

Crowding out Banks: Credit Substitution by Peer-to-Peer Lending

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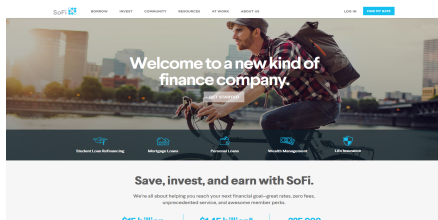
September 8, 2017

Increasing Size and Scope of P2P Lending

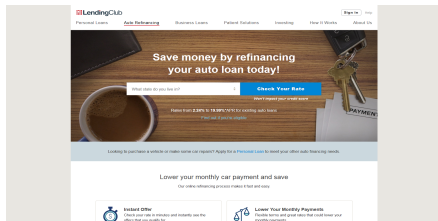
Current

SEE THE DIFFERENCE	Discover ¹ Personal Loans	Lending Club	Prosper ² Funding	Citibank ³ Personal Loan	PNC Bank
No origination or closing fees	✓	X	X	✓	✓
No prepayment penalties	✓	✓	✓	✓	✓
Payment plans up to 84 months	✓	X	X	X	X
Same-day decision in most cases	✓	X	X	✓	X
Option to pay off creditors directly	✓	X	X	✓	✓
Funds directly deposited into any bank account you choose	✓	✓	✓	X	X
Loan is not dependent on 3rd-party funding	✓	X	X	✓	✓
Loans are available to borrowers in all 50 states	✓	X	X	✓	X
100% U.S.-based customer service	✓	✓	✓	X	✓

Future



SoFi website banner featuring a man on a bicycle. The text reads: "Welcome to a new kind of finance company." Below the banner, it says "Save, invest, and earn with SoFi." and lists assets: "\$15 billion", "\$1.45 billion", and "225,000".



LendingClub website banner for auto refinancing. The text reads: "Save money by refinancing your auto loan today!" It includes a "Check Your Rate" button and a note: "Lower your monthly car payment and save." Below the banner, there are two icons: "Instant Offer" and "Lower Your Monthly Payments".

Does this Non-Bank Encroachment Affect Commercial Bank Lending or Does P2P Lending Represent Credit Expansion?

Information Asymmetry Models

- ▶ “Processing Information” reduces competition and captures borrowers (Hauswald and Marquez 2003)
- ▶ Informationally close lenders poach borrowers and poison the well for informationally distant lenders (Hauswald and Marquez 2006)
- ▶ Flight to captivity – shift to borrowers that are informationally distant for other lenders (Dell’Ariccia and Marquez 2004)

Empirical Observations

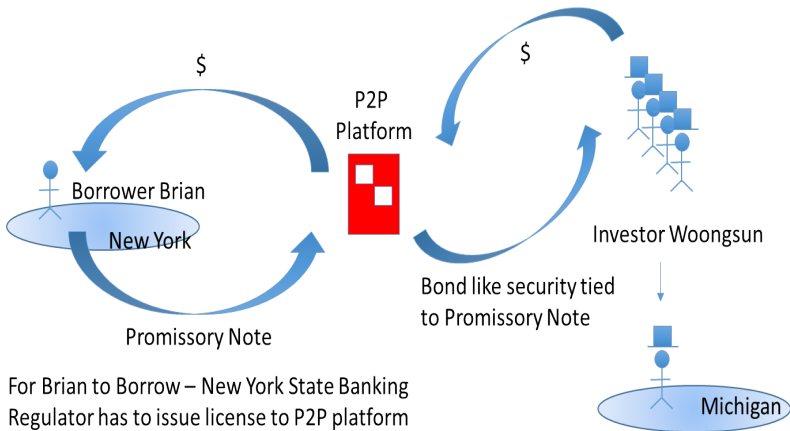
- ▶ Peer-to-peer lending targets high risk borrowers and may represent credit expansion outside traditional banking channel
 - Butler et al. (MS, 2015)
 - Roure et al. (2016)

Main Results

- ▶ Small/Rural commercial banks bear the increase in competition from P2P
 - Loan losses $\sim 1.8\%$ per σ in P2P lending (conservative estimate)
 - Increase in delinquency & charge off measures
 - Similar results in low competition
- ▶ Large commercial banks appear unaffected
- ▶ P2P substitution with commercial banks appears strongest in low credit rating segments
- ▶ Allowing banks to participate as investors appears to minimize loan losses
- ▶ A large fraction of the P2P loan volume (26.7%) displaces bank lending

- ▶ Commercial Bank data
 - FDIC Condition & Income (“Call”) Report – Quarterly bank financial data
 - FDIC Summary of Deposit Data – Annual bank branch & geography data
- ▶ P2P Loan data
 - Prospectus supplement filings (424(b)(3)) – EDGAR
- ▶ Security Registration dates
 - State security regulator interviews
- ▶ Local Economy
 - Bureau of Economic Analysis (BEA)

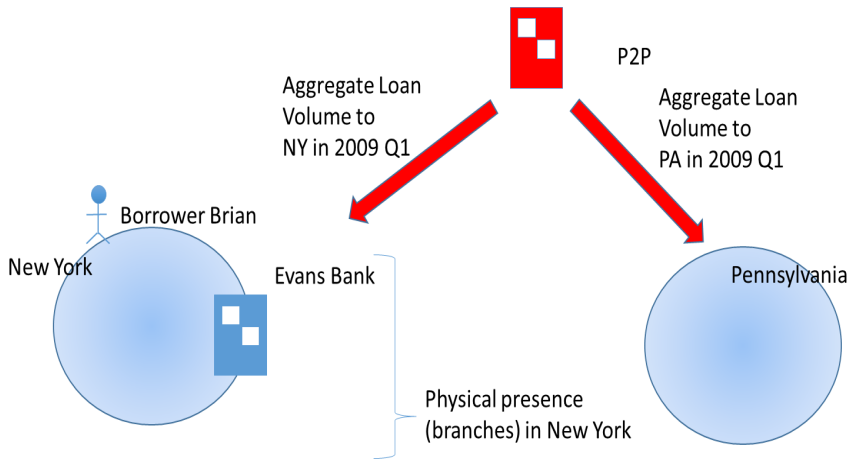
P2P Lending Basics



For Brian to Borrow – New York State Banking Regulator has to issue license to P2P platform

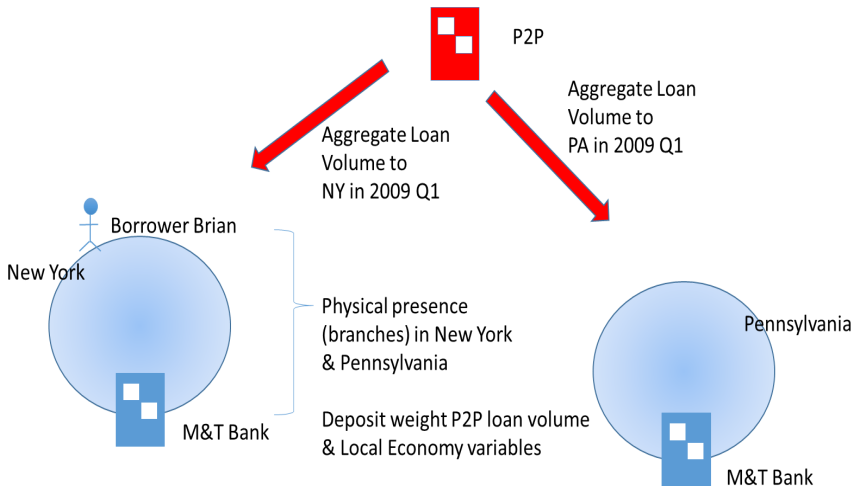
For Woongsun to Invest – Michigan (State) Security Regulator has to approve security registration to P2P platform

Empirical Strategy



$$\text{Loan Volume}_{it} = \text{P2Pvolume}_{it} + \text{Bank}_{it} + \text{Local}_{it} + \text{time}_t + \text{bank}_i + \text{error}_{it}$$

Empirical Strategy



$$\text{Loan Volume}_{it} = \text{P2Pvolume}_{it} + \text{Bank}_{it} + \text{Local}_{it} + \text{time}_t + \text{bank}_i + \text{error}_{it}$$

Bank Loan Volume

Bank Loan Volume [Table 2]

	(1)	(2)	(3)	(4)
	All Consumer Loans	Personal Loans	All Consumer Loans	Personal Loans
$P2Pvolume_{it}$	-0.010 (-1.63)	-0.013** (-2.14)		
$P2PLowRating_{it}$			-0.226*** (-2.72)	-0.200*** (-2.63)
$P2PHighRating_{it}$			0.028* (1.83)	0.022 (1.58)
Bank Characteristics				
$TotalAsset_{it}$	0.001* (1.94)	0.001*** (3.04)	0.001* (1.94)	0.001*** (3.04)
$TotalEquity_{it}$	0.010 (1.09)	0.002 (0.38)	0.010 (1.09)	0.002 (0.38)
$NetIncome_{it}$	0.097*** (7.86)	0.091*** (7.98)	0.097*** (7.87)	0.092*** (8.00)
$InterestExp_{it}$	-0.068* (-1.74)	-0.106*** (-3.35)	-0.071* (-1.84)	-0.109*** (-3.46)
Local Economy	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
SE clustered	Bank	Bank	Bank	Bank
R^2	0.931	0.933	0.931	0.933
$Adj.R^2$	0.927	0.930	0.927	0.930
Obs.	164,711	164,711	164,711	164,711
Number of Banks	7,758	7,758	7,758	7,758

► IV Table

► Full Table

Personal Loans Delinquency

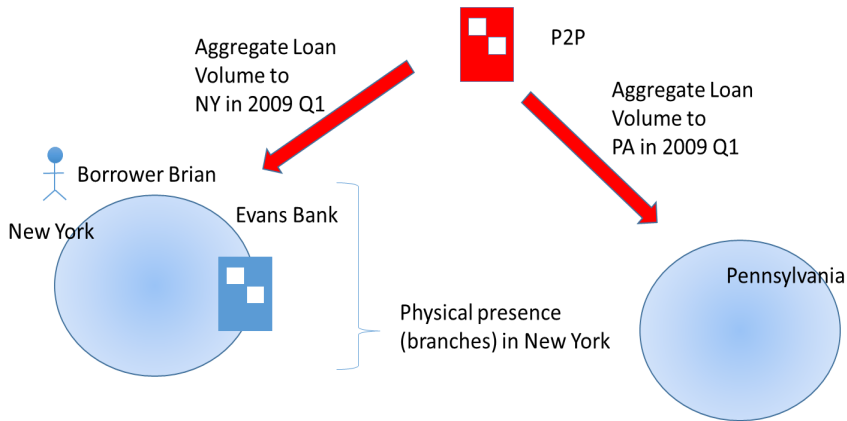
Personal Loans Delinquency [Table 3]

	~ 30 Days Past Due			~ 90 Days Past Due			Charged off		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	$PL30Past_t$	$PL30Past_{t+1}$	$PL30Past_{t+2}$	$PL90Past_t$	$PL90Past_{t+1}$	$PL90Past_{t+2}$	$PLChgOff_t$	$PLChgOff_{t+1}$	$PLChgOff_{t+2}$
$P2Pvolume_{it}$	0.369* (1.68)	0.447** (1.97)	0.557** (2.33)	0.131 (0.92)	0.166 (1.13)	0.279* (1.79)	0.360*** (3.32)	0.430*** (3.82)	0.483*** (4.06)
Bank Characteristics									
$TotalAsset_{it}$	0.022** (2.45)	0.021** (2.35)	0.020** (2.43)	0.014** (2.16)	0.013** (2.19)	0.012** (2.15)	0.001 (0.10)	0.004 (0.70)	0.002 (0.47)
$TotalEquity_{it}$	-0.472** (-2.56)	-0.563*** (-3.10)	-0.569*** (-2.91)	-0.118 (-1.02)	-0.133 (-1.12)	-0.096 (-0.78)	-0.566*** (-5.61)	-0.462*** (-4.51)	-0.515*** (-5.03)
$NetIncome_{it}$	0.803* (1.71)	0.570 (1.21)	0.864* (1.86)	1.963*** (6.90)	1.240*** (4.20)	1.504*** (5.07)	-1.554*** (-5.32)	-0.563** (-2.07)	-1.327*** (-5.03)
$InterestExp_{it}$	3.139*** (2.69)	3.465*** (3.08)	3.044*** (2.81)	0.499 (0.66)	-0.629 (-0.90)	-0.301 (-0.43)	1.951*** (2.72)	2.044*** (3.27)	1.721*** (2.87)
Local Economy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SE clustered	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank
R^2	0.786	0.789	0.791	0.624	0.629	0.633	0.560	0.563	0.565
$Adj.R^2$	0.775	0.778	0.780	0.605	0.610	0.613	0.538	0.540	0.542
Obs.	164,711	157,384	149,638	164,711	157,384	149,638	164,711	157,394	149,657
Number of Banks	7,758	7,758	7,683	7,758	7,758	7,683	7,758	7,758	7,683

▶ IV Table

▶ Full Table

Empirical Strategy – IV



$$\text{Loan Volume}_{it} = \text{P2Pvolume}_{it} + \text{Bank}_{it} + \text{Local}_{it} + \text{time}_t + \text{bank}_i + \text{error}_{it}$$

Instrument with US fraction of population able to invest

- ▶ Using instrumented peer-to-peer lending volume
 - IV results are consistent with the OLS results.
 - Small commercial banks appear to suffer volume losses as peer-to-peer lending increases.
 - Small commercial banks take on lower quality borrowers.
- ▶ Robustness to QE
 - Results are consistent and robust even after controlling Federal Reserve's MBS and Treasury bond purchasing activities.

Conclusion

- ▶ We show evidence that P2P loan volume is substituting for commercial bank loans. We find a 1.8% decline in small/rural bank personal loan volume (per σ in P2P lending)
 - Conservative estimate of loan loss
 - Driven by low credit rating volume
- ▶ Loss in loan volume is accompanied by higher levels of delinquent loans and charge off activity
- ▶ Loan losses are stymied by platform investor expansion (2013Q2)
- ▶ A large fraction of the P2P loan volume (26.7%) displaces bank lending

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Link to the paper on SSRN



Bank Loan Volume – Full

Bank Loan Volume [Table 2]

	(1)	(2)	(3)	(4)
	AllPersonal	PersonalLoans	AllPersonal	PersonalLoans
<i>P2PVolume_{it}</i>	-0.010	-0.013**		
	(-1.63)	(-2.14)		
<i>P2PLowRating_{it}</i>			-0.226***	-0.200***
			(-2.72)	(-2.63)
<i>P2PHighRating_{it}</i>			0.028*	0.022
			(1.83)	(1.58)
Bank Characteristics				
<i>TotalAsset_{it}</i>	0.001*	0.001***	0.001*	0.001***
	(1.94)	(3.04)	(1.94)	(3.04)
<i>TotalEquity_{it}</i>	0.010	0.002	0.010	0.002
	(1.09)	(0.38)	(1.09)	(0.38)
<i>NetIncome_{it}</i>	0.097***	0.091***	0.097***	0.092***
	(7.86)	(7.98)	(7.87)	(8.00)
<i>InterestExp_{it}</i>	-0.068*	-0.106***	-0.071*	-0.109***
	(-1.74)	(-3.35)	(-1.84)	(-3.46)
Local Economy				
<i>PerCapInc_{it}</i>	0.115	0.161	0.096	0.146
	(0.85)	(1.32)	(0.70)	(1.19)
<i>Unemp_{it}</i>	-0.017	-0.011	-0.014	-0.008
	(-0.99)	(-0.69)	(-0.83)	(-0.50)
<i>AutoDebt_{it}</i>	-5.452***	-5.230***	-5.506***	-5.293***
	(-5.63)	(-5.90)	(-5.67)	(-5.96)
<i>CCDebt_{it}</i>	2.535	1.809	2.360	1.616
	(1.42)	(1.09)	(1.33)	(0.98)
<i>MortDebt_{it}</i>	-0.437***	-0.479***	-0.427***	-0.470***
	(-3.19)	(-4.02)	(-3.12)	(-3.95)
<i>AutoDebtDelinq_{it}</i>	0.010	0.005	0.010	0.005
	(0.29)	(0.17)	(0.30)	(0.15)
<i>CCDebtDelinq_{it}</i>	0.070***	0.056***	0.078***	0.063***
	(3.43)	(2.98)	(3.90)	(3.46)
<i>MortDebtDelinq_{it}</i>	-0.041**	-0.036**	-0.041**	-0.035**
	(-2.45)	(-2.44)	(-2.47)	(-2.42)
<i>Constant</i>	0.052***	0.054***	0.052***	0.054***
	(7.01)	(8.33)	(7.01)	(8.35)
Year-Quarter FE	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
SE clustered	Bank	Bank	Bank	Bank
<i>R</i> ²	0.931	0.933	0.931	0.933
<i>Adj. R</i> ²	0.927	0.930	0.927	0.930
<i>Obs.</i>	164,711	164,711	164,711	164,711
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<i>P2Volume_{it}</i>	0.369* (1.68)	0.447** (1.97)	0.557** (2.33)	0.131 (0.92)	0.166 (1.13)	0.279* (1.79)	0.360*** (3.32)	0.430*** (3.82)	0.483*** (4.06)
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<i>TotalEquity_{it}</i>	-0.472** (-2.56)	-0.563*** (-3.10)	-0.569*** (-2.91)	-0.118 (-1.02)	-0.133 (-1.12)	-0.096 (-0.78)	-0.566*** (-5.61)	-0.462*** (-4.51)	-0.515*** (-5.03)
<i>NetIncome_{it}</i>	0.803* (1.71)	0.570 (1.21)	0.864* (1.86)	1.963*** (6.90)	1.240*** (4.20)	1.504*** (5.07)	-1.554*** (-5.32)	-0.563** (-2.07)	-1.327*** (-5.03)
<i>InterestExp_{it}</i>	3.139*** (2.69)	3.465*** (3.08)	3.044*** (2.81)	0.499 (0.66)	-0.629 (-0.90)	-0.301 (-0.43)	1.951*** (2.72)	2.044*** (3.27)	1.721*** (2.87)
Local Economy									
<i>PerCapitalInc_{it}</i>	-2.784 (-0.63)	-3.101 (-0.70)	-4.420 (-1.00)	3.718 (1.24)	4.218 (1.40)	2.330 (0.76)	3.649 (1.54)	3.649 (1.52)	1.964 (0.84)
<i>Unemp_{it}</i>	2.902*** (4.49)	2.241*** (3.44)	1.918*** (2.93)	0.761 (1.61)	0.547 (1.16)	0.306 (0.64)	2.199*** (6.14)	1.756*** (4.87)	1.460*** (4.08)
<i>AutoDebt_{it}</i>	-154.341*** (-4.43)	-143.922*** (-4.12)	-123.851*** (-3.46)	-118.186*** (-5.00)	-120.353*** (-5.21)	-112.813*** (-4.81)	-33.709* (-1.80)	-20.371 (-1.10)	-9.597 (-0.52)
<i>CCDebt_{it}</i>	155.056** (2.52)	173.411*** (2.87)	197.499*** (3.30)	24.184 (0.56)	19.430 (0.47)	21.130 (0.52)	47.710 (1.49)	72.814** (2.31)	90.297*** (2.93)
<i>MortDebt_{it}</i>	-17.262*** (-3.96)	-15.180*** (-3.56)	-11.234*** (-2.69)	-2.777 (-0.98)	-1.628 (-0.59)	-0.957 (-0.34)	-7.175*** (-3.01)	-6.311*** (-2.74)	-4.060* (-1.81)
<i>AutoDebtDelinq_{it}</i>	-0.423 (-0.37)	-0.172 (-0.15)	0.649 (0.56)	-2.551*** (-3.13)	-2.205*** (-2.76)	-1.799** (-2.24)	0.250 (0.39)	0.691 (1.10)	0.568 (0.92)
<i>CCDebtDelinq_{it}</i>	1.367* (1.87)	1.381* (1.92)	0.914 (1.25)	1.365*** (2.77)	1.234** (2.55)	1.186** (2.38)	2.289*** (5.77)	2.062*** (5.25)	1.783*** (4.54)
<i>MortDebtDelinq_{it}</i>	-1.046** (-2.09)	-0.835* (-1.70)	-0.780 (-1.58)	-0.407 (-1.17)	-0.304 (-0.89)	-0.129 (-0.37)	-0.934*** (-3.31)	-0.702** (-2.52)	-0.572** (-2.03)
<i>Constant</i>	1.750*** (6.83)	1.683*** (6.65)	1.399*** (5.53)	0.524*** (3.04)	0.505*** (3.02)	0.475*** (2.79)	0.166 (1.21)	0.098 (0.72)	-0.071 (-0.54)
Year-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SE clustered	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank
<i>R²</i>	0.786	0.789	0.791	0.624	0.629	0.633	0.560	0.563	0.565
<i>Adj. R²</i>	0.775	0.778	0.780	0.605	0.610	0.613	0.538	0.540	0.542
<i>Obs.</i>	164,711	157,384	149,638	164,711	157,384	149,638	164,711	157,394	149,657
<i>Number of Banks</i>	7,758	7,758	7,683	7,758	7,758	7,683	7,758	7,758	7,683