LENDING MARKETS IN TRANSITION?

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University of California, Berkeley

December 2, 2016
Conference of the Board of Governors of the Federal Reserve System

“Financial Innovation: Online Lending to Households and Small Businesses”
• Material for this talk largely draws from an article I wrote a few years ago, but updated:

Outline

i. Disintermediation & Investing

ii. Information about Borrowers & Contract Design

iii. Macroeconomic Picture

iv. Regulation
Traditional Lending Model: e.g., credit cards

What really does the word disintermediation mean?
Platforms: Application Process in P2P

• A typical consumer Peer-to-peer:
  • Prospective borrower enters application data into platform
    • Income (sometimes with verification)
    • Amount of desired loan
    • Duration of desired loan
    • Some demographics
    • Waiver allowing platform to pull credit history from registry

• Platform posts application information for investors to see. Investors can be anyone.
  • Investors bid/commit to invest increments on the desired loan
  • If the loan offering gets bids covering the desired loan amount, the loan is filled.
P2P Platforms: Disintermediation

Disintermediation is in removing investment bank that issues ABS
Platforms: Application Process in P2P

• Note: Not all platforms are P2P

• Many platforms instead are asset packagers
  • Big U.S. examples:
    • SOFI (student loans): mixed model
    • OnDeck (small business loans)
  • They gather prospective borrowers on the platform
  • Package them according to risk buckets
  • Have a pass-through relationship with a bank that issues ABS-like securities to (generally) institutional investors
    • Or variants of this
Asset Packager Platforms: Disintermediation

Disintermediation is still in removing investment bank that issues ABS
Disintermediation: Investor Returns?

- Financial intermediation costs 2% of asset value: Philippon (2014)
  - Removal of one layer of financial services should provide rents
- Platforms also argue: use information better to price credit risk
  - (Details: Next bullet point in outline)

- If EITHER disintermediation saves on transaction cost OR platforms are able to use information to price risk, **there should be rents that someone can capture:**
  - Better pricing for borrowers?
  - Higher risk-adjusted investor returns?
  - Abnormal profits by platforms?
Disintermediation: Investor Returns?

• So, how have investors done?
  • Quick answer: We don’t know. Time horizon from 2008 – today is simply not long enough for risk adjustment

• What investors in U.S. say:
  • Looked for anything that gave fixed income yield during this period.
  • ABS consumer loans, for example, performed 3.4% over 2009-2014
  • Barclays Investment Grade Bonds performed 5.5%
  • Lending Club & Prosper performed ~ 7%

• Since then, stock price concerns by many platforms
  • Why… concerns over:
    • Business cycle concerns about non-performing loans looming ????
    • Not serving the “looking for ANY yield” any more?
    • Governance & regulation
Disintermediation: Investor Returns?

(continued)…

- How about individuals who never really had access to ABS market?
  - In theory, investors can diversify across borrowers and/or hedge background risk
    - Are they?
    - Waiting for evidence on research front

- Moot question?
  - Most of investors are not crowd, but rather hedge funds and large institutions

- MANY unanswered questions!
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Proximity: Theoretic Underpinnings

- Jaffee Russell / Stiglitz Weiss: More information via proximity => improved access or price
  - Subsequent screening literature: Petersen and Rajan (1994), Boot and Thakor (2000); Berger and Udell (2002); Petersen (2004); Berger, Miller, Petersen, Rajan, and Stein (2005); Stein (2002); Karlan (2007); Iyer and Puri (2012); Schoar (2014); many others

- Signaling literature
  - Use of narratives text (non-costly?) in application to signal quality
  - Signals of “friends” investing (skin in the game)

- Ex post moral hazard reduction?
  - Does the observable nature or friends exposure change repayment behavior?
Proximity: Baseline question: 
Is there room for improvement?

- Does credit scoring over and above traditional credit scores (credit history + debt:income) improve predictions on default?

  - Or just in-sample data mining a host of demographics

  - Iyer, Khwaja, Luttmer Shue (2015): It is possible to profitably sort individuals even within pooling of borrowers in a credit score bucket (a few points)
Proximity

1) Is there proximate knowledge in the crowd?

- Freedman and Jin (2014), (also see Everett (2010))
  - When investor-lenders “endorse and bid” – big IRR improvement
  - Could be other investors following connected investors to higher risk classes
  - But, at least partially due to information in the crowd
    - Reduction in default rates by 4%

- NOTE! Endorsements without investment do worse
  - Costly skin in the game (Spence 1973)
Proximity

1) Is there proximate knowledge in the crowd?

• But how important is this question going forward?
  • Do we think that people are going to put costly effort to manually provide information about prospective borrowers who are friends or within their network
  • Scale of this thought seems too far-reaching for the distribution of who has wealth

• And, how does the fact that most (in U.S.) investors are hedge fund or similar?

• My view is that “wisdom in the crowd” is not the right way to think about marketplaces
• More promising: “proximate information” (or just more information) by use of technology afforded by platforms
Proximity

1) Is there proximate knowledge in the crowd?

2) Can borrowers make lenders proximate through a narrative

- Herzenstein, Sonenshein and Dholakia (2011) study individuals using identify claims to influence lenders
  - Trustworthy and successful improve financing terms,
  - But no effect in default… narratives can bias investors? (troubling)
  - Also see Gao and Lin (2012) for more on deceit

- Other research looks at linguistic clarity, face features & race
  - Pope & Snyder – racial statistical discrimination is profitable

- Promising is hard coding of narrative info Michels (2012)
  - Disclosure items make finance cheaper and are relevant for defaults
  - Algorithms!
Proximity

1) Is there proximate knowledge in the crowd?
2) Can borrowers make lenders proximate through a narrative?
3) Can local indicators be a proxy for proximity?

• **Crowe and Ramcharan (2013):**
  - Crowd investors incorporate relevant local house price effects in deciding on both the provision of funds and the rate to charge.

• A lot more research can be done here –
• Regulators are going to have a lot to say about discrimination in this realm.
**Proximity**

1) Is there proximate knowledge in the crowd?
2) Can borrowers make lenders proximate through a narrative?
3) Can local indicators be a proxy for proximity?
4) Can network be a proxy for proximate information?

- Lin, Prabhala, and Viswanathan (2013): Who your friends are as a proxy for your economic setting
  - Prospective borrowers on Prosper with high credit quality friends
  - succeed in fundraising more often, face lower interest rates, and default less.

- Big Data = big implications!
- See new work of Theresa Kuchler, Johannes Stroebel et al using facebook data
Proximity

1) Is there proximate knowledge in the crowd?
2) Can borrowers make lenders proximate through a narrative
3) Can local indicators be a proxy for proximity?
4) Can network be a proxy for proximate information?
5) Does everyone have to have proximate knowledge or does information diffuse?

- Herding/cascades: first research says yes.
- More work needed here as the investors pool changed over time
Contract design

• Question that is not fully explored in literature:
  • Are the contracts in the credit markets optimal
    • For whom?
• Afternoon session today is very much about the use of information in (either implicitly or explicitly) the design of contracts

Examples:
• Papers of pricing model (next slide)
  • Wei and Lin (2013)
  • Franks, Serrano-Velarde, Sussman (2016)
• Papers about duration of installment loans
  • Hertzberg et al (2015)
  • Basten, Guin, Koch (2015)
• Installment versus credit line?
Is Information from investors more valuable that volume? Evidence from pricing models

- Wei and Lin (2013): study Prosper’s switch from price setting via auction versus assignment
  - **Auction**: interest rate price the margin when supply = demand
  - **Assignment**: a coarser system in which Prosper pre-assigns an interest rate based on credit scoring
  - **Finding**: Under assignment, loans are funded with a higher probability at a higher price, with a higher default rate.
    - Interpretation 1: Prosper may be increasing the pool of borrowers who get funded by pricing the high risk types
    - Interpretation 2: coarser pricing = more pooling of risk (Stiglitz and Weiss (1980)), => higher price & loan-cost induced default

- Franks, Serrano-Velarde, Sussman (2016): study SME version of this experiment for British Funding Circle
  - **Finding**: More volume under assignment, less precise default predictions
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Macro Picture

• Do platforms expand access to credit?

• What do platforms do to the overall risk of household sector?
  • Understand the micro implications
## Lending Club Stats from Morse (2015, Annual Review of F.E.)

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**Take Away 1:** These are large debt-to-income loans.
**Take Away 2:** The borrowers are not low income.
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<tr>
<td>House</td>
<td>82,617</td>
<td>16,912</td>
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<td>443</td>
<td>2.0%</td>
<td>$301.56</td>
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<tr>
<td>Medical</td>
<td>73,325</td>
<td>8,375</td>
<td>0.191</td>
<td>38.0</td>
<td>122</td>
<td>0.5%</td>
<td>$289.11</td>
</tr>
<tr>
<td>Moving</td>
<td>76,911</td>
<td>8,325</td>
<td>0.193</td>
<td>37.6</td>
<td>73</td>
<td>0.3%</td>
<td>$290.08</td>
</tr>
<tr>
<td>Other</td>
<td>68,913</td>
<td>9,702</td>
<td>0.197</td>
<td>40.0</td>
<td>696</td>
<td>3.1%</td>
<td>$324.56</td>
</tr>
<tr>
<td>Renewable Energy</td>
<td>99,977</td>
<td>12,602</td>
<td>0.194</td>
<td>42.5</td>
<td>11</td>
<td>0.0%</td>
<td>$401.91</td>
</tr>
<tr>
<td>Small Business</td>
<td>92,278</td>
<td>17,023</td>
<td>0.193</td>
<td>40.9</td>
<td>253</td>
<td>1.1%</td>
<td>$557.48</td>
</tr>
<tr>
<td>Vacation</td>
<td>63,913</td>
<td>6,003</td>
<td>0.190</td>
<td>36.9</td>
<td>55</td>
<td>0.2%</td>
<td>$211.76</td>
</tr>
<tr>
<td>Wedding</td>
<td>70,315</td>
<td>11,703</td>
<td>0.194</td>
<td>39.4</td>
<td>134</td>
<td>0.6%</td>
<td>$394.56</td>
</tr>
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<td>100.0%</td>
<td>$473.86</td>
</tr>
</tbody>
</table>

Take Away 3: These loans are overwhelmingly debt consolidations (credit card debt generally). Also see new work by Balyuk (2016)
### Survey of Consumer Finance Stats from Morse (2015)

<table>
<thead>
<tr>
<th>Income Quintile</th>
<th>Mean Consumer Debt</th>
<th>Percent with No Borrowing</th>
<th>Debt Conditional on Borrowing</th>
<th>Household Income</th>
<th>Debt-to-Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>7,968</td>
<td>52.4%</td>
<td>15,194</td>
<td>14,908</td>
<td>0.575</td>
</tr>
<tr>
<td>2nd</td>
<td>9,458</td>
<td>43.6%</td>
<td>21,702</td>
<td>31,358</td>
<td>0.306</td>
</tr>
<tr>
<td>3rd</td>
<td>16,777</td>
<td>30.0%</td>
<td>55,923</td>
<td>49,985</td>
<td>0.339</td>
</tr>
<tr>
<td>4th</td>
<td>22,198</td>
<td>22.6%</td>
<td>98,438</td>
<td>78,977</td>
<td>0.280</td>
</tr>
<tr>
<td>5th</td>
<td>35,351</td>
<td>33.0%</td>
<td>107,058</td>
<td>247,445</td>
<td>0.204</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>17,208</strong></td>
<td><strong>37.5%</strong></td>
<td><strong>45,839</strong></td>
<td><strong>75,631</strong></td>
<td><strong>0.361</strong></td>
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<th></th>
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<th>Vehicle Loans</th>
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<th>Line of Credit</th>
<th>Other Loans</th>
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<td><strong>Average</strong></td>
<td><strong>4,833</strong></td>
<td><strong>3,938</strong></td>
<td><strong>2,650</strong></td>
<td><strong>4,506</strong></td>
<td><strong>1,281</strong></td>
<td><strong>17,208</strong></td>
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**Take Away 4:** The LC people consolidating $15k are extremely heavy on high-cost debt relative to the population.
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Take Away 5: Mean interest rates on LC loans are 14.1%. Plus borrower pays origination fee, with size depending on risk bucket. It adds another 3% to the 41 month installment loan.
- Not cheap: 17%
- But revealed preference
### Survey of Consumer Finance Stats from Morse (2015)

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<th>Income Quintile</th>
<th>Mean Interest Rate of Highest Debt</th>
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<tr>
<td>1st</td>
<td>14.50</td>
</tr>
<tr>
<td>2nd</td>
<td>14.04</td>
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<td>4th</td>
<td>13.28</td>
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<td>13.01</td>
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<td>Average</td>
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**Take Away 5 (continued):** Compared to average borrower, LC loans are expensive.
- **Why?**
- From Take-away 4, these borrowers have high debt (countering relatively high income and pretty good FICO scores).
Summary: Picture of borrowers

- These are **prime borrowers**
  - Who have decent credit scores
  - And above-median income
  - But large debt

- Refinancing **credit card debt** into installment platform products
  - By revealed preference, it must be that they are paying more (20-29%) on credit cards

- **This is not expansion of credit per se.**
  - By in fact it does expand credit, because it expands the credit capacity of these high debt borrowers
    - What happens when they ramp up the credit cards AND have the platform loans?(!)
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<tr>
<td>Small Business</td>
<td>92,278</td>
<td>17,023</td>
<td>0.193</td>
<td>40.9</td>
<td>253</td>
<td>1.1%</td>
<td>$557.48</td>
</tr>
<tr>
<td>Vacation</td>
<td>63,913</td>
<td>6,003</td>
<td>0.190</td>
<td>36.9</td>
<td>55</td>
<td>0.2%</td>
<td>$211.76</td>
</tr>
<tr>
<td>Wedding</td>
<td>70,315</td>
<td>11,703</td>
<td>0.194</td>
<td>39.4</td>
<td>134</td>
<td>0.6%</td>
<td>$394.56</td>
</tr>
<tr>
<td>Total</td>
<td>75,674</td>
<td>15,542</td>
<td>0.141</td>
<td>41.0</td>
<td>22,707</td>
<td>100.0%</td>
<td>$473.86</td>
</tr>
</tbody>
</table>

Take Away 6: Payments are about $480 per month. Is that constraining?
<table>
<thead>
<tr>
<th>Category</th>
<th>Budget Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clothing / Jewelry</td>
<td>0.033</td>
</tr>
<tr>
<td>Housing</td>
<td>0.191</td>
</tr>
<tr>
<td>Food at home</td>
<td>0.268</td>
</tr>
<tr>
<td>Food away</td>
<td>0.046</td>
</tr>
<tr>
<td>Alcohol/ Tobacco</td>
<td>0.021</td>
</tr>
<tr>
<td>Personal Care</td>
<td>0.009</td>
</tr>
<tr>
<td>Communication &amp; Media</td>
<td>0.040</td>
</tr>
<tr>
<td>Entertainment Services</td>
<td>0.026</td>
</tr>
<tr>
<td>Utilities</td>
<td>0.061</td>
</tr>
<tr>
<td>Other Transportation</td>
<td>0.097</td>
</tr>
<tr>
<td>Health &amp; Education</td>
<td>0.073</td>
</tr>
<tr>
<td>Other Non-durable</td>
<td>0.028</td>
</tr>
<tr>
<td>Home Furnishings</td>
<td>0.062</td>
</tr>
<tr>
<td>Entertainment Durables</td>
<td>0.004</td>
</tr>
<tr>
<td>Vehicles</td>
<td>0.041</td>
</tr>
</tbody>
</table>

**Sum of yellow** 0690

- Is $480 in monthly payments large relative to a $70,000 income?
- First, taxes. Assume 25%
  - Leaves $4400 per month
- Let’s look at household budget shares
  - (table from Bertrand & Morse (2014))
  - Minimum of 69% absorbed by relatively inflexible items. Maybe 79%.
  - Leaves $900-$1300 in disposable income per month.
- Is $480 constraining? Yes
Macro: Profile of borrowers (consumer)

- Statistics from Mach and Carter (2016):
  - Almost $50 billion in loans were sought on LC platform in 2015 by 3.3 million people
  - Average loan sought is $10,000
  - 13% are funded

- De Roure, Pelizzon, Tasca (2016) study German context of P2P where the choice set for households is more defined
  - Households mostly have credit card debt from local bank
  - Thus can use the choice of new platforms is more of a direct comparison of new versus the observable credit card data
  - Find: platforms charge higher rates, but fair in risk-adjusted sense
Macro: Profile of borrowers (SME)

- **Schweitzer & Barkely (2016)**, smaller, younger, less profitable firms with less collateral apply to platforms compared to bank loans
- **Li (2016)**: Firms with more growth but less internal cash or collateral go to marketplace lending;
  - This extra risk is priced

Me: Is risk priced enough?
- Recent struggles of some SME lenders
- History of SME lending failure: How does platform resolve lack of recourse and ex post moral hazard?

- **Lin & Zhang (2016)**: Marketplace investors invest closer to home in equity (as opposed to debt) – clustering of equity marketplace
Macro: Aggregate risk

- People have credit capacity slack, but little disposable income breathing room

- Default happens on Lending Club loan when:
  1. small shock to disposable income or expenses
  2. continually run a deficit, re-ramping up credit cards and eventually getting into trouble again
     - Very common in consumer finance data

- Evidence: Hertzberg, Liberman, Paravisini (2015): FICO scores decline on average, because of distribution skewing to the left.
Important tangent

• I have often though that one reason payday loans are much more used in the UK (15% of population) than the U.S. (5%) is because the accepted form is online

• Hundtofte & Gladstone (2016): find that applicants applying via mobile apps are riskier than those applying via the internet during a roll-out of a Mobile App
  • Early work, but these authors have a great question that has a lot of implications
Outline

i. Disintermediation & Investing

ii. Information about Borrowers & Contract Design

iii. Macroeconomic Picture

iv. Regulation
Regulation: “The Wild West”

• Some aspects to consider
  1. Discrimination via platform demographics
     • E.g., In the U.S., zip codes are not allowed in bank lending because correlated with race.
     • But we know from work by Crowe and Ramcharan (2013) that zip code data can be used for pricing risk
  2. Are platforms banks?
     • Platforms generally use a pass-through bank (like other non-bank lenders do) to avoid regulations of being a bank
  3. Transparency (standardization) in risk buckets
     • Investor-lenders count on lenders to truthfully place prospective borrowers into risk buckets
  4. Credit registry
Final thoughts: Evolution vs. Disruption

- Do peers matter: perhaps, but only social media peers

- Evolution not disruption:
  - Future is as much about integration of platforms, networks into traditional banking than about disrupting markets
    - OnDeck relationship with J.P. Morgan
  - How much of finance will transfer to completely new players?
    - Depends on specifics of contracts:
      - Eg: Houses, cars
        - Are platforms at an advantage in managing servicing on collateral?
        - Are platform investors wary of 30 year contracts?
        - Where is the secondary market?
  - On thing is for sure: Platform technology is here to stay