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Research Article

The Effect of Personality Characteristics, Pessimism, and Procrastination towards Investment Decisions

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ABSTRACT

This study explores the effect of personality traits and behavioral constraints of students on their decision to invest in the stock and cryptocurrency markets. Personality traits are measured using Norman's personality traits which are neuroticism, extraversion, conscientiousness, openness to experience, and agreeableness, while behavioral constraints are measured using pessimism and procrastination. An online questionnaire is administered to active students; in total, 212 final samples are collected. The data is analyzed using PLS-Structural Equation Modelling (SEM), in which the reflective measurement is applied. This study found that extraversion positively influences the students' probability of investing in the stock market as their risk tolerance moderates it. At the same time, a similar result also found that risk tolerance positively affects openness to experience personality regarding the cryptocurrency acquisition.

Keywords: big five personality traits, pessimism, procrastination, investment decision.

INTRODUCTION

Researchers have discussed the presence of bias in decision-making for a long time (Kahneman & Riepe, 1998; Opaluch & Segerson, 1989; Simon, 1993; Wendy et al., 2014). Rational decisions seem too good to be true from the perspective of behavioral finance. Gambetti & Giusberti (2012) explained how bold financial decisions in certain conditions have to be appropriately placed with the options of aggressive or conservative manners. Financial decision is considered complex as many determinations' correlates to the individual.

Several researchers explicitly report how it is difficult to justify investors' behavior based on rational theories, as investors are unpredictable (Sharpe, 1964; Lintner, 1965).

Durand et al. (2008) scientifically proved how personality influences an individual's investment decisions.

Personality traits are a determining factor in an individual investment decision (Akhtar et al., 2018). According to the Cambridge Dictionary, personality shows the kind of person they are, and traits are the characteristics that produce a particular type of behavior. Two point-of-view shows how traits are described as definitions of people's thoughts, feelings, and behaviors and explain the background of perspectives, feelings, and actions the way they do (Jayawickreme et al., 2019). Several studies agreed on how financial decisions are influenced by personality. In the studies conducted by R. B. Durand et al. (2008), Piotrowska (2019), and Oehler et al. (2018), It is affirmed that personality traits take part in investment behavior in an investor's financial decision.

Personality traits that scholars widely use are Norman's Big Five Personality Traits, as they could act as the base that explains the general personal characteristics of how an individual would behave (Abood, 2019). The ability to form into a hierarchy makes Norman's Big-Five Personality Traits own its vast cross-cultural replicability and can be discussed through a robust cross-questionnaire (Akhtar & Das, 2020). Norman's Big-Five Personality Traits depict personality at the broadest level of abstraction (Gosling et al., 2003), including neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness.

Firstly, neuroticism is the feelings of anxiety that overly depicts an investor's emotions over information. A higher degree of neuroticism would focus more on negative rather than positive information (Noguchi et al., 2006). It is confirmed by Durand et al. (2019) that Myopic Loss Aversion (MLA), a bias where investors become too sensitive to any short-term losses as the expected outcomes mismatch the actual returns, has high correlations with neuroticism. On the other hand, extraversion is bold and socially active individuals who tend to absorb positive information rather than negative information (Noguchi et al., 2006). Like neuroticism, extraversion also affects an individual's decision-making as it is interconnected with an individual's emotional expression (Oehler et al., 2018).

Third, openness to experience relates to an individual's creativity and curiosity. Willingness towards unconventional thoughts and values, high sensitivity to emotions, and tendency to experience something as their interests are shown within an individual with high openness to experience outcome (Costa & McCrae, 2008). In their conclusion, Nga & Ken Yien (2013) stated, "openness in individuals promotes greater willingness to embrace unconventional rules of thumb prescribed in financial decision making." Agreeableness relates to how sympathetic (R. B. Durand et al., 2008) and kindness over others; in simple words, people with agreeableness are friendly and straightforward (Kristjánsson, 2006) because agreeable investors easily connect with other investors and understand them through their emotions while making financial decision.

Lastly, conscientiousness is how people are thorough, responsible, and trustworthy (R. B. Durand et al., 2008). However, at the same time, George & Zhou (2001) links conscientiousness with low creative behavior as they avoid extraordinary thinking and stay responsibly and safely in their comfort zone. It is proven through empirical study that individuals with lower conscientiousness will pursue higher risks (McGhee et al., 2012) and has a considerable connection to perceived investment performance (Akhtar et al., 2018).

In addition to personality traits, empirical studies show that behavioral constraints such as pessimism and procrastination influence financial decisions (Piotrowska, 2019). This kind of behavior drives individuals to see themselves in unoptimistic views, leads them to see the future negatively, and would retrieve undesirable outcomes over what they will do (Gupta & Maheshwari, 2021). The feeling of pessimism would likely push them to

depression, anxiety, and disappointment. Pessimistic investors feel agitated about the upcoming outcomes as they discern regard worst situations (Joo et al., 2017). Steel (2007) defines procrastination as to voluntarily delay an intended course of action despite expecting to be worse off for the delay. Steel (2007) also reports that it would eventually decrease performance and lead to a higher procrastination rate. From a time perspective, individuals with regretful past experiences tend to be pessimistic, which leads to high procrastination levels (Zabelina et al., 2018). This study aims to analyze the effect of such personality traits and behavioral constraints on the probability of students investing in the stock market and cryptocurrency market.

LITERATURE REVIEW AND HYPOTHESIS

Life Cycle Theory of Consumption

A theory developed by Modigliani and Brumberg in the '50s called Life Cycle Theory of Consumption explains the choices of an individual's spending in stages. It is limited by how much time the individual can earn financial resources. The theory came from the life cycle hypotheses of saving that make us understand individual factors and their aggregate saving and wealth-holding behavior. It was found by Modigliani (1986) that due to high productivity growth and more extensive lifetime resources, youngers tend to have more wealth compared to older individuals. Rationally, this means young individuals can prepare for their non-productive stage to reach financial freedom in the future. On the contrary, it was also found that the constant rate of saving in the significant age group, while the younger and older individuals tended to have lower savings or even dissaving (Modigliani, 1986). The savings that young people had collected throughout the time would be used to finance their retirement in the future (Piotrowska, 2019). It is also found that access to credit becomes one of the essential parts of raising the liquidity of consumption profile in young households, influencing the development of financial markets (Alexandre et al., 2020).

Deaton (2011), in his study, illustrates how life-cycle theory, in the context of wealth, is passed around from the retirees to their children and would also be used to prepare for their retirement. Deaton also explains that theory is derived explicitly from the broad underlying basis of issues related to consumption and savings, as people are devising their preparedness for an uncertain future. Financial independence preparation that requires full of consistency and forbearance is becoming one of the most challenging financial decisions during an individual's busy times, as personality is the essential factor that restrains us.

Investment and Financial Independence

Investment is a way an individual could reach financial independence, regardless of the investor's luck or unlucky; as long as they reinvest dividends, they achieve substantial growing dividends complementing the investor's income (Spaht, 2014). Spaht also specifies, using the S&P Dividend Aristocrats Index data, whether investors are lucky, unlucky, or average investors, reinvestment of dividend and dollar-cost averaging strategy can help investors' portfolio performance at least surpass the current inflation rate.

Baker & Ricciardi (2014) classified investors into two types, overconfident investors who aggressively trade and overestimate their skills and status quo investors who show less portfolio management attention. Overconfidence is also believed to influence investors to

take a risk (Pahlevi & Oktaviani, 2018). An empirical study found that young adults are shifting from financial dependence to independence within the age of 18-23 years old, where it also found that several psychological factors such as economic self-efficacy, money management ability, and decision-making ability took effect on young adults financial independence (Xiao et al., 2014).

Personal Characteristics and Financial Decision

The behavior of investors in managing their investments has become one viral topic to be studied in the behavioral finance literature (Ahmad, 2020; Akhtar & Das, 2020; R. Durand et al., 2013; Gambetti & Giusberti, 2012; Oehler et al., 2018). Especially in psychological manners, it drives someone toward specific behavior, attitude, and way of thinking that directly and substantially influences any decision-making process (Sarwar & Afaf, 2016), including financial decisions. Behavioral finance is defined by Sahi (2012) as "*the behavior of people making investment decisions,*" referring to Tseng's (2006) explanation that behavioral finance "*investigate how people act and interact in the process of making financial decisions and interpret these actions based on established psychological concepts and theories.*"

The study of Kahneman & Riepe (1998) stated that because the outcomes of certain decisions are uncertain, the decision-making is tended to gamble, as it has an identity of the judgment of probabilities. It is also explained that an entirely rational way of thinking to create an optimal financial decision is undoubtedly inapplicable as investors might turn around at a certain period imprecisely. The statements are aligned with the *Prospect Theory*, where Kahneman & Tversky (1979) stated that "decision-making under risk can be viewed as a choice between prospects or gambles." The theory would also criticize the *Expected Utility Theory*, where Kahneman and Tversky exhibit several empirical effects that are unattainable behaviors in utility theory through prospect theory experiments.

Deaton (2011) states that in the decision-making process under uncertainty, even if we know a better-off decision, it does not mean that we are about to do it and would often appreciate help in doing better as life is complicated. In the study by Chmelíková (2017), students' financial decisions are mainly influenced by the information provided by the financial institution that offers them financially literate friends and relatives and even their own experiences. This means a decision would occur from their reaction to certain information they received, passing through their personality.

Big Five Personality Traits and Financial Decision

Many scholars use the relevance of the five primary personality factors as a measuring tool extracted from various personality theories (Costa & McCrae, 2013). A commonly used personality taxonomy by scholars, the Big-Five Personality Traits (De Bortoli et al., 2019), is associated with investment period selections, the investor's attitude towards risk, and their portfolio performance (Lai, 2019). Borghans et al. (2008) define personality traits as thoughts, feelings, and behaviour patterns. Big-Five Personality traits categorize personalities into five major dimensions that may represent personality on a broad level of abstraction: extraversion, neuroticism, conscientiousness, openness to experience, and agreeableness (De Bortoli et al., 2019). Big-Five Personality Traits arguably provided a comprehensive and universal personality theory and contributed by presenting the traits as a more popular personality description (Abood, 2019). Hilton (2001) considered personality a relevant

psychological characteristic as it may provide more information to understand the psychological causes of irrationality.

Piotrowska (2019), referring to the work of Caliendo et al. (2014), explains the variables indicating the extent of each personality: extraversion indicates individuals are assertive, dominant, ambitious, and energetic; agreeableness as relating to being cooperative, forgiving, and trusting; conscientiousness as encompassing two distinct aspects, being achievement-oriented and being hard-working; emotional stability (opposite to neuroticism) as relating to self-confidence, optimism and the ability to deal with stressful situations; and openness to experience as relating to an individual's creativity, innovativeness, and curiosity.

Lai (2019), in his study, confirms how personality traits affect individual investment behaviours. A study also found that personality traits make investment decision-making more difficult (Baker & Ricciardi, 2014). As neuroticism is correlated with Pessimism (Marshall & Brown, 2004), it is found that neuroticism has a tremendous negative effect on an individual's investment behaviour due to emotional interactions (Oehler et al., 2018). Extraversion and openness, however, have a positive effect on short-term and long-term investment intentions, respectively (Mayfield et al., 2008). Regarding conscientiousness, it is proven through empirical study that individuals with lower conscientiousness will pursue higher risks (McGhee et al., 2012) and has a considerable connection to perceived investment performance (Akhtar et al., 2018). Lastly, agreeableness to the study by Zarri (2017) has a negative association with stock holding and affects financial risk tolerance.

Pessimism and Procrastination and Financial Decision

A considerable lack of literature studies the relation between pessimism and investment decision. Pessimism may be described oppositely from optimism, where pessimists anticipate adverse outcomes (Scheier et al., 2001). Scheier also states that pessimistic attributes carry the sense of continual adverse outcomes in the future. Pessimism was substantially significant in each financial decision as it affects investors' rationality (Joo et al., 2017).

Ludwig & Zimper (2006) argue that pessimistic individuals would tend to liquidize uncertain investment projects as they attain more information within their pessimistic view, which gains the feeling of distrust of the project. In general, a study by Norem & Cantor (1986) shows how pessimist estimations levels are always lower than optimistic in certain risky academic conditions. Other studies add that pessimists tend to be unsure of their coping capabilities towards some misfortunes, even though they depict optimism about how they would not experience those misfortunes (Blanton et al., 2001). This would show how in certain financial events, pessimists are likely to stay in a comfortable position and neglect inopportune future probabilities while being unsure of how they should prepare and adequately handle any undesirable economic events.

A study found that procrastination was affected by pessimism as procrastination has a positive association with anxiety and depression (Piotrowska, 2019). Task averseness, task delay, self-efficacy, and impulsiveness can predict procrastination precisely (Steel, 2007). In his study, Steel states that individuals who dislike the task or expect the delay of reward rather than punishment are likely to procrastinate. Steel also states that procrastination is likely to be found at a younger age and tends to act against their original intention. The statements supporting the empirical evidence where procrastination as a voluntary action delay may complicate retirement saving as it influences the decision of retirement saving within highly educated, non-poor of mobile working age, regardless of their income (Piotrowska, 2019).

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Risk Tolerance and Financial Decision

Hoffmann & Post (2012) describes risk tolerance and risk perception composing the tendency of investors to perceive risks and their explication towards risks of investment. This would figure out how risk plays as one main factor that influences the financial decision, as investors of course do not want to lose their money. The consideration of stocks as a risky asset as it was found that the level of investor's exposure to stocks was negative and statistically significant (R. B. Durand et al., 2008). In contrast with pessimistic investors, it is proven that investors with considerably high-risk tolerance would have better portfolio performance (Akhtar & Das, 2020), confirming the statement of "high risk, high return". Risk tolerance is considered an important factor that influences financial decisions, savings and investment choices, as it is capable of precisely evaluating individual risk behaviour and investment instrument allocation regarding the risk level that the investor could bear (Nauman Sadiq & Ased Azad Khan, 2019).

In the study of Massol et al. (2015), it is found that psychological biases such as overconfidence and cognitive dissonance are positively affecting students' risk tolerance. Other empirical studies found that risk tolerance would also determine by the level of education, whether the higher the tolerance, the higher the level of study that investors are in (Ramudzuli & Muzindutsi, 2015). From Indonesia's perspective, the study of Yohnson (2008) accepts that risk tolerance still influences students' financial decisions, although Johnson put the assumption that Indonesian students have a different style of investment compared to foreign students.

Empirical Review and Hypothesis Development

There is no literature discussing the relation between neuroticism and stocks and cryptocurrency acquisition. Costa and McCrae describe neuroticism leads individuals "*to experience a moderately high level of negative emotion and occasional episodes of psychological distress*" (Costa & McCrae, 2008). High neuroticism that is emotionally unstable is found to be unable to manage their profit target and cut-loss points (Hidayah & Kustina, 2020). Neuroticism was found to escalate the influence of procrastination towards retirement saving, which was also found to significantly effecting negatively, directly and indirectly, retirement saving decisions (Piotrowska, 2019). R. B. Durand et al. (2008) found neurotic investors tend to rely on someone with financial expertise for investment advice, supporting the findings by Ahmad (2020) that individuals with neuroticism are risk-averse, pessimistic and show a substantial propensity towards herding behaviour and the findings by (Aren & Aydemir, 2015) where investors with emotional stability are more risk-taking than emotionally unstable investors.

H1a: Neuroticism negatively affects the probability of Indonesian students investing both in the stock market and cryptocurrency market.

There is a lack of research finding the correlation between extraversion and the decision to be involved in stocks and cryptocurrency investment. Extraversion is explained by Noguchi et al. (2006) as the tendency over positive information. Costa & McCrae (2008) illustrates how extrovert individuals are active in social interactions and exuberant. The study by Mayfield et al. (2008) found extraversion within undergraduates leads to the intention to invest on their own. A study by Nauman Sadiq & Ased Azad Khan (2019) found the positive impact of extraversion on the individual intention for short-term investment.

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H1b*: Extraversion positively affects the probability of Indonesian students investing both in the stock market and cryptocurrency market.*

There is a lack of research finding the correlation between openness to experience and the investment decision on stocks and the cryptocurrency market. Costa & McCrae (2008) illustrates how individuals with openness are "enjoy novelty and variety" and also "willing to consider new ideas and values, and may be somewhat unconventional in their views". Hopfensitz & Wranik (2012) concludes that openness to experience would likely choose an unstable market, as new information is used in the decision-making process. Evidence found by Hunter & Kemp (2004) exhibits how investors who invest in risky e-commerce companies show a substantial score on experience seeking. They also found that e-commerce investors are younger than those who invest in established companies.

H1c*: Openness to experience positively affects the probability of Indonesian students investing both in the stock market and cryptocurrency market.*

Piotrowska (2019) defines agreeableness as a tendency to tend to be cooperative, forgiving and trusting. There is a significant negative correlation between agreeableness and risk tolerance, which would also substantially affect an investor's investment decision (Pak & Mahmood, 2015). Mayfield et al. (2008) found that agreeableness does not affect investment intentions.

H1d*: Agreeableness negatively affects the probability of Indonesian students investing both in the stock market and cryptocurrency market.*

Costa & McCrae (2008) defines conscientious individuals to be "reasonably efficient and generally sensible and rational in making decisions" but at the same time "occasionally hasty or impetuous and sometimes acts without considering all the consequences". Conscientiousness was empirically found to weaken the effect of procrastination and positively effecting retirement savings indirectly (Piotrowska, 2019). Similar to the evidence above, well-organised individuals have short-term and long-term financial goals which positively impact their intention in short-term and long-term investments intention (Nauman Sadiq & Ased Azad Khan, 2019). On the contrary, it is also found that those who are high in conscientiousness would avoid being involved in risk-taking investments (McGhee et al., 2012).

H1e*: Conscientiousness negatively affects the probability of Indonesian students investing both in the stock market and cryptocurrency market.*

There is very little empirical research confirming pessimism would affect investment decisions in stocks and the cryptocurrency market. Pessimism depends on their occupation and their investment experience, which differ significantly in their financial decision-making (Joo et al., 2017). Pessimism drives the feeling of negative feelings and unoptimistic views over their future, expecting to retrieve undesirable outcomes over what they will do (Gupta & Maheshwari, 2021). A study by Blanton et al. (2001) found pessimists "reserve their pessimism about their coping ability for those events that they perceive as unlikely". Similarly, it is also found that pessimistic investors would feel agitated about their future as they perceive the worst situation (Joo et al., 2017). Ludwig & Zimper (2006) argues that pessimistic individual would tend to liquidise uncertain investment project as they attain more information within their pessimistic view, which gains the feeling of distrust of the project. Joo et al. (2017) also found pessimism within investors' financial decisions would influence investment experience.

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H2a: *Pessimism negatively affects the probability of Indonesian students investing in both the stock market and cryptocurrency market.*

There is a considerable lack of evidence studying the relationship between procrastination and stocks and cryptocurrency investment decisions. Steel (2007) discussed procrastination to be linked with a conscientiousness that deputizes responsibility, which gives understanding related to performance and motivation of individuals. A study by Piotrowska (2019) empirically discovered procrastination leads antagonists to indirectly reduce retirement savings. Piotrowska also found the higher the procrastination due positive association with pessimism, it would put off someone to save for their retirement. This would expect students to postpone their decision to invest in stocks and the cryptocurrency market.

H2b: *Procrastination negatively affects the probability of Indonesian students investing in both the stock market and cryptocurrency market.*

The less financially literate the investor is, the lower their risk tolerance would be (Samsuri et al., 2019). A study by Pak & Mahmood (2015) found that agreeable undergraduates as potential investors have a negative relationship with risk tolerance. It is similar to the result of individuals that show high agreeableness likely to avoid risks as agreeableness strongly correlates with risk-averse (Jiang et al., 2020). On the contrary, K & Kakkakunnan (2020) found that agreeable and conscientious people take more risks than others. Related to neuroticism, Mayfield et al. (2008) found neurotic investors less likely to be involved in short-term investment. It is also similar to the conclusion that neurotic individual is likely to have a higher frequency of postponement in retirement saving decision (Piotrowska, 2019), which supports evidence where high neuroticism was found to take the least possible risk (K & Kakkakunnan, 2020). Another piece of evidence that also supports previous findings also discovers anxious investors would avoid risky investments as they have lower incitement (Ferreira, 2019). It also found a negative influence of conscientiousness on risk tolerance (Pak & Mahmood, 2015), which another evidence also supports Pak and Mahmood's findings that investors with a high level of conscientiousness would have a substantial response to loss.

H3a: *The higher the tolerance towards risk, the weaker the effect of neuroticism, agreeableness and conscientiousness towards the probability of Indonesian students investing in both the stock market and cryptocurrency market.*

Extroverted investors were found by R. B. Durand et al. (2008) to have more confidence in risky investments and lead to better portfolio returns. Risk tolerance was also found to be positively correlated with extraversion and openness to experience (Pak & Mahmood, 2015). Mayfield et al. (2008) found how both extraversion and openness to experience would encourage investors for a short period, but in the longer period would be only influenced by openness to experience. Jiang et al. (2020) found that low openness and extraversion would lead to higher individual risk aversion, supporting the evidence that openness to experience may foster investors to a risk-taking decision as it challenges dominant responses by taking into account new information (Hopfensitz & Wranik, 2012). Previous statements also support the findings of K & Kakkakunnan (2020) that found extroverted individuals are taking more risks than others.

H3b: *The higher the tolerance towards risk, the stronger the effect of extraversion and openness to experience towards the probability of Indonesian students investing in both the stock market and cryptocurrency market.*

There is a considerable lack of research regarding the analysis of the risk tolerance effect on the relationship between pessimism to the investment decision. Pessimism is part of negative emotions that leads to emotional instability and feeling of guilt (R. B. Durand et al., 2008). It is found that pessimism would put off investors to save for their retirement (Piotrowska, 2019). It is aligned with the findings by Weinstock & Sonsino (2014) that shows risk tolerance to be negatively exhibited by pessimism. On the contrary, Benmansour et al. (2007) empirically prove optimism is positively interrelated with risk aversion.

H4a: The higher the tolerance towards risk, the weaker the effect of pessimism towards the probability of Indonesian students investing in both the stock market and cryptocurrency market.

There is no empirical study exploring the influence of risk tolerance on the relationship between procrastination and stocks and cryptocurrency acquisition. A study by Thaler & Benartzi (2004) found procrastination is becoming one of the causes of households' delayed savings, even when they understand their future spending would be higher than their current expenses. Procrastination is also found to complicate people saving for their retirement with different levels of income.

H4b: The higher the tolerance towards risk, the weaker the effect of procrastination on the probability of Indonesian students investing in both the stock market and cryptocurrency market.

RESEARCH METHODS

Based on the research model below, there are five research attributes which are personality traits, behavioural constraints, risk tolerance, investment behaviour in the stocks market, and investment behaviour in the cryptocurrency market. Personality traits and behavioural constraints have several constructs which are neuroticism, extraversion, openness to experience, agreeableness, conscientiousness, pessimism, and procrastination. The uniqueness of the personality and behaviour of each individual would directly influence their investment behaviour and decision-making both in stocks and cryptocurrency markets. Risk tolerance would also take effect on the investment behaviour and decision-making of young investors.
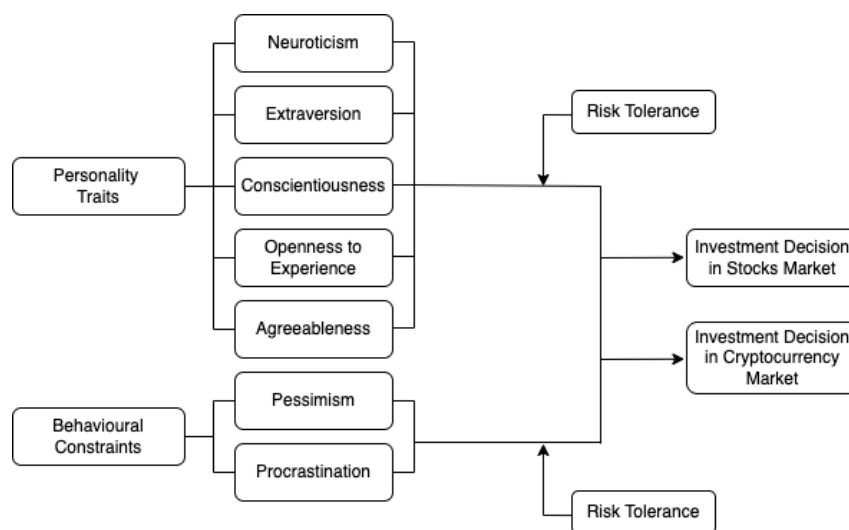

Figure 1. Conceptual Model of the Study; *Source*: Authors

RESULTS AND DISCUSSION

To understand how the personality characteristics, pessimism and procrastination may affect the student's investment behaviour, the questionnaire that is distributed through an online form to be filled by students that are following several qualifications, which are:

a. Active high school or university student within the age of 17 – 30 years old.
b. Currently a student of any high school or university in Java Island.

222 responses were obtained as the students of high schools and universities throughout Java Island fulfilled the questionnaire containing the variables of Extraversion, Neuroticism, Agreeableness, Conscientiousness, Openness to Experience, Pessimism, Procrastination and Risk Tolerance. 10 responses were considered invalid, as respondents unable to fulfil the criteria of "currently a student of any high school or university in Java Island".

Table 1. Demographic Profile of Respondents

Data	Frequency	Percentage	Total
Gender:			
Female	116	54.7%	212
Male	96	45.3%	
Age:			
18 - 20	124	58.49%	212
21 - 23	84	39.62%	
24 - 26	4	1.89%	
Source of Income:			
Monthly Allowance	181	85.4%	212
Salary	14	6.6%	
Business Income	17	8%	
Income Group:			
< 1 Million Rupiah	80	37.7%	212
1 – 3 Million Rupiah	89	42%	
3 – 5 Million Rupiah	27	12.7%	
> 5 Million Rupiah	16	7.5%	

Source: Primary Data, 2021-2022.

Descriptive statistics of the data are presented in Table 2 which shows the mean, the standard deviation, and the median of each indicator. Table 2 also presents two statistics, skewness and excess kurtosis (presented as kurtosis), which provide insights into the shape of the distribution.

Table 2. Descriptive Statistics of Data

Variable	Indicator	Mean	Median	SD	Kurtosis	Skewness
	neur_1	4.377	4	1.466	-0.452	-0.132
	neur_2	4.802	5	1.532	-0.519	-0.408
Neuroticism	neur_3	3.929	4	1.807	-0.887	0.111
	neur_4	3.571	3	1.817	-0.907	0.289
	neur_5	4.118	4	1.657	-0.819	-0.227

Variable	Indicator	Mean	Median	SD	Kurtosis	Skewness
Extraversion	extv_1	4.604	5	1.468	-0.315	-0.4
	extv_2	5.052	5	1.289	-0.104	-0.536
	extv_3	4.995	5	1.506	-0.235	-0.609
	extv_4	4.542	5	1.445	-0.455	-0.298
Conscientiousness	cons_1	5.335	6	1.341	-0.13	-0.607
	cons_2	5.288	5	1.224	0.662	-0.721
	cons_3	5.019	5	1.356	-0.239	-0.377
	cons_4	5.08	5	1.46	0.125	-0.672
Openness to Experience	open_1	4.684	5	1.292	-0.082	-0.253
	open_2	5.679	6	1.091	0.051	-0.587
	open_3	5.132	5	1.256	-0.21	-0.453
	open_4	5.321	5	1.19	-0.204	-0.423
Agreeableness	agrs_1	5.491	6	1.188	-0.488	-0.599
	agrs_2	5.627	6	1.204	1.257	-1.012
	agrs_3	5.274	5	1.278	0.166	-0.661
	agrs_4	4.349	4	1.596	-0.473	-0.129
Pessimism	pesm_1	3.759	4	1.57	-0.676	0.227
	pesm_2	4.061	4	1.688	-0.795	-0.085
	pesm_3	4.519	5	1.591	-0.742	-0.148
	pesm_4	3.547	3	1.776	-0.91	0.258
Procrastination	proc_1	4.288	4	1.523	-0.499	-0.294
	proc_2	3.373	3	1.642	-0.422	0.392
	proc_3	4.175	4	1.483	-0.413	-0.286
	proc_4	4.415	5	1.501	-0.575	-0.303
Risk Tolerance	risk_1	3.84	4	1.778	-0.735	-0.004
	risk_2	3.741	4	1.73	-0.583	0.296
	risk_3	3.995	4	1.744	-0.808	0.109
	risk_4	4.858	5	1.507	-0.073	-0.531

Source: Primary Data, 2021-2022

Validity Analysis and Data Reliability

An assessment of convergent and discriminant validity is required to reveal that reflective indicators depict all the constructs. This is the first requirement before continuing to the next steps of bootstrapping and further analyses. Convergent validity is the first of all. Convergent validity will ensure that the correlation between each indicator in one construct positively correlates. The convergent validity assessment's results are presented in Table 7.

It is shown that several constructs, Neuroticism, Agreeableness, Procrastination, and Risk Tolerance cannot fulfil the required measurement to achieve the data reliability and validity to further analyses. To make further analyses, the assessment of outer loadings is also necessary.

Table 7. Model 1 Convergent Validity

Constructs	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Neuroticism	0.718	0.569	0.247
Extraversion	0.858	0.896	0.685
Conscientiousness	0.764	0.828	0.553
Openness to Experience	0.820	0.878	0.645
Agreeableness	0.707	0.775	0.473
Pessimism	0.748	0.822	0.536
Procrastination	0.817	0.716	0.415
Risk Tolerance	0.286	0.430	0.426

Source: Processed Primary Data, 2021-2022

Table 8. Model 1 Outer Loadings

No	Variable	Indicators	Outer Loadings
1		neur_1	0.386*
2		neur_2	0.192*
3	Neuroticism	neur_3	0.590*
4		neur_4	0.267*
5		neur_5	0.793
6		extv_1	0.909
7	Extraversion	extv_2	0.824
8		extv_3	0.703
9		extv_4	0.861
10		cons_1	0.792
11	Conscientiousness	cons_2	0.903
12		cons_3	0.643*
13		cons_4	0.596*
14		open_1	0.759
15	Openness to Experience	open_2	0.702
16		open_3	0.886
17		open_4	0.852
18		agrs_1	0.521*
19	Agreeableness	agrs_2	0.624*
20		agrs_3	0.897
21		agrs_4	0.653*
22		pesm_1	0.830
23	Pessimism	pesm_2	0.646*
24		pesm_3	0.674*
25		pesm_4	0.769
26	Procrastination	proc_1	0.473*
27		proc_2	0.956
28		proc_3	0.402*
29		proc_4	0.600*

No	Variable	Indicators	Outer Loadings
30	Risk Tolerance	risk_1	0.900
31		risk_2	-0.552*
32		risk_3	0.240*
33		risk_4	0.729

*Outer loading value < .70

As provided in the table above, several indicators for several constructs score below the acceptable score of outer loadings, which are 0.708 or 0.70. This causes the Average Variance Extracted (AVE) of Neuroticism, Agreeableness, Procrastination, and Risk Tolerance to scores below 0.50 and fails to explain more than half of the variance of its indicators. Hair et al. (2011) explain that all indicators with very low outer loadings, below 0.40, are required to be eliminated. In this stage, deletion of several indicators is needed for re-estimation.

Re-estimation (called *Model 2*) was done by deleting several indicators from Neuroticism, Agreeableness, Procrastination, and Risk Tolerance latent variable. The deleted indicators are *neur_1, neur_2, neur_4, agrs_1, proc_3, risk_2* and *risk_4*. After the deletion of those indicators, there are changes in the values of Cronbach Alpha, Composite Reliability, and AVE. *Model 2* convergent reliability and outer loadings are as follow:

Table 9. Model 2 Convergent Validity

Constructs	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Neuroticism	0.145	0.696	0.538
Extraversion	0.858	0.896	0.685
Conscientiousness	0.764	0.828	0.553
Openness to Experience	0.820	0.878	0.645
Agreeableness	0.609	0.768	0.534
Pessimism	0.748	0.822	0.538
Procrastination	0.730	0.786	0.564
Risk Tolerance	0.646	0.843	0.730

Source: Data processing (2022)

Table 10. Model 2 Outer Loadings

No	Variable	Indicators	Outer Loadings
1	Neuroticism	neur_3	0.637*
2		neur_5	0.818
3	Extraversion	extv_1	0.909
4		extv_2	0.824
5		extv_3	0.703
6		extv_4	0.861
7	Conscientiousness	cons_1	0.792
8		cons_2	0.903

No	Variable	Indicators	Outer Loadings
9		cons_3	0.643*
10		cons_4	0.596*
11		open_1	0.759
12	Openness to Experience	open_2	0.702
13		open_3	0.886
14		open_4	0.852
15		agrs_2	0.584*
16	Agreeableness	agrs_3	0.91
17		agrs_4	0.657*
18		pesm_1	0.83
19	Pessimism	pesm_2	0.646*
20		pesm_3	0.674*
21		pesm_4	0.769
22		proc_1	0.555*
23	Procrastination	proc_2	0.963
24		proc_4	0.676*
25	Risk Tolerance	risk_1	0.921
26		risk_4	0.781

* Outer loadings value < .70

The deletion of several indicators above allows *Model 2* to reach convergent validity as all AVE ranges between 53% to 73%, above the recommended level of .05 (Hair et al., 2013). On the other hand, Neuroticism composite reliability is still below the threshold value of 0.708. It is still considered acceptable as the changes after the indicators deletion towards *NEUR* composite reliability, from 0.569 in *Model 1* to 0.696 in *Model 2*, are still above the recommended level of .6 (Fornell & Larcker, 1981). Thus, the all-composite reliability of *Model 2* was considered reliable, as any other deletion of its indicators might alter the research's result. The elimination of *the agrs_1* indicator, even though it is still above the suggested threshold value, it significantly increases the composite reliability and the AVE value of *AGRS*. Similarly, *PROC* AVE values were also increased to the suggested threshold value as its *proc_3* indicator was eliminated.

The last step to evaluate the measurement model is the discriminant validity analysis. Discriminant validity measures validate that a reflective construct is strongly related to its indicators. The Fornell-Larcker criterion was used to measure the discriminant validity of the reflective model. It compares the square root of the AVE values with the latent variable correlations. Specifically, the square root of each construct's AVE should be greater than its highest correlation with any other construct, as it is based on the idea that a construct shares more variance with its associated indicators than with any other constructs. Table 4.11 shows each variable are having higher variance on its own compared to the other constructs (e.g. *AGRS -> AGRS* = .731; *CONS -> AGRS* = .256). It is concluded that (presented in Table 4.12) all constructs in *Model 2* are fulfilling the suggested reflective measurement model reliability and validity recommended value and are allowed to continue to the structural model assessment.

Table 11. Model 2 Fornell-Larcker Criterion

	AGRS	CONS	EXTV	NEUR	OPEN	PESM	PROC	RISK
AGRS	**0.731**							
CONS	0.256	**0.744**						
EXTV	0.411	0.385	**0.828**					
NEUR	-0.122	-0.035	-0.261	**0.733**				
OPEN	0.360	0.552	0.553	0.045	**0.803**			
PESM	-0.007	-0.162	-0.349	0.247	-0.147	**0.734**		
PROC	-0.049	-0.137	-0.212	0.263	-0.166	0.494	**0.751**	
RISK	0.140	0.142	0.137	0.128	0.252	-0.009	0.065	**0.854**

Source: Data processing (2022)

Table 12. Summary for Reflective Measurement Models

Latent Variable	Indicators	Loadings	Indicator Reliability	Composite Reliability	AVE	Discriminant Validity?
NEUR	neur_3	0.637	0.406	0.696	0.538	Yes
	neur_5	0.818	0.669			
EXTV	extv_1	0.909	0.826	0.896	0.685	Yes
	extv_2	0.824	0.679			
	extv_3	0.703	0.494			
	extv_4	0.861	0.741			
CONS	cons_1	0.792	0.627	0.828	0.553	Yes
	cons_2	0.903	0.815			
	cons_3	0.643	0.413			
	cons_4	0.596	0.355			
OPEN	open_1	0.795	0.632	0.878	0.645	Yes
	open_2	0.702	0.493			
	open_3	0.886	0.785			
	open_4	0.852	0.726			
AGRS	agrs_2	0.584	0.341	0.768	0.534	Yes
	agrs_3	0.910	0.828			
	agrs_4	0.657	0.432			
PESM	pesm_1	0.830	0.689	0.822	0.538	Yes
	pesm_2	0.646	0.417			
	pesm_3	0.674	0.454			
	pesm_4	0.769	0.591			
PROC	proc_1	0.555	0.308	0.786	0.564	Yes
	proc_2	0.963	0.927			
	proc_4	0.676	0.457			
RISK	risk_1	0.921	0.848	0.843	0.730	Yes
	risk_4	0.781	0.610			

Source: Data processing (2022)

Hypotheses Testing

To prove how hypotheses are being accepted or rejected, we can use the t-statistics or *p*-value. The critical path is significant when the t-value exceeds 1.96, or the significance level

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(*p*-value) is under 0.05. The author uses bootstrapping subsamples of 5,000 and a two-tailed significance level of 0.05 (5%) for the bootstrapping testing. The hypotheses of personality traits and behavioral constraints' variable are as follow.

Table 13. Path Coefficient

Construct	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values (p)
NEUR -> STCK	0.104	0.11	0.08	1.305	0.192
NEUR -> CRYP	-0.034	-0.014	0.065	0.526	0.599
EXTV -> STCK	0.045	0.055	0.11	0.404	0.686
EXTV -> CRYP	0.036	0.023	0.082	0.439	0.661
CONS -> STCK	0.102	0.098	0.078	1.309	0.191
CONS -> CRYP	0.01	0.024	0.089	0.11	0.912
OPEN -> STCK	0.044	0.052	0.084	0.522	0.602
OPEN -> CRYP	0.105	0.088	0.095	1.106	0.269
AGRS -> STCK	0.012	0.01	0.097	0.122	0.903
AGRS -> CRYP	-0.05	-0.031	0.09	0.548	0.583
PESM -> STCK	-0.017	-0.003	0.099	0.172	0.863
PESM -> CRYP	0.052	0.039	0.089	0.579	0.562
PROC -> STCK	0.033	0.024	0.09	0.368	0.713
PROC -> CRYP	0.104	0.077	0.096	1.091	0.275

* *p* < .10. ** *p* < .05. *** *p* < .01

Table 14. Hypotheses Testing Results

Hypothesis	Sub-Hypothesis	Subject	Expected Sign	Resulted Sign	Significant
H1	a	Neuroticism	Negative	Positive (S) Negative (C)	Not Significant
	b	Extraversion	Positive	Positive (S & C)	Not Significant
	c	Openness to Experience	Positive	Positive (S & C)	Not Significant
	d	Agreeableness	Negative	Positive (S) Negative (C)	Not Significant
	e	Conscientiousness	Negative	Positive (S & C)	Not Significant
H2	a	Pessimism	Negative	Negative (S)	Not Significant

Hypothesis	Sub-Hypothesis	Subject	Expected Sign	Resulted Sign	Significant
	b	Procrastination	Negative	Positive (C) Positive (S & C)	Not Significant

Note: (S) = STCK; (C) = CRYP

The effect of neuroticism is insignificant to a student's investment decision in stocks and cryptocurrency. T-values of 1.305 and 0.526 for STCK and CRYP signify that neuroticism does not affect students' involvement in the stocks and cryptocurrency markets. Therefore, **H1a** is rejected.

Even though students show a high tendency toward extraversion traits (mean = 4.797), it doesn't affect the student's involvement in the stock and cryptocurrency markets. With the T-statistics value of 0.404 and 0.439 and *p*-value of 0.686 and 0.661 for *STCK* and *CRYP*, we cannot describe how extroverted students are unconfident in investing in the stock and cryptocurrency market. Thus, hypothesis **H1b**, where extraversion positively affects students to invest in the stocks and cryptocurrency markets, is rejected.

Openness to experience, where individuals are eager to try new things, shows that there is no significance for students to be curious to invest in stocks and the cryptocurrency market. With the t-statistics value of 0.522 and 1.106 and *p*-value of 0.602 and 0.269 for *STCK* and *CRYP*, respectively, it is unable to describe how students with high curiosity (*mean = 5.20)* are willing to invest in stocks market and cryptocurrency market. Therefore, it rejects hypothesis **H1c**, where openness to experience positively affects students investing in the stock and cryptocurrency markets.

Agreeableness doesn't also significantly affect the students' investment decisions to invest in stocks and the cryptocurrency market (the t-statistics = 0.122 and 0.548 for *STCK* and *CRYP*, respectively). Therefore, the hypotheses **H1d** where agreeableness negatively affects students to invest in stocks market and cryptocurrency market are rejected. The case also applies to conscientiousness. Consequently, it rejects hypothesis **H1e**, where conscientiousness negatively affects students investing in the stocks and cryptocurrency markets.

One of the behavioral constraints, pessimism, was also found to have no significance towards investment in stocks and the cryptocurrency market. The t-statistics of 0.172 and 0.579 and *p*-value of 0.863 and 0.562 for *STCK* and *CRYP*, respectively, show how pessimist students are not likely to avoid investing in stocks and cryptocurrency. Therefore, hypothesis **H2a**, where pessimism negatively affects students to invest in stocks and the cryptocurrency market, is rejected. Procrastination was also found insignificant, whereby t-statistics of 0.368 and 1.091 are higher than 0.5. Therefore, hypotheses **H2b**, where pessimism negatively affects students to invest in stocks and cryptocurrency markets, are rejected.

This research also analyses the moderation variable, a variable where it directly affects the relationship between the exogenous and endogenous latent variables but in a different way. Risk tolerance (*RISK*) in this research acts as a continuous moderating variable where it is metrically measured. It could change the strength of the relationship between personality traits and behavioral constraints towards students' investment decisions in stocks and the cryptocurrency market.

Table 15. Path Coefficient (*Risk Tolerance* as moderating variable)

Construct	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values (p)
NEUR*RISK -> STCK	0.116	0.103	0.066	1.762	0.078*
NEUR*RISK -> CRYP	0.070	0.058	0.074	0.945	0.345
EXTV*RISK -> STCK	-0.050	-0.029	0.089	0.562	0.574
EXTV*RISK -> CRYP	-0.019	-0.045	0.108	0.178	0.859
CONS*RISK -> STCK	0.075	0.084	0.062	1.197	0.231
CONS*RISK -> CRYP	-0.031	0.006	0.092	0.339	0.735
OPEN*RISK -> STCK	0.043	0.040	0.082	0.519	0.604
OPEN*RISK -> CRYP	0.287	0.264	0.103	2.792	0.005***
AGRS*RISK -> STCK	0.030	0.022	0.063	0.471	0.638
AGRS*RISK -> CRYP	-0.087	-0.063	0.075	1.151	0.250
PESM*RISK -> STCK	-0.052	-0.025	0.074	0.709	0.479
PESM*RISK -> CRYP	0.090	0.071	0.089	1.006	0.315
PROC*RISK -> STCK	-0.076	-0.055	0.066	1.146	0.252
PROC*RISK -> CRYP	-0.068	-0.033	0.088	0.773	0.440

* p < .10. ** p < .05. *** p < .01.

Table 16. Hypotheses testing result (*Risk Tolerance* as moderation variable)

Hypothesis	Sub-Hypothesis	Subject	Expected Sign	Resulted Sign	Significant
H3	a	Neuroticism	Weaker	Positive (S & C)	Significant (S)
		Agreeableness		Positive (S) Negative (C)	Not Significant
		Conscientiousness		Positive (S) Negative (C)	Not Significant
	b	Extraversion	Stronger	Negative (S & C)	Not Significant
		Openness to Experience		Positive (S & C)	Significant (C)
H4	a	Pessimism	Weaker	Negative (S) Positive (C)	Not Significant
	b	Procrastination	Weaker	Negative (S & C)	Not Significant

Note: (S) = STCK; (C) = CRYP

H3a states that the effect of neuroticism, agreeableness, and conscientiousness towards the probability of investing in stocks and the cryptocurrency market is weaker when risk tolerance serves as moderating variable. *RISK*, as the moderator between *NEUR* to *STCK* and *CRYP* based on the T-statistics of 1.762 and 0.945 and *p*-value of 0.078 and 0.345 for *STCK* and *CRYP*, respectively, are only showing significance toward student's investment decision in stocks market after it is moderated with *RISK*. Therefore, the moderating effect of *RISK* only significantly affects the relation between *NEUR* and *STCK*, while *NEUR* and

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CRYP, *AGRS*, and *CONS* were non-significant. It is concluded that hypothesis **H3a** is rejected.

RISK on hypotheses **H3b** was expected to significantly affect the positive relationship between *EXTV* and *OPEN* towards *STCK* and *CRYP*. RISK has no significant influence on *OPEN* to *STCK*, shown by the value of T-statistics = 0.519 and *p*-value = .604. On the other hand, *RISK* significantly affects the relationship between *OPEN* to *CRYP* with the t-value = 2.792 and *p* = .005. Thus, the moderating effect of *RISK* towards *EXTV* to *STCK* and *CRYP* and *OPEN* to *STCK* has no significant effect (t-statistics value <1.96; *p* > .05) while *RISK* has a significant effect (t-statistics value >1.96; *p* < .05) towards the relation between *OPEN* to *CRYP*. We can conclude that RISK influences students with openness to experience only to invest in the cryptocurrency market, where it is accepted partly of the hypotheses **H3b**. In contrast, the non-significance of *RISK* moderation towards *OPEN* to *STCK*, *EXTV* to *STCK*, and *EXTV* to *CRYP* reject hypothesis **H3b.**

NEUR relationship towards *STCK* and *CRYP*, moderated by *RISK*, attained a T-statistics value of 0.709 and 1.006 and *a p*-value of 0.479 and 0.315 for *STCK* and *CRYP*, respectively. Based on the value, it shows how *RISK* has no significant effect (T-statistics value <1.96; *p* > .05), and therefore the hypotheses **H4a** where *RISK* will weaken the relationship between *PESM* to *STCK* and *CRYP* are rejected.

PROC relationship towards *STCK* and *CRYP*, moderated by *RISK*, attained T-statistics values of 1.146 and 0.773 and *p*-value of 0.252 and 0.440 for *STCK* and *CRYP*, respectively. Based on the value, it shows how *RISK* has no significant effect (T-statistics value <1.96; *p* >0.05), and therefore the hypotheses **H4b**, where *RISK* will weaken the relationship between *PROC* to *STCK* and *CRYP* are rejected.

Discussion

This study found that almost all personality traits and behavioral constraints have no significant effect to student's decision to invest in stocks and cryptocurrency markets. The neuroticism traits are not found to influence students' decisions to invest in the stocks and cryptocurrency markets. The result contradicts the evidence that neurotic individuals are likely to avoid high-risk investment instruments as they lose their confidence and instead follow professional advice (Ahmad, 2020). It shows how students' pessimistic and emotional instability personality does not influence their decision to invest in stocks and cryptocurrency.

This study also cannot be consistent with the findings that highly neurotic individuals would hold less risky assets within their portfolio (Mayfield et al., 2008; Oehler et al., 2018). On the other hand, the moderation effect of *RISK* influencing neurotic students to invest in the stock market is positive and statistically significant (p < .10). It indicates that the higher the student's risk tolerance, the more emotionally unstable they are likely to invest in the stock market. The finding is consistent with previous studies where neurotic individuals are likely eager to take risks (R. Durand et al., 2013; R. B. Durand et al., 2008). The result cannot denote the negative significance of neuroticism to students' decisions on stocks and cryptocurrency acquisition as proposed in the hypotheses, which failed to support the evidence that neurotic individuals tend to avoid risk (Nicholson et al., 2005). Both direct and moderated results of neuroticism towards investment decisions of students (except *NEUR*RISK* -> *STCK*) were found non-significant, based on its *p* > .05 on *STCK* and *CRYP*. There is no tendency for students to have neuroticism traits (*mean = 4.160*). The indicator of *neur_2* that states "*I see myself as an anxious individual*" failed to indicate that neurotic students invest in stocks and the cryptocurrency market. Thus, it cannot support the findings

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by Piotrowska (2019), where neuroticism, directly and indirectly (procrastination as mediator), undermines the decision to invest for retirement.

Extraversion traits have no significant effect on students' decision to invest in stocks and cryptocurrency, even after moderated by risk tolerance. The results are contrary to Mayfield et al. (2008) and Nga & Ken Yien (2013), where extroversion leads undergraduates to invest on their own and be less risk-averse, which those findings supports the evidence by Nicholson et al. (2005), where extroverts are risk-taker. An exciting result by R. B. Durand et al. (2008) shows a positive and statistically significant relationship between extraversion and stock exposure. This study would assume that extroverts are likely to invest in the stock market.

Openness to experience was found to have no direct significance on students' investment decisions in stocks and the cryptocurrency market. The evidence contradicts the study result of a substantial score of experience seeking by young participants in e-commerce investments (Hunter & Kemp, 2004). However, after it is moderated by *RISK*, it shows a positive and statistically significant towards *CRYP*, which explains that students with high curiosity tend to invest in the cryptocurrency market (*OPEN*RISK -> CRYP*; *p*-value = .005). The finding supports De Bortoli et al. (2019) statement that high openness to experience scores would exhibit higher risk propensity, as cryptocurrency is considered a high-risk instrument (Binda, 2020). On the other hand, Risk Tolerance has no significant effect on moderating the relationship between Openness to Experience and investment decisions in the stock market, which makes hypotheses **H1c** are rejected and hypotheses **H3a** are partially accepted.

Mayfield et al. (2008) found evidence that agreeableness has no significant effects on investment intentions, which is similar to this study's data. Even when the result is positively related to the decision in the stocks market and negatively related to cryptocurrency investment, as the respondents showed a high agreeableness score based on the study's descriptive statistics (*mean = 5.185*), there is no significant effect found between agreeableness and student's investment decision in stocks and cryptocurrency market. Risk tolerance is the moderating variable also did not change the relationship of agreeableness to the student's decision to invest in stocks and cryptocurrency market, which cannot provide a similar result where low agreeableness likely shows high-risk aversion (Jiang et al., 2020) and a contradicting result where higher agreeableness leads to less wealth in his or her securities (R. B. Durand et al., 2008). However, this study found that there are changes where agreeableness traits are likely to invest in the cryptocurrency market, though it is not significant.

Conscientiousness, where an individual shows high cautiousness to make any rational decisions, was found to have no significant effect on the student's investment decisions in both stocks and cryptocurrency markets. As students are showing high conscientiousness levels (*mean = 5.18*), the study result cannot support the previous studies of Piotrowska (2019) where conscientiousness supports retirement saving as it weakens the procrastination effect nor the study of McGhee et al. (2012) where a high level of conscientiousness leads to lower risk tolerance. Risk tolerance is the moderating variable also did not influence the relationship of conscientiousness to the students' investment decision in stocks and cryptocurrency market, even when a study found that procrastination trait would make such individuals avoid risk as they are considered as rational thinkers (Nga & Ken Yien, 2013). Eventually, the statistical result found that the negative effect of conscientiousness to invest in cryptocurrency changes to positive after it is moderated by risk tolerance. However, both results are found non-significant.

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Previous studies found that pessimism would feel despair for their future as they are experiencing wrong financial decisions regarding their investment (Joo et al., 2017). This study cannot find the relationship between pessimism and the investment decision in stocks and the cryptocurrency market, even when Risk Tolerance moderates the relationship. On the other hand, it was found that there is a negative relation between pessimism and students' decision to invest in the stocks market and a negative association between students' decision to invest in the cryptocurrency market, though all results are non-significant. Those results are likely caused by the neutral side of students toward pessimism. The study result is also inconsistent with the Weinstock & Sonsino (2014) study, which shows how pessimism negatively exhibits risk tolerance. We may conclude that pessimist students would likely avoid stocks investment but are likely to start to invest in cryptocurrency instruments.

Procrastination is also found to have no significant effect on its relationship with the students' investment decisions in the stocks market and cryptocurrency market, though statistically, there is a positive relationship between procrastination with student's probability of investing in the stocks market and cryptocurrency market, before and after it moderated by risk tolerance. The study where procrastination hinders the household's saving even when they know the increasing expenses in the future (Thaler & Benartzi, 2004) and how procrastination would prevent someone from investing in preparing for their retirement cannot be supported by the result of this study.

CONCLUSION

Evidence from literature found that psychological factors influence an investor's mind before any investment decisions are conducted (Gupta & Maheshwari, 2021). This study explores personality traits with the commonly used personality taxonomy, big-five personality traits, pessimism, and procrastination included as behavioral constraints, to the probability of students to invest in stocks market and cryptocurrency market. None of all personality traits and behavioral constraints are statistically significant to exhibit the student's decision to invest in stocks and the cryptocurrency market. In contrast, we can conclude that personality traits (extraversion, neuroticism, conscientiousness, openness to experience, and agreeableness), pessimism, and procrastination cannot determine the probability.

The use of risk tolerance as moderating variable is meant to find the relationship changes caused by risk tolerance towards students' investment decisions in the stocks market and cryptocurrency market. This study evidence shows neurotic students with high-risk tolerance would probably invest in the stock market. Similar results also found that risk-seeker creative students have a high probability of investing in cryptocurrency. Students' decisions to invest in stocks and the cryptocurrency market may also be affected by their income level, as it was found that the higher the income, the more likely they invest in the stocks market. It gives a sense that students with an income level lower than 3 million Indonesian Rupiah (IDR) per month have a lower probability to start investing in stocks market, which is also indicated by a small percentage of respondents who experienced stocks and cryptocurrency investment.

The researcher believed that this research is far from a definition of perfect. There were still several things that were taken into account when the researcher conducted this study. For example, the limited time they invested and the difficulty in finding the respondents made the sample of 212 students unable to represent the whole population of students in Indonesia. This research does not guarantee the same result and findings when the framework is tested on another platform because respondents' behavior might differ from time to time.

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Based on the overall results of this study, the researcher proposes several suggestions that are expected to be useful for future research: increasing the sample size to increase the power of the statistical test. The non-significant direct and moderated effect were caused by the small sample size ($n = 212$) and the study's robustness by doing the Pearson correlation, as Norman (2010) found that the Pearson correlation was highly robust concerning violations of assumptions.

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