

Research on the Impact of Household Housing Loan on Stock Market Participation

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Abstract: This paper uses the China Household Finance Survey (CHFS) data and instrumental variable analysis method to study the impact of family housing loans on residents' stock market participation. The results show that housing loans can significantly increase the probability of household participation in the stock market, but also increase the proportion of household assets allocated to the stock market. Housing loans have a significant positive impact on household participation and participation in the stock market.

1. Introduction

Since the establishment of Shenzhen Stock Exchange and Shanghai Stock Exchange in 1990s, China's stock market has been developing rapidly. According to the data released by China's Securities Regulatory Commission, by December 2017, the number of Listed Companies in China reached 3552, the total market value of Shanghai and Shenzhen stock markets reached 66.33 trillion yuan, and the face value of securities reached 15.03 trillion yuan. At the same time, as residents' incomes continue to increase, they tend to choose higher-risk investment methods such as stocks. The absolute scale and relative scale of China's households participating in the stock market have been greatly improved. As of December 2017, the number of individual investors' stock accounts reached 133,362,100.

Family stock market participation and asset allocation are not only the problems faced by many families, but also a hot spot in the research of China's financial sector. On the one hand, as an important way of household asset allocation, stock investment has a significant impact on household assets and consumption. On the other hand, the participation of the stock market of households will also affect the development of a country's capital market and economy to a certain extent. The research on the participation and depth of household stock market is not only helpful to understand the theories and practices related to finance such as capital market and asset pricing. It will also help the government to establish and improve relevant economic and financial policies such as investor protection policy, monetary and financial policy, social security system, and promote the sustainable and healthy development of Finance and economy.

Based on the data of China Family Finance Research Center, this paper examines the impact of housing loans on household participation in the stock market in China, and finds that housing loans can significantly increase the probability of household participation in the stock market. At the same time, the proportion of household assets allocated to the stock market will increase, and housing loans have a significant impact on the participation and participation of household stock market. At the same time, the reasons for the above results are analyzed. On the one hand, housing loans are a formal channel for families to obtain funds more easily, which can alleviate the problem of liquidity constraints faced by families. On the other hand, families with more human capital tend to invest in the stock market in order to integrate risks and returns [1].

2. Research design and model setting

2.1 Variable definitions

For the participation of households in the stock market, refer to the setting of Rao, Mei and Zhu

[2]. If the resident family currently holds a stock account, the assignment is 1 and if there is no stock account, the assignment is 0. For the degree of household participation in the stock market, the proportion of household stock market investment in total household assets and financial assets is used to measure.

This paper focuses on the explanatory variable of housing loan, which is measured by whether there is housing loan, the outstanding balance of housing loan and monthly repayment.

Consistent with other literatures, other control variables set in this paper include social demographic characteristics of households, household income and assets, financial knowledge level of residents, degree of information concern, subjective risk attitude, family location and other variables. The sociodemographic characteristics of residents mainly include the gender of the head of the household, age, education level, health status, marital status, whether there is faith, the number of family members, and the number of children.

Table 1 Housing Loan and Sample Family Characteristics

Variable	Housing loans				Housing-free loans			
	Mean value	Standard deviation	Minimum value	Maximum value	Mean value	Standard deviation	Minimum value	Maximum value
Stock market participation	0.17	0.37	0	1	0.06	0.24	0	1
Number of family members	3.42	1.3	1	13	3.49	1.65	1	19
Information Concern	3.4	1.15	1	5	3.89	1.1	1	5
Income	13.14	31.3	0.2	750.08	5.92	23.21	0.2	2568
Assets	162.77	265.87	0.4	5644.05	74.48	675.66	0.25	100240.1
Number of children	0.75	0.72	0	5	0.69	0.88	0	9
The head of household is male	0.71	0.46	0	1	0.76	0.43	0	1
Age	41.52	11.54	0	88	52.11	14.39	1	113
Health	2.95	1.17	1	5	3.39	1.2	1	5
Faith	0.36	0.48	0	1	0.37	0.48	0	1
Marital status	0.89	0.32	0	1	0.85	0.36	0	1
Risk attitude	3.56	1.22	1	5	4.08	1.2	1	5
College and above	0.46	0.5	0	1	0.14	0.35	0	1
Middle school	0.44	0.5	0	1	0.54	0.5	0	1
Primary school	0.09	0.28	0	1	0.24	0.43	0	1
East	0.46	0.5	0	1	0.43	0.5	0	1
West	0.35	0.48	0	1	0.27	0.45	0	1
Other loans	0.09	0.28	0	1	0.05	0.21	0	1

Table 1 shows the characteristics of households with and without housing loans, from which we can see that the stock market participation rate of households with housing loans is significantly higher than that of households without housing loans by about 11%. And information attention is higher than that of households without housing loans. Households with housing loans are younger, about 10 years younger than those without housing loans, and have better health and higher education. The proportion of college education or above is about 32% higher than that of families without housing loans, and the degree of risk aversion is low. The income and assets of households with housing loans are also significantly higher than those without housing loans. The average household income is about 70,000 yuan higher, and the average value of household assets is about 880,000 yuan higher.

2.2 Model setting

This paper uses Probit model to study the impact of housing loans on household stock market participation. The specific models are as follows:

$$P(P_i = 1 | Debts_i, Economic_i, X_i) = \Phi(Debts_i\beta_1 + Economic_i\beta_2 + X_i\beta_3)$$

P is a dummy variable in whether households participate in stock market investments. Debts expressed variables about home housing loans. Economics represent variables in the family's economic situation, including household assets and household income. X is the sociodemographic

characteristic variable of the head of household and family. u is a random disturbance term.

In addition, this paper uses the Tobit model to estimate the effect of each housing loan variable on the participation of households in the stock market. The specific model settings are as follows:

$$y_i^* = Depts_i\beta_1 + Economic_i\beta_2 + X_i\beta_3 + u_i, \quad Y = \max(0, y_i^*)$$

Where Y represents the degree of participation of the i family in the stock market, y_i^* represents the observed value of the family stock market participation between (0, 1), and the remaining explanatory variables are consistent with the above model.

3. Empirical results and analysis

3.1 Housing Loan and Family Stock Market Participation

The household housing loan is measured by whether there is housing loan, the outstanding balance of housing loan and monthly repayment. The impact of housing loan on household stock market participation is estimated. The regression results are reported in Table 2.

Table 2 Housing Loans and Family Stock Market Participation in Probit Regression Results

Variable	(1)	(2)	(3)
Is there a housing loan?	0.0191*** (4.173)		
Unrepayments of housing loans		0.00137*** (4.985)	
Monthly repayment			0.00167*** (5.714)
Number of family members	-0.00657*** (-6.265)	-0.00658*** (-6.274)	-0.00654*** (-6.054)
Financial knowledge	0.00956*** (2.590)	0.00951*** (2.579)	0.00940*** (2.644)
Information Concern	-0.0176*** (-17.74)	-0.0176*** (-17.74)	-0.0175*** (-16.96)
Family income	0.000220*** (4.223)	0.000219*** (4.197)	0.000211*** (4.517)
Family assets	-4.59e-05** (-2.365)	-4.56e-05** (-2.357)	-4.37e-05*** (-3.047)
Number of children	0.00296* (1.699)	0.00299* (1.716)	0.00295 (1.521)
Male	-0.0172*** (-5.998)	-0.0172*** (-5.996)	-0.0174*** (-6.172)
Age	0.00606*** (11.49)	0.00607*** (11.52)	0.00600*** (10.96)
Age squared	-0.00536*** (-10.56)	-0.00537*** (-10.58)	-0.00530*** (-10.13)
Healthy	0.000476 (0.554)	0.000471 (0.547)	0.000457 (0.513)
Faith	0.00476** (2.073)	0.00476** (2.074)	0.00495** (2.145)
Married	0.0110*** (3.943)	0.0110*** (3.930)	0.0107*** (3.934)
Risk attitude	-0.0112*** (-13.06)	-0.0112*** (-13.06)	-0.0112*** (-12.54)
University and above	0.309*** (6.010)	0.308*** (6.008)	0.307*** (6.121)
Middle school	0.0867*** (6.138)	0.0867*** (6.139)	0.0867*** (6.267)
Primary school	0.0371* (1.880)	0.0371* (1.880)	0.0371* (1.922)
East	0.0332*** (11.06)	0.0331*** (11.05)	0.0327*** (11.01)
West	0.00137 (0.445)	0.00137 (0.447)	0.000951 (0.313)
Other loans	-0.0175*** (-5.591)	-0.0175*** (-5.600)	-0.0175*** (-5.689)
Observation value	25,353	25,353	25,353

Note: The marginal effects reported in the Table are Z values in brackets, *** is significant at 1%, ** is significant at 5%, and * is significant at 10%.

It can be seen from the results that, contrary to the conclusions of some foreign literatures [1] [3] [4], the three variables of family housing loans have a significant positive impact on the possibility of households participating in the stock market. Home loans can significantly promote household investment in the stock market and increase the likelihood of family participation in the stock market. At the same time, the more households with unpaid repayments and monthly repayments, the greater the likelihood of participation in the stock market. The reasons for the above results, on the one hand, the family can be used for mortgage assets are few, facing strong liquidity constraints, housing loans are a regular channel for families to easily obtain funds, can alleviate the problem of liquidity constraints faced by the family. When households have greater confidence in investing in the stock market and believe that the return from investing in the stock market will be higher than the interest from obtaining housing loans, housing loans will promote households to participate in the stock market. On the other hand, as housing has the dual functions of consumption and investment, families with abundant human capital tend to invest in and consume better housing, thereby lending more money to banks. The wage income brought by human capital is risky, but its risk is low, similar to national debt, so families with more human capital tend to invest in the stock market in order to synthesize risks and benefits [1].

3.2 Housing Loan and Family Stock Market Participation

Use the same way to measure housing loans, and use the proportion of stock market investment in total household assets and financial assets to measure the degree of stock market participation. Based on the Tobit model, the impact of housing loans on household stock market participation is estimated. Table 3 reports the regression results.

Table 3 Tobit regression results of housing loans and household stock market participation

Variable	The proportion of stock market investment in total assets			The proportion of stock market investment in financial assets		
	(1)	(2)	(3)	(4)	(5)	(6)
Is there a housing loan?	0.0238*** (2.771)			0.128*** (4.744)		
Loan outstanding		0.00204*** (2.854)			0.0109*** (4.851)	
Monthly repayment			0.00193*** (2.498)			0.0112*** (4.634)
Observation value	25342	25342	25342	24841	24841	24841

From the results, we can see that the three proxy variables of household housing loans have a significant positive impact on the participation of households in the stock market, and households with housing loans will significantly increase the proportion of investment in the stock market.

3.3 Endogenous problems

There may be endogenous problems in the study of household housing loans and stock market participation. This paper argues that there may be two potential endogenous sources. On the one hand, there may be interaction between household housing loans and stock market participation. On the other hand, there may be missing variables in regression. Becker and Shabani [5] in their study of household debt and stock market participation, the missing variables are likely to be the family's financial knowledge and wealth effects. To this end, the householder's financial knowledge level variables and household asset variables are added to the regression model to mitigate the endogeneity of the missing variables.

This paper draws on the method of Beaubrun and Maury [6] to use the community house price as a tool variable for the unpaid amount of housing loans and the monthly repayment amount. There is a direct relationship between community housing prices and the amount of unpaid repayments and monthly repayments of current housing loans. For example, the higher the community housing

prices, the greater the unpaid amount and monthly repayment amount. The community housing price is not directly related to whether the family participates in the stock market, in the first stage of the regression of instrumental variables. The significant level of community housing price at 1% has a significant impact on the amount of outstanding housing loans and monthly repayments. There is no problem of weak instrumental variables. The Wald test statistics are 400.95 and 397.62 respectively, which reject the hypothesis that the results of Probit regression are exogenous. To avoid the errors caused by endogenous problems, we need to use Ivprobit model to estimate. Next, we will use the regression method of instrumental variables to analyze household stock market participation and stock market investment.

3.4 Instrumental Variable Regression of Housing Loan and Family Stock Market Participation

Table 4 Result of IV_Probit Regression of Housing Loan and Household Stock Market Participation

Variable	(1)	(2)
Unrepayments of housing loans	2.622***	
	(5.51)	
Monthly repayment		2.278***
		(6.63)
Observation value	23873	23873

Note: The regression results of the control variables are similar to those in Table 2 and are no longer shown.

From the regression results, it can be concluded that the unpaid amount of housing loans and the monthly repayment amount have a significant positive impact on the participation of the family stock market. Moreover, the regression coefficient of instrumental variables is larger than that of non-instrumental variables, which indicates that the previous regression underestimated the impact of unpaid housing loans and monthly repayments on household stock market participation.

3.5 Instrumental Variable Regression of Housing Loan and Household Stock Market Participation

Table 5 Housing Loan and Household Stock Market Participation Level IV_Tobit Regression Results

Variable	Stock market investment accounted for total assets		Stock market investment accounts for the proportion of financial assets	
	(1)	(2)	(3)	(4)
Unrepayments of housing loans	0.501**		1.571**	
	(2.323)		(2.350)	
Monthly repayment		0.300***		0.950***
		(3.936)		(3.960)
Observation value	23865	23865	23419	23419

From the regression results, it can be concluded that the unpaid amount of housing loans and the monthly repayment amount have a significant positive impact on the participation of the family stock market. Moreover, due to the fact that the unpaid amount of housing loans and the monthly repayment amount are directly proportional to the scale of housing loans, the larger the scale of family housing loans, the higher the proportion of family investment in the stock market. Moreover, the regression coefficient of instrumental variables is larger than that of non-instrumental variables, which indicates that the estimated results of non-instrumental variables underestimate the impact of unpaid housing loans and monthly repayments on household stock market participation.

4. Conclusion

Based on the data of China Family Financial Survey Center, this paper examines the impact of

housing loans on household participation in the stock market in China. The study finds that housing loans can significantly increase the probability of household participation in the stock market, but also increase the degree of household participation in the stock market. The reasons for the above results are, on the one hand, that families have few assets available for mortgage and face strong liquidity constraints. Housing loan is a formal channel for families to obtain funds easily, which can alleviate the liquidity constraints faced by families. When households have greater confidence in investing in the stock market, they think that the income from stock market investment will be higher than the interest earned from obtaining a home loan, and housing loans will promote family participation in the stock market. On the other hand, because housing has the dual function of consumption and investment, families with rich human capital tend to invest in and consume better housing, thus lending more money to banks. While the wage income brought by human capital is risky, its risk is low, similar to treasury bonds, so families with more human capital tend to invest in the stock market in order to integrate risks and benefits [1].

Studies have shown that households with housing loans are more inclined to invest in the stock market. This article suggests that households should pay close attention to financial markets, adjust the proportion of stocks in the portfolio, and guard against potential risks faced by households. At the same time, the government should speed up the development of the financial market, increase the training and education of investors' financial knowledge and risk awareness, strengthen the protection of investors, and avoid the drastic fluctuations in the stock market aggravating household debt.

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