FinTech Adoption and Household Risk-Taking
ABFER Webinar Series

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
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 culture of “winner-take-all.”
- **Super Apps**: financial services delivered directly to households via super apps.
  - Free of traditional financial advisors.
  - All-in-one ecosystems with a wide range of products.

In China, activities central to household finance are taking place on FinTech platforms via super apps:

- **Consumption**: online consumption accounts for 25% of the total.
- **Investments**: 30% of mutual fund purchases takes place on FinTech platforms.
- **Payments**: digital payments everywhere.
Imagine if
1. Main-street banks
2. Wall Street’s brokers
3. Boston’s asset managers
4. Connecticut’s insurers
all shrunk to fit into
1. a single app designed in Silicon Valley
that almost everyone used.

— The Economist, Oct 8th 2020
Consumption, Investments, and Payments
aggregated over a random sample of 50,000 individuals

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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.”


- **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

2017-12-22 17:16 | 绍兴晚报
Offline Digital Payments: An Emerging Trend Since 2017

Alipay, Taobao, Risky Funds, Money Market Funds

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Individual-Level Measures of FinTech Adoption

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

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

![Maps showing FinTech adoption by quarter from 2017Q2 to 2018Q4 with different color codes for different fractions.](image)
## Individual-Level Measures of Risk-Taking and Consumption Volatility

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

<table>
<thead>
<tr>
<th></th>
<th>Risk-Taking</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female</td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td>0.61</td>
</tr>
<tr>
<td><strong>Median</strong></td>
<td>1.00</td>
</tr>
<tr>
<td><strong>Std</strong></td>
<td>0.49</td>
</tr>
</tbody>
</table>

### All 50,000 Users

<table>
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- **Participate**: Equals one for active users with positive investment in risky funds.
- **Risky Share**: Fraction of risky-fund investments over total portfolio holdings.
- $\sigma_W$: Portfolio return volatility.
- $\sigma_C$: Taobao 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 = 37.5% 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)

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

- Use monthly panel data to further decompose the effect of FinTech adoption:

<table>
<thead>
<tr>
<th>Fixed Effect</th>
<th>AliFrac Variation</th>
<th>Participate</th>
<th>Risk Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>none</td>
<td>all</td>
<td>12.6%</td>
<td>11.1%</td>
</tr>
<tr>
<td>individual</td>
<td>across time</td>
<td>9.53%</td>
<td>3.90%</td>
</tr>
<tr>
<td>month $\times$ city</td>
<td>cross individual</td>
<td>6.95%</td>
<td>9.17%</td>
</tr>
<tr>
<td>individual $+$ month $\times$ city</td>
<td>individual idiosyncratic</td>
<td>0.57%</td>
<td>1.95%</td>
</tr>
</tbody>
</table>
Can FinTech Improve Household Risk-Taking? City-Level Findings

- FinTech adoption at city level: less affected by individual’s self-selection.
  - Cities with higher FinTech penetration: higher risk-taking.
  - Increase in city-level FinTech penetration: increase in city-level risk-taking.

- IV test: Use distance to Hangzhou as an instrument for FinTech penetration.
  - Main insight: the gradual spread of offline Alipay emanated from Hangzhou.
  - Complication: closeness of Hangzhou to Shanghai.

- Comparing the economic significance of the IV tests:

<table>
<thead>
<tr>
<th>IV</th>
<th>FinTech Penetration</th>
<th>All Cities</th>
<th>≤500km</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Risky Share</td>
<td>T-stat</td>
</tr>
<tr>
<td>No</td>
<td>one-std of AliFrac</td>
<td>1.17%</td>
<td>(3.04)</td>
</tr>
<tr>
<td>Yes</td>
<td>one-std of AliFrac</td>
<td>1.16%</td>
<td>(2.32)</td>
</tr>
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Distance to Hangzhou Instrumenting for FinTech Adoption

First Stage: \( Y = \text{AliFrac} \)

<table>
<thead>
<tr>
<th>Log(Distance to HZ)</th>
<th>( \leq 200 )</th>
<th>( \leq 500 )</th>
<th>( \leq 1000 )</th>
<th>( \leq 2000 )</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Observations</td>
<td>238</td>
<td>799</td>
<td>2,278</td>
<td>4,624</td>
<td>4,879</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.85</td>
<td>0.66</td>
<td>0.54</td>
<td>0.51</td>
<td>0.50</td>
</tr>
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First Stage: \( Y = \text{AliFrac} \)

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<th>Log(Distance to SH)</th>
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Who Benefits More from FinTech Advancements?

- **Risk-taking improvement stronger for more risk-tolerant individuals.**
  - Proxy individual risk tolerance using consumption growth volatility $\sigma_C$.
  - Insights from Merton’s optimal consumption and portfolio weights:
    \[
    \sigma_C = \sigma_W = w^*\sigma_R = \frac{1}{\gamma} \frac{\mu - r}{\sigma_R}
    \]

- **Quantify the FinTech improvement relative the optimal risk-taking.**
  - The alignment of $\sigma_W$ and $\sigma_C$ is substantially closer to Merton’s optimal solution for investors with high FinTech adoption.

- **Cities under-served by banks benefit more from FinTech penetration.**
  - Proxy financial-service coverage using number of local bank branches.
Optimal Alignment of Consumption and Investment

High FinTech: \( \sigma_W = 6.23 + 0.91 \sigma_C \); \( R^2 = 77\% \).

Low FinTech: \( \sigma_W = 6.65 + 0.58 \sigma_C \); \( R^2 = 45\% \).
Which Cities Benefit More from FinTech Advancements?

![Graph showing the relationship between City Tech-Penetration and Risky Share]

Low Coverage: Risky Share = 0.28 + 0.57 Tech-Penetration
\[ (0.28 + 0.57) \text{ Tech-Penetration} \]
\[ R^2 = 5\% \]

High Coverage: Risky Share = 0.55 + 0.01 Tech-Penetration
\[ (0.55 + 0.01) \text{ Tech-Penetration} \]
\[ R^2 = 0\% \]
Related Literature

- **Theory:** Markowitz (1952), Tobin (1958), and Merton (1969, 1971).
- **Household Finance:** Campbell (2006).
- **Risk-Taking and**
  - **Consumption Volatility:** Mankiw and Zeldes (1991).
  - **Familiarity:** Hong, Kubic and Stein (2004).
  - **Trust:** Guiso, Sapienza, and Zingales (2008).
- **Technology and Investor Behavior:**
  - Internet and stock trading: Barber and Odean (2002).
  - FinTech platforms and mutual fund flows: Hong, Lu, and Pan (2020).
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.