

Impact Of Stock Market Volatility on Household Financial Assets

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Abstract. At present, the scale of financial assets of urban and rural households in China is expanding, but there are big differences in type and structure. The securities market plays an important role as an important platform for financial asset allocation. Based on data from the China Household Finance Survey (CHFS) and the China Family Tracking Survey (CFPS), this paper analyzes the differences in household financial assets between urban and rural residents in China from 2016 to 2020 (the current data open to the public is only updated to 2020) using the TVP-VAR model. The results of the model show that the financial assets of rural residents' households are heterogeneously affected by different levels of the stock market, and the responses of high- and low-risk financial assets to them are also heterogeneous.

Keywords: Urban and rural households; financial assets; stock market.

1. introductory

Under continuous development, China's economy has been able to grow steadily, the capital market has been expanding, the incomes of urban and rural residents have been growing rapidly, and the scale of financial assets has been expanding. However, owing to the limitations of the dualistic economic structure, urban and rural residents face different financial risk profiles. Although China has begun to address major financial risks, financial risks are taking on new characteristics and gradually spreading to the household level. The diversification of China's financial investment structure has increased the risk of private investment. Heterogeneous risks come from all markets. Such differences in risk will have a significant impact on the value of household financial assets. That is why we must attach great importance to this issue. Urban and rural households in China mainly hold low-risk financial assets such as cash and demand deposits, and other high-risk financial assets such as equity. According to the traditional cognitive logic, as financial assets are directly affected by stock market fluctuations, urban and rural residents are increasingly concerned about them, especially high-risk financial assets, as they would have little impact on low-risk financial investments. However, if the stock market fluctuates, regardless of the type of financial assets, they will be affected by a certain value, but to a different extent or direction. For example, there may be an implicit change in the low-risk financial assets of urban and rural households. By hidden changes, we mean that in the absence of significant losses in the financial assets deposited in risky investments by financial institutions, or without knowing the actual risks borne by their assets, some financial institutions invest the assets in risky investments higher than the original underlying ones, thus making the actual value of the assets change. Therefore, based on these two scenarios, it is particularly important to study the implicit changes in the financial assets of urban and rural low-risk households and the time-varying impact of stock market volatility on them.

2. Literature review

From the academic literature available at present, domestic and foreign scholars' research on the issue of financial assets of urban and rural families is mainly reflected in three aspects.

First, the impact of the financial environment on the allocation of financial assets among urban and rural households. Foreign scholars, such as Guiso, have found that households living in areas with higher social resources have a greater likelihood of allocating their assets to the capital market. After that, Yin Zhichao and Dong Xiaolin analyzed the interactions among financial availability,

financial market participation and household financial asset choices under multiple information channels through the relevant data of CHFS, and the results showed that financial availability has an important impact on asset allocation. The advantages and disadvantages of the financial environment represent the degree of construction of the financial infrastructure, and financial availability directly affects the ability to make effective financial asset allocation.

Second, the influence of subjective and objective factors on capital market participation and asset allocation structure. Based on CFPS data, Ocean Zhang et al. explored the interrelationship between family financial asset allocation and life satisfaction, and the results pointed out that there is an inverse relationship between family members' life satisfaction and risky financial asset investment, and that there may be a variety of factors that jointly influence family financial asset allocation. Moreover, Lu Yajuan and Zhang Jingjing believe that the basic personal conditions such as gender, age, years of education, health status, as well as economic income, attitude of the head of the household and other factors will have an impact on the allocation structure of family financial assets and market choice. Different family structures may make differences in the individual status of residents, which in turn leads to differences in the allocation of household financial assets. Meanwhile, Yang Wenke, Cao Bin et al. utilize the propensity score matching (PSM) approach to explain the differences in the financial asset allocation of urban and rural households. Subsequently, Lu Yajuan et al. investigated the impact of household structure on financial asset allocation based on a sample of rural households from the 2015 CHFS, and the results showed that different risk attitudes of households with different structures produce heterogeneous risky asset allocations.

Third, the impact of financial institutions' behavior on the financial asset allocation behavior of urban and rural households. Based on the perspective of commercial bank credit, Fu Qinghua explores the interrelationship between financial asset price volatility and financial stability of urban and rural households. On this basis, Luo Yu, by exploring the financial asset allocation of commercial banks, deeply analyzes the differences in the transmission efficiency of monetary policy in the money market and bond market, and the impact on the value changes of financial assets of urban and rural households. Since the asset allocation behavior of commercial banks is usually a multifactorial and difficult-to-observe process, both direct and indirect investments are a blind spot of capital movement for ordinary residents, where trust issues between investment entities are likely to arise. Accordingly, Guiso et al. study the asset allocation choices of urban and rural households between banks and the stock market from the perspective of trust, and find that the stronger the investor protection, the higher the transparency of the industry, and the stronger the willingness of households to invest in stocks.

3. Theoretical analysis and research hypothesis

A high savings rate has become an important feature of Chinese households, as most urban and rural residents choose to temporarily deposit their idle funds in banks. Demand and time deposits are usually regarded as low-risk financial assets whose direct value is not affected by interest rate risk. In fact, the relative value of these financial assets can also change due to stock market fluctuations, i.e., implicitly. For commercial banks, liquidity risk can be avoided through deposit reserves as long as funds are maintained at an appropriate liquidity ratio. Once the cost of funding (i.e., the deposit rate) is fixed, commercial banks will focus more on the expected return and risk of their asset allocation, and the expected high return and demand will rise. When this happens, volatility in the stock market can cause gains and losses to arise. Since commercial banks' cash flows are based on low-risk financial assets, in the case of investment or loan losses, the losses are covered by the pool and the deposit insurance system, i.e., the losses are not credited to the savings accounts of urban and rural residents. When an investment or loan generates income, the financial assets of urban and rural low-risk households cannot be shared. In short, low risk as opposed to high-risk financial assets carry the same risk but not the same reward. As a result, the allocation of financial assets between urban and rural low-risk households is an information asymmetric market. The difference between risk and reward leads to the depreciation of financial assets of urban and rural households. Therefore, this

paper proposes the H1 hypothesis that depository financial institutions, such as commercial banks, will utilize some of the low-risk financial assets of urban and rural residents to conduct investment transactions that are higher than their original underlying risks. At present, China's securities market has gradually developed into different levels of the market, and there are large differences between the markets in terms of industry, access conditions, and size. Therefore, the impact of stock market fluctuations on various financial assets is heterogeneous. At the same time, with the rapid development of China's financial market and the expansion of investment scale in urban and rural areas, diversified investment has become the norm. When the stock market fluctuates, different financial assets of urban and rural residents react differently to the same stock market. On this basis, the H2 hypothesis is established, i.e., the financial assets of urban and rural residents' households are heterogeneously affected by different levels of the stock market, and the responses of high- and low-risk financial assets to it are also heterogeneous.

Based on the above theoretical analysis, we believe that the changes in the value of financial assets of urban and rural residents are caused by stock market fluctuations, which should be realized through the following two types of investments that directly affect the value of risky financial assets. Secondly, stock market fluctuations will change the rate of return on bank investments, that is to say, there will be 'intangible' changes that will affect the total value of urban households' financial assets.

4. Construction and analysis of empirical models

4.1. Model Selection

This paper adopts the vector autoregressive TVP-VAR model with time-varying parameters. Because the stock market fluctuations on the value of financial assets of urban and rural households will show a different state, in which the time-varying structure is involved, the traditional VAR model cannot take the time-varying factors into account in the relationship between the three influences, and the stock market data is a time-series data, the use of time-varying structure of the model can be better portrayed in the fluctuations of its impact on the changes caused by the fluctuations, and therefore choose the TVP - VAR model. VAR model.

4.2. Data selection and description

Data on financial assets of urban and rural households are derived from CHFS data for 2017 and 2019 and CFPS data for 2016, 2018 and 2020. The low-risk financial assets include cash and savings, i.e., demand and time deposits, while the high-risk assets include stocks, funds, unlocked income and Internet of Things Financial Products. The volatility of the stock market, however, is measured by the CSI 300 index, GEM index, and SMB index, which represent the main board, GEM, and NSE markets, respectively. The stock market indices in this paper are sourced from Juchao Information Network as well as RESET Database. This paper uses MATLAB to process the data, and the specific code is detailed in the annex. The descriptive statistics of variables are shown in Table 1.

Table 1. Descriptive statistics for variables (N=732)

Variable	Mean	S. D.	Min.	Max.
CSI 300 index	- 0.000606145	0.023378887	- 0.0819511	0.0649881
Growth Enterprise Market Index (GEM)	0.00285843	0.029358927	- 0.0867357	0.0676141
Nikkei index	- 0.000141289	0.002507587	-0.006618	0.0118694
Low-risk financial assets of rural households	- 0.056164035	2.361886715	-8.411833	8.79163
High-risk financial assets of rural households	- 0.124940762	1.903124549	-6.109247	6.239301
Low-risk financial assets of urban households	0.00360506	2.53055557	-8.111728	8.517193
High-risk financial assets of urban households	0.051653414	2.164549765	-7.600902	7.600902

4.3. Analysis of empirical results

4.3.1 Smoothness Check

The TVP - VAR model needs to ensure the smoothness of its data. Since the original series of data from the stock market is not smooth, this paper applies the logarithmic difference treatment to it. Based on the requirement of uniformity of the variable scale, this paper applies the logarithmic difference treatment to the financial assets of urban and rural residents' households. After the data processing, the series conforms to the first-order single integer, and the variables are smooth. The results of unit root test of variables are shown in Table 2.

Table 2. Results of Augmented Dickey-Fuller Unit Root Test for variables

Variable	ADF unit root test	P-value	Result
CSI 300 index (stock market index)	-18.360	<0.01	smooth
Growth Enterprise Market Index (GEM)	-20.571	<0.01	smooth
Nikkei index	-9.987	<0.01	smooth
Low-risk financial assets of rural households	-18.500	<0.01	smooth
High-risk financial assets of rural households	-19.060	<0.01	smooth
Low-risk financial assets of urban households	-23.195	<0.01	smooth
High-risk financial assets of urban households	-17.529	<0.01	smooth

4.3.2 Time-varying parameter estimation results and impulse response analysis

The results of the parameter estimation of the TVP - VAR model can be seen in Table 3. In terms of convergence, none of the Geweke values for this set exceeded the critical value of 1.96 at 5%, so the dummy hypothesis of convergence to the posterior distribution could not be rejected. The null factor, which represents the number of samples needed to obtain the uncorrelated samples, has a maximum value of 67.07 in the setting of 10,000 simulations, so that about 149 (10,000 /67.07) uncorrelated samples can be obtained, which can support the inferential analysis of the model.

Table 3. Parameter estimation results

Parameter	Mean	Stdev	95%U	95%L	Geweke	Inef.
sb1	0.0023	0.0003	0.0018	0.0029	0.056	10.30
sb2	0.0023	0.0003	0.0018	0.0028	0.267	11.34
sa1	0.0059	0.0019	0.0034	0.0109	0.756	70.18
sa2	0.0053	0.0014	0.0032	0.0087	0.463	37.00
sh1	0.0055	0.0016	0.0034	0.0098	0.258	83.11
sh2	0.0056	0.0015	0.0034	0.0093	0.148	67.07

With the estimation results, the impulse response function can be further utilized to analyze the time-varying impact of stock market volatility on the financial assets of urban and rural households. Due to the persistence of the volatility trend of the stock market, in order to highlight the impact of stock market volatility in different periods, this paper selects three specific time points, namely, mid-November 2017, mid-November 2018, and a day in mid- to late-June 2019, in this paper. Figures 1 and 2 represent the impulse response functions at specific time points; Figures 3 and 4 represent the equal-interval impulse response functions.

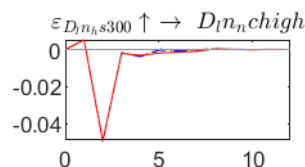


Fig.1 Time-point-specific impulse responses of rural households with high-risk assets

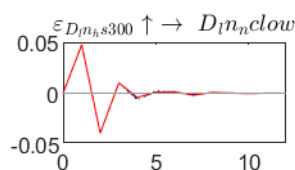


Fig. 2 Time-point-specific impulse responses for low-risk assets of rural households

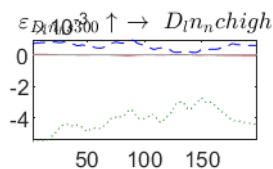


Fig. 3 Equal-interval impulse responses of rural households with high-risk assets

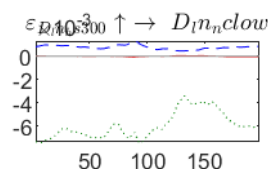


Fig. 4 Equal-interval impulse responses for low-risk assets of rural households

Time-varying effects of CSI 300 index fluctuations on rural households' financial assets. As can be seen from Figure 1, CSI 300 index fluctuations have significant time-varying effects on rural households' financial assets at different time points. And the impulse responses of different risky financial assets at multiple time points are somewhat different. In the middle and end of June 2019, the risky financial assets of rural households show a strong response to the shock of CSI 300 index, which shows a significant positive response in the first period after the shock, and the response tendency is rapidly declining from the end of the first period. The impulse response at 2017 and 2018 is relatively smooth. Combined with Figure 3 and Figure 4, it can be seen that when the CSI 300 index generates a shock, the financial assets of rural households in the short term fluctuate greatly, and in the long term tends to stabilize and gradually converge to 0. This phenomenon reflects that the investment sensitivity of rural residents is strong, and they are more inclined to short-term investment.

Time-varying impact of CSI 300 index fluctuations on urban households' financial assets. Combining Figures 5 and 6, in June 2019, urban households' high-risk and low-risk financial assets respond to CSI 300 shocks to a stronger extent than in 2016, 2017, and 2018. Combining Figures 3 and 7, at the 4-period interval, both urban and rural households respond negatively, but urban households respond more negatively than rural households. It can be seen that both rural and urban households have a certain degree of financial knowledge and investment experience as well as awareness of their own rights and interests, but the financial asset holdings of rural households are

generally lower than those of urban households, resulting in constraints on their operating space, so the degree of negativity is not as low as that of urban.

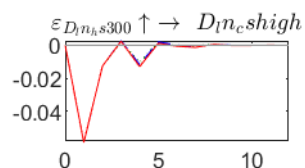


Fig.5 Time-point specific impulse responses of urban households with risky assets

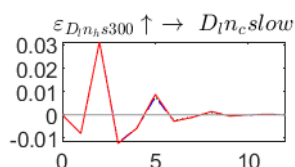


Fig. 6 Time-point-specific impulse responses for low-risk assets of urban households

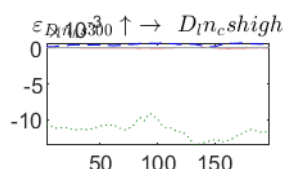


Fig.7 Equal-interval impulse responses of urban households with risky assets

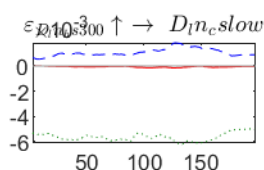


Fig.8 Equal-interval impulse responses for low-risk assets of urban households

Time-varying impact of GEM index fluctuations on financial assets of urban and rural households. As can be seen from the figure below, the responses of both high and low risk financial assets of urban and rural households to GEM shocks exhibit heterogeneity across time points, with the degree of impulse response in June 2019 being much larger than in 2017 and 2018. The direction of the response of urban households is similar to the case of rural households, but the degree of response is much larger than that of rural households and lasts longer. The phenomenon suggests that urban households are able to respond quickly when market conditions change. The response of financial assets of urban and rural households oscillates substantially in the short term and gradually stabilizes in the long term, and there is a time lag in the impact of GEM fluctuations on the financial assets of urban households.

To summarize, both CSI 300 Index and GEM Index fluctuations have heterogeneous time-varying impacts on the financial assets of urban and rural households. In addition, financial assets of urban and rural households are also affected by the time-varying effects of the fluctuations of the three stock market indices, which will not be discussed here. Comparing the time-varying impacts of stock market fluctuations on the financial assets of urban and rural households at three different levels, we can see that the time-varying impacts of the GEM and the NSE indices are stronger, while that of the CSI 300 index is slightly lower. This suggests that each level of the stock market has a different degree of impact on the investment of urban and rural households.

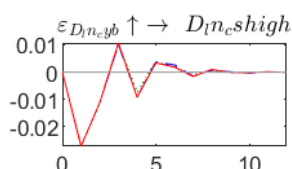


Fig.9 Time-point specific impulse responses of urban households with risky assets

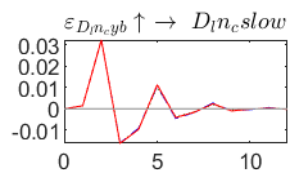


Fig.10 Time-point-specific impulse responses for low-risk assets of urban households

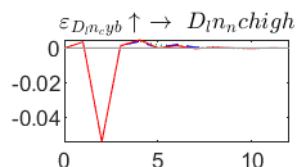


Fig.11 Time-point-specific impulse responses of rural households with high-risk assets

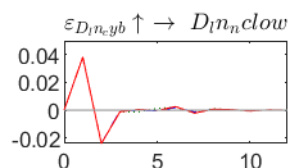


Fig.12 Time-point-specific impulse responses for low-risk assets of rural households

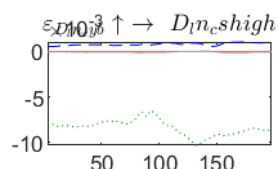


Fig.13 Equal-interval impulse response of urban households with risky assets

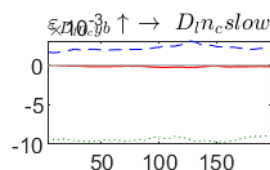


Fig.14 Equal-interval impulse responses for low-risk assets of urban households

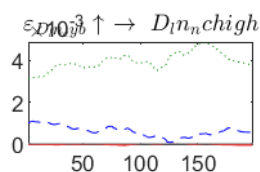


Fig.15 Equal-interval impulse responses of rural households with high-risk assets

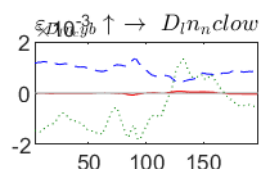


Fig.16 Equal-interval impulse responses for low-risk assets of urban households

5. Conclusions and Implications

5.1. Findings

First, the volatility of the stock market affects the value of financial assets of urban and rural households. Financial institutions will utilize urban and rural reserves to implement high-risk investments. In the case of stock market volatility, changes in the value of low-risk financial assets

are difficult to observe for urban and rural households, and differences in the structure of financial assets of urban and rural households lead to different flows of funds to different stock markets.

Second, the non-homogeneous impact of different levels of the stock market on the financial assets of urban and rural households varies over time, as does the impact of different levels of risk on financial assets. Thus, the correctness of the H2 hypothesis is confirmed. The impact of differences in stock market, urban-rural, etc. on the value of financial assets is non-homogeneous.

5.2. Recommendations for responses

First, taking into account the time-varying impact of the financial assets of urban and rural residents' households on the different degrees of volatility in the stock market, an optimization strategy for the allocation of financial assets can be implemented, and when the degree of impact on low-risk financial assets is greater than or close to that on high-risk financial assets, more than half of the financial assets can be converted to high-risk financial assets. When low-risk financial assets are less affected than high-risk financial assets, they can be converted to low-risk financial assets.

Secondly, in view of the heterogeneity of the financial assets of urban and rural households, measures have been taken to improve the risk-resistant capacity of the financial assets of rural residents. For example, further improving the rural financial infrastructure, further optimizing the structure of the allocation of financial assets to rural households, and strengthening the financial education of rural households, while maintaining a reserve of daily needs and low-risk assets, among other things.

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