Peer-to-Peer Lenders versus Banks: Substitutes or Complements?

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How does it work?

- Internet-based, streamlined process

- Lenders: individual & institutional investors, wholesale funding

- Loan types: personal & small business loans
  - Loan maturity: 2 - 5 years
  - Loan amount: < $50k
U.S. P2P Market

- LendingClub + Prosper + SoFi: $16.1 bn (7.3% of new consumer credit)
- LendingClub: more than 50% of the P2P lending market
This paper

- Does P2P lending mainly cover borrowers under-served by banks or those who could have obtained credit from banks?
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- **Challenge**: P2P borrower’s access to similar bank loans is unobservable
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- **Challenge**: P2P borrower’s access to similar bank loans is unobservable

- **Solution**: Exogenous (negative) shock to bank credit supply
  \[\Rightarrow\] Does the quality of P2P borrower pool improve or decline?
Literature

- P2P investors
  - Herding (Duarte, Siegel, and Young 2012; Lin, Prabhala and Viswanathan 2012); Lending in relation to borrower characteristics, e.g. appearance, disclosure, and social networks (Kim and Viswanathan 2016; Zhang and Liu 2012)
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- Information production and efficiency (Franks, Serrano-Velarde, and Sussman 2016; Balyuk 2016; Iyer, Khwaja, Luttmer and Shue 2015)
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- Information production and efficiency (Franks, Serrano-Velarde, and Sussman 2016; Balyuk 2016; Iyer, Khwaja, Luttmer and Shue 2015)

- P2P lending in relation to bank lending
  - FinTech lenders serve risky borrowers in residential lending market (Buchack, Matvos, Piskorski and Seru, 2017WP) and in consumer credit market in Germany and China (De Roure, Pelizzon, and Thakor 2018WP; Liao, Wang, Xiang, and Zhang, 2017WP)
  - U.S. banks lose market share to P2P lenders (Wolfe and Yoo, 2017WP)
Key findings

- P2P platforms substitute banks and do not go beyond the customer base of banks
- P2P platforms complement banks by providing small-size loans
Plan

Introduction

Research Question

Research Design

Assumptions

Conceptual Framework

Identification

Data and Results

Data

Results
Assumptions

- Pool of borrowers with heterogenous quality $\gamma$

- Banks and P2P platforms serve all borrowers with sufficient quality:

  $$\gamma \geq \gamma^{\text{bank}} \quad \text{or} \quad \gamma \geq \gamma^{\text{P2P}}$$

- Of borrowers with access to bank credit and P2P credit, a fraction $\alpha$ choose P2P
Substitutes

**Before Shock**

\[ \gamma_{bank} = \gamma_{P2P} \]

Banks and P2P serve the same market

**After Shock**

Banks cut lending to riskier borrowers

\[ \gamma_{P2P} \quad \gamma_{bank} \]
Complements

**Before Shock**

P2P serves risky borrowers

**After Shock**

Banks cut lending to riskier borrowers

\[ \gamma_{P2P} \quad \gamma_{bank} \]
Intermediate case

P2P serves the same population as bank & low quality borrowers

Banks cut lending to riskier borrowers
Tests

Case I. “Substitute”

(1) Volume: P2P loan volume ↑

Case II. “Complement”

(1) Volume: P2P loan volume ↑
Tests

Case I. “Substitute”

(1) Volume: P2P loan volume ↑
(2) Quantiles: mean and quantiles ↓

Case II. “Complement”

(1) Volume: P2P loan volume ↑
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Tests

Case I. “Substitute”

(1) Volume: P2P loan volume ↑
(2) Quantiles: mean and quantiles ↓
(3) Frequency: higher frequency at the left tail

Case II. “Complement”

(1) Volume: P2P loan volume ↑
(2) Quantiles: mean and quantiles ↑
(3) Frequency: higher frequency at the right tail
Identification: Shock to local bank credit supply

- **Stage 1**: Regulatory shock to bank credit supply

- Regulatory shock to bank credit supply

- Affected banks:
  - Reduce lending to small businesses by 16% (Dou, 2017)
  - Improve quality of credit card loans (Tian and Zhang, 2016)

- Exposure to FAS 166/167 varies across counties
Identification: Shock to local bank credit supply

- **Stage 1**: Regulatory shock to bank credit supply
  - FAS 166/167 (2011) ⇒ Banks consolidate $400bn off-B/S assets (of which 80% are revolving loans)
  - Affected banks:
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- **Stage 2**: Effect on distribution of P2P borrowers

  \[
  \text{Percentile}_{c,t}^N = \beta \text{Treated}_c \times \text{Post}_t + \text{Controls}_{c,t} + \gamma_c + \sigma_t + \varepsilon_{c,t}
  \]

  \[N \in \{5, 15, 25, ..., 95\}\]

  \[\beta > 0 \Rightarrow \text{complements}\]

  \[\beta < 0 \Rightarrow \text{substitutes}\]
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- LendingClub data (2009-2012)
  - Loan level: size, borrower location, loan characteristics
  - County level: total volume, distribution of quality and size
  - Borrower quality:
    1. FICO score
    2. Alternative measure (using FICO, DTI ratio, and employment history)

- FAS 166/167:
  - Call Reports: amount of consolidated assets
  - Summary of Deposits: bank branches
Prediction 1: P2P loan volume

\[ y_{c,t} = Treated_{c,t} \times \sum_{t=-8}^{t=8} \beta_t D_t + Controls_{c,t} + \gamma_c + \sigma_t + \varepsilon_{c,t} \]

Dollar amount ($) Number of loans (#)
P2P loan volume

\[ y_{c,t} = \beta Treated_c \times Post_t + Controls_{c,t} + \gamma_c + \sigma_t + \varepsilon_{c,t} \]

<table>
<thead>
<tr>
<th></th>
<th>Applications</th>
<th>Funded loans</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Amount($)</td>
<td>Number(#)</td>
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<tr>
<td>Treated x Post</td>
<td>1107.69***</td>
<td>0.07***</td>
</tr>
<tr>
<td></td>
<td>(2.89)</td>
<td>(2.92)</td>
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<tr>
<td>Controls</td>
<td>Y</td>
<td>Y</td>
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<tr>
<td>Year FE</td>
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<tr>
<td>County FE</td>
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<td>Y</td>
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<tr>
<td>( N )</td>
<td>11,726</td>
<td>11,726</td>
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<td>( R^2 )</td>
<td>0.710</td>
<td>0.756</td>
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</tbody>
</table>

- Treatment effect per thousand inhabitants in the county:
  - Application volume: +$1,100 (+42%)
  - Loan volume: +$300 (+150%)
Prediction 2: Shift in quantiles of P2P borrower quality

\[ y_{c,t} = \beta Treated_{c} \times Post_{t} + Controls_{c,t} + \gamma_{c} + \sigma_{t} + \varepsilon_{c,t} \]

<table>
<thead>
<tr>
<th>Percentile</th>
<th>5th (1)</th>
<th>15th (2)</th>
<th>25th (3)</th>
<th>35th (4)</th>
<th>45th (5)</th>
<th>55th (6)</th>
<th>65th (7)</th>
<th>75th (8)</th>
<th>85th (9)</th>
<th>95th (10)</th>
<th>Mean (11)</th>
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<tbody>
<tr>
<td>Panel A. FICO score</td>
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<tr>
<td>Treated x Post</td>
<td>-2.36</td>
<td>-0.32</td>
<td>-0.05</td>
<td>-2.40</td>
<td>-2.15</td>
<td>-8.68***</td>
<td>-7.00**</td>
<td>-8.79**</td>
<td>-6.72*</td>
<td>-1.18</td>
<td>-3.71</td>
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<td>(-0.74)</td>
<td>(-0.10)</td>
<td>(-0.02)</td>
<td>(-0.75)</td>
<td>(-0.68)</td>
<td>(-2.61)</td>
<td>(-2.31)</td>
<td>(-2.38)</td>
<td>(-1.71)</td>
<td>(-0.29)</td>
<td>(-1.56)</td>
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<td>Panel B. Predicted borrower quality</td>
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<tr>
<td>Treated x Post</td>
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<td>-0.02</td>
<td>-0.01</td>
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<td>(-3.06)</td>
<td>(-1.22)</td>
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<td>(-0.84)</td>
<td>(-0.53)</td>
<td>(-1.54)</td>
<td>(-1.12)</td>
<td>(-1.59)</td>
<td>(-1.35)</td>
<td>(-0.46)</td>
<td>(-1.40)</td>
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- Negative coefficients: distribution shifts to the left ("substitute" case)
Prediction 3: Change in frequency by borrower quality

\[ \text{Count}_{c,t}^N = \beta \text{Treated}_c \times \text{Post}_t + \text{Controls}_{c,t} + \gamma_c + \sigma_t + \epsilon_{c,t} \]

- New borrowers fall in the left tail of the distribution ("substitute" case)
Prediction 2: Shift in quantiles of loan size

\[ y_{c,t} = \beta \, Treated_{c,t} \times Post_t + Controls_{c,t} + \gamma_c + \sigma_t + \varepsilon_{c,t} \]

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<tr>
<td>Treated \times Post</td>
<td>-431.2</td>
<td>133.1</td>
<td>539.8</td>
<td>315.9</td>
<td>782.4</td>
<td>122.9</td>
<td>860.9</td>
<td>955.8</td>
<td>1562.9**</td>
<td>3869.7***</td>
<td>1066.0**</td>
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<tr>
<td>(t)</td>
<td>(-0.77)</td>
<td>(0.24)</td>
<td>(1.00)</td>
<td>(0.56)</td>
<td>(1.36)</td>
<td>(0.21)</td>
<td>(1.46)</td>
<td>(1.43)</td>
<td>(2.05)</td>
<td>(4.82)</td>
<td>(2.04)</td>
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<td>Controls</td>
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- **Positive** coefficients: distribution shifts to the right ("complement" case)
Prediction 3: Change in frequency by loan size

\[ y_{i,c,t} = \gamma_c + \beta \text{Treated}_c \times \text{Post}_t + \sigma_t + \text{LoanControls}_{i,c,t} + \varepsilon_{i,c,t}, \]

- New borrowers fall in the right tail of the distribution
- Consistent with the “complement” case
Excluded Alternative Explanations

- The worsening of P2P borrower pool post shock is not driven by:
  - time/location-specific LendingClub pricing policy
  - time/location-specific investor’s funding behavior
  - change in demographics or local economic conditions
Conclusion

- P2P platforms substitute banks by serving inframarginal bank borrowers
- They also complements banks by providing small loans
- Credit expansion occurs among borrowers with access to bank credit