



Information Disclosure and Regulation on Peer-to-Peer Lending

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1. Motivation and Introduction



Overview of P2P lending

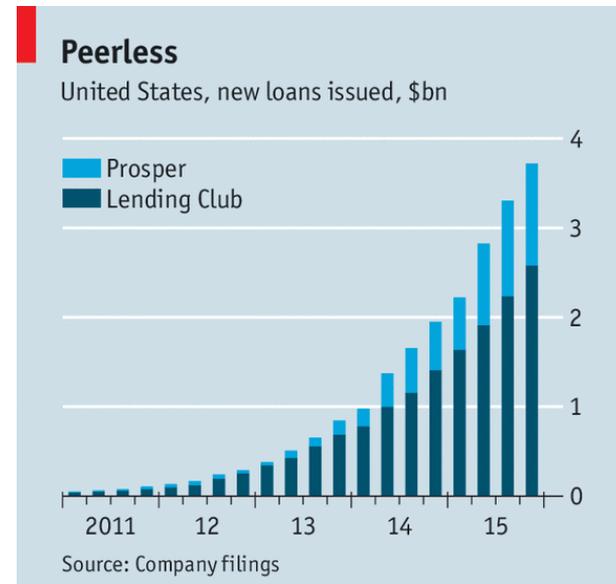
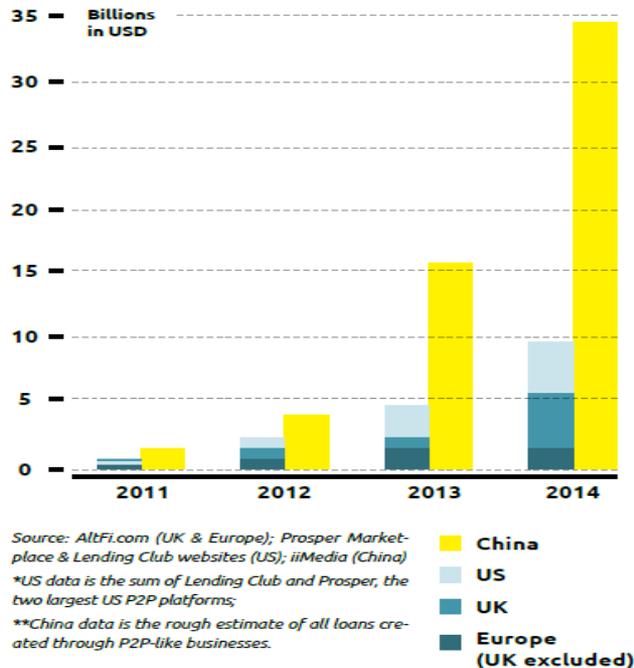
P2P lending is carried out directly between borrowers and lenders without intermediation of a traditional credit institution.

- Borrowers request loans online
- Investors can then invest in pieces of these loans or whole loans through an online marketplace
- P2P companies organize the entire process from start to finish, screening loan applications, evaluating the risk of borrowers, providing the online marketplace for buying loans, and eventually overseeing repayments back to lenders. They make money by charging fees to both borrowers and lenders but does not take any risk itself. No government guarantee.

The Power of P2P lending

- No need for physical branches, faster transaction processes, fewer staff, lower operation cost, higher rate of return
- Advanced credit evaluation: use big, digital data collected through mobile apps, online websites, utility bills, tax returns, and client purchase and payment histories to assess clients without having a prior relationship with them
- Extend financial inclusion

Global Growth in P2P Industry



Economist.com

The credit-tight environments made by the financial crisis forced regulators to roll out strict measures against banks that curbed loan making. These changes pushed borrowers and investors toward using new financial channels. Lax regulation has helped the industry to innovate. It is estimated that the global P2P lending market will grow to a trillion dollars by 2025.

Information asymmetry on P2P lending

- Information asymmetry on P2P lending is likely to be more exaggerated than that in the traditional credit market
 - Borrowers and lenders are anonymous
 - No financial intermediation
- Results:
 - Investors need to screen creditworthiness of borrowers by aggregating information disclosed by borrowers
 - lending fraud, identity theft, money laundering, consumer privacy and data protection violations.

Information asymmetry on P2P lending

- Screening and Signaling mechanisms on P2P lending
 - Duarte *et al.* (2012): borrowers appearing more trustworthy are more likely to have their borrowing requests funded
 - Sanchez-Gonzalez and Palomo-Torres (2014): beautiful applicants have higher probability of getting loans, paying lower rates, but have similar default rates in comparison to average looking borrowers.
 - Pope and Sydnor (2011): blacks are less likely to receive funding than those of whites with similar credit profiles
 - Lin *et al.* (2013): online friendships of borrowers act as signals of credit quality
 - Everett (2014): group membership can predict borrowers' repayment performance
 - Guarantee provided by the platforms

Information asymmetry at P2P lending

- Limited studies on information disclosures at P2P lending
 - Klafft (2008): verified bank account information and the credit rating are key determinants for a listing's success and interest rate
 - Herzenstein *et al.* (2011b): financial strength such as a better credit grade, homeownership, and a lower debt-to-income ratio increase funding success and reduce the interest rate borrowers pay on their loans.
- What is the role of voluntary and unverified information disclosure when hard information like credit rating is not available?
 - Michels (2012): using data from Prosper, he finds more borrowers' voluntary information disclosures are more likely to attract investors and thereby decrease the borrowing rate of borrowers

Regulation on P2P lending

US model:

- P2P platforms registered at Security Exchange Committee
- P2P platforms are required to disclose all information that may be material to an investor's decision
- SEC protects investors through disclosure requirements and antifraud provisions that can be used to hold companies liable for providing false or misleading information to investors

Regulation on P2P lending

China: no clear regulation on information disclosure.

- platforms are agency of information, not guarantee;
- Use custodian bank to manage the flow of funds
- caps on borrowing amount and interest rate;

Our research question

- What's the value of voluntary and unverifiable information disclosure and its impact on P2P lending when hard information is unavailable?
- How voluntary and unverifiable disclosure affects funding probability
- How voluntary and unverifiable disclosure affects number of bids
- How the effects of voluntary and unverifiable disclosure on funding probability varies across borrowers of different quality
- How to regulate the fast growing P2P lending market?

2. Hypothesis development



H1: voluntary disclosures and funding success

- **Disclosure is seen as a main solution for information asymmetry** problem in the financial market
 - Scott (2003) shows that financial accounting and reporting is a mechanism to moderate information asymmetry problems by converting inside information into outside information.
 - Kothari (2000) suggests that reduced information asymmetry has desirable effects on the cost of capital and the volatility of security prices.
 - Barron and Qu (2014) find high-quality public disclosure leads to increased price efficiency and decreased cost of capital
- **Unverifiable information is valuable** in the financial market
 - Crawford and Sobel (1982) suggest disclosures are not necessarily truthful.
 - Gigler (1994) shows that even when disclosures are unverifiable, the cost associated with disclosure lends it credibility.
 - Stocken (2000) demonstrates that in a repeated cheap-talk game setting the manager will most likely to make truthful although unverifiable disclosures to a potential investor.

H1: voluntary disclosures and funding success

- According to findings by psychology and behavioral economics, **uninformative materials** can influence choices
 - people rely on false or irrelevant information in decision making
 - mental simplification strategy can result in useless information influencing choice, either through the misapplication of information within a partition, or by influencing the partition choice.
- H1: Funding success rates are increasing with the amount of voluntary disclosures in a loan listing

H2: voluntary disclosures and number of bids

- Trading volume in the financial market is proportional to information content of earnings announcement.
 - Beaver (1968) finds there is abnormally high trading volume and return volatility during the earnings announcement week.
 - Bamber (1986) demonstrates that the volume of securities traded is positively associated with the magnitude of "surprises" in annual earnings announcements.
- H2: If unverifiable disclosures in a loan listing are convincing, they should not only raise funding success rate, but also trigger greater bidding activities.

H3: voluntary disclosures for borrowers with relatively low credit quality

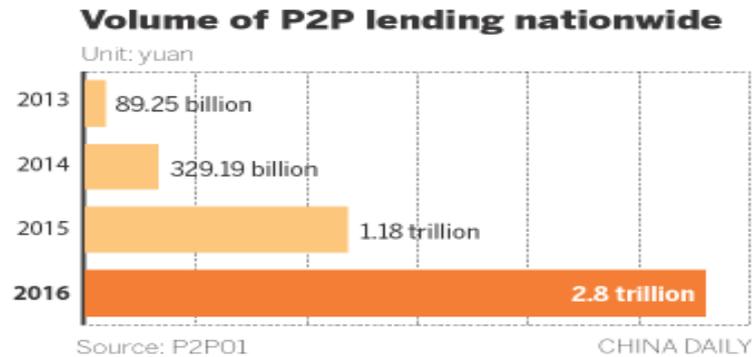
- Borrowers with good credit are easy to signal their trustworthiness by virtue of verifiable and hard information like credit report issued by the crediting authorities. They can easily obtain bids and fund without disclosing much information.
- Borrowers with poor credit have to rely more heavily on the information disclosure to differentiate themselves from other competing borrowers with poor credit.
- H3: The relationship between funding success and the amount of voluntary disclosures is stronger for borrowers with relatively low credit quality

3. Data and Variable Measurement



P2P lending in China

- China has developed the biggest and fastest growing market for online P2P lending.
- In 2016, the transaction volume of P2P lending nationwide exceeded 2.8 trillion yuan (\$403 billion), increasing by 138 percent from a year earlier.



- Compared with high income countries, the social credit system is underdeveloped in China.
 - As of 2014, the People's Bank of China maintained credit histories for around 350 million citizens, less than one-third of the adult population while in America 89% of adults have credit scores
- The issue of information asymmetry is serious in P2P lending market.

Renrendai

Founded in 2010, it now has over 1 million members located in more than 2,000 cities and counties across the country

Transaction volume: 13.21bn in 2015; one of the largest peer-to-peer lending platforms in China.

The transaction taking place at Renrendai is a typical P2P lending, akin to Prosper

- borrowers post loan request or listing with the required information of loan title, borrowing amount, interest rate, description of loan usage
- lenders may place bids by stating the amount they want to fund with a minimum bid amount of RMB 50

Figure 2: Example Loan Listing on Renrendai.com (Loan ID=136431)



Voluntary Information disclosure at Renrendai

- *Education*
- *Working experience*
- *Income*
- *Marriage*
- *Living place*
- *Firm size*
- *Industry working for*
- *Loan purpose*

Summary Statistics of Disclosure

Variable	Mean	Sd	Min	Max	N
<i>Edu_Disclosure</i>	0.881	0.324	0	1	604838
<i>Worktime_Disclosure</i>	0.700	0.458	0	1	604838
<i>Income_Disclosure</i>	0.755	0.430	0	1	604838
<i>Marry_Disclosure</i>	0.969	0.174	0	1	604838
<i>City_Disclosure</i>	0.698	0.459	0	1	604838
<i>Firmsize_Disclosure</i>	0.697	0.459	0	1	604838
<i>Purpose_Disclosure</i>	0.998	0.044	0	1	604838
<i>Ind_Disclosure</i>	0.697	0.459	0	1	604838

4. Empirical Results



Empirical Models

$$SUCCESS_i = \beta_0 + \beta_1 Vol_Disclosure_i + \beta_2 Control_i + \varepsilon_i$$

$$SUCCESS_i = \beta_0 + \beta_1 Vol_DSCORE_i + \beta_2 Control_i + \varepsilon_i$$

$$BIDS_i = \beta_0 + \beta_1 DSCORE_Vol_i + \beta_2 Control + \varepsilon_i$$

$$SUCCESS_i = \beta_0 + \beta_1 Vol_DSCORE_i + \beta_2 POOR_i + \beta_3 (Vol_DSCORE) * POOR_i + \beta_4 Control_i + \varepsilon_i$$

INFORMATION DISCLOSURE AND FNDING SUCCESS

	(1) <i>SUCCESS</i>	(2) <i>SUCCESS</i>	(3) <i>SUCCESS</i>	(4) <i>SUCCESS</i>	(5) <i>SUCCESS</i>	(6) <i>SUCCESS</i>	(7) <i>SUCCESS</i>	(8) <i>SUCCESS</i>
<i>Edu_Disclosure</i>		5.4195*** (15.32)						
<i>Worktime_Disclosure</i>			5.7425*** (27.52)					
<i>Income_Disclosure</i>				6.5446*** (17.36)				
<i>City_Disclosure</i>					3.3880*** (53.75)			
<i>Firmsize_Disclosure</i>						1.1416*** (43.57)		
<i>Purpose_Disclosure</i>							0.4435** (1.98)	
<i>Ind_Disclosure</i>								1.1414*** (43.55)
<i>lnAMOUNT</i>	-0.6013*** (-87.71)	-0.5985*** (-86.25)	-0.6023*** (-84.57)	-0.5963*** (-84.54)	-0.6081*** (-85.47)	-0.5939*** (-84.86)	-0.6012*** (-87.69)	-0.5939*** (-84.88)
<i>INTEREST</i>	-0.1020*** (-35.62)	-0.1033*** (-36.51)	-0.1065*** (-38.53)	-0.1050*** (-37.78)	-0.1066*** (-38.38)	-0.1046*** (-37.19)	-0.1020*** (-35.62)	-0.1046*** (-37.19)
<i>MONTHS</i>	0.0092*** (8.88)	0.0078*** (7.47)	0.0049*** (4.69)	0.0066*** (6.31)	0.0056*** (5.31)	0.0061*** (5.85)	0.0092*** (8.87)	0.0061*** (5.85)
<i>CREDIT</i>	1.5154*** (92.57)	1.4886*** (93.14)	1.4332*** (94.16)	1.4533*** (93.84)	1.4641*** (97.20)	1.4832*** (92.89)	1.5154*** (92.57)	1.4830*** (92.89)
<i>AGE</i>	0.0471*** (45.37)	0.0492*** (46.91)	0.0527*** (49.40)	0.0511*** (48.21)	0.0523*** (49.02)	0.0484*** (45.87)	0.0471*** (45.39)	0.0484*** (45.86)
<i>HOUSE</i>	0.5392*** (31.38)	0.4102*** (24.42)	0.1453*** (8.95)	0.2458*** (15.00)	0.1606*** (9.77)	0.3388*** (19.58)	0.5391*** (31.38)	0.3389*** (19.58)
<i>CAR</i>	0.6213*** (32.88)	0.5647*** (30.79)	0.4417*** (25.41)	0.4891*** (27.62)	0.4647*** (26.48)	0.5417*** (29.37)	0.6213*** (32.88)	0.5417*** (29.37)
<i>Title_Length</i>	0.0509*** (25.58)	0.0459*** (23.04)	0.0381*** (19.13)	0.0405*** (20.36)	0.0400*** (19.99)	0.0465*** (23.32)	0.0508*** (25.54)	0.0465*** (23.32)
<i>Description_Length</i>	0.0037*** (23.99)	0.0035*** (22.38)	0.0031*** (20.14)	0.0032*** (20.54)	0.0032*** (20.35)	0.0033*** (21.41)	0.0037*** (23.97)	0.0033*** (21.42)
<i>_cons</i>	-0.3998*** (-6.13)	-5.5987*** (-15.61)	-5.3380*** (-24.91)	-6.4026*** (-16.85)	-3.0067*** (-33.71)	-1.1393*** (-16.81)	-0.8425*** (-3.62)	-1.1384*** (-16.80)
²⁶ Year	YES							
N	604838	604838	604838	604838	604838	604838	604838	604838
r2_p	0.2829	0.2969	0.3272	0.3163	0.3215	0.2939	0.2829	0.2939

INFORMATION DISCLOSURE INTENSITY AND FNDING SUCCESS

	(1)	(2)	(3)	(4)	(5)	(6)
	<i>SUCCESS</i>	<i>SUCCESS</i>	<i>SUCCESS</i>	<i>SUCCESS</i>	<i>SUCCESS</i>	<i>SUCCESS</i>
<i>DSCORE_ALL</i>	1.3101*** (50.66)	0.0410*** (48.56)				
<i>DSCORE</i>			0.5076*** (79.67)	0.0159*** (71.95)		
<i>DSCORE_NOR</i>					0.5117*** (79.92)	0.0160*** (72.13)
<i>lnAMOUNT</i>	-0.5982*** (-84.80)	-0.0187*** (-78.61)	-0.5962*** (-83.75)	-0.0186*** (-77.92)	-0.5963*** (-83.76)	-0.0186*** (-77.93)
<i>INTEREST</i>	-0.1054*** (-37.60)	-0.00330*** (-37.16)	-0.1065*** (-38.38)	-0.00333*** (-37.92)	-0.1064*** (-38.37)	-0.00333*** (-37.91)
<i>MONTHS</i>	0.0048*** (4.61)	0.000151*** (4.615)	0.0042*** (3.99)	0.000131*** (3.987)	0.0042*** (3.99)	0.000131*** (3.991)
<i>CREDIT</i>	1.4789*** (93.81)	0.0463*** (101.0)	1.4536*** (93.89)	0.0454*** (101.7)	1.4537*** (93.88)	0.0454*** (101.7)
<i>AGE</i>	0.0491*** (46.39)	0.00154*** (45.14)	0.0507*** (47.52)	0.00158*** (46.20)	0.0507*** (47.49)	0.00158*** (46.17)
<i>HOUSE</i>	0.2722*** (15.71)	0.00852*** (15.65)	0.1893*** (11.39)	0.00592*** (11.36)	0.1896*** (11.40)	0.00592*** (11.37)
<i>CAR</i>	0.5177*** (28.34)	0.0162*** (28.03)	0.4735*** (26.62)	0.0148*** (26.37)	0.4737*** (26.62)	0.0148*** (26.38)
<i>Title_Length</i>	0.0454*** (22.73)	0.00142*** (22.60)	0.0417*** (20.94)	0.00130*** (20.84)	0.0418*** (21.00)	0.00131*** (20.90)
<i>Description_Length</i>	0.0033*** (21.17)	0.000103*** (21.09)	0.0031*** (20.07)	9.78e-05*** (20.02)	0.0031*** (20.10)	9.79e-05*** (20.04)
<i>_cons</i>	-1.1313*** (-16.71)		-3.7348*** (-47.36)		-2.7454*** (-37.62)	
Year	YES	YES	YES	YES	YES	YES
N	604838		604838		604838	
r2_p	0.2989		0.3123		0.3121	

Voluntary Disclosure Intensity and Biddings

	(1)	(2)	(3)
	<i>BIDS</i>	<i>BIDS</i>	<i>BIDS</i>
<i>DSCORE_ALL</i>	4.6918*** (10.04)		
<i>DSCORE</i>		2.1651*** (8.29)	
<i>DSCORE_NOR</i>			2.1738*** (8.31)
<i>lnAMOUNT</i>	28.8311*** (49.85)	28.8632*** (49.79)	28.8641*** (49.79)
<i>INTEREST</i>	-0.3369*** (-4.55)	-0.3413*** (-4.60)	-0.3413*** (-4.60)
<i>MONTHS</i>	-0.3335*** (-15.97)	-0.3321*** (-15.85)	-0.3321*** (-15.85)
<i>CREDIT</i>	0.3350** (1.96)	0.3203* (1.87)	0.3204* (1.87)
<i>AGE</i>	0.1625*** (4.46)	0.1628*** (4.47)	0.1627*** (4.46)
<i>HOUSE</i>	-2.3377*** (-5.94)	-2.3004*** (-5.85)	-2.3015*** (-5.85)
<i>CAR</i>	-1.9577*** (-5.02)	-1.9925*** (-5.11)	-1.9936*** (-5.11)
<i>Title_Length</i>	-0.1273** (-2.29)	-0.1318** (-2.37)	-0.1315** (-2.36)
<i>Description_Length</i>	0.0214*** (3.13)	0.0213*** (3.12)	0.0213*** (3.12)
<i>_cons</i>	-2.6e+02*** (-46.03)	-2.7e+02*** (-43.04)	-2.7e+02*** (-44.18)
Year	YES	YES	YES
N	27111	27111	27111
<i>r2_a</i>	0.4746	0.4744	0.4744

Disclosure Score and Funding Probability for borrowers with low credit

	(1)	(2)	(3)	(4)	(5)	(6)
	<i>SUCCESS</i>	<i>SUCCESS</i>	<i>SUCCESS</i>	<i>SUCCESS</i>	<i>SUCCESS</i>	<i>SUCCESS</i>
<i>DSCORE_ALL</i>	-0.1006*	-0.00293*				
	(-1.93)	(-1.925)				
<i>DSCORE_ALL*POOR</i>	1.4978***	0.0436***				
	(24.05)	(23.83)				
<i>DSCORE</i>			0.0218	0.000633		
			(0.92)	(0.917)		
<i>DSCORE*POOR</i>			0.5034***	0.0146***		
			(20.01)	(19.86)		
<i>DSCORE_NOR</i>					0.0184	0.000533
					(0.77)	(0.766)
<i>DSCORE_NOR*POOR</i>					0.5113***	0.0148***
					(20.16)	(20.01)
<i>POOR</i>	-6.6683***	-0.194***	-9.0348***	-0.262***	-8.0769***	-0.235***
	(-33.58)	(-34.51)	(-32.96)	(-33.40)	(-33.40)	(-34.00)

Robustness check

- Probit Estimation
- Sample Adjustment
 - borrowing amount less than 200,000 RMB
 - borrowing rate lower than 24%
- Heckman (1979)'s two-stage model

Two-Step Heckman Selection Model

	(1) <i>DSCORE_ALL</i>	(2) <i>SUCCESS</i>
<i>DSCORE_ALL</i>		1.1577*** (42.71)
<i>IMR</i>		-2.8106*** (-28.41)
<i>lnAMOUNT</i>	-0.1177*** (-70.91)	-0.4785*** (-56.55)
<i>INTEREST</i>	0.0780*** (109.09)	-0.1833*** (-44.09)
<i>MONTHS</i>	0.0091*** (39.76)	-0.0060*** (-5.36)
<i>CREDIT</i>	0.1750*** (30.28)	1.3370*** (82.61)
<i>AGE</i>		0.0490*** (46.43)
<i>HOUSE</i>	1.1827*** (236.24)	-1.0071*** (-20.76)
<i>CAR</i>	0.7277*** (114.69)	-0.1340*** (-4.57)
<i>Title_Length</i>	0.0185*** (34.09)	0.0240*** (11.35)
<i>Description_Length</i>	0.0042*** (72.10)	-0.0001 (-0.43)
<i>_cons</i>	-0.4507*** (-23.66)	1.4947*** (12.77)
Year	No	YES
N	604838	604838
r2_p	0.1883	0.3037

5. Conclusion



- The information asymmetry at the online P2P lending market is a critical issue
- It motivates us to explore the role of voluntary disclosures in bridging the information gap between the borrowers and investors.
- A single item of voluntary information disclosure helps to improve the funding success rate by 35.3%.
- The impact is even more important for the borrowers with lower credit rating.
- investors are able to screen borrowers with the help of information disclosed voluntarily even though hard facts like credit scores are not available.
- Information disclosure shall be the core of regulation on P2P lending market

Thank you very much!