

What Drives the Expansion of the Peer-to-Peer Lending?

Olena Havrylchuk (University of Lille, LEM, CEPPI, EconomiX)

Carlotta Mariotto (Labex Refi, École des Mines de Paris)

Talal-Ur- Rahim (Boston University)

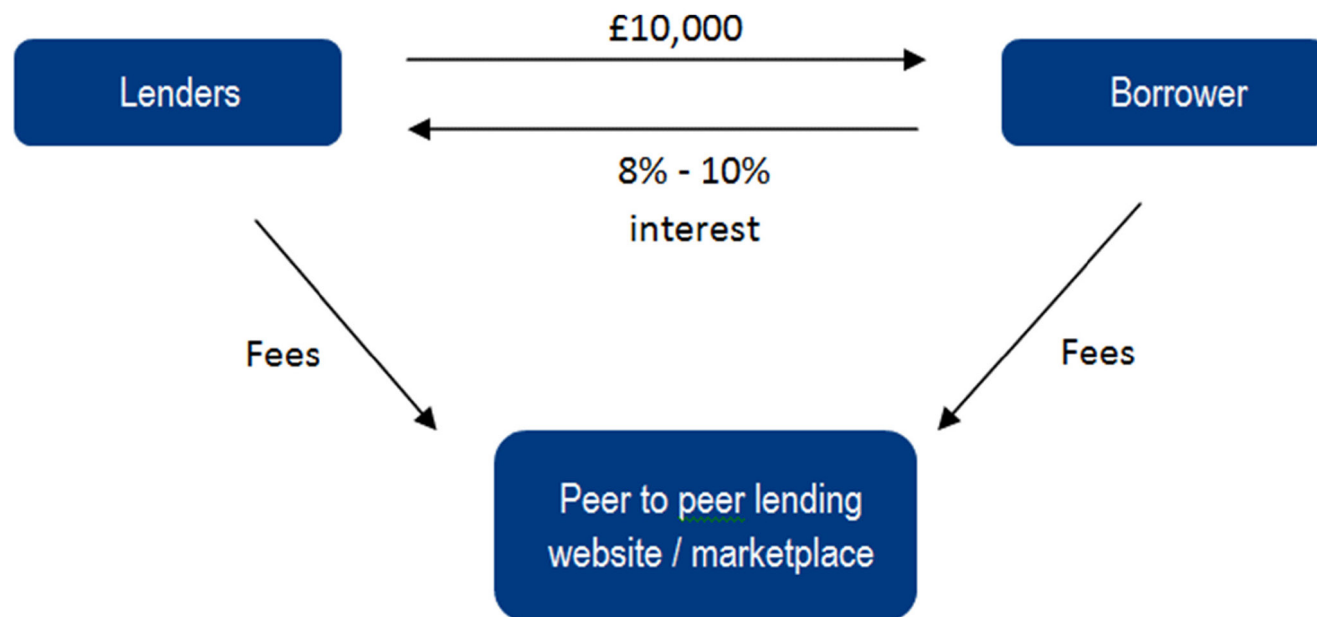
Marianne Verdier (University of Paris 2, CRED)

“Banking is necessary; banks are not”

Bill Gates, 1990

1. P2P/marketplace lending is a new form of (dis)intermediation
2. Review of the literature on P2P lending
3. Three driving forces behind the P2P lending
 - A. Competition
 - B. Crisis
 - C. Technology
4. Identification strategy and empirical findings
5. Conclusions

P2P/marketplace lending is a new form of (dis)intermediation



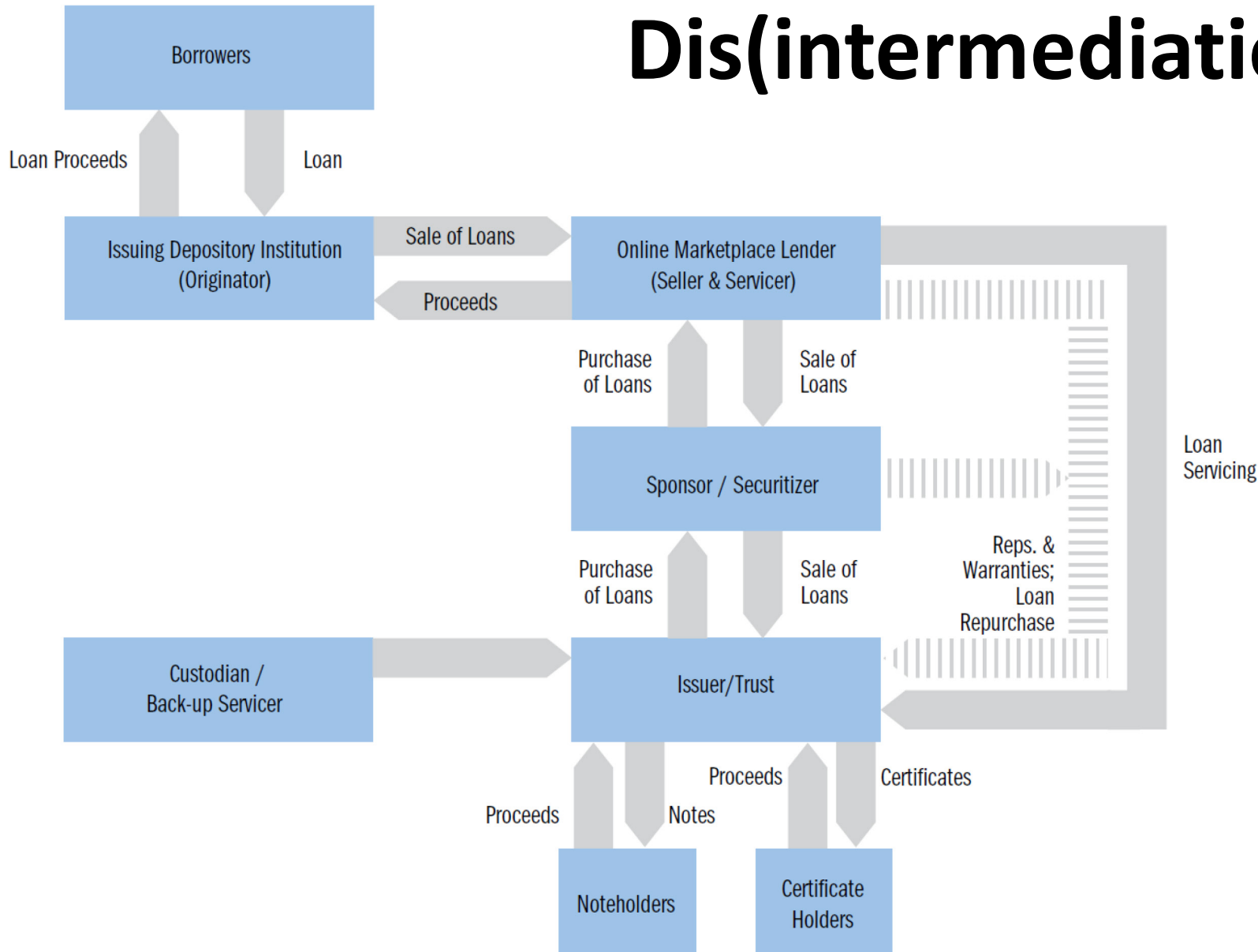
PROSPER

Prosper: variable rate model (Dutch auction) from 2006 to 2009 and fixed interest rate afterwards.

LendingClub

Lending Club: fixed interest rate

Dis(intermediation)?



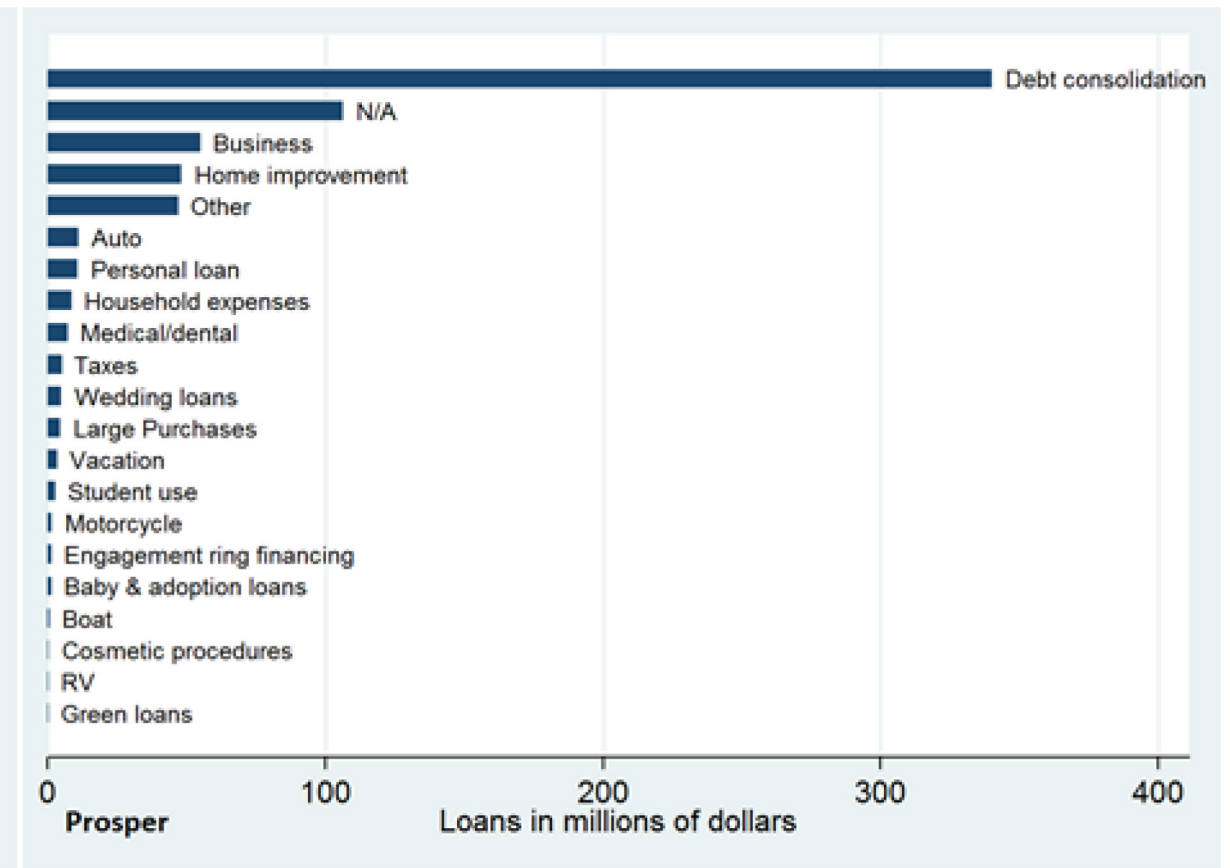
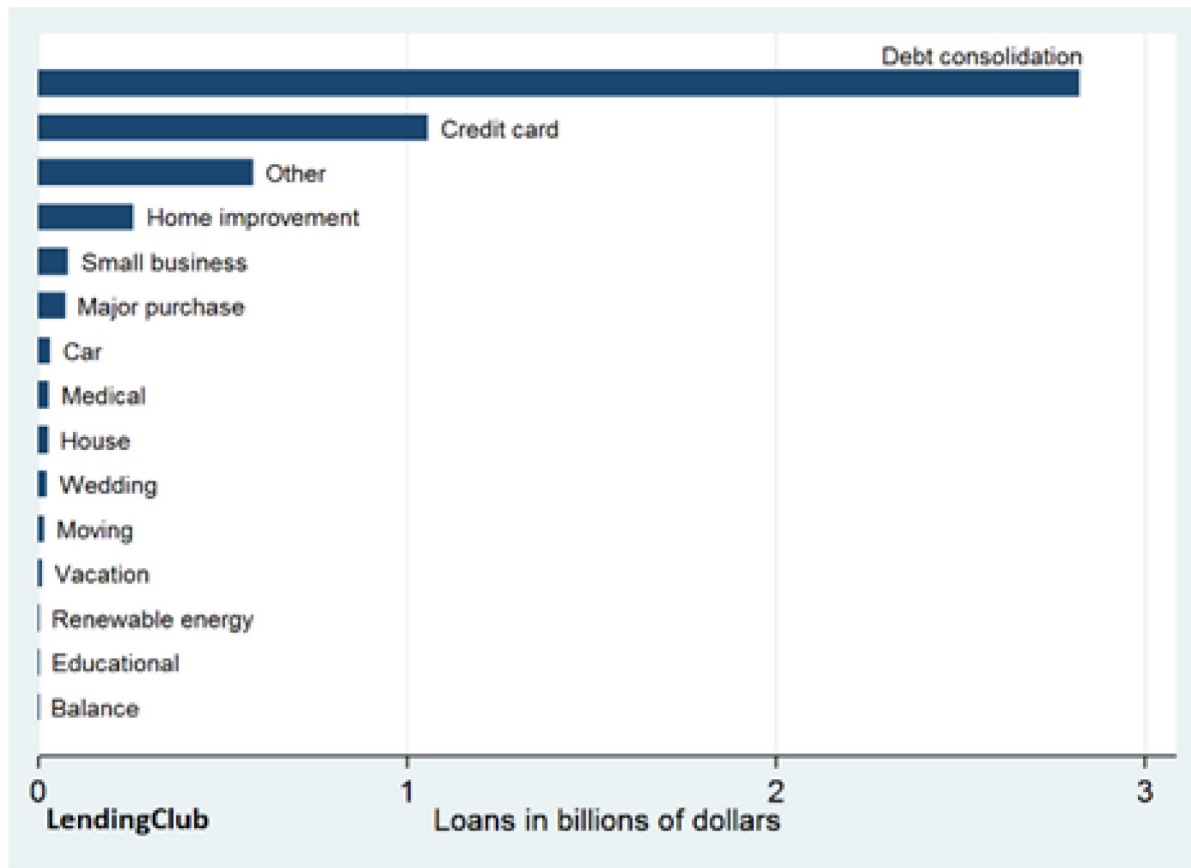
- Marketplace lenders in the US need a depository institution to **originate** a loan
- **Securitization** is growing in the consumer and student lending market (Lead banks: Goldman Sachs, Morgan Stanley, Citi, Credit Suisse, DB)

Invest with Prosper

Listing ID # [Search](#) Invest in multiple loans with Quick Invest

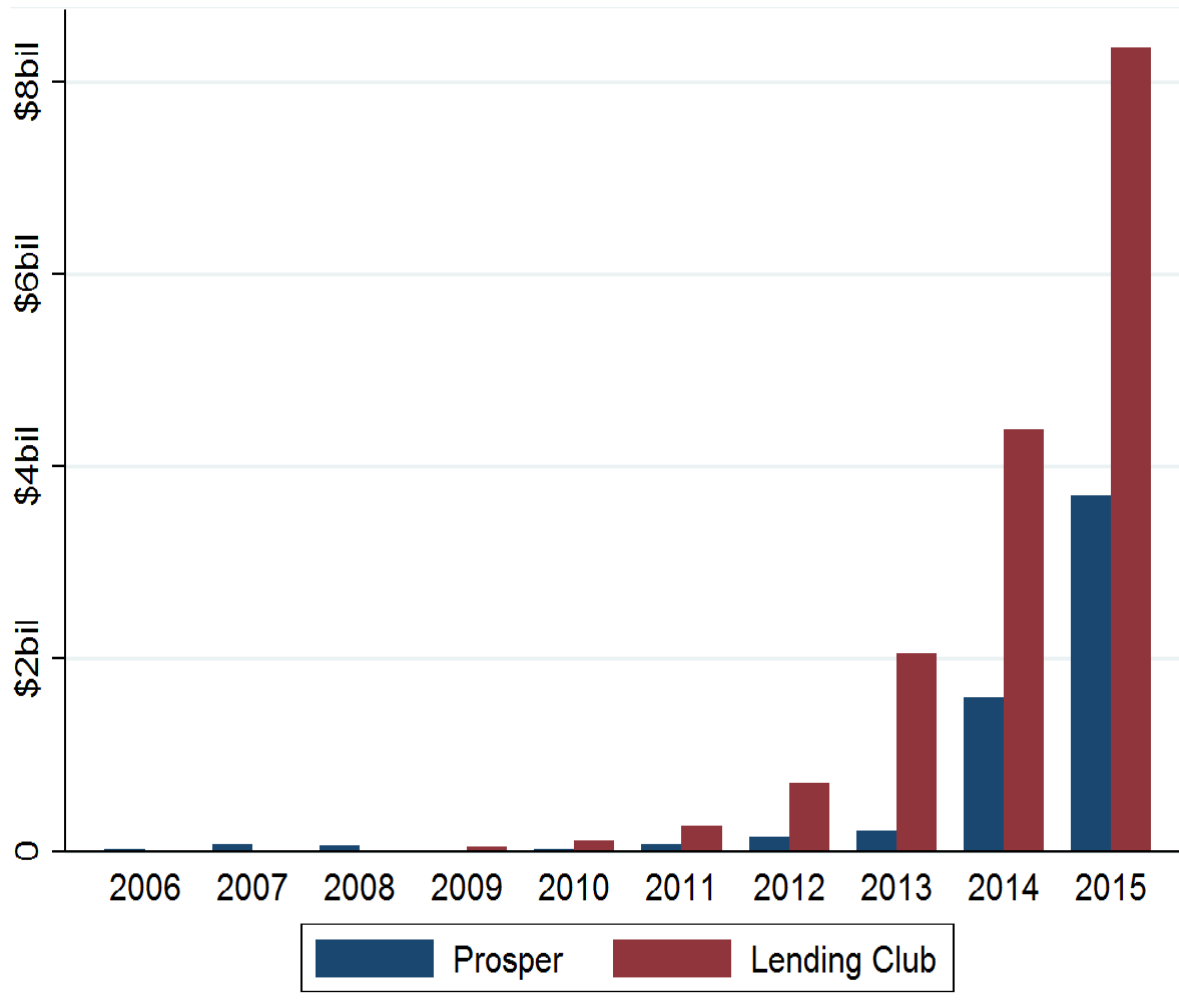
Filter by Rating (All) Term (All) Loan Category (All) [Advanced / Saved Filters](#) Total: 251 listings

Listing ID	Loan Category	Rating	Amount	Yield	% Funded	Time Left
5414249	Debt Consolidation	D	\$5,500	19.99%	29% \$3,905.00 left	13d 23h 6m
5403737	Home Improvement	C	\$15,000	17.6%	29% \$10,600.00 left	13d 23h 6m
5402183	Debt Consolidation	AA	\$16,000	5%	45% \$8,767.35 left	13d 23h 6m
5399891	Home Improvement	C	\$25,000	18.24%	22% \$19,486.00 left	13d 23h 6m
5392337	Debt Consolidation	B	\$5,000	11.1%	32% \$3,395.00 left	13d 23h 6m
5628237	Debt Consolidation	C	\$10,000	16.45%	99% \$115.87 left	13d 5h 7m
5627889	Debt Consolidation	AA	\$9,000	5.6%	27% \$6,549.49 left	13d 5h 7m
5627577	Business	B	\$20,000	11.1%	9% \$18,176.10 left	13d 5h 7m



- A typical borrower in the US is a wealthy individual with high level of debt (Morse, 2016). Securitized marketplace lending is often AAA!

P2P lending growth in the US (in billions of dollars)



- Launch of P2P lending platforms in 2006 (Prosper) and 2007 (LC)
- Prosper and LC closed in 2008 due to the regulatory uncertainty (selling of unregistered securities) and litigation
- In 2008-2009, platforms reopen after SEC registration.
- 2012 and 2014: LC and Prosper become profitable
- 2014: LC goes public

How important is P2P lending?

- Very small in % of total bank lending
- But in some niche markets, it becomes very important.
 - In 2015, the flow of US online alternative finance consumer lending was equivalent to **12.5% of traditional consumer lending** (Wardrop et al., 2016).
 - In 2015, **12% of new UK small business loans and 16% of venture and seed capital** came from P2B and equity crowdfunding platforms (Wardrop et al., 2016).

2. Literature on P2P consumer lending

- Learning by doing (Freedman and Jin, 2011)
- Crowd could enhance the soft information
 - Loans funded by **investor groups** perform better if someone in the group is personally connected to borrowers (Everett, 2010). Yet, origination reward to group leader incentives them to bid for riskier borrowers (Hildebrand, Puri, and Rocholl, 2014)
 - Endorsement and bids on the **friends'** applications yield 6pp higher returns to lenders, but evidence of gaming the system! (Freedman and Jin, 2014)
 - Credit quality of one's friends is an informative signal of quality (Lin, Prabhala, and Viswanathan, 2013) .
 - When a borrower friend defaults, the likelihood that the borrower will default more than doubles (Lu, Gu, Ye, and Sheng, 2012)

Literature on P2P consumer lending (2)

➤ Extracting signal from the narrative

- Trustworthy and successful identity claims ↑ increase funding and improve funding terms, but no impact on loan performance (Herzenstein, Sonenshein and Dholakia, 2011).
- Ease of reading ↓ lower default rates, and narrative complexity ↑ higher default (Gao and Lin (2012)

➤ Photo-based discrimination

- Irrational bias toward attractive photographs (Ravina, 2016).
- Discrimination against racial minorities ↓ default (Pope and Sydnor, 2011).
- Bias toward trustworthy faces ↓ default (Duarte et al., 2012).

Literature on P2P consumer lending (3)

- Iyer et al. (2014) finds that borrowers predict default better than FICO score!
- Herding
 - 10 percent higher portion of funding being from rational herding (conditional on borrower attributes and bids) ↓ default probability by 2pp (Zhang and Liu, 2012)

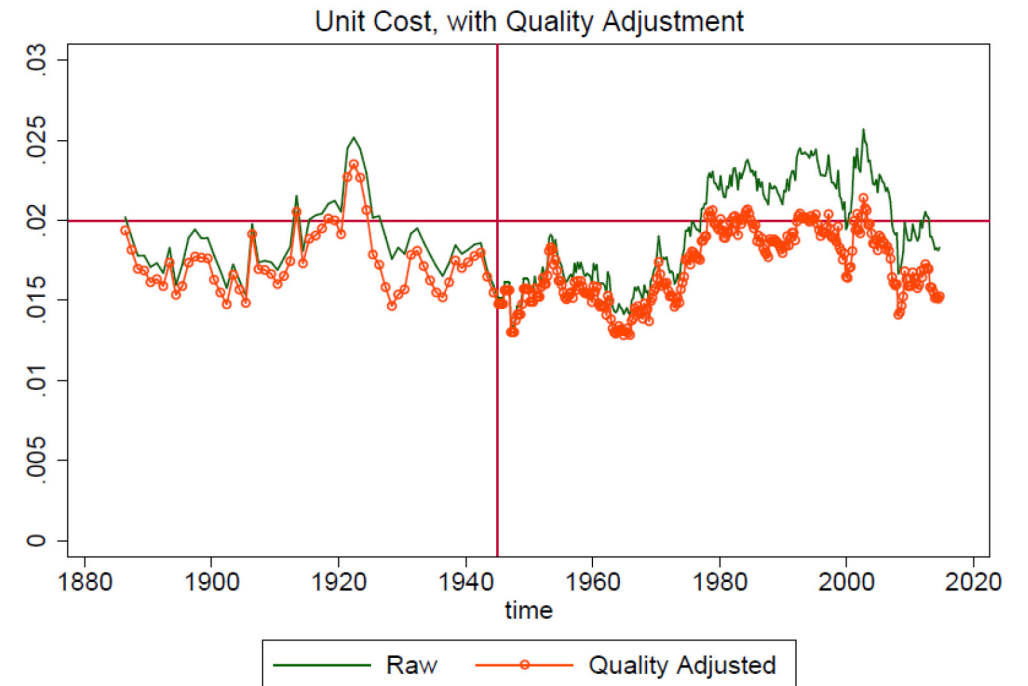
Our paper

- First paper to explore the driving forces behind the expansion of the P2P lending
- We focus on the US, the largest consumer lending market (Prosper and Lending Club)

3. What are the main drivers of the expansion of the P2P lending?

H1: Competition-related hypothesis

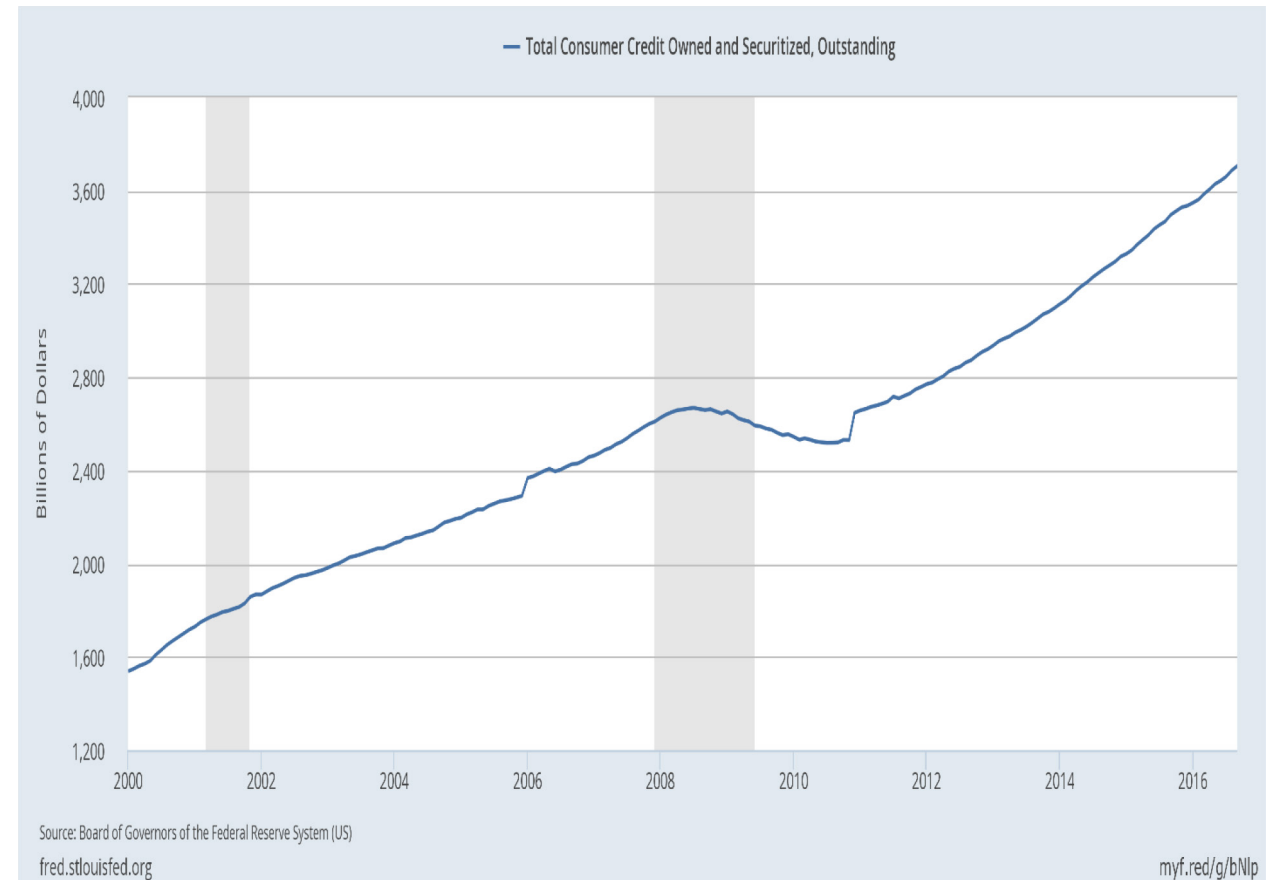
Figure 3: Unit Cost and Quality Adjustment



What are the main drivers of the expansion of the P2P lending?

H1: Competition-related hypothesis

H2: Crisis-related hypothesis

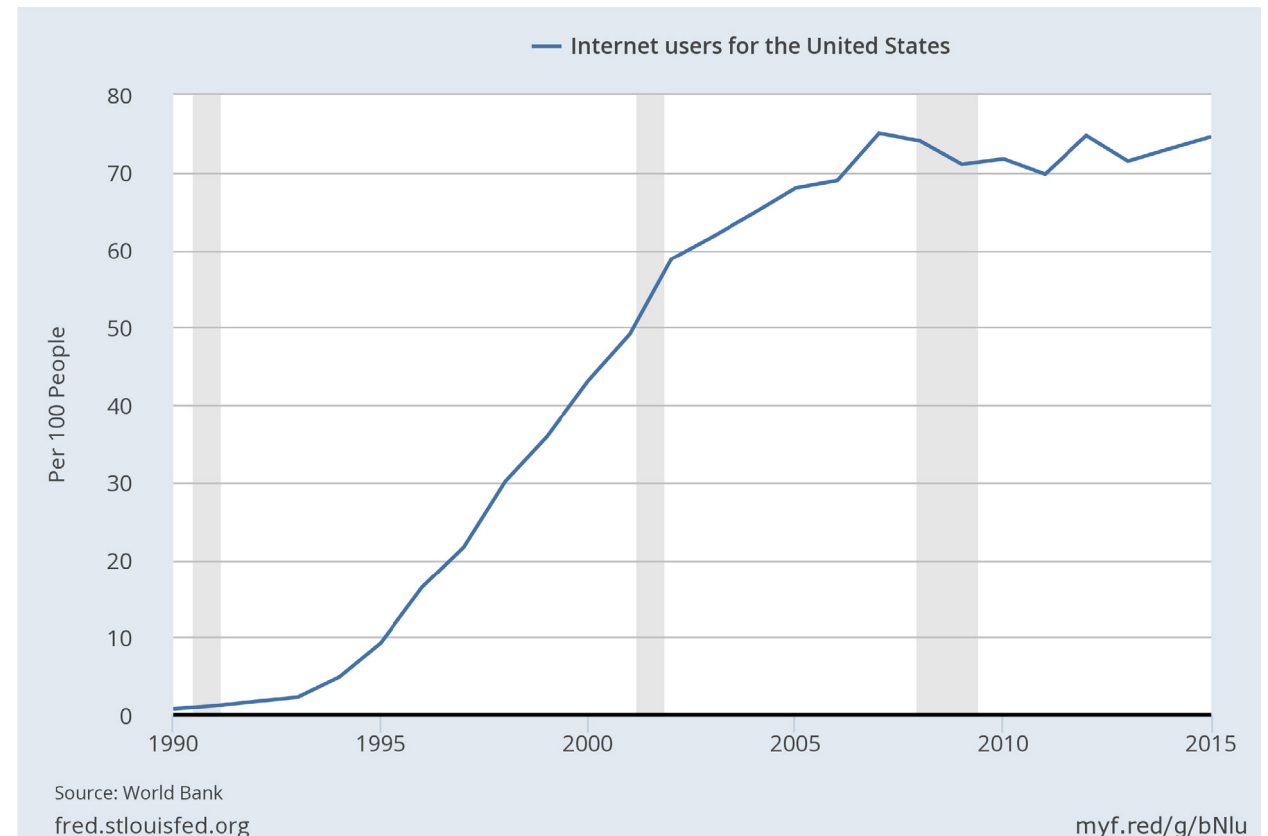


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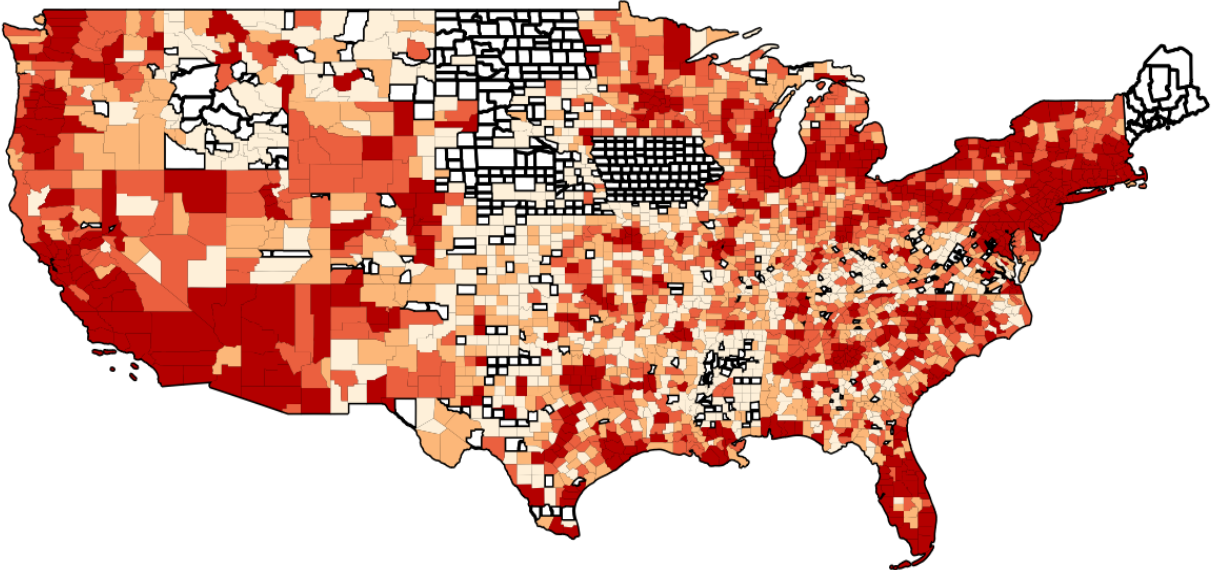
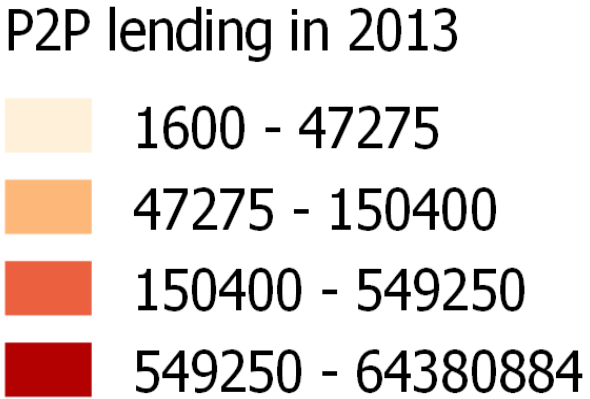
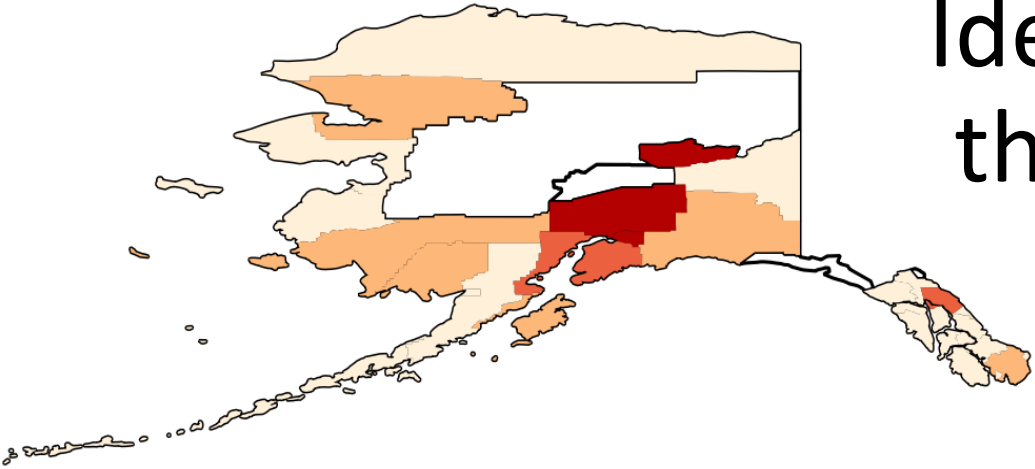
H1: Competition-related hypothesis

H2: Crisis-related hypothesis

H3: Technology-related hypothesis



Identification strategy relies on the geographic heterogeneity



Estimation with SARAR model

Dep. variables: (1) Log (Volume of P2P lending); (2) Log (N. of loans)

Spatial autoregressive model with a spatial autoregressive disturbance

$$\mathbf{y}_i = \beta_0 + \lambda \mathbf{W}\mathbf{y}_j + \beta_1 * \mathbf{competition} + \beta_2 * \mathbf{crisis} + \beta_3 * \mathbf{technology} + \alpha * \mathbf{X} + u_i;$$

where $u_i = \rho \sum_{j=1}^n w_{ij} u_j + \varepsilon_i$, with $\varepsilon_i \sim N(0, \sigma^2 I)$

Does geography explain P2P lending?

Various channels of spatial interdependence

- ✓ Theory of human interactions (Comin et al., 2012) and technology diffusion
- ✓ Boundary mismatch problems when the economic notion of a market does not correspond well with the county boundaries (Rey and Montouri, 1999).
 - ✓ Regional business cycles and economic shocks
 - ✓ Policy coordination
 - ✓ Regional disparities for which we do not control with our right-hand variables

Measuring the depth of the crisis

- ✓ **Failed banks:** % of deposits affected by bank failures in a county
- ✓ **Crisis Leverage:** The average leverage ratio of deposit taking institutions present via branches in a county, during crisis years
- ✓ **Crisis Tier 1 capital:** The average Tier A capital ratio of deposit taking institutions, during crisis years
- ✓ **Credit rationing:** change in Credit Card Debt Balance per Capita during crisis years
- ✓ **Delinquencies:** % of Credit Card Debt Balance 90+ Days Delinquent during crisis years

Measuring competition by market structure

- ✓ **HHI**: Herfindahl-Hirschmann index, computed in terms of deposits
- ✓ **C3**: The share of deposits of the three largest deposit taking institutions in a county
- ✓ **Branches per capita**: Number of branches in a county divided per 10 000 population
- ✓ **Pay Day loans**: Number establishment divided by 10 000 population.

Measuring technology

- ✓ **Patents:** Number of patents per 10 000 population
- ✓ **Broadband:** % of county population with access to any broadband technology (excluding satellite)
- ✓ **Mobile:** % of county population with access to Mobile Wireless (Licensed) technology
- ✓ **Speed:** % of county population with access to upload speed 50 mbps or higher

Controlling for socio-economic characteristics

- ✓ **Age 20 to 34:** The share of the population between 20-34 years
- ✓ **Population density:** Population number divided by area in sq. m. in a county
- ✓ **Bachelor:** % of county population with at least bachelor education
- ✓ **Poverty:** % of county population below poverty line
- ✓ **Black:** % of Afro-Americans in the county population
- ✓ **Hispanic:** % of Hispanic population in the county population
- ✓ **Asian:** % of Asian population in the county population
- ✓ **State level dummies**

Log (Volume of P2P loans per capita)

Crisis variables

Total Failed	-0.429		
Tier1 crisis		-0.460	
Leverage crisis			-14.46***

Other variables

Patents	0.156***	0.156***	0.144**
Branches	-0.01***	-0.0146***	-0.0128***
Density	0.422***	0.421***	0.402***
Broadband	-2.353**	-2.367***	-2.229**
Education	0.413	0.397	0.113
Poverty	-3.91***	-3.916***	-3.943***
Black	0.243	0.240	0.224
Hispanic	5.933***	5.930***	5.709***
Asian	3.277	3.331	3.982
Age 20-34	11.17***	11.23***	11.09***
Lambda	0.683***	0.684***	0.681***
Sigma2	8.222***	8.222***	8.177***
Constant	8.197***	8.250***	9.404***
Observations	3,059	3,059	3,059

P2P expands more in counties with less branches per capita and less banking concentration

	Log (Volume of P2P loans per capita)			
Market structure variables				
Branches	-0.01***			
HHI average		-2.76***		
C3 average			-2.01***	
HHI in 2007			-2.46***	
C3 in 2007				-1.53***
Pay day loans				0.16***

P2P lending expands more in counties with higher share of patents

	Log (Volume of P2P loans per capita)				
Technology variables					
Patents	0.15***	0.14**	0.15**	0.15**	0.13**
Broadband	-2.35**				
Optical fiber		-0.66***			
Mobile wireless			-0.42		
Speed > 10000k				0.15	
Speed > 50000k					0.36**

Conclusions:

What are the main drivers of the P2P lending?

- ✓ Leveraged banks
- ✓ Low level of branch density
 - Due to lower penetration of traditional banks in these counties?
- ✓ Low level of banking concentration
 - Due to lower brand loyalty and willingness of bank customers to switch banks?
- ✓ Presence of young, technology savvy, and wealthy population
- ✓ Presence of hispanic minorities
 - Due to discrimination by traditional bank?
- ✓ Spatial diffusion plays an important role