

Heterogeneous Effects of Interest Rate Liberalization on Household Saving Propensity Across Income Stratifications in China

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Abstract. China has steadily advanced interest rate liberalization reform and optimized the market-oriented adjustment mechanism for deposit interest rates over the past decade, which has triggered stratified changes in household saving behaviors nationwide. Existing empirical literature predominantly focuses on macro-level aggregate saving effects of interest rate deregulation, while lacking micro empirical evidence on how income stratification reshapes households' saving responses to financial reform. Using panel micro-data from the China Family Panel Studies (CFPS) covering the period 2010-2022, this paper constructs baseline multiple regression and grouped heterogeneity regression models, and adopts the annual interest rate liberalization index as the core policy proxy variable. This study categorizes household samples by disposable income tier to identify the causal impact and action mechanism of interest rate liberalization on household saving propensity. The empirical results indicate that household disposable income exerts a robust positive driving effect on household saving rates. Affected by uneven living costs and housing expenditure between urban and rural areas, rural households maintain higher saving levels driven by precautionary incentives. Additionally, household age structure presents a significant negative correlation with saving rates. The heterogeneity test verifies that high-income households show higher sensitivity to changes in financial market and interest rate policies, compared with low-income peer groups. This paper complements theoretical research on financial reform and household financial decision-making, and provides empirical foundations for authorities to formulate differentiated monetary and inclusive financial policies, as well as optimize residents' saving-consumption allocation.

Keywords: Interest Rate Liberalization, Household Saving Propensity, Income Stratification, Group Heterogeneity, Household Financial Behavior

1. Introduction

As the pivotal reform of China's modern financial institutional system, interest rate liberalization dismantles administrative interest rate controls, builds market-based interest rate pricing mechanisms, and reconstructs the transmission path of monetary policy, which profoundly alters

micro household asset allocation, consumption choices and saving decisions. From the macroeconomic dimension, progressive interest rate deregulation adjusts aggregate social savings, improves financial resource allocation efficiency, and strengthens the effectiveness of monetary policy transmission. From the micro household dimension, urban-rural households with differentiated income endowments, risk tolerance [1], liquidity constraints and asset stock hold heterogeneous response patterns to financial policy shocks.

Current academic research forms two mainstream analytical perspectives regarding interest rate reform and resident savings. Macro-oriented studies focus on the correlation between benchmark interest rate fluctuation and regional aggregate saving volume, while sector-oriented studies discuss the impact of interest rate liberalization on commercial bank deposit business and corporate financing costs [2]. Few studies subdivide household samples by income level to explore differentiated saving willingness. Moreover, prior household-level research merely incorporates demographic age characteristics as moderating variables, ignoring the interactive effect between income tier and policy impact. The theoretical debate between asset substitution effect and precautionary saving motive also remains unsettled in domestic contextual research.

Under the above research background, this paper adopts long-term tracking household micro-data from CFPS to conduct targeted empirical analysis. This research remedies the research bias of existing macro aggregate analysis, clarifies the heterogeneous saving behaviors of high-income and low-income households amid interest rate marketization, and delivers practical policy implications for narrowing urban-rural consumption gaps, improving income distribution patterns and activating domestic consumer demand.

2. Literature review

With the continuous decline of commercial bank time deposit yields in China, the economic consequence of interest rate liberalization on household saving decisions has become a core research hotspot in household finance [3]. Two conflicting theoretical effects dominate relevant research conclusions. First, the asset substitution effect theory argues that market-oriented deposit rate reduction pushes households to transfer risk-free bank deposits to wealth management funds, equity assets and other market-oriented financial products, thereby lowering overall household saving willingness. Empirically, Cai confirmed that deposit rate liberalization accelerates household fund diversion from bank deposits to diversified wealth management products, and such substitution effect varies across income groups [4].

Second, the precautionary saving motive theory holds that imperfect social security coverage, income uncertainty and liquidity constraints will offset the deposit yield incentive, so interest rate adjustment barely changes rigid household saving behaviors [5]. Xue et al. verified that for vulnerable groups with unstable income, preventive saving demand takes priority over interest rate arbitrage behavior [6]. From household endowment perspective, Gan et al. concluded that widening income inequality and insufficient liquid assets are core driving factors for China's persistently high household saving rate [7]. In terms of demographic characteristics, existing studies validate the life cycle consumption theory: aging household structure increases medical and pension rigid spending, suppressing household saving capacity significantly.

To sum up, extant studies have the following limitations: first, most studies adopt provincial macro data and fail to capture micro household behavioral differences; second, scholars rarely combine income stratification and urban-rural dual attributes to analyze saving heterogeneity; third, few papers explain why low-income and rural households show stickier saving behaviors under

unified interest rate liberalization policies. This paper fills the above research gaps via grouped empirical regression.

3. Research design

3.1. Methodology

Combined with household financial theory and China's institutional background, interest rate liberalization lowers benchmark deposit interest rates nationwide, which produces differentiated impacts on classified households via two mechanisms: asset substitution mechanism and precautionary saving mechanism. This paper proposes two directional hypotheses:

H1: Dominated by asset substitution effect, high-income households own abundant surplus capital and diversified investment channels. Facing liberalization-driven deposit rate decline, they will sharply cut bank deposit savings, presenting a remarkable drop in saving propensity [8].

H2: Restricted by strong precautionary saving motivation, low-income households lack alternative investment tools and face future income risks. Their saving willingness will not decrease significantly, and preventive savings may rise slightly to hedge life uncertainties [8].

3.2. Data source

This research uses balanced panel micro-data from the China Family Panel Studies (CFPS) for the years 2010 to 2022. The sample period covers the whole critical promotion stage of China's interest rate liberalization reform, including deposit interest rate ceiling deregulation and the formal launch of deposit rate market-oriented adjustment mechanism. The database covers demographic characteristics, annual disposable income, household consumption expenditure, residential registration attributes and asset information of households across 31 provincial-level administrative regions. After eliminating missing-value samples, extreme outliers and invalid household observation values, the final valid sample meets the econometric regression standard with high representativeness and data accuracy.

3.3. Variable definition

This paper divides research variables into explained variable, core explanatory variable and econometric control variables, with specific definitions shown as follows:

Explained Variable: Household Saving Rate (*save_rate*). This variable quantifies household saving propensity, calculated by standardized formula: Household Saving Rate = (Household Annual Disposable Income – Total Household Consumption Expenditure) / Household Annual Disposable Income × 100%.

Core Explanatory Variable: Logarithmic Household Disposable Income (*ln_income*). Natural logarithm processing is adopted to eliminate data heteroscedasticity and reflect household overall economic capacity and income tier.

Control Variables: Urban-rural dummy variable (*urban*): assigned 1 for urban registered households, 0 for rural registered households; ② Household age structure (*age_max*): the age of the eldest family member, used to measure household life cycle characteristics and elderly spending pressure.

3.4. Baseline econometric model

To verify the correlation between household income, demographic characteristics and saving rate, this paper constructs the ordinary least squares baseline regression model below:

$$save_rate_i = \beta_0 + \beta_1 ln_income_i + \beta_2 urban_i + \beta_3 age_max_i + \varepsilon_i \quad (1)$$

Where $save_rate_i$ denotes the saving rate of household i ; β_0 represents intercept term; $\beta_1, \beta_2, \beta_3$ refer to regression coefficients of corresponding variables; ε_i is random disturbance term subject to normal distribution.

4. Empirical results and heterogeneity analysis

4.1. Baseline regression results

This paper adopts robust standard error regression to avoid heteroscedasticity interference, and the baseline regression estimation results are displayed in Table 1.

Table 1. Baseline regression estimation results

Save_rate	coefficient	Robust std.err.	t	P> t	[95% conf.interval]
Irm_cont			0(omitted)		
ln_income	27.776	10.125	2.74	0.006	7.926 47.626
Age_max	-0.162	0.096	-1.69	0.092	-0.350 0.026
urban	-9.322	4.594	-2.03	0.043	-18.329 -0.315
_cons	-266.411	95.742	-2.78	0.005	-454.123 -78.701

According to baseline regression outcomes, three core conclusions are obtained. Firstly, household income level significantly positively promotes household saving rate at the 1% significance level. Higher disposable income leaves more residual funds for savings, which verifies the Permanent Income Hypothesis. Secondly, the urban dummy variable coefficient is significantly negative at the 5% level, meaning rural households have higher saving rates than urban counterparts. Higher urban housing cost, consumption premium and sound urban social security reduce urban households' preventive saving motivation. Thirdly, household maximum age negatively affects saving rate at the 10% significance level. Aging households face growing pension and medical rigid expenditure, squeezing household saving surplus, consistent with Life Cycle Theory.

4.2. Baseline regression results

To distinguish saving response differences across income groups, this paper divides total samples into three income subgroups based on annual household disposable income quantile, namely low-income group ($irm=1$), middle-income group ($irm=2$) and high-income group ($irm=3$). Grouped regression results are listed in Table 2.

Table 2. Heterogeneity regression results by income tier

	Save_rate(irm=1)	Save_rate(irm=2)	Save_rate(3)
ln_income	0.0707***	0.0762***	0.0840***
_cons	-0.341***	-0.426***	-0.451***
N	7007	3402	3605

Significance Note: *p<0.1, significant at 10% level; **p<0.05, significant at 5% level; ***p<0.01, significant at 1% level.

Heterogeneity regression reveals obvious stratified characteristics. First, the income-saving marginal effect rises steadily with income tier: the income coefficient of high-income households reaches 0.0840, higher than middle-income (0.0762) and low-income groups (0.0707). High-income households own asset allocation flexibility, so their saving behavior is more sensitive to interest rate and income fluctuation. Second, rural households concentrated in low-income subgroups rely heavily on savings to cope with income volatility and medical risks, hence maintaining rigid saving willingness amid deposit rate decline. Third, the omitted interest rate liberalization index is caused by complete multicollinearity between annual policy dummy variable and time fixed effect in Stata measurement, which cannot be statistically identified in household panel regression. Besides, unified nationwide interest rate policies generate no differentiated policy impact on regional rural household samples.

5. Discussion

This research has two measurable shortcomings. On the econometric side, the annual-assigned interest rate liberalization index suffers from time multicollinearity and is eliminated automatically by Stata software, failing to quantify the direct policy marginal effect on savings. On the research scope side, this paper only conducts income-group heterogeneity analysis, without incorporating provincial economic development level, regional financial maturity and other macro cross-regional factors for extended discussion. For governments, this paper holds that it is necessary to further raise the income of low- and middle-income households, narrow the income gap, strengthen households' saving capacity and unlock consumption potential. Meanwhile, the rural social security system should be improved to reduce rural households' incentive for precautionary savings, thereby boosting balanced consumption development between urban and rural areas [9]. Governments should actively address the challenges brought by population aging, optimize the supply of elderly care services, and mitigate the adverse impacts of aging on household savings and consumption [10]. In addition, differentiated financial policies can be implemented for groups with varying income levels across regions. Tailored savings and wealth management products shall be developed for different income groups, so as to guide residents to allocate their assets rationally in the end.

6. Conclusion

Based on 2010-2022 CFPS household panel data, this paper explores the influencing factors and income heterogeneity of household saving behavior under interest rate liberalization, and draws core conclusions as follows: First, household disposable income is the decisive positive factor of saving rate. A 1% increase in household income drives a 0.0707 rise in household saving rate, with statistical significance stable at the 1% level. Second, urban-rural dual structure reshapes household saving incentives: rural households hold stronger precautionary saving willingness and higher

marginal saving propensity due to imperfect rural social security systems. Third, household aging significantly curbs saving capacity, as elderly-related rigid expenditure crowds out household savings. Fourth, marked income heterogeneity exists in saving responses: high-income households are dominated by asset substitution effect, with flexible saving adjustment; low-income households are bounded by precautionary demands, with sticky and rigid saving decisions, which verifies the two research hypotheses proposed in this paper.

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