

RISK PREFERENCE AND
FINANCIAL DECISION MAKING:
EVIDENCE ON HOUSEHOLD ASSET
OWNERSHIP ON INDONESIA

CHONG MING LUAN
ENG SHU PEI
EVELYN WONG CARMEN
HUE CHI XIAN
NG KHAI EARN

BACHELOR OF FINANCE (HONS)

UNIVERSITI TUNKU ABDUL RAHMAN
FACULTY OF BUSINESS AND FINANCE
DEPARTMENT OF FINANCE

APRIL 2020

RISK PREFERENCE AND
FINANCIAL DECISION MAKING:
EVIDENCE ON HOUSEHOLD ASSET
OWNERSHIP ON INDONESIA

BY

CHONG MING LUAN
ENG SHU PEI
EVELYN WONG CARMEN
HUE CHI XIAN
NG KHAI EARN

A final year project submitted in partial fulfillment of
the requirement for the degree of

BACHELOR OF FINANCE (HONS)

UNIVERSITI TUNKU ABDUL RAHMAN

FACULTY OF BUSINESS AND FINANCE
DEPARTMENT OF FINANCE

APRIL 2020

Copyright @ 2020

ALL RIGHTS RESERVED. No part of this paper may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, graphic, electronic, mechanical, photocopying, recording, scanning, or otherwise, without the prior consent of the authors.

DECLARATION

We hereby declare that:

- (1) This undergraduate FYP is the end result of our own work and that due acknowledgement has been given in the references to ALL sources of information be they printed, electronic, or personal.
- (2) No portion of this FYP has been submitted in support of any application for any other degree or qualification of this or any other university, or other institutes of learning.
- (3) Equal contribution has been made by each group member in completing the FYP.
- (4) The word count of this research report is 19230.

Name of Student:	Student ID:	Signature:
1. CHONG MING LUAN	1602348	_____
2. ENG SHU PEI	1603520	_____
3. EVELYN WONG CARMEN	1605409	_____
4. HUE CHI XIAN	1601653	_____
5. NG KHAI EARN	1602113	_____

Date: _____

ACKNOWLEDGEMENT

We would like to pay our deepest gratitude and appreciation to those who helped and guided us throughout this research project. The success and final outcome of this project would not realize without the supervision, assistance, and advices. We are extremely grateful to their supports.

First and foremost, we would like to show our heartfelt appreciation to our supervisors, Ms Lau Siew Yee and Dr Wei Chooi Yi for overseeing and gave us millions of assistances and supports on this research project. They took keen interest on our research project and guided us until the completion of our project by topping up our information, knowledge and skill in developing a well-structured written project and smooth oral presentation.

Next, we would like to deliver our thankfulness to Universiti Tunku Abdul Rahman (UTAR) for providing us infrastructure and facilities that ease us in conducting our research project. Also thanks UTAR for giving us an opportunity to learn and gain more knowledge other than what we have only learn in the university.

Lastly, we would not forget to pay tribute to our group members. This research project will only be able to complete successfully with their contribution, hard-work, cooperation and supports to each other. The credit also given to our family who provide huge mentally support to us, so that we could concentrate and able to motivate us throughout the whole project.

TABLE OF CONTENT

	Page
Copyright.....	ii
Declaration.....	iii
Acknowledgement.....	iv
Table of Content.....	v
List of Table.....	vii
List of Abbreviations.....	viii
Preface.....	x
Abstract.....	xi
CHAPTER 1 INTRODUCTION.....	1
1.1 Research Background.....	1
1.2 Research Problem.....	3
1.3 Objectives and Significance of Study.....	7
1.3.1 Research Questions.....	7
1.3.2 Research Objectives.....	7
1.3.3 Research Significance.....	8
CHAPTER 2 LITERATURE REVIEW.....	10
2.1 Theoretical Review.....	10
2.1.1 Expected Utility Theory.....	10
2.1.2 Prospect Theory.....	13
2.2 Literature Review.....	16

CHAPTER 3 RESEARCH METHOD.....	28
3.0 Introduction.....	28
3.1 Potential Outcome Framework.....	28
3.2 Empirical Strategy.....	30
3.3 Data Collection.....	32
3.4 Proposed Data Analysis.....	34
CHAPTER 4 DATA ANALYSIS, FINDINGS, AND INTERPRETATION....	38
4.0 Introduction.....	38
4.1 Results.....	38
4.2 Descriptive Analysis and Interpretation.....	38
4.2.1 Household Assets and Risk Preference.....	38
4.2.2 Household Assets in Urban Areas.....	42
4.2.3 Household Assets in Rural Area.....	44
4.2.4 Assets in Household size not more than 5 people.....	47
4.2.5 Assets in Household size more than 5 people.....	49
4.3 Inferential Analysis.....	51
CHAPTER 5 CONCLUSIONS AND IMPLICATIONS.....	59
5.1 Summary.....	59
5.2 Policy Implications.....	60
5.3 Limitations.....	64
5.4 Recommendations.....	65
References.....	67

LIST OF TABLES

	Page
Table 1: Summary Statistics	34
Table 2: The effects of risk preference on household assets	38
Table 3: Subsample (Urban)	42
Table 4: Subsample (Rural)	44
Table 5: Subsample (Household size equal or less than 5)	47
Table 6: Subsample (Household size more than 5)	49

LIST OF ABBREVIATIONS

ARM	Adjusted-Rate Mortgage
BAPPENAS	Ministry of National Development Planning of the Republic of Indonesia
BPDPKS	Palm Oil Plantation Fund Management Agency
BRAC	Building Resources Across Communities
BRI	Bank Rakyat Indonesia
CAPM	Capital Assets Pricing Model
CIA	Conditional Independence Assumption
DSR	Debt Service Ratio
EUT	Expected Utility Theory
FRM	Fixed-Rate Mortgage
FSR	Financial Stability Review
GDP	Gross Domestic Product
GST	Goods and Service Tax
IFLS	Indonesian Family Life Survey
LCCG	Low Cost Green Car
OJK	Financial Services Authority
RAND	Research and Development
RT	Role Theory

SCF	Survey of Consumer Finances
SNRT	Household Balance Sheet Survey
ST	Socialization Theory

PREFACE

This project is solely conducted and produced by the authors with reference of researches that have been made by previous researchers and the resources are all quoted as in references. This research paper is made to fulfil the requirement of course of studying Bachelor of Finance (HONS) as final year project.

In this study, we would like to examine how risk preference will affect the financial decision making. We focus the study on determinants of behavioural factor which is risk preference on household asset ownership because current literature lack of the studies of behavioural factor, especially Indonesia. There is no study on how behavioural factor, which is risk preference would affect the household financial decision making. We contribute the studies to fill up the gap for Indonesia to help them in improving their policy against the risk preference of their citizen to improve their economy.

The challenging part we met throughout this research project is we have insufficient references of previous study about risk preference on financial decision making. Due to this reason, we have some hard time in searching for related information for supports. Despite the limited resources, we are still able to complete our research, and strongly believe that the research will be useful for future researchers.

ABSTRACT

This study aims to examine the effect of risk preference on financial decision making in household assets in Indonesia. We used risk preference: risk-averse and risk-seeking as our independent variable. We measure our independent variable in dummy variables to investigate the effect on financial decision making in household assets in Indonesia. Cross sectional data from IFLS-5 for year 2014 is being used in this study, which contains 9786 sample size. We employed potential outcome framework to form our regression model, and employed CIA to eliminate the selection bias in our model to ensure our results is unbiased. The results show that risk preference has significant relationship with some of our household asset ownership that policymakers can make improvement on their policy to improve economy based on the results. This research provided contribution to the society such as policymakers, financial analyst, and the investors.

CHAPTER 1: INTRODUCTION

1.1 Research Background

Indonesia is the fourth most populous country in the world, with the total population of 269.6 million, as of July 2019 (Worldometer, 2019). Its population has been growing since 1950 for two reasons, although its crude birth rate (births per thousand population) is declining while its crude death rate (deaths per thousand population) is rising. First, the total birth is still greater than the total deaths the country. In 2018, for example, the crude birth rate and crude death rate were 18.3 and 7.2 (per thousand population), respectively (Knoema, 2019). Second, enhancement in food production contributes to the population growth (Putera, 2011). The country's food production index was 21.6 in 1967 and grew substantially to 144.6 in 2016 (Knoema, 2019). The government had implemented various programmes to boost the food production, which include enhancing agricultural technology (improved seeds and varieties, fertilisers and pesticides) and introducing professional field extension workers to local farmers (Tya, 2017).

Despite a slowdown of global economy, Indonesia's gross domestic product (GDP) per capita fluctuated little from 2000 through 2016. The GDP per capita increased from 780 US dollar in 2000 to 3,694 US dollar in 2012, a peak over a decade. However, it dropped to the trough of 3,332 US dollar in 2015 and rebounded to 3,563 US dollar in the following year (Knoema, 2019). The decrease in 2015 was because of a global economic slowdown in 2011-2014 that caused dropping commodity prices and hence sliding export performance (Indonesia is a major exporter of rubber, oil and gas). In 2016, Indonesia's GDP per capita recovered because of a rebound in world commodity prices (Indonesia Investment, 2019).

Household portfolio is also the key determinant of Indonesia total household wealth growth. Based on Financial Stability Review 2018 (FSR, 2018) generated by Bank Indonesia, about 60% of financial assets in the household sectors were made up of currency and deposit instruments, besides loan and other investments. Indonesia financial assets of household to GDP had decreased from 20.69% (2016 Q1) to

19.23% (2018 Q1), as the growth of household liabilities is greater than the growth of household assets. Consequently, Indonesia financial support from the household sectors stayed confined because of the constant fall of the household net assets. Indonesia household deposits growth was relatively consistent and majorly denominated by savings deposits as it accelerated 10.19% in the first semester of 2018. Other deposits such as term deposits and demand deposits were not that preferable by Indonesia households, thus the growth of these deposits was declining as time passed. In addition, Barro, Maniew and Xavier (1995) indicated that savings and investment and capital accumulation are positively related. Also, in order to have long term investment, long term savings is a must (Andriansyah, 2016). The researcher also imply that there is an upward trend in the saving level of Indonesia. On the other hand, the level of household debt in Indonesia is still tractable as the national household debt service ratio (DSR) is comparatively low, which was only 10.96% in 2018, according to the Household Balance Sheet Survey (SNRT) conducted by Bank Indonesia. From FSR 2018, it is clearly known that the sources of household debt in Indonesia are mostly come from banks, following by non-bank financial institution and lastly non-financial institution.

However, household wealth gap is widening in Indonesia. For example, only the richest 20% of the population were benefited from the country's economic growth (Soseco, 2018; World Bank, 2015). Uncertainties such as financial crisis, crop failures or natural disasters threaten the income of the poor and rich as well (Zain, 2016). However, the poor households do not have much mechanisms like insurance or savings to cope with these shocks, unlike the rich household. As a result, they have to get some loans to overcome these difficulties, which reduced their abilities to accumulate income which could help them to climb up the economic ladder (Zain, 2016). Besides, broad wealth gap had led to the existence of two different income groups, which are lower-middle income group and upper-high income groups. These two groups differ in their consumption, savings and investment patterns. Pardede and Zahro (2017) indicate that upper-high income group tends to be risk-averse as they are less willing to invest and borrow but save more when they have excess income. On the other hand, the lower-middle income group are less likely to have excess income to be saved but forced to get more borrowings. Moreover, regarding to the spending behaviour of the groups, upper-high income group are

more likely to spend on leisure or luxury goods and services; whereas the lower-middle income group spend most of their income on their foods and daily needs.

1.2 Research Problem

Despite Indonesia's growing per capita household income, the growth of household wealth is slow. According to the data shown in Global Wealth Databook (2018), the percentage of growth rate of Indonesia's total household wealth had been maintaining a downward trend since year 2016.¹ The reason is most Indonesian households prefer low risk investments. For example, a large proportion of money is in the form of savings while only a small proportion of money is invested in the capital market. The data from Financial Services Authority (OJK) showed that third-party funds in Indonesia's banking sector (saving and deposit accounts) increased 11.2% year-on-year (y/y) in May 2017. The article further stated that the data provided by Bank Indonesia showed money supply increased by 10.2% (y/y), meanwhile credit disbursement in Indonesia rose 8.7% (y/y). The slow growth rate in credit disbursement and increment in the funds in savings and deposit accounts indicated that consumers and companies are withholding spending and investment.

Moreover, wealth gap in Indonesia is widening between the richest 10% households and the poorest households in Indonesia. The increase in concentration of wealth in a small number of Indonesian households that benefits from the income generated from financial and physical assets is what causes wealth inequality. According to Gibson (2017), the gap between the richest and the rest in Indonesia has grown faster than in any other country in South-East Asia. This statement is supported by a report WorldBank Report (2016), Indonesia has one of the highest concentrations of wealth out of 38 countries. The richest 10% of Indonesian households own approximately 77% of all Indonesia's wealth. Other than that, the richest 1% of household own 50.3% of whole Indonesia's total wealth, which is the second-highest (along with Thailand) after Russia. The report also states that the share of wealth owned by the richest 10% household in Indonesia increased by 7 percentage

¹ Data obtained from <https://www.credit-suisse.com/corporate/en/research/research-institute/global-wealth-report.html>

points between 2007 and 2014. This happens because the financial and physical assets continue to generate high income for the small number of wealthy households, and on top of that, the household save up the income, which ultimately drives the wealth inequality in Indonesia even higher.² Empirical studies in Indonesia corroborate the argument. Soseco (2018), for example, finds disparity in household wealth across age groups and concludes that households in the age group of 30-44 are the wealthiest while households in the age group of 0-14 are the poorest. The disparity is primarily the result of accumulation of income and investments. Seseco (2018) also finds household wealth is unequally distributed across quantiles. It reveals that the 10th decile owns the largest proportion for each wealth components, and concludes that 10th decile is the wealthiest class group, with wealth more than 500 times compared to the 1st decile.

In contrast, the growth of household wealth is much faster in other Asian countries. For example, Gilchrist (2019) forecasts that, in the ‘High Net Worth Handbook 2019’, Bangladesh has the fastest growth of household wealth, with a compound annual growth rate of 11.4% between 2019-2023; Vietnam is the second, with the growth rate of 10.1%, followed by 9.8% and 9.4% in China and the Philippines, respectively. The main contribution to Bangladesh’s fast growth in household wealth is the efforts of nongovernmental organizations Grameen Bank and BRAC which made significant changes towards educating girls. The Bangladesh government also supports grassroots initiatives in economic inclusion, which resulted in more frequent digital transactions and less dormant bank accounts among the Bangladeshi adults with bank accounts. The success of garment manufacturing industry could be one of the contributions to the rising growth in household wealth in Bangladesh. The large size of garment firms and absence of law offered a better environment for manufacturing firms to achieve economies of scale and create larger number of jobs. On the other hand, according to the WorldBank (2019), Vietnam’s fast household wealth growth is contributed by the support in robust domestic demand and export-oriented manufacturing, declining

² Information obtained from World Bank. 2016. *Indonesia's Rising Divide*. World Bank, Jakarta. © World Bank. <https://openknowledge.worldbank.org/handle/10986/24765> License: CC BY 3.0 IGO.

poverty, rapid demographic and social change, improved access to household infrastructure and narrowing gender gaps.

Household wealth distribution in other Asian countries are unequal too in various aspects. For instance, in Malaysia, disparity of wealth distribution occurs within and among ethnic groups: within-group inequality of wealth is more prominent among Indians, followed by Bumiputera and Chinese, respectively. As for wealth distribution across groups, the Bumiputera have the lowest wealth among all ethnic groups, with an average wealth of RM72,872. The Indians have average wealth of 20% higher than the Bumiputera at RM87,229 while the Chinese have the highest average wealth at RM128,325 (Abdul Khalid, 2011). A study in China shows that wealth inequality exists across the dimensions of age, employment status, education, marital status, rural-urban residence, and regions. Young households earn more and are wealthier than older ones. Along the dimension of employment status, retirees are wealthier than workers, but farmers are the poorest while self-employed are the richest (Tan, Zeng & Zhu, 2017). As for education levels, households with bachelor's degree or above are the richest, and those with diploma and college degree are the second richest. The second poorest are households with secondary and high school education while the poorest are households with education level of primary school or below. Wealth distribution also differs by marital status. Married households enjoy more wealth as compared to single households. The wealth accumulation is also unequally distributed between rural and urban residences in China. Urban households possess higher wealth than rural households. Lastly, wealth inequality exists across regions in China where wealth inequality among households are the highest in East China with Gini coefficients of 0.747, followed by West China and Central China, with Gini coefficients of 0.622 and 0.549 respectively. A study in Australia shows wealth inequality also exists across gender: Australian men have more opportunities for wealth accumulation than women, which resulted in better wealth position for men as compared to women. (Austen, Ong, Bawa, & Jefferson, 2015). Similar study in Canada shows that inequality in wealth exists among Canadian men and women aged 45 and older. Women report less wealth accumulation because of the gendering of work and family roles that restricts women's ability to build up assets over the course of life.

In sum, two issues arise in Indonesia and some Asian countries: slow growth of household wealth and widening wealth gap; these issues, in long term, could retard economic growth, cause social problems such as increased level of crime or precipitating riots, increase political inequality since high-income groups have the power to manipulate government in their favour through legal processes and through corrupt practices, decrease health since the poor may not have access to quality health care and healthy food, and decrease education due to the absence of private or public scholarship programs for the poor who cannot afford to pay for education. The WorldBank (2014) also states similar statement where inequality increases crime and erodes social capital, and growing inequality may affect political and social cohesion. It also states that the poorest households in Indonesia that are unable to exit vulnerability and move into middle class would weaken economic growth. The low consumption growth by the poorest will cause underinvestment in human capital, and will continue to affect the economic growth prospects. In addition, Dr Holmes (2013) states that past research³ have proven that inequality causes poor health reduction in educational attainment.

Therefore, it is important for us to understand the possible factors that stimulate the average wealth accumulation or growth of household wealth in Indonesia. This can be achieved through understanding households' preference or behaviour that influences their financial decision making. Many past studies focus on factors that determine the risk preference of individual investors or how the investor's risk preference affects their financial assets, but none has shed the light on the effect of risk preference on household asset ownership. Therefore, the main focus of our research report is to identify the behavioural factors that may influence average wealth growth in developing countries by studying how risk preference of households can affect their asset ownership.

³ Research paper obtained from
<https://www.sciencedirect.com/science/article/abs/pii/S0277953609007655>

1.3 Objective and Significance of Study

1.3.1 Research Question

These problems raise questions about the effect of risk preference on households' ownership of household assets. How does risk preference affect households' ownership of household assets? How does it differ between urban and rural areas, and between household size less than 5 and more than 5?

1.3.2 Research Objectives

This study investigates the impact of risk preference on households' ownership of household assets in Indonesia. Specifically, this study aims to:

- 1) Examine how risk preference affect households' asset ownership.
- 2) Examine the difference of effect of risk preference on households' asset ownership between urban and rural area, and between household size less than 5 and more than 5.

1.3.3 Research Significance

In this study, our contributions are threefold. First, this study aims to investigate how risk preference affects households' or individuals' ownership of household assets, in which the literature has shed little light on. Most of the studies highlight on either what determines risk preferences among households (see, e.g., Dercon and Krishnan (1996) on income portfolios of households; Dercon (1998) on households' endowment; Powell and Ansic (1997) and Olsen and Cox (2001) on gender) or the impact of risk preference on investors' financial decision making (see, e.g., Meraner and Finger (2017)). One paper that is relevant to our study is Le (2018) who finds that the relationship between household's risk preference and the homeownership decisions among young adults in changing housing market conditions, but the paper studies home ownership only. By contrast, we consider more measures of household assets, which include house or property, land, livestock, vehicles, household appliances, savings, financial assets, jewellery, as well as furniture in order to better understand households' financial decision making. Therefore, we fill the gap in the literature through discussing more respects of financial decision making among households in a developing country.

Second, we contribute to the literature on behavioural factors that influence financial decision making from the perspectives of households or individual investors. Much has been said about macroeconomic factors or social factors that influence the financial decision making of the investors, including GDP, exchange rates, interest rates, current account balance, government expenditure on investment and capital inflows (see, e.g., Acikalin, Aktas and Unal (2008) in Turkey; Moshi and Kilindo (1999) in Tanzania), and relatively little studies discuss behavioural factors. Behavioural factors may affect households' ownership of assets, which, in turn, determine average wealth growth in developing countries. Donkers and Soest (1999) is the only paper we are aware of that is similar to our research. The study examines the effect of time preference, risk-aversion, and interest in financial matters on households' financial decision making; by contrast, we study how risk preference influences households' financial decision making.

Third, the study fills the gap in current literature by emphasizing how risk preference affects households' or individuals' ownership of household assets in Indonesia. Since the first two contributions do not specify in Indonesia which are only generally research around the world. To our best knowledge, although interest in households' asset ownership in Indonesia has grown eventually, risk preference – a fundamental determinant in households' asset ownership which are risk-aversion and risk-seeking – is missing in the studies. In the context in Indonesia, no paper or study has used risk preference as a factor that influence households' or individuals' ownership of household assets in Indonesia. Thus, we contribute that how risk preference influences households' or individuals' ownership of household assets in Indonesia.

CHAPTER 2: LITERATURE REVIEW

2.1 Theoretical Review

2.1.1 Expected Utility Theory

Expected utility theory (EUT), which Daniel Bernoulli develops, is a rational finance paradigm that assumes individuals are rational and aim to maximize their utility (Jurevičienė & Ivanova, 2013) and is supported by Suer and Minibas-Poussard (2015). Every individual has different perspective in terms of “values” or “utilities” (Stamer, 2000). According to Prosad, Kapoor and Sengupta (2015), EUT asserts that investors or market participants compare the expected utility value of different alternative in making decision that involves risk.

Bernoulli introduced expected utility theory to solve St. Petersburg paradox by showing the distinction between expected value and expected utility. He also proposed using of weighted utility multiplied by probabilities instead of the weighted outcome. The paradox is about conducting a lottery game to determine the value of an individual willing to pay. The lottery game is a fair coin flipped and payment of \$2 would be given if a tail appears. The payoff would be based on $\$2^n$, where n is the number of successfully get a tail. For example, if a player able to successfully tossed three times ($n = 3$), the player would get a payoff of \$8 ($\2^3). Theoretically, individuals are expected to play the game at any price if the expected value is infinite. However, the expected value hypothesis may not make sense if the cost of entering the game is higher than the expected value.

Bernoulli proposed maximum expected utility⁴ of a player is concerned instead of expected value to solve the paradox (Dahlstrom, 2016). Based on Briggs (2019), utility of an outcome can act as a measurement of which outcome is more preferable than the alternative. Utilities are not measure in term of currency such as pounds, dollars or yen (Briggs, 2019). Prosad, et.al. (2015) states the expected utility is the

⁴ The formula of maximum expected value is $EU = p * U(x) + (1 - p) * U(y)$.

multiple of weighted sum of utility values and probabilities of winning. All people perceive the same price for an item, however, different individual have different perspective on utility. It depends on how an individual weight their gain or loss or based on their risk preference (Bernoulli, 1954). Bernoulli also states that when the player's wealth increase, utility increases as well but marginal utility decreases. For example, the additional gain in one dollar is less valuable for a rich man. In other words, a person's satisfaction decreases as the extra joy an individual gets from earning additional one dollar drops as the additional one dollar earned is less significant in the total wealth of the rich man.

Neumann and Morgenstern (1944) formalized the solution by developing four axioms for rationality within utility functions. The axiomatization showed how an individual behaves in making choices that involve risk with the motive of maximising their utility. The axioms include completeness, transitivity, continuity and independence.

Decision makers were categorised into risk-averse, risk-neutral and risk-seeking in EUT (Prosad, et.al., 2015). According to Mujahid, Zuberi, Rafiq and Sameen (2014), each investor has different risk-tolerance behaviour. Different investors have different willingness in taking risk with the given level of return. Risk-averse is an individual who prefers to take low risk in her investment decision and receives lower return. Individual who are risk-seeking would seek for the investment that offer high risk and compensate with higher return. For instance, a risk-seeking investors would invest in low performing stock in order to receive higher return. Risk-neutral is an individual who cares little about risk and return.

Suer and Minibas-Poussard (2015) states that EUT assumes risk-aversion is the natural human behaviour when facing risk. The curvature of utility function is used to measure the degree of risk-aversion as it is directly related to the utility function. Stamer (2000) and Suer and Minibas-Poussard (2015) both state the utility function of risk-averse investors is concave and of risk-seeking investors is convex. A risk-seeking investors would prefer a prospect with high risk and high return that would compensate the amount of risk taken in the investment. A risk-averse individual has negatively related expected wealth and utility function (Prosad, et.al., 2015). Suer

and Minibas-Poussard (2015) further elaborate that the utility function of risk-neutral individual is linear. This also can explain with the risk-averse individual will take lesser risk as compared to risk-seeking individual for the same utility function.

In overall, EUT is concern on how different individuals have different expected utility provided with the presence of risk. Based on this theory, as an individual have different risk preference, he or she will have different level of expected utility. For instance, risk-averse individuals or households might have low expected utility as they unwilling to take high risk. Their personalities are prefer safer investment and due to this they might have lower expectation on gain as their motive are taking low risk and earn a small return. High satisfaction and return usually come with high risk, as mentioned “high risk, high return”. We could relate our research based on this theory as we could analyse the households’ expected utility in doing investment on household assets.

2.1.2 Prospect Theory

Prospect Theory is proposed by Kahneman and Tversky (1979) as a critique of expected utility theory. This theory focuses on the investors' risk-taking behaviour prior to an outcome. Based on this theory, an investor would care on the changes in their financial wealth, and the changes would contribute to a change in investors' attitude on their investment (Barberis, Huang & Santos, 2001). It is an alternative model developed to consider making choices under risk (Barberis, 2013). The prospect theory describes some important psychological traits of investors in their decision-making under uncertainty situation. It can be considered as irrational finance paradigm as contrary to expected utility theory that is rational finance paradigm (Jurevičienė & IvanovaIt, 2013).

Kahneman and Tversky (1979) categorise the effects that are contrary with the utility theory into three tenants: certainty effect, isolation effect and value function. Certainty effect arises when individuals prefer certain outcomes—that is, they prefer certain outcomes and underweight outcomes that are only probable. Isolation effect is about the occurrence of different preference when different form of the same choice is proposed. Value function is an individual tends to focus on the gain or losses instead of their final asset.

Persons who make decisions based on perceived gains are risk-averse while those who make decisions based on perceived losses are risk-seeking (Kahneman and Tversky, 1979). For example of high probability situation (certainty effect), in a sure gain investment, option A is an investment in which an individual has 95% chance to win \$10,000, while option B is he has 100% chance to get \$9,499. In this case, a risk-averse individual who looks for certainty will take the option B with lower gain and zero risk. In a sure loss investment, for option A, there is 95% chance in losing \$10,000, while for option B there is 100% in losing \$9,499. Under this situation, a risk-seeking individual who looks for opportunity will take option A because of the five-percent possible gain. When there is probability effect (low probability), its outcome is mirror effect of certainty effect, that known as reflection effect (Kahneman & Tversky, 1979).

The prospect theory is reviewed by Kahneman and Tversky (1992) and named cumulative prospect theory which employ cumulative decision making rather than separable decision weight. It transforms cumulative probabilities instead of the individual probabilities. The utility function of concave for gains (risk-averse) and convex for risk losses (risk-seeking) is remained from the original prospect theory (Lopes & Oden, 1999). The purposes of revision of prospect theory are to resolve the problem of application of gamble at most two non-zero outcomes and prospect theory which estimate the choices made by an individual are mainly on influential gambles (Barberis, 2013). The key elements that illustrate the formulation of prospect theory are reference dependence, loss aversion, diminishing sensitivity and probability weighting (Barberis, 2013; He and Zhou, 2010).

Thaler and Johnson (1990) review this theory and proposed “endowment effect” based on prospect theory for riskless choice. Endowment effect also refer as “exchange asymmetries” is the difference between the willingness to accept and pay. In Kahneman, Knetsch and Thaler (1991)’s experimental literature, the survey proves that individuals have different perception in treating opportunity cost based on “out-of-pocket” cost due to the impact on endowment effect. Some individuals have perception those perceived loss more painful than foregone gains. This shows people judgement on fairness and justice are affected. Based on the research done by Thaler and Johnson, an individual who has earlier gain would be less painful to loss with the perception of those gain could offset the subsequent loss. An individual could have higher acceptance on this situation (Barberis, Huang and Santos, 1999).

Barberis et al. (2001) conduct study on economy asset price, and suggest that prospect theory influences the designed model. They use prospect theory because they find losses aversion causes the reluctance of investors to invest in stock even though an attractive equity premium is provided (Barberis et al., 2001; Benartzi and Thaler, 1995). By considering prospect theory in their study, they realise that they are able to understand the level of average return. They find that performance of investors prior investment would affect their risk-taking behaviour. For instance, an investor who has a gain in prior investment is less risk-averse while an investor who has loss in prior investment is more risk-averse.

Fernandes and Luiz (2007) also show that the participants who obtain a gain would be less willing to take risk, while the participants who experience a loss would be more willing in taking risk. It supports Laughhunn and Payne (1984) who show 20 managers in the multiple risk choice process express risk-averse for gain and risk-seeking for losses.

Prospect theory is related to our study in terms of focusing how risk preference affect individual decision making when the outcome with probabilities is provided. As mentioned above by Kahneman and Tversky (1979), when an outcome shows perceived gain, risk-averse individuals will take the investment. By analysing the nature of household assets, we could relate households' risk preference with this theory and having a brief idea on how household would make financial decisions based on their risk preference.

2.2 Literature Review

In general, there are two types of risk preference: risk-aversion and risk-seeking. According to Mujahid et al. (2014), and Prabhakaran and Karthika (2011), risk-tolerance behaviour is the level of investors' willingness to take risk in relation with their return. In finance sector, there is a general statement mentioning higher return is complied with higher risk, risk-seeking investors will have higher returns by taking the risk to invest in low performing stocks. Risk-aversion behavior refers to a behavior of unwilling to take any risks and feeling comfortable in low but consistent returns. According to Mujahid et. al. (2014); Larkin, Lucey and Mulholland (2012), an individual who is willing to accept more financial risk will have a goal of generating higher returns in the future and thus will accumulate greater amount of wealth overtime.

The literature of risk preference suggests that **risk preference affects investors' and households' choices of investment**, which include bonds, savings, stocks, portfolios, house ownership and so forth. Several studies find risk-averse individuals prefer risk-free or low risk investment. For example, Campbell (2006) and Tobin (1958) suggest that **risk-averse investors hold more bonds** and less stocks in their portfolios. Campbell and Viceira (2001) further argue that the suggestion is acceptable if time variation in interest rates is hedged by bonds. King and Leape (1998) stated risk-averse private investors are preferred to invest in risk-free assets such as saving accounts and government bonds and therefore they tend to not invest into risky assets.

Campbell (2006) mentioned that households that have **less risk-tolerance are reported less likely to hold public equity**. Carroll (2002) proposes a model in which all agents have a common utility function with declining relative risk-aversion in the argument of stock market participants are more risk-tolerant than nonparticipants, and argues that this model explains the high participation rate and more aggressive asset allocation of wealthy households. Dohmen et al. (2011) state that risk preference has significant effect on the financial matters such as the willingness to hold stock. A one standard deviation increase in risk preference will

result in 34% increase in the probability of holding stock. Individuals who are aged less than 20 years old or having two highly educated parents are 8% more likely to hold stock. Campbell and Cocco (2003) suggest that demand for stocks is a hump-shaped function of risk-tolerance. For investors with intermediate levels of risk-aversion, demand is strongly positive, but negative for risk-averse investors and risk-takers. Due to the fluctuations in the future returns, the assets can be hedged. The forming of “hump” shaped in the middle because this hedging feature can be attractive for those with intermediate levels of risk-aversion. Two sides of this hump are considered as very conservative investors. They only absorb little risk in their investment, and for those who are very risk-tolerant, they do not have much interest in hedging intertemporally.

Flavin and Yamashita (2002) find when risk-tolerance increases, the weight of household portfolio asset in bond decreases while stock increases. This indicates if households are highly risk-tolerance, they will allocate their entire financial asset portfolio in holding stock. As the risk-tolerance decreases, the percentage in holding bond increases from zero to 80%, and the percentage in holding stock decreases from 100% to 20% in the household portfolio. Canner, Mankiw, Gregory and Weil (1997) indicate when the level of risk-aversion increases, the ratio of bond to stock increases. The range of household’s attitude toward risk is categorised as risk tolerant, moderate and high levels of risk-aversion.

Risk-averse investors prefer low-risk and steady-return mutual funds.

Investors are having positive perception about mutual fund investment but with a cautious attitude. There are various factors that the investors emphasize in order to invest in the mutual fund including the performance, reputation, earnings and risk. Mutual fund investment which is based on income scheme provides high and regular return, has low risk and diversified schemes can attract more investors (Pinto, Ajaya & Munshi, 2016). Besides, fund performance record and reputation of the fund act as the important factor for the investors to make the purchasing decision. In short, investors prefer mutual fund with high and steady return and comfortable levels of risk (Pinto et al., 2016).

Another group of studies find **risk-averse individuals favour savings** as investment. Campbell (2006), Haliassos and Michaelides (2003), and Gomes and Michaelides (2005) argue that risk-averse households have a strong precautionary saving motive and will accumulate more wealth. Hermansson (2015) suggests that risk-averse individuals are usually more cautious with their savings because they are afraid of losses and they tend to save more to self-insure against uncertainty. The reason behind is that debt requires repayment in the future, which is also financed from the household income, and the risk-averse individual may be worrying as there is risk that the repayment cannot be done on time in the future.

Risk preference governs **individuals' mortgage decision** too, the literature says. Campbell (2006), and Campbell and Cocco (2003) find that adjustable-rate mortgage (ARM) is more attractive to unconstrained households when inflation risk is large compare with real interest rate risk and also potentially borrowing-constrained households with low risk-aversion. They are more likely unattractive to risk-averse borrowing-constrained households, especially on those have high mortgage debt relative to their income. Campbell (2006) state that fixed and adjustable mortgages have the same expected value of household lifetime resources. However, a risk-averse household will prefer ARM due to its random lifetime resources if mortgage lenders are averse to inflation risk and have a fixed rate or premium rate for bearing it. Risk-neutral borrowing constrained households prefer ARM because they want to increase the average period-1 consumption relative to period-2 consumption only. Risk-averse constrained household prefer refinanceable fixed-rate mortgage (FRM) because the reduction in period-1 consumption risk may outweigh both the increase in period-2 consumption risk and reduce the average level of period-1 consumption. Nonetheless, Canner et. al. (1997) state that the opportunity to leverage the asset portfolio will exploit by risk-tolerant investors by taking 100% of the house mortgage, while the risk-averse household will avoid to be fully leverage.

In a more general context, **individuals' portfolios**, which include various forms of financial investment, vary by their risk preference. Friend and Blume (1975) and Morin and Suarez (1983) propose the predictions of classical portfolio theory that suggests a close positive relationship between the level of diversification and risk-

aversion. Gomes and Michaelides (2005) also find similar results that more risk-averse investors will hold more diversified portfolios. Kapteyn and Teppa (2002) showed a risk tolerant individual would choose a safe income stream as the individual with a risky portfolio caused he or she is already expose to risk; however, risk-averse individuals have the ability to afford riskier income path because having a safe portfolio allow them to allocate the risk in income path. Mujahid et. al. (2014) suggest that risk-averse investors often use portfolio management tool to minimize their risk associated with their investment. They will select some high risk and low risk stocks in their portfolio to perform diversification in order to have consistent returns. Some financial advisor helps to analyse the investors' risk preferences in which they are either risk-seekers or risk-aversion investors to make portfolio decisions and help to decide what kind of stocks should they invest. The decision on the choice of stocks depends on the goals of investors of either making short term return by investing in high performing stocks or taking risk to invest in risky stocks for wealth maximizing decisions.

Traces back to the mean-variance analysis of Markowitz (1952), it reveals that non risk-averse investors only accumulate very little wealth. Low risk-takers prefer diversified portfolios which provide moderate expected returns rather than undiversified portfolios with higher expected returns. This is because the risk of portfolio associated with variance of returns on individual assets can be reduced. Nonetheless, there is no relationship between the risk-aversion and level of diversification through the capital assets pricing model (CAPM) which is the derivation of Markowitz's mean-variance analysis. This model predicts that the willingness of investor's is based in the fraction of risky assets in the portfolio.

Polkovnichenko (2005) mentioned that the individual investors are suggested to buy and hold diversified portfolio through portfolio theory. Although the mutual funds are cheap diversification and are widely available, US Survey of Consumer Finances shows that the households in US who involve in the stock market are very less. The preferred risk habitat hypothesis is the selection stocks of the investors are depended on the risk characteristics that suit his attitude towards risk.

Other factors may also influence individuals' financial decision making or investment decision. **Age and family size** will affect individual's home ownership are shown in few literatures. In economic theory, life cycle hypothesis affects household consumption and saving behaviour (see, e.g., Deaton, 1992; Browning & Lusardi, 1996). When the age and the family size increase, the value of the house also increases. In short, there is a close positive relationship between the value of the house and the age and the family size. Owning a house is the most significant component in household portfolios in The Netherlands. It constitutes more than 60% of households' gross assets on average (Alessie, Lusardi & Aldershof, 1997). According to the survey of Dutch households in 1993, those who are married own more expensive houses compared to singles. However, during 1995, this is only significant if the partner is working. Single individuals with fewer responsibilities have higher risk-tolerance (Fan & Xiao, 2006; Grable & Joo, 2004; Hallahan, Faff & McKenzie, 2004; Hawley & Fujii, 1993 and Yao, Hanna & Lindamood, 2004). According family development theory, once individual form a family, they will become more risk-averse as they have more responsibilities such as children or housing (Chaulk, Johnson & Bulcroft, 2004). Based on this theory, having more studies prove that there is a negative relationship between financial risk-tolerance and number of dependants (Chaulk, Johnson & Bulcroft, 2003; Grable & Joo, 1999; Hallahan et al., 2004). Harikanth and Praganthi (2012) show results indicated that respondents within the age group of 41-50 and above 50 years old prefers safer investment avenues such as Bank deposits, Insurance, Post office saving schemes and Bullion. Respondents who are post graduates prefers investing in insurance, followed by mutual funds, then bank deposits. Lastly, respondents who are retired prefers investing in bank deposits, followed by insurance, then bullion.

Older people are more likely to have more experience on investment know more about the fundamental principles of investing. Thus, they are able to make better investment decisions due to their accumulated investing wisdom. In theoretical model, (Bakshi & Chen, 1994; Campbell & Viceira, 2002; Cocco, Gomes, & Maenhout, 2005; Gomes & Michaelides, 2005), the willingness of investors to hold risky portfolios decrease with age. This is because the investment horizon decrease and the risk-aversion increase. From the individual investor literature, the empirical evidence reveals that older people show a weaker disposition effect (Dhar & Zhu,

2006). They will hold less risky portfolios (Goetzmann & Kumar, 2008), and show a lower degree of overconfidence (Barber & Odean, 2001). In addition, when the investors gain more experience, the behavioral biases will decrease (List, 2003; Feng & Seasholes, 2005; Goetzmann & Kumar, 2008).

Rate of time preferences might affect investment decision, mentioned in literature. Tobit regressions showed that age has negatively affects the rate of time preference among the households, and that females are more patient than males. However, the behaviour of private investors cannot be explained by most variation in subjective interest rates. From the data of Dutch households in 1993, as expected, there is an inverse relationship between the home ownership decision and the subjective interest rate. On the other hand, the subjective interest rate does not affect the value of the house or on the mortgage.

Another factor that affect individual's financial decision making is **financial literacy**. Financial literacy is having a positive relationship with the trading behaviour of an individual. Bellofatto, D'Hondt, and De Winne (2018) indicated that investors who have higher financial literacy level are more likely to invest smarter as they prefer trading on stocks and complicated financial instruments. These investors have less exposure to the disposition effect too, due to their financial literacy level as well as their experience. In addition, these investors tend to focus on stock portfolios and perform global diversification through the investment fund holdings rather than owning single stock or bond (Bellofatto et al., 2018). Korniotis and Kumar (2013) are then further explained that investors who concentrate on stock portfolio provides them benefit from risk diversification through fund and make their information gathering process easier. Consequently, investor with higher financial literacy level obtained greater net and gross returns as well as higher excess Sharpe ratios (Bellofatto et al., 2018). Janor, Yakob, Hashim, Zanariah and Wel (2016) found that both Malaysia and UK demonstrated an average level of financial literacy results in having positive financial attitude towards long term financial well-being.

Existing background risk of an individual will affect their financial making as well. Pratt and Zeckhauser (1987) claimed that the existing of background risk

cause the households to save more and prevent other uncertainties such as stock market risk, a behaviour termed temperance by Kimball (1991). Besides, Heaton and Lucas (2000a) also found the similar result. Therefore, households are more likely to invest in risk-free assets due to temperance arising from the background risks they face. Labour income uncertainty is one of the background risks. It seems to reduce the household holdings in risky assets. The example of Haliassos and Bertaut (1995), Heaton and Lucas (1997), as well as the analysis of Heaton and Lucas (2000), the calibration models including the labour income uncertainty has been used in predicting the avoidance of risky investments among the households. The modelling literature showed that background risk increases, especially the labour and proprietary business income and real estate. Heaton and Lucas (2000) conducted a dynamic model of households' portfolio allocation using US data. It indicates that background risk increases, especially the labour and proprietary business income and real estate. Thus, some of the low stockholding based on the observation in US can be estimated. Based on one of the calibration models in US data, households that involved in housing mortgage and facing labour income risk at the same time will cause temperance. In short, it reduces the holdings of risky assets among the private investors (Frantantoni, 2001).

Attitude of individuals will affect their decision in investing. Parimalakanthi and Kumar (2015) conducted Factor Analysis to ascertain the investors' attitude before investment, at the time of investment, and post investment. The results indicated that before investing, investors will search for various type of investments, seek intermediaries' advices, and they prefer investments with low transaction costs. At the time of investment, investors will monitor their investment's performance, bear the responsibilities of their investments, and they tend to diversify their investments. At post-investment period, investors will retain their investments if needed, continue to invest in same avenue that fulfils their objective, and may consider switching over to other investment sources if they find it appropriate.

Risk appetite of an individual shows how he or she in choosing different type of investment. Kumar and Persaud (2002) indicated that assets with same risk level should have same excess returns and individual's risk appetite will increase when the excess return of a risky asset is greater than the less-risky asset. The researcher

then stated that the individual willingness to bear the risk should be one of the factors that cause the degree of correlation between the assets excess return and the assets risk to alter. Risk appetite and demand of risky asset tends to have positive relationship. According to Kumar and Persaud (2002), if an investor risk appetite decreased, he would reduce his exposure to higher risk asset, whereas if an investor risk appetite increased, he will demand riskier asset. Several studies found that the participation of households in the markets for risky financial assets were low. The fact that a particular household invests in two types of risky assets which are real estate and equity is the main point in linking the non-participation of households puzzle with the possibility of investors in making rational choices.

The effects of risk preference may depend on its determinants, and the literature suggests several determinants. **Gender**, which is a determinants of risk preference was shown in the literature of Janor et al. (2016). Janor et al. (2016) showed that women display lesser financial knowledge than men in both countries, particularly, young women, widows, less educated women and women with low income. Women as compared to men are also more risk-adverse when making financial decisions. Harikanth and Praganthi (2012) found that males are more interested in risky investment avenues and are more exposed to financial decision process compared to woman. According to Arti, Julee and Sunita (2011) in an investment decision, male investors are found to be more confident as compare to female investors. Besides, women generally involve emotion in making decision while men would look for the facts and data in making decision. According to Barsky, Juster, Kimball and Shapiro (1997), females are less risk-tolerant than males. From the Survey of Consumer Finances (SCF), Grable and Lytton (1998), and Sung and Hanna (1996) found that females were significantly less risk-tolerant than males. Researchers concluded that females' risk-tolerance were based on observed wealth accumulation and investment decision.

Jianakoplos and Bernasek (1998) stated that when the individuals' wealth increase, the willingness of both males and females to hold risky assets increase as well. However, the effect on single women was significantly smaller. Therefore, the risk-tolerance of single men was higher than single women. Using the data of faculty members employed at five universities in Colorado, the percentage of defined

contribution plan in stocks of females were significantly lower than males (Bernasek & Shwiff, 2001). In the National Longitudinal Survey (NLS) of mature women, Papke (1988) found that there is no relationship between the gender differences on investment decisions. Based on Embrey and Fox (1997), women prefer to make low risk investment as compared to men due to the inheritance of different perception on wealth and expectation. According to role theory (RT) and socialization theory (ST), women responsibility in taking care of their family and children has become one of the factors that lead to women become less confident and more risk-averse on their financial situation (Hira & Loibl, 2006; Ozmete & Hira, 2011).

One of the determinants is **wealth (income) and financial sophistication**. Individuals with higher income and wealth tend to have higher risk-tolerance (Hermansson, 2015). The researcher then stated that the wealthier an individual, the riskier assets he holds and they are more likely to invest greater portion of their wealth in the risky asset. Based on the study conducted by Siegel and Hoban (1982), it shows the pattern of U.S. National Longitudinal Survey data is consistently increase or constant risk-tolerance when based on the narrow definition of wealth and decreasing risk-tolerance when based on broader definition of wealth, which include housing and non-marketable assets. Moreover, risk preference has a positive relationship between wealth and financial sophistication (Buccioli & Miniaci, 2019). This indicate the wealthier household will have higher percentage of portfolio weight in mortgage, housing and allocate more wealth to finance the investment in stocks which showed the risk-tolerance increase with increased wealth and financial sophistication. Research focus on financial wealth also showed a positive relationship with risk-tolerance, which reflect stock holdings increase with wealth (Buccioli & Miniaci, 2019; Friedman, 1974; Cohn et al., 1975; Riley & Chow, 1992; Shaw, 1996). Lan, Xiong, He and Ma (2018) concluded that experienced investors with high income are more likely to take risks. Harikanth and Praganthi (2012) found that respondents with high annual income prefers investing in share market even though it is riskier compared to other investment avenues.

In addition, **personality traits** will be one of the factors that influence the risk preference of investor and thus affect their financial decision making. Gambetti and

Giusberti (2019) indicated that investor with low anxiety, low tough mindedness and high independence has higher risk-tolerance when involve in financial decision making. Conversely, anxious people will be more sensitive towards high risks and cause them to have less risky investment in their portfolio (Oehlar, Wendt, Wedlich & Horn, 2017). Moreover, investors who are rich in investment experience have higher risk-tolerance and higher risk portfolios compare with the investors who are lack of investment experience (Gambetti&Giusberti, 2012).

Age of an individual have effect on their risk preference as well. Based on Mather et al. (2012) stated that people normally assume that an individual become less willing to take risk as they get older as compare to the younger adult. However, based on the findings done by Mather et al. (2012), it conclude that older and younger investor have same risk-taking in two risky option. However, when the options involved one with sure gain options, older adult would more likely than younger adult to possess in choosing a sure gain investment rather than choosing an investment with possibility of larger gain. This is supported by Mather, 2006; Peters, Hess, Västfjäll, & Auman, 2007 which showed an older adult did not reduce their risk preference as they get older. For example, older and younger adult showed same level of risk-seeking when involve choosing between aggressive and conservative option. This showed the level of risk preference might not be decreased or reduced when getting older. They might pursue the same level of risk with the younger adult.

Few individuals found that household in **different locations** have different risk preferences. For **rural areas**, according to Miyata (2003), household risk preferences will depend on whether they are living with their parents. This is because the parents might have years of experience in making decision on investment and thus will provide their children a safe advice that prevent failure, and this lead to the household who live with their parents are found to be risk-averse. Jin, He, Xu and He (2017) also found that the farmers in rural are more likely to unwilling to take risks, while only very small portion of farmers are risk-takers. However, as mentioned in Vieider et. al. (2017) journal, household in rural area in Ethiopia are highly risk-tolerance, but the students are more risk-seeking than others in West. Moreover, the wealthy households in rural are more risk-tolerance result

in a negative relationship between wealthier household in rural area and risk-aversion. For **urban areas**, Cook, Chatterjee, Sur, and Whittington (2013) mentioned most of the poor in urban are highly risk-averse which lead to a positive relationship between the urban poor and risk-averse. Urban household prefer more with long-term or high risk saving instruments (Kusairi, Sanusi, Suriyani, Shukri, & Zamri, 2019).

Alserda, Dellaert, Swinkels, and van der Lecq, (2019) suggest that **heterogeneity in risk preference** affects optimal asset allocation, but its effect depends on individuals' income and age. The difference in risk preferences often leads to two sources of welfare loss: One, collective welfare loss that arises when the collective asset allocation does not match the average risk preferences. Two, individual loss that arises for the assortment in risk preferences between members. By considering pension fund as one of the asset allocation, when income level is above the stated pension, the effect of asset allocation on total pension income will increase as well and thus increase the value of risk preference elicitation (Alserda et al., 2019). As for the role of age—or the periods to retirement—correlates negatively with the value of risk preference elicitation: the optimal asset allocation varies less with longer periods to retirement. In short, higher income brings larger impact on the heterogeneity of risk preference, which, in turn, more diverse optimal asset allocation and thus higher value of risk preference elicitation.

There are some different perspectives which related with individuals involve in **farm sector and livestock** from previous researchers. Adegaye and Dittoh (1985) stated agricultural investment surround with uncertainties result in lesser individual or household willing to invest in this sector. The uncertainties include weather, disease, fluctuation in prices, available of input material, policies implemented by government and changes in technology. As a farmer need to take these uncertainties in consideration that will affect their production later. In 1990, according to the random rural sample survey of Shinyanga households in Western Tanzania (Anderson, 1988), there is a difference in living standards across households. For poorer households, they are more depend on crop income and non-agricultural incomes which include agricultural wage labour and male and female off-farm income constitutes compared to those who are richer. Richer households tend to

invest in livestock. Cattle is considered as a liquid buffer, it also provides protection against income shortfalls. For those who are not owning cattle may tend to reduce income risk through entry in low profit activities with lesser risk. Since it is not match with other evidence from Tanzania and other African countries, this result will need to do some further investigation. In contrast to the study, Anderson (1988) claimed that for other areas in rural Tanzania, richer households are more rely on off-farm income than poorer households. However, the average income share gained from off-farm sources in their study was however higher 27% than in the present study. Moreover, Matlon (1979) on Northern Nigeria and Reardon, Delgado and Malton (1992) on Burkina Faso also found similar results.

Rural households' income can be derived from various sources. According to the data on Ethiopia and Tanzania peasant households, there are three main groups which are livestock rearing, off-farm activities and cropping. From survey data and von Rotenhan (1966), the most famous productive investment among the households is livestock investment. 69% of Ethiopia households and 49% of Tanzania households preferred invest in livestock rather than invest in trade or other business activity. On the other hand, 8% of Ethiopia households as well as 13% of Tanzania households preferred the trading investment or other business activity respectively. It reflects that there might be some disincentives for commercial activity in Ethiopia. There is a contrary relationship between the income share of livestock and the households' preference on investing in livestock. For instance, those poorer households that have very low income share of livestock, there would be the highest preference of households on investing in livestock. Those areas that have very high income share of livestock, there would be the lowest preference of households on investing in livestock. As a result, poorer households will definitely consider livestock is significant to them. However, for the richer households, they may not definitely choose livestock to maximize their wealth. There is no relationship between the farming systems or the environment and the preference of households to keep livestock, especially the cattle.

CHAPTER 3: RESEARCH METHOD

3.0 Introduction

This chapter consist of 4 sections. Section 3.1 focus on the fundamental equation to examine the outcome. In section 3.2, focus on explaining how we solve the underlying problem. Section 3.3 is mentioning how and where we collect our data. Section 3.4 is summary of our statistic data analysis.

3.1 Potential Outcome Framework

We use the potential outcome framework to study whether households' financial decision making differs by their risk preference as equation 1 shows.

$$Y_i = \beta_1 + \beta_2 D_i \text{ ---- (1)}$$

where Y_i is household i 's assets (not for businesses) and D_i is the household's risk preference. The coefficient β_2 measures the causal effect, which also can be explained by the difference in two potential outcomes as follows:

$$Y_i = Y_{0i} + (Y_{1i} - Y_{0i})D_i \text{ ---- (2)}$$

where D_i denotes risk preference of individual i and it equals one if individual i is risk-averse (low risk-takers) and zero otherwise. Y_{1i} is the potential household assets of individual i if $D_i = 1$; Y_{0i} is the potential household assets of individual i if $D_i = 0$. The difference between the two potential outcomes ($Y_{1i} - Y_{0i}$) will be the impact of risk preferences on the dependent variable, which is financial decision on household asset.

However, we can never observe Y_{1i} and Y_{0i} in equation 2 at the same time for individual i ; therefore we cannot measure individual causal effect of risk preference. To solve this problem, we will obtain the average causal effect (instead of individual causal effect) by comparing the potential outcomes between two group of households, the treatment group ($D_i = 1$) and control group ($D_i = 0$). These two groups of households, on average, are expected to be similar in all respects except their risk preference. For example, under random assignment, these two groups of households share similar characteristics such as demographics, average income, average spending and so forth.

We would estimate the potential outcome between two groups of households by considering the average causal effect as follow:

$$E(Y_i|D_i = 1) - E(Y_i|D_i = 0) = E(Y_{1i}|D_i = 1) - E(Y_{0i}|D_i = 0) + E(Y_{0i}|D_i = 1) - E(Y_{0i}|D_i = 0) \text{ ---- (3)}$$

where $E(Y_{1i}|D_i = 1) - E(Y_{0i}|D_i = 0)$ is potential outcome of treated group; $E(Y_{0i}|D_i = 1) - E(Y_{0i}|D_i = 0)$ is selection bias, which may occur because of omission of variables that correlate with both financial decision making and risk preference.⁵ For example, other factors such as the age and gender of household head may explain the difference in financial decision making, instead of risk preference alone. To eliminate the selection bias, Conditional Independence Assumption (CIA), which is also named selection on observables, asserts that controlling for the variables correlate with both financial decision making and risk preference, X_i , makes D_i independent of potential outcomes:⁶

⁵ Selection bias problem arise when the inclusion of observation into a sample is dependent of the outcome (Elwert & Winship, 2014; Winship & Mare 1992, p. 328). This indicate the treatment or outcome would have effect on the selection (Elwert & Winship, 2014; Berk, 1983, Winship & Mare, 1992, Stolzenberg & Relles, 1997, Fu et al., 2004). For example, the estimation on the impact of education on wages would be misleading if the research only includes low earners (Elwert & Winship, 2014; Hausman & Wise, 1977). This problem would lead to misleading inferences on the result obtained (Mare, 1992).

⁶ Common variables that have impact on the treatment assignment and treatment specific outcome is observable under Conditional independence assumption (CIA). Under CIA, it can remove the treatment assignment and treatment specific outcome that is dependence to each other by conditioning on these observable variables (Glossary, n. d.).

$$\{Y_{0i}, Y_{1i}\} = D_i | X_i$$

By conditioning the potential outcomes on X_i , selection bias disappears, and equation 3 can be rewritten as follows:

$$\begin{aligned} E(Y_i | X_i, D_i = 1) - E(Y_i | X_i, D_i = 0) &= [E(Y_{1i} | D_i = 1) - E(Y_{0i} | D_i = 1)] | X_i \\ &= [E(Y_{1i} | D_i = 1) - E(Y_{0i} | D_i = 0)] | X_i \text{ ---- (4)} \end{aligned}$$

3.2 Empirical Strategy

To answer the question on whether households' financial decision making differs by their risk preference status, we use the specification below to examine the causal effect of risk preference:

$$Y_i = \beta_1 + \beta_2 D_i + \beta_3 X_i + \mu_i \text{ ---- (5)}$$

where Y_i is the logarithm of the financial decision making on household ownership asset; D_i is risk preference dummy, an indicator of whether an individual is risk-aversion or risk-seeking; X_i is a vector of control variables which include demographic, household expenditure, income of household, education level, debt level, insurance, and pension fund; and μ_i is the error term.

We introduce **demographic characteristics** to avoid selection bias. For example, male individuals are likely more willing to take risk than female individuals. Older individuals are less likely to have high tolerance on risk compare to younger individuals. To overcome potential selection bias, we control for age, gender, ethnicity, ability to read Indonesian language newspaper, birthplace, employment status, family size, internet accessibility, marital status, and health condition.

We include **household expenditure** to make the two groups of households more comparable. For example, household with higher expenditures may not invest in high risk assets to prevent great loss. We include total expenditure for living

necessity, total expenses generated by household for the business, and amount of money used for household.

We also control for **income of household** to ensure the likelihood of a household to be risk-averse is as random as possible. For example, the higher the income of a household, the more risk the household might be willing to take. We include total income from the assets for farm business, net profit generated, total income from assets, total income received from other sources, annual salary including value of all benefits, and year-end bonus.

We also consider **education level** to overcome omitted variable bias. For example, individual with higher education level may have more knowledge and therefore they are more to risk-takers to have higher return. We include highest education level attended, spouse education level, child's education, child's highest education level, whether child work while schooling, whether child receive assistance for school costs, and parents' education level.

We suggest **debt level** as one of the control variables. For example, household with higher debt level may be more risk-averse. We include amount of household debt, and outstanding debt. Lastly, **insurance and pension fund** are considered as our control variables as well.

We argue that we are able to overcome the selection bias after introducing the control variables that are available in the IFLS. Therefore, ordinary least squares (OLS) can be applied to equation 5 to estimate the effect of risk preference on financial decision making (ownership of household assets).

We expect the slope coefficient of risk preference, β_2 , to be negative: risk-averse individuals prefer lower risk investment household assets. We use robust standard error in equation 5.

3.3 Data Collection

We use the data from the fifth wave of Indonesia Family Life Survey (IFLS-5), which is conducted by RAND Corporation in collaboration with a few research centres such as the Center for Population and Policy Studies of University of Gadjah Mada in 2014. It is an ongoing longitudinal household survey in Indonesia, which covers 83% of Indonesian population and includes more than 30,000 individuals.⁷

We use logarithm measurement for our dependent variables, the values of **financial decision on household asset**, which are from Section HR of Book 2 (Household Economy), and Section HR of Book 3A of IFLS-5.

In basic specification, **risk preference** is a dummy variable that takes the value one if the individual is risk-averse and zero otherwise. We use various risk preference measures in the risk and time preference module (Section SI) of Book 3A of IFLS-5.

Demographic characteristics that include age, gender, ethnicity, ability to read Indonesian language newspaper, birthplace, birthday is village, small town or big city, employment status, family size, internet accessibility, marital status, and health condition are from Sections DL, MG, and RE of Book 3A, Sections KW and EP of Book 4, and Section MAA of Book 5 of IFLS-5.

Household expenditures that include total expenditure for living necessity, total expenses generate by household for the business, and amount of money used for household are from Section KS of Book 1, Section NT of Book 2, and Section DLA of Book 5 of IFLS-5.

We use as control variables the **income of households** include total income from the assets for farm business, net profit generated, total income from assets, total income received from other sources, annual salary including value of all benefits

⁷ The data is available at <http://www.rand.org/labor/FLS/IFLS.html>.

are from Section UT, NT, HR and HI of Book 2 (Household Economy), and Section TK of Book 3A of IFLS-5.

We use **education level** as our control variables which include highest education level attended, spouse education level, child's education, child's highest education level, whether child work while schooling, whether child receive assistance for school costs, and parents' education level are in are from Section DL of Book 3A, Section KW of Book 4, Section DLA and BAA of Book 5 of IFLS-5.

Debt level as control variables include amount of household debt, and outstanding debt are from Section BH of Book 2 (Household Economy) of IFLS-5. **Insurance and pension fund** from Section KR of Book 2 (Household Economy), and Section TK of Book 3A of IFLS-5.

3.4 Summary Statistics

Table 1 Summary Statistics

	Mean		
	Risk-averse (1)	Risk (2)	Difference (3)
A. Household assets			
Own Occupied House	123.86 (198.14)	109.47 (187.61)	-143.93*** (-3.43)
Other House	24.19 (105.78)	24.55 (114.85)	0.36 (0.15)
Non-agricultural Land	12.72 (69.78)	11.70 (73.19)	(1.02) (-0.67)
Poultry	0.28 (6.00)	0.14 (1.66)	(0.14) (-1.33)
Livestock	0.34 (4.80)	0.27 (3.39)	(0.07) (-0.73)
Own Hard Stem Plant	0.63 (12.94)	0.42 (7.29)	(0.21) (-0.87)
Own Vehicles	18.21 (44.70)	15.86 (46.29)	-2.35** (-2.41)
Own Household Appliances	4.85 (9.70)	4.48 (7.32)	-0.37* (-1.89)
Have Savings/ Certificate of Deposits/Stocks	5.18 (26.36)	6.86 (42.38)	1.67** (2.39)
Have Receivables	1.87 (19.29)	2.58 (20.51)	0.71* (1.68)
Own Jewellery	3.74 (25.04)	3.17 (19.56)	(0.56) (-1.11)
Own Household Furniture & Utensils	4.64 (8.88)	4.69 (20.58)	0.05 (0.18)
Own Other Household Assets	0.59 (16.14)	0.81 (20.96)	0.21 (0.56)

B. Household Spending and Income

Spending on Schooling (Last Year)	8.96	7.81	-1.15***
	(6.99)	(7.15)	(-6.38)
Food Expenditure	12.02	11.95	-0.07***
	(0.97)	(0.98)	(-2.91)
Non-Food Expenditure (Last Month)	12.72	12.72	12.54
	(1.41)	(1.46)	(-4.86)
Non-Food Expenditure (Last Year)	14.16	14.16	14.00
	(1.81)	(1.82)	(-3.31)
Unconditional Cash Transfer Programme	0.20	0.19	(0.01)
	(0.40)	(0.39)	(-0.95)
Conditional Cash Transfer Programme	0.00	0.00	0.00
	(0.04)	(0.05)	(0.67)
Monthly wage ('millions)	1.87	1.36	(0.50)
	(16.59)	(3.04)	(-1.41)
Annual Wage ('millions)	20.07	15.18	(4.89)
	(308.79)	(39.66)	(-0.74)

C. Household Characteristics

Married (Household Head)	0.85	0.81	-0.04***
	(0.36)	(0.39)	(-3.77)
Muslim	0.89	0.89	0.00
	(0.31)	(0.31)	(-0.10)
Head Education	0.25	0.21	-0.04***
	(0.43)	(0.41)	(-3.38)
Javanese	0.42	0.43	0.01
	(0.49)	(0.50)	(0.58)
Can Write a Letter in Indonesian or other language	0.96	0.94	-0.02***
	(0.19)	(0.23)	(-3.91)
Gender of Household Head	0.85	0.83	-0.02*
	(0.36)	(0.38)	(-1.81)
Number of Female Members	1.43	1.31	-0.12***
	(1.77)	(1.72)	(-2.73)
Household Size	6.21	5.59	-0.62***

	(3.41)	(3.36)	(-7.11)
Average Age	31.31	31.60	0.29
	(11.79)	(12.74)	(0.94)
N	6586	3200	

The numbers are means. The numbers in parentheses in columns 1 and 2 are standard deviations; the numbers in parentheses in column 3 are standard errors. The asterisks ***, ** and * indicate statistical significance at 1%, 5% and 10%, respectively.

Panel A of Table 1 reports the descriptive statistics of household assets. The value of several household assets does not differ much by the households' risk preference: other house, non-agricultural land, poultry, livestock, hard stem plant, jewellery, household furniture and utensils and other household assets; the mean differences are statistically insignificant. For example, both risk-averse and risk-seeking households own Rp 0.02 billion of other house, Rp 0.01 billion of non-agricultural land, on average, Rp 0.20 million of poultry, Rp 0.30 million of livestock, Rp 0.50 million of hard stem plant, Rp 3.50 million of jewellery, Rp 4.70 million of household furniture and utensils and Rp 0.70 million of other household assets. The value of these household assets does not differ much between risk-averse and risk-seeking households.

A greater contrast exists, however, between the ownership of occupied house of these two groups of households: risk-taking households have, on average, Rp 0.1 billion less of self-occupied houses; the mean difference is statistically significant. There are also marked differences in the values of ownership of vehicles, household appliances, savings/certificate of deposits/stocks as well as receivables. There is a difference between the two groups of households for those statistically significant figures in column 3. There are about Rp 2.35 million and Rp 0.37 million lesser owned by households who are risk-taking respectively. For the ownership of savings/certificate of deposits/stocks and receivables, there are about Rp 1.67 million and Rp 0.71 million lesser owned by risk-averse households compared to risk-taking households. The mean differences are statistically significant.

Panel B shows the means of household spending. The mean values show that households who are risk-seeking have lower household spending. Risk-taking

households spend Rp 1.15 billion lesser when compared to risk-averse households on schooling last year; the mean difference is statistically significant. There are also marked differences in the food expenditure, non-food expenditure last month as well as non-food expenditure last year. The values are about Rp 0.07 billion, Rp 0.18 billion and Rp 0.15 billion lesser for risk-seeking households respectively. For unconditional cash transfer programme, risk-taking households have statistically different by about 1 percentage point fewer than risk-averse households. Moreover, the mean differences of monthly wage and annual wage between these households are statistically significant. The odds of both wages are about Rp 0.50 million and Rp 4.89 million respectively.

Panel C shows household characteristics; most characteristics are statistically different between risk-averse and risk-taking households. There is 85 percent of household head in risk-averse households are married while there is 81 percent of household head in risk-taking households are married. The difference between the two rates is 4 percentage points. There is also 3 percentage points more household heads in risk-averse households completed senior high school compared to risk-taking households. Risk-taking households is 1 percentage point more Javanese than risk-averse households. Besides, 2 percentage points more households in risk-averse households who can write a letter in Indonesian or other language. There is also a different between the males and females of household head and the rate between them is 2 percentage points. 12 percentage points more female members in risk-averse households compared to risk-taking households. The household size of risk-averse households is 62 percentage points more than the household size of risk-taking households. The difference between the two rates of average age is 29 percentage points.

There is one household characteristic does not differ much by the households' risk preference: Muslim; the mean rate difference is statistically insignificant. For example, both risk-averse and risk-seeking households have the same percentage in religion Islam which is 89 percent.

CHAPTER 4: DATA ANALYSIS, FINDINGS AND INTERPRETATION

4.0 Introduction

This chapter consists of 3 sections. Section 4.1 is our results briefing, Section 4.2 is our interpretation and descriptive analysis based on our result. In section 4.3, we present our inferential analysis.

4.1 Results

We examine the effect of risk preference on financial decision on household assets. In basic specification, we regress risk preference (risk-averse) on household assets and include a set of district dummies to control differences across districts. To reduce selection bias, we consider two sets of control variables in the regressions: household spending and income and household characteristics. We also analyze the effect by subsamples as robustness checks.

4.2 Descriptive Analysis and Interpretation

4.2.1 Household Assets and Risk Preference

Table 2 The effects of risk preference on household assets

Dependent Variables (in logarithm)	(1)	(2)	(3)
Total assets	0.22***	0.22***	0.28***
	(0.05)	(0.06)	(0.08)
Own Occupied House	0.49**	0.33	0.39
	(0.21)	(0.29)	(0.34)
Other House	0.28	0.29	0.45

	(0.17)	(0.23)	(0.31)
Non-agricultural Land	0.24	0.22	0.52*
	(0.16)	(0.22)	(0.29)
Poultry	(0.04)	(0.02)	0.31
	(0.14)	(0.19)	(0.26)
Livestock	(0.03)	0.09	0.15
	(0.09)	(0.12)	(0.15)
Own Hard Stem Plant	0.19	0.32*	0.41*
	(0.12)	(0.17)	(0.23)
Own Vehicles	1.30***	1.39***	1.45***
	(0.20)	(0.26)	(0.34)
Own Household Appliances	0.41***	0.47***	0.46***
	(0.09)	(0.12)	(0.15)
Have Savings/ Certificate of Deposits/Stocks	(0.16)	(0.41)	(0.11)
	(0.20)	(0.27)	(0.33)
Have Receivables	(0.07)	0.07	0.23
	(0.14)	(0.19)	(0.24)
Own Jewellery	0.56***	0.72***	1.04***
	(0.21)	(0.28)	(0.36)
Own Household Furniture & Utensils	0.32***	0.36***	0.28**
	(0.08)	(0.10)	(0.12)
Own Other Household Assets	(0.04)	(0.09)	(0.13)
	(0.09)	(0.12)	(0.17)
N	7,204	4,424	2,899
Control Variables:			
Household spending	.	√	√
Household characteristics	.	.	√

The numbers in each column are the estimates of OLS regressions of risk-averse on household assets, without (column 1) and with control variables (column 2-3). All regressions include district dummies. The asterisks ***, ** and * indicate statistical significance at 1%, 5% and 10%, respectively.

Table 2 show the basic results. Column 1 shows the specification without control variables; columns 2 and 3 controls for household spending and income and household characteristics, respectively. The intention of inclusion of control variables are to reduce selection bias.

Column 1 shows, on average, risk-averse households have more total assets, own occupied houses, vehicles, household appliances, jewellery and household furniture

and utensils compare to risk-taking households. For example, their total assets, own occupied houses, vehicles, household appliances, jewellery and household furniture and utensils are 22%, 49%, 130% , 41%, 56% and 32%, respectively, higher than those of risk-taking households. The estimates are statistically significant at 1% level except for the estimate of own occupied houses. However, we find no evidence that the value of other household assets, including other houses, poultry, livestock, hard stem plant, saving/certificate of deposits/stocks, receivables and other household assets differ between risk-averse and risk-taking households. The estimates of the variables are statistically insignificant.

In column 2, in which we control for household spending and income, the estimates of total assets, own vehicles, household appliances, jewellery and household furniture and utensil remain statistically significant. The household asset of hard stem plant are statistically significant after we control for household spending and income. We find evidence that risk-averse households own 32% more hard stem plants. However, the estimate of own occupied house becomes statistically insignificant after we control for household spending and income. The estimates of other measures of household assets remain statistically insignificant.

Column 3, which adds household characteristics as control variables, shows some evidence that risk-averse households own more assets. For example, risk-averse households own non-agriculture land, hard stem plant, vehicles, household appliances, jewellery and household furniture and utensils more than risk-taking households do. After controlling for household income, spending and characteristics, the estimate for non-agricultural land become statistically significant at 10%. The result shows risk-averse households own 52% more of non-agricultural land compare to risk-taking households. However, furniture and utensil remain statistically significant at 5% after we control for household characteristics while other estimates remain statistically insignificant.

Based on Table 2, it shows the estimate of risk-averse households is statistically significant and risk-averse has a positive relationship with total assets, household assets of vehicles, housing appliances, jewellery, household furniture and utensils at the significance level of 1%. We find evidence that the risk-averse household

own more jewellery perhaps be women prefer simple and conservative investment product such as jewellery (Rangarajan & Manimekalai, 2019). As based on Reddy and Narayanan (2015), before investment decisions made, usually family members and friends would seek consultant from women.

Moreover, risk preference is statistically significant for self-occupied house at significance level of 5% in column 1. The reason it become insignificant after including control variables could be housing price in Indonesia are overpriced and this situation lead to Indonesian cannot afford in buying house at the given price (Rahadi, Wiryono, Koesrindartoto & Syamwil, 2016). As this situation arises, risk preference might not be the main consideration of household in purchasing occupied house.

Besides, at significance level of 10%, risk preference is statistically significant for non-agricultural land and hard stem plant. The estimate of non-agricultural land is statistically significant after include both control variables might because of involvement in agricultural sector would expose to multiple uncertainties such as natural and financial uncertainties (Knoke et al., 2011).

Risk preference has no statistically relationship with the financial decision on household asset of house, poultry, livestock, savings/certificate of deposits/stocks, receivables and other household assets. There is no evidence that the risk preference affects financial decisions on owning house perhaps due to the policy implemented by Jakarta's government. Start from 2013, government's plans in reducing land and housing tax had increased investors' confidence (Global Business Guide Indonesia, 2013). Besides, risk preference does not seem to affect financial decision on poultry and livestock perhaps due to the demand on protein and for healthy purpose as protein is required by human no matter it is risk-averse or risk-seeking individual (Patrick et al., 2014). Moreover, risk preference has no impact on savings/certificate of deposits/stocks possible because the wide geographical reach banking system and minimum deposit requirement by Bank Rakyat Indonesia (BRI) which only 53 U.S. cents (Cole, Sampson & Zia, 2009).

4.2.2 Household Assets in Urban Areas

Table 3 Subsample (Urban)

Dependent Variables (in logarithm)	(1)	(2)	(3)
Total assets	0.09	0.08	0.16
	(0.07)	(0.08)	(0.10)
Own Occupied House	0.35	0.24	0.04
	(0.33)	(0.43)	(0.55)
Other House	0.12	0.39	0.75
	(0.28)	(0.35)	(0.50)
Non-agricultural Land	0.28	0.22	0.60
	(0.24)	(0.31)	(0.41)
Poultry	(0.04)	(0.20)	(0.27)
	(0.20)	(0.26)	(0.38)
Livestock	0.11	0.07	0.17
	(0.11)	(0.15)	(0.18)
Own Hard Stem Plant	0.19	0.44**	0.54*
	(0.16)	(0.21)	(0.30)
Own Vehicles	0.84***	0.60*	0.95**
	(0.28)	(0.35)	(0.48)
Own Household Appliances	0.12	0.15	0.24
	(0.10)	(0.14)	(0.20)
Have Savings/ Certificate of Deposits/Stocks	(0.32)	-0.89**	(0.05)
	(0.30)	(0.38)	(0.52)
Have Receivables	(0.17)	0.18	0.41
	(0.20)	(0.27)	(0.36)
Own Jewellery	0.47	0.67*	0.98*
	(0.30)	(0.39)	(0.53)
Own Household Furniture & Utensils	0.35***	0.33**	0.08
	(0.11)	(0.14)	(0.17)
Own Other Household Assets	(0.13)	(0.18)	(0.21)
	(0.13)	(0.17)	(0.24)
N	3,985	2,577	1,643
Control Variables:			
Household spending	.	√	√
Household characteristics	.	.	√

The numbers in each column are the estimates of OLS regressions of risk-averse on household assets, without (column 1) and with control variables (column 2-3). All regressions include district dummies. The asterisks ***, ** and * indicate statistical significance at 1%, 5% and 10%, respectively.

Table 3 shows the result of the financial decision on household assets. On average, column 1 shows, risk-averse households have more vehicles and household furniture and utensils that is 84% and 35% respectively, higher than those of risk-taking households. The estimates are statistically significant at 1% level. However, we do not find evidence of other household assets, including total assets, own occupied house, own other house, non-agriculture land, poultry, livestock, hard stem plant, household appliances, savings/certificate of deposits/stocks, receivables, jewellery and other household assets, differ between risk-averse and risk-taking households. The estimates of the variables are statistically insignificant.

In column 2, after we control for household spending and income, the estimates of household assets for vehicles and household furniture and utensils remain statistically significant. We find evidence of household assets including hard stem plant, saving/certificate of deposits/stocks and jewellery differ between households; the estimates are statistically significant at 5% except for jewellery. Hard stem plant and jewellery in risk-averse households are 44% and 67% respectively, higher than risk-taking households. As for saving/certificate of deposits/stocks, the estimate shows risk-averse household own 89% less than risk-taking households. The estimates of other measures of household assets remain statistically insignificant.

Column 3, which adds household characteristics as control variables, the estimates for hard stem plant, vehicles and jewellery remain statistically significant at 5% except the estimates of vehicles. However, the estimates for household furniture and utensils become statistically insignificant after we control for household characteristic while other estimates of household assets are statistically insignificant.

4.2.3 Household Assets in Rural Area

Table 4 Subsample (Rural)

Dependent Variables (in logarithm)	(1)	(2)	(3)
Total assets	0.35***	0.38***	0.38***
	(0.07)	(0.10)	(0.11)
Own Occupied House	0.53**	0.50	0.65
	(0.26)	(0.36)	(0.41)
Other House	0.39*	0.07	0.18
	(0.20)	(0.29)	(0.40)
Non-agricultural Land	0.18	0.10	0.36
	(0.24)	(0.34)	(0.45)
Poultry	0.02	0.31	0.94**
	(0.21)	(0.31)	(0.38)
Livestock	(0.19)	0.10	0.04
	(0.15)	(0.21)	(0.27)
Own Hard Stem Plant	0.26	0.25	0.40
	(0.20)	(0.29)	(0.38)
Own Vehicles	1.80***	2.33***	1.96***
	(0.31)	(0.42)	(0.52)
Own Household Appliances	0.77***	0.90***	0.69***
	(0.16)	(0.21)	(0.26)
Have Savings/ Certificate of Deposits/Stocks	(0.04)	0.00	(0.08)
	(0.27)	(0.37)	(0.46)
Have Receivables	0.09	0.09	0.32
	(0.21)	(0.30)	(0.36)
Own Jewellery	0.78**	0.86**	1.40***
	(0.31)	(0.43)	(0.53)
Own Household Furniture & Utensils	0.30***	0.35***	0.39**
	(0.10)	(0.14)	(0.19)
Own Other Household Assets	0.07	0.02	(0.21)
	(0.11)	(0.17)	(0.24)
N	3219	2577	1643
Control Variables:			
Household spending	.	√	√
Household characteristics	.	.	√

The numbers in each column are the estimates of OLS regressions of risk-averse on household assets, without (column 1) and with control variables (column 2-3). All regressions include district dummies. The asterisks ***, ** and * indicate statistical significance at 1%, 5% and 10%, respectively.

Table 4 shows the result of the financial decision on household asset in rural area. In terms of total household assets, the result shows risk preference has only weak positive relationship with the financial decision on household assets no matter with or without the control variables, household spending and household characteristics. The magnitudes with the presence or absence of control variables have no major differences, with the range from 35% to 38%, at the statistical significance of 1%.

Result in column 1 shows risk-averse households have more total assets, own occupied house, other house, vehicles, household appliances, jewellery and household furniture and utensils. For instance, their total assets, occupied house, other house, vehicles, household appliances and household furniture and utensils are 35%, 53%, 39%, 180%, 77%, 78% and 30% respectively as compared to risk-taking households. The estimates are statistically significant at 1% except the measure for household asset of own other house and jewellery. They are statistically significant at 10% and 5% respectively. We do not find evidence of the household assets including own non-agriculture land, poultry, livestock, hard stem plant, saving/certificate of deposits/stocks, receivables and other household assets differ. These estimates are statistically insignificant.

In column 2, in which households spending and incomes are added as control variables, the estimates of household assets including total assets, own vehicles, household appliances, jewellery and household furniture and utensils remain statistically significant at 1% except for the estimate of jewellery. However, the estimates of occupied house and other house become statistically insignificant after including the control variables. The estimates for other measures of household assets remain statistically insignificant.

Column 3, after controlling for household characteristic, the estimate of household assets remains statistically significant, including total assets, own vehicles, household appliances, jewellery and household furniture and utensils. All of the estimates are statistically significant at 1% significance level except household asset of jewellery and other household assets with 1% and 10% significance level respectively. With the control for household spending, income and household characteristics, we find evidence that risk-averse household own 94% more in

poultry as compared with risk-taking households. However, we find no evidence of other household assets differ.

4.2.4 Assets in Household size not more than 5 people

Table 5 Subsample (Household size equal or less than 5)

Dependent Variables (in logarithm)	(1)	(2)	(3)
Total assets	0.22***	0.12	0.20
	(0.07)	(0.08)	(0.13)
Own Occupied House	0.68**	(0.04)	0.11
	(0.32)	(0.45)	(0.63)
Other House	0.55**	0.61*	0.28
	(0.25)	(0.35)	(0.58)
Non-agricultural Land	0.21	0.09	1.09**
	(0.24)	(0.33)	(0.52)
Poultry	(0.02)	(0.03)	0.01
	(0.21)	(0.28)	(0.51)
Livestock	(0.08)	0.01	(0.07)
	(0.12)	(0.16)	(0.27)
Own Hard Stem Plant	0.14	0.28	0.57
	(0.18)	(0.24)	(0.44)
Own Vehicles	1.39***	1.55***	1.28**
	(0.30)	(0.39)	(0.59)
Own Household Appliances	0.44***	0.41**	0.26
	(0.13)	(0.16)	(0.28)
Have Savings/ Certificate of Deposits/Stocks	0.10	0.01	0.09
	(0.30)	(0.40)	(0.64)
Have Receivables	(0.02)	0.14	(0.08)
	(0.22)	(0.29)	(0.46)
Own Jewellery	1.05***	1.29***	1.29*
	(0.32)	(0.42)	(0.68)
Own Household Furniture & Utensils	0.36***	0.36**	0.17
	(0.12)	(0.16)	(0.23)
Own Other Household Assets	0.00	(0.02)	(0.40)
	(0.13)	(0.17)	(0.29)
N	3694	2311	1153
Control Variables:			
Household spending	.	√	√
Household characteristics	.	.	√

The numbers in each column are the estimates of OLS regressions of risk-averse on household assets, without (column 1) and with control variables (column 2-3). All regressions include district dummies. The asterisks ***, ** and * indicate statistical significance at 1%, 5% and 10%, respectively.

Table 5 shows the results of financial decision on household assets of risk-averse households with not more than 5 people. In column 1, on average, risk-averse households have more household assets such as total assets, own occupied house, other house, vehicles, household appliances, jewellery, household furniture and utensils. The result shows that their total assets, own occupied house, other house, vehicles, household appliances, jewellery, household furniture and utensils are 22%, 68%, 55%, 139%, 44%, 105% and 36% more than risk-taking households. The estimates are statistically significant at 1% except own occupied house and other house. However, the household assets of non-agricultural land, poultry, livestock, hard stem plant, savings/certificate of deposits/stocks, receivables and own other household assets are statistically insignificant.

In column 2, in which household spending and income are included as control variables, the estimates of own other house, vehicles, household appliances, jewellery and household furniture and utensils remain statistically significant. However, the estimates of total assets and occupied house become statistically insignificant after control for household spending and income. We could not find evidence for the remaining household assets that show statistically insignificant result.

In column 3, we control for household spending, income and household characteristics, the household assets of vehicles and jewellery remain statistically significant at 5% and 10% respectively. After including household characteristic as control variables, we find evidence that risk-averse households own 109% more of non-agricultural land than risk-taking households. The estimate is statistically significant at 5%. However, the estimates including other houses, household appliances and household furniture and utensils are statistically insignificant. We find no evidence that the remaining household assets differ between risk-averse and risk-taking household. The estimates of the variables are statistically insignificant.

4.2.5 Assets in Household size more than 5 people

Table 6 Subsample (Household size more than 5)

Dependent Variables (in logarithm)	(1)	(2)	(3)
Total assets	0.15*	0.30***	0.35***
	(0.08)	(0.10)	(0.11)
Own Occupied House	(0.21)	(0.04)	0.03
	(0.29)	(0.41)	(0.45)
Other House	(0.01)	0.01	0.19
	(0.27)	(0.38)	(0.44)
Non-agricultural Land	0.25	0.72**	0.59
	(0.25)	(0.33)	(0.41)
Poultry	0.03	(0.12)	0.47
	(0.22)	(0.32)	(0.38)
Livestock	(0.11)	(0.09)	0.15
	(0.14)	(0.20)	(0.21)
Own Hard Stem Plant	0.06	0.17	0.33
	(0.20)	(0.28)	(0.31)
Own Vehicles	1.34***	1.58***	1.56***
	(0.31)	(0.42)	(0.50)
Own Household Appliances	0.34**	0.61***	0.62***
	(0.13)	(0.20)	(0.23)
Have Savings/ Certificate of Deposits/Stocks	(0.29)	(0.36)	(0.21)
	(0.29)	(0.40)	(0.47)
Have Receivables	0.02	0.35	0.40
	(0.20)	(0.29)	(0.33)
Own Jewellery	0.01	0.32	0.64
	(0.32)	(0.44)	(0.53)
Own Household Furniture & Utensils	0.17*	0.28**	0.38**
	(0.10)	(0.14)	(0.17)
Own Other Household Assets	(0.08)	(0.06)	(0.07)
	(0.14)	(0.19)	(0.23)
N	3510	2113	1746
Control Variables:			
Household spending	.	√	√
Household characteristics	.	.	√

The numbers in each column are the estimates of OLS regressions of risk-averse on household assets, without (column 1) and with control variables (column 2-3). All regressions include district dummies. The asterisks ***, ** and * indicate statistical significance at 1%, 5% and 10%, respectively.

Table 6 shows the results of financial decision on household assets ownership of risk-averse households with more than 5 people. In column 1, we found evidence that household assets including total assets, vehicles, household appliances and household furniture and utensils hold by risk-averse households are higher as compared to risk-taking households. For instance, the estimates of total assets, vehicles, household appliances and household furniture and utensils hold by risk-averse households are 15%, 134%, 34% and 17% higher than those of risk-taking households. The estimates of total assets and own household furniture and utensils are statistically significant at 10%, while the estimate of own vehicles and household appliances are statistically significant at 1% and 5% respectively. However, household assets including occupied house, other house, non-agricultural land, poultry, livestock, hard stem plant, savings/certificate of deposits/stock, receivables, jewellery and other household assets are statistically insignificant. There is no evidence of the household assets differ between risk-averse households and risk-taking households.

Column 2 which result include household spending as control variable shows the estimates of total assets, own vehicles, household appliances and household furniture and utensils remain statistically significant. The estimates are statistically significant at 1% except estimates of household furniture and utensils. After control for household spending, we find that risk-averse households own non-agricultural land 72% more than risk-taking households do. The estimates of other household assets remain statistically insignificant.

Based on column 3, which control for household spending, income and household characteristic, the household assets including total assets, own vehicles, household appliances and household furniture and utensil remain statistically significant at 1% except estimate for own household furniture and utensils. However, the estimate of non-agricultural land become statistically insignificant we control for household characteristic. The estimates of other measures of household assets remain statistically insignificant.

4.3 Inferential Analysis

There are **several differences in financial decision on household assets between urban area (Table 3) and rural area (Table 4)**. Firstly, the results in Table 4 shows that there is a positive significant relationship between risk-averse households and owning both occupied and other house in rural areas, whereas Table 3 shows that there is no significant relationship between risk-averse households and owning both occupied and other houses in urban areas. Susilawati and Yakobus (2010) state that one of housing problems in Indonesia is the accessibility to affordable housing for low income people especially in major cities like Jakarta and Surabaya. Soseco, Wulandari, Utomo and Narmaditya, 2018 also give a similar statement where people in urban areas are facing skyrocketing house prices. Rukmana (2018) shows that 40 percent of households in Indonesia are below or close to poverty and cannot afford even a basic housing unit. Most poor residents in Indonesian urban areas live in spontaneous informal settlements (*kampungs*). The government has provided solutions by indirect subsidizing on home ownership for low income groups. However, the low-cost housings are located in cheaper lands which is very far from the city. This explains our result where the majority of poor households in Indonesia that cannot afford to own houses in urban areas will opt to own lower-cost houses located in rural areas that are subsidized by the Indonesian government.

Next, the ownership of poultry also differs between households in urban and rural areas. The results show that the effect of risk-averse is statistically significant in rural areas but not urban areas. According a publication⁸ by the United States Agency International Development, poultry is an important source of income for poor households in Indonesia and it can be an important source of livelihoods in the rural areas. Ferlito and Respatiadi (2019) also state that the situation is worsened by the fact that poultry facilities are not located in the main cities. Poultry facilities are located in rural areas, reachable only after many hours of travelling by truck. Bounds and Zinyemba (2018) also state that rural people are burdened by the effects

⁸ Publication produced by Nathan Associates Inc. for review by the United States Agency for International Development obtained from https://pdf.usaid.gov/pdf_docs/pbaaa047.pdf

of unemployment and poverty. Poverty has limited the ability of rural community to develop their own communities. Agricultural businesses are known to provide approximately 70% of the employment opportunities in the rural areas of developing countries (The World Bank, 2013). Backyard poultry not only provides employment to rural households, but also provides livelihood and food security in rural areas. Therefore, owning poultry in rural areas are highly important to risk-averse households as it is their main means of living. In other words, rural households make a living out of agricultural businesses.

Next, the ownership of hard stem plant also differs between households in urban and rural areas. The results show that the effect of risk-averse is statistically significant in urban areas but not rural areas. This is probably because the poorer urban communities can make use of tree products from their local environment (Long and Nair, 1999). For example, Davenport, Gambiza and Shackleton (2011) show that up to 70% of poorer urban households in three small towns in South Africa collected at least one tree product, mostly fire-wood, herbal medicines and fodder for livestock for direct use (Kaoma & Shackleton (2014). Hard-stem trees provide consumptive and non-consumptive benefits. Consumptive benefits include timber, fruits, seeds, fronds, bark, resins and etc. for multiple uses. Non-consumptive benefits on the other hand include tree shade and psychological rejuvenation. Having trees also contributes environmental benefits, where trees can help reduce stormwater runoff and hence soil erosion, they also provide windbreaks for agricultural crops and residential areas. Trees also helps ameliorate the urban heat and poor quality. According to Kaoma and Shackleton (2014), consumptive tree products can bring direct income into household through trade (Kalaba, Chirwa & Prozesky, 2009; Murwendo, 2011) and indirectly by cash saving through the supply of free products (Murwendo, 2011). They may also be useful as temporary safety-net in the event of a household suffering a setback, such as retrenchment, illness or death (Shackleton & Shackleton, 2004; Zulu & Richardson, 2013; Kaoma & Shackleton, 2014).

Furthermore, the ownership of household appliances also differs between households in urban and rural areas. The results show that the effect of risk-averse is statistically significant in rural areas but not urban areas. This is due to the rural

electrification program in Indonesia that has increased the use of household appliances in rural households. According to Barnes (2019) the use of appliances such as lights, televisions, stoves and radios has caused a direct social impact and improved the quality of rural life. The use of household appliances helps integrate rural households into the larger society. Electric appliance use in rural households has also changed the rural energy-use patterns. Another reason could be the Indonesian government started the rural electrification program in the late 1950s that has increased the demand for appliances in rural households.

Additionally, the ownership of savings/ certificate of deposits/ stocks also differs between households in urban and rural areas. The results show that the effect of risk-averse is statistically significant in urban areas but not rural areas. According to the report from a Survey on Financial Inclusion and Access (2017)⁹, the use of informal financial services remains significant among those in urban locations who have access to banking services. Additionally, urban-based adults are more likely to invest in financial products as they have higher financial literacy and have more accessibility to financial services than those in rural areas. The report also stated that there is a higher proportion of the urban-based population who have savings, compared to those in rural areas. Another explanation for this situation is because the risk-averse households favour savings as investment. This is in line with our literature review as Campbell (2006), Haliassos and Michaelides (2003), and Gomes and Michaelides (2005) stated that risk-averse households have a strong precautionary saving motive and will accumulate more wealth.

However, both tables show similar results where there is positive significant relationship between risk-averse households and owning vehicles in both urban and rural areas. According to an article released by Press Room (2014), despite the overall low vehicle ownership level across the region, purchase intent is still high with Indonesia, Malaysia, Philippines and Thailand, all ranking in the top 10 countries globally for intention to acquire a car within the next two years. The executive director of consumer insights at Nielsen's Automotive Industry Group in

⁹ Report obtained from
https://www.bappenas.go.id/files/6415/1668/2623/SOFIA_Report_May_2017_low_res.pdf

Indonesia Anil Anthony stated that it is largely due to rising income levels across the region as more and more households are joining the middle class and attaining the financial means to own their first cars (Yulisman, 2014). It could also be due to their relatively long commute hours to their working place that caused many Southeast Asian car owners believe the primary purpose of owning a car is to get them to their destination (Press Room, 2014). Yulisman (2014) also states that people now believe owning a vehicle a symbol of success that will boost their social status plus cars in Indonesia had also become increasing affordable for their local consumers.

Other than that, risk-averse households in both urban and rural areas also have positive significant relationship with owning jewellery. According to a news released by The Jakarta Post (2019), investing in jewellery is common among Indonesians, many whom would buy jewellery to sell in the future instead of keeping it. Jewellery can be easily converted to money at times of emergency where the person might be in need of cash. A fixed deposit on the other hand although it is also a safe investment product, the money can't be withdrawn at any time the investor wants, plus bank offices are closed on weekend. Investing in jewellery is much more flexible, and the value of jewellery might increase as well as it becomes more and more rare.

Lastly, risk-averse households in both urban and rural areas have significant relationship with owning household furniture and utensils. Owning furniture and utensils are important as they are considered basic necessities of a household. According to an article published by Ideal Furniture (2016), furniture increases the quality of life. Furniture contributes in improving the visual appearance of households and making the work environment more positive. Using furniture to store items is highly recommended as it helps save space especially in houses with limited space. Utensils are important as well as it is not only needed for cooking and eating, but for safety reasons as well. Utensils are needed when handling hot food.

There are also **several differences in financial decision on household assets between household size equal or less than 5 (Table 5) and household size more than 5 (Table 6)**. First, ownership of occupied house and other house differs between household with household size equal or less than 5 and household with household size more than 5. The results show that the effect of risk-averse is statistically significant for household with household size equal or less than 5 but not household with household size more than 5. According to Halket and Vasudev (2014), changes in family size would crucially affect one's decision on household ownership and housing consumption. Our results can be supported by Andrews and Sánchez (2011) who find changes in household size and structure show a downward trend on aggregate homeownership rates. For example, larger family size which indicates greater number of children will need higher cost in rearing children, thus might reduce the cost and possibility of a household to own a house (Mulder, 2006).

Next, ownership of non-agricultural land also differs between household with household size equal or less than 5 and household with household size more than 5. The results show that the effect of risk-averse is statistically significant for household with household size equal or less than 5 when both household spending and household characteristic is included whereas only significant when household spending is included in household with household size more than 5. Based on a publication¹⁰ by Food and Agriculture Organization of the United Nations, household with smaller family size tends to complement their annual income with non-agricultural sources or self-employment although agriculture still remain as their main income. These non-agricultural sources usually play as a diversification role for the small household's income to ensure their livelihood against the occurrence of shock such as natural disaster that would affect their agricultural production in a negative way. Besides, copra and rubber plantation provide more benefits in terms of cash income, thus motivating Indonesian to converse their land from agricultural to non-agricultural land, especially the small householders (Dolly, Kismartini & Purnaweni, 2018). The author also mentioned that most of the

¹⁰ Publication by Food and Agriculture Organization of the United Nations obtained from <http://www.fao.org/3/i8881en/I8881EN.pdf>

agricultural land had been transformed into copra and rubber plantation, settlement and rural gold mining without license.

Furthermore, ownership of jewelry differs between household with household size equal or less than 5 and household with household size more than 5 too. The results show that the effect of risk-averse is statistically significant for household with household size equal or less than 5 but not household with household size more than 5. According to Kiran and Dhawan (2015) an individual's saving income ratio tends to have an adverse relationship with the household size, whereas an individual's consumption income ratio tends to increase with household size. In other words, a bigger family size will increase the household's burden since more spending is needed in order to satisfy the daily consumption needs of the family members. Therefore, smaller household size is more likely to have extra money to be spent on purchasing jewellery since Meriküll and Rõõm (2016) stated that income is one of the factors that will affect the ownership rate of valuables such as valuable jewellery, antiquities and art.

On the other hand, ownership of vehicles does not differ between household with household size equal or less than 5 and household with household size more than 5. The results show that the effect of risk-averse is statistically significant for both households with household size equal or less than 5 and household size more than 5. According to a survey conducted by Statista Research Department¹¹, the ownership of vehicles is rising through the years and about 60.54% of Indonesian respondents owned a car in 2019. It is understandable that there is a high demand of vehicles ownership in the market nowadays as it may ease us to travel to our destination and people tend to unsatisfied about the space and conveniently of public transportation. Belgiawan, Schmöcker and Fujii (2016) suggested that factors such as a car's arrogant prestige, independence, environmental care and monthly income will motivate the ownership of vehicles in Indonesia but not household size. Zhao and Kockelman (2002) also found that only vehicles types would be affected by family size like larger household size is preferable to own

¹¹ Data obtained from <https://www.statista.com/statistics/1028847/indonesia-car-ownership-among-consumers/>

SUVs and minivans since these cars generally will provide more seats and larger spaces.

In addition, ownership of household appliances and ownership of household furniture and utensils do not differ between household with household size equal or less than 5 and household with household size more than 5 too. The results show that the effect of risk-averse is statistically significant for both households with household size equal or less than 5 and household size more than 5. According to Debnath, Bardhan and Sunikka-Blank (2019), household size is having a positive significant relationship with residential electricity consumption. Sakah, du Can, Diawuo, Sedzro and Kuhn (2019)'s findings corroborates Debnath et al. (2019)'s: household size is statistically significant for the power consumptions and the demand of electricity will rise with the increasing average household size. For example, household appliances such as air conditioner, freezer, refrigerator and television are the important determinants of household electricity demand. Moreover, according to Khajehzadeh and Vale (2017), larger house will usually have more rooms, thus need more furniture to fill them. Generally, it is known that bigger family size will need larger house in order to ensure everyone would have enough space for their daily life. However, it does not mean that small household size does not need household furniture or household appliances. Therefore, it is reasonable that household appliances and household furniture are statistically significant regardless the household size.

Next, ownership of poultry is statistically insignificant in both households with household size equal or less than 5 and household with household size more than 5. However, by considering both household spending and household characteristic as control variables, the results in table 5 and table 6 show that there is positive relationship between risk-averse household and owning poultry, regardless the household size. According to Hailemichael, Gebremedhin and Tegegne (2017), household size positively affects the tendency of a household owning poultry. This phenomenon occurred due to larger family size will have greater needs for food and income, thus motivating them to participate in various farming activities such as poultry production. Generally, household size also indicating labour availability of a household. Tan (2013) suggests that household size is having a positive

relationship with the usage of improved breeds and constructions of housing for young chicks. Besides, the author explained that smaller household size is more likely to purchase poultry rather than produce it since their subsistence requirements are lower and have fewer daily needs to fulfil.

Furthermore, the status of having savings/certificate of deposits/stocks is statistically insignificant with households with household size equal or less than 5 and household with household size more than 5. Xiao (1995) finds that household size often has negative relationship with most of the financial asset ownership such as stocks, savings account, certificate of deposits and life insurance. Kiran and Dhawan (2015)'s finding corroborates Xiao (1995)'s: an individual's saving income ratio tends to have an adverse relationship with the household size, whereas an individual's consumption income ratio tends to increase with household size. In other words, individual with larger household size is more likely to have lower mean monthly savings compare with smaller household size. A bigger family size increases household's burden since more spending is needed in order to satisfy the daily consumption needs of the family members, thus it is understandable that family size is having a negative impact towards household savings.

CHAPTER 5: CONCLUSIONS AND IMPLICATIONS

5.1 Summary

In overall, the results we found in Chapter 4 show us that risk preference has significant impact financial decision on certain household assets such as non-agricultural land, vehicles, household appliances, jewelry, household furniture and utensils after controlling for household spending, income and household characteristic. The estimate of non-agricultural land is statistically significant as risk-averse households with household size less than or equal five members are unwilling to invest in agriculture sector that have many uncertainties such as weather, disease, fluctuation in prices and more (Adegeye & Dittoh, 1985). Risk preference significantly affecting the financial decision of households including households in rural and urban; households size more than and less than five members in owning vehicles. Based on this result, we could indicate that risk preference having high influence on household financial decision in the household asset of vehicles. However, there is no previous study could support this result. We assume that one of the reasons in contributing this result is introduction of “Low Cost Green Car” (LCGC) in year 2014. LCCG is government manufactured car with financially benefit provided (Ozaki, 2011). Risk-averse households might feel more secure as it is manufacture under government and benefits are given.

Furthermore, households size with more than five members in rural area significantly affected by risk preference when making financial decision on owning household appliances and household furniture and utensils. An increase in household size would increase the residential electricity consumption especially on rural area as due to rural electrification program (Debnath et al., 2019) We also found evidence that value of jewelry is differ between risk-averse and risk-taking households specifically households less than five members in rural and urban area. This is supported by Rangarajan and Manimekalai (2019); Reddy and Narayanan (2015) stated family would seek consultant from women when making investment

decision and women with characteristic of risk-averse would invest in simple investment products such as jewelry.

5.2 Policy Implication

Indonesia remains one of the countries that contains the highest poverty rate in Asia. Despite multiple actions had been taken by the Indonesian government, the progress of existing policies in reducing poverty in Indonesia is still relatively slow. Our study revealed that the current issues faced by Indonesian households are the slow growth of household wealth and the widening of wealth gap between the richest and poorest households in Indonesia.

Our study aims to determine how risk preference affects the financial decision making of Indonesian households in asset ownership. In the previous chapter, our results show that risk-averse households have significant relationship with owning occupied house, non-agricultural land, hard-stem plant, vehicles, household appliances, jewelry and household furniture & utensils. To increase household wealth among poor Indonesian households, the government should come up with policies that will ease the process and reduce the risk of owning the statistically significant assets.

Over the years, the Indonesian government has implemented various policies in effort to accelerate reduction of poverty thus stimulates growth of Indonesian household wealth. The policies are designed to meet the basic needs of Indonesian households in hope to improve the socio-economic welfare of the poorest members of their communities. For example, the Ministry of National Development Planning of the Republic of Indonesia (BAPPENAS) introduced four Clusters of Poverty Alleviation Programs from year 2010 to 2014 that targets different communities of Indonesia¹². The fourth cluster of the program called the Pro-Poor Program is a pro people program that targets the poorest, poor and near-poor households in Indonesia.

¹² Booklet obtained from
https://www.bappenas.go.id/files/7213/8070/7102/Poverty_Reduction_Program_in_Indonesia.pdf

The aim of the Pro-Poor Program is to provide low cost basic facilities for the poor through implementation of coordinated sectional activities in certain regions. This program targets areas such as urban areas, less developed regions and coastal areas. The basic facilities provided includes low cost housing, affordable public transportation, clean water in selected coastal areas and villages, affordable electricity to poor houses, improved livelihood of fishermen and marginal group in urban areas. This program will contribute most to rural households as our findings suggest that risk-averse households in rural areas has positive relationship with owning occupied house, other houses, poultry, household appliances, household furniture & utensils, vehicles and jewellery. Existing policy that provides low cost housing will help the risk-averse households own houses more easily; providing affordable electricity to poor houses will allow the households make use of their household appliances such as lights, fans, televisions; and providing clean water will help maintain their poultry business.

We suggest that the government can also consider implementing several other policies to help reduce risk of owning the assets that are statistically significant to risk-averse households in Indonesia. For instance, we found that risk-averse households have positive significant relationship with owning occupied house. However, some households may have trouble owning their own home as they do not wish to risk being over-indebted. In this case, the government could come up with equity finance instrument that help limit risk, improve affordability and fund first-time home purchases. For example, the U.K. government has a set of housing policies for first-time house buyers to help them acquire newly built homes through equity sharing (Smith & Whitehead, 2012). The policies provide a 20% equity mortgage that is half funded by the government and half funded by the developer. The purchaser only needs to put down 5% deposit and fund the rest by a 75% traditional mortgage. This helps the buyers to own a house with lower deposit rate and lower mortgage fund, and allows the buyer to share the risk of falling house prices with the funders.

Next, we also found that risk-averse households have positive significant relationship with owning non-agricultural land. As stated by Deininger (2003), land is a key asset for the rural and urban poor. It provides a foundation for economic

activity and the functioning of market and nonmarket institutions in many developing countries. It is important for poor households to have access to land and have the ability to make productive use of such land. It would help promote poverty reduction and economic growth. The government can reduce land taxation to reduce the burden of land owner; loosen the restrictions imposed on the transferability of land to permit the transfer of ownership of land from a person to another and establish a “normative” price for land to guide activity in land sales markets to prevent land sales to be priced too high, exceeding the normative price range.

Our findings also suggest that there is a positive significant relationship between risk-averse households and owning hard-stem plant. Palm oil tree is an example of hard-stem plant. Schlanger (2019) reported that the demand of palm oil exports from Indonesia has spiked by more than 50% in June because it was highly used as an alternative for soybean oil. This in turn requires an expansion of palm oil plantation in Indonesia. The government can implement policies to encourage more palm oil plantation to meet the spike in demand. They can support the development of palm oil industry by providing more grants for replantation projects, and provide subsidies or other incentives for private sectors to plant palm oil trees. For instance, the Palm Oil Plantation Fund Management Agency (BPDPKS) provided farmers and smallholders with Rp25million per hectare to replant their farms with oil palms of higher quality (Yasmin, 2019). This would encourage more independent farmers to participate in the plantation of palm oil trees, allowing them to have a stable business while tackling the issue of increased palm oil demand in Indonesia.

Moreover, our findings revealed that risk-averse households have significant positive relationship with owning vehicles. Car ownership is important for low-income households as it means of transportation for the individuals to arrive to their workplace. Research has shown that a person with car is more likely to be employed and work more hours than a person without a car. Having a vehicle can provide the person with access to greater employment opportunities. The federal government could directly help low-income families by providing them grant funding to purchase cars, or provide subsidized loans to them for car purchase or repair. This way the government can assist the families with obtaining a vehicle, while at the same time helping them build relationships with local bank. Governments could

also facilitate car ownership through car donation programs where charity funds could be given to the car donation program, or vehicles could be obtained from public entities, businesses and individual donations (Goldberg, 2001).

Furthermore, our results revealed that there is a positive significant relationship between risk-averse households and owning household appliances, household furniture and utensils. It is important that families own these assets as they are the basic necessities of a household. Similar to owning vehicles, the government could also implement the same strategies to tackle the issue of household appliances, furniture and utensils ownership. Government could offer goods grant to encourage the poor households to buy the necessary assets that they wouldn't normally consider buying. Government could also come up with schemes such as interest-free loans on other things that the individual may not be able to afford paying in lump sum, such as house furniture and some appliances. Charities could also be held to encourage other people to donate household appliances such as cookers and fridges to families struggling with financial hardships.

Lastly, our results show that risk-averse households have significant relationship with owning jewellery. Certain jewellery can retain its monetary value which makes it a good investment alternative. Precious metal such as gold is often used as a long-term savings tool. Characteristics such as the uniqueness of the design, the quality of the jewellery and the percentage of precious metals it contains determines its value. A jewellery designed by a reputable designer, made with high quality material, with uniquely exquisite design, containing high percentage of precious metal would be highly valuable. Therefore, some people may consider buying jewellery as a source of investment. The Indonesian government could encourage jewellery ownership by promoting domestic gold industry and exports of gems and jewellery. According to the Press Trust of India (2018), similar strategy has already been implemented by the government of India where they are expecting to come out with comprehensive gold policy to promote the metal industry, gems and jewellery sector. The government could reduce import duty on gold and exempting the goods and service tax (GST) imposed on gems and jewelry exports to boost shipments. It is also recommended that the government review and revamp the gold monetization

scheme and ensure the public is aware of such investment tool to encourage more households invest in gold.

The government should consider the policies we suggested above as it would greatly benefit the risk-averse households. Joint efforts from all party including the central government, local government, private sector and communities are required to successfully implement these strategies. Their involvement in the implementation of these strategies are vital as it would help improve the well-being of Indonesian citizens and the future of the country.

5.3 Limitations

In this study, there are few limitations that constraint the process of research. Firstly, there are only **limited previous research** that investigate how risk preferences affects household's ownership on household assets. Most of the researches done were studying the opposite way of this research as they discussed factors that affect an individual's risk preference. In addition, these studies were focusing from investors' perspective instead of households.

Next, there are **different factors that may influence an individual's behavior**. As from behavioral science, human behavior can be influenced by the emotional processes involved, thus vary the process as well as results of a decision. In other words, household's ownership might not only be affected by an individual's risk preference, but also his emotion when deciding which assets to own.

Lastly, this study is based on cross sectional data, thus **only able to assess the respondents' data at a specific point of time**. For cross sectional data, the timing of the snapshot could not guarantee to be representative of the issue we discussed. Besides, due to the data of each individual were recorded only once, our study is unable to infer the temporal relationship between the risk preferences and household's ownership on household assets.

5.4 Recommendations

After acknowledging the limitations of the study, the recommended way to solve the problem of lacking previous studies on how risk preference affects households' or individuals' ownership of household assets is to **cultivate a totally new research typology**. For instance, conduct an exploratory research instead of conducting an explanatory research design. Exploratory research is actually an initial research into a hypothetical or theoretical idea. In this situation, the researcher is able to throw out the ideas or observe something to seek for more understating about it. The future researches would lead by an exploratory research project which is an attempt to set the preliminary work. In other words, examine if what is being discovered might be analysed by a presently existing theory. On the whole, exploratory research sets the initial preliminary work for future studies. Exploratory research is categorized into two big forms: either a new topic or a new angle. If the findings are always unpredictable and surprising, it is known as a new topic. On the other hand, looking at things in a new way is known as new angles. There are two ways of looking at things which are in a theoretical perspective and a new way of measuring something.

Furthermore, the approach to solve different factors may influence the investors' behaviour is the **individuals should understand behavioral finance**. For example, emotional process might affect human behaviour. According to Agarwal and Verma (2016), an investor is able to make a better decision if he understands behavioral finance. It may lead him to avoid some of the mistakes and errors when making decision in the future. The main point of understanding behavioral finance is to reduce or the psychological biases in investment decisions of the individuals. Several extensive studies have pointed out that behavioral finance is a perfect application which can help a successful individual or investor to make fewer mistakes or errors when he perceives behavioral finance. A disciplined trading solution is required to deal with these mental barriers to all categories of individuals.

In addition, since our study is based on cross sectional data and assessed respondent perception of obligation at a specific time, a **longitudinal design study** is recommended in future study. Longitudinal design study is better than cross-sectional study when it comes to include time variants as well as observed

individual differences. Longitudinal design study is effective in examining variable patterns over the time. The reason is longitudinal study involves using and collecting data in long haul, so they are able to examine the patterns efficiently. In this case, the researchers are possible to study more about cause and effect relationships make connections in a better manner. Moreover, it is better to have more data over longer periods of time because it is likely to have more precise and better results.

REFERENCES

- Abdul Khalid, M. (2011). Household wealth in Malaysia: Composition and inequality among ethnic groups. *Jurnal Ekonomi Malaysia*, 45(1), 71-80.
- Agarwal, A., Verma, A., & Agarwal, R. K. (2016). Factors influencing the individual investor decision making behavior in India. *Journal of Applied Management and Investments*, 5(4), 211-222.
- Alserda, G. A. G., Dellaert, B. G. C., Swinkels, L., & van der Lecq, F. S. G. (2019). Individual pension risk preference elicitation and collective asset allocation with heterogeneity. *Journal of Banking & Finance*, 101, 206-225.
- Anderson, K. H., (1988). Labour and poverty in rural Tanzania: Paul Collier, Samir Radwan and Samuel Wangwe with Albert Wagner (Oxford University Press, Oxford, 1986). *Journal of Development Economics*, 28(1), 143-147.
- Andrews, D., & Sánchez, A. C. (2011). The evolution of homeownership rates in selected OECD countries: Demographic and public policy influences. *OECD Journal: Economic Studies*, 2011(1), 1-37.
- Andriansyah A. (2016). *Savings and investment in Indonesia* [Background Paper]. International Forum On Economic Development and Public Policy.
- Angrist, J. D., & Pischke, J. S. (2009). *Mostly harmless econometrics: An empiricist's companion*. Princeton: Princeton University Press.
- Arti, G., Julee J., & Sunita, S. (2011). Difference in gender attitude in investment decision making in India. *Research Journal of Finance and Accounting*, 2(12), 1-6.
- Austen, S., Ong, R., Bawa, S., & Jefferson, T. (2015). Exploring recent increases in the gender wealth gap among Australia's single households. *The Economic and Labour Relations Review*, 26(1), 3-28.
- Baker, H. K., & Nofsinger, J. R. (2002). Psychological biases of investors. *Financial services review*, 11(2), 97.
- Bakshi, G. S., & Chen, Z. (1994). Baby boom, population aging and capital markets. *Journal of Business*, 67, 165-202.
- Barber, B. M., & Odean, T. (2001) Boys will be boys: Gender, overconfidence, and common stock investment. *The Quarterly Journal of Economics*, 116(1), 261-292.
- Barberis, N. C. (2013). Thirty years of prospect theory in economics: A review and assessment. *Journal of Economic Perspectives*, 27(1), 173-195.

- Barberis, N., Huang, M., & Santos, T. (2001). Prospect theory and asset prices. *The Quarterly Journal of Economics*, 116(1), 1-53.
- Barnes, D. F. (2019). *Electric power for rural growth: how electricity affects rural life in developing countries*. New York: Routledge.
- Barro, R., Mankiw, N., & Xavier Sala-I-Martin. (1995). Capital mobility in neoclassical models of growth. *The American Economic Review*, 85(1), 103-115.
- Barsky, R., Juster, F., Kimball, M., & Shapiro, M. (1997). Preference parameters and behavioral heterogeneity: An experimental approach in the health and retirement study. *The Quarterly Journal of Economics*, 112(2), 537-579.
- Belgiawan, P. F., Schmöcker, J. D., & Fujii, S. (2016). Understanding car ownership motivations among Indonesian students. *International Journal of Sustainable Transportation*, 10(4), 295-307.
- Bellofatto, A., D'Hondt, C., & De Winne, R. (2018). Subjective financial literacy and retail investors' behavior. *Journal of Banking & Finance*, 92, 168-181.
- Benartzi, S., & Thaler, R. H. (1995). Myopic loss aversion and the equity premium puzzle. *The Quarterly Journal of Economics*, 110(1), 73-92.
- Bernasek, A., & Shwiff, S. (2001). Gender, risk, and retirement. *Journal of Economic Issues*, 35(2), 345-356.
- Bernoulli, D. (1954). Exposition of a new theory on the measurement of risk. *Econometrica*, 22(1), 23-36.
- Bounds, M., & Zinyemba, O. (2018). Poultry farming: Lessening poverty in rural areas. *South African Journal of Agricultural Extension*, 46(1), 59-70.
- Briggs, R. A. (2019). *Normative theories of rational choice: Expected utility*. Stanford: Encyclopedia of Philosophy.
- Buccioli, A., & Miniaci, R. (2011). Household portfolio and implicit risk preference. *The Review of Economics and Statistics*, 93(4), 1235-1250.
- Campbell, J. Y. (2006). Household finance. *Journal of Finance*, 61(4), 1553-1604.
- Campbell, J. Y., & Joao, F. C. (2003). Household risk management and optimal mortgage choice. *Quarterly Journal of Economics*, 118, 1449-1494.
- Campbell, J. Y., & Viceira, L. M. (2001). Who should buy long-term bonds?. *American Economic Review*, 91, 99-127.
- Campbell, J.Y., & Viceira, L. M. (2002). *Strategic asset allocation: Portfolio choice for long-term investors*. New York: Oxford University Press.

- Canner, N., Mankiw, N. G., & Weil, D. N. (1997). An asset allocation puzzle. *American Economic Review*, 87(1), 181–91.
- Cardak, B. A., & Wilkins, R. (2009). The determinants of household risky asset holdings: Australian evidence on background risk and other factors. *Journal of banking & Finance*, 33(5), 850-860.
- Carroll, C. D. (2002). Portfolios of the rich. In L. Guiso, M. Haliassos, & T. Jappelli (Eds.), *Household Portfolios*. Conference of European University Institute. Cambridge, MA.
- Cocco, J. F., Gomes, F. J., & Maenhout, P. J. (2005). Consumption and portfolio choice over the life cycle. *The Review of Financial Studies*, 18(2), 491–533.
- Cole, S., Sampson, T., & Zia, B. (2009). *Financial literacy, financial decisions, and the demand for financial services: Evidence from India and Indonesia*. Working paper.
- Commonwealth Parliament & Parliament House. (2013). *Some economic effects of inequality*. Retrieved from https://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/pubs/BriefingBook44p/EconEffects.
- Denton, M., & Boos, L. (2007). The gender wealth gap: Structural and material constraints and implications for later life. *Journal of Women & Aging*, 19(3-4), 105-120.
- Cook, J. H., Chatterjee, S., Sur, D., & Whittington, D. (2013). Measuring Risk Aversion Among the Urban Poor in Kolkata, India. *Applied Economics Letter*, 20(1), 1-9.
- Prosad, J. M., Kapoor, S., & Sengupta, J. (2015). Theory of Behavioural Finance. In Copur, Z. (Ed), *Handbook of research on behavioral finance and investment strategies: decision making in the financial industry* (pp. 1-24). United States of America: Business Science Reference (an imprint of IGI Global).Dahlstrom, T. E. (2016). *Development of utility theory and utility paradoxes*. (Honor project, Lawrence University, Appleton, Wisconsin). Retrieved from <https://lux.lawrence.edu/luhp/90/>.
- Davenport, N. A., Gambiza, J., & Shackleton, C. M. (2011). Use and users of municipal commonage around three small towns in the Eastern Cape, South Africa. *Journal of Environmental Management*, 92(6), 1449-1460.
- Debnath, R., Bardhan, R., & Sunikka-Blank, M. (2019). How does slum rehabilitation influence appliance ownership? A structural model of non-income drivers. *Energy policy*, 132, 418-428.
- Deininger, K. W. (2003). *Land policies for growth and poverty reduction*. World Bank Publications.

- Dercon, S. (1998). Wealth, risk and activity choice: cattle in Western Tanzania. *Journal of Development Economics*, 55(1), 1-42.
- Dercon, S., & Krishnan, P. (1996). Income portfolios in rural Ethiopia and Tanzania: choices and constraints. *The Journal of Development Studies*, 32(6), 850-875.
- Dhar, R. & Zhu, N. (2006). Up close and personal: Investor sophistication and the disposition effect. *Management Science*, 52(5), 726-740.
- Dohmen, T., Falk, A., Huffman, D., Sunde, U., & Schupp J., Wagner, G. G. (2011). Individual risk attitudes: Measurement, determinants and behavioural consequences. *Journal of the European Economic Association*, 9(3), 522-550.
- Dolly, F. I., Kismartini, K., & Purnaweni, H. (2018). The land use change from agricultural to non-agricultural in Bungo Regency, Jambi Province, Indonesia. *E3S Web of Conferences*, 31, 09019.
- Donkers, B., & Van Soest, A. (1999). Subjective measures of household preferences and financial decisions. *Journal of Economic Psychology*, 20(6), 613-642.
- Feng, L. & Seasholes, M. S. (2005). Do investor sophistication and trading experience eliminate behavioral biases in financial markets?. *Review of Finance*, 9(3), 305-351.
- Ferlito, C., & Respatiadi, H. (2019). *Policy reform on poultry industry in Indonesia* [Discussion Paper]. Retrieved from EconStor website: <http://hdl.handle.net/10419/190822>.
- Fernandes, B., & Luiz, J. (2007). *Risk-taking in financial markets: a behavioral perspective* (PhD Thesis, University Carlos III De Madrid, Getafe, Spain). Retrieved from <https://core.ac.uk/download/pdf/6287466.pdf>.
- Flavin, M., & Yamashita, T. (2002). Owner-occupied housing and the composition of the household portfolio. *The American Economic Review*, 92(1), 345-362.
- Friend, I. & Blume, M. E. (1975). The demand for risky assets. *American Economic Review*, 65(5), 900-922.
- Gambetti, E., & Giusberti, F. (2012). The effect of anger and anxiety traits on investment decisions. *Journal of Economic Psychology*, 33(6), 1059-1069.
- Gambetti, E., & Giusberti, F. (2019). Personality, decision-making styles and investments. *Journal of Behavioral and Experimental Economics*, 80, 14-24.

- Gibson, L. (2017). *Towards a more equal Indonesia: How the government can take action to close the gap between the richest and the rest*. Retrieved from https://oi-files-d8-prod.s3.eu-west-2.amazonaws.com/s3fs-public/bp-towards-more-equal-indonesia-230217-en_0.pdf.
- Gilchrist, K. (2019, January 16). *These countries are set to see their millionaire populations skyrocket in the next 5 years*. Retrieved from <https://www.cnbc.com/2019/01/16/countries-with-the-fastest-growing-millionaire-billionaire-populations.html>
- Global Business Guide Indonesia (2013). Property in Indonesia: Overview. Retrieved from http://www.gbgingonesia.com/en/property/article/2011/property_in_indonesia_overview.php
- Goetzmann, W. N., & Kumar, A. (2008). Equity portfolio diversification. *Review of Finance*, 12(3), 433–463.
- Goldberg, H. (2001). *State and county supported car ownership programs can help low-income families secure and keep jobs*. Retrieved from <https://www.cbpp.org/archives/11-8-01wel.htm>
- Gomes, F., & Michaelides, A. (2005), Optimal life-cycle asset allocation: understanding the empirical evidence. *Journal of Finance*, 60, 869–904.
- Grable, J. E., & Lytton, R. H. (1998). Investor risk-tolerance: Testing the efficacy of demographics as differentiating and classifying factors. *Financial Counseling and Planning*, 9(1), 61-73.
- Hailemichael, A., Gebremedhin, B., & Tegegne, A. (2017). Status and drivers of village poultry production and its efficiency in Ethiopia. *NJAS-Wageningen Journal of Life Sciences*, 83, 30-38.
- Haliassos, M., & Michaelides, A. (2003). Portfolio choice and liquidity constraints. *International Economic Review*, 44, 143–177.
- Halket, J., & Vasudev, S. (2014). Saving up or settling down: Home ownership over the life cycle. *Review of Economic Dynamics*, 17(2), 345-366.
- Harikanth, D., & Pragathi, B. (2012). Role of Behavioural Finance in Investment Decision Making-A Study on Select Districts of Andhra Pradesh, India. *International Journal in Multidisciplinary and Academic Research*, 1(4), 1-15.
- He, X. D., & Zhou, X. Y. (2010). Portfolio choice under cumulative prospect theory: an analytical treatment. *Management Science*, 57(2), 315-331.

- Hermansson, C. (2015). *The relationship between bank customers' risk attitudes and their balance sheets* [Working Paper]. Retrieved from Centre for Banking and Finance, KTH website: <http://kth.diva-portal.org/smash/record.jsf?pid=diva2%3A899738%22&dswid=-9149>.
- Hira, T. and Loibl, C. (2006). *Gender differences in investment behavior*. Retrieved from <http://kgk.uni-obuda.hu/sites/default/files/Article.pdf>.
- Hui E., Wang H., & Zheng X. (2010). Risk appetite of real estate and property security markets: an empirical study of Hong Kong. *Journal of Property Investment & Finance*, 28(6), 420-433.
- Ideal Furniture. (2016). *The importance of furniture in any home*. Retrieved from <https://www.thejakartapost.com/news/2019/03/07/jewelry-investment-trending-among-indonesians.html>.
- Indonesia Investments. (2019) Gross domestic product indonesia - GDP per capita. Retrieved from <https://www.indonesia-investments.com/finance/macro-economic-indicators/gross-domestic-product-of-indonesia/item253>.
- Janor, H., Yakob, R., Hashim, N. A., Zanariah, Z., & Wel, C. A. C. (2017). Financial literacy and investment decisions in Malaysia and United Kingdom: A comparative analysis. *Geografia-Malaysian Journal of Society and Space*, 12(2), 106-118.
- Jianakoplos, N., & Bernasek, A. (1998). Are women more risk-averse?. *Economic Inquiry*, 36(4), 620-630.
- Jin, J. J., He, R., Gong, H. Z., Xu, X., & He, C. Y. (2017) Farmers' risk preferences in rural China: Measurements and determinants. *International Journal of Environmental Research and Public Health*, 14(7), 713-723.
- Jurevičienė, D., & Ivanova, O. (2013). Behavioural finance: theory and survey. *Business in XXI century*, 5(1), 53-58.
- Kahneman, D., Knetsch, J. L., & Thaler, R. H. (1991). Anomalies: The endowment effect, loss aversion, and status quo bias. *Journal of Economic Perspectives*, 5(1), 193-206.
- Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica*, 47(2), 263-292.
- Kahneman, D., & Tversky, A. (1992). Advances in prospect theory: Cumulative representation of uncertainty. *Journal of Risk and Uncertainty*, 5(4), 297-323.
- Kalaba, F. K., Chirwa, P. W., & Prozesky, H. (2009). The contribution of indigenous fruit trees in sustaining rural livelihoods and conservation of natural resources. *Journal of Horticulture and Forestry*, 1(1), 1-6.

- Kaoma, H., & Shackleton, C. M. (2014). Collection of urban tree products by households in poorer residential areas of three South African towns. *Urban Forestry & Urban Greening*, 13(2), 244-252.
- Kapteyn, A., & Teppa, F. (2002). Subjective measures of risk-aversion and portfolio choice. *CentER Discussion Paper*, 11.
- Kaur, M., & Vohra, T. (2012). Women and stock market participation. *Management and Labour Studies*, 37(4), 283–293.
- Khajehzadeh, I., & Vale, B. (2017). How house size impacts on the number of furniture, appliance and tool items (FATs) in a house: An embodied energy study of New Zealand houses. *Energy Procedia*, 142, 3170-3175.
- King, M. A., & Jonathan I. L. (1998). Wealth and portfolio composition: Theory and evidence. *Journal of Public Economics*, 69, 155–193.
- Kiran, T., & Dhawan, S. (2015). The impact of family size on savings and consumption expenditure of industrial workers: a cross-sectional study. *American Journal of Economics and Business Administration*, 7(4), 177.
- Knoema (2019). *Indonesia Crude Birth Rate, 1950 – 2018*. Retrieved from <https://knoema.com/atlas/Indonesia/topics/Demographics/Fertility/Crude-birth-rate>.
- Knoema (2019). *Indonesia Crude Death Rate, 1960 – 2018*. Retrieved from <https://knoema.com/atlas/Indonesia/topics/Demographics/Mortality/Crude-death-rate>.
- Knoema (2019). *Indonesia Food Production Index, 1960 – 2018*. Retrieved from <https://knoema.com/atlas/Indonesia/Food-production-index>.
- Knoema (2019). *Indonesia GDP per capita, 1960 – 2018*. Retrieved from <https://knoema.com/atlas/Indonesia/topics/Economy/National-Accounts-Gross-Domestic-Product/GDP-per-capita>.
- Knoke, T., Hildebrandt, P., Klein, D., Mujica, R., Moog, M., & Mosandl, R. (2008). Financial compensation and uncertainty: Using mean-variance rule and stochastic dominance to derive conservation payments for secondary forests. *Canadian Journal of Forest Research*, 38(12), 3033–3046.
- Knoke, T., Steinbeis, O.-E., Bösch, M., Román-Cuesta, R. M., & Burkhardt, T. (2011). Cost-effective Compensation to avoid carbon emissions from forest loss: An approach to consider price–quantity effects and risk-aversion. *Ecological Economics*, 70(6), 1139–1153.
- Korniotis, G. M., & Kumar, A. (2013). Do portfolio distortions reflect superior information or psychological biases?. *Journal of Financial and Quantitative Analysis*, 48(1), 1-45.

- Kumar, M. S., & Persaud, A. (2002). Pure Contagion and Investors' Shifting Risk Appetite: Analytical Issues and Empirical Evidence. *International Finance*, 5(3), 401-36.
- Kusairi, S., Sanusi, N.A., Suriyani, M., Shukri, M., & Zamri, N. (2019). Financial households' efficacy, risk preference and saving behaviour: Lessons from lower income households in Malaysia. *Economics and Sociology*, 12(2), 301-318.
- Lan, Q., Xiong, Q., He, L., & Ma, C. (2018). Individual investment decision behaviors based on demographic characteristics: Case from China. *PloS one*, 13(8), e0201916.
- Larkin, C., Lucey, B. R., & Mulholland, M. (2012). *Risk-tolerance and demographic characteristics: Preliminary Irish evidence* [Discussion paper No. 406]. Retrieved from <https://www.tcd.ie/triss/assets/PDFs/iiis/iiisdp406.pdf>.
- Laughunn, D., & Payne, J. W. (1984). The impact of sunk outcomes on risky choice behaviour. *Canadian Journal of Operations Research and Information Processing*, 22(2), 155-181.
- Le, V. C. (2018). *The relationship between household's risk preference and the homeownership decisions among young adults in changing housing market conditions* (Doctor of Philosophy's Thesis). Kansas State University, Manhattan, Kansas.
- List, J. (2003). Does market experience eliminate market anomalies? *The Quarterly Journal of Economics*, 118(1), 41-47.
- Long, A. J., & Nair, P. R. (1999). Trees outside forests: agro-, community, and urban forestry. In *Planted Forests: Contributions to the quest for sustainable societies* (pp. 145-174). Springer, Dordrecht.
- Lopes, L. L., & Oden, G. C. (1999). The role of aspiration level in risky choice: a comparison of cumulative prospect theory and SP/A theory. *Journal of Mathematical Psychology*, 43, 286 -313.
- Maipita, I., Hermawan, W., & Fitrawaty, F. (2012). Reducing poverty through subsidies: Simulation of fuel subsidy diversion to non-food Crops. *Buletin Ekonomi Moneter dan Perbankan*, 14(4), 349-366.
- Mather, M. (2006). A review of decision making processes: Weighing the risks and benefits of aging. In L. L. Carstensen and C. R. Hartel (Eds.), *When I'm 64. Committee on aging frontiers in social psychology, personality, and adult developmental psychology* (pp. 145-173). Washington, DC: The National Academies Press.

- Mather, M., Mazar, N., Gorlick, M. A., Lighthall, N. R., Burgeno, J., Schoeke, A., & Ariely, D. (2012). Risk preferences and aging: The “Certainty Effect” in older adults' decision making. *Psychology and Aging, 27*(4), 801-816.
- Meraner, M., & Finger, R. (2017). Data on German farmers risk preference, perception and management strategies. *Data in brief, 15*, 102-105.
- Meriküll, J., & Rõõm, T. (2016). The assets, liabilities and wealth of Estonian households: Results of the household finance and consumption survey [Occasional Paper]. Retrieved from Eesti Pank website: https://www.eestipank.ee/sites/eestipank.ee/files/publication/en/occasional_papers/2016/op_2016_03.pdf.
- Miyata, S. (2003). Household's risk attitudes in Indonesian villages. *Applied Economics, 35*, 573-583.
- Morin, R. A., & Suarez, A. F. (1983). Risk-aversion revisited. *The Journal of Finance, 38*(4), 1201–1216.
- Mujahid, M., Zuberi, M. A., Rafiq, M. Q., & Sameen, S. N. (2014). Investor's risk preference and tolerance behaviors about their investment decisions of highly risky investment. *Journal of Finance and Accounting, 5*(21), 102-106.
- Mulder, C. H. (2006). Home-ownership and family formation. *Journal of Housing and the Built Environment, 21*(3), 281-298.
- Murwendo, T. (2011). Improving urban livelihoods at household level through sustainable utilisation of peri-urban forests in Masvingo City. *Journal of Sustainable Development in Africa, 13*(4), 252-266.
- Neumann, J.V., & Morgenstern, O. (1944). *Theory of games and economic behavior*. New Jersey: Princeton University Press.
- Oehler, A., Wendt, S., Wedlich, F., & Horn, M. (2017). Investors' personality influences investment decisions: Experimental evidence on extraversion and neuroticism. *Journal of Behavioral Finance, 19*(1), 30-48.
- Olsen, R. A., & Cox, C. M. (2001). The influence of gender on the perception and response to investment risk: The case of professional investors. *The Journal of Psychology and Financial Markets, 2*(1), 29-36.
- Ozmete E., & Hira, T. (2011). Conceptual analysis of behavioral theories/models: Application to financial behavior. *European Journal of Social Sciences, 18*(3), 386–404.
- Papke, L. (1988). How are participants investing their accounts in participant-directed individual account pension plans?. *American Economic Review, 88*(2), 212-216.

- Pardede, R., & Zahro, S. (2017). Saving not spending: Indonesia's domestic demand problem. *Bulletin of Indonesian Economic Studies*, 53(3), 233-259.
- Parimalakanthi, K., & Kumar, M. A. (2015). A study on investment preference and behaviour of individual investors in Coimbatore City. *Bonfring International Journal of Industrial Engineering and Management Science*, 5(4), 170-174.
- Patrick, I., Smith, G., Hasnah, H., Sarini, N. P., Karim, H., Kurnianto, B., Dharma, D., Putri Komaladara, A.A.S., & Jubb, T. (2014). Developing a clean market chain for poultry products in Indonesia. *ACIAR Impact Technical Reports*, 82, 1-53.
- Peters, E., Hess, T. M., Västfjäll, D., & Auman, C. (2007). Adult age differences in dual information processes: Implications for the role of affective and deliberative processes in older adults' decision making. *Perspectives on Psychological Science*, 2(1), 1-23.
- Pinto, P., Ajaya, & Munshi, M. M. (2016). An analysis of selection behaviour of retail investors towards mutual funds: A study with reference to Udupi District Karnataka. *Anvesha*, 9(3), 36-49.
- Polkovnichenko, V. (2005). Household portfolio diversification: A case for rank-dependent preferences. *Review of Financial Studies, Society for Financial Studies*, 18(4), 1467-1502.
- Powell, M., & Ansic, D. (1997). Gender differences in risk behaviour in financial decision-making: An experimental analysis. *Journal of economic psychology*, 18(6), 605-628.
- Prabhakaran, K., & Karthika, P. (2011). A study on risk perception and portfolio management of equity investors in Coimbatore City. *Journal of Management and Science*, 1(2), 1-13.
- Press, R. (2014). *Rising middle class will drive automotive demand in the coming two years*. Retrieved from <https://www.nielsen.com/my/en/press-releases/2014/rising-middle-class-will-drive-global-automotive-demand/>.
- Press Trust of India. (2018). *Govt to come out with gold policy to boost jewellery sector, create jobs*. Retrieved from https://wap.business-standard.com/article-amp/economy-policy/govt-to-come-out-with-gold-policy-to-boost-jewellery-sector-create-jobs-118101800808_1.html#aoh=15830868266206&referrer=https%3A%2F%2Fwww.google.com&_tf=From%20%251%24s.

- Prosad, J. M., Kapoor, S., & Sengupta, J. (2015). Theory of Behavioural Finance. In Copur, Z. (Ed), *Handbook of research on behavioral finance and investment strategies: decision making in the financial industry* (pp. 1-24). United States of America: Business Science Reference.
- Putera, I.K.W.T. (2011). *Population Growth and Economic Growth in Indonesia* (Bachelor's thesis). Tilburg University, Tilburg, Netherlands.
- Rahadi, R. A., Wiryono, S. K., Koesrindartoto, D. P., & Syamwil, I. B. (2016). Factors affecting housing products price in Jakarta Metropolitan region. *International Journal of Property Science*, 6(1), 19-39.
- Rangarajan, M., & Manimekalai, N. (2019). Understanding the attitude and approach to savings and investments among southern railway women employees: Gender concerns. *Research Review International Journal of Multidisciplinary*, 4(4), 1040-1047.
- Reardon, T, Delgado, T. C., & Malton, P. (1992). Determinants and effect of income diversification among farm households in Burkina Faso. *Journal of Development*, 289(2), 264-296.
- Reddy K, S. & Narayanan, L. (2015). Investment pattern of working women in the twin cities of Hyderabad and Secunderabad – A study. *Asian Journal of Management Research*, 6(1), 223-242.
- Rukmana, D. (2018). Upgrading housing settlement for the urban poor in Indonesia: An analysis of the Kampung Deret Program. In *Metropolitan Governance in Asia and the Pacific Rim* (pp. 75-94). Springer, Singapore.
- Sakah, M., du Can, S. D. L. R., Diawuo, F. A., Sedzro, M. D., & Kuhn, C. (2019). A study of appliance ownership and electricity consumption determinants in urban Ghanaian households. *Sustainable Cities and Society*, 44, 559-581.
- Sambodo, M. T. (2015). Rural electrification program in Indonesia: Comparing SEHEN and SHS Program. *Economics and Finance in Indonesia*, 61(2), 107-119.
- Savage, L. J. (1964). *The Foundations of Statistics*. New York: John Wiley & Sons.
- Schlanger, Z. (2019). *The global demand for palm oil is driving the fires in Indonesia*. Retrieved from, <https://qz.com/1711172/the-global-demand-for-palm-oil-is-driving-the-fires-in-indonesia/>.
- Shackleton, C., & Shackleton, S. (2004). The importance of non-timber forest products in rural livelihood security and as safety nets: a review of evidence from South Africa. *South African Journal of Science*, 100(11), 658-664.

- Smith, S., & Whitehead, C. (2012, October 17). How to reduce the risk of home ownership. *The Guardian*. Retrieved from <https://www.theguardian.com/housing-network/2012/oct/17/reduce-risk-home-ownership>
- Soseco, T. (2018). The composition and distribution of household wealth in Indonesia. *Jurnal Ekonomi dan Studi Pembangunan*, 10(2), 153-167.
- Soseco, T., Wulandari, D., Utomo, S. H., & Narmaditya, B. S. (2018). House ownership circumstances in rural area: Evidence from Indonesia. *Jurnal Pendidikan Ekonomi Dan Bisnis (JPEB)*, 6(2), 93-102.
- Starmer, C. (2000). Developments in non-expected utility theory: The hunt for a descriptive theory of choice under risk. *Journal of Economic Literature*, 38, 332-382.
- Suer, O., & Minibas-Poussard, J. (2015). Social representations of risk: A comparison between risk-taker and risk-averse investors. *Actual Problems of Economics*, 4(166), 314-324.
- Sung, J. & Hanna, S. (1996). Factors related to risk-tolerance. *Financial Counseling and Planning*, 7, 11-20.
- Susilawati, C., & Yakobus, S. (2010). New affordable strata title housing solutions: a case study in Surabaya, Indonesia. In *Proceedings of 2010 International Conference On Construction & Real Estate Management* (pp. 397-402). China Architecture & Building Press.
- Suppakitjarak, N., & Krishnamra, P. (2015). Household saving behavior and determinants of the forms of saving and investment in Thailand. *Journal of Economics, Business and Management*, 3(3), 326-330.
- Tan, D. H. Q. (2013). *Understanding village poultry through the agricultural household model* (Master's thesis) Swedish University of Agricultural Sciences, Uppsala, Sweden.
- Tan, J., Zeng, T., & Zhu, S. (2017). *Earnings, income, and wealth distributions in China: Facts from the 2011 China Household Finance Survey*. Retrieved from http://www.pseweb.eu/ydepot/seance/512298_DistributionsInChina-20092017.pdf.
- Thaler, R. H., & Johnson, E. J. (1990). Gambling with the house money and trying to break even: the effects of prior outcomes on risky choice. *Management Science*, 36(6), 643-600.
- The Jakarta Post (2019, March 8). *Jewelry investment trending among Indonesians*. Retrieved from <https://www.thejakartapost.com/news/2019/03/07/jewelry-investment-trending-among-indonesians.html>.

- The World Bank in Vietnam (2019). *Overview*. Retrieved from <https://www.worldbank.org/en/country/vietnam/overview>
- Tobin, J. (1958). Liquidity preference as behavior towards risk. *Review of Economic Studies*, 25, 68–85.
- Tya (2017). Agriculture of Indonesia - Food Production - Development. Retrieved from <https://factsofindonesia.com/agriculture-of-indonesia>.
- Vieider F. M., Beyene, A., Bluffstone, R., Dissanayake, S., Gebreegziabher, Z., Martinsson, P., & Mekonnen, A. (2016). Measuring risk preferences in rural Ethiopia. *Economic Development and Cultural Change*, 66(10), 1-51.
- Wessel, D. (2019). *Who are the rich and how might we tax them more?*. Retrieved from <https://www.brookings.edu/policy2020/votervital/who-are-the-rich-and-how-might-we-tax-them-more/>
- Worldometer. (2019). *Indonesia Population (2019)*. Retrieved from <https://www.worldometers.info/world-population/indonesia-population/>.
- World Bank. (2015). *Indonesia's Rising Divide*. Retrieved from <https://www.worldbank.org/en/news/feature/2015/12/08/indonesia-rising-divide>
- Xiao, J. J. (1995). Patterns of household financial asset ownership. *Financial Counseling and Planning*, 6, 99-106.
- Yasmin, N. (2019). *Indonesia doubles down on its palm oil commitment*. Retrieved from <https://jakartaglobe.id/business/indonesia-doubles-down-on-its-palm-oil-commitment>.
- Yulisman, L. (2014, April 19). *Indonesians driven by desire for car ownership: Survey*. Retrieved from <https://www.thejakartapost.com/news/2014/04/19/indonesians-driven-desire-car-ownership-survey.html>.
- Zain, W. (2016). Behind The rise if income inequality in Indonesia. *The Jakarta Post*. Retrieved from <https://www.thejakartapost.com/academia/2016/06/08/behind-the-rise-of-income-inequality-in-indonesia.html>.
- Zhao, Y., & Kockelman, K. M. (2002). Household vehicle ownership by vehicle type: application of a multivariate negative binomial model. In *Proceedings of the Transportation Research Board's 81st Annual Meeting*. Washington, DC.
- Zulu, L. C., & Richardson, R. B. (2013). Charcoal, livelihoods, and poverty reduction: Evidence from sub-Saharan Africa. *Energy for Sustainable Development*, 17(2), 127-137.