Family Income and Family Risk Preference

——An Empirical Study Based on CHFS Database

Xuping Luo[1,a,*]

[1]*School of Mathmatics and Statistics, Central China Normal University, No.152 Luyu Road, Wuhan, P. R. China*
a.lxp2016212531@mails.ccnu.edu.cn
**corresponding author*

Keywords: risk preference, family income, asset allocation, linear regression, non-parametric estimation

Abstract: With the rapid development of China's economy, venture capital, as an effective means of property appreciation, is becoming more and more popular. Therefore, the risk preference which is closely related to venture capital is more and more significant and vital. Based on the micro-database of CHFS, this paper conducted an empirical study on the mechanism of family income affecting subjective and objective risk preference. By using parametric models, kernel regression and semi-parametric regression, it is found that the relationship between family income and family risk preference (both objective and subjective risk preference) is u-shaped. That is, both low-income and high-income families have high risk preference, while those in between have lower risk preference. This paper also found that although the measurement of is different, the subjective risk preference and objective risk preference of families changes consistently with the fluctuation of family income. Finally, according to the research results, this paper gave several relevant policy suggestions and opinions.

1. Introduction

It is recognized that every individual considers risk as one of the most crucial factors in making financial asset allocation decisions. And as China's financial markets mature and Chinese households become wealthier, the need for research on risk preference is growing. On the one hand, families' perception of their own risk preference -- subjective risk preference -- undoubtedly plays an important role in making financial asset allocation decisions. On the other hand, the family's actual choice -- objective risk preference -- has important reference value for the pricing, design and user positioning of financial products in the financial market. Therefore, it is very important to study and discover the characteristics and rules of subjective and objective risk preference.

It is for the above reasons that the study of risk preference has attracted the attention of academia and even the whole society. There is a lot of research on risk preference. In China, based on the Tobit and probit models of linear regression, Liang Lijun and Wu Fan (2018) [1] found that individual risk preference first increased and then decreased with the increase of education level. Wu Qi (2018) [2] used linear model and parameter estimation and found that the use of computers and the Internet has a positive impact on family participation in venture capital. Also based on linear regression, Yin Zhichao et al. (2014) [3] found that the wealth of financial knowledge and investment experience would make families increase their efforts in venture capital. Internationally, Jianakoplos and Bernaske(1998) [4] found that as the number of children increased, the risk assets held by married couples increased significantly. Grable and Joo(2000) [5] proved that men are more willing to take higher risks of financial assets than women. Bakshi and Chen(1994) [6] used annual data from 1900 to 1990 to test the "life cycle hypothesis" and verified that people's risk preference decreases with the increase of age.

Although the existing literature have studied many aspects of the factors affecting household risk preference, most of them have done their research based on linear regression and parameter estimation. Not only linear regression and parameter estimation but also semi-parametric and non-parametric estimation is used in this paper. Based on the CHFS database, this paper draws the conclusion that Chinese households prefer risk with the increase of income.

The structure of this paper is organized as follows. After the introduction section, section 2 introduces the statistical methods used in this paper. Section 3 is mainly about the background of the database used in this article and the slection of variables of data. PartIV contains the result of this research and the analysis of the result. PartV is designated to make summary and draw conclusion of the research. The references and articles cited in this paper are listed in PartVI.

2. Statistic Method

In this paper, the parametric model is firstly used, which mainly includes the direct use of income as the core variable for linear regression and the introduction of the quadratic term of income for linear regression. Suppose X is the design matrix, where X_{ij} represents the independent variable value of the j^{th} observations. $\hat{\beta}$ is a $(p+1)$-dimensional vector, where β_0 stands for the intercept and $\beta_i (i > 0)$ stands for the regression coefficient of each variable x_i.Y is an n-dimensional vector, where y_i stands for the income value of the i^{th} observation. The specific expression is:

$$X = \begin{pmatrix} 1 & x_{11} & \cdots & x_{1p} \\ 1 & x_{21} & \cdots & x_{2p} \\ \vdots & \vdots & \ddots & \vdots \\ 1 & x_{n1} & \cdots & x_{np} \end{pmatrix}, \quad \hat{\beta} = \begin{pmatrix} \beta_0 \\ \beta_1 \\ \vdots \\ \beta_p \end{pmatrix}, \quad Y = \begin{pmatrix} y_1 \\ y_2 \\ \vdots \\ y_n \end{pmatrix} \tag{1}$$

According to OLS and simple algebraic transformation, it is easy to get the result of the regression:

$$\hat{\beta} = (X^T X)^{-1} X^T Y \tag{2}$$

After finding that the quadratic terms of income and income are statistically significant, we use kernel regression to develop an image to verify the non-linear conjecture of income's influence on risk preference. There are three nonparametric methods for function estimation: kernel method, local polynomial method and spline method. The advantage of nonparametric function estimation is that it is robust. There are no specific assumptions about the model, but it thinks that the function is smooth and avoids the risk of model selection.

Suppose: y is the dependent variable. For each i, y_i represents the value of $\text{risk} - \text{preference}$ variable of i^{th} observation. x is the independent variable. For each i, x_i represents the value of income variable of i^{th} observation. ϵ is the stochastic disturbance term. Consider the following nonparametric regression model:

$$y_i = m(x_i) + \epsilon_i,\ \epsilon_i \sim i.i.d(0, \sigma^2) \tag{3}$$

where $m(\cdot)$ is an unknown function. Define Kernel Regression Estimator:

$$\widehat{m}(x_0) = \frac{\sum_{i=1}^{n} K[(x_i - x_0)/h] y_i}{\sum_{i=1}^{n} K[(x_i - x_0)/h]} \tag{4}$$

where $K(\cdot)$ is Kernel Function. Common kernel functions include Epanechnikov kernel, uniform kernel, triangle kernel, and Gaussian kernel. h is Bandwidth. It determines the smoothness of the fitted function. The bias is

$$\text{Bias}(x_0) \equiv E[\widehat{m}(x_0)] - m(x_0) = h^2 \left[m'(x_0) \frac{f'(x_0)}{f(x_0)} + \frac{1}{2} m''(x_0) \right] \int_{-\infty}^{+\infty} z^2 K(z) \mathrm{d}z \tag{5}$$

And the variance of the nuclear regression estimate is

$$\text{Var}[\widehat{m}(x_0)] = \frac{1}{nh} \frac{\sigma_\varepsilon^2}{f(x_0)} \int_{-\infty}^{+\infty} K(z)^2 \mathrm{d}z + o(1/nh) \tag{6}$$

$$\therefore Bias(x_0) = O(h^2),\ Var[\widehat{m}(x_0)] = O(1/nh) \tag{7}$$

It's easy to get the objective equation according to Mean Square Error:

$$\text{MSE}\big[\hat{f}(x_0)\big] = [\text{Bias}(x_0)]^2 + \text{Var}[\widehat{m}(x_0)] \tag{8}$$

Intuitively, the goal is to find h that minimizes $MSE\big[\hat{f}(x_0)\big]$. However, the mean square error $MSE\big[\hat{f}(x_0)\big]$ still depends on x_0. If we want an overall measure of the mean square error for all possible values of x_0, we can minimize the following Integrated Mean Square Error (IMSE):

$$\min_h \text{IMSE} \equiv \int_{-\infty}^{+\infty} \text{MSE}\big[\hat{f}(x_0)\big] \mathrm{d}x_0 \tag{9}$$

where δ is a constant and $\delta \equiv \left[\int_{-\infty}^{+\infty} K(z)^2 \mathrm{d}z \Big/ \left(\int_{-\infty}^{+\infty} z^2 K(z) \mathrm{d}z \right)^2 \right]^{0.2}$. Obviously, δ only depends on the kernel function.

After a lot of trial and evaluation, this paper adopted the Kernel-weighted local polynomial smoothing. The mathematical principle of the method is to assume that $m(x)$ is a p-degree polynomial in some neighborhood near x_0.

$$m(x) = a_{0,0} + a_{0,1}(x - x_0) + \cdots + a_{0,p}(x - x_0)^p \tag{10}$$

Local Polynomial Estimator of Degree p minimizes the objective function:

$$\min_{\{a_{0,0},a_{0,1},\dots,a_{0,p}\}} \sum_{i=1}^{n} K[(x-x_0)/h]\left(y_i - a_{0,0} - a_{0,1}(x_i-x_0) - \cdots - \frac{a_{0,p}}{p!}(x_i-x_0)^p\right)^2 \quad (11)$$

The kernel function that minimizes IMSE(h) is Epanechnikov Kernel, which is the default Kernel function of Stata. The expression of Epanechnikov Kernel:

$$\frac{3}{4}(1-z^2)\cdot I(|z|<1) \quad (12)$$

where $z=(x_i-x_0)/h$, $I(\cdot)$ is indicative function.

By adopting Epanechnikov Kernel as kernel function and optimizing the objective function of 'Local Polynomial Estimator of Degree p', the result of kernel regression can be reached.

At last, semi-parameter estimation is used as robustness test and quadratic conjecture verification. The semi-parametric model used in this paper is 'partially linear model'(PL for short), Suppose: x, y, ϵ are the same as x, y in Kernel regression part

$$E(\varepsilon_i|x_i,z_i)=0 \quad (13)$$
$$y_i = x_i'\beta + \lambda(z_i) + \varepsilon_i \quad (14)$$

where $x_i'\beta$ is parametric part and $\lambda(z_i)$ is non-parametric part

Given z_i fixed, take conditional expectation on both sides of this equation:

$$E(y_i|z_i) = E(x_i|z_i)'\beta + \lambda(z_i) + \underbrace{E(\varepsilon_i|z_i)}_{=0} \quad (15)$$

According to the Law of Iterated Expectation,

$$E(\varepsilon_i|z_i) = E_{x_i}E[(\varepsilon_i|z_i)|x_i] = E_{x_i}\underbrace{E(\varepsilon_i|x_i,z_i)}_{=0} = 0 \quad (16)$$

We can obtain the equation,

$$y_i - E(y_i|z_i) = [x_i - E(x_i|z_i)]'\beta + \varepsilon_i \quad (17)$$

Intuitively, conditional expectation $E(y_i|z_i)$ and $E(x_i|z_i)$ can be estimated by non-parametric method. The following linear equation is estimated by least square method:

$$y_i - \widehat{E}(y_i|z_i) = \left[x_i - \widehat{E}(x_i|z_i)\right]'\beta + \varepsilon_i \quad (18)$$

According to OLS and non-parametric methods introduced above, the results of semi-parametric regression can be obtained.

3. Data Source and Variable Selection

This section must be in one column. The data of this study were cleaned and merged from the original data of CHFS（China Household Finance Survey） database of China family finance survey and research center of Southwest University of Finance and Economics, which contained 37291 valid family data. CHFS is a nationwide sampling survey project conducted by China Household Finance Survey and Research Center, which aims to collect relevant information on the micro-level of household finance. The agency has conducted three successful surveys in 2011, 2013 and 2015. The data used in this study are the latest available data from 2015.

CHFS survey includes the question: which of the choice below do you want to invest most if you have adequate money?' The options for this question are: 1. Project with high-risk and high-return. 2. Project with slightly high-risk and slightly high-return. 3. Project with average risk and return. 4. Project with slight risk and return. 5. Unwilling to carry any risk 6. No idea. According to the answer to this question, this paper establishes discrete indicators to measure subjective risk preference. The survey also collected information about the present value of various assets held by households. In order to measure. This paper uses the ratio of risk assets' present value to total assets' present value to measure the 'objective risk preference' of household.

$$\text{ratio} = \frac{\text{asset}_{\text{risk}}}{\text{asset}} \tag{19}$$

Taking into account the results of other existing studies, the control variables used in this paper include: 'lasset', 'age', 'house', 'married', 'rural', and 'province'.

The definition of all variables mentioned is shown in the following table:

Table 1: Variable Definition.

VarName	Definition
Explanatory Variable	
sub_level	Subjective risk preference
obj_level	Objective risk preference
Concerned Variable	
income	Annual income of household
lincome	$\ln(income)$
lincomesq	$ln^2(\text{income})$
Family Characteristics	
asset	The present value of all kinds of assets held by households
lasset	$\ln(\text{asset})$
province	Dummy variable that represents the province that the family belong to
house	$= 1$, if owning at least one housing $= 0$, if not owning at least one housing
Household Characteristics	
age	Age of household
married	$= 1$, if the householder is married $= 0$, if the householder is not married
rural	$= 1$, if the the family is settled in rural district $= 0$, if the family is settled in urban district

4. Sample Selection and Descriptive Statistics

In order to make the data available for the research, this paper preprocessed the original data of CHFS database as follows: (1) Only samples showing subjective risk preference were retained(Only the samples with answers of 1-5 to the question 'which of the choice below do you want to invest most if you have adequate money?' are retained) (2) Since the original data saved the data of families and individuals in two data files respectively, the family data and individual data were firstly merged according to individual id. (3) A family may have more than one member. In order to ensure consistency, this paper only keeps the data of the head of each household, thus the data of other members are deleted. (4) Because this paper studies the impact of income on family risk preference, data missing income (core variable) and related control variables in the database are deleted. After preprocessing, the number of valid remaining observations is 37291.

The descriptive statistics of selected variables are shown in the table below:

Table 2: Descriptive Statistics of Variables.

VarName	Mean	SD	Min	Median	Max
sub_level	0.23	0.293	0	0	1
obj_level	0.04	0.173	0	0	1
income	81368.96	2.00e+05	-800000	48000	5000000
asset	965501.90	1.86e+06	0	400200	2.00e+07
age	55.02	14.810	6	55	107
house	0.92	0.279	0	1	1
married	0.92	0.270	0	1	1
rural	0.31	0.464	0	0	1

As is presented in the table, there seems a conspicuous bias between subjective risk preference and objective risk preference. However, this does not directly show that there is a huge discrepancy between the subjective and objective risk preferences of Chinese families. This discrepancy is mainly due to different measurement of risk preference. According to the research of Chen liyu (2003), if the ratio of risk assets to household net wealth exceeds 0.1, this family can be regarded as a family with high risk preference. The objective risk preference of this paper is the proportion of risk assets to household net wealth. Looking back at the definition of subjective risk preference in this paper, the option corresponding to mean 0.2 is 'Project with slight risk and return.' Therefore, this difference is mainly caused by different quantitative methods, and does not affect the final result. When processing the data, in order to maintain the consistency of the research, this paper only retained the data of householders to represent their families. Therefore, an average age of 55.02 years for the sample is acceptable. 92% of the households in the sample owned at least one home. Considering the price of urban housing in China, it is quite reasonable for family to own property with the present value of 965501.90￥ in average. It is worth noting that the percentage of married individuals in the sample was almost equal to the percentage who owned at least a home. This phenomenon has a lot to do with Chinese cultural tradition, but this is not the focus of this paper. At last, about 31% of the sample live in rural areas, and 69% of the sample live in urban areas.

5. Regression Results and Analysis

The results of the parametric model and the results of the parametric part of the semi-parametric model in this paper are shown in Table 3.

Table3: Regression Results.

	Without sq	With sq	Semipar	Without sq	With sq	Semipar
	sub_level	sub_level	sub_level	obj_level	obj_level	obj_level
lincome	0.009*** (7.702)	-0.086*** (-10.951)	--- (.)	0.010*** (13.235)	-0.092*** (-18.552)	--- (.)
lasset	0.025*** (18.713)	0.022*** (16.090)	0.019*** (15.038)	0.014*** (16.392)	0.011*** (12.254)	0.012*** (15.100)
house	-0.046*** (-7.066)	-0.041*** (-6.353)	-0.034*** (-5.559)	-0.059*** (-14.521)	-0.054*** (-13.378)	-0.061*** (-15.837)
age	-0.005*** (-44.742)	-0.005*** (-44.407)	-0.006*** (-48.505)	0.000*** (4.716)	0.000*** (5.454)	0.001*** (7.174)
male	0.054*** (17.435)	0.053*** (17.281)	0.057*** (18.838)	0.002 (1.202)	0.002 (0.881)	-0.001 (-0.408)
edu	0.007*** (15.024)	0.007*** (14.119)	0.006*** (13.156)	0.006*** (19.556)	0.006*** (18.112)	0.006*** (19.330)
married	-0.066*** (-10.982)	-0.067*** (-11.191)	-0.066*** (-11.110)	-0.005 (-1.429)	-0.007* (-1.750)	-0.008** (-2.209)
rural	0.003 (0.796)	0.002 (0.429)	0.000 (0.082)	-0.005* (-1.818)	-0.006** (-2.453)	-0.012*** (-4.814)
lincomesq		0.005*** (12.305)			0.005*** (20.885)	
_cons	0.073*** (3.548)	0.550*** (12.546)		-0.264*** (-20.393)	0.247*** (8.931)	

First, for the regression results of the parametric model, we can see that when the model did not introduce $\ln^2(\text{income})$, the coefficient of $\ln(\text{income})$ was statistically significant and positive in both the subjective risk preference model and the objective risk preference model. This shows that on the whole, when the annual income of the family increases, the family will be more willing to take risks subjectively and objectively. The results are consistent with common sense, which is that people are more likely to invest in risk assets when they have more income to make their lives more secure and stable. On the other hand, in the result of the parameter model that include $\ln^2(\text{income})$, we can see that both the coefficients of $\ln(\text{income})$ and $\ln^2(\text{income})$ are statistically significant, and the coefficient sign of $\ln(\text{income})$ is negative, and the coefficient sign of $\ln^2(\text{income})$ is positive. This result shows a more subtle and meaningful phenomenon: the effect of household annual income on household risk preference is not one-way, but non-linear. This means that the increase in annual household income can even weaken the risk preference of low-income families. However, the expected increase in family annual income for the family risk preference will only show up after the family annual income exceeds a certain threshold. It also shows that family risk preference shows a "U-shaped" relationship with family annual income, that is, families with lower annual income and families with higher annual income both prefer risk in self-cognition(subjectively) and objective asset allocation. The higher risk preference of low-income families may be the reflection of 'gamblers' psychology' in family risk preference. Low-income families may know they are in trouble, but they despair of trying to get their finances up to where they expect them to be, and hope to "bet" on a future with risky assets. After all, the situation could not be worse than the current situation. The risk preference of high-income households is readily understood. Since high-income households have far more than they need to support themselves, and their excess assets cannot be left to inflation, so they are naturally invested in a variety of assets. This point, where the marginal utility of income to the family's risk preference turn from negative to positive, can be regarded as a index of household income when making specific policies.

In addition to the relationship between family annual income and family risk preference, Table 3 also shows the influence of other control variables on family risk preference. The first is total household assets. Whether subjective risk preference or objective risk preference, total household assets have a significant positive impact on it. It's pretty intuitive, after all, that you have to have more than you need in order to be able to invest in risky assets. However, owning a house has a significant negative effect on the subjective and objective risk preference of the family. Given the prevalence of long-term loans for Chinese households buying homes, it is reasonable to view Chinese households buying homes as an investment (even for self-use). However, family housing investment often has a noteworthy crowding-out effect on family investing in venture capital. Therefore, owning a home will weaken the risk preference of Chinese families. The regression coefficient corresponding to age is positive, indicating that the family's risk preference will become more conservative as the age of the householder increases. This is intuitive because as you get older, a sense of responsibility awakes and you are more likely to make financial choices that are good for your family's stability. For objective risk preference, age, while statistically significant, is not economically significant. The reason may be that aging gives householders more of a change in self-perception, but in practice they still make more or less risky investments. Gender is statistically significant in the regression model of subjective risk preference, and the corresponding coefficient is positive, indicating that in terms of self-cognition, male's risk preference is significantly greater than female's risk preference. Then, gender is not statistically significant in the regression model of objective risk preference, which indicates that when actually making investment choices, both men and women tend to make rational choices similarly, and neither side shows a more obvious pursuit of risk. In the regression model of subjective and objective risk preference, the number of years of education has a significant positive impact on risk preference. This is easy to understand, because the more years of education you have, the more rational and deeper your understanding of risky assets will be. Therefore, they will not be blindly zealous to risk or blindly averse to risk. Instead, they will choose to rationally invest in some risky assets to optimize the family's asset allocation. Marriage has a significant negative impact on the subjective risk preference, but has no significant impact on the objective risk preference of the family. This shows that marriage only has a psychological impact on the householder's self-cognition on whether to invest in risky assets, but it does not affect the family's rational choice when it comes to their own self-interest. Finally, it is worth mentioning that although living in the city or the rural has no significant impact on the subjective risk preference of the family, it has a significant negative impact on the objective risk preference of the family. This is consistent with common sense. Because families living in rural areas are either limited in education or limited in information access channels, they have very little understanding and recognition of risk assets and even purchase channels, which leads to the consequence that families living in rural areas buy fewer risk assets.

Although the linear model achieves excellent results. Limited by the method itself, only the linear model demonstrates the problem discussed in this paper is not reasoning enough to determine a conclusion. Therefore, non-parametric regression is also used in this paper, and the results are as follows:

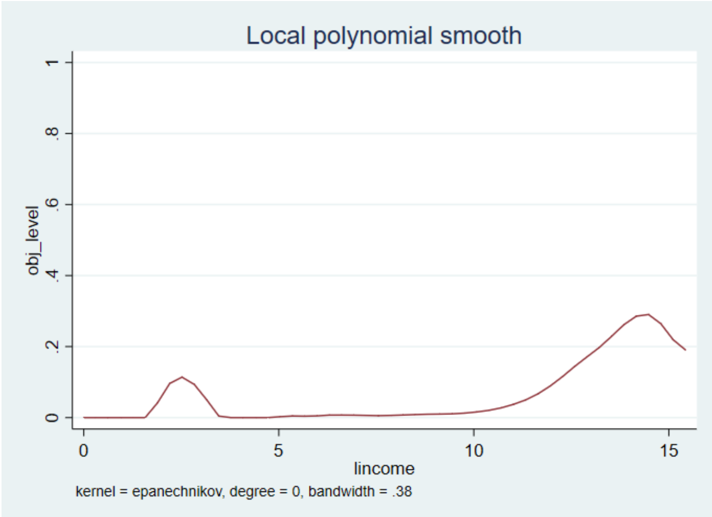

Figure 1: Non-parametric regression result of subjective risk preference.

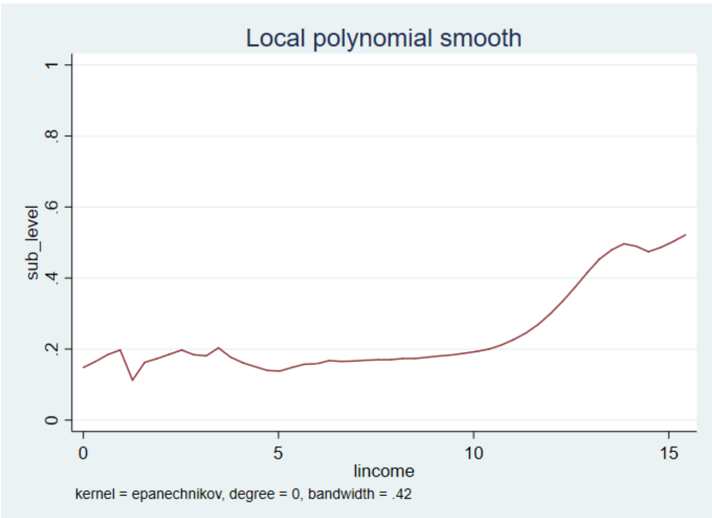

Figure 2: Non-parametric regression result of objective risk preference.

As is presented, the results of the nonparametric regression coordinate with the results of the parametric models with $\ln^2(income)$. That is, the relationship between risk preference (both subjective and objective) and $\ln(income)$ is 'U-shaped'. The is basically the same in the low-income interval. The main difference lies in high-income interval. The subjective risk preference of households in high-income interval increased significantly with the increase of income. However, in high-income interval, the objective risk preference of households increases significantly with the increase of income, and then declines at the top. The reason for this phenomenon may be that wealthy families tend to have rich experience and knowledge of investing, so they prefer risk in their self-perception than families with relatively low income. However, in actual portfolio decisions, these families may make relatively conservative investment decisions due to their rich experience and knowledge. Through the comparison of subjective and objective risk preference, it can be found that the family's cognition of risk preference is basically consistent with their objective risk preference, and there are some minor differences at the end of the curve. The results also show that the risk preference of low-income families has no obvious law on income change, but the risk preference of middle-income and high-income families is positively correlated with income.

Based on the previous results, this paper further hypothesized that the functional form of family risk preference about ln(income) is a quadratic function. As a robustness test, semi-parametric model is used in this paper. The regression results are shown in the following figure:

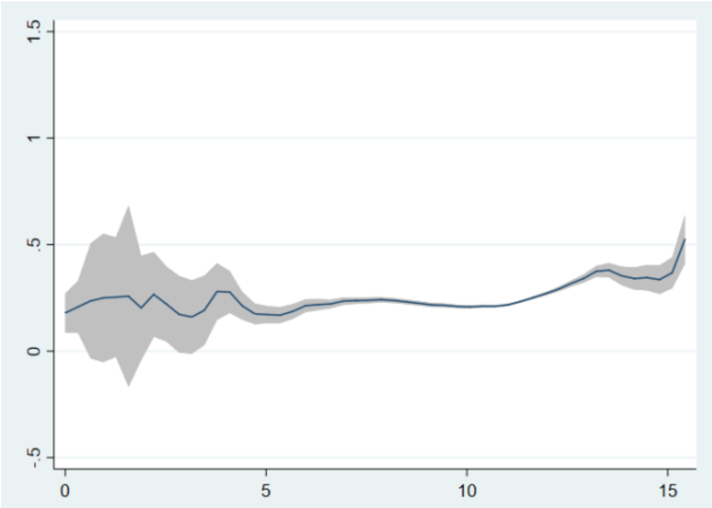

Figure 3: Semiparametric regression result of subjective risk preference.

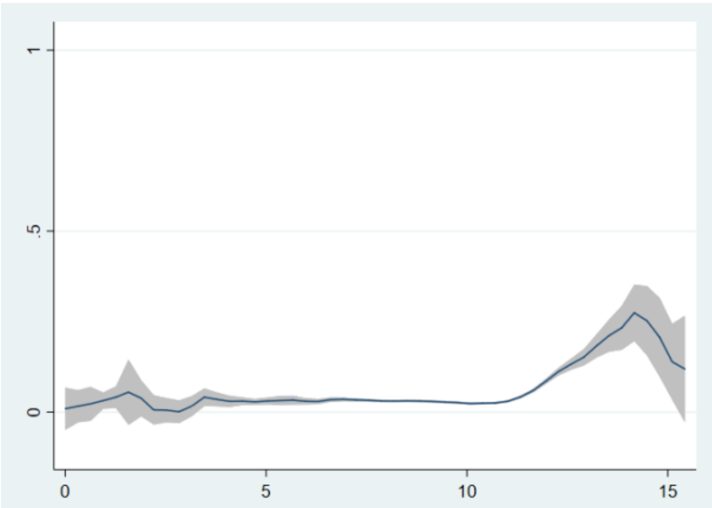

Figure 4: Semiparametric regression result of objective risk preference.

It can be seen that the results of the semi-parametric model are consistent with the hypothesis, that is, the curve that family risk preference (both subjective and objective) about ln(income) is " U-shaped".

6. Conclusions & Recommendations

This paper makes an empirical analysis of risk preference and household annual income by constructing a parametric model with quadratic terms, using kernel regression fitting images and semi-parametric regression as a robustness test using a national household financial survey database. Finally, the conclusion that both subjective and objective risk preference have a positive u-shaped relationship with family annual income is obtained.

Subjective risk preference reflects the family's self-cognition and evaluation of risk preference, while objective risk preference reflects the family's allocation of asset structure. More specifically, subjective risk preference reflects a social trend, namely "how should I be". For example, the results of this paper show that men think they are more risk-seeking than women, and married people think they are more conservative and cautious in facing risks than unmarried people. The objective risk preference reflects the understanding and acceptance of risk assets.

In the period of economic transformation, local banks of rural areas should not only pay attention to the development of the real industry but ignore the demand of the financial industry for innovation and progress. Only when more people share in the dividends of a mature economy and financial system can the fruits of economic development be delivered to the general public. Based on the results of this paper, we propose the following Suggestions:

First, after the aging of the population becomes prominent in the future, the crowding-out effect of housing on risk asset investment will be diluted. At that time, people's investment demand for risky assets will be greatly increased. The local bank of rural areas should, therefore, guide and educate people at all income levels to become more familiar with and understand a wide range of risky assets, rather than being put off by ignorance.

Second, local bank of rural areas should pay attention to the gap between the rich and the poor while increasing the family income. Increasing the presence of common prosperity will allow more households to participate in risk markets, increasing the diversity of their assets and making them more stable and less likely to collapse.

Third, according to the results of this paper, there is a quadratic relationship between family income and family risk preference. Therefore, local banks of rural areas should guide the relatively high-risk preference shown by low-income families to avoid these families from making wrong risk decisions. For these families, making the wrong risky decisions can be devastating to their lives. More seriously, if these families make the wrong decisions, they are likely to become socially unstable because their lives are unsustainable.

Forth, China's rural area is a large capital reservoir. Once it can be activated, it can not only increase the stability of this capital reservoir but also open up new sources for the capital needs of the financial market. Therefore, local banks of rural areas should accelerate the spreading of financial knowledge and the development of financial industry in rural areas. At the same time, financial security and economic efficiency should also be taken into account.

References

[1] Liang Li-jun, Wu Fan. Education Level and Risk Preference. Journal of Mudanjiang University,2018,27(7):107-111.

[2] Wu Qi. Internet use and Chinese household stock market participation. Modern Management Science,2018,6:67-69.

[3] Yin Zhichao, Song Quanyun, Wuyu. Financial Literacy, Trading Experience and Household Portfolio Choice.Economic Research Journal,2014,49(04):62-75.

[4] Jianakoplos N.A, Bernasek A, 1998, "Are Women More Risk Averse?". Economic Inquiry, 36(4), 620–630.

[5] Grable, John. E, So-Hyun and Joo, 2000, "A Cross-Disciplinary Examination of Financial Risk Tolerance,". Consumer Interests Annual, 46, 151–157.

[6] Bakshi G.S, Chen, 1994, "Baby Boom, Population, Aging and Capital Markets,". Journal of Business, 67(2), 163–202.

[7] Li-Yu Chen. Risk Tolerance and Asset Allocation. Taiwan: National Changhua University of Education,2003.

[8] John Y. Campbell. Household Finance. Journal of Finance, 2006, (4):1553-1604.
[9] Harrison Hong, Jeffrey D. Kubik and Jeremy C. Stein. Social Interaction and Stock-Market Participation． Journal of Finance,2004(1):137-163.
[10] Zhang Xiaojiao. Risk Attitude and Household Financial Portfolio. Chengdu: Southwestern University Of Finance And Economics,2013.
[11] Zhang Yan. Research on the Behavior Preference and Influencing Factors of Household Financial Portfolio Choice.Chong Qing: Southwest University,2016.
[12] Lin Huimin. Financial Exclusion, Socialbility and the Household's Financial Assets Allocation.Nanjing: Nanjing University,2019.
[13] Dong Xiaolin, Dai Yue, Zhu Chenlu. The Impact of Financial Literacy on Household Lending decisions.Journal of Southeast University,2019,21(3):44-52
[14] DOHMEN T,FALK A,HUFFMAN D, et al. Are Risk Aversion and Impatience Related to Cognitive Ability?. American Economic Review,2010,100（3):1238-126
[15] LUSARDI A,TUFANO P. Debt Literacy, Financial Experience and Over indebtedness. Journal of Pension Economics and Finance,2015,14(4).