



FINTECH: REGULATING THE FRONTIERS IN DIGITAL FINANCIAL SERVICES

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Consumer Protection Research for Policymaking Workshop

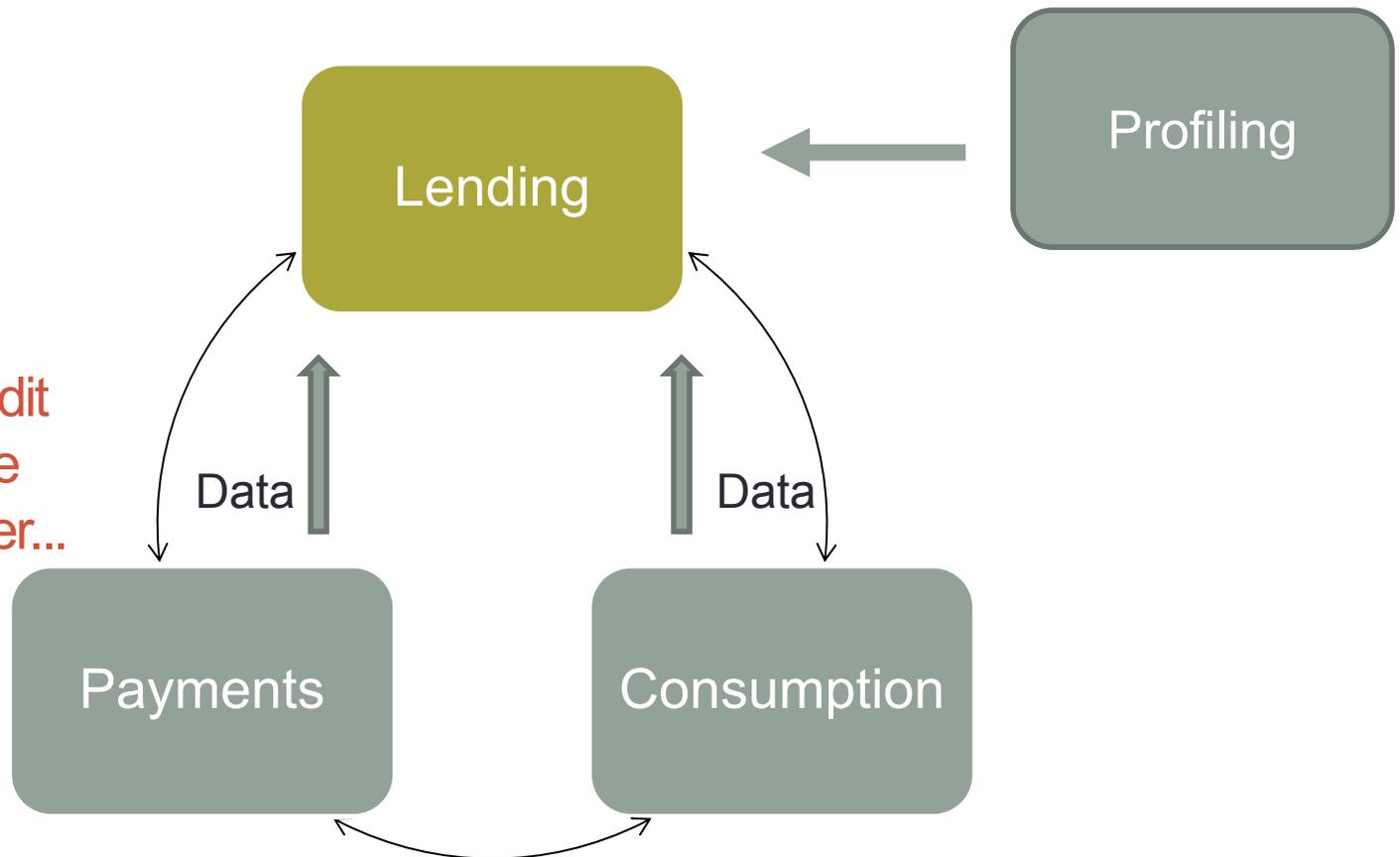
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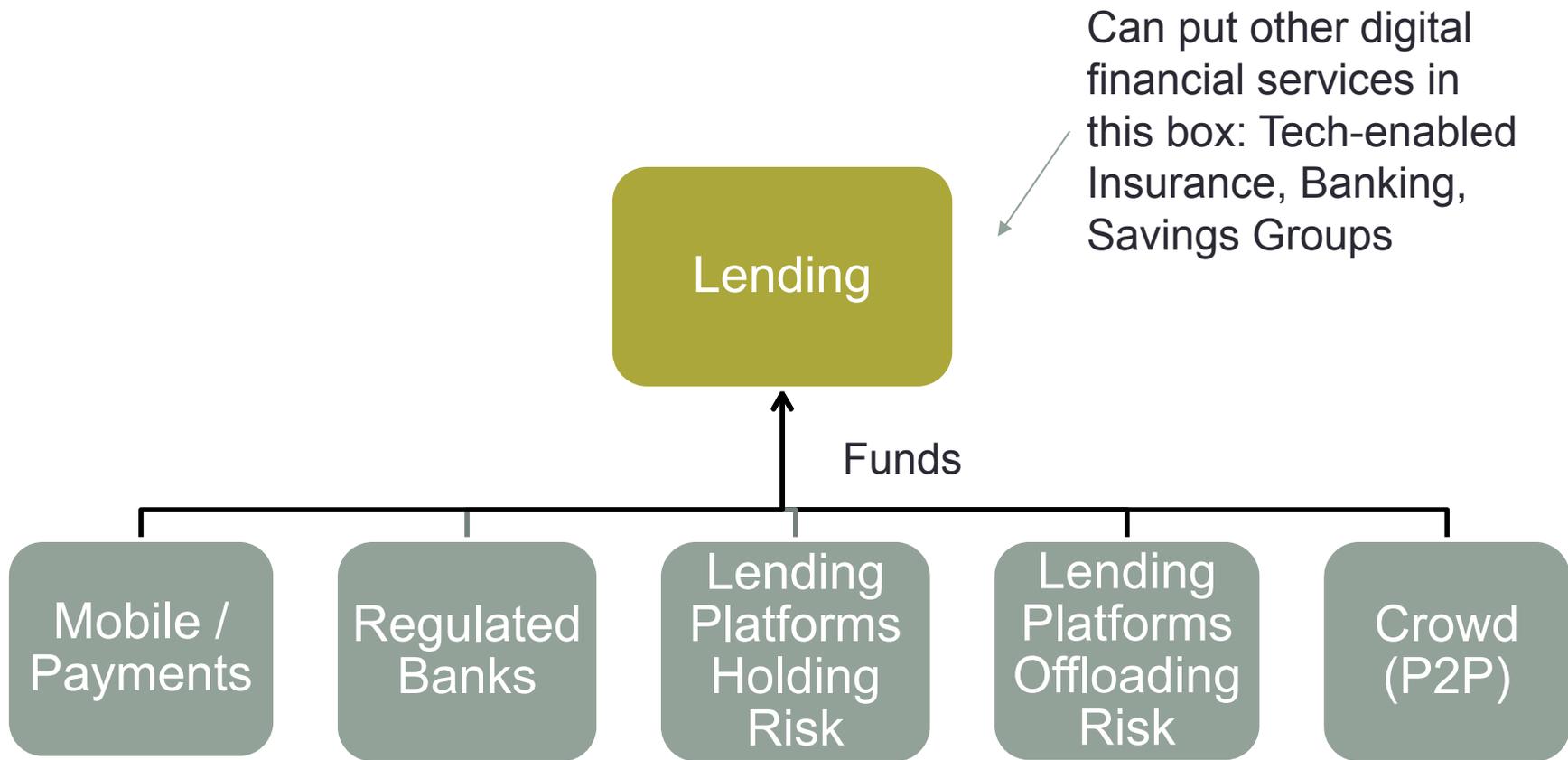
May 2017

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- A quick note on me:
 - Research: Household Finance, FinTech, Corruption, Venture Capital
 - Policy: SEC, CFPB, Greek Tax Fraud, State Banking Authorities
 - Teaching: New Venture Finance: Innovation Equity Finance, FinTech, Impact Investment
 - 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

I often say that
consumption, credit
and payments are
collapsing together...



- Studying consumer protections in digital lending, foremost in our minds should be:
- What data are used and how are they used?
 - Who owns the data



We also need to think about structures on the funding side

- Systemic & Counterparty Risks
- Competition

Outline

- i. Structures of Digital Finance Lenders
- ii. Access to Finance
- iii. Big Data: Information, Discrimination & Regulation
- iv. Equity Innovation Platforms / Crowdfunding Innovation

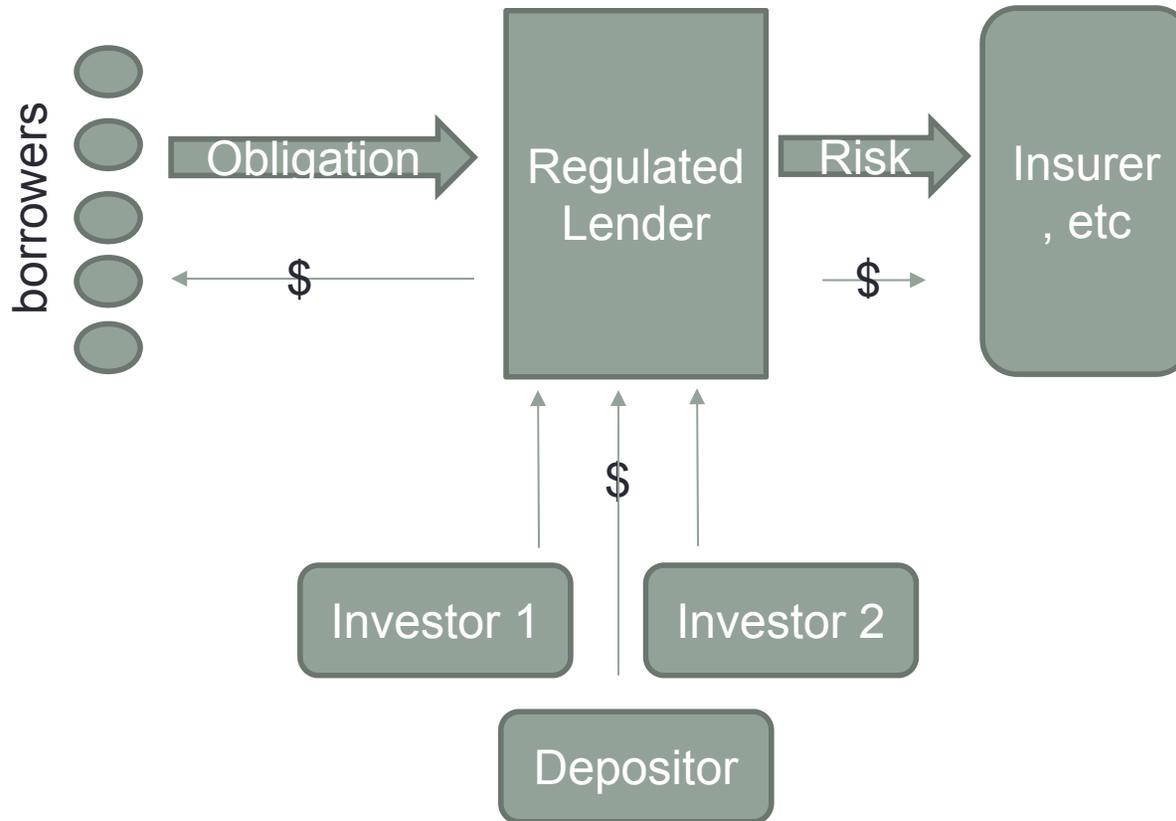


Outline

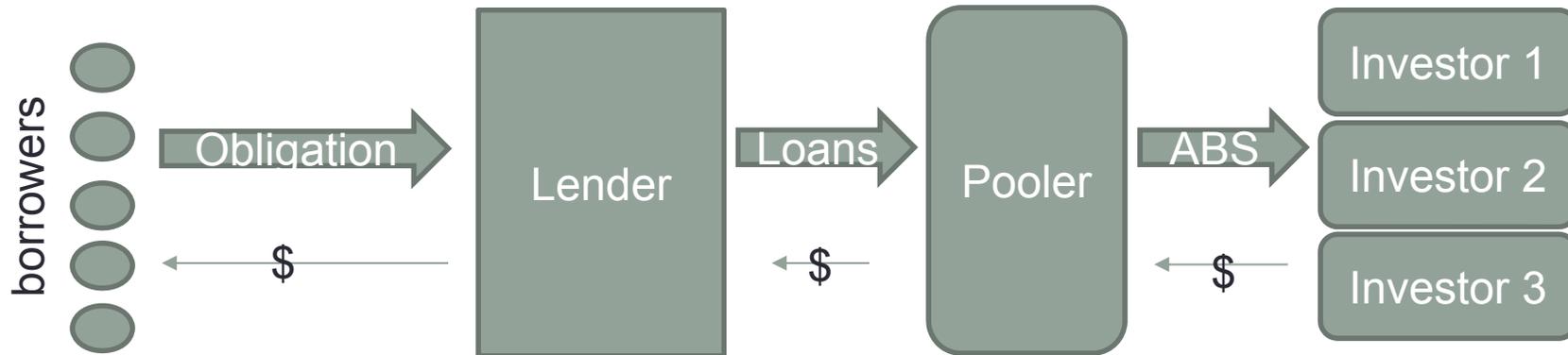
- i. Structures of Digital Finance Lenders

I want to start by briefly advocating why structures matter.

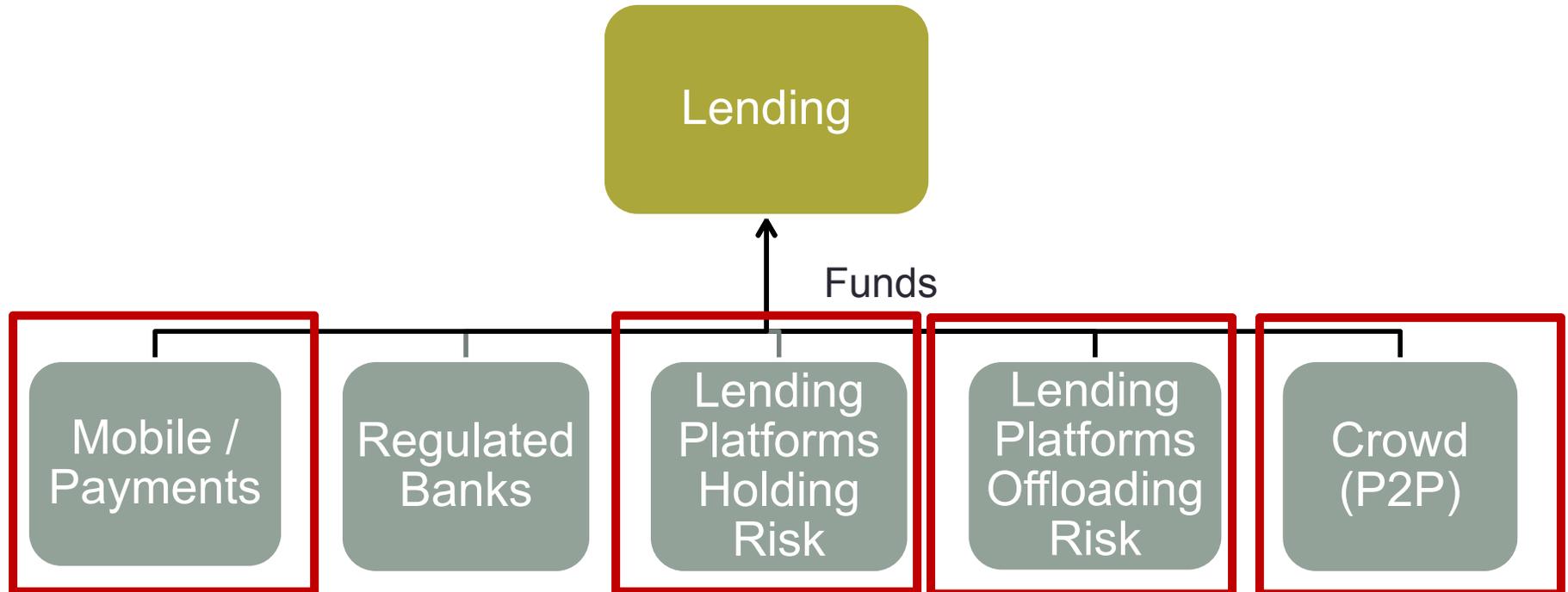
Traditional Lending Model: e.g., bank



Traditional Lending Model: e.g., credit cards

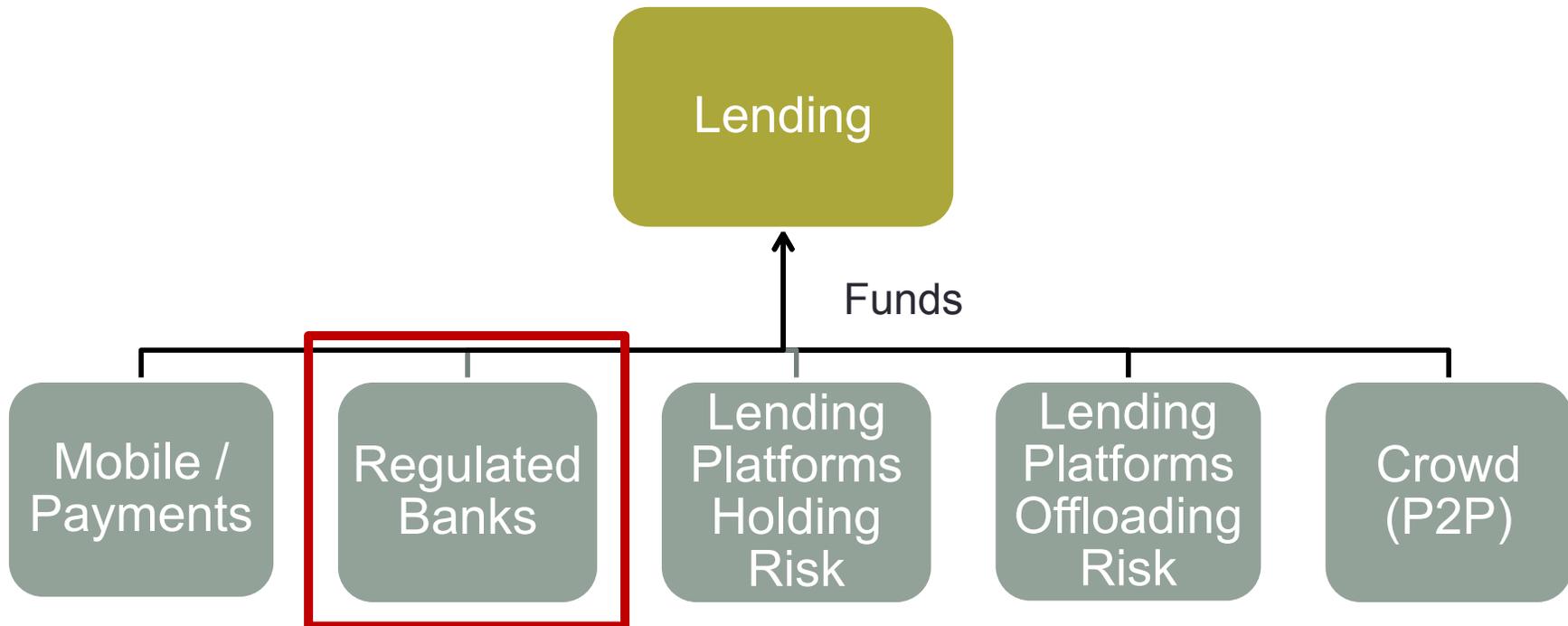


Implementation of digital lending



Non-regulated structures for digital lending:

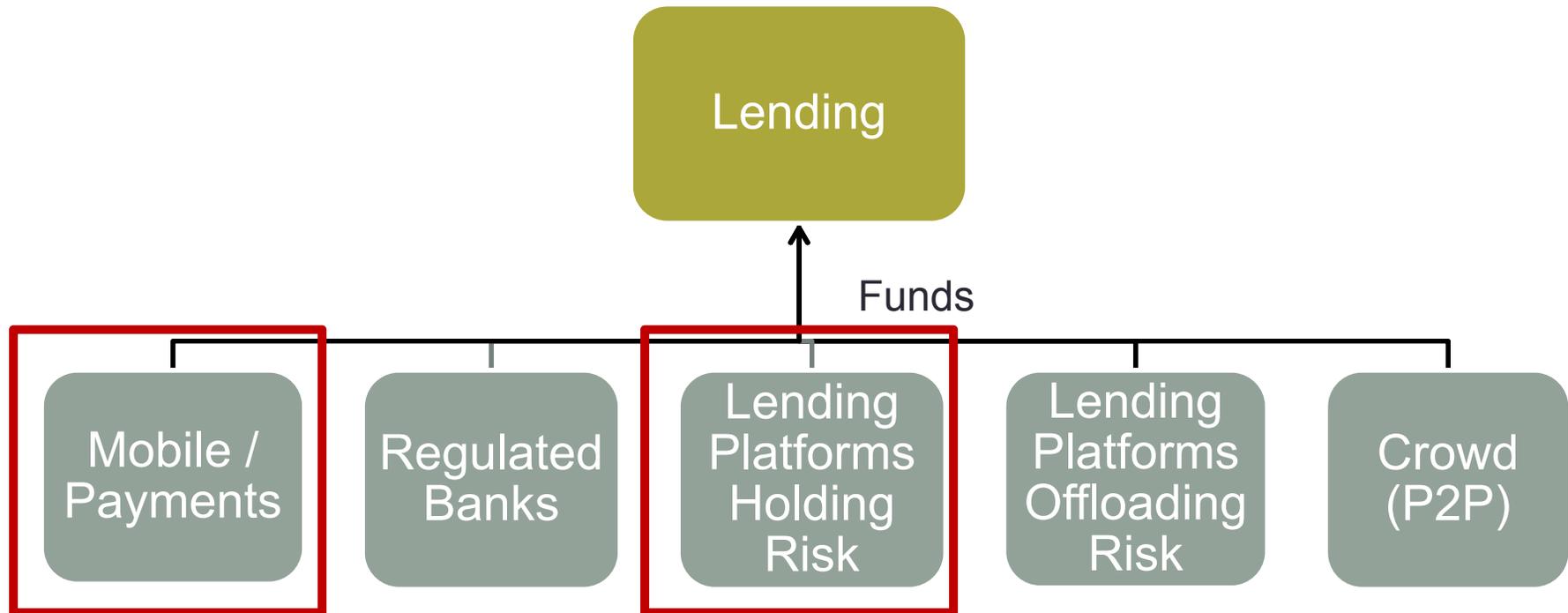
- Not regulated risk
- Questions of competition



Regulated bank structure of digital finance:

Tradeoffs and disincentives for increased access:

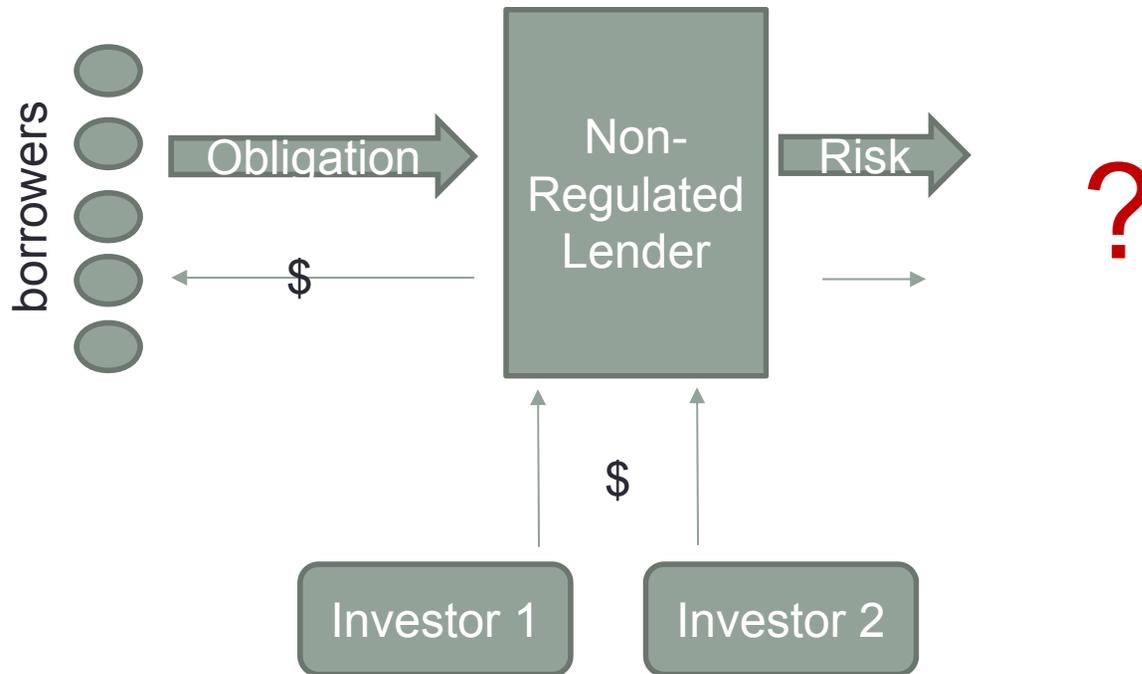
- Risk can be regulated easily
- But potentially foregone economic rents from disintermediation & use of Big Data.

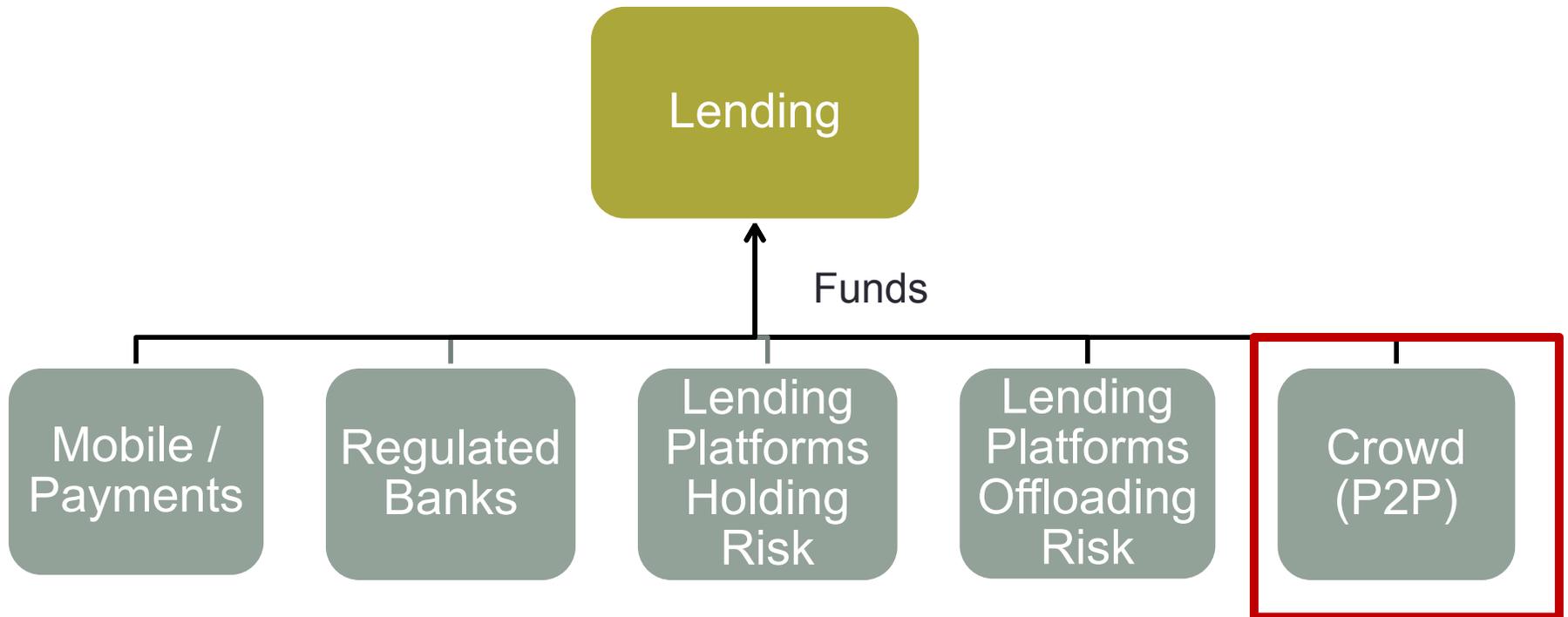


Mobile Models:

- Similar to bank structure.
- Questions about systemic risk without banking regulation
- Question about competition & use of data (data “owners” = monopoly?)

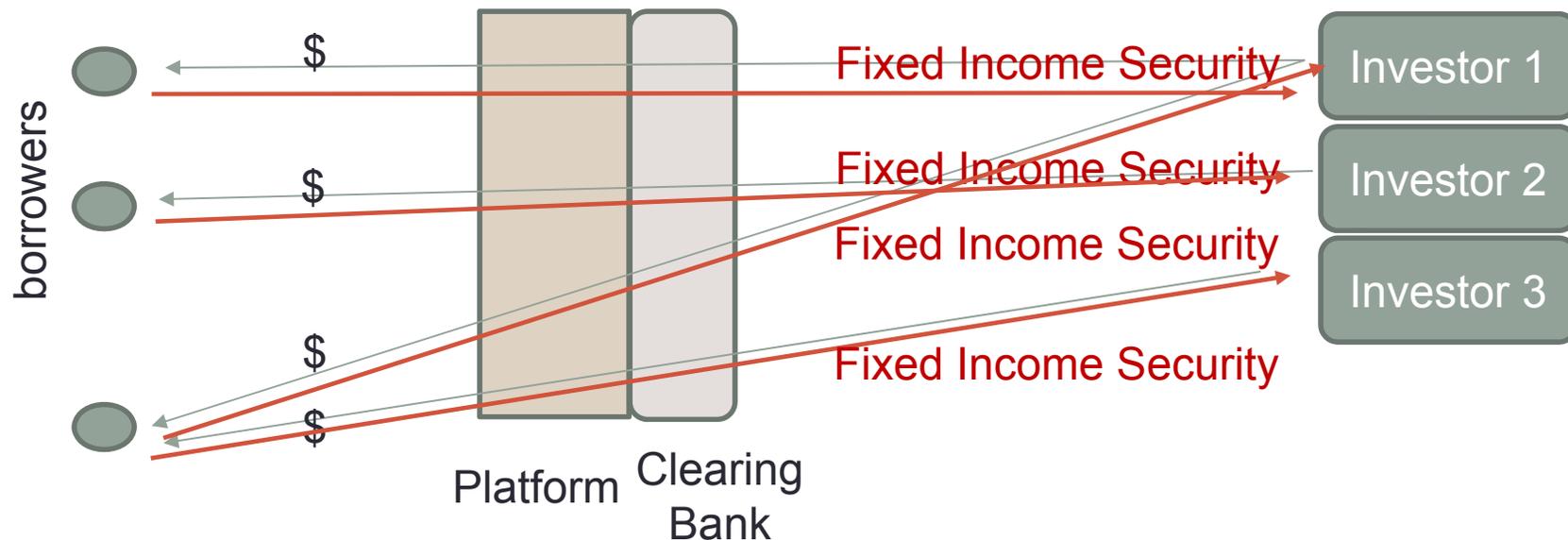
Mobile / Payments Model: Who is Holding Borrower Risk ?





Platforms packaging borrowers into an investment pool

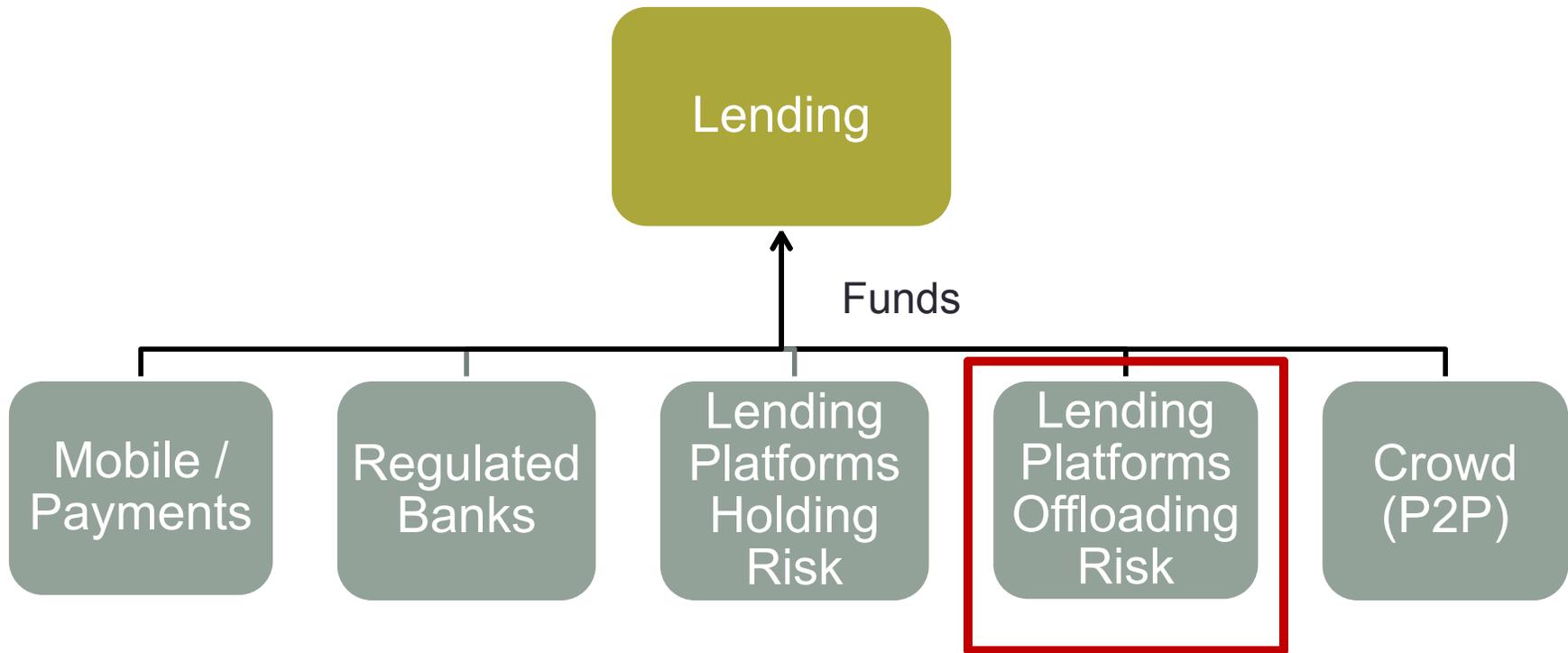
Peer-to-Peer Platforms



Compared to bank model: **Disintermediation** allows investors to invest directly in borrowers, not in bank

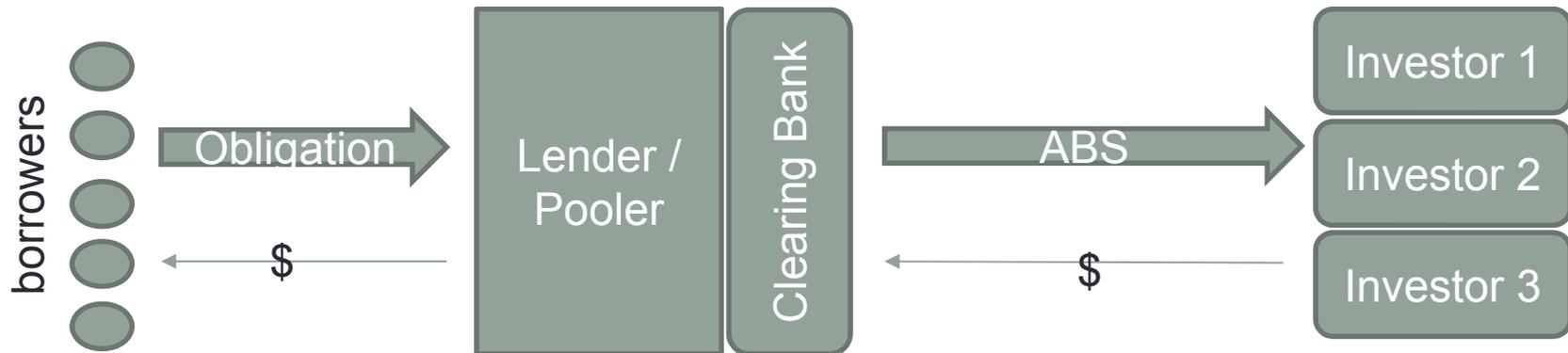
Compared to credit card model: **Disintermediation** removes a layer of financial intermediation. Someone (who?) should capture benefits

Questions remain: **Counterparty (servicing) risk**, need for **large players** (not competitive) so investors can hold **diversified portfolio of borrowers**, who **regulates platform proprietary models** of putting borrowers in risk buckets?



Platforms packaging borrowers into an investment pool

Asset Packager Platforms



- Like P2P, Asset Packagers Platforms also disintermediate a layer of financial services.
- Investors clearly exposed to counterparty risk here. Same questions remain as P2P.
- Again, this model requires scale, not competition, so that investment opportunity is attractive

Why structures matter

- Who is holding debt risks economy-wide?
 - Systemic Risk
- Who is exposed to counterparty risk?
 - Investor protections
- Is there disintermediation?
 - Economic rents for each layer of disintermediation
 - Who captures?
- What is appropriate level of competition?
 - Note!! : It is not possible to have a completely competitive environment
 - Why: Then each lender would not get enough borrowers such that the holder of the risk (either the lender or investor/funders) could diversify away idiosyncratic risk
 - But, if no competition, then any benefits that technology and disintermediation afford will go to platform or data owner, not borrower

Research

Existing data could be very valuable.

Things we do not know:

- What the distribution of structures look like within countries or across countries
- What technology is doing to systemic risk exposures
- What is the relationship between structures and competition,
 - Natural evolution given data ownership
 - Optimal arrangement from regulator point of view



Outline

- i. Structures of Digital Finance Lenders
- ii. Access to Finance

Access to Credit

- Is digital finance just replacing existing credit or is it expanding access
 - Next slides: Summary stats from the U.S.
 - But ideas apply to question of whether digital finance simply replaces traditional community money lenders, giving circles, relationship banking, etc.

Implications...

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: These loans are overwhelmingly debt refinancing, not expanding credit float.

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 + grey 0.81

- Platform loans are typically 3-5 year **installment loans**
- With payments representing 7.5% of monthly income.
- Such payments are **very constraining**, given that most people spend 81% of income on the grey and yellow items.
- **At least in the U.S. context, the prior debt was much more flexible lines of credit.**

Macro: Aggregate risk

With digital re-financing:

- People are paying lower interest rates
- People have credit capacity slack, but with LESS 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.

Access to Credit

- Is digital finance just **replacing existing credit** or is it **expanding access**

Implications

1. Macro aggregate risk increases as the credit capacity increases by those who are already borrowing a lot
 - Re-ramping up traditional borrowing (in U.S. case, credit cards)
2. Macro risk is further exposed because little attention is being paid to whether the contract terms of digital finance are appropriate for the borrowers

Both of these points also suggest that the welfare of the borrower could be at risk

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

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

Take Away: The borrowers are not low income:

\$75,674 here >> \$52,000 median U.S. household income.

Rates are about 17% (with fee amortized in)... not terribly low for U.S.

Access to Credit

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2. Macro risk is further exposed because little attention is being paid to whether the contract terms of digital finance are appropriate for the borrowers
3. **At least in the U.S. model, digital finance is not reaching those who were shut out of finance prior to digital finance**
 - **“Democratization”?: not on borrower side.**

Maybe some structures are democratizing? Which structures, which loan contracts achieve that? Research!

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

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 platform lending;
 - This extra risk is priced
-
- Me: Is risk priced enough?
 - Recent struggles of some SME digital lenders
 - History of SME lending failure: How does platform resolve lack of recourse and ex post moral hazard?
 - Important area for research in what is working and what is not
..... & HOW TO USE DATA TO GET TO THIS SECTOR!



Outline

- i. Structures of Digital Finance Lenders
- ii. Access to Finance
- iii. Big Data: Information, Discrimination & Regulation

Lenders' Classic Tasks & Information

Screening

- More information should lead to improved access or price, overcoming problems of asymmetric information (Stiglitz Weiss)
 - Where “Information” = big data, mobile data, consumption, crowd
- Add in Signaling:
 - Can use of narratives text or other signals of quality (vouching by social networks or crowd) improve sorting

Monitoring

- How can information be used to price risk and control credit capacities overcoming ex post moral hazard?
- Note: Almost never done in digital lending (yet)
 - Ripe for experimentation

Data Use

Benefits of technology for providing loans:

- Use data measuring or proxying for credit worthiness to improve screening over and above traditional ways to assess default risk
- **What data are useful?**

Platform/mobile application data:

- Iyer, Khwaja, Luttmer Shue (2015): Is it possible for lenders to improve their screening over credit history scores using data collected on platforms? Yes

Peer-to-peer certification from “peer”:

- Is there wisdom in the crowd? (ie: community connections between investors and those wanting to borrow)
- Freedman and Jin (2014), Everett (2010)
 - When investor as lenders “endorse and bid” – big IRR improvement
 - But when investors just endorse without skin in the game, deceit

Peer-to-peer: wisdom in the crowd?

- 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, in U.S., P2P investors are hedge funds or similar
 - Platforms have to hold back a slice for retail investors so that they can still call themselves P2P
- My view is that “wisdom in the crowd” is not the right way to think about the future of digital lending except in very community settings
- More promising: Big data

Big Data: Narratives

Credit Profiling through Narratives

- Borrowers writing about themselves/ proposed use of loan to promote credit worthiness
- Herzenstein, Sonenshein and Dholakia (2011):
 - Investors react to narratives, but no effect in default...
 - Troubling: Narratives are bias investors
- Gao and Lin (2012): narratives are deceitful

Big Data: Local Economic Indicators

Credit Profiling through Local Economic Indicators...

- Data measuring how Local Economy is doing; relevant for borrowers income /ability to pay in future
- Crowe and Ramcharan, 2013: Lenders use of local geography indicators is profitable
- But...

Big Data: Discrimination

Credit Profiling through Discrimination

- Pope & Snyder – Racial statistical discrimination is profitable
- Crowe and Ramcharan, 2013: Lenders use of local geography indicators is both profitable and discriminates
- Discrimination is incredibly easy for lenders to do
 - Note: on peer-to-peer platforms, investors can also discriminate
 - Names, location, employer, etc.
- Incredibly hard to prevent digital lenders from discriminating (next slide)

Big Data: Regulation & Discrimination

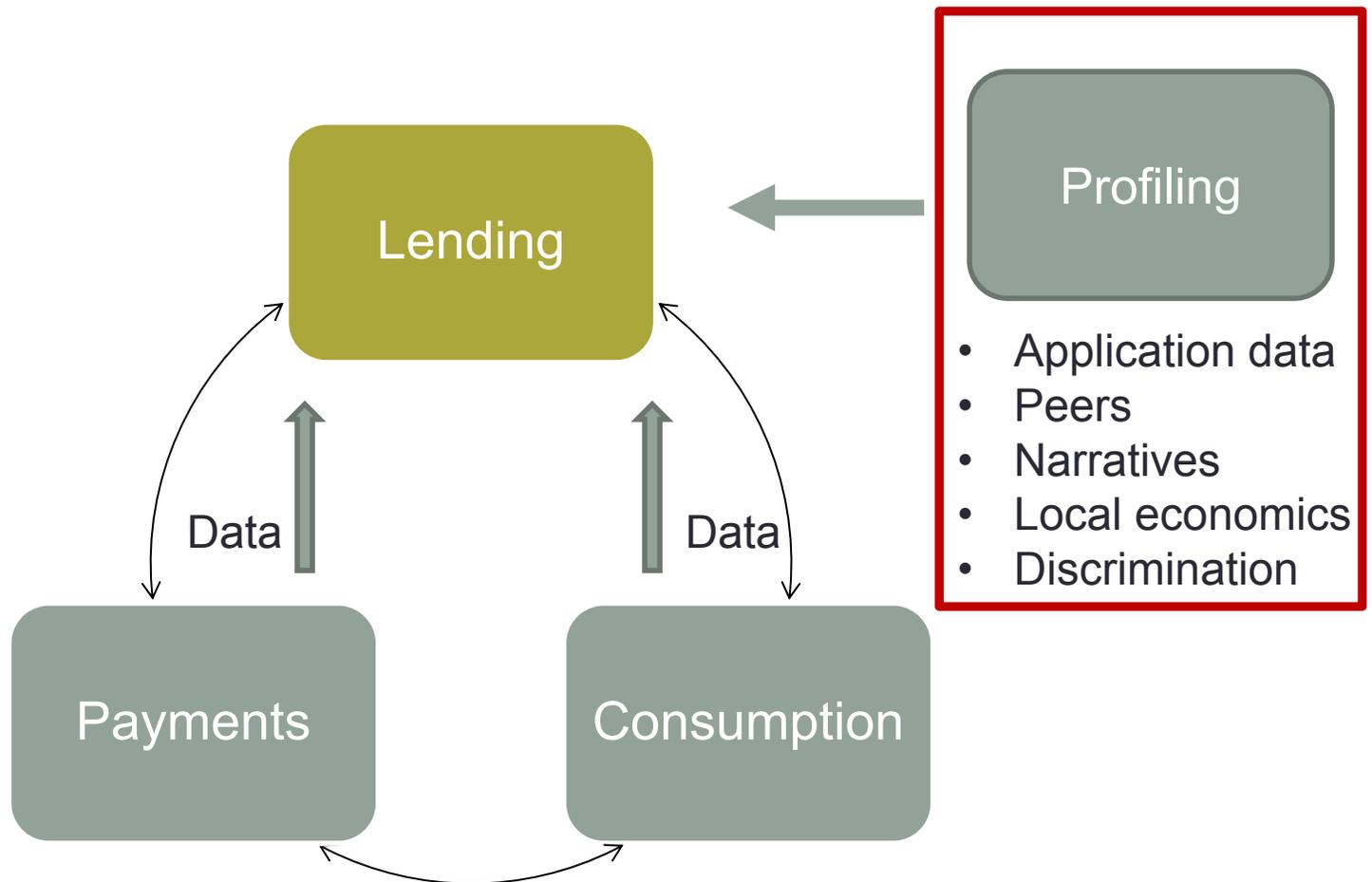
Regulator must set up testing of proprietary models

- Compliance, expertise?
- Not sufficient:
 - Proprietary model does not have ethnic group as variable
 - Or that model does not have ethnic group or location as variable

Rather

- Proprietary models must have zero correlation with ethnic group, once conditioned on other fundamental credit worthiness variables
 - What are the fundamental variables?
 - Really hard for lender to achieve this even if innocent

Prime area for observational study research



We looked at profiling...

but there is a lot more data (and will increasingly be more) in the circle

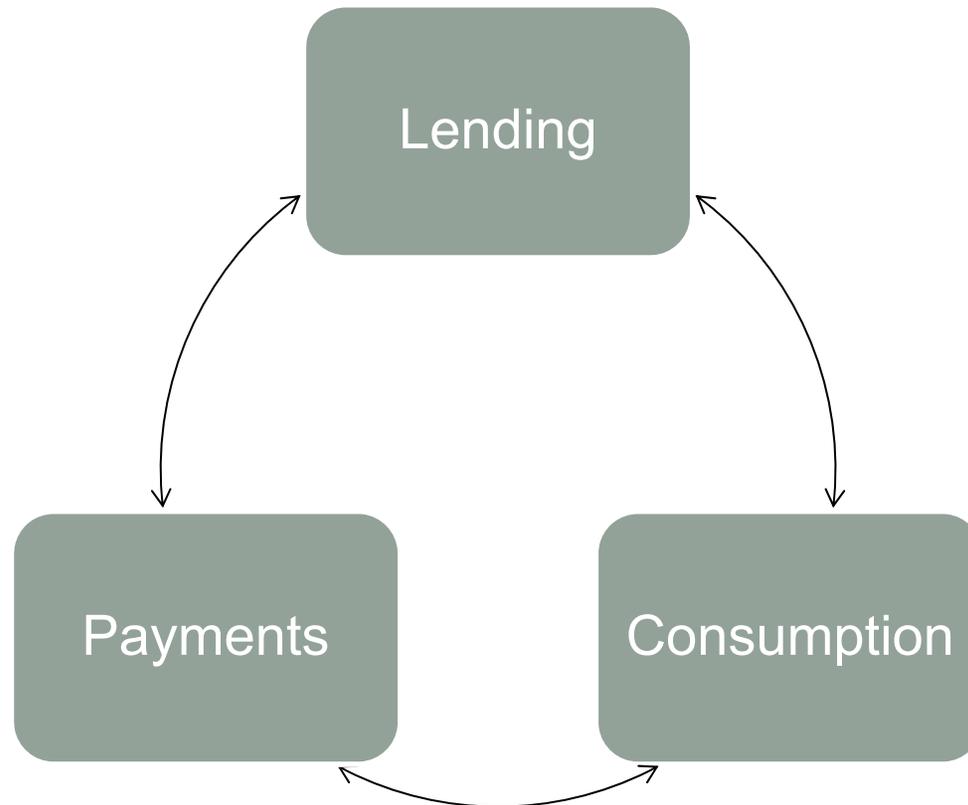
The future of data and credit

- As a lender, I can assess your credit worthiness based on:
 1. Information on **consumption items**:
 - Vissing-Jorgensen (2012): studies Mexican households and can credit profile individuals based on what goods they buy
 - Easy to imagine credit monitoring SME based on whether they are buying input items into production versus pure consumption
 2. Information in **payments**
 - Mobile doing this on consumer and small business (trade credit)
 - Mastercard ,Paypal – paycredit , Alipay - ANT – Alibaba
 3. The **credit worthiness of your Facebook network** (Lin, Prabhala, and Viswanathan 2013)
 4. Your **browser search history**. Did you do searches for a new job? Did you search for terms akin to bankruptcy?
 5. Your **location tracking**

What kinds of things regulators need to consider in Big Data usage

- **Monopoly power**
 - What is the advantage of proprietary datasets in terms of spread in better prediction models
 - Can other data correlate sufficiently to generate competition versus regulation have to “share” credit worthiness screening & monitoring
 - Opportunities for collusion and corruption
- **Distribution of who wins / who loses on borrower side**
 - Big data use is surely regressive and not pareto
 - Financial inclusion (defined as having credit) is pitched a bit too strongly as always optimal
- **Indentured servitude**
 - As more technology connects all of personal finances, freedom from debt servitude becomes a question worth answering
- **Discrimination!**

Actually, this is a picture of Alibaba in China.



Who is the natural monopoly of the future?

Google? Facebook? Digital Financial Planning Tools?

Payments land mobile transfer like Mastercard, Paypal, M-Pesa?

Consumption like Amazon , Uber, your car?

Digitization: Disruption?

- What has digitization accomplished?
 - Pooled more information from the Crowd / Peers? Maybe, but future is more about social media peers than communities in most (not all) places
 - Pooled more information from Big Data? Surely
 - Increased access to finance? Depends on where
 - Disintermediation? Yes but now re-intermediating
- Evolution not disruption:
 - In many contexts: Future is more about the integration of digital finance networks into traditional banking and consumption than about disrupting markets
 - OnDeck relationship with J.P. Morgan Chase
 - My question to startup would-be (U.S.) founders is always:
 - What does the next network look like, the next data linkage?
 - Not anymore: what is the newest lending portal

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- i. Structures of Digital Finance Lenders
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- iii. Big Data: Information, Discrimination & Regulation
- iv. **Equity Innovation Platforms**
Can Digital Finance bring capital to Innovation Economy startups?
 - Important: The innovation economy is funded by payoff structures expecting 90% failure
 - This means payoff to investors must be incredibly high in the 10% of entrepreneurial successes....
 - Cannot achieve in debt.
 - Must be equity product

Types of Crowdfunding

1. **Digital Lending**
 - Consumer loans & Small business loans
 - Important sectors, but not structured to fund innovation
2. **Donation/ philanthropy**: not structured for innovation
3. **Rewards**: (examples: indiegogo, kickstarter)
 - Idea: crowd “invests” for product reward
 - Main purpose: market research
 - Successful campaign generates spin for founders and facilitates future fundraising,
 - The marketing research platforms become (very) important paths of access to equity finance
4. **Equity Crowdfunding** (examples: AngelList, CircleUp, Seedrs)
 - Crowd can buy equity (like stock) in non-publicly-traded startups

Equity Crowdfunding: Issues for implementing in developing/emerging markets (or any new markets)

3. Rewards

- Success depends on existence of funding when entrepreneurs have successful “kickstarter campaigns”
- Success depends on control of fraud

4. Equity Crowdfunding Issues: The innovation economy depends on:

1. The value-added (strategy, networks, labor) of VCs & angel investors
 - Digital-based equity finance generally works only for startups not needing these value-add.
 - e.g., real estate development, gaming, known entities
 - Promising models are those that combine platform equity fundraising with an “angel” expertise (sometimes called syndicates)
2. Having exit possibilities for equity investors
3. A tolerance for failure
 - By labor market, by governments, by investors