

FinTech Adoption and Household Risk-Taking

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Based on joint work with **Claire Yurong Hong** and **Jun Pan** from SAIF, SJTU

Household Finance in the Age of FinTech

The current wave of “Fin + Tech” development is unique in that

- **FinTech Platforms:** Created by tech not finance firms.
 - ▶ Giant user bases, low operational costs, and a phenomenon of “winner-take-all.”

Household Finance in the Age of FinTech

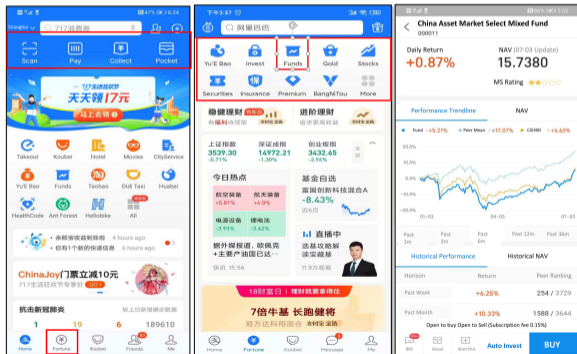
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- **Super Apps:** A wide range of financial services delivered directly to households.

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Shrunk into one single app:

- 1 Main-street banks
- 2 Wall Street's brokers
- 3 Boston's asset managers
- 4 Connecticut's insurers

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 - ▶ Giant user bases, low operational costs, and a phenomenon of “winner-take-all.”
- **Super Apps:** A wide range of financial services delivered directly to households.
- In China, activities central to households are taking place on FinTech platforms via super apps:
 - ▶ **Consumption:** online consumption accounts for 25% of the total.
 - ▶ **Investments:** 30% of mutual fund indirect sales occur on FinTech platforms.
 - ▶ **Payments:** digital payments everywhere.

Motivations and Research Questions

*“The study of household finance is challenging because household behavior is **difficult to measure**, and households face **constraints** not captured by textbook models.”*

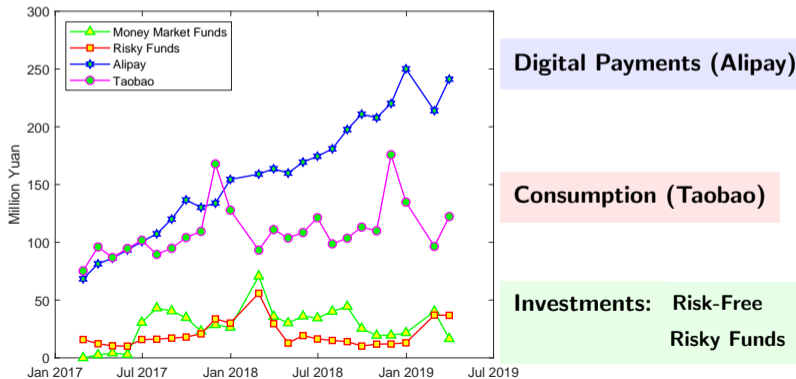
– John Campbell, 2006 AFA Presidential Address.

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A random sample of 50,000 users from Ant Group



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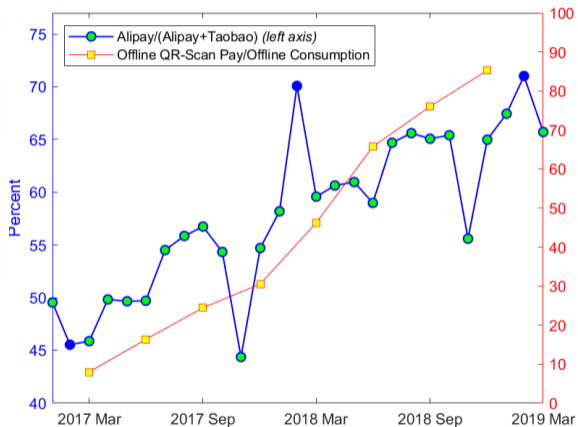
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- **Can FinTech lower investment barrier and improve household risk-taking?**
 - ▶ Physical costs: convenience, transaction costs, and access to information.
 - ▶ Psychological costs: familiarity, trust, and financial literacy.
- **Who benefits more from FinTech Advancements?**
 - ▶ The otherwise more constrained investors prior to the arrival of FinTech.
 - ▶ Individuals who are more risk-tolerant.
 - ▶ Individuals living in areas under-served by financial institutions.

Offline Digital Payments via QR-Code Scan

买菜也能扫码支付了 绍兴首家智慧农贸市场下月使用

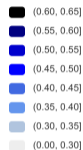
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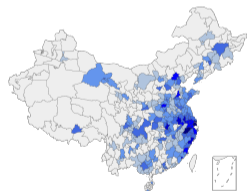
Measures of FinTech Adoption

- Individual i 's consumption on Alipay and Taobao during month t :

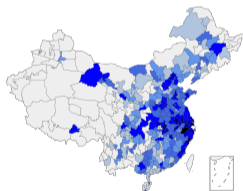
$$\text{AliFrac}_t^i = \frac{\text{Alipay}_t^i}{\text{Alipay}_t^i + \text{Taobao}_t^i}$$



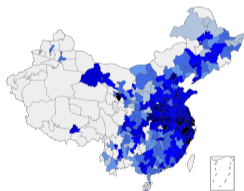
- Aggregated to the city level using individuals' location information:



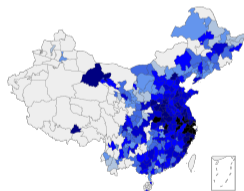
2017Q2



2017Q4



2018Q2



2018Q4

Measures of Risk-Taking and Consumption Volatility

28,393 Active Users (> 100 RMB Fund Purchases)

			Consumption		FinTech Adoption				Risk-Taking		
	Female	Age	Consumption	σ_C	AliFrac	$\log(\text{AliCnt})$	$\Delta\text{AliFrac}$	$\Delta\log(\text{AliCnt})$	Participate	Risky Share	σ_W (%)
Mean	0.61	31.1	2,292	1.21	0.55	3.05	0.08	0.62	0.66	0.45	1.77
Median	1.00	30.0	1,396	1.16	0.57	3.12	0.07	0.54	1.00	0.15	0.18
Std	0.49	7.8	4,732	0.40	0.22	0.83	0.17	0.76	0.47	0.47	2.97

All 50,000 Users

Mean	0.61	30.4	2,155	1.21	0.54	3.01	0.08	0.59	0.38		
Median	1.00	29.0	1,259	1.16	0.56	3.08	0.07	0.53	0.00		
Std	0.49	7.8	17,063	0.40	0.22	0.84	0.22	0.67	0.48		

- **Participate:** = 1 for active users with positive investment in risky funds.
- **Risky Share:** Fraction of risky-fund investments
- σ_W : Portfolio return volatility.
- σ_C : Consumption growth volatility.

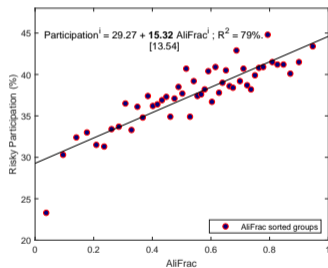
Can FinTech Improve Household Risk-Taking? Individual-Level Findings

- FinTech adoption from zero to one corresponds to an increase of
 - ▶ **12.7%** in risky participation (average=38% among 50,000 individuals)
 - ▶ **13.1%** in risky share (average=45% among 28,393 individuals)
 - ▶ **0.43%** in portfolio volatility (average=1.77% among 28,393 individuals)

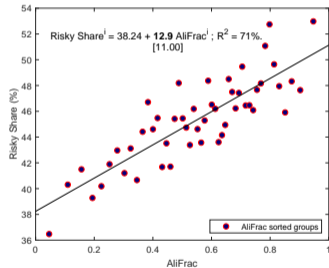
	Participate		Risky Share		Portfolio Volatility (σ_w)	
FinTech Adoption	0.127*** (10.47)	0.239*** (17.94)	0.131*** (7.65)	0.146*** (7.80)	0.431*** (4.76)	0.446*** (4.59)
σ_c (Consumption Vol.)	0.037*** (7.37)	0.019*** (3.69)	0.052*** (7.87)	0.018*** (2.72)	0.345*** (8.43)	0.163*** (4.07)
Other Controls	N	Y	N	Y	N	Y
City FE	Y	Y	Y	Y	Y	Y
Adjusted R2	0.004	0.024	0.006	0.025	0.004	0.016
N	50,000	50,000	28,393	28,393	28,393	28,393

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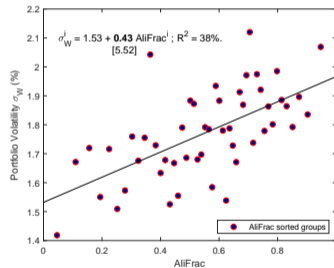
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Participate



Risky Share



σ_W

Can FinTech Improve Household Risk-Taking? Individual-Level Findings

- Tracking the same individual's change in FinTech adoption from 2017 to 2018,
 - ▶ $\Delta\text{AliFrac}=1$ corresponds to $\Delta\text{Participate}=\mathbf{1.4\%}$ and $\Delta\text{Risky Share}=\mathbf{8.7\%}$.

Can FinTech Improve Household Risk-Taking? Individual-Level Findings

- Tracking the same individual's change in FinTech adoption from 2017 to 2018,
 - $\Delta \text{AliFrac}=1$ corresponds to $\Delta \text{Participate}=\mathbf{1.4\%}$ and $\Delta \text{Risky Share}=\mathbf{8.7\%}$.
- Monthly panel regressions with fixed effects:

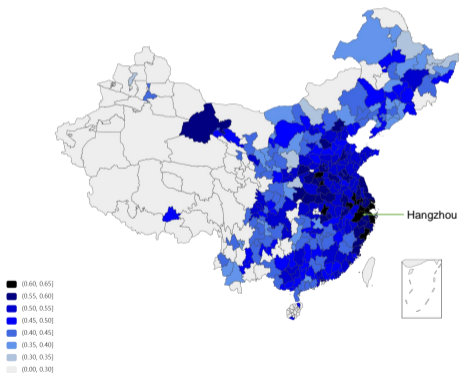
Fixed Effect	Participate	Risky Share
none	12.6%	11.1%
individual	9.53%	3.90%
month \times city	6.95%	9.17%
individual+month \times city	0.57%	1.95%

Can FinTech Improve Household Risk-Taking? City-Level Findings

- FinTech adoption at city level: less affected by individual's self-selection.
 - ▶ Results consistent with our individual-level findings.

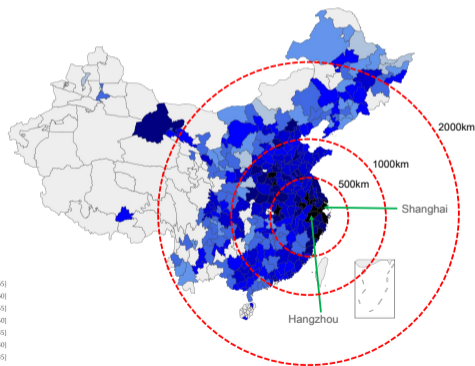
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	First Stage: $Y=AliFrac$				
	≤ 200	≤ 500	≤ 1000	≤ 2000	All
Log(Distance to HZ)	-0.392*** (-5.99)	-0.437*** (-3.99)	-1.096** (-2.31)	-1.955** (-2.14)	-1.995** (-2.16)
Controls	Y	Y	Y	Y	Y
Time FE	Y	Y	Y	Y	Y
Observations	238	799	2,278	4,624	4,879
R-squared	0.85	0.66	0.54	0.51	0.50

	First Stage: $Y=AliFrac$				
	≤ 200	≤ 500	≤ 1000	≤ 2000	All
Log(Distance to SH)	0.124 (0.54)	0.129 (0.70)	-0.936* (-1.84)	-1.731* (-1.77)	-1.766* (-1.77)
Controls	Y	Y	Y	Y	Y
Time FE	Y	Y	Y	Y	Y
Observations	238	799	2,278	4,624	4,879
R-squared	0.81	0.65	0.53	0.49	0.48

Can FinTech Improve Household Risk-Taking? City-Level Findings

- FinTech adoption at city level: less affected by individual's self-selection.
 - ▶ Results consistent with our individual-level findings.
- IV test: Use distance to Hangzhou as an instrument for FinTech adoption.
- Comparing the economic significance of IV vs OLS tests:

	FinTech (one-std)	Risky Share	
		All Cities	$\leq 500\text{km}$
OLS	AliFrac	1.17% (3.04)	2.34% (2.21)
IV	$\widehat{\text{AliFrac}}$	1.16% (2.32)	4.10% (5.26)

Financial Inclusion: Who Benefits More?

- **High vs Low Risk-Tolerance:**

- ▶ Proxy individuals' risk tolerance using their consumption volatility σ_C .
Insights from Merton's portfolio and consumption problem:

$$\sigma_C = \sigma_W = \text{risky share} \times \sigma_R = \frac{1}{\gamma} \frac{\mu - r}{\sigma_R}$$

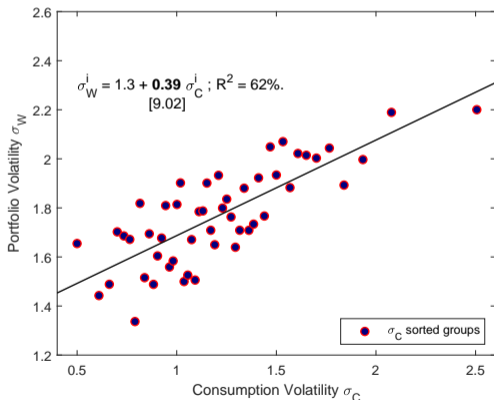
- **High vs Low Bank Coverage:**

- ▶ Proxy financial-service coverage using number of bank branches in each city.

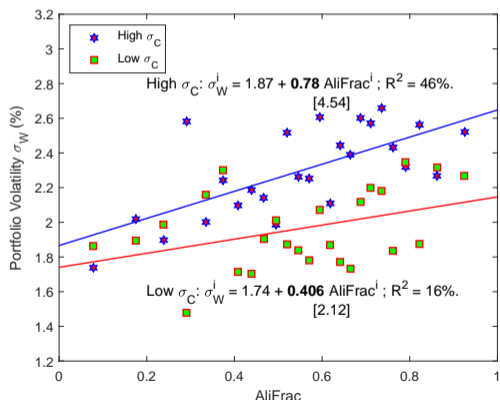
Financial Inclusion: High vs Low Risk-Tolerance

- Proxy individuals' risk tolerance using their consumption volatility σ_C .

All Active Users

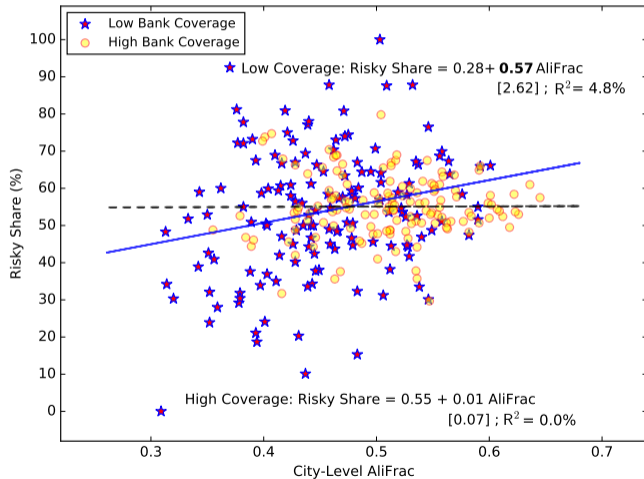


High and Low σ_C



Financial Inclusion: High vs Low Bank Coverage

- Proxy financial-service coverage using number of local bank branches.



Welfare and Investment Efficiency

- Given the overall low-participation situation, an increase in risky asset investment is welfare-improving.
- We further examine the investment efficiency in the cross-section
 - Higher FinTech adoption, higher diversification benefit.
 - Higher FinTech adoption, higher Sharpe ratio, especially for investors with low risky share.

	Diversification					Sharpe Ratio				
	All	By Risky Share		By σ_C		All	By Risky Share		By σ_C	
		Low	High	Low	High		Low	High	Low	High
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
AliFrac	0.038*** (9.77)	0.032*** (7.30)	0.037*** (5.55)	0.036*** (6.70)	0.040*** (6.73)	0.028*** (8.31)	0.040*** (9.02)	-0.007** (-2.33)	0.026*** (4.75)	0.030*** (7.49)
Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
City FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	20,033	10,112	9,921	10,028	10,005	20,033	10,112	9,921	10,028	10,005
R-squared	0.038	0.053	0.043	0.056	0.052	0.045	0.058	0.043	0.058	0.062

Related Literature

- **Household Finance:** Shedding light on the long standing puzzle of low participation and under risk-taking. Campbell (2006); Guiso and Sodini (2013) and Beshears et al. (2018); Hong, Kubik, and Stein (2004); Guiso, Sapienza, and Zingales (2008).
- **Impact of Technology:** On household finance and financial inclusion. Barber and Odean (2002); Hong, Lu, and Pan (2022); Suri (2017).
- **Household Portfolio Choice:** Studying individual-level preferences: Calvet et al. (2021); Connecting consumption and investment: Merton (1971); Mankiw and Zeldes (1991); Agarwal and Qian (2014); Di Maggio, Kermani, and Majlesi (2020); Agarwal, Charoenwong, and Ghosh (2020); Loos, Meyer, and Pagel (2020).

Conclusions

- We find that FinTech can help households improve risk-taking, especially for those who need it the most:
 - ▶ Individuals who are more risk-tolerant.
 - ▶ Individuals living in cities with low bank coverage.
- Interpretations of our findings:
 - ▶ FinTech convenience reduces physical costs, increasing participation.
 - ▶ Repeated usage of Alipay builds familiarity and trust, increasing risk-taking.
- Future of FinTech:
 - ▶ Brighter for emerging economies lacking financial infrastructures.
 - ▶ From Tech to Fin, more content building.