

LENDING MARKETS IN TRANSITION?

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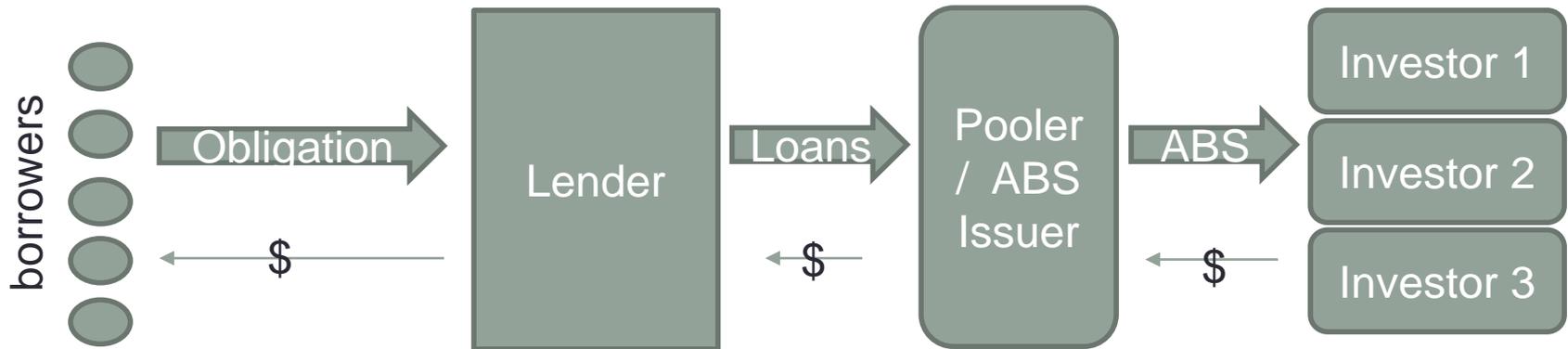
“Financial Innovation: Online Lending to Households and Small Businesses”

- Material for this talk largely draws from an article I wrote a few years ago, but updated:
 - “Peer-to-Peer Crowdfunding: Information and the Potential for Disruption in Consumer Lending?” *Annual Review of Financial Economics*, December 2015

Outline

- i. Disintermediation & Investing
- ii. Information about Borrowers & Contract Design
- iii. Macroeconomic Picture
- iv. Regulation

Traditional Lending Model: e.g., credit cards

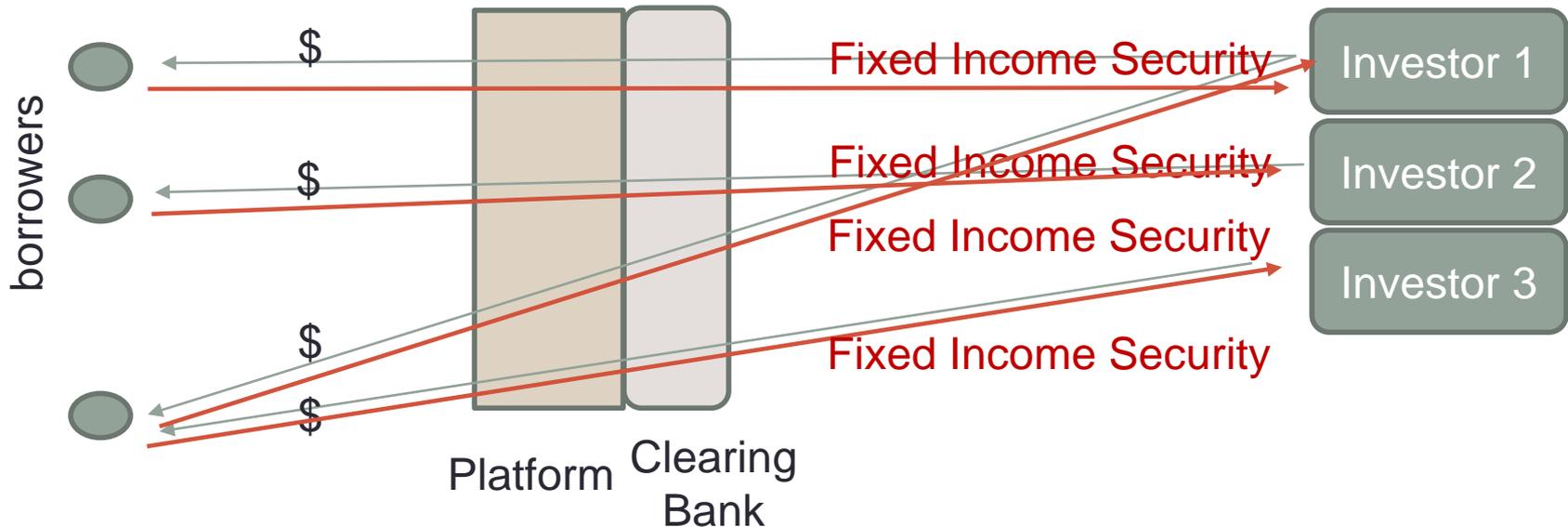


What really does the word disintermediation mean?

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

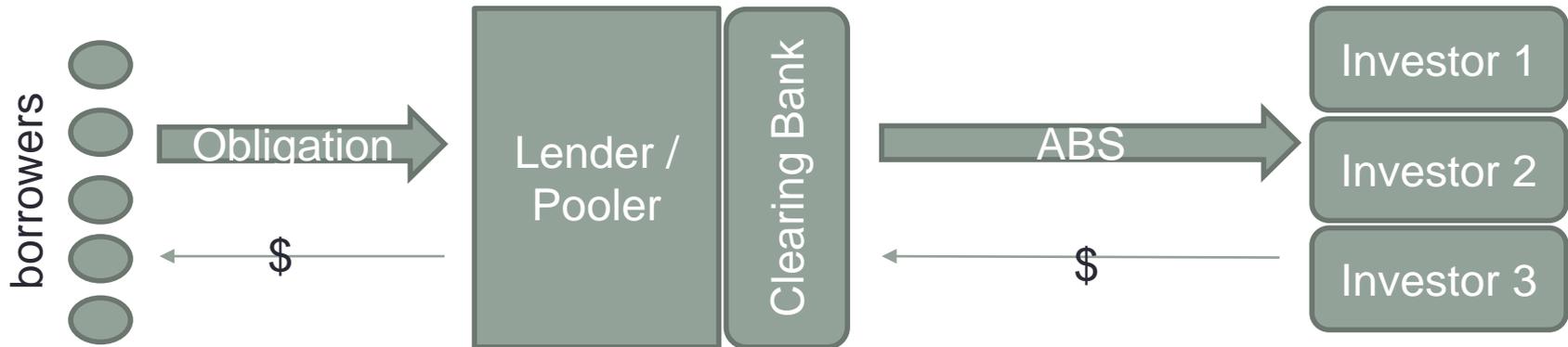


Disintermediation is in removing investment bank that issues ABS

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
- SO 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 than 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.)

Census Income Quintile	Annual Income	Loan Amount	Interest Rate	Term Months	Loan-to-Income	Payment-to-Income	Count	% of Sample
1st	19,944	4,722	18.1%	36.2	0.237	0.100	423	1.9%
2nd	32,425	8,478	16.0%	36.8	0.261	0.107	2,464	10.9%
3rd	50,314	13,206	14.8%	40.8	0.262	0.097	7,694	33.9%
4th	80,216	17,636	13.6%	42.2	0.220	0.078	8,158	35.9%
5th	148,303	21,305	12.4%	42.1	0.144	0.050	3,968	17.5%
Total	75,674	15,542	14.1%	41.0	0.205	0.075	22,707	100.0%

Take Away 1: These are large debt-to-income loans.

Take Away 2: The borrowers are not low income.

Lending Club Stats from Morse (2015, Annual Review of F.E.)

Type of Loan	Annual Income	Loan Amount	Interest Rate	Term Months	Count	% of Sample	Payments
Car	65,993	8,556	0.134	39.2	185	0.8%	\$267.29
Credit Card	74,017	15,406	0.134	39.8	5,680	25.0%	\$475.58
Debt Consolidation	75,468	16,350	0.141	41.6	13,797	60.8%	\$492.27
Home Improvement	87,893	15,056	0.129	41.8	1,120	4.9%	\$444.33
House	82,617	16,912	0.139	41.7	138	0.6%	\$506.25
Major Purchase	78,365	9,740	0.129	39.4	443	2.0%	\$301.56
Medical	73,325	8,375	0.191	38.0	122	0.5%	\$289.11
Moving	76,911	8,325	0.193	37.6	73	0.3%	\$290.08
Other	68,913	9,702	0.197	40.0	696	3.1%	\$324.56
Renewable Energy	99,977	12,602	0.194	42.5	11	0.0%	\$401.91
Small Business	92,278	17,023	0.193	40.9	253	1.1%	\$557.48
Vacation	63,913	6,003	0.190	36.9	55	0.2%	\$211.76
Wedding	70,315	11,703	0.194	39.4	134	0.6%	\$394.56
Total	75,674	15,542	0.141	41.0	22,707	100.0%	\$473.86

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)

Income Quintile	Mean Consumer Debt	Percent with No Borrowing	Debt Conditional on Borrowing	Household Income	Debt-to-Income
1st	7,968	52.4%	15,194	14,908	0.575
2nd	9,458	43.6%	21,702	31,358	0.306
3rd	16,777	30.0%	55,923	49,985	0.339
4th	22,198	22.6%	98,438	78,977	0.280
5th	35,351	33.0%	107,058	247,445	0.204
Average	17,208	37.5%	45,839	75,631	0.361

But....

	Education Loans	Vehicle Loans	Credit Card Debt	Line of Credit	Other Loans	Total Consumer Debt
Average	4,833	3,938	2,650	4,506	1,281	17,208

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)

Income Quintile	Mean Interest Rate of Highest Debt
1st	14.50
2nd	14.04
3rd	13.86
4th	13.28
5th	13.01
Average	13.63

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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Take Away 6: Payments are about \$480 per month. Is that constraining?

Consumer Expenditure Survey: Household Budget Share for Consumption Goods

Clothing / Jewelry	0.033
Housing	0.191
Food at home	0.268
Food away	0.046
Alcohol/ Tobacco	0.021
Personal Care	0.009
Communication & Media	0.040
Entertainment Services	0.026
Utilities	0.061
Other Transportation	0.097
Health & Education	0.073
Other Non-durable	0.028
Home Furnishings	0.062
Entertainment Durables	0.004
Vehicles	0.041
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.

Macro: Aggregate Risk

Important tangent

- I have often thought 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

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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
 - No regulation on this accounting
 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