

The Role of Trust in Online Lending¹

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¹Disclaimer: These are the views of the authors and do not necessarily reflect those of the Riksbank.

Research Question

What role has trust played in the expansion of online lending?

Trust and Financial Development

- Important determinant of financial development (Guiso, Sapienza, and Zingales 2004)
- Predictor of stockholding decisions (Guiso, Sapienza, and Zingales 2008)
- Trust is affected by experiences of cheating or fraud

Trust and Financial Development

- Interpersonal trust is persistent on the individual level (Butler, Giuliano, and Guiso 2016) and the societal level (Guiso, Sapienza, and Zingales 2016)
- Rooted in history and social norms (see, e.g., Tabellini (2008))
- Trust in financial institutions has been impaired after the Great Recession (Corsetti, Devereux, Guiso, Hassler, Saint-Paul, Sinn, Sturm, and Vives 2010; Zingales 2015)

Definitions of Trust

- Gambetta (2000) and Guiso et al. (2008) define trust as the subjective probability assigned to being cheated
 - ▶ **Trust in traditional banking:** individual's subjective probability of being cheated by a bank
 - ▶ **Interpersonal trust:** subjective probability an individual assigns to the chance of being cheated by others
 - ▶ **Trust in traditional finance:** investor's subjective probability of being cheated in the financial system more generally

Measures of Trust

- **Trust in traditional banking:** CFPB Consumer Complaint Database: bank name, date of complaint, and location of complainant. State and county level.
- **Interpersonal trust:** General Social Survey (GSS); established measure of state-level interpersonal trust.
- **Trust in traditional finance:** Number of Madoff scam victims by state (Guiso 2010).

Results Preview

1 Distrust in traditional banking increases online lending

- ▶ One complaint/branch increase: 6% increase in online debt ratio in median state.

2 Interpersonal trust lowers online lending

- ▶ One standard deviation increase: 11% decrease in online debt ratio in the median state.

3 Distrust in traditional finance increases online lending

- ▶ 1000 Madoff victim increase: 4.7% online debt ratio increase in the median state.

The Model

- **Emphasize borrower perspective and focus on consumer credit.**
- **Borrowers choose whether and how to consolidate debt.**
 - ▶ Traditional banks
 - ▶ Online lending platforms
- **Borrower payoff depends negatively on:**
 - ▶ Borrowing cost
 - ▶ Expected utility loss of being cheated

The Model

- **Bank lending has interpersonal trust dimension.**
 - ▶ In-person interaction conveys soft and hard information.
 - ▶ Repeated interaction builds trust.
- **Online platforms have cost advantage.**
 - ▶ Automated credit scoring
 - ▶ No branch network

Online Lending

- **LendingClub (LC):** the first publicly traded P2P marketplace, largest in the U.S. (origination volume: \$15.9 bn in 2015; \$24.6 bn in 2016, \$33+ bn in April 2018)
- **Prosper:** the first U.S. P2P marketplace, fast growing recently (origination volume: \$2.2 bn in 2016, \$10+ bn in April 2018)
- **Data Source:** Loan book posted by LC on the website, in combination with the SEC filings from LC and Prosper

Summary Statistics

	Mean	SD	P25	Median	P75	N
State variables						
Interpersonal trust	0.40	0.11	0.33	0.39	0.46	49
Madoff in thousands	0.86	1.15	0.17	0.40	1.30	51
State-year variables						
Credit card debt (10b\$)	1.53	1.83	0.38	0.91	1.94	459
Total debt (10b\$)	24.35	33.20	6.04	15.19	32.06	459
population density(1000/km2)	0.11	0.43	0.02	0.03	0.07	459
Log GDP	12.21	1.01	11.43	12.29	12.94	459
Log population	14.94	1.03	14.20	15.08	15.64	459
Unemployment rate	6.76	2.12	5.10	6.60	8.10	459
Number of bank branches (k)	1.82	1.73	0.47	1.46	2.38	459
HHI	0.11	0.09	0.06	0.09	0.12	459
College+ attainment (in %)	27.15	5.44	23.60	26.00	29.80	459
State-month variables						
CFPB complaints per branch	0.20	0.66	0.06	0.10	0.16	2839
P2P debt (m\$)	5.83	11.41	0.31	1.59	6.32	4653
P2P debt (m\$)/Bank debt (10 bn\$)	0.24	0.25	0.02	0.15	0.41	4653
Average DTI ratio	0.17	0.06	0.13	0.17	0.19	4653
Average interest rate	0.13	0.01	0.13	0.13	0.14	4653
Average annual income (k\$)	75.08	26.41	65.78	73.16	81.56	4653
Average employment duration	5.30	1.11	4.95	5.50	5.82	4653

Hypotheses and Regressions

Hypothesis 1: Trust in Traditional Banking

$$Y_{i,t} = \beta_1 \text{CFPB complaints}_{i,t} + \gamma X_{i,t} + (A_i + B_t) + \epsilon_{i,t} \quad (1)$$

Hypothesis 2: Interpersonal Trust

$$Y_{i,t} = \beta_1 \text{Interpersonal trust}_i + \gamma X_{i,t} + (B_t) + \epsilon_{i,t} \quad (2)$$

Hypothesis 3: Trust in Traditional Finance

$$Y_{i,t} = \beta_1 \text{Madoff victims}_i + \gamma X_{i,t} + (B_t) + \epsilon_{i,t} \quad (3)$$

Trust in Traditional Banking (State)

Table: Online lending and CFPB consumer complaints with additional controls

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
CFPB	0.017** (0.007)	0.023*** (0.005)	0.023*** (0.007)	0.012*** (0.002)	0.009*** (0.001)	0.008*** (0.001)	0.009*** (0.001)	0.009*** (0.001)
DTI		0.537* (0.319)		0.408* (0.216)		0.280* (0.149)		0.108*** (0.038)
interest rate		-4.225*** (1.397)		-2.487** (1.088)		-0.796 (1.083)		1.324* (0.715)
income		0.003*** (0.001)		0.001** (0.001)		0.000 (0.000)		-0.000 (0.000)
employment		0.002 (0.013)		-0.001 (0.009)		0.003 (0.009)		0.013* (0.007)
population density		0.041** (0.019)		-1.298*** (0.184)		-1.196*** (0.166)		-1.141*** (0.164)
log GDP		0.106*** (0.024)		-0.552*** (0.142)		-0.381*** (0.135)		-0.415*** (0.135)
log population		-0.066*** (0.024)		1.757*** (0.585)		-0.374** (0.157)		-0.305** (0.147)
unemployment rate		-0.056*** (0.006)		-0.129*** (0.011)		-0.021*** (0.003)		-0.021*** (0.002)
college		-1.210*** (0.095)		73.285** (35.339)		-39.587** (16.130)		-35.111** (15.174)
internet		-0.210** (0.086)		-31.681* (16.440)		18.940** (8.185)		16.587** (7.658)
hhi		0.215*** (0.035)		-0.120 (0.262)		0.453*** (0.158)		0.515*** (0.137)
Year FE	NO	NO	NO	NO	YES	YES	NO	NO
State FE	NO	NO	YES	YES	YES	YES	YES	YES
Year-Month FE	NO	NO	NO	NO	NO	NO	YES	YES
Controls	NO	YES	NO	YES	NO	YES	NO	YES
No. of observations	2839	2839	2839	2839	2839	2839	2839	2839
Adj R2	0.002	0.326	0.111	0.567	0.684	0.693	0.874	0.882

Trust in Traditional Banking (County)

Table: Online lending and CFPB consumer complaints at the county level

	(1)	(2)	(3)	(4)	(5)	(6)
CFPB	-0.008 (0.040)	0.222*** (0.042)	0.033 (0.040)	0.242*** (0.044)	-0.010 (0.041)	0.222*** (0.043)
DTI		-0.026 (0.018)		-0.009 (0.021)		-0.027 (0.021)
interest rate		0.497*** (0.044)		0.543*** (0.047)		0.505*** (0.047)
income		0.000*** (0.000)		0.000*** (0.000)		0.000*** (0.000)
employment		0.003*** (0.001)		0.003*** (0.001)		0.003*** (0.001)
pop. density (1000/km2)		0.017*** (0.003)		0.017*** (0.003)		0.017*** (0.003)
log county income		0.191*** (0.050)		0.203*** (0.050)		0.190*** (0.051)
log county population		-0.326*** (0.054)		-0.342*** (0.054)		-0.324*** (0.055)
log county jobs		0.049* (0.026)		0.050* (0.026)		0.048* (0.027)
college		0.086 (0.102)		0.068 (0.102)		0.088 (0.104)
internet		6.037 (5.643)		4.592 (5.658)		6.103 (5.685)
HHI		0.539*** (0.090)		0.538*** (0.090)		0.537*** (0.092)
State-Year FE	YES	YES	NO	NO	NO	NO
State-Month FE	NO	NO	YES	YES	NO	NO
State-Year-Month FE	NO	NO	NO	NO	YES	YES
Controls	NO	YES	NO	YES	NO	YES
No of observations	45822	45822	45822	45822	45822	45822
Adj. R-square	0.160	0.404	0.134	0.397	0.153	0.399

Trust in Traditional Banking (Extensive Margin)

Table: Extensive margin: number of applicants/population and CFPB complaints

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
CFPB	0.071*** (0.022)	0.079*** (0.016)	0.063*** (0.019)	0.030*** (0.005)	0.020*** (0.004)	0.020*** (0.004)	0.020*** (0.003)	0.019*** (0.003)
DTI		1.527* (0.903)		1.055* (0.561)		0.720* (0.390)		0.218** (0.105)
interest rate		-12.974*** (4.053)		-7.828** (3.081)		-3.360 (3.070)		1.267 (1.863)
income		0.008*** (0.002)		0.002 (0.001)		-0.000 (0.001)		-0.001 (0.001)
employment		0.002 (0.039)		0.003 (0.024)		0.015 (0.022)		0.038** (0.017)
pop. density		-0.058 (0.041)		-1.516*** (0.471)		-1.235*** (0.404)		-1.155*** (0.378)
log GDP		0.517*** (0.064)		-1.508*** (0.380)		-1.168*** (0.364)		-1.273*** (0.368)
log population		-0.420*** (0.062)		7.300*** (1.687)		1.869*** (0.416)		2.078*** (0.437)
unemployment rate		-0.150*** (0.018)		-0.371*** (0.028)		-0.100*** (0.009)		-0.100*** (0.009)
Year FE	NO	NO	NO	NO	YES	YES	NO	NO
State FE	NO	NO	YES	YES	YES	YES	YES	YES
Year-Month FE	NO	NO	NO	NO	NO	NO	YES	YES
Controls	NO	YES	NO	YES	NO	YES	NO	YES
No. of observations	2839	2839	2839	2839	2839	2839	2839	2839
Adj. R-square	0.005	0.324	0.119	0.627	0.722	0.730	0.891	0.896

Trust in Traditional Banking (Intensive Margin)

Table: Intensive margin: size of loan request and CFPB complaints

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
CFPB	0.003 (0.007)	0.005 (0.007)	0.000 (0.002)	0.000 (0.001)	-0.001* (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
homeowner		0.047*** (0.005)		0.019*** (0.003)		0.019*** (0.003)		0.019*** (0.003)
has mortgage		0.034*** (0.003)		0.037*** (0.002)		0.037*** (0.002)		0.037*** (0.002)
employment		0.003*** (0.000)		0.004*** (0.000)		0.004*** (0.000)		0.004*** (0.000)
income		0.000*** (0.000)		0.000*** (0.000)		0.000*** (0.000)		0.000*** (0.000)
interest rate		0.316*** (0.025)		0.280*** (0.020)		0.290*** (0.017)		0.304*** (0.017)
maturity		0.074*** (0.004)		0.074*** (0.004)		0.074*** (0.004)		0.073*** (0.004)
Year FE	NO	NO	NO	NO	YES	YES	NO	NO
State FE	NO	NO	YES	YES	YES	YES	YES	YES
Year-Month FE	NO	NO	NO	NO	NO	NO	YES	YES
Controls	NO	YES	NO	YES	NO	YES	NO	YES
No. of observations	1680778	1680778	1680778	1680778	1680778	1680778	1680778	1680778
Adj. R-square	0.000	0.236	0.138	0.306	0.140	0.306	0.142	0.309

Interpersonal Trust

Table: Online lending and interpersonal trust

	(1)	(2)	(3)	(4)	(5)	(6)
interpersonal trust	-0.103*** (0.024)	-0.346*** (0.057)	-0.133*** (0.024)	-0.154*** (0.025)	-0.134*** (0.024)	-0.150*** (0.024)
DTI		1.125** (0.436)		0.194 (0.127)		0.074 (0.047)
interest rate		0.080 (0.697)		-0.121 (0.523)		0.570 (0.437)
income		0.000* (0.000)		0.000 (0.000)		-0.000 (0.000)
employment		0.021*** (0.004)		0.001 (0.003)		0.003 (0.003)
pop. density		0.020** (0.010)		-0.045*** (0.007)		-0.042*** (0.006)
log GDP		0.054*** (0.019)		0.027*** (0.007)		0.022*** (0.007)
log population		0.012 (0.020)		-0.030*** (0.007)		-0.026*** (0.006)
unemployment rate		-0.063*** (0.007)		0.004*** (0.001)		0.003*** (0.001)
branches		-0.014*** (0.002)		0.003** (0.001)		0.003** (0.001)
Year FE	NO	NO	YES	YES	NO	NO
State FE	NO	NO	NO	NO	NO	NO
Year-Month FE	NO	NO	NO	NO	YES	YES
Controls	NO	YES	NO	YES	NO	YES
No. of observations	4297	4297	4297	4297	4297	4297
Adj. R-square	0.002	0.466	0.760	0.765	0.866	0.870

Interpersonal Trust: Credit Card Debt

Table: Credit card debt and interpersonal trust

	(1)	(2)	(3)	(4)
interpersonal trust	-0.004*** (0.001)	-0.010** (0.004)	-0.004*** (0.001)	-0.014*** (0.002)
pop. density		-0.002 (0.002)		-0.003*** (0.001)
log GDP		-0.018** (0.005)		-0.013*** (0.003)
log population		0.013** (0.004)		0.009*** (0.002)
unemployment rate		-0.000 (0.001)		-0.001*** (0.000)
branches		0.003*** (0.001)		0.002*** (0.001)
Year FE	NO	NO	YES	YES
State FE	NO	NO	NO	NO
Year-Month FE	NO	NO	NO	NO
Controls	NO	YES	NO	YES
No. of observations	441	441	441	441
Adj. R-square	0.001	0.254	0.238	0.431

Interpersonal Trust: Mortgage Debt

Table: Mortgage lending and interpersonal trust

	(1)	(2)	(3)	(4)
interpersonal trust	0.126*** (0.009)	0.185*** (0.014)	0.126*** (0.009)	0.168*** (0.004)
pop. density		-0.022* (0.011)		-0.029*** (0.002)
log GDP		0.127*** (0.020)		0.151*** (0.006)
log population		-0.115*** (0.023)		-0.132*** (0.008)
unemployment rate		0.013*** (0.004)		0.010*** (0.001)
branches		-0.007** (0.002)		-0.010*** (0.002)
Year FE	NO	NO	YES	YES
State FE	NO	NO	NO	NO
Year-Month FE	NO	NO	NO	NO
Controls	NO	YES	NO	YES
No. of observations	441	441	441	441
Adj. R-square	0.047	0.334	0.179	0.454

Trust in Traditional Finance

Table: Online lending and Madoff scandal victims

	(1)	(2)	(3)	(4)	(5)	(6)
Madoff victims	0.001 (0.000)	-0.005*** (0.001)	0.004*** (0.001)	0.006*** (0.001)	0.004*** (0.001)	0.006*** (0.001)
DTI		0.969*** (0.262)		0.068 (0.056)		0.016 (0.030)
interest rate		-0.087 (0.496)		-0.119 (0.261)		0.232*** (0.086)
income		0.001*** (0.000)		0.000 (0.000)		0.000* (0.000)
employment		0.143*** (0.021)		0.010** (0.004)		0.004 (0.003)
pop. density		0.024*** (0.008)		-0.023*** (0.003)		-0.022*** (0.003)
log GDP		0.037** (0.018)		-0.003 (0.005)		-0.006 (0.005)
log population		0.013 (0.019)		-0.005 (0.005)		-0.003 (0.005)
unemployment rate		-0.042*** (0.005)		0.006*** (0.001)		0.006*** (0.001)
branches		-0.016*** (0.002)		0.002** (0.001)		0.002** (0.001)
Year FE	NO	NO	YES	YES	NO	NO
State FE	NO	NO	NO	NO	NO	NO
Year-Month FE	NO	NO	NO	NO	YES	YES
Controls	NO	YES	NO	YES	NO	YES
No. of observations	4653	4653	4653	4653	4653	4653
Adj. R-square	0.000	0.434	0.826	0.829	0.930	0.933

All Trust Measures

Table: Online lending, CFPB complains, interpersonal trust and Madoff victims

	(1)	(2)	(3)	(4)	(5)	(6)
CFPB	0.012** (0.005)	0.018*** (0.003)	0.003** (0.001)	0.003** (0.001)	0.002** (0.001)	0.003** (0.001)
interpersonal trust	-0.039** (0.016)	-0.349*** (0.034)	-0.045*** (0.013)	-0.042** (0.018)	-0.047*** (0.013)	-0.027** (0.012)
Madoff victims	0.004*** (0.001)	0.000 (0.002)	0.007*** (0.001)	0.009*** (0.001)	0.007*** (0.001)	0.009*** (0.001)
DTI		0.384** (0.153)		0.066 (0.064)		0.015 (0.036)
interest rate		-4.617*** (1.111)		-0.693 (0.840)		0.687** (0.285)
income		0.004*** (0.001)		0.000 (0.000)		0.001*** (0.000)
employment		0.176*** (0.047)		0.089*** (0.027)		0.041** (0.016)
pop. density		0.017 (0.011)		-0.030*** (0.005)		-0.029*** (0.004)
log GDP		-0.071*** (0.017)		-0.008 (0.013)		-0.018* (0.010)
log population		0.089*** (0.016)		0.001 (0.012)		0.011 (0.010)
unemployment rate		-0.062*** (0.005)		0.006*** (0.001)		0.006*** (0.001)
Year FE	NO	NO	YES	YES	NO	NO
State FE	NO	NO	NO	NO	NO	NO
Year-Month FE	NO	NO	NO	NO	YES	YES
Controls	NO	YES	NO	YES	NO	YES
No. of observations	2739	2739	2739	2739	2739	2739
Adj. R-square	0.003	0.452	0.701	0.710	0.888	0.896

Main Results

- 1 Distrust in traditional banking positively associated with online lending share.
- 2 Interpersonal trust negatively associated with online lending share.
- 3 Distrust in traditional finance positively associated with online lending share.

- Algan, Y. and P. Cahuc (2014). Trust, Growth, and Well-Being: New Evidence and Policy Implications. In *Handbook of Economic Growth*, Volume 2, Chapter 2, pp. 49–120.
- Butler, J., P. Giuliano, and L. Guiso (2016). Trust and Cheating. *Economic Journal* 126(595), 1703–1738.
- Corsetti, G., M. P. Devereux, L. Guiso, J. Hassler, G. Saint-Paul, H.-W. Sinn, J.-E. Sturm, and X. Vives (2010). A trust-driven financial crisis. *EEAG Report on the European Economy*.
- Einav, L., M. Jenkins, and J. Levin (2013). The Impact of Information Technology on Consumer Lending. *RAND Journal of Economics* 44(2), 249–274.
- Guiso, L. (2010). A trust driven financial crisis: Implications for the future of financial markets. *EEAG Report on the European Economy 2010*.
- Guiso, L., P. Sapienza, and L. Zingales (2004). The Role of Social Capital in Financial Development. *American Economic Review* 94(3), 526–556.

- Guiso, L., P. Sapienza, and L. Zingales (2008). Trusting the Stock Market. *Journal of Finance* 63(6), 2557–2600.
- Guiso, L., P. Sapienza, and L. Zingales (2016). Long-Term Persistence. *Journal of the European Economic Association* 14(6), 1401–1436.
- Lin, M. and S. Viswanathan (2016). Home Bias in Online Investments: An Empirical Study of an Online Crowdfunding Market. *Management Science* 62(5), 1393 – 1414.
- Tabellini, G. (2008). Presidential address: Institutions and Culture. *Journal of the European Economic Association* 6(2-3), 255–294.
- Zingales, L. (2015). Presidential address: Does Finance Benefit Society? *The Journal of Finance* 70(4), 1327–1363.