FinTech Adoption and Household Risk-Taking

Guest Lecture, Stanford GSB

Jun Pan

Shanghai Advanced Institute of Finance (SAIF)
**Shanghai Jiao Tong University**

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Based on joint work with Claire Yurong Hong and Xiaomeng Lu from SAIF

Household Finance in the Age of FinTech

- The current wave of FinTech is unique in that
  - ▸ FinTech platforms created by tech not finance firms: giant user bases, low operational costs, and a culture of "winner-take-all."
  - ▸ Financial services delivered directly to households via super apps, free of financial advisors.
- Increasingly in China, activities central to household finance are taking place on FinTech platforms:
  - ▸ Consumption: online consumption accounts for 25% of the total consumption.
  - ▸ Investments: 30% of mutual fund purchases takes place on FinTech platforms.
  - ▸ Payments: digital payments everywhere.
- Our questions:
  - ▸ Can FinTech improve household risk-taking?
  - ▸ Who benefits the most from FinTech adoption?

Consumption, Investments, and Payments,
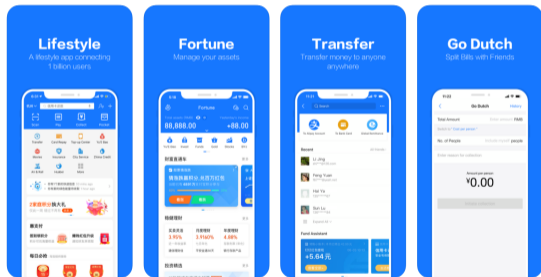aggregated over a random sample of 50,000 individuals
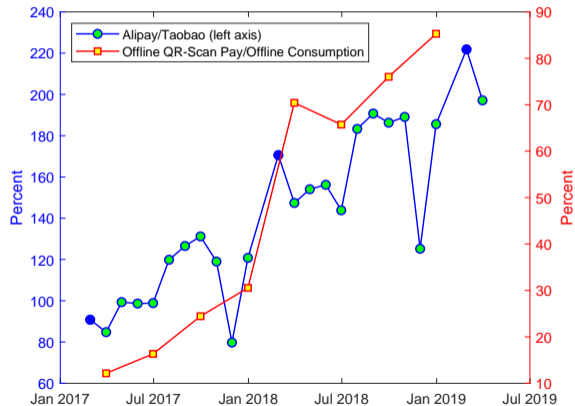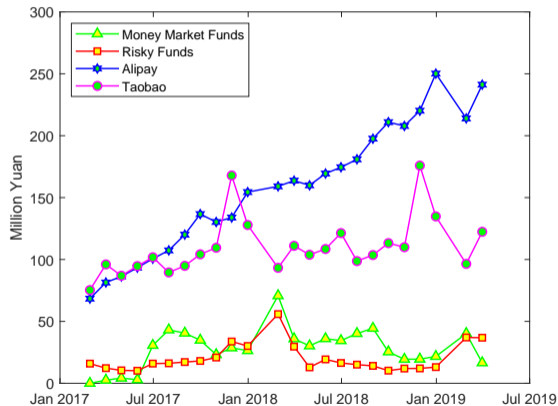
Super Apps

Alipay - Simplify Your Life 4+
Alipay (Hangzhou) Technology Co., Ltd.
★★★★☆ 3.1 • 1.7K Ratings
Free

Screenshots   iPhone   iPad   Apple Watch   iMessage

| Lifestyle | Fortune | Transfer | Go Dutch |
| A lifestyle app connecting 1 billion users | Manage your assets | Transfer money to anyone anywhere | Split Bills with Friends |

手机淘宝 - 淘到你说好 17+
网购美食外卖旅行平台
Taobao (China) Software CO.,LTD
★★★★☆ 3.8 • 3.6K Ratings
Free

Screenshots   iPhone   iPad
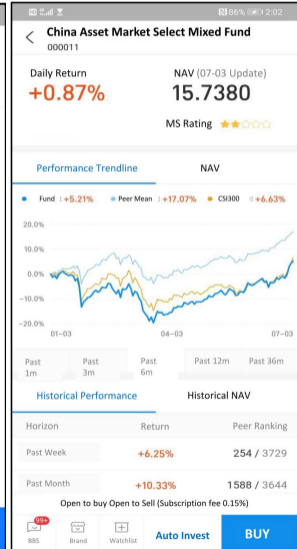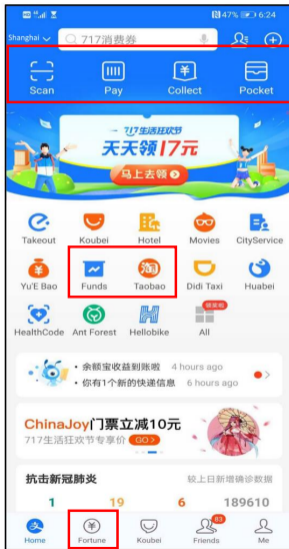
双11官方榜单 | 大牌明星直播 | 大牌新人有礼

Alipay from Ant Group   **Taobao from Alibaba Group**
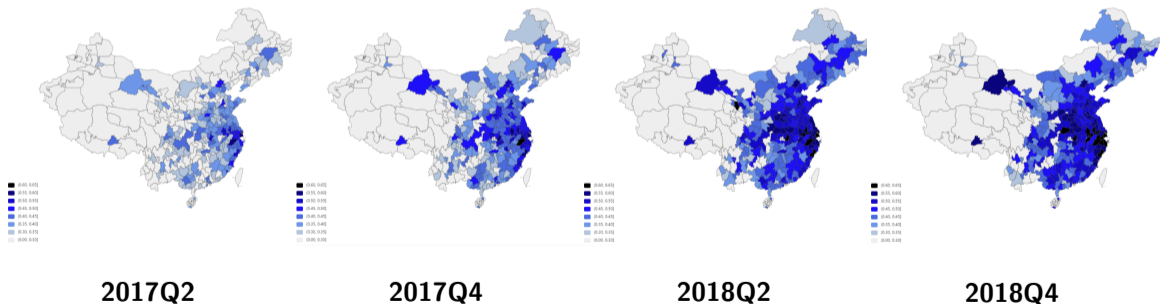
Alipay as a One-Stop FinTech App

Our Measure of FinTech Adoption

Using individual i's month-t consumption on Alipay and Taobao:

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

2017Q2   **2017Q4**   **2018Q2**   **2018Q4**

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
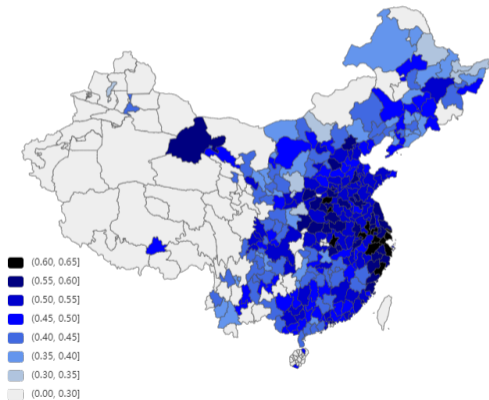
2017-12-22 17:16 | 绍兴晚报

Risk-Taking and FinTech Adoption

- **Increased risk-taking with FinTech adoption:** moving the FinTech adoption measure from zero to one corresponds to an increase of
  - **13.6%** in risky participation (average=37.5% among 50,000 individuals)
  - **14.0%** in risky share (average=45% among 28,393 individuals)
  - **0.52%** in portfolio volatility (average=1.77% among 28,393 individuals)
- **Increased risk-taking with increased FinTech adoption:** tracking the same individual's FinTech savviness from 2017 to 2018, a change from 0 to 1 corresponds to changes of
  - **1.4%** in risky participation
  - **8.7%** in risky share
- **Controlling for risk tolerance:** findings remain robust.
- **Risk-taking improvement stronger for more risk-tolerant individuals.**

FinTech Penetration

Change in FinTech Penetration, 2017-2018

FinTech Penetration legend:
- (0.60, 0.65]
- (0.55, 0.60]
- (0.50, 0.55]
- (0.45, 0.50]
- (0.40, 0.45]
- (0.35, 0.40]
- (0.30, 0.35]
- (0.00, 0.30]

Change legend:
- (0.045, 0.080]
- (0.035, 0.045]
- (0.025, 0.035]
- (0.010, 0.025]
- (-0.03, 0.010]
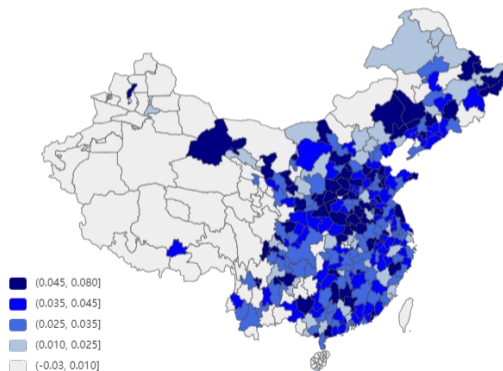
Which Cities Benefit More from FinTech Advancement?

FinTech Penetration
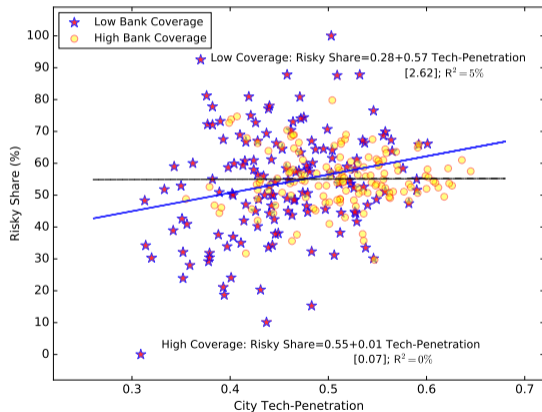
Change in FinTech Penetration
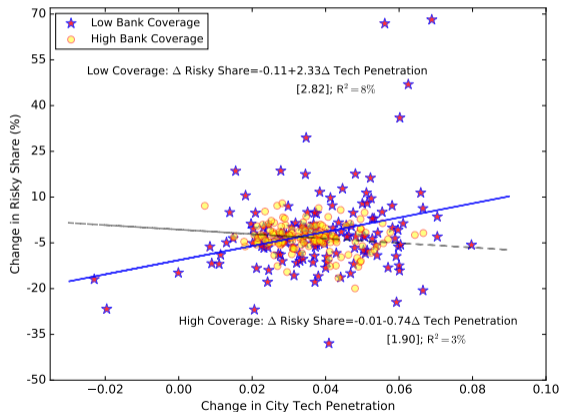
Conclusions

- We study how FinTech can help households move toward optimal risk-taking:
  - ▸ FinTech adoption improves risk-taking, more for risk-tolerant individuals.
  - ▸ FinTech can help improve the alignment of risk-taking and consumption.
  - ▸ Cities with low banking coverage benefit more from FinTech penetration.

- 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.

Appendix

- Future of FinTech: financial inclusion and financial advisory.
- Academic studies on household finance.
- Optimal alignment of risk-taking and consumption.
- Additional tables and figures.

Financial Inclusion via FinTech

FINANCIAL TIMES

VISIT FT.COM   FASTFT   MARKETS DATA

Fintech

Colombian fintechs fill Latin American banking gaps

Investors pour $1bn into an industry spurred by financial inclusion and undeterred by money laundering curbs

A robot delivers to a customer in Medellín, Colombia. Many customers pay via apps offered by fintechs © Joaquin Sarmiento/AFP via Getty Images

October 7, 2020 10:22 am by Mariana Palau

A 2019 Ernst & Young report found Colombia has the highest "fintech adoption" rate in Latin America, with 76 per cent of its population using fintech services and the industry growing at about 120 per cent a year. Investors have poured more than $1bn into the industry in the past three years, $300m of which came during the first five months of the pandemic, according to Fintech Colombia.

Investors find Colombia attractive because it is a large market with a history of stable macroeconomic policy. The rise of Rappi, an online delivery tech start-up, put Colombia on the map when it raised $1bn from SoftBank last year.

Delivery services app Rappi uses pavement robots © Fredy Builes/VEWpress via Getty Images

But perhaps what best explains this growing fintech industry is Colombia's need for financial inclusion. About 84 per cent of Colombians have had access to some kind of financial product in their lives, but fintech industry leaders believe only 30 per cent of them use any regularly.

That leaves many people in need of financial services, and fintechs are changing the way the finance sector works in Colombia by offering products to people who have been left out by traditional banks.

Movii, a challenger bank, is the best example of a digital wallet provider. Users need only an ID and a smartphone to open an account that carries no fees. That makes it easy for people in rural areas to open up an account. Customers who do not have a smartphone (the case for 20 per cent of Colombians) get a Movii debit card.

Seventy per cent of Movii's 1.1m users, up from 300,000 at the beginning of the year, do not have a traditional bank account. At least 200,000 use the app to receive welfare payments.

From Tech to Fin: Financial Advisory

Vanguard faces roboadviser competition from Chinese partner

Ant Group signals wish to expand beyond its joint venture platform

Ant aims to supply more asset managers with proprietary artificial intelligence © ALEX PLAVEVSKI/EPA-EFE/Shutterstock

Selena Li, Ignites Asia 53 MINUTES AGO

Ant currently offers 13 fund portfolio services operated by 10 different Chinese fund houses, including six Sino-foreign joint ventures, that range from very conservative to riskier strategies, information from Alipay shows.

Ant and Vanguard teamed up in June last year to establish their fund advisory joint-venture company, which launched Bang Ni Tou in March. Bang Ni Tou, which translates as "Help You Invest", is an automated advisory service operated via Ant's digital wallet Alipay.

When Ant's tie-up with Vanguard was first formed, some market observers believed that Ant would take advantage of Vanguard's established robo capabilities in the US and European markets, and replicate that model in China in partnership with the US fund giant.

This move seems to indicate, however, that China's tech giant is choosing to focus on developing proprietary advisory capabilities rather than relying on the collaboration.

However, Huang Hao, president of digital finance business group at Ant, has said that China's largest online wealth platform aims to supply more asset managers with proprietary artificial intelligence to allow them to offer discretionary roboadvisory services.

Mr Huang urged asset managers to better prepare themselves to "capture the opportunity" when Ant fully opens up its discretionary roboadvisory ecosystem to include more fund providers.

"I would suggest [that] fund houses develop their automated asset allocation capability and obtain the qualification that's required," Mr Huang said.

Academic Study on Household Finance

- Campbell (2006): The study of household finance is challenging because
  - household behavior is difficult to measure,
  - households face constraints not captured by textbook models.
- The emergence of FinTech revolutionizes the practice and study of household finance:
  - break down many of the traditional barriers faced by households,
  - more data from FinTech platforms are made available to researchers.
- Our paper: Can FinTech improve household risk-taking?
  - Standing puzzle in household finance: limited participation and low risk-taking.
  - Physical costs: convenience, transaction cost, information cost.
  - Psychological costs, information-asymmetry costs, familiarity, trust, financial literacy, etc.

Academic Theory on Household Finance

- Financial theories on optimal portfolio choice and consumption:
  - ▶ Mean-variance: Markowitz (1952) and Tobin (1958).
  - ▶ Dynamic continuous-time models: Merton (1969, 1971).
- Insights from Merton (1971):
  - ▶ The optimal portfolio weight for an individual with risk-aversion γ:

$$w^* = \frac{1}{\gamma} \frac{\mu - r}{\sigma_R^2} \, .$$

  As long as the risk premium $\mu - r > 0$, the optimal risk-taking $w^* > 0$.
  - ▶ Moreover, the optimal consumption-to-wealth ratio is a constant, resulting in

$$\sigma_c = \sigma_w = w^* \sigma_R \, .$$

  Consumption volatility σ_c is linear in w^*, proportional to risk tolerance $1/\gamma$.

Optimal Alignment of Risk-Taking and Consumption

All Individuals

$\sigma_W^i = 6.54 + \mathbf{0.79}\ \sigma_C^i\ ;\ R^2 = 62\%.$
[9.02]

● σ_C sorted groups

FinTech Adoption: High vs Low

★ High FinTech Adoption
■ Low FinTech Adoption

High FinTech: $\sigma_W^i = 6.23 + \mathbf{0.91}\ \sigma_C^i\ ;\ R^2 = 77\%.$
[8.86]

Low FinTech: $\sigma_W^i = 6.65 + \mathbf{0.58}\ \sigma_C^i\ ;\ R^2 = 45\%.$
[4.42]

FinTech Adoption and Risk Taking, Controlling for Risk Aversion

	Participate		Risky Share		Portfolio Volatility (σ_W)	
	(1)	(2)	(3)	(4)	(5)	(6)
Tech-Savviness	0.127***	0.239***	0.131***	0.146***	0.431***	0.446***
	(10.47)	(17.94)	(7.65)	(7.80)	(4.76)	(4.59)
σ_C	0.037***	0.019***	0.052***	0.018***	0.345***	0.163***
	(7.37)	(3.69)	(7.87)	(2.72)	(8.43)	(4.07)
Log(C)		0.076***		0.031***		0.128***
		(30.06)		(9.03)		(5.46)
Female		-0.067***		-0.102***		-0.542***
		(-12.24)		(-15.12)		(-15.52)
Log(Age)		0.007		-0.171***		-0.861***
		(0.57)		(-11.11)		(-10.50)
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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Change in FinTech Adoption from 2017 to 2018

	ΔParticipate	ΔRisky Share	ΔTrade Propensity
	(1)	(2)	(3)
ΔTech Savviness	0.014**	0.087***	0.025***
	(2.08)	(5.30)	(6.60)
σ_C	0.009**	-0.010	0.000
	(2.23)	(-1.32)	(0.09)
Log(C)	0.013***	0.000	-0.002**
	(8.25)	(0.10)	(-2.13)
Female	-0.025***	-0.004	0.000
	(-8.31)	(-0.68)	(-0.076)
Log(Age)	-0.041***	0.012	-0.005**
	(-5.98)	(0.98)	(-2.05)
City FE	Y	Y	Y
Adjusted R2	0.004	0.154	0.001
N	50.000	28,393	50,000

Determinants of FinTech Adoption

	AliFrac				Log(AliCnt)			
	All Users		Active Users		All Users		Active Users	
σ_C	0.032***	0.034***	0.033***	0.035***	0.044***	0.054***	0.042***	0.052***
	(11.13)	(12.31)	(10.52)	(10.52)	(4.85)	(6.31)	(3.31)	(4.37)
Log(C)	-0.104***	-0.107***	-0.107***	-0.109***	0.133***	0.124***	0.130***	0.121***
	(-81.59)	(-94.95)	(-72.19)	(-80.70)	(19.60)	(25.10)	(17.15)	(20.31)
Female	-0.054***	-0.050***	-0.055***	-0.051***	-0.170***	-0.160***	-0.190***	-0.180***
	(-16.95)	(-16.18)	(-16.00)	(-15.21)	(-14.94)	(-13.70)	(-16.04)	(-14.74)
Log(Age)	0.000	-0.002	-0.015	-0.017	-0.816	-0.818	-0.861	-0.863
	(0.03)	(-0.27)	(-1.61)	(-1.86)	(-23.04)	(-28.26)	(-23.49)	(-26.97)
Log(GDP)	0.023**		0.022**		0.123**		0.1292**	
	(2.50)		(2.18)		(2.17)		(2.07)	
Log(Income)	0.029***		0.029***		0.1172***		0.1262***	
	(4.32)		(4.45)		(3.28)		(3.39)	
Log(Population)	0.006		0.005		0.0138		0.0233	
	(0.90)		(0.71)		(0.35)		(0.59)	
Log(#Branch)	-0.003		-0.004		0.0194		-0.0077	
	(-0.35)		(-0.34)		(0.40)		(-0.13)	
Citylevel=1	-0.059**		-0.059**		-0.2612**		-0.267**	
	(-2.50)		(-2.65)		(-2.20)		(-2.22)	
City FE	N	Y	N	Y	N	Y	N	Y
R2	0.210	0.208	0.230	0.230	0.0857	0.086	0.096	0.095
N	49,087	50,000	27,886	28,393	49,087	50,000	27,886	28,393