and risk capacity. Statistical t-value indicates a significant direct effect between age on risk capacity. This result is in line with the proposed hypothesis, thus we may not reject the alternative hypothesis (H13).

Based on the results of this analysis it can be concluded that the higher a person's age, the higher the person's risk capacity. This is because older individuals have more time to generate wealth to increase their risk capacity. Whereas younger individuals have limited time in the short term to increase their risk capacity. This is in line with the study of Zanella (2015) whereas they get older, the value of their human capital decreases, but the financial portfolio grows. So they must keep their assets and assets as part of growing risk capacity to be able to withstand possible losses on the investment. Meanwhile, for young investors, to maintain a constant risk exposure from time to time, they must incorporate riskless assets into their financial portfolios, shortly, until their portfolios grow.

Investors aged 50 years and over usually have independent family dependents and they also have more assets. They are also very mature financially. At this age, they usually pay off mortgage debts and only enjoy the returns on their investments so they have more capacity to increase their income from risky investments.

- There is a significant effect of income on risk capacity

**H14:** There is a direct effect of income on risk capacity.

The result finding shows a positive original sample value, which indicates that there is a positive and aligned relationship between the income variable and risk capacity. Statistical t-value also indicates a significant direct effect between income and risk capacity. This is in line with the hypothesis proposed, thus, hypothesis 14 is accepted.

Based on the results of this analysis it can be concluded that the higher a person's income, the capacity of the person to bear the risk is greater, and the lower the level of one's income, the person's capacity to bear the risk is lower. This is in line with Concannon's research (2018), where it is stated that risk capacity is determined by the amount and reliability of income from sources other than individual investment portfolios. So the higher the ability of investors to invest, the greater the capacity they have to accept some investment risks in getting higher returns.

As for investors with lower income levels, they certainly prefer investments with small to moderate risks, which they can bear following their risk capacity.
- There is a significant effect of age on risk tolerance mediated by risk capacity

\[ H_{15}: \text{There is an indirect effect of age on investors' financial risk tolerance which is mediated by risk capacity.} \]

Based on the results of hypothesis testing using SmartPLS 3.2.8 as in Table 16, we may not reject hypothesis 15.

The results of this hypothesis test strengthen hypothesis one (H1) where age has a direct positive effect on risk tolerance and the thirteen hypotheses (H13) where age also has a positive effect on risk capacity, thus it can be concluded that risk capacity can carry out its function as a mediator between age against risk tolerance. This research is an enhancement of previous theories related to demographic factors and risk multidimensional of risk tolerance, so it can be said that the hypothesis test in this study adds to the contribution of new theories, that age also indirectly has an influence on risk tolerance through risk mediation.

Based on this analysis it can be concluded that the higher or older a person is, the more the person has a large risk capacity so that the risk tolerance is also greater, and vice versa, the younger a person is, the lower the risk capacity and makes the risk tolerance also lower.

Young investors have more human capital than older investors. This is because the correlation between human capital (which is the future flow of labor income) and market returns is usually low, so young investors can diversify capital market risks (Zakaria, et al., 2017 and Cavezzali & Rigoni, 2012) so that their risk tolerance decreases after diversified risk. For older investors, their financial capacity is more in line with the amount of material and non-material wealth (such as the number of families) they have so that when exposed to great risk, they have adequate "cushion" for risk. This risk bearing is their risk capacity which makes them more willing to take it.

- There is a significant effect of income on risk tolerance mediated by risk capacity

\[ H_{16}: \text{There is an indirect effect of income on investors' financial risk tolerance which is mediated by risk capacity.} \]

The result test shows that we may not reject hypothesis 16 (H16). Hypothesis test results strengthen hypothesis five (H5) where income has a direct positive effect on risk tolerance and hypothesis fourteen (H14) where income also has a positive effect on risk capacity, thus it can be concluded that risk capacity can carry out its function as a mediation between income and tolerance risk. This research is a development of the previous theory related to demographic factors and risk multidimensional of risk tolerance, so it can be said that the hypothesis test in this study adds to the contribution of new theories, that indirect income also has an influence on risk tolerance through risk capacity mediation.

In this study, it can be concluded that the higher a person's income, the greater the person's capacity to accept the risk, thereby increasing risk tolerance, and vice versa. Investors with greater wealth can determine the level of investment that carries greater risk because the level of wealth is possible to recover quickly in the event of unexpected investment risks both in the short term and long term. Wealthier investors have more risk guard attributes, such as assets, insurance protection, sources of capital, and the routine income derived from various sources, so they are more willing to assume higher risks because they have a greater capacity to withstand investment risks on a large scale.

CONCLUSION

Based on the analysis and discussion previously, the following conclusions can be drawn that most of socio-demographic has an effect on financial risk tolerance. We expected that investor and financial adviser might use the research-work in assessing risk tolerance to determine the best type of investment and best suits the character of investors. They might also consider demographic factors in analyzing investor risk tolerance. The study result can also develop risk tolerance assessment instruments that tailored to the conditions and characteristics of Indonesia’s investors by taking into account the multidimensional elements of risks as an integral part of the tool.

LIMITATION AND STUDY FORWARD

Multidimensional risks in this study only focus on two dimensions of risk, namely, risk attitude and risk capacity. Future studies are expected to also be able to test the risk propensity and risk knowledge variables on financial risk tolerance. The scale in this study uses several different scales, namely the Likert scale and the risk tolerance scale. In subsequent studies, it is expected to be able to use a uniform scale to achieve the accuracy of the research results.

The suggestions that researchers can give to be taken into consideration in future studies include considering other demographic factors such as religion and employment status as other variables that can enrich research. In this study, the education level variable only focuses on formal education. Future studies are expected to be able to further specify the variables of education to formal education and also its relation to financial literacy education.
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AUTHOR CONTRIBUTIONS
Gatot NA and Ari W were responsible for designing, analyzing, interpreting, and writing the research. Irama PL was responsible for collecting, analyzing, and interpreting the data.

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