International Review of Economics and Finance 109 (2026) 105418

Contents lists available at ScienceDirect

International Review of Economics and Finance

journal homepage: www.elsevier.com/locate/iref

The impact of economic uncertainty on household portfolio choice: Evidence from China

Zhuo Huang [a], Ying Tan [b], Zi Yang [c,*], Xun Zhang [d]

[a] China Center for Economic Research, National School of Development, Peking University, China
[b] Department of Economic Statistics, School of Statistics, Southwestern University of Finance and Economics, China
[c] Department of Quantitative Economics, School of Statistics and Mathematics, Central University of Finance and Economics, China
[d] Department of Financial Statistics, School of Statistics, Beijing Normal University, China

ARTICLE INFO

JEL classification:
C53
D14
D81
G11

Keywords:
Economic uncertainty
Portfolio choice
Risky assets
Return volatility
Credit constraint

ABSTRACT

This paper provides micro-level evidence on the effects of economic uncertainty on household portfolio choices driven by precautionary motives. We propose a conceptual framework illustrating how increased economic uncertainty—through heightened volatility in financial asset returns and tighter credit constraints—reduces household participation in risky asset investments while promoting a shift toward risk-free assets. Using region-level economic uncertainty indices and household-level portfolio data from China, we empirically confirm these theoretical predictions. To address potential endogeneity, we employ the incidence of extreme temperature as an instrumental variable, yielding consistent and statistically significant results. Additionally, our results reveal that economic uncertainty exerts a more significant impact on households with higher levels of human capital, higher financial literacy, and a risk-appetite preference, due to their heightened sensitivity to financial risks. This study contributes to the literature by providing robust micro-level evidence on how economic uncertainty influences household financial decision-making.

1. Introduction

Households play a central role as decision-making agents in financial markets (Gomes et al., 2021). However, existing research shows that households often deviate from the predictions of traditional portfolio theory, which advocates for a proportional allocation of wealth across financial assets (Markowitz, 1952). Campbell (2006) refers to this phenomenon as the “limited participation puzzle”. Even in the United States, where financial markets are well-developed, only about 15% of households directly participate in the stock market.[1] The situation is even more pronounced in developing countries. For instance, according to the 2019 China Household Finance

* Corresponding author. Central University of Finance and Economics, Changping District, Beijing, 102206, China.
E-mail address: ziyang@cufe.edu.cn (Z. Yang).

[1] The data is sourced from the Survey of Consumer Finance (SCF) in 2019. Generally, the SCF is a triennial cross-sectional survey of American families, and the data has been collected by the National Opinion Research Center (NORC) at the University of Chicago.

https://doi.org/10.1016/j.iref.2026.105418
Received 6 July 2025; Received in revised form 4 March 2026; Accepted 17 May 2026
Available online 18 May 2026

Survey (CHFS), only 11.07% of Chinese households hold risky assets such as stocks, funds, or bonds, while deposit-based assets account for 43.75% of total financial assets. Additionally, based on risk preference questions about financial investments in the CHFS questionnaire,[2] 63.95% of households fall into the risk-averse category. Such conservative financial behavior becomes especially salient during periods of economic uncertainty, when households tend to further reduce exposure to risky assets rather than pursue new investment opportunities.

In recent years, economic uncertainty has remained elevated and persistent, driven by factors such as geopolitical tensions, the COVID-19 pandemic, and inflationary pressures in both developed and developing economies. For example, the global financial instability caused by the COVID-19 pandemic disrupted markets and heightened volatility, while in developing countries, such as Argentina, recurrent sovereign debt crises and inflation spikes have amplified economic uncertainty. Many studies have investigated the macroeconomic effects of economic uncertainty shocks, highlighting their adverse impacts not only on macroeconomic variables, which hinder economic recovery (Bloom, 2009), but also on financial market volatility (Pástor & Veronesi, 2012, 2013). Additionally, financial institutions often respond to heightened uncertainty by tightening credit supply (Ashraf & Shen, 2019; Francis et al., 2014), aiming to mitigate default risks. This, in turn, increases credit constraints for households, further restricting their ability to diversify portfolios or invest in risky assets. Given these dynamics, the "limited participation puzzle" may be partly explained by the pervasive influence of economic uncertainty. We hypothesize that external economic uncertainty impacts both the expected returns from risky assets and the optimal investment opportunities available to households, thereby shaping household portfolio decisions.

To investigate this issue, we first develop a conceptual framework that illustrates how economic uncertainty influences household portfolio choices. We propose that increased economic uncertainty raises the volatility of risky assets returns, thereby reducing households' willingness to invest in financial markets. Additionally, increased economic uncertainty tightens credit constraints by limiting the supply of credit and raising household's borrowing demand, further restricting households' investment capabilities. Together, these two mechanisms ultimately lead to a decrease in holdings of risky assets, with a shift towards risk-free assets.

We then provide micro-level empirical evidence to test this interpretation by combining regional indicators of economic uncertainty with household-level data. The household data source we utilize is the China Household Finance Survey (CHFS), which is a nationally representative survey initiated by the Southwestern University of Finance and Economics in 2011 and has been conducted biennially ever since. It adopts a scientific sampling approach utilizing a multi-stage stratified random sampling approach to ensure representation across diverse geographical regions and household structures. The CHFS data furnishes comprehensive and detailed information regarding individual and household characteristics, encompassing demographics, employment status, assets, liabilities, income, expenditures, as well as insurance coverage. In our analysis, we focus primarily on data related to the financial assets held by households, which include cash, demand deposits, time deposits, and a variety of risky financial assets such as stocks, mutual funds, bonds, financial derivatives, foreign exchange, and gold.

To measure economic uncertainty in China, we adopt the methodology developed by Jurado et al. (2015), calculating province-quarter level economic uncertainty spanning from Q1 2006 to Q4 2022. This index is based on unpredictable conditional volatility of various economic indicators, including national accounts, financial data, household surveys, inflation, investment, agriculture, manufacturing, energy, construction, insurance, and real estate data. The index captures the variation in real economic uncertainty over time and meanwhile offers rich regional differentiation.

First, to examine the impact of economic uncertainty on household portfolio choices, we conduct household-level panel regressions with fixed effects. Our findings reveal that increased economic uncertainty reduces the proportion of households' investments in risky financial assets. We further control for various factors, including the characteristics of the household and regional development indicators, and the results remain statistically and economically significant. Relative to the mean level of risky assets share, a one standard deviation increase in economic uncertainty reduces the share of household investments in risky assets by 8.75%.

Second, to confirm the robustness of our baseline findings, measurement error and sample selection issues are fully considered. More importantly, to establish the causal relationship between economic uncertainty and household portfolio choices, we adopt the incidence of extreme temperatures in each province as an instrumental variable for economic uncertainty. Theoretically, extreme climate events can disrupt normal economic activities and heighten economic uncertainty (Barnett et al., 2020; Burke et al., 2015; Dell et al., 2014). Thus, it is reasonable to expect that higher frequency of extreme temperatures is associated with greater economic uncertainty. Additionally, extreme weather events are inherently random and largely unpredictable, satisfying the exogeneity for instrumental variables. Our analysis confirms that this instrumental variable is significantly correlated with economic uncertainty in China, consistent with our expectations. The second-stage estimation results of the instrumental variable regression also show that increased economic uncertainty leads households to reduce their holdings of risky assets, reinforcing the robustness of our findings.

We further investigate the mechanisms through which economic uncertainty has a negative impact on household portfolio choices. From the perspective of return volatility, we hypothesize that increased economic uncertainty raises the volatility of returns on risky assets, making households less willing to invest in financial markets. This ultimately results in a reduction in risky asset holdings and an increase in the proportion of risk-free assets in household portfolios. Our empirical findings confirm that economic uncertainty indeed raises the volatility of returns on risky assets, reduces financial portfolios returns, and shift investment away from high-risk assets

[2] Based on the question regarding the household head's risk attitude in the CHFS questionnaire — "If you had a sum of money for investment, which of the following options would you most prefer? (1) high risk and high return; (2) moderately high risk and moderately high return; (3) average risk and average return; (4) moderately low risk and moderately low return; (5) unwilling to take any risk" — this study classifies households into two categories: risk-appetite and risk-averse. Specifically, a household is defined as risk-appetite if the household head selects the first two options. Households where the head selects options (3), (4), or (5) are classified as risk-averse.

towards risk-free assets. From the perspective of credit constraint, we demonstrate that economic uncertainty reduces the supply of credit and intensifies household credit constraints, thereby altering household portfolio choices and reducing their holdings of risky assets. Empirical evidence shows that increasing economic uncertainty not only reduces the credit supply from banks but also increases borrowing demand for households. These two effects further limit households' ability to invest in financial markets, resulting in a reduction in the share of risky assets in household portfolios. We also find that economic uncertainty has a particularly strong and negative impact on the holdings of risky assets among credit-constrained households, highlighting the essential role of credit constraints in shaping portfolio choices.

Further heterogeneity analysis focuses on the role of risk awareness in shaping household responses to economic uncertainty. Since that human capital, financial literacy and risk preference are key factors influencing risk awareness, we specifically examine how these three factors influence the way economic uncertainty affects household portfolio choices. Our results reveal that economic uncertainty exerts a more significant impact on households with higher human capital and financial literacy. For risk preference, where we split the sample into risk-appetite and risk-averse groups, economic uncertainty also has a more significant impact on the risk-appetite subgroup. These finding support the notion that households with greater risk awareness are more likely to adjust their portfolios, often reducing their exposure to risky assets in response to economic volatility.

Our study contributes to the literature on the measurement of economic uncertainty. Given the absence of an objective measure for uncertainty, existing research predominantly relies on several alternative approaches: employing single proxy variables (Bredin & Fountas, 2009; Bali & Zhou, 2016; Bloom, 2009), leveraging exogenous shocks (Chan et al., 2020; Duchin, & OzbasSensoy, 2010; Julio & Yook, 2012; Williams, 2012), or utilizing text-based analysis of news reports or internet searches (Baker et al., 2016; Huang & Luk, 2020). While these measures offer the advantage of direct observability, they often fail to fully capture the multifaceted nature of economic uncertainty. Furthermore, most of these indicators are constructed at the national level or time-series, thereby overlooking potential regional heterogeneity. Similar to Jurado et al. (2015), we construct our uncertainty measure based on the unpredictable conditional volatility of a broad set of economic variables. Building upon this approach and following Qiu (2021), we contribute to the literature by developing a province-quarter measure of economic uncertainty for China, enabling a more accurate examination of its economic consequences.

In terms of its economic impact, numerous studies have theoretically and empirically confirmed the negative impact of economic uncertainty on economic growth (Baker et al., 2016; Bloom, 2009; Bloom et al., 2018; Fernández-Villaverde et al., 2011; Jurado et al., 2015). For instance, Bloom (2009) uses a time-varying second-order stochastic model to simulate the effects of macroeconomic uncertainty shocks, finding that such shocks lead to sharp declines in output, employment, and investment. Regarding the impact of uncertainty on financial markets, economic uncertainty is a key driver of market volatility (Pástor & Veronesi, 2012, 2013; Baker et al., 2016; Bali et al., 2021; Asgharian et al., 2023). Specifically, Pástor and Veronesi (2013) indicate that uncertainty increases the risk premium of stocks, leading to greater market volatility, especially during economic downturns. Bali et al. (2021) explore the role of macroeconomic uncertainty on the cross-sectional returns of corporate bonds, confirming that uncertainty is a significant predictor of future bond returns. However, this strand of literature focuses exclusively on macroeconomic outcomes or aggregate financial markets and has not extended its analysis of financial market-related uncertainty impacts to the micro household level.

Furthermore, economic uncertainty also affects the behaviors of microeconomic agents. In response to potential adverse default risks, commercial banks tend to reduce liquidity supply to mitigate potential default risks (Ashraf & Shen, 2019; Francis et al., 2014). At the same time, heightened uncertainty raises the value of real options and borrowing costs for firms, making them more cautious in their investment decisions and more likely to hold cash reserves (Bloom et al., 2007; Choi et al., 2018; Gulen & Ion, 2016; Julio & Yook, 2012). A few studies focus on households, primarily examining the impact of specific economic shocks or perceived economic uncertainty on household spending behavior (Gourio, 2012; Aaberge et al., 2017; Ben-David et al., 2018; Coibion et al., 2024; Oh & Picco, 2025). For instance, Coibion et al. (2024) use randomized information treatments to induce exogenous changes in perceived macroeconomic uncertainty and find that households with higher expectations of economic uncertainty are more likely to reduce their total monthly spending. We contribute to this literature by comprehensively identifying the impact of macroeconomic uncertainty on household financial decisions, expanding the understanding of micro-level effects to the domain of household finance.

Our paper also contributes to the extensive literature on household finance, which has identified a variety of demographic characteristics—such as age, gender, risk attitude, financial literacy, and social networks—as important determinants of household portfolio choices (Cocco, 2005; Barasinska et al., 2012; Campbell, 2006; Cardak & Wilkins, 2009; Gomes et al., 2021; Grinblatt et al., 2011; Van Rooij et al., 2011). Another significant strand of this literature empirically examines the role of income risk in shaping portfolio allocations (Guiso et al., 1996; Angerer & Lam, 2009; Fagereng et al., 2017; Chang et al., 2022; Catherine et al., 2024).

However, few studies have systematically investigated the role of macroeconomic uncertainty in this context, despite its particular salience for households in developing economies. A limited but related body of research explores the effect of political or policy uncertainty on household stock market participation. For instance, Agarwal et al. (2022) investigate the impact of political uncertainty, using exogenous shocks from U.S. gubernatorial elections, and find that such uncertainty reduces household stock market participation. Lee et al. (2020) show that U.S. households reduce their exposure to the stock market in response to an increase in the economic policy uncertainty (EPU) of not only U.S., but also to an increase in the Chinese EPU. We contribute this literature by systematically examining the effect of broader macroeconomic uncertainty on household portfolio choice. Furthermore, we develop a conceptual framework to the underlying mechanisms and provide empirical evidence that return volatility and credit constraints serve as two critical channels through which economic uncertainty influences household financial decisions. Our findings could have broader implications for assessing the impact of economic uncertainty in other developing countries.

This paper proceeds as follows. Section 2 constructs a conceptual framework and proposes main propositions of the study. Section 3 introduces the measurement of economic uncertainty at the provincial level. Section 4 provides a comprehensive explanation of our specification, measurements, and data. Section 5 documents the impact of economic uncertainty on household portfolio choices. Sections 6 focus on mechanism analysis. Section 7 explores further discussion and Section 8 concludes.

2. Conceptual framework

To illustrate the intuition behind how economic uncertainty influences household portfolio choice, we consider a one-period financial market comprising two types of assets: risk-free and risky financial assets. The risk-free rate is assumed to be zero, while the price of risky asset is denoted by p, with its total return following a normal distribution characterized by mean r and standard deviation σ. Households make borrowing and investment decisions at the beginning of the period. Let the initial wealth of a representative household be W_0, and the wealth at the end of the period be denoted as W_1. Household's preferences are modeled through a constant absolute risk aversion (CARA) utility function, where utility depends on the terminal wealth:

$$U(W_1) = -\exp(-\alpha W_1) \tag{2.1}$$

where α is household's risk-aversion coefficient. Note that W_1 contains the return of risky assets, which is a random variable. Therefore, the representative household is maximizing expected utility $E[U(W_1)]$. Based on this utility function, we can explore the mechanisms of economic uncertainty affecting household portfolio choice from the aspects of return volatility and credit constraint.

2.1. Mechanism of return volatility

First, we analyze how economic uncertainty affects household portfolio choice through heightened return volatility. Substantial literature establishes that economic uncertainty amplifies financial market volatility (e.g., Bloom, 2009; Boutchkova et al., 2012), which in turn increases the uncertainty surrounding asset returns (Pástor & Veronesi, 2012; 2013). In our model, we assume that the standard deviation of risky asset returns, σ, increases with economic uncertainty. This section thus focuses on the relationship between return volatility and portfolio allocation decisions.

At the start of the period, households can borrow from credit market, with maximum borrowing amount given by a fixed multiple φ of their initial wealth W_0. The household allocates total wealth between risk-free and risky assets. Let k and d denote the amount of wealth allocated to risk-free and risky assets, respectively. The household's total wealth at the beginning of the period is therefore:

$$W_0(1+\varphi) = k + dp \tag{2.2}$$

The ending wealth W_1 can thus be expressed as:

$$W_1 = W_0 + d(r-p) \tag{2.3}$$

Note that the allocation d is endogenous, determined by the expected return and volatility of the risky asset.

Given the CARA utility function in Equation (2.1), the household's expected utility is:

$$E[U(W_1)] = \int U(W_1)f(r)dr = -\exp\left\{-\alpha\left[W_0 + d(\bar{r}-p) - \frac{1}{2}\alpha\sigma^2 d^2\right]\right\} \tag{2.4}$$

where $\bar{r}$ is the expected return of the risky asset. The optimal amount of risky assets d^* that maximizes household's expected utility is given by:

$$d^* = \frac{1}{\alpha\sigma^2}(\bar{r}-p) \tag{2.5}$$

Equation (2.5) reveals that an increase in the volatility of returns, reflected by σ, reduces the optimal amount (and proportion) of risky assets in household's portfolio. This leads to the following proposition:

Proposition 1. (***Mechanism of Return Volatility***)**:** *An increase in economic uncertainty raises the volatility of risky asset returns, thereby reducing the proportion (and amount) of risky assets held by households.*

2.2. Mechanism of Credit Constraint

We now turn to the second mechanism, i.e., tightened credit constraint, through which economic uncertainty influences portfolio choice. As established in Section 2.1, households can achieve the optimal allocation of risky assets if their access to credit is sufficiently large, satisfying:

$$W_0(1+\varphi) \geq d^* = \frac{1}{\alpha\sigma^2}(\bar{r}-p) \tag{2.6}$$

However, when households face tighter credit constraints—such as when the credit multiple φ declines—the optimal allocation condition in Equation (2.6) no longer holds, forcing households to reduce their investment in risky assets.

Economic uncertainty exacerbates credit constraints through its effect on the credit supply. This is primarily a supply-side phenomenon. Under heightened uncertainty, it becomes more challenging for banks to accurately assess borrowers' repayment capacity

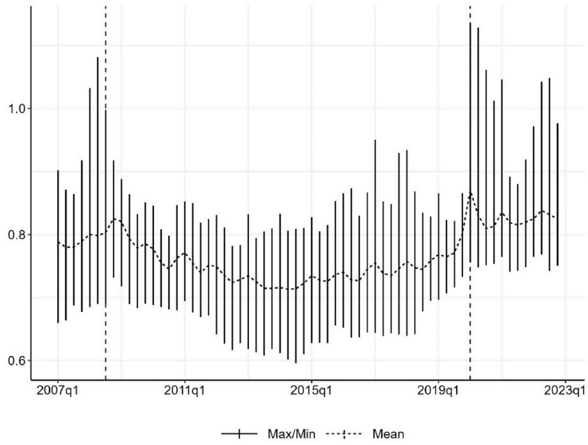

Fig. 1. Evolution of Economic Uncertainty in China
Note: Economic uncertainty is measured at the provincial-quarter level based on the unpredictable conditional volatility of numerous economic variables. The "Max/Min" refers to the max or min index value of provincial economic uncertainty, while the "Mean" refers to the national arithmetic average economic uncertainty.

and associated credit risks. In response to this increased uncertainty, risk-averse banks may perceive a higher overall probability of borrower default and consequently reduce the supply of credit (Ashraf & Shen, 2019). The resulting credit contraction limits households' ability to finance investments in risky assets, reducing both the absolute and relative amount allocated to such assets. This mechanism leads to the following proposition.

Proposition 2. (***Mechanism of Credit Constraint***): *An increase in economic uncertainty reduces the supply of credit, intensifies households' credit constraints, and consequently leads to a decrease in the proportion (and amount) of risky assets held by households.*

3. Measurement of economic uncertainty in Chinese provinces

Existing studies have predominantly focused on constructing economic uncertainty indices at the national level, relying on time-series data, which fails to capture the heterogeneity of economic uncertainty across regions (Baker et al., 2016; Bloom, 2009; Jurado et al., 2015). To address this gap, we build on the frameworks of Jurado et al. (2015) and Qiu (2021), employing a conditional volatility model to develop an economic uncertainty index based on various economic variables at the province-quarter level in China.

3.1. Methodology

The economic uncertainty for province p at time t over a future period h is defined as $EU_{p,t}(h)$, representing the weighted aggregation of the uncertainties of multiple economic variables, measured as the conditional volatility of their unpredicted components:

$$EU_{p,t}(h) \equiv \underset{N_y \to \infty}{plim} \sum_{s=1}^{N_y} w_s u^y_{p,st}(h) \equiv E_w\left[u^y_{p,st}(h)\right] \tag{3.1}$$

where

$$u^y_{p,st}(h) = \sqrt{E\left[\left(y_{p,s,t+h} - E\left[y_{p,s,t+h}\middle|I_t\right]\right)^2\middle|I_t\right]} \tag{3.2}$$

Here, w_s denotes the weight assigned to each economic variable, and $y_{st} \in Y_t = \left(y_{1t}, \cdots, y_{N_y t}\right)'$ represents a set of economic variables. The term $u^y_{p,st}(h)$ captures the uncertainty of variable $y_{p,st}$ as the conditional volatility of its unexpected component, after accounting for the predictable part of the provincial economic data. $E[\cdot|I_t]$ denotes the conditional expectation given the information set I_t available at time t. An increase in the mean squared error of $y_{p,s,t+h}$, conditional on the available information, reflects an increase in the economic uncertainty of the corresponding variable for province p.

To estimate $E\left[y_{p,s,t+h}\middle|I_t\right]$, we approximate the information set using 61 provincial-level quarterly economic variables from Q1 2006 to Q4 2022, covering domains such as national accounts, finance, household surveys, trade in goods and services, inflation, investment, agriculture, manufacturing, energy, construction, insurance, and real estate. A detailed list of the economic variables is provided in Appendix. Principal component analysis (PCA) is employed to extract potential common factors F_t.

We then estimate y_{st} using a forecasting model based on F_t and derive the forecast error as follows:

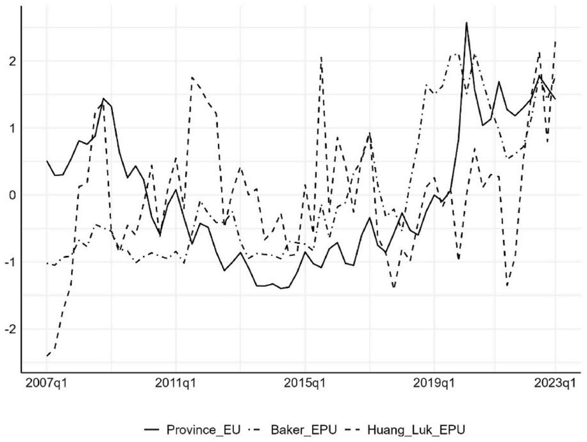

Fig. 2. Comparison of Economic Uncertainty and EPU Index
Note: We compare the provincial economic uncertainty index with the uncertainty index constructed by Baker et al. (2016), Huang and Luk (2020). These two indexes are both Chinese economic policy uncertainty Index (EPU) based on text search analysis of newspaper coverage, but newspaper sources used are different. To make the index comparable in magnitude, we standardized all index over the sample period.

$$y_{s,t+1} = \phi_s^y(L)y_{st} + \gamma_s^F(L)\widehat{F}_t + \gamma_s^W(L)W_t + \upsilon_{s,t+1}^y, \upsilon_{s,t+1}^y \sim N\left(0, \left(\sigma_{s,t+1}^y\right)^2\right) \tag{3.3}$$

where $\widehat{F}_t$ represents consistent estimates of a rotation of the factors F_t, and W_t includes additional predictors such as lagged common factors and their squared terms to capture non-linear dynamics. The polynomials $\phi_s^y(L)$, $\gamma_s^F(L)$ and $\gamma_s^W(L)$ are finite-order lag operators. Linear regression is applied to estimate the forecast error $\upsilon_{s,t+1}^y$, which is then used to construct a stochastic volatility model:

$$log\left(\sigma_{s,t+1}^y\right)^2 = \alpha_s^y + \beta_s^y\, log\left(\sigma_{s,t}^y\right)^2 + \delta_s^y\mu_{s,t+1}^y, \mu_{s,t+1}^y \sim i.i.d.N(0,1) \tag{3.4}$$

The parameters α_s^y, β_s^y, and δ_s^y, are estimated using the least square residuals from the forecasting models through Markov Chain Monte Carlo (MCMC) methods, yielding the estimates for $\sigma_{s,t}^y$.

Finally, we compute the overall economic uncertainty for each province by taking a simple average, setting $w_s = 1/N_y$. This aggregation approach imposes no additional structure beyond the assumptions on the latent volatility process. As suggested by business cycle theory, uncertainty tends to exhibit common movements across multiple variables, indicating that economic uncertainty reflects the synchronized fluctuations in uncertainty across the economy, rather than being tied to any single variable.

3.2. Description of economic uncertainty

The evolution of economic uncertainty is illustrated in Fig. 1. The dashed line shows the time-series national average value of our constructed index, and the vertical bars capture the range between the highest and lowest values of provincial economic uncertainty index. It is obvious that the index captures variations in real economic uncertainty over time. At the national level, economic uncertainty peaked during the global financial crisis of 2007-2008 and the COVID-19 pandemic in 2020, with the pandemic causing the most significant uncertainty during the sample period. Additionally, significant cross-sectional differences in economic uncertainty are evident across provinces, with greater variability during periods of economic distress, such as the global financial crisis and the COVID-19 pandemic. This province-level index not only reflects macroeconomic dynamics but also captures regional heterogeneity in economic uncertainty that nation-level indices overlook.

3.3. Comparison with existing indices

We further validate our provincial economic uncertainty index by comparing it with the Economic Policy Uncertainty (EPU) indices constructed by Baker et al. (2016) and Huang and Luk (2020). Both indices are based on text analysis of newspaper articles, capturing uncertainty related to fiscal, monetary, and regulatory policies, though the sources of the articles differ. To facilitate comparison, we standardize all indices over the sample period.

As shown in Fig. 2, our provincial uncertainty index exhibits distinct dynamics compared to the EPU. For example, following the 2008 financial crisis, both indices spiked, but they diverged after the Chinese government introduced a 4-trillion-RMB stimulus package in late 2008. The EPU dropped sharply in Q4 2008, reflecting reduced policy-related uncertainty, whereas our index decreased more gradually, indicating that underlying economic uncertainty persisted.

Similarly, during the 2018 Sino-US trade war, the EPU rose significantly more than our provincial index, reflecting heightened policy-related uncertainty. In contrast, during the COVID-19 pandemic, our index captured the surge in economic uncertainty, while the EPU remained relatively low, as the pandemic was not a policy-driven shock. These differences demonstrate that the provincial index is better suited to capturing uncertainties arising from economic shocks beyond the scope of policy measures.

4. Specification and data

4.1. Specification

To examine the impact of economic uncertainty on household portfolio choice, we propose the following empirical model:

$$Asset_{ipt} = \gamma_0 + \gamma_1 \ ln(EU_{pt}) + X'_{ipt}\gamma + \phi_i + \varphi_t + u_{ipt} \tag{4.1}$$

In this model, i refers to households, p to provinces where households are located, and t to years. The dependent variable, $Asset_{ipt}$ is set to be household $i's$ risky asset share of total financial assets. EU_{pt} represents the constructed economic uncertainty index for province p in year t, capturing the uncertainty environment where the household resides. The vector X_{ipt} includes several control variables reflecting individual, household, and regional characteristics. These factors allow us to account for heterogeneities that may affect household portfolio choices. Household-level controls include the head's demographic and socio-economic characteristics, such as age, education level, marital status, living conditions, health status, and risk preferences. Due to the inclusion of fixed effects in our model, the coefficient on age cannot be separately identified. To mitigate potential omitted variable bias, we control for the square of age. Additional household controls are the logarithm of net family income and household size. We also include region-level variables to control for differences in economic and financial development, specifically the logarithm of GDP per capita, the logarithm of loan balances of financial institutions, and economic growth rate, at the city level. These variables ensure that our analysis captures the influence of both individual behavior and macroeconomic factors on portfolio choices.

The model further incorporates household fixed effects ϕ_i to control for unobserved time-invariant household characteristics and year fixed effects φ_t to capture time-specific shocks that affect all households simultaneously. The error term u_{ipt} accounts for unobserved idiosyncratic factors. To mitigate concerns about reverse causality—where household portfolio decisions might influence perceived economic uncertainty—we lag the economic uncertainty index by one year. Additionally, we cluster standard errors at the province-year level to correct for potential correlations within regions and over time. The key parameter of interest is γ_1, which measures the effect of economic uncertainty on the share of risky financial assets held by households. We expect this coefficient to be negative, as heightened uncertainty typically leads to more conservative investment behavior.

4.2. Data

This study draws on two main datasets. The first source is China Household Finance Survey (CHFS), a nationally representative survey conducted biennially by Southwestern University of Finance and Economics since 2011. The CHFS employs a stratified, multi-stage, and proportionate sampling method to collect detailed household data across China. Five rounds of the survey have been completed so far, covering the years 2011, 2013, 2015, 2017, and 2019. The survey provides extensive information on household demographics, employment, income, expenditures, assets, liabilities, and insurance. For our analysis, we focus on the information of financial assets held by households. These assets include cash, demand deposits, time deposits, and a variety of risky financial assets covering stocks, mutual funds, bonds, financial derivatives, foreign exchange, and gold.

The second source of data consists of region-level economic indicators. This includes the 61 economic variables used to construct the provincial-level economic uncertainty index, as well as the regional control variables employed in the estimation of model (4.1). The economic uncertainty index is built using quarterly provincial data, while the regional control variables—such as GDP per capita, economic growth rate, and total deposits of financial institutions—are sourced from the Chinese Urban Statistical Yearbook.

Given that the CHFS data is collected biennially, we align the provincial-level quarterly economic uncertainty index by taking the arithmetic average of the four quarters within each year. This aggregation ensures consistency between the uncertainty index and the annual household-level data. We then restrict the sample to households with heads aged 16 or older[3] and exclude observations with missing values for key variables, such as risky financial investments, to maintain data quality. Subsequently, household-level data are matched with provincial-level variables using the province of residence and survey year available in the CHFS. Ultimately, our final unbalanced panel dataset covers 29 provinces, including 27,072 unique households and a total of 78,165 household-wave observations.[4] Table 1 provides the summary statistics of the main variables.

[3] According to the Labor Law of the People's Republic of China, 16 years old is clearly defined as the minimum legal working age. Individuals aged 16 and above are entitled to engage in formal employment and obtain independent labor income, which lays the foundation for their participation in household economic decision-making. This legal threshold aligns with the practical reality of adolescent economic engagement, as it signifies the age at which individuals begin to acquire economic agency. There is a growing body of research on economic participation that supports the inclusion of 16-year-olds. For instance, Giuntella, and LuWang (2024) explicitly include 16-year-olds in their household data from China; Yang and Zhang (2022) adopt a 16-year-old threshold for household heads in their analysis of Chinese household financial behavior.

[4] As with most large-scale household panel surveys, attrition is inevitable across waves (e.g., due to household relocation, or loss of contact). Meanwhile, the CHFS supplements new samples in each wave to maintain representativeness. To maximize the utilization of valid observations while retaining sufficient longitudinal information, we retained households that participated in at least two waves—rather than restricting to households with complete data across all waves.

Table 1
Summary statistics.

Variables	Obs	Mean	Std.Dev	Min	Max
Risky Asset Share	78165	0.0262	0.1136	0	1
Economic Uncertainty	78165	0.7757	0.0305	0.7045	0.8425
Age	78165	55.3938	13.48	17	102
Schooling Years	78165	9.0926	3.9642	0	22
Health Status	78165	3.1996	1.0552	1	5
Living Condition	78165	0.6369	0.4809	0	1
Marriage Status	78165	0.8740	0.3319	0	1
Risk Preference	78165	0.0557	0.2293	0	1
Family Size	78165	3.4754	1.628	1	19
Family Income (log)	78165	9.3487	1.631	0	15.2018
GDP per capita (log)	78165	11.0915	0.5492	9.3156	12.8281
Financial Institutions Loans (log)	78165	17.3446	1.7893	13.7487	21.0069
Economic Growth Rate(%)	78165	8.4609	3.4141	−15.9	19.31

Note: This table gives the characteristics of households in our sample. Risky asset share is defined as the proportion of households' risky assets to total financial assets. Economic uncertainty is measured at provincial level based on the unpredictable conditional volatility of numerous economic variables. Schooling years refer to the total years of formal education completed by the household head. Living condition is approximated using a dummy variable that equals one if the household is in an urban area. Health status is an ordinal variable ranging from 1 to 5, with higher values indicating better health of the household head. Risk preference is a dummy variable that equals one if the household is risk appetite. Regional development indicators—including the logarithm of GDP per capita, the logarithm of loans from financial institutions, and the economic growth rate—are measured at the city level.

Table 2
Economic uncertainty and household portfolio choice.

Risky Asset Share	(1)	(2)	(3)	(4)
Economic Uncertainty	−0.0514**	−0.0517**	−0.0523**	−0.0583**
	(0.0245)	(0.0246)	(0.0245)	(0.0237)
Head Controls	N	Y	Y	Y
Household Controls	N	N	Y	Y
Regional Controls	N	N	N	Y
Household Fixed Effect	Y	Y	Y	Y
Year Fixed Effect	Y	Y	Y	Y
N	78,165	78,165	78,165	78,165
R^2	0.6105	0.6117	0.6118	0.6120

Note: This table reports regression estimates of economic uncertainty on household portfolio choice using a fixed-effects model at the household level. Risky asset share is defined as the proportion of households' risky assets to total financial assets. Economic uncertainty is measured at provincial level based on the unpredictable conditional volatility of numerous economic variables and we lag the measurement of economic uncertainty by one year. The control variables are the characteristics of the head of a household (age, years in education, marriage status, health status, living condition and risk preference), household factors (logarithm of family income and family size), and indicators of regional development (logarithm of gdp per capita and financial institutions loans, and economic growth rate). Standard errors are clustered at the provincial-year level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

5. Economic uncertainty and household portfolio choice

5.1. Baseline results

We begin our empirical analysis by investigating the effect of economic uncertainty on household portfolio choice. Table 2 presents the OLS estimation results of model (4.1) in which we control for household and year fixed effects as well as a wide set of control variables, including individual, household, and regional characteristics. To avoid serial correlation within province, the standard errors are clustered at the province-year level. Column (1) of Table 2 shows the univariate relationship between economic uncertainty and household's risky asset holding, as measured by household-level proportion of risky asset in total financial assets, and columns (2) to (4) present the results after controlling for individual, household, and regional characteristics.

In all regressions, the coefficient for economic uncertainty is significantly negative, indicating that higher economic uncertainty is associated with a reduction in the proportion of risky financial assets held by households. In terms of magnitude, a one standard deviation increase in economic uncertainty corresponds to a reduction of 0.229 percentage points in the share of risky financial assets, or 8.75% relative to the mean (0.0262). Regarding control variables, we find that household heads who are older and in poorer health tend to hold a lower share of risky financial assets. Additionally, households with higher risk preference allocate more to risky assets, while higher family income is positively associated with investment in financial assets. At the regional level, higher per capita GDP is linked to greater exposure to financial markets.

In addition to the baseline analysis that identifies an overall negative effect of economic uncertainty on household's risky asset holding, we further examine its impact on different categories of risky assets. Specifically, we focus on three key asset types—stocks,

Table 3
Economic uncertainty and household portfolio choice: By category.

	(1)	(2)	(3)
	Stock	Bond	Fund
Economic Uncertainty	−0.0375***	−0.0021	−0.0136
	(0.0141)	(0.0038)	(0.0093)
Head Controls	Y	Y	Y
Household Controls	Y	Y	Y
Regional Controls	Y	Y	Y
Household Fixed Effect	Y	Y	Y
Year Fixed Effect	Y	Y	Y
N	78,165	78,165	78,165
R^2	0.6502	0.4930	0.4610

Note: This table reports regression estimates of economic uncertainty on household portfolio choice by Category using a fixed-effects model at the household level. Columns (1)-(3) is present the estimation results for the share of household assets allocated to the stock market, fund market, and bond market, respectively. Economic uncertainty is measured at provincial level based on the unpredictable conditional volatility of numerous economic variables and we lag the measurement of economic uncertainty by one year. The control variables are the characteristics of the head of a household (the squared of age, years in education, marriage status, health status, living condition and risk preference), household factors (logarithm of family income and family size), and indicators of regional development (logarithm of gdp per capita and financial institutions loans, and economic growth rate). Standard errors are clustered at the provincial-year level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 4
Robustness check.

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Measurement Bias		Sample Selection			
	Participation	Weighted Index	Remove Samples	Balanced Panel Data	Keep age ≥ 18	Heckman
Economic Uncertainty	−0.1114***	−0.0432**	−0.0539**	−0.0811*	−0.0583**	−0.0635**
	(0.0409)	(0.0191)	(0.0235)	(0.0418)	(0.0237)	(0.0245)
Head Controls	Y	Y	Y	Y	Y	Y
Household Controls	Y	Y	Y	Y	Y	Y
Regional Controls	Y	Y	Y	Y	Y	Y
Household Fixed Effect	Y	Y	Y	Y	Y	Y
Year Fixed Effect	Y	Y	Y	Y	Y	Y
N	78,165	78,165	75,129	17,908	78,152	78,165
R^2	0.7172	0.6119	0.6108	0.5350	0.6120	0.6126

Note: This table reports robustness regression estimates of economic uncertainty on household portfolio choice using a fixed-effects model at the household level. Columns (1) reports the results of financial market participation measured by a binary variable which takes one if households hold risky financial assets otherwise zero. Columns (2) reports the results of using this weighted economic uncertainty index. Columns (3) reports the results of the sample excluding household members working in the financial sector. Columns (4) report the results of a balanced panel data from 2013, 2015, 2017, and 2019. Columns (5) report the results by restricting the sample to household heads aged 18 or above. Column (6) reports the second-stage results of the Heckman two-step method, controlling for the Inverse Mills Ratio (IMR) obtained from the first stage. Economic uncertainty is measured at provincial level based on the unpredictable conditional volatility of numerous economic variables and we lag the measurement of economic uncertainty by one year. The control variables are the characteristics of the head of a household (age, years in education, marriage status, health status, living condition and risk preference), household factors (logarithm of family income and family size), and indicators of regional development (logarithm of gdp per capita and financial institutions loans, and economic growth rate). Standard errors are clustered at the provincial-year level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

mutual funds, and bonds, and investigate how economic uncertainty influences households' holdings in each. Columns (1) to (3) of Table 3 present the estimation results for the share of household financial assets allocated to the stock market, fund market, and bond market, respectively. The results show that the coefficient of economic uncertainty is negative for all three asset categories. Notably, this negative effect is statistically significant solely for stock assets. This heterogeneous impact can be attributed to the varying risk levels of the three asset types. Stocks—compared to bonds and funds—exhibit higher price volatility, greater sensitivity to macroeconomic fluctuations, and more uncertain returns, making them the riskiest asset class among the three. When faced with heightened economic uncertainty, households tend to adjust their portfolios more drastically by reducing holdings of high-risk assets (i.e., stocks) to mitigate potential investment losses. In contrast, the adjustment for bonds and funds is relatively weaker, as reflected in the statistically insignificant coefficients, which aligns with their lower risk attributes. Collectively, these findings clearly demonstrate that economic uncertainty drives households to reallocate their risky asset holdings in response to the risk characteristics of different assets.

5.2. Robustness check

We now perform a series of robustness checks to test the sensitivity of our results, focusing on the measurement bias and potential sample selection issues. Furthermore, we address concerns regarding the potential endogeneity of the economic uncertainty variable by implementing an instrumental variable (IV) approach.

(1) **Measurement Bias.** To begin with, we explore alternative specifications for the dependent variable. A potential concern is that the negative coefficient of economic uncertainty in the baseline results reflects not only the changes of household investment behavior, but also the depreciation in the market value of risky assets. Therefore, in the robustness check, we explore the impact of economic uncertainty on the extensive margin of household financial investment, beyond the intensive margin captured by the share of risky assets. Specifically, households may choose to withdraw entirely from risky investments rather than merely reducing their holdings. To investigate this, we use a binary variable indicating whether a household holds any risky financial assets. The estimated results from column (1) of Table 4 indicate that increased economic uncertainty significantly reduces the probability of households holding risky assets, thus alleviating the concern of market value depreciation effect.

Besides, the original economic uncertainty index, which employed a simple averaging method, could be influenced by uneven category sizes—since categories containing more sub-indicators (such as real estate) would inherently carry greater weight. To enhance the index's representativeness, we refine our index construction method by adopting a hierarchical weighting approach to aggregate the uncertainty of individual macroeconomic variables. Specifically, we categorize all underlying macroeconomic variables into ten distinct groups: output, public finance, people's livelihood, prices, foreign trade, finance, investment, corporate performance, real estate, and others. Each category is assigned an equal weight, ensuring that each economic domain contributes proportionally to the overall uncertainty index. Within each group, we further assign equal weights to each individual time series variable. As shown in column (2) of Table 4, the regression results using this weighted economic uncertainty index remain statistically significant and consistent with our main findings, supporting the robustness of the approach.

(2) **Sample Selection.** To address potential sample selection biases, we conduct a series of robustness checks. First, we exclude households with members working in the financial sector, as these individuals may have specialized knowledge or earlier access to information related to economic uncertainty, particularly in financial markets. Column (3) of Table 4 show that economic uncertainty continues to have a significantly negative effect on the share of risky financial assets held by household. Second, to avoid attrition bias, we construct a balanced household panel dataset by retaining trackable data from 2013, 2015, 2017, and 2019. The results of column (4) in Table 4 indicate that the negative impact of economic uncertainty on household holdings of risky assets remains robust. Third, although our baseline sample includes households whose heads are aged 16 or older, we acknowledge that 16-year-olds may lack sufficient economic independence or financial decision-making authority. To ensure sample validity, we restrict the sample to households with heads aged 18 or above. Column (5) show that the estimated coefficients remain consistent with our baseline results. Finally, the dependent variable in the baseline regressions—the share of risky assets in total household financial assets—may suffer from sample selection bias, as households without any risky asset holdings would have missing observed values on this measure. To address this potential selection bias, we adopt the Heckman two-step method. In the first stage, we use a Probit model to estimate the likelihood of participating in risky financial markets and obtain the Inverse Mills Ratio (IMR). We then include the IMR in the second-stage regression. Column (6) of Table 4 reports the two-step estimates. The results confirm that our main findings are robust to this correction.

(3) **IV approach.** To avoid estimation bias raised by other endogeneity issues such as measurement error of economic uncertainty variable, as well as reversed causality, we employ the instrumental variable (IV) approach. we adopt the incidence of extreme temperatures in each province as an instrumental variable for economic uncertainty. Theoretically, extreme climate events can disrupt normal economic activities and heighten economic uncertainty. A growing body of literature confirms that climate shocks significantly affect economic and financial systems (Baker et al., 2024; Barnett et al., 2020; Burke et al., 2015; Dell et al., 2014). Specifically, Baker et al. (2024) use exogenous natural disasters as shocks to identify the negative impact of uncertainty on economic growth. Thus, it is reasonable to expect that higher frequency of extreme temperatures is associated with greater economic uncertainty in a region. Regarding exogeneity, extreme weather events are inherently random and largely unpredictable. Conceptually, their influence on household financial decisions operates primarily through the channel of economic uncertainty. Furthermore, we control for a comprehensive set of regional economic variables in our regression models, which further strengthens the exogeneity of the climate variable.[5]

The instrumental variable estimation results are presented in Table 5. Columns (1) and (2) report the first-stage regression results, which show a significant positive correlation between the incidence of extreme temperatures and economic uncertainty, consistent with expectations. Columns (3) and (4) present the second-stage estimation results. The F-statistics for the weak instrument test are all above 10 across specifications, providing statistical evidence against the presence of weak instrument bias. The results suggest that

[5] Prior research suggests that climate risk affects household economic decisions not only through macroeconomic uncertainty, but also via more direct channels (e.g., Cui & Tang, 2024; Gan et al., 2025; Li et al., 2025; Li & Li, 2025). To address concerns about the exclusion restriction of our instrumental variable, we sequentially examined the effects of extreme temperatures on potential direct channel variables, including household consumption, household income, housing assets, financial assets, and household risk aversion, and found no significant impacts. Furthermore, we performed an additional test by regressing household risky asset allocation directly on the incidence of extreme temperatures, and again found no evidence that extreme temperatures exert a direct effect on household risky asset allocation.

Table 5
Instrumental variable approach.

Variables	(1)	(2)	(3)	(4)
	Economic Uncertainty		Risky Asset Share	
Economic Uncertainty			−0.1417**	−0.1549**
			(0.0669)	(0.0736)
Extreme Temperature	0.0495***	0.0457***		
	(0.0108)	(0.0105)		
Head Controls	N	Y	N	Y
Household Controls	N	Y	N	Y
Regional Controls	N	Y	N	Y
Household Fixed Effect	Y	Y	Y	Y
Year Fixed Effect	Y	Y	Y	Y
N	78,165	78,165	78,165	78,165
First stage F-stat	/	/	21.12	18.95

Note: This table reports robustness regression estimates of economic uncertainty on household portfolio choice using a fixed-effects model at the household level. Columns (1) and (2) report the first-stage estimation results. The instrumental variable is measured as the logarithm of the number of days with extreme temperatures recorded in each province for the corresponding year. Columns (3) and (4) report the second-stage estimation. Risky asset share is defined as the proportion of households' risky assets to total financial assets. Economic uncertainty is measured at provincial level based on the unpredictable conditional volatility of numerous economic variables and we lag the measurement of economic uncertainty by one year. The control variables are the characteristics of the head of a household (age, years in education, marriage status, health status, living condition and risk preference), household factors (logarithm of family income and family size), and indicators of regional development (logarithm of gdp per capita and financial institutions loans, and economic growth rate). We control for household fixed effects and add a time trend term. Standard errors are clustered at the provincial-year level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

economic uncertainty reduces the share of risky financial assets held by households. Although the estimated coefficient increases slightly compared to the baseline OLS model, the magnitude of change is modest, which further supports the robustness of our baseline findings.

6. Mechanism analysis

In this section, we investigate the mechanisms through which economic uncertainty impacts on household portfolio choice. We mainly focus on two mechanisms, as stated in Section 2. Firstly, due to risk aversion, increased economic uncertainty, by heightening the volatility of asset returns, reduced the incentive of investing in risky financial assets. Secondly, increased economic uncertainty by tightening credit constraints in household level due to reduced credit supply, may serve to downgrade the capacity of household investment and ultimately reduce the share of risky assets held by households.

6.1. Return volatility

As mentioned above, extensive research indicates that economic uncertainty amplifies financial market volatility (Bloom, 2009; Boutchkova et al., 2012), which, in turn, increases the uncertainty of asset returns (Pástor & Veronesi, 2012; 2013). This increased volatility likely triggers households to adjust their portfolio choices in response to their subjective risk perception (Guiso et al., 1996; Malmendier & Nagel, 2011; Coibion et al., 2024).

To investigate, we begin by focusing on the impact of economic uncertainty on the volatility of portfolio returns held by households. Following the approach of Delaney and Devereux (2019), we measure portfolio return volatility by using a five-year sample window. In details, we regress household-level financial asset returns on a set of control variables—household and regional factors—and compute the residuals. The standard deviation of these residuals within the five-year window serves as our measure of portfolio return volatility. For example, to calculate return volatility for 2013, we use portfolio returns from 2011, 2013, and 2015, regress them on control variables, and obtain the residuals' standard deviation for each household. This method is applied consistently across other years. As shown in Column (1) of Table 6, we find that economic uncertainty significantly increases the volatility of household portfolio returns.

Next, to mitigate potential errors in self-reported financial returns, we adopt the methodologies of Pelizzon and Weber (2009), using financial market index returns as proxies for household expected returns, and calculate return volatility based on these indices. Specifically, we categorize household financial assets into three types based on their risk levels: deposit-based, bond-based, and stock-based assets. For each category, we use the corresponding financial indices to approximate household financial asset returns. For instance, bond-based assets, including bonds and bond-oriented funds, are represented by the annual return rate of the China Bond Composite Index. Stock-based assets, encompassing stocks, equity-oriented funds, derivatives, and foreign currencies, are represented by the weighted average return of the Shanghai Composite and Shenzhen Component Indices, based on trading volume. Following the minimum variance model of Markowitz (1952), we use the standard deviation of the household portfolio returns to measure return volatility. For deposit-based assets, we set volatility to zero, while for stock-based and bond-based assets, we calculate volatility as the standard deviation of the monthly return for each asset class during the survey period. The specific calculation formula is:

Table 6
Mechanisms analysis: Return volatility.

Variables	(1)	(2)
	Return Volatility	Weighted Return Volatility
Economic Uncertainty	0.7065**	0.3589*
	(0.3441)	(0.1986)
Head Controls	Y	Y
Household Controls	Y	Y
Regional Controls	Y	Y
Household Fixed Effect	Y	Y
Year Fixed Effect	Y	Y
N	15,418	78,165
R^2	0.7677	0.9532

Note: This table reports the return volatility mechanism results of economic uncertainty on household portfolio choice using a fixed-effects model at the household level. Columns (1) reports the results of the volatility of portfolio returns, which is defined as the standard deviation of the residuals from regressing financial asset returns on household, family, and regional control variables within the five-year window. Column (2) reports the return volatility of household portfolios, calculated as the standard deviation of financial market index returns, with each asset category (deposit-based, bond-based, and stock-based assets) weighted by its proportion in the total household financial assets. Economic uncertainty is measured at provincial level based on the unpredictable conditional volatility of numerous economic variables and we lag the measurement of economic uncertainty by one year. The control variables are the characteristics of the head of a household (age, years in education, marriage status, health status, living condition and risk preference), household factors (logarithm of family income and family size), and indicators of regional development (logarithm of gdp per capita and financial institutions loans, and economic growth rate). Standard errors are clustered at the provincial-year level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 7
Mechanisms analysis: Alter portfolio choices.

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	High-Risk Participation	Low-Risk Participation	Risk-Free Only	High-Risk Share	Low-Risk Share	Risk-Free Share
Economic Uncertainty	−0.0781**	−0.0333*	0.4325**	−0.0419***	−0.0163	0.2360**
	(0.0320)	(0.0201)	(0.1813)	(0.0147)	(0.0118)	(0.0946)
Head Controls	Y	Y	Y	Y	Y	Y
Household Controls	Y	Y	Y	Y	Y	Y
Regional Controls	Y	Y	Y	Y	Y	Y
Household Fixed Effect	Y	Y	Y	Y	Y	Y
Year Fixed Effect	Y	Y	Y	Y	Y	Y
N	78,165	78,165	78,165	78,165	78,165	78,165
R^2	0.7411	0.5057	0.6255	0.6414	0.4882	0.5808

Note: This table reports the results of economic uncertainty on household altering portfolio choice using a fixed-effects model at the household level. We categorize household financial assets into three types: high-risk assets, including stocks, financial derivatives (such as futures, options), and foreign exchange; low-risk assets, including bonds, mutual funds, and other risk-related assets; and risk-free assets, such as deposits and cash. Column (1)-(3) report the results of extensive margin of household financial asset holdings with varying degrees of risk. We construct binary variables to indicate whether households participate in high-risk assets, low-risk assets, or solely hold risk-free assets. Columns (4)- (6) report the results of intensive margin, which is measured by the proportion of each asset type within household portfolios. Economic uncertainty is measured at provincial level based on the unpredictable conditional volatility of numerous economic variables and we lag the measurement of economic uncertainty by one year. The control variables are the characteristics of the head of a household (age, years in education, marriage status, health status, living condition and risk preference), household factors (logarithm of family income and family size), and indicators of regional development (logarithm of gdp per capita and financial institutions loans, and economic growth rate). Standard errors are clustered at the provincial-year level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

$$\sigma(R_i) = \left(w_i' \sum w_i\right)^{\frac{1}{2}} \tag{6.1}$$

where w_i represents the proportion of each type of financial asset to the total assets at the base year, $\sum$ is the covariance matrix of the financial asset categories, and $\sigma(R_i)$ denotes the return volatility on the portfolios of household i. Column (2) of Table 6 presents the results, showing that economic uncertainty significantly increases the return volatility on household portfolios. This finding further explains why households reduce their allocation to risky financial assets in face of economic uncertainty: the heightened volatility undermines the ability of these portfolios to act as a hedge against risk, and thus reduces the incentive of households in risky financial asset investment.

Given that increased economic uncertainty has raised asset return volatility, we expect that the share of risky assets held by households will be reduced. Theoretically, if the mechanism of return volatility holds, the effect of economic uncertainty is expected to

Table 8
Mechanisms analysis: Credit constraint.

Variables	(1)	(2)	(3)	(4)
	Bank Loan	Loan Growth Rate	Income Uncertainty	Credit Constraint
Economic Uncertainty	−0.7236***	−0.2239*	1.0978**	0.1344**
	(0.2467)	(0.1149)	(0.4623)	(0.0577)
Head Controls	/	/	Y	Y
Household Controls	/	/	Y	Y
Regional Controls	Y	Y	Y	Y
Household Fixed Effect	/	/	Y	Y
Bank Fixed Effect	Y	Y	/	/
Year Fixed Effect	Y	Y	Y	Y
N	1801	1801	78,165	78,165
R^2	0.9927	0.3988	0.6981	0.5392

Note: This table reports the credit constraint mechanism results of economic uncertainty on household portfolio choice using a fixed-effects model at the household level. Columns (1) to (2) report the results at bank level. Column (3) reports the results of household income uncertainty, which is defined as the unexpected temporary income. Column (4) reports the results of household credit constraint, which is based on the ratio of high-liquidity assets to household income. If high-liquidity assets are less than half of the current annual income, the household is considered credit constrained, with a value of 1; otherwise, it is 0. Economic uncertainty is measured at provincial level based on the unpredictable conditional volatility of numerous economic variables and we lag the measurement of economic uncertainty by one year. The control variables are the characteristics of the head of a household (age, years in education, marriage status, health status, living condition and risk preference), household factors (logarithm of family income and family size), and indicators of regional development (logarithm of gdp per capita and financial institutions loans, and economic growth rate). Standard errors are clustered at the provincial-year level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

be more pronounced on the holding of more risky assets. To investigate, we categorize financial assets into three types: high-risk assets, including stocks, financial derivatives (such as futures, options), and foreign exchange; low-risk assets, including bonds, mutual funds, and other risk-related assets; and risk-free assets, including deposits and cash. We then empirically analyze how economic uncertainty affects the allocation of these three categories of assets within household portfolios. In columns (1) to (3) of Table 7, we examine the effect of economic uncertainty on the extensive margin of household financial asset holdings with varying degrees of risk. We construct binary variables to indicate whether households participate in high-risk assets, low-risk assets, or solely hold risk-free assets. In columns (4) to (6), we explore the intensive margin, analyzing how economic uncertainty affects the proportion of each asset type in household portfolios.

As shown in column (1) of Table 7, we find that economic uncertainty reduces the participation probability of households participating in high-risk assets. Although it also has a negative effect on low-risk assets, as shown in column (2), this effect is relatively smaller. This suggests that heightened uncertainty discourages risk-taking behavior, prompting households to scale back their investments in high-risk assets and, in some cases, completely withdraw from them. To further confirm this, we construct a binary indicator for households that exclusively hold risk-free assets, defined as those who entirely divest from risky assets and invest solely in risk-free financial instruments. The results in column (3) show that economic uncertainty significantly increases the probability of households holding only risk-free assets, reinforcing the idea that households adjust their portfolios to mitigate the risks associated with uncertainty. Moreover, columns (4) to (6) of Table 7 indicate that economic uncertainty significantly reduces the proportion of high-risk assets in household portfolios, while increasing the share of risk-free assets. The effect on low-risk assets is negative but not statistically significant. These findings suggest that, as economic uncertainty increases the volatility of returns on risky assets, households reduce their exposure to high-risk assets by both decreasing their likelihood of holding such assets (extensive margin) and lowering their relative allocation to high-risk assets in favor of risk-free assets (intensive margin). This shift indicates that households aim to safeguard their financial stability and minimize potential losses in an uncertain economic environment.

6.2. *Credit constraint*

In addition to return volatility, credit constraints arising from economic uncertainty also play a crucial role in shaping household portfolio decisions. It is widely accepted that increased economic uncertainty exacerbates potential loan default risks, prompting banks to reduce credit supply (Ashraf & Shen, 2019), which in turn aggravates household liquidity constraints (Aaberge et al., 2017; Di Maggio et al., 2022; McKay, 2017). The resulting credit squeeze can restrict household participation in financial markets, often reducing exposure to risky assets in favor of safer, more liquid options in preparation for potential economic shocks.

To investigate, we first analyze the impact of economic uncertainty on credit supply. Using commercial bank annual report data on loan information, we assess whether economic uncertainty leads to a reduction in credit supply. Columns (1) and (2) of Table 8 explore whether banks adjust their credit supply in response to heightened uncertainty. Our findings show that increased economic uncertainty significantly reduces both the total loan amount and the loan growth rate at the bank level. This contraction in credit supply is expected to exacerbate household credit constraints, limiting their participation in financial markets.

Secondly, we investigate the impact of economic uncertainty on household's borrowing demand. Theoretically, increased economic uncertainty elevates the income risk faced by households. In response, households may require additional funds to hedge against this heightened risk. Specifically, when future income streams become less predictable, households tend to increase their precautionary

Table 9
Mechanisms analysis: Heterogeneity of credit constraint.

Risky asset share	(1)	(2)	(3)	(4)	(5)
	Fewer Asset	Greater Asset with Debts	Greater Asset without Debts	High-Consumption	Low-Consumption
Economic Uncertainty	−0.0196*	−0.1414**	−0.0686	−0.0849***	−0.0165
	(0.0108)	(0.0578)	(0.0507)	(0.0305)	(0.0156)
Head Controls	Y	Y	Y	Y	Y
Household Controls	Y	Y	Y	Y	Y
Regional Controls	Y	Y	Y	Y	Y
Household Fixed Effect	Y	Y	Y	Y	Y
Year Fixed Effect	Y	Y	Y	Y	Y
Mean	0.0117	0.0552	0.0549	0.0410	0.0113
N	52,113	8268	17,784	39,082	39,083
R^2	0.5734	0.6257	0.6130	0.6184	0.5722

Note: This table reports the results of credit constraint heterogeneity of economic uncertainty on household portfolio choice using a fixed-effects model. Columns (1) to (3) present the results of different household asset level, that we categorize households into two groups based on their endowments, and households with more assets are further divided into two subgroups: those with debt and those without debt. Columns (4) to (5) present the results of different consumption level, that we divide the sample into groups with low and high levels of consumption based on the household consumption at the base year. Risky asset share is defined as the proportion of households' risky assets to total financial assets. Economic uncertainty is measured at provincial level based on the unpredictable conditional volatility of numerous economic variables and we lag the measurement of economic uncertainty by one year. The control variables are the characteristics of the head of a household (age, years in education, marriage status, health status, living condition and risk preference), household factors (logarithm of family income and family size), and indicators of regional development (logarithm of gdp per capita and financial institutions loans, and economic growth rate). Standard errors are clustered at the provincial-year level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

borrowing to maintain consumption stability or to prepare for potential adverse economic shocks. Moreover, economic uncertainty could lead to greater demand for liquidity, as households may anticipate the need for immediate financial resources in the face of unforeseen contingencies. This heightened borrowing demand reflects households' adaptive strategies to safeguard their financial well-being under uncertain economic conditions. To measure income risk, we regress household income on a range of variables related to household characteristics and regional economic development characteristics, and compute the residuals, which represent unexpected temporary income. Then, we define the squared value of the residuals as the income risk. In Column (3) of Table 8, we report the impact of economic uncertainty on income risk in household level. The results show that economic uncertainty significantly increases household income risk, raising future borrowing demand.

We have found that economic uncertainty typically leads to a reduction in the credit supply provided by banks while simultaneously increasing households' borrowing demand. This mismatch between supply and demand is expected to exacerbate the issue of household credit constraints. Following the methodology proposed by Kaplan et al. (2014), we construct an indicator to measure household-level credit constraints based on the ratio of high-liquidity assets to household income. Specifically, a household is considered credit constrained if its high-liquidity assets are less than half of its current annual income, in which case the indicator takes a value of 1. Conversely, if a household's high-liquidity assets are at least half of its annual income, the indicator is assigned a value of 0. This approach provides a simple yet effective way to capture variations in credit constraints across households. The estimation results in Column (4) of Table 8 indicate that economic uncertainty increases the probability of households facing credit constraints. Households thereby adjust their portfolios by reducing their holdings of risky financial assets.

Finally, to investigate how economic uncertainty influences household portfolio choices through its impact on credit constraints, we conduct heterogeneity analyses based on household asset and consumption levels. If economic uncertainty indeed exacerbates credit constraints, this effect should be more pronounced for households with lower asset levels or higher consumption levels, who are more likely to face credit constraints. In columns (1) to (3) of Table 9, households are classified into two groups based on their endowments, and households with more assets are further divided into two subgroups: those with debt and those without debt. This classification enables a more precise analysis of the variation in how households with different characteristics experience credit constraints. Our results indicate that households with greater asset holdings generally allocate a larger proportion of their portfolios to risky financial assets, with the allocation increasing from 0.0117 to 0.0552. Moreover, the impact of economic uncertainty on risky asset holdings differs across household groups. Specifically, households with fewer assets and those with greater assets but carrying debt are significantly influenced by economic uncertainty, with the latter group experiencing the most pronounced effect. This suggests that credit constraints induced by economic uncertainty have a more substantial impact on indebted households with greater assets, as they are more engaged in financial markets yet face tighter credit restrictions. In contrast, households with greater assets and no debt exhibit no significant changes in their portfolios. Similarly, households with fewer assets generally have lower financial portfolio demands, and their investment decisions are less sensitive to economic uncertainty.

Similarly, economic uncertainty is expected to impose greater credit constraints on households with higher consumption levels, as they are more likely to reduce financial investments to sustain their regular consumption patterns. In columns (4) and (5) of Table 9, we categorize the sample into two groups based on base-year consumption levels: low-consumption and high-consumption households. Our findings indicate that high-consumption households are more active in financial markets but experience a more significant reduction in risky asset holdings when faced with economic uncertainty. This suggests that while high-consumption households are subject to greater credit constraints, their financial decisions are strongly influenced by the trade-off between maintaining

Table 10
Further discussion: Human capital.

Risky Asset Share	(1)	(2)	(3)	(4)
	High Human Capital		Low Human Capital	
Economic Uncertainty	−0.0738*	−0.0834**	−0.0165	−0.0219
	(0.0382)	(0.0368)	(0.0177)	(0.0177)
Head Controls	N	Y	N	Y
Household Controls	N	Y	N	Y
Regional Controls	N	Y	N	Y
Household Fixed Effect	Y	Y	Y	Y
Year Fixed Effect	Y	Y	Y	Y
Mean	0.0593		0.0102	
N	25,403	25,403	52,762	52,762
R2	0.6166	0.6192	0.5526	0.5533

Note: This table reports human capital heterogeneity of economic uncertainty on household portfolio choice using a fixed-effects model at the household level. We divide the sample into groups with low and high levels of human capital based on their education years at the base year. Risky asset share is defined as the proportion of households' risky assets to total financial assets. Economic uncertainty is measured at provincial level based on the unpredictable conditional volatility of numerous economic variables and we lag the measurement of economic uncertainty by one year. The control variables are the characteristics of the head of a household (age, years in education, marriage status, health status, living condition and risk preference), household factors (logarithm of family income and family size), and indicators of regional development (logarithm of gdp per capita and financial institutions loans, and economic growth rate). Standard errors are clustered at the provincial-year level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

consumption stability and investing in risky assets. These results highlight the critical role of credit constraints as a mechanism shaping household portfolio choices.

7. Further discussion on risk awareness

The preceding results indicate that economic uncertainty negatively affects households' holdings of risky assets. In this section, we delve deeper into the heterogeneity of this effect by focusing on the role of risk awareness in shaping household responses to economic uncertainty. Financial markets are inherently characterized by risk and uncertainty, and a household's ability to perceive and understand these risks plays a crucial role in their portfolio decisions (Barasinska et al., 2012). Notably, households lacking sufficient risk awareness may fail to recognize or respond to economic uncertainty, resulting in muted or negligible adjustments to their investment behavior. This suggests that the impact of economic uncertainty on household portfolio choices is likely contingent upon their level of risk awareness, highlighting the need for a nuanced understanding of this interaction.

7.1. Human capital

As financial products become increasingly diverse and complex, households' portfolio decisions are heavily influenced by their ability to process information and assess risk, with human capital playing a pivotal role in this process. Human capital enhances individuals' understanding and awareness of financial products and services, shaping both their participation in financial markets and the efficiency of their portfolio allocation (Grinblatt et al., 2011; Gomes et al., 2021). A lack of human capital, by contrast, limits financial literacy and risk awareness, reducing households' responsiveness to economic uncertainty.

To examine the interplay between human capital and risk awareness, we categorize the sample into two groups based on education levels in the base year: low and high human capital. The results, presented in Table 10, reveal significant heterogeneity in household responses to economic uncertainty. Specifically, economic uncertainty exerts a stronger negative impact on the portfolio choices of households with high human capital, while its effect on households with low human capital is statistically insignificant.

Further analysis shows that as education levels increase, the proportion of risky financial assets in household portfolios rises markedly (from 0.0102 to 0.0593). This indicates that households with higher education levels not only have greater exposure to risky assets but also exhibit more pronounced sensitivity to economic uncertainty. For households with low human capital, limited financial literacy and risk awareness constrain their participation in financial markets, making them less likely to perceive or react to market fluctuations. As a result, economic uncertainty does not significantly influence their portfolio choices. In contrast, households with high human capital, equipped with better financial knowledge and risk awareness, are more attuned to potential market volatility. This heightened awareness prompts them to actively adjust their portfolios, often by reducing their holdings of risky assets in response to rising uncertainty. These findings underscore the critical role of human capital in shaping risk awareness and, consequently, the heterogeneity in household responses to economic uncertainty.

7.2. Financial literacy

Financial literacy is a critical factor influencing household portfolio choices, particularly in contexts involving risk and uncertainty (Van Rooij et al., 2011; Von Gaudecker, 2015). On one hand, households with higher financial literacy tend to exhibit greater risk tolerance and are more inclined to pursue higher returns in financial markets. On the other hand, financial literacy enhances

Table 11
Further discussion: Financial literacy.

Risky Asset Share	(1)	(2)	(3)	(4)
	Subjective Measure		Objective Measure	
	Higher Financial Literacy	Lower Financial Literacy	Higher Financial Literacy	Lower Financial Literacy
Economic Uncertainty	−0.0973**	−0.0392*	−0.0967**	−0.0079
	(0.0379)	(0.0201)	(0.0414)	(0.0091)
Head Controls	Y	Y	Y	Y
Household Controls	Y	Y	Y	Y
Regional Controls	Y	Y	Y	Y
Household Fixed Effect	Y	Y	Y	Y
Year Fixed Effect	Y	Y	Y	Y
Mean	0.0518	0.0125	0.0531	0.0054
N	25,334	49,424	29,477	37,451
R^2	0.6593	0.5332	0.6292	0.4618

Note: This table reports financial literacy heterogeneity of economic uncertainty on household portfolio choice using a fixed-effects model at the household level. Columns (1) and (2) report results based on the subjective financial literacy measure, derived from a CHFS questionnaire that asks respondents how closely they follow economic and financial information. Higher scores indicate greater attention to financial matters, reflecting higher financial literacy. Columns (3) and (4) report the results of objective measure using the iterative principal factor method. Households with scores above the sample median are categorized as having higher financial literacy, while those below the median are classified as having lower financial literacy. Risky asset share is defined as the proportion of households' risky assets to total financial assets. Economic uncertainty is measured at provincial level based on the unpredictable conditional volatility of numerous economic variables and we lag the measurement of economic uncertainty by one year. The control variables are the characteristics of the head of a household (age, years in education, marriage status, health status, living condition and risk preference), household factors (logarithm of family income and family size), and indicators of regional development (logarithm of gdp per capita and financial institutions loans, and economic growth rate). Standard errors are clustered at the provincial-year level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

individuals' understanding of financial products, including their associated risks, returns, and market dynamics, thereby enabling more informed and deliberate decision-making. Importantly, financial literacy directly shapes a household's level of risk awareness, influencing their sensitivity and responses to economic uncertainty.

To explore this relationship, we analyze the impact of economic uncertainty on the portfolio choices of households with varying levels of financial literacy. Financial literacy is measured using two indicators. The first is a subjective measure based on self-reported financial knowledge, derived from a CHFS questionnaire that asks respondents how closely they follow economic and financial information. Higher scores indicate greater attention to financial matters, reflecting higher financial literacy and, by extension, stronger risk awareness. The second indicator is an objective measure constructed from responses to a series of financial questions in the CHFS questionnaire, which assess knowledge of concepts such as interest rate calculations, inflation, and investment risks. We use factor analysis with the iterative principal factor method to create a composite financial literacy score. Households with scores above the sample median are categorized as having higher financial literacy, while those below the median are classified as having lower financial literacy.

Columns (1) and (2) of Table 11 report results based on the subjective financial literacy measure, while columns (3) and (4) present results based on the objective measure. The findings consistently demonstrate that financial literacy and risk awareness are closely intertwined. From columns (1) and (2), households who pay closer attention to financial information—indicative of higher subjective financial literacy—are more likely to reduce their holdings of risky financial assets in response to economic uncertainty. These households, being more informed about financial markets, also possess greater awareness of the risks posed by economic uncertainty, making them more sensitive to its effects. Similarly, columns (3) and (4) show that households with higher objective financial literacy also experience a significant negative impact on their financial investments during periods of economic uncertainty. This suggests that households with greater financial knowledge, due to their enhanced risk awareness, are better equipped to anticipate and respond to potential market volatility. Consequently, they actively adjust their portfolios to mitigate potential losses.

These findings underscore the pivotal role of financial literacy in shaping risk awareness and highlight the heterogeneity in household responses to economic uncertainty. Financially literate households are not only more attuned to market risks but also more proactive in managing their portfolios to navigate periods of heightened uncertainty.

7.3. Risk preference

Risk preference is a fundamental determinant of household financial behavior, directly shaping attitudes toward return trade-offs and influencing portfolio choices (Dow & Werlang, 1992; Guiso et al., 2018; Hanaoka et al., 2018). Households with different risk attitudes vary in how they perceive and respond to changes in economic uncertainty. For risk-appetite households, while they have a higher tolerance for market volatility, heightened economic uncertainty may erode their confidence in risky asset returns; for risk-averse households, their inherent caution toward risk may be further amplified, but the scope for adjusting risky asset holdings could be limited by their low initial exposure. To clarify the heterogeneous effects of economic uncertainty across households with different risk preferences, we conduct subgroup analyses based on household heads' self-reported risk attitudes in the base year.

The results in Table 12 reveal heterogeneity in the response of household portfolio choices to economic uncertainty, driven by risk

Table 12
Further discussion: Risk preference.

Risky Asset Share	(1)	(2)	(3)	(4)
	Risk-Appetite		Risk-Averse	
Economic Uncertainty	−0.1792**	−0.1673**	−0.0396*	−0.0484**
	(0.0732)	(0.0764)	(0.0217)	(0.0203)
Head Controls	N	Y	N	Y
Household Controls	N	Y	N	Y
Regional Controls	N	Y	N	Y
Household Fixed Effect	Y	Y	Y	Y
Year Fixed Effect	Y	Y	Y	Y
Mean	0.0695		0.0216	
N	7170	7170	70,995	70,995
R2	0.6762	0.6769	0.5835	0.5840

Note: This table reports human capital heterogeneity of economic uncertainty on household portfolio choice using a fixed-effects model at the household level. Based on the question "If you had a sum of money for investment, which of the following options would you most prefer? (1) high risk and high return; (2) moderately high risk and moderately high return; (3) average risk and average return; (4) moderately low risk and moderately low return; (5) unwilling to take any risk" — this study classifies households into three categories: risk-appetite, risk-neutral, and risk-averse. Specifically, a household is defined as risk-appetite if the household head selects the first two options. Households where the head selects options (3), (4), or (5) are classified as risk-averse. Risky asset share is defined as the proportion of households' risky assets to total financial assets. Economic uncertainty is measured at provincial level based on the unpredictable conditional volatility of numerous economic variables and we lag the measurement of economic uncertainty by one year. The control variables are the characteristics of the head of a household (age, years in education, marriage status, health status, living condition and risk preference), household factors (logarithm of family income and family size), and indicators of regional development (logarithm of gdp per capita and financial institutions loans, and economic growth rate). Standard errors are clustered at the provincial-year level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

preference. First, economic uncertainty exerts a statistically significant negative impact on risky asset holdings for both risk-appetite and risk-averse households, confirming that regardless of inherent risk attitude, heightened uncertainty prompts households to reduce exposure to risky assets. Second, the magnitude of this negative effect differs substantially across the two groups. For risk-appetite households, columns (1) and (2) show that the estimated coefficient of risk-appetite households are larger, indicating that they adjust their risky asset holdings more sharply in response to uncertainty. In contrast, while the negative effect on risk-averse households is still significant, its degree is much smaller. These findings highlight that risk preference is a key driver of heterogeneous household responses to economic uncertainty. While all households exhibit conservative behavior amid rising uncertainty, risk-appetite households—due to their higher initial risky asset exposure (0.0695)—show more pronounced adjustments.

8. Concluding remarks

The global economic environment remains highly uncertain, and as vital participants in the market economy, households are inevitably influenced by external conditions. This paper contributes to literature by exploring household portfolio choices in the context of economic uncertainty, focusing on how such uncertainty impacts both households' willingness and ability to invest.

In details, we first propose a conceptual framework to illustrate how rising economic uncertainty—via increased volatility in financial asset returns and tighter credit constraints—reduces household participation in risky asset investments while encouraging a shift toward risk-free assets. Using region-level economic uncertainty indices and household-level portfolio data from China, we empirically confirm these theoretical predictions. To address potential endogeneity concerns, the incidence of extreme temperatures is used as an instrumental variable, and the results remain consistent and statistically significant. Furthermore, our results reveal that economic uncertainty exerts a more significant impact on households with higher levels of human capital, higher financial literacy, and a risk-appetite preference, due to their heightened sensitivity to financial risks. This study contributes to the literature by offering robust micro-level evidence on how economic uncertainty shapes household financial decision-making.

The findings of this study carry several important policy implications. First, reducing economic uncertainty is crucial for stabilizing household investment expectations and fostering broader participation in financial markets. Policymakers should focus on implementing measures that enhance economic stability and reduce volatility, such as sound fiscal and monetary policies. Second, addressing information asymmetry can mitigate the adverse effects of economic uncertainty. In uncertain times, risk-averse financial institutions tend to tighten credit supply, as they perceive a higher likelihood of borrower default (Ashraf & Shen, 2019). Enhancing transparency and improving information sharing between households and financial institutions can help alleviate these constraints and facilitate access to credit. Finally, promoting human capital development and financial literacy is essential for enabling households to better navigate economic fluctuations. Educational programs and policy initiatives aimed at improving financial knowledge and decision-making skills can empower households to make informed portfolio choices, even in the face of uncertainty.

Funding

This work was supported by the National Natural Science Foundation of China [Grant numbers: 72503226, 72303180, 72271010]; National Social Science Fund of China [Grant numbers: 23AZD028]; Fundamental Research Funds for the Central Universities.

Acknowledgements

This work was supported by the National Natural Science Foundation of China [Grant numbers: 72503226, 72303180, 72271010]; National Social Science Fund of China [Grant numbers: 23AZD028]; Fundamental Research Funds for the Central Universities.

Appendix. Original Economic Variables

Number	Category	Index Name	Period
1	National Account	Gross domestic product	2002Q1-2019Q4
2		Gross domestic product: Primary industry	2002Q1-2019Q4
3		Gross domestic product: Secondary industry	2002Q1-2019Q4
4		Gross domestic product: Tertiary industry	2002Q1-2019Q4
5	Fiscal	Fiscal revenue	2002Q1-2019Q4
6		Fiscal expenditure	2005Q1-2019Q4
7	Household Survey	Disposable income per capita: Urban	2002Q1-2019Q4
8		Consumer expenditure per capita: Urban	2002Q1-2019Q4
9	Consumer Goods and Services	Retail sales of consumer goods	2002Q1-2019Q4
10	Inflation	Consumer price index	2002Q1-2019Q4
11		Retail price index	2002Q1-2019Q4
12		Producer price index for industrial production	2002Q1-2019Q4
13		Purchasing price index for industrial producers	2002Q1-2019Q4
14	International	Export: Foreign-invested enterprises	2002Q1-2019Q4
15	Trade	Import: Foreign-invested enterprises	2002Q1-2019Q4
16		Export: Commodity source	2002Q1-2019Q4
17		Export: Location of commodity business unit	2002Q1-2019Q4
18		Import: Destination of goods	2002Q1-2019Q4
19		Import: Location of commodity business unit	2002Q1-2019Q4
20	Bank and Currency	Deposit: Local and foreign currency	2004Q1-2019Q4
21		Loan: Local and foreign currency	2004Q1-2019Q4
22	Investment	Fixed asset investment	2002Q1-2019Q4
23		Fixed asset investment: Construction and installation	2004Q1-2019Q4
24		Fixed asset investment: Purchase of equipment, tools, and instruments	2004Q1-2019Q4
25		Fixed asset investment: Other expenses	2004Q1-2019Q4
26	Commercial housing price	Commercial housing sales prices	2003Q1-2019Q4
27		Commercial housing sales price: Residential	2002Q1-2019Q4
28		Commercial housing sales price: Office building	2006Q1-2019Q4
29		Commercial housing sales price: Commercial business building	2006Q1-2019Q4
30	Agricultural	Agriculture: Total agricultural output value: Agriculture, forestry, husbandry, and fishing	2002Q1-2019Q4
31	Industrial Industry	Cumulative industrial added value year-on-year	2002Q1-2019Q4
32	Steel Industry	Steel industry: Production: steel	2002Q1-2019Q4
33	Energy Industry	Power generation	2002Q1-2019Q4
34		Power generation: Firepower	2002Q1-2019Q4
35	Construction Industry	Gross value of construction industry	2014Q1-2019Q4
36	Information and Communications	Number of phone users: Landline	2003Q1-2019Q4
37		Number of telephone users: Mobile phones	2003Q1-2019Q4
38	Insurance Industry	Premium income	2006Q1-2019Q4
39		Premium income: Property insurance	2006Q1-2019Q4
40		Premium income: Life insurance	2006Q1-2019Q4
41		Premium income: Accidental injury insurance	2006Q1-2019Q4
42		Premium income: Health insurance	2006Q1-2019Q4
43	Real Estate Industry	Real estate investment and development	2002Q1-2019Q4
44		Real estate investment and development: residential	2002Q1-2019Q4
45		Commercial housing sales turnover	2002Q1-2019Q4
46		Commercial housing sales turnover: Residential	2002Q1-2019Q4
47		Commercial housing sales turnover: Office building	2002Q1-2019Q4
48		Commercial housing sales turnover: Commercial business building	2002Q1-2019Q4
49		Floor space newly started of commercial housing	2002Q1-2019Q4
50		Floor space newly started of commercial housing: Residential	2002Q1-2019Q4
51		Floor space newly started of commercial housing: Office building	2002Q1-2019Q4
52		Floor space newly started of commercial housing: Commercial business building	2002Q1-2019Q4
53		Floor space completed of commercial housing	2002Q1-2019Q4
54		Floor space completed of commercial housing: Residential	2002Q1-2019Q4
55		Floor space completed of commercial housing: Office building	2002Q1-2019Q4
56		Floor space completed of commercial housing: Commercial business building	2002Q1-2019Q4
57		Sales floor space of commercial housing	2002Q1-2019Q4
58		Sales floor space of commercial housing: Residential	2002Q1-2019Q4
59		Sales floor space of commercial housing: Office building	2002Q1-2019Q4

(continued on next page)

(*continued*)

Number	Category	Index Name	Period
60		Sales floor space of commercial housing: Commercial business building	2002Q1-2019Q4
61		Land acquisition area	2002Q1-2019Q4

Data availability

The authors do not have permission to share data.

References

Aaberge, R., Liu, K., & Zhu, Y. (2017). Political uncertainty and household savings. *Journal of Comparative Economics, 45*(1), 154–170.
Agarwal, V., Aslan, H., Huang, L., & Ren, H. (2022). Political uncertainty and household stock market participation. *Journal of Financial and Quantitative Analysis, 57*(8), 2899–2928.
Angerer, X. H., & Lam, P. S. (2009). Income risk and portfolio choice: An empirical study. *The Journal of Finance, 64*(2), 1037–1055.
Asgharian, H., Christiansen, C., & Hou, A. J. (2023). The effect of uncertainty on stock market volatility and correlation. *Journal of Banking & Finance, 154*, Article 106929.
Ashraf, B. N., & Shen, Y. (2019). Economic policy uncertainty and banks' loan pricing. *Journal of Financial Stability, 44*, Article 100695.
Baker, S. R., Bloom, N., & Davis, S. J. (2016). Measuring economic Policy uncertainty. *Quarterly Journal of Economics, 131*(4), 1593–1636.
Baker, S. R., Bloom, N., & Terry, S. J. (2024). Using disasters to estimate the impact of uncertainty. *The Review of Economic Studies, 91*(2), 720–747.
Bali, T. G., Subrahmanyam, A., & Wen, Q. (2021). The macroeconomic uncertainty premium in the corporate bond market. *Journal of Financial and Quantitative Analysis, 56*(5), 1653–1678.
Bali, T. G., & Zhou, H. (2016). Risk, uncertainty, and expected returns. *Journal of Financial and Quantitative Analysis, 51*(3), 707–735.
Barasinska, N., Schäfer, D., & Stephan, A. (2012). Individual risk attitudes and the composition of financial portfolios: Evidence from German household portfolios. *The Quarterly Review of Economics and Finance, 52*(1), 1–14.
Barnett, M., Brock, W., Hansen, L. P., & Hong, H. (2020). Pricing uncertainty induced by climate change. *Review of Financial Studies, 33*(3), 1024–1066.
Ben-David, I., Fermand, E., Kuhnen, C. M., & Li, G. (2018). *Expectations uncertainty and household economic behavior*. NBER Working Paper No.25336.
Bloom, N. (2009). The impact of uncertainty shocks. *Econometrica, 77*(3), 623–685.
Bloom, N., Bond, S., & Van Reenen, J. (2007). Uncertainty and investment dynamics. *The Review of Economic Studies, 74*(2), 391–415.
Bloom, N., Floetotto, M., Jaimovich, N., Saporta-Eksten, I., & Terry, S. J. (2018). Really uncertain business cycles. *Econometrica, 86*(3), 1031–1065.
Boutchkova, M., Doshi, H., Durnev, A., & Molchanov, A. (2012). Precarious politics and return volatility. *Review of Financial Studies, 25*(4), 1111–1154.
Bredin, D., & Fountas, S. (2009). Macroeconomic uncertainty and performance in the european Union. *Journal of International Money and Finance, 28*(6), 972–986.
Burke, M., Hsiang, S. M., & Miguel, E. (2015). Global non-linear effect of temperature on economic production. *Nature, 527*(7577), 235–239.
Campbell, J. Y. (2006). Household finance. *The Journal of Finance, 61*(4), 1553–1604.
Cardak, B. A., & Wilkins, R. (2009). The determinants of household risky asset holdings: Australian evidence on background risk and other factors. *Journal of Banking & Finance*.
Catherine, S., Sodini, P., & Zhang, Y. P. (2024). Countercyclical income risk and portfolio choices: Evidence from Sweden. *The Journal of Finance, 79*(3), 1755–1788.
Chan, K. F., Gray, P., Gray, S., & Zhong, A. (2020). Political uncertainty, market anomalies and presidential honeymoons. *Journal of Banking & Finance, 113*, Article 105749.
Chang, Y., Hong, J. H., Karabarbounis, M., Wang, Y., & Zhang, T. (2022). Income volatility and portfolio choices. *Review of Economic Dynamics, 44*, 65–90.
Choi, S., Furceri, D., Huang, Y., & Loungani, P. (2018). Aggregate uncertainty and sectoral productivity growth: The role of credit constraints. *Journal of International Money and Finance, 88*, 314–330.
Cocco, J. F. (2005). Portfolio choice in the presence of housing. *Review of Financial Studies, 18*(2), 535–567.
Coibion, O., Georgarakos, D., & Gorodnichenko, Y. (2024). The effect of macroeconomic uncertainty on household spending. *The American Economic Review, 114*(3), 645–677.
Cui, X., & Tang, Q. (2024). Extreme heat and rural household adaptation: Evidence from Northeast China. *Journal of Development Economics, 167*, Article 103243.
Delaney, J. M., & Devereux, P. J. (2019). More education, less volatility? The effect of education on earnings volatility over the life cycle. *Journal of Labor Economics, 37*(1), 101–137.
Dell, M., Jones, B. F., & Olken, B. A. (2014). What do we learn from the weather? The new climate-economy literature. *Journal of Economic Literature, 52*(3), 740–798.
Di Maggio, M., Kermani, A., Ramcharan, R., Yao, V., & Yu, E. (2022). The pass-through of uncertainty shocks to households. *Journal of Financial Economics, 145*(1), 85–104.
Dow, J., & Werlang, S. R. D. C. (1992). Uncertainty aversion, risk aversion, and the optimal choice of portfolio. *Econometrica, 60*(1), 197–204.
Duchin, R., Ozbas, O., & Sensoy, B. A. (2010). Costly external finance, corporate investment, and the subprime mortgage credit crisis. *Journal of Financial Economics, 97*(3), 418–435.
Fagereng, A., Guiso, L., & Pistaferri, L. (2017). Portfolio choices, firm shocks and uninsurable wage risk. *The Review of Economic Studies*.
Fernández-Villaverde, J., Guerrón-Quintana, P., Rubio-Ramirez, J. F., & Uribe, M. (2011). Risk matters: The real effects of volatility shocks. *The American Economic Review, 101*(6), 2530–2561.
Francis, B. B., Hasan, I., & Zhu, Y. (2014). Political uncertainty and bank loan contracting. *Journal of Empirical Finance, 29*, 281–286.
Gan, H., Guo, M., Li, J., Niu, G., & Zhou, Y. (2025). Air pollution and household stock market participation. *Journal of Banking & Finance, 172*, Article 107397.
Giuntella, O., Lu, Y., & Wang, T. (2024). How do workers adjust to robots? Evidence from China. *Economic Journal, 135*(666), 637–652.
Gomes, F., Haliassos, M., & Ramadorai, T. (2021). Household finance. *Journal of Economic Literature, 59*(3), 919–1000.
Gourio, F. X. (2012). Disaster risk and business cycles. *The American Economic Review, 102*(6), 2734–2766.
Grinblatt, M., Keloharju, M., & Linnainmaa, J. (2011). IQ and stock market participation. *The Journal of Finance, 66*(6), 2121–2164.
Guiso, L., Jappelli, T., & Terlizzese, D. (1996). Income risk, borrowing constraints, and portfolio choice. *The American Economic Review, 86*(1), 158–172.
Guiso, L., Sapienza, P., & Zingales, L. (2018). Time varying risk aversion. *Journal of Financial Economics, 128*(3), 403–421.
Gulen, H., & Ion, M. (2016). Policy uncertainty and corporate investment. *Review of Financial Studies, 29*(3), 523–564.
Hanaoka, C., Shigeoka, H., & Watanabe, Y. (2018). Do risk preferences change? Evidence from the Great East Japan earthquake. *American Economic Journal: Applied Economics, 10*(2), 298–330.
Huang, Y., & Luk, P. (2020). Measuring economic Policy uncertainty in China. *China Economic Review, 59*, Article 101367.
Julio, B., & Yook, Y. (2012). Political uncertainty and corporate investment cycles. *The Journal of Finance, 67*(1), 45–83.
Jurado, K., Ludvigson, S. C., & Ng, S. (2015). Measuring uncertainty. *The American Economic Review, 105*(3), 1177–1216.
Kaplan, G., Violante, G. L., & Weidner, J. (2014). *The wealthy hand-to-mouth*, Article 20073. NBER Working Paper.
Lee, K., Jeon, Y., & Jo, C. (2020). Chinese economic policy uncertainty and U.S. households' portfolio decisions. *Pacific-Basin Finance Journal, 64*, Article 101452.

Li, J., & Li, J. (2025). Does climate risk impact household consumption? Evidence from China. *Economic Modelling, 152*, Article 107270.
Li, J., Li, J., & Ouyang, C. (2025). Physical climate risk and household saving behavior: Evidence from China. *Economic Analysis and Policy, 87*, 2508–2519.
Malmendier, U., & Nagel, S. (2011). Depression babies: Do macroeconomic experiences affect risk taking? *Quarterly Journal of Economics, 126*(1), 373–416.
Markowitz, H. (1952). Portfolio selection. *The Journal of Finance, 7*(1), 77–91.
McKay, A. (2017). Time-varying idiosyncratic risk and aggregate consumption dynamics. *Journal of Monetary Economics, 88*, 1–14.
Oh, J., & Picco, A. R. (2025). Macro uncertainty, unemployment risk, and consumption dynamics. *International Economic Review, 66*(1), 287–312.
Pástor, L., & Veronesi, P. (2012). Uncertainty about government policy and stock prices. *The Journal of Finance, 67*(4), 1219–1264.
Pástor, L., & Veronesi, P. (2013). Political uncertainty and risk premia. *Journal of Financial Economics, 110*(3), 520–545.
Pelizzon, L., & Weber, G. (2009). Efficient portfolios when housing needs change over the life cycle. *Journal of Banking & Finance, 33*(11), 2110–2121.
Qiu, Z. (2021). *Uncertainty and corporate financial decisions*. Peking University.
Van Rooij, M., Lusardi, A., & Alessie, R. (2011). Financial literacy and stock market participation. *Journal of Financial Economics, 101*(2), 449–472.
Von Gaudecker, H. (2015). How does household portfolio diversification vary with financial literacy and financial advice? *The Journal of Finance, 70*(2), 489–507.
Williams, N. (2012). Monetary Policy under financial uncertainty. *Journal of Monetary Economics, 59*(5), 449–465.
Yang, T., & Zhang, X. (2022). Fintech adoption and financial inclusion: Evidence from household consumption in China. *Journal of Banking & Finance, 145*, Article 106668.