

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

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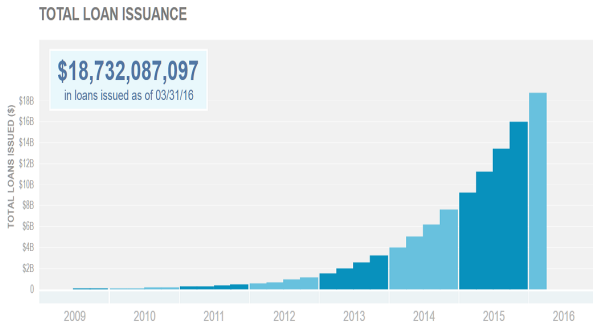
ACPR Chair Workshop 2018

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

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- ▶ **Does P2P lending mainly cover borrowers under-served by banks or those who could have obtained credit from banks?**
- ▶ **Challenge:** P2P borrower's access to similar bank loans is unobservable
- ▶ **Solution:** Exogenous (negative) shock to bank credit supply
⇒ 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

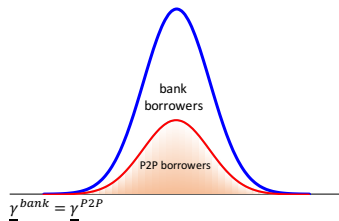
- ▶ Pool of borrowers with heterogenous quality γ
- ▶ Banks and P2P platforms serve all borrowers with sufficient quality:

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

- ▶ Of borrowers with access to bank credit and P2P credit, a fraction α choose P2P

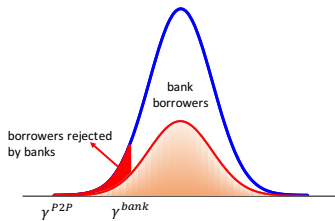
Substitutes

Before Shock



Banks and P2P serve the same market

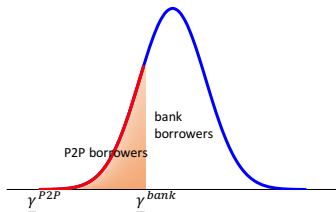
After Shock



Banks cut lending to riskier borrowers

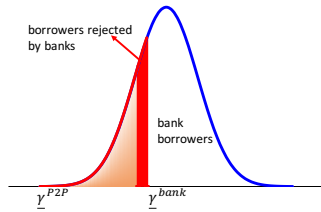
Complements

Before Shock



P2P serves risky borrowers

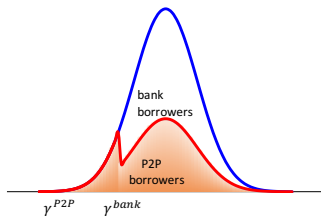
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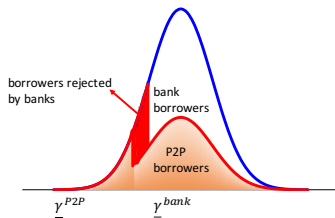
Intermediate case

Before Shock



P2P serves the same population as bank & low quality borrowers

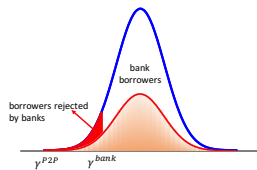
After Shock



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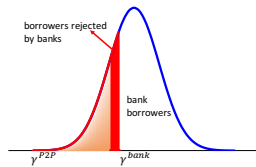
Tests

Case I. "Substitute"



(1) Volume: P2P loan volume \uparrow

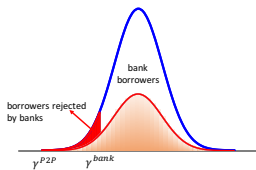
Case II. "Complement"



(1) Volume: P2P loan volume \uparrow

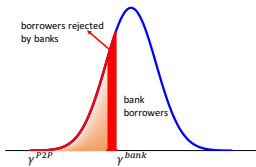
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Case I. "Substitute"



- (1) Volume: P2P loan volume \uparrow
- (2) Quantiles: mean and quantiles \downarrow

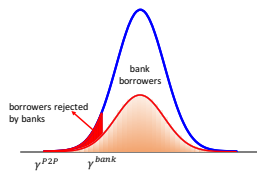
Case II. "Complement"



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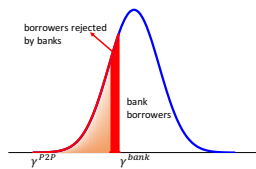
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Case I. "Substitute"



- (1) Volume: P2P loan volume \uparrow
- (2) Quantiles: mean and quantiles \downarrow
- (3) Frequency: higher frequency at the left tail

Case II. "Complement"



- (1) Volume: P2P loan volume \uparrow
- (2) Quantiles: mean and quantiles \uparrow
- (3) Frequency: higher frequency at the right tail

Identification: Shock to local bank credit supply

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 - ▶ Affected banks:
 - Reduce lending to small businesses by 16% ([Dou, 2017](#))
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- ▶ **Stage 2:** Effect on distribution of P2P borrowers

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

$$N \in \{5, 15, 25, \dots, 95\}$$

$\beta > 0 \Rightarrow$ complements

$\beta < 0 \Rightarrow$ substitutes

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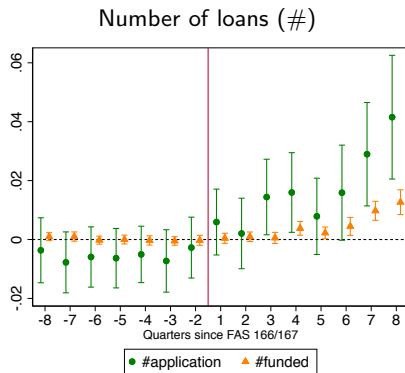
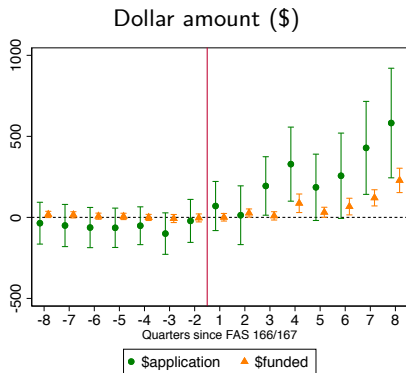
Results

Data

- ▶ **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

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



P2P loan volume

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

	Applications		Funded loans	
	Amount(\$) (1)	Number(#) (2)	Amount(\$) (3)	Number(#) (4)
Treated × Post	1107.69*** (2.89)	0.07*** (2.92)	300.54*** (6.31)	0.02*** (4.74)
Controls	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
County FE	Y	Y	Y	Y
<i>N</i>	11,726	11,726	11,726	11,726
<i>R</i> ²	0.710	0.756	0.532	0.557

- ▶ 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

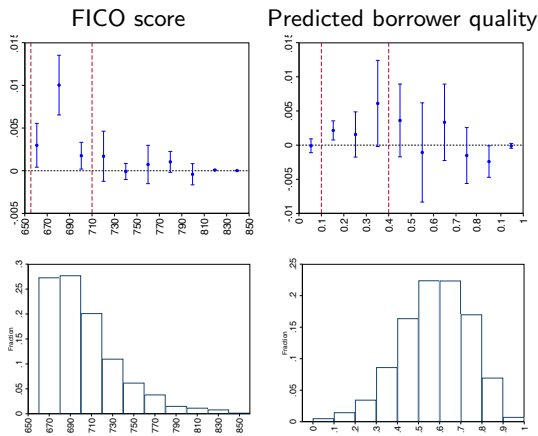
$$y_{c,t} = \beta \text{Treated}_c \times \text{Post}_t + \text{Controls}_{c,t} + \gamma_c + \sigma_t + \varepsilon_{c,t}$$

	Percentile										Mean (11)
	5th (1)	15th (2)	25th (3)	35th (4)	45th (5)	55th (6)	65th (7)	75th (8)	85th (9)	95th (10)	
<i>Panel A. FICO score</i>											
Treated × Post	-2.36 (-0.74)	-0.32 (-0.10)	-0.05 (-0.02)	-2.40 (-0.75)	-2.15 (-0.68)	-8.68*** (-2.61)	-7.00** (-2.31)	-8.79** (-2.38)	-6.72* (-1.71)	-1.18 (-0.29)	-3.71 (-1.56)
<i>Panel B. Predicted borrower quality</i>											
Treated × Post	-0.05*** (-3.06)	-0.02 (-1.22)	-0.01 (-0.40)	-0.01 (-0.84)	-0.01 (-0.53)	-0.02 (-1.54)	-0.02 (-1.12)	-0.02 (-1.59)	-0.02 (-1.35)	-0.01 (-0.46)	-0.02 (-1.40)
Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
County FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
N	5,059	5,059	5,059	5,059	5,059	5,059	5,059	5,059	5,059	5,059	5,059

- **Negative** coefficients: distribution shifts to the left (“substitute” case)

Prediction 3: Change in frequency by borrower quality

$$Count_{c,t}^N = \beta Treated_c \times Post_t + Controls_{c,t} + \gamma_c + \sigma_t + \varepsilon_{c,t}$$



- ▶ New borrowers fall in the **left tail** of the distribution (“substitute” case)

Prediction 2: Shift in quantiles of loan size

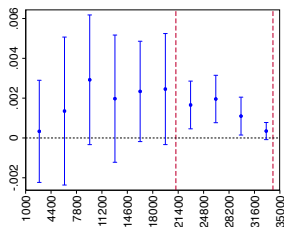
$$y_{c,t} = \beta Treated_c \times Post_t + Controls_{c,t} + \gamma_c + \sigma_t + \varepsilon_{c,t}$$

	Percentile										Mean
	5th (1)	15th (2)	25th (3)	35th (4)	45th (5)	55th (6)	65th (7)	75th (8)	85th (9)	95th (10)	
Treated × Post	-431.2 (-0.77)	133.1 (0.24)	539.8 (1.00)	315.9 (0.56)	782.4 (1.36)	122.9 (0.21)	860.9 (1.46)	955.8 (1.43)	1562.9** (2.05)	3869.7*** (4.82)	1066.0** (2.04)
Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
County FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
N	5,059	5,059	5,059	5,059	5,059	5,059	5,059	5,059	5,059	5,059	5,059

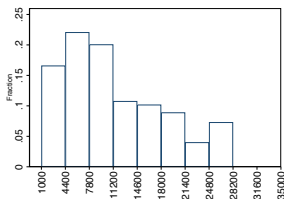
- ▶ **Positive** coefficients: distribution shifts to the right (“complement” case)

Prediction 3: Change in frequency by loan size

$$y_{i,c,t} = \gamma_c + \beta Treated_c \times Post_t + \sigma_t + LoanControls_{i,c,t} + \varepsilon_{i,c,t},$$



- ▶ 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