Household Needs Priority and Risky Investments

Woon Sau Leung, Zhongyan Zhu

University of Edinburgh, Monash University

December 2021

Overview

1. Research Question
   - Why do not households participate in risky investments

2. Needs Priority Explanation
   - Households have two needs to consider before investment
   - Luxury consumption may crowd out investments

3. Empirical Design
   - Testable insight: higher reserves tolerate lower returns
   - Two-by-two games: two players, each with two choices

4. Empirical Results
   - Flow across mutual funds of two risk categories
   - Flow differences linked to specific low returns

5. Conclusion

Research Question and What We Have Done

- **Why do not most of typical households and some rich participate in risky investments**?
  - Limited equity participation puzzle (Mankiw and Zeldes 1991; Haliassos and Bertaut 1995; Heaton and Lucas 2000; Campbell 2006; Guiso and Sodini 2013; Gomes, Haliassos, and Ramadorai 2020).
- We offer the "needs priority" explanation, and
  - **Cash reserve** is necessary for long-term risk-taking adventures.
- test causality: **higher reserve** and **lower return tolerance**.
  - Design a two-player game where investors with heterogeneous tolerance to low returns engage fixed income mutual funds allocating assets with high or low risk exposure;
  - test investor financial decision changes in various settings.

Hierarchy of Household Needs and Investment Decisions

- Households allocate resources to satisfy daily cash outflow needs.
- We extend the budget constraint in (Merton 1969).
- We allocate cash outflows in a **hierarchy** order for basic needs, psychological needs, and self-actualization (Maslow 1970).
    - Labor incomes satisfy household basic needs.
    - Luxury goods satisfy psychological needs.
    - After basic needs, households choose the next cash outflow.
- We identify the cash reserve as a financial safety net.
- We recognize that households are **heterogeneous** on psychological satisfaction.
    - Households borrow to meet cash flows beyond the basic lifestyle and invest wealth to meet debt payment dues (DPD).
- Cash reserve or luxury consumption, which has **priority**?

Two Households: Self-disciplined or Self-indulgence

- We model two households that give priority to different needs.
- **Self-disciplined** $Household_1$ prioritizes financial safety.
  1. Set $Reserve_1 > 0$, so $Wealth_1 - Reserve_1 = iWealth_1$;
  2. take temperate lifestyle (DPD_1) s.t. $(iWealth_1 - Treasury_1) \times \overline{Ret}_{fund} = DPD_1 + Growth_1$, with $Growth_1 > 0$.
- Self-disciplined households invest for growth (Merton 1969).
- **Self-indulgence** $Household_2$ prioritizes psychological needs.
  1. Set luxury lifestyle (DPD_2) as ($Wealth_2$) $\times \overline{Ret}_{fund} = DPD_2$.
  2. $Reserve_2 = 0$, $Treasury_2 = 0$, and $Growth_2 = 0$.
- $Household_2$ will drop out of investment on any additional cash outflow ($Wealth_2$) $\times \overline{Ret}_{fund} < DPD2 + \epsilon$.

$Household_2$ Rehabilitation, Limiting Indulgence

- Rehabilitated $household_2$ **sets a limit** on indulgence.
  1. Keep luxury lifestyle (DPD_2) at ($Wealth_2$) $\times \overline{Ret_{fund}} = DPD_2$,
  2. with ($\epsilon = 0$), $Reserve_2 = 0$, $Treasury_2 = 0$, and $Growth_2 = 0$.
- In a static setting, $household_2$ with indulgence limit can keep its investment but drops out at low investment returns.
  - $Wealth_2 \times Ret_{t,low} < DPD_2$.
  - Key feature: Lifestyle cash outflows (DPD) are **constant**, but investment returns are **time-varying** $dRet_t = \mu dt + \sigma dW_t$.
- In the dynamic setting, $household_2$ can save all extra returns ($Ret_{t,high} > \overline{Ret_{fund}}$) as a rainy day fund.
- **Proposition**: Cash reserve is **necessary** to engage long-term risky investments, or drop out on **below-average returns**.
  - Proof at page 14-15 of the draft.
- Self-indulgence $household_2$ is rich, may temporarily invest but drops out of risky investments in equilibrium.

Cash Reserves Keep Investments During Tough Times

- **Self-disciplined** $Household_1$ with $Reserve_1 > 0$
- A low return ($Ret_{t,low} < \overline{Ret}$) causes cash outflow shortages ($iWealth_1 - Treasury_1) \times Ret_{t,low} < DPD_1$.
- However, a cash reserve replenishes cash outflow gap.
    - $(iWealth_1 - Treasury_1) \times Ret_{t,low} + Reserve_1 > DPD_1$.
- $Household_1$ can practice mean-variance optimization in equilibrium and holds risky assets $\alpha(P, t)$ as in (Merton 1969).
    - $\alpha(P, t) = \frac{\mu - r_f}{\sigma^2 \gamma}$.

Testable Insight

- Two investors share the same wealth ($Wealth_1 = Wealth_2$).
- $Investor_1$ sets higher reserve ($Reserve_1^H > Reserve_2^L$),
    - so $investor_1$ lives a lifestyle of lower DPD ($DPD_1^L < DPD_2^H$).
- When the investment returns are above the mean level, both investors keep their engagements.
- On the arrival of a certain low return, there must be
    1. $iWealth_1^L \times Ret_{t,low} + Reserve_1^H > DPD_1^L$;
    2. $iWealth_2^H \times Ret_{t,low} + Reserve_2^L < DPD_2^H$.
- $Investor_1$ can keep its investment but $investor_2$ has to withdraw.
- **Testable causality**: Of two investors, the one with higher reserves can tolerate lower returns and keeps its risky engagement whereas the other withdraws with an arrival of low return.

Two Players: Mutual Funds and Investors

- We test investors that depend on **fixed** returns.
- Fixed income mutual funds have high or low risk exposure.
- We address two questions without information for individual asset holdings (Campbell 2006, p1561-1562).
- **How do households choose between high and low risk categories?**
  - High-reserve households can take high-risk funds (with exposure to credit risk and interest rate risk).
  - Low-reserve households should invest in low-risk funds (with interest rate risk).
- **Do households withdraw investments (change their decisions) when fund returns are low?**
  - Households with more reserves can tolerate lower returns.

Fund Flow Difference When Returns Are Low

- Black (Str tol, Wk tol) inflows; Red (Wk tol) outflows.
- Fund flows when fund returns are **above** tolerance levels.

		High risk funds	Low risk funds
Maj investors	Existing	Str tol	Wk tol
	New	Str tol	Wk tol
Min investors	Existing	Wk tol	Str tol
	New	Wk tol	Str tol

- Fund returns are **lower** than the tolerance of (Wk tol) investors.

		High risk funds	Low risk funds
Maj investors	Existing	Str tol	Wk tol
	New	Str tol	Wk tol
Min investors	Existing	Wk tol	Str tol
	New	Wk tol	Str tol

- When funds deliver low returns, fund flows to high-risk funds are **higher** than to low-risk funds.

Data and Research Hypotheses

- 67 SICFIF follow high risk benchmark (interest rate & credit risk).
- 70 SIUSTGF follow low risk benchmark (interest rate risk).
  - However, SIUSTGF take high-risk assets before 2000.

1. **Hypothesis 1**: Fund flows to SICFIF(high risk funds) are higher than to SIUSTGF (low risk funds) in the long-term.

2. **Hypothesis 2**: When significant investors with strong tolerance of low returns invest in SIUSTGF category, cross-category fund flows become insignificant.

3. **Hypothesis 3**: When funds have delivered low returns (i.e., returns on the left side of the distribution), the fund outflows from SIUSTGF are larger than from SICFIF, and differences are observable shortly after low-return delivery.

Variable Construction

- Fund flows at fund level

$$Fund\ flow_{j,t} = \frac{\sum_{i=1}^{n}\left[TNA_{i,t} - TNA_{i,t-1} \times (1 + r_{i,t})\right]}{\sum_{i=1}^{n} TNA_{i,t-1}},$$

- Var *Low-return tolerance* is equal to one (1) for SICFIF and zero (0) for SIUSTGF.
- Var *Low past returns* is equal to one (1) for fund j from month $t+1$ to $t+3$ or $t+6$, or zero (0) otherwise if fund j's median return from month $t-12$ to $t-1$ is below investors' tolerance.
- Var *Left tail returns* is equal to one (1) for fund j from month $t+1$ to months $t+3$ or $t+6$, or zero (0) otherwise if fund j delivers a substantial, negative return in month $t-1$.

T5 & T6: Fund Flow Difference, 1992 to 2015

			Dependent var: Fund flow		
Table	Period	Independent var:	(7)	(8)	(9)
T5, Panel A	1992-2015		0.0057**	0.0069***	0.0062***
T5, Panel B	2003-2015	Low-return tolerance	0.0065**	0.0079***	0.0075***
T6	1992-2002		0.0064	0.0062	0.0047
Controls: managerial skills, fund characteristics, FE			Y	Y	Y

- The cross-risk category flow difference is significant in 1992-2015, and in 2003-2015, but disappeared in 1992-2002.
- **Question**: How to explain the disappearance in 1992-2002?

Causality: High or Low Fund Risk Exposure and Risk Tolerance Heterogeneity of Investors

- **Empirical causality**: the cross-risk category flow differences are observable conditional on **heterogeneity**.
  1. SICFIF have higher credit risk exposure than SIUSTGF,
  2. and investors have heterogeneous tolerance to low returns.
- Cross-risk category flow differences should disappear if either condition has been violated.
- When SIUSTGF took much **larger credit risk exposure** in 1992-2002 (condition one violation),
  - investors of SIUSTGF and SICFIF must share similar tolerance.
- Clienteles with **homogeneous** risk tolerance invest two fund categories (condition one holds, but condition two violation).
  - Institutions have more cash and less debt since 1990s.
  - On the contrary, households borrow more relative to income.

T7, Institutional and Household Investors, Respectively

- SIUSTGF took similar credit risk as did SICFIF 1992-2002.
  - Both institutional and retail investors must have a strong tolerance for low returns.
  - Cross-category flow difference is insignificant, either institutional or retail investors.

		Dependent var: Fund flow	
Period	Independent var:	Institutional	Retail
1992-2002	Low-return tolerance	0.0026	-0.0037
2003-2015		0.0005	0.0046*
Controls: skills (alpha), fund, FE		Y	Y

- SIUSTGF took a lower credit risk than did SICFIF since 2003.
  - Institutional investors have a strong tolerance for low returns, so cross-category flow difference keeps insignificant.
  - Retail investors with weak tolerance participate in, so cross-category flow difference becomes significant.

T7, Households Make Decisions, Not Financial Advisors

		Dependent var: Fund flow	
Period	Independent var:	Retail direct-sold	Retail broker-sold
1992-2002	Low-return tolerance	0.0025	-0.009
2003-2015		0.0070**	0.0054
Controls: skills (alpha), fund, FE		Y	Y

- Households, rather than their financial advisors, make investment or withdrawal decisions.
- Skill control of *Performance rank* in the paper.
- **T5**-**T7 takeaway**: Enhance the causality of reserve on risk tolerance through heterogeneity of funds and investors.
- Next, we test explicitly the low returns and flow difference.

T8, When Past Fund Returns Are Consistently Low

- **Consistently low returns** are measured by the median return in the past 12 months.

	Dependent var: Fund flow	
Independent var:	1992-2002	2003-2015
	1-yr median return: 0%	1-yr median return: 6%
Low-return tolerance	0.0056	0.0008
Low past return	-0.0003	-0.0094***
Low-return tolerance × Low past return	0.0093**	0.0066**
Controls: skills (alpha), fund, FE	Y	Y

- Next 6-month effect (3-month effect available in the paper).
- When the returns are **lower than 6%** (2003-2105), there are significant fund outflows from SIUSTGF.
- Positive and significant **interaction terms**: investors of SICFIF are more risk tolerant than those of SIUSTGF.

T9, Different Tolerance After a Left Tail Return

- **Left tail return** is measured by a large and negative return in a single month.

	Dependent var: Fund flow	
Independent var:	Year 2008	May-December 2013
	One-month low return: -23%	One-month low return: -22%
Low-return tolerance	-0.0079	0.0120
Left tail return	-0.0345***	-0.0531***
Low-return tolerance x Left tail return	0.0322*	0.0405***
Controls: skills (alpha), fund, FE	Y	Y

- Next 6-month effect (3-month effect available in the paper).

- In 2008 financial crisis, additional results of left-tail returns are at -40% to -50%.

- In the taper tantrum period, May-December 2013, the additional result of left tail return is at -28%.

- **Interpretation**: investors of SICFIF can tolerate lower returns.

T10, Performance Contribution at Fund Category

- Additional evidence on managerial active asset allocation.

	Dependent var: **Category fund returns**			
	1992-2002	2003-2015	1992-2002	2003-2015
Independent var	SICFIF		SIUSTGF	
Intercept	-0.0004**	-0.0004	-0.0004***	-0.0009***
Aggregate bond MKT	1.0080***	1.0339***	0.9637***	1.0769***
CRSP MKT	0.0137**	0.0588***	-0.0136***	0.0057

- Fund returns are exposures to the fixed income benchmark (both SICFIF and SIUSTGF) and equity market returns (SIC-FIF only).
- Managerial active contribution (**intercept**) is limited at the fund category level.

Conclusion

- We offer a theoretical explanation (needs priority) why most of the typical households and some rich do not participate in risky investments.
  - Our explanation follows CRRA framework and the extension is on budget allocation.
  - A cash reserve is necessary for long-term risk taking.
- Empirically, we test a higher reserve can tolerate lower returns.
- We confirm the insight through cross-category fund flows of fixed income mutual funds.
- We hope you enjoy the presentation. For more details, please go to SSRN site for current draft and future updates.
- We appreciate any comments you may have. Please send correspondence to zhongyan.zhu@monash.edu. Thank you!