Based on Mental Accounting, the Impact of Income Differences on the Irrational Biases in Family Investment

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Abstract. This paper systematically reviews the research results of the impact of income differences on the irrational behavior of family investment from the perspective of Mental Accounting, deeply analyzes the characteristics of investment behavior of different income groups and the mechanism of Mental Accounting, discusses in detail the psychological changes and account division strategies of each income class in the face of investment decisions, summarizes the contributions and limitations of existing research, and on this basis, puts forward the future research direction with foresight. Research shows that income differences not only significantly affect the division mode of Mental Accounting but also lead to irrational investment bias through a variety of complex factors, such as non-substitution effect and psychological expectation bias. Different income groups have different forms of expression. Low-income groups tend to prefer conservative investment, while high-income groups may show higher risk preference. This review not only provides a rich theoretical basis for deepening the research on household investment behavior but also provides an important reference for decision makers in the financial market when formulating relevant policies, which helps to optimize the allocation of market resources and improve the stability and efficiency of the financial system.

1 Introduction

With the accumulation of household wealth and the development of financial markets, irrational deviations in household investment behavior are becoming increasingly prominent. The Mental Accounting theory reveals the tendency of individuals to manage income from different sources differently, and income differences may have a systematic impact on family investment decisions through the division logic of Mental Accounting [1]. Based on the Mental Accounting theory of behavioral finance, this study focuses on the investment decision-making process of family investors. By analyzing the decision-making characteristics and behavior patterns of family investors at different income levels, this paper focuses on the mechanism of the division of Mental Accounting, cognitive bias and other effects in family investment decision-making, aiming to provide accurate strategies for

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family financing and investment practice, and help investors to achieve rational investment. The current research pays less attention to how income stratification induces investment irrationality through the Mental Accounting mechanism, and it is urgent to conduct in-depth analysis from the perspective of behavioral finance.

In terms of theory, this study deepens the application of Mental Accounting theory in family finance, reveals the relationship between income differences and irrational investment bias, and improves the theoretical framework of family financial decision-making; In practice, provide investment guidance for family investors, assist in formulating investment plans, make rational choices of financial products, and promote the development of financial markets.

2 Theoretical basis

2.1 Mental accounting

Thaler proposed the Mental Accounting theory states that investors do not view all wealth as a unified whole when making economic decisions but instead construct multiple relatively independent virtual accounts at the psychological level based on income sources, wealth types, and expenditure purposes [1]. These accounts follow different decision-making rules, breaking the assumption in traditional economics that funds can be completely replaced. For example, investors typically set strict savings and consumption budgets for their salary income, while they may be more inclined to use unexpected bonuses and other income for hedonic consumption or high-risk investments.

In the investment decision-making process, Mental Accounting mainly have an impact through three stages: encoding, evaluation, and selection. The Mental Accounting category that determines the ownership of funds during the coding stage; During the evaluation phase, different weights are assigned to returns and losses based on account attributes, and investors often have a higher aversion to losses than a preference for equivalent returns; The selection stage makes the final decision based on the results of the first two stages. Shefrin and Statman further proposed the behavioral portfolio theory based on Mental Accounting theory, explaining how investors allocate assets between different Mental Acoounting in pursuit of psychological satisfaction rather than simply maximizing economic returns [2].

2.2 Theory related to income inequality and investment behavior

The income stratification theory suggests that different income groups exhibit significant differentiation in their investment behavior due to differences in economic resources, education levels, and financial literacy [3]. High income families, relying on their economic advantages and rich financial knowledge, are more inclined to allocate high-risk, high-yield assets such as stocks and funds, and have a higher degree of diversification in their investment portfolios, in pursuit of rapid wealth appreciation; Low income families are limited by their capital size and financial literacy, and their investment choices are relatively conservative, relying more on low-risk products such as bank deposits to ensure fund security [4]; Middle income families are in between, expecting to achieve wealth advancement through investment while also worrying about risks. Investment decisions are easily influenced by market sentiment, and the "herd effect" has a significant impact on middle-income families [5].

In Behavioral Finance, theories such as overconfidence and loss aversion explain the root causes of irrational investment behavior from a psychological cognitive perspective. Overconfidence leads investors to overestimate their own abilities, resulting in excessive

trading; Loss aversion makes investors more sensitive to losses and tends to hold loss making assets for the long term, missing out on stop loss opportunities [6].

2.3 Cognitive bias theory

From the perspective of theoretical development, cognitive dissonance theory, as an important cornerstone of Behavioral Finance, profoundly influences investors' psychology and behavior in investment decisions. The cognitive dissonance theory proposed by Leon Festinger in 1957 aims to reveal that individuals experience uncomfortable psychological states when their behavior deviates from their original cognition and drive them to alleviate this discomfort by adjusting their cognition or behavior [7]. In the field of investment, the impact of cognitive dissonance theory is extensive and profound, intertwined and working together with other related theories. From the perspective of Prospect Theory, investors' risk preference changes when facing losses are closely related to cognitive dissonance [6]. The expectancy theory proposed by Kahneman and Tversky suggests that people are more sensitive to losses and gains when making decisions, and the pain caused by losses is much greater than the pleasure caused by equal gains [6]. When investors encounter a sharp drop in stock prices and experience cognitive dissonance, the loss aversion characteristic in the expectancy theory will further exacerbate their psychological discomfort. In order to alleviate the imbalance and pain caused by losses, investors may take extreme actions, such as taking excessive risks to replenish their positions in an attempt to recover their losses. This also explains why many investors increase their investment risks and fall into deeper investment difficulties in a state of loss.

2.4 The manifestations of irrational behavior deviation

Common irrational investment biases include overtrading, herd behavior, and disposition effects. Barber and Odeanfound that excessive trading significantly reduces investors' returns [5]; Shiller pointed out that herd behavior can lead investors to blindly follow market trends and neglect fundamental analysis [8]; The disposition effect is manifested as investors selling profitable assets too early but holding loss making assets for a long time [9]. There are differences in irrational behavior among families with different incomes, and low-income families often fall into informal financial traps due to a lack of financial knowledge [4]; High income families may over diversify their investments due to overconfidence [3].

3 Research on the impact of income differences on investment irrationality deviation

3.1 Related research on low-income families

Due to limited economic resources and other reasons, low-income families exhibit obvious short-term and strong risk aversion characteristics in their Mental Accounting. Rooij et al. found that the income of low-income families is mainly used to meet basic living needs, and the Mental Accounting structure is simple, usually dominated by "survival accounts" [10]. Investment accounts have limited funds and account for a very small proportion of household wealth. Due to income constraints, low-income families often exhibit two extreme irrational investment behaviors: one is insufficient savings, making it difficult to reserve sufficient funds to cope with unexpected situations, and even more so, unable to make long-term investments; Secondly, there is a preference for high-risk speculation. Some low-income individuals are influenced by the mentality of reporting sudden wealth and participate in

private high interest loans, illegal pyramid schemes, and other investment activities without understanding the risks. Li Tao et al. revealed that over 30% of low-income households in China have fallen into informal financial traps due to a lack of financial knowledge, resulting in property losses [4]. Low income families are limited by financial literacy and have cognitive biases towards investment risks, often underestimating the potential losses of high-risk investments and overestimating the likelihood of returns.

According to the 2018 China Urban Household Wealth Report (table 1), low-income families (income 0% -40%) prioritize ensuring the security of basic living funds and coping with short-term expenses, and their investment decisions heavily rely on liquidity and safety. The proportion of monetary assets in the income group of 0% -20% reached 43.7%, while the proportion in the income group of 21% -40% was 38.8%, significantly higher than other income groups. These types of assets (such as bank deposits and money market funds) have high liquidity and can respond to sudden expenditures such as healthcare and education at any time, reflecting the investment logic of "survival first". The insurance category accounts for 27.3% of the income group from 0% to 20%, and 28.8% of the income group from 21% to 40%, which is the highest among all income groups. This indicates that low-income families have weak risk resistance and tend to transfer risks such as diseases and accidents through insurance to avoid falling into economic crises due to unexpected situations. The proportion of bonds with income ranging from 0% to 40% is only 4.2% to 6.6%, while stocks account for 24.7% to 25.8%. This indicates that low-income families have low participation in the stock market and bond investments. Due to a lack of professional knowledge and inability to bear principal losses, their investments are limited by the small amount of funds, making it difficult for them to participate in high-risk investments [11].

Table 1. Investment situation of low-income families

Item	Data	Data sources
Proportion of investment account funds to household wealth	About 5% or less	Rooij et al. [10]
Proportion of households trapped in informal financial traps	More than 30%	Li Tao et al. [4]
Proportion of insurance category	27.3%（0-20%）,28.8%（20%-40%）	2018 China Urban Household Wealth and Health Report [11]
Proportion of debt category	4.2%（0-20%），6.6%（20%-40%）	
Proportion of currency category	43.7%（0-20%），38.8%（20%-40%）	
Proportion of stock category	24.7%（0-20%），25.8%（20%-40%）	

3.2 Related research on middle-income families

Middle income families face investment anxiety in the "middle-income trap" and are caught in a dilemma between the dual goals of "security" and "wealth growth", leading to significant decision-making biases. The Mental Accounting conflict theory proposed by Heath and Soll suggests that middle-income families form a "safety risk" dual account structure, which can easily lead to confusion in fund allocation [12]. The strong motivation for precautionary savings tends to make investment decisions more conservative, which often leads to missing out on some investment opportunities; At the same time, middle-income families are eager to achieve class advancement through investment, which can easily lead to a "herd effect"

under the influence of market sentiment. Barber and Odean found in their study of US stock market investors that the middle-income group is particularly prominent in following trends in investment, with significantly higher trading frequency than other income groups, but significantly lower returns than the market average [5]. Due to cognitive biases, middle-income families often strictly distinguish emergency funds from investment funds. When investing in losses, they are unwilling to use emergency account funds to make up for them, missing the opportunity to cut losses or dilute costs, and exacerbating investment losses.

According to the 2018 China Urban Household Wealth Report(table 2), the middle-income group (income 40% -80%) is gradually attempting asset appreciation and pursuing a balance between risk and return while ensuring liquidity. In the currency category, the income group of 41% -60% accounts for 35.9%, and the income group of 61% -80% accounts for 28.1%. The lower income group has decreased but still higher than the high-income group, which not only retains emergency funds but also allows for the use of some funds for appreciation. In the stock category, the income group of 41% -60% accounts for 34.8%, and the income group of 61% -80% accounts for 40.3%, becoming the allocation direction second only to the high-income group. The income stability of this group has increased, and they have begun to pursue asset appreciation through products such as stocks and funds, but prefer generally stable funds or stocks. In the category of creditor's rights, the proportion has increased from 5.3% of income 40% -60% to 9.3% of income 61% -80%. This group obtains stable income through treasury bond, corporate bonds, etc., balances the risk of stock market fluctuations, and forms a triangular configuration structure of "currency-stock-bond" [11].

Table 2. Investment situation of middle-income households

Item	Data	Data sources
Annual average trading frequency	About 12-18 times	Barber&Odean [5]
The proportion of investment returns lower than the market average	About 40%	Barber&Odea [5]
Proportion of insurance category	23.9%（40%-60%），22.3%（61%-80%）	2018 China Urban Household Wealth and Health Report [11]
Proportion of debt category	5.3%（40%-60%），9.3%（61%-80%）	
Proportion of currency category	35.9%（40%-60%），28.1%（61%-80%）	
Proportion of stock category	34.8%（40%-60%），40.3%（61%-80%）	

3.3 Research on high income families

The diversification of income sources for high-income families has led to the formation of a multi-level and refined Mental Accounting system. Yao and Zhang found that high-income groups often set up "wealth appreciation accounts", "education reserve accounts", "high-end consumption accounts", etc. However, different accounts correspond to different investment strategies, and the degree of risk tolerance significantly varies due to account isolation [3]. However, the wealth effect can also easily lead to overconfidence and excessive diversification of investments among high-income groups. Grinblatt et al. found through their study of high net worth investors in Finland that some high-income individuals often overestimate their investment levels due to their richer financial knowledge, blindly concentrate on betting on individual assets, and ignore the principle of diversification; The

other part is due to the excessive pursuit of diversified asset allocation, which leads to overly diversified investment portfolios and makes it difficult to achieve ideal returns [13].

According to the 2018 China Urban Household Wealth and Health Report(table 3), high-income households (with incomes ranging from 80% to 100%) prioritize asset appreciation as their core goal, achieve rapid wealth growth through high-risk asset allocation, and prioritize liquidity needs over profitability. The proportion of stock investment in high-income households reached 49.4%, the highest among all income groups, indicating that high-income households have risk tolerance and professional investment ability, and tend to allocate to aggressive products such as growth stocks and private equity, pursuing excess returns. High income households' monetary investment accounts for only 25.1%, reflecting their low demand for short-term liquidity, with funds mainly used for long-term investments. The proportion of bonds is 9.1%, and the risk return ratio of the portfolio is optimized through high rated bonds or convertible bonds; Insurance accounts for 16.5%, focusing on wealth inheritance insurance rather than basic protection, reflecting the higher-level needs of wealth management [11].

Table 3. Investment situation of high-income families.

Item	Data	Data sources
Proportion of venture capital investment	About 60%—80%	Yao&Zhang [3]
Proportion of over diversified investment cases	About 25%	Grinblatt et al [13]
Proportion of insurance category	16.5%	2018 China Urban Household Wealth and Health Report [11]
Proportion of debt category	9.1%	
Proportion of currency category	25.1%	
Proportion of stock category	49.4%	

Based on the above research on investment product selection among families with different incomes, including low, medium, and high, it is possible to clearly compare the impact of Mental Accounting on investment strategy designation among these three income families. The following chart (figure 1) shows the household allocation structure at different income levels, which more intuitively reflects the investment choices of different income groups.

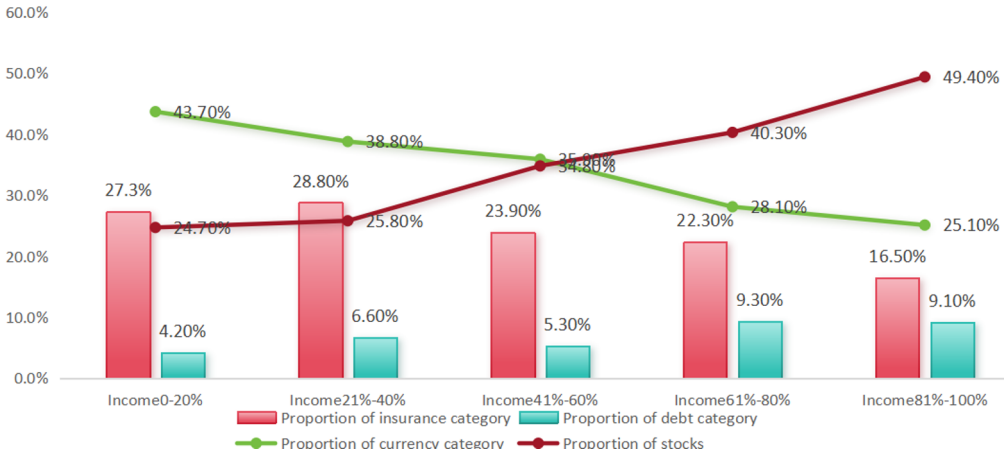

Fig.1. Household asset allocation structure at different income levels.

4 Analysis of the impact mechanism from the perspective of mental accounting

There are significant differences in the division of Mental Accounting among families with different income levels. Low income families usually prioritize meeting their basic living needs, with daily consumption being dominant. Emergency account funds are relatively limited, while investment accounts are more marginalized; Middle income families form a "safety risk" dual account structure, seeking a balance between ensuring stable living and pursuing wealth growth, but often resulting in unreasonable fund allocation due to conflicting goals; Due to the diversification of funding sources, high-income families have a more complex Mental Accounting system, and each account has clear functions. However, excessive segmentation may lead to rigid fund allocation.

The flow of funds between accounts follows irrational rules, and the "casino fund effect" is reflected in different income groups [14]. For example, when low-income families receive unexpected income, although their risk tolerance remains unchanged, they are more likely to use this unexpected income for high-risk investments; High income families' specific sources of funds are fixed for certain types of investments, and even if the market environment changes, it is difficult to flexibly adjust the allocation of funds between accounts, which exacerbates the irrationality of investment.

5 Conclusion and perspective

5.1 Conclusion

From the perspective of Mental Acoounting, income differences have a systematic impact on irrational behavior in household investment by influencing psychological account classification, cognitive biases, and external environmental factors. Different income groups exhibit unique investment behavior characteristics and irrational bias types. For example, low-income families mainly rely on "survival accounts" and rarely engage in high-risk investments; Middle income families are trapped in investment anxiety under the dual goals of "safety and security" and "wealth growth". They are influenced by the theory of psychological account conflict and struggle with fund allocation. The precautionary savings motivation leads to conservative investment, and they are prone to follow the trend in investment behavior due to the desire for class advancement. Moreover, they are also susceptible to exacerbating investment losses when they are affected by cognitive biases; High income families may experience investment losses due to overconfidence. Meanwhile, non substitution effects, sunk cost effects, and transaction cost effects play important roles in it.

5.2 Future perspective

Although current research has achieved certain results, there are still limitations in research methods, dynamic analysis, and cross-cultural studies. In the future, it is necessary to strengthen interdisciplinary and dynamic research, deeply explore the internal mechanism of Mental Accounting affecting investment decisions, and provide stronger theoretical support for household wealth management, financial market stability, and policy formulation.

So, in future research, big data and experimental economics methods can be used to obtain richer micro data and conduct in-depth analysis of the causal relationship between Mental Accounting and investment behavior. By simulating different income scenarios and psychological account activation conditions, explore the underlying mechanisms of

investment decisions. Combining socio-cultural factors, conducting cross-cultural comparative research, analyzing the impact mechanism of income differences on investment psychology and behavior under different cultural backgrounds, and providing a more universal theory for global household investment behavior research. From the perspective of policy intervention, design targeted irrational behavior correction plans, such as guiding households to allocate assets reasonably through tax policies, using financial technology tools to help investors optimize psychological account management, and promoting household investment rationalization.

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