Fintech Lending: Financial Inclusion, Risk Pricing, and Alternative Information

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The Roles of Alternative Data and Machine Learning in Fintech Lending: Evidence from the LendingClub Consumer Platform

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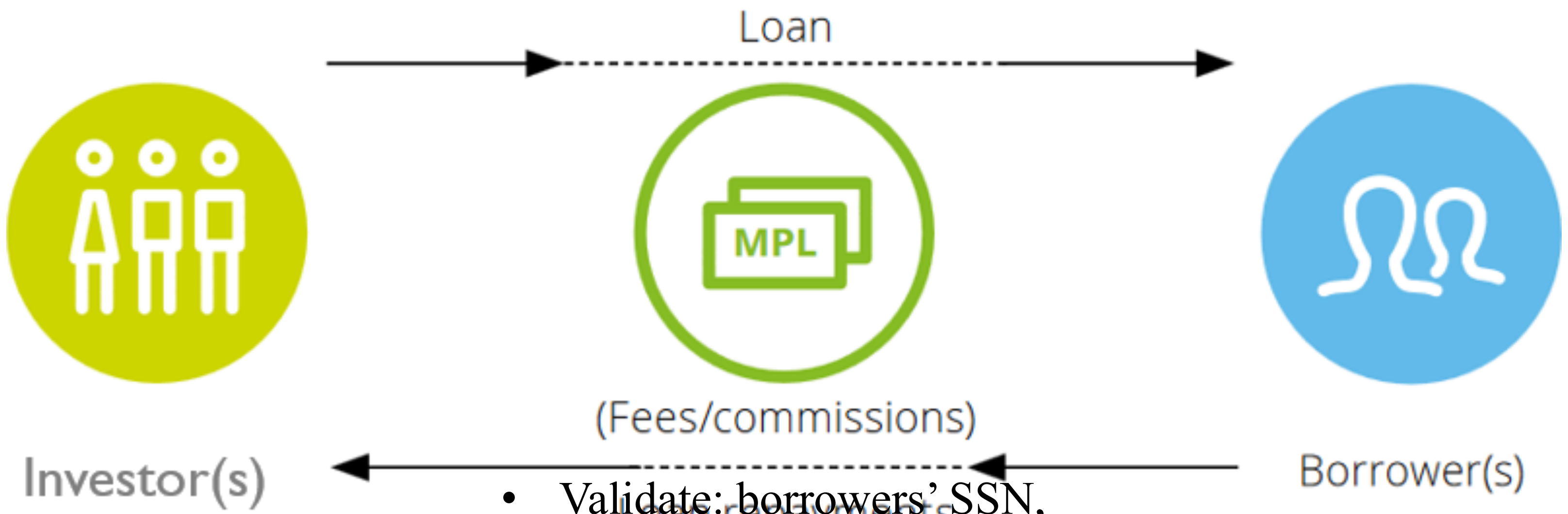
WHAT IS P2P MARKETPLACE?



- Obtain borrowers' information both validated and not.
- Obtain interest rate.
- Make lending decision
- Transfer funds

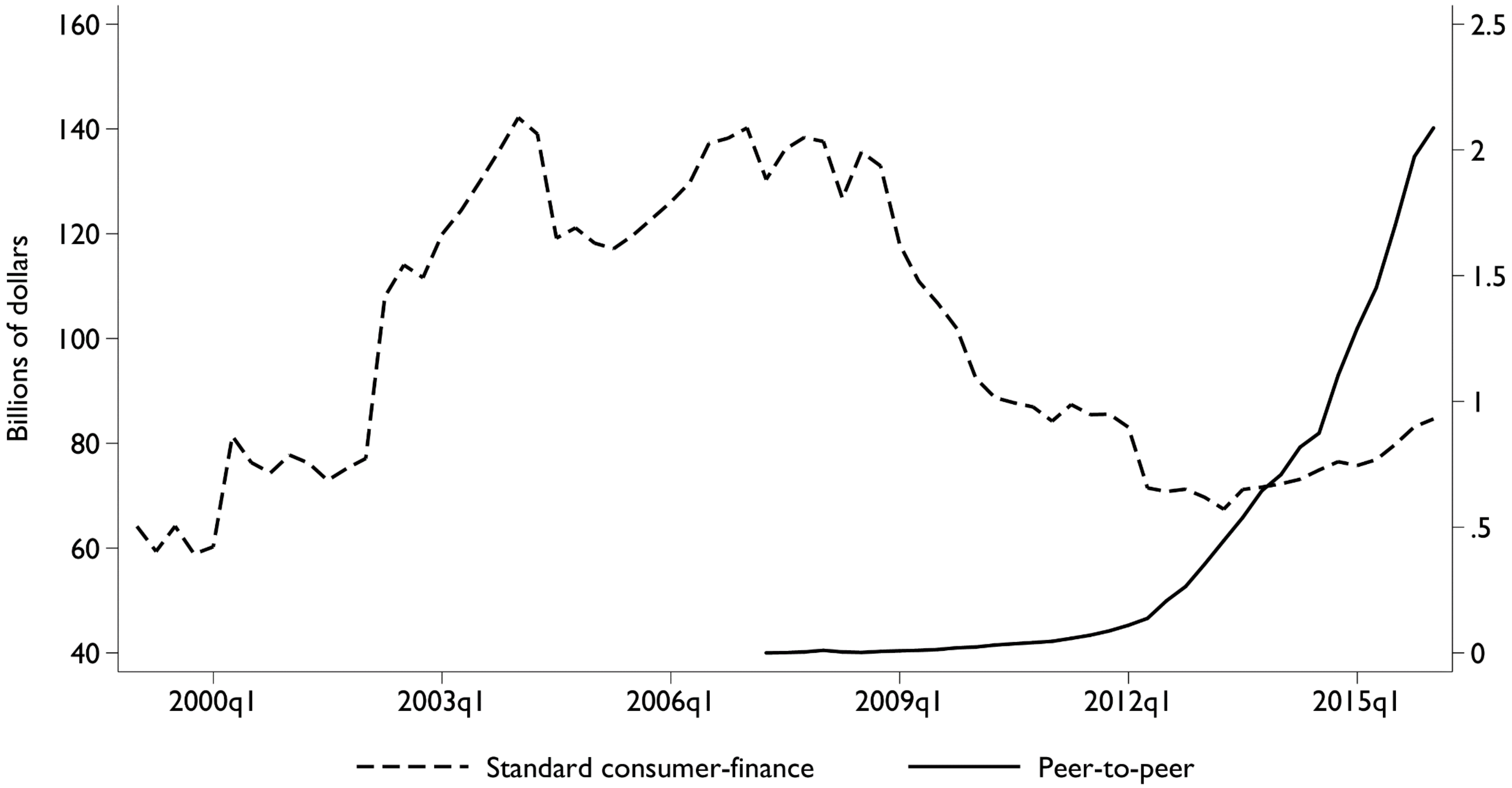
- Validate: borrowers' SSN, drivers license, bank account info, FICO score.
- Collect additional borrower information.
- Provide/compute credit rating for each borrower
- Assign interest rate to each rating
- Administer loan payments

To apply for P2P loan
- Provide: SSN, drivers license, bank account, credit score.
- Provide additional data requested by platform.
- Agree to interest rate assigned by platform.

P2P Industry: advantages

- a fundamentally lower-cost operating model
- an ability to use public data to (safely) overcome incumbents' data advantage in scoring risk, potentially going on to achieve better risk-pricing by taking a more agile 'Big Data'-based approach
- a superior customer (borrower) experience, driven by speed and convenience
- an ability to better absorb and diversify risk by matching the appetite of borrowers and investors for both risk and duration.

P2P Industry: LendingClub



What fuels this growth?

- Institutional investor participation
  - Hedge funds
  - Private equity funds
  - 2016: Estimated to be <u>at least 80%</u> of the funded loans

- Technology development
  - “Robo-advisors” in P2P space
    - From small portfolio firms (>$20,000) to large institutional lenders (>$5,000,000)
    - Lending Club and Prosper have their own robo-advisory platforms

- Securitization
  - In 2013 NYC based Eaglewood Capital closed $53 million deal
  - 2016, more than 60 P2P loan securitization deals were registered.
  - In Q2 of 2017, the deal volume reached $3 billion or 80% year-to-year growth.

- Weak regulatory oversight

P2P vs Credit Card Debt: Marketing Pitch

- P2P credit
  - Term loans
  - (Relatively low) interest rate due to better risk assessment
  - Non-collateralized (unsecured)

- Ideal source of funds to refinance credit card debt
  - Revolving credit
  - Most expensive form of consumer debt
  - Non-collateralized (unsecured)

- About 80% of Lending Club loans are self-reported to be used for refinancing and debt consolidation purposes

P2P vs Credit Card Debt Marketing

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Focus of this study:

LendingClub

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LendingClub Credit Ratings (Grades)

- Uses all customer supplied data as well as alternative data (proprietary) to form
  - 8 core categories and 35 sub-categories of borrower credit ratings
- Assigns *progressive loan prices* for each of those categories
  - Fixed prices at any point of time;
  - Macro-economic events and changes in LC credit policies lead to shift in price schedules;
  - Shifts are infrequent.

Core Questions (as stated in the paper)

- LendingClub used alternative data and ML analysis to assess risk
  1. What is the dynamic of using alternative data in risk scoring?
  2. Is LC risk scoring effective/appropriate?
  3. Is it better than traditional FICO scores?
     - Does it capture risk better?
  4. Does it allow better risk pricing?
     - And maybe lead to Cheaper credit for borrowers?

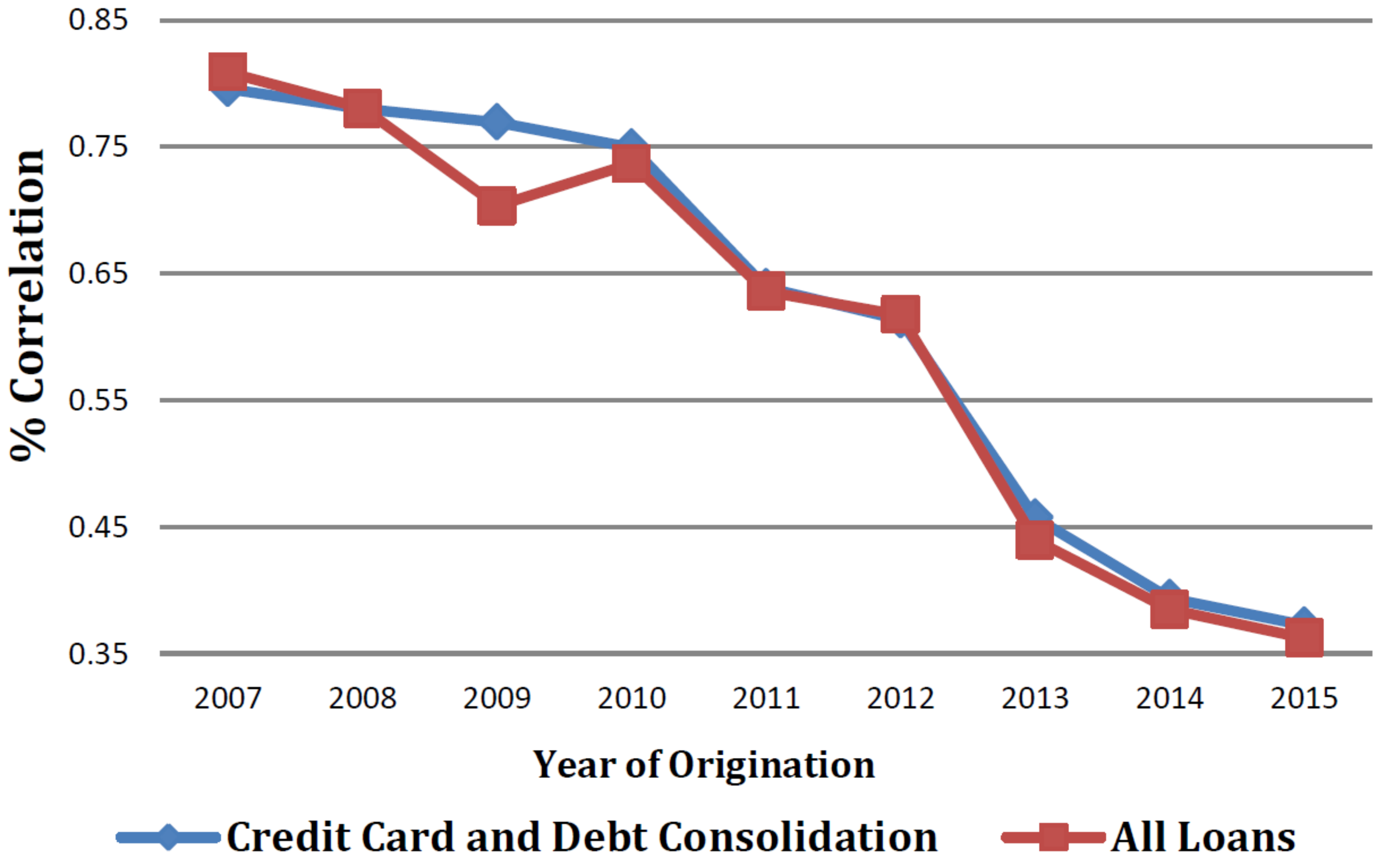
Core Conclusions of This Paper

- LendingClub
  - interest rate spreads are correlated with LendingClub rating grades, and loan performance;
  - the rating LC grades perform well in predicting loan performance over the two years after origination;
  - some LC "subprime" borrowers are slotted into "better" loan grades, which allowed them to get lower priced credit.
- As compared to credit cards (Y-14M)
  - the correlations between the rating grades and FICO scores have declined from about 80 percent (2007) to only about 35 percent (2014–2015),
  - the same risk of default (FICO), consumers pay smaller spreads on loans from LendingClub than from credit card borrowing.

What is the dynamic of using alternative data in risk scoring?

<u>Authors conclusion</u>: LendingClub progressively uses more and more alternative data in their risk assessment of borrowers.

Figure 1. Correlation Between Origination FICO and Rating Grade Assigned by LendingClub



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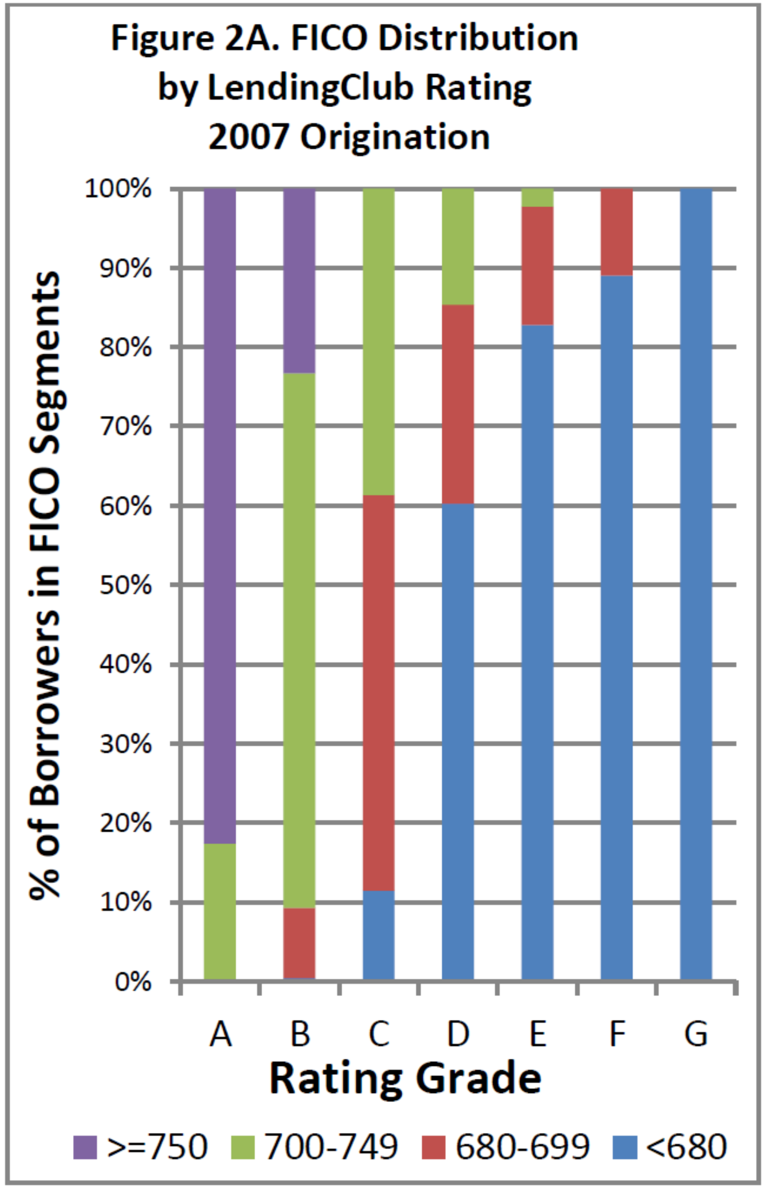
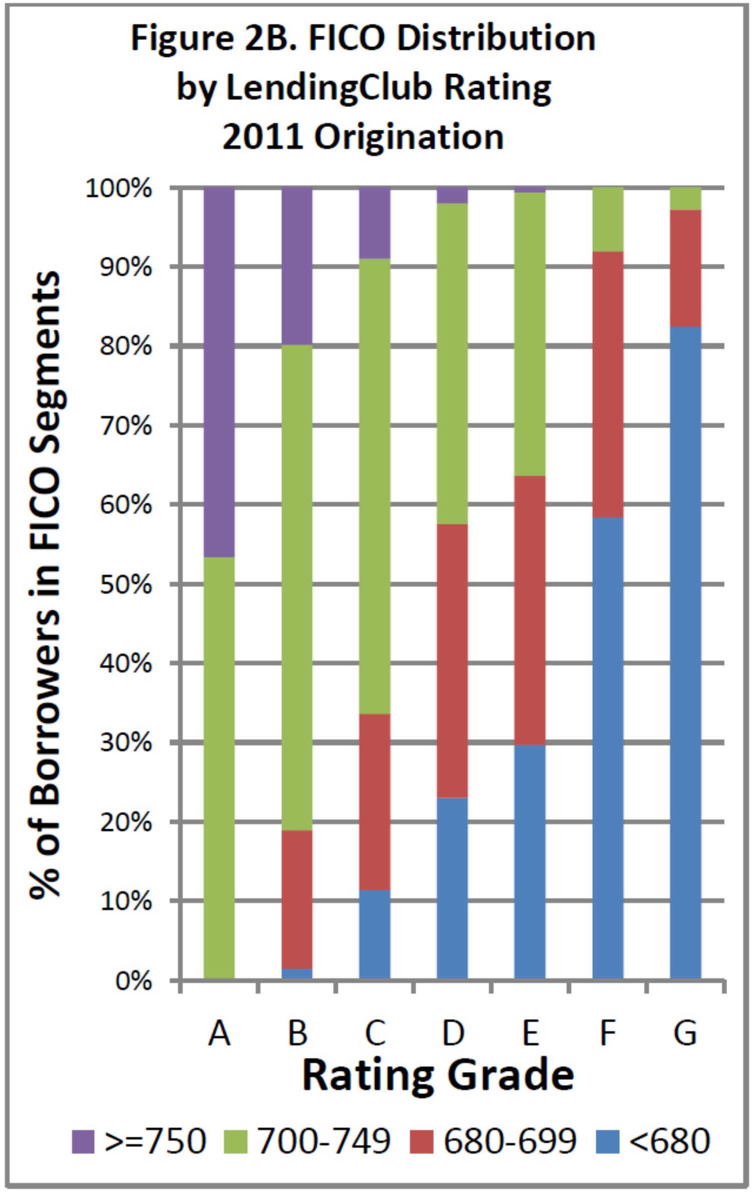
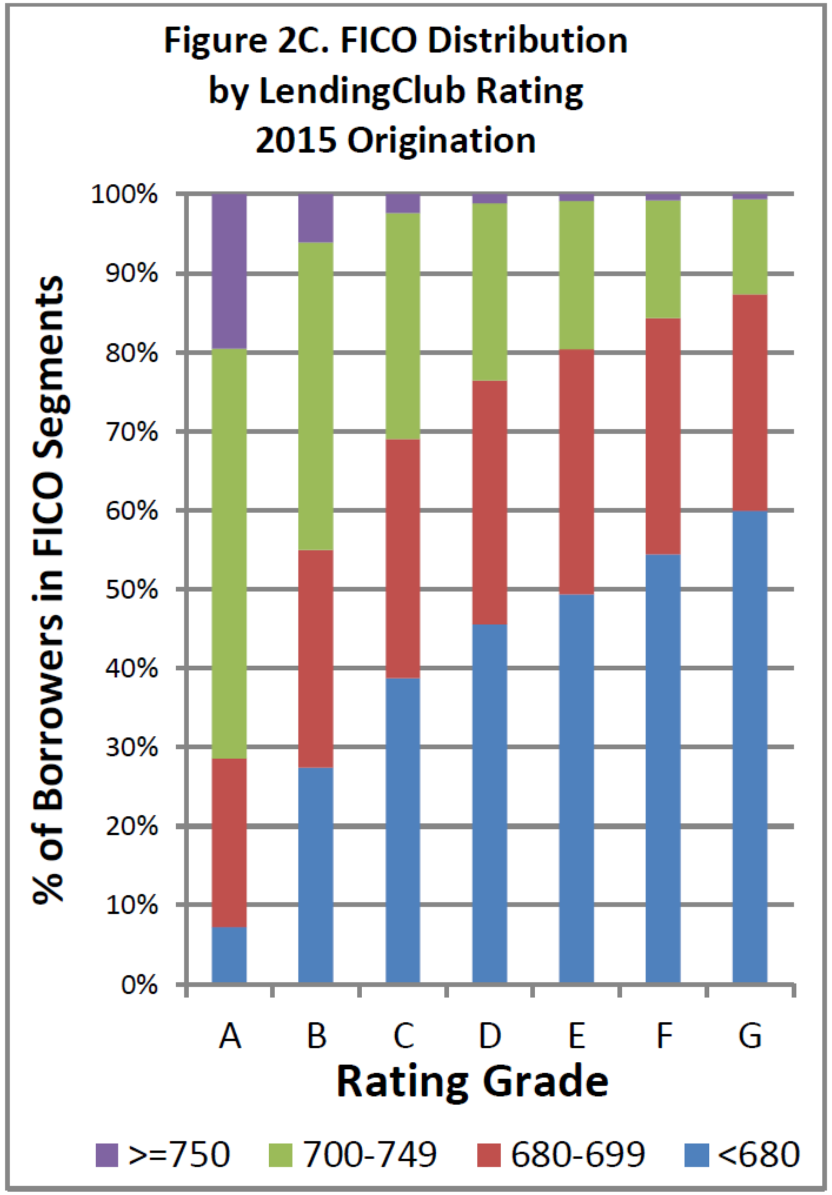
What is the dynamic of using alternative data in risk scoring?







Question

- 1 point change in credit rating vs 1 (or 20) point change in FICO

- **2007**

  - Corr = 1

- **2014**

  - Corr <1
- Solution: multinomial logit ML fit?

Are LendingCLub credit ratings appropriate?

Figure 4A. Probability of being ≥60 DPD Within 24 Months After Origination — For Loans Originated in 2014–2015 With FICO Score <680 Only

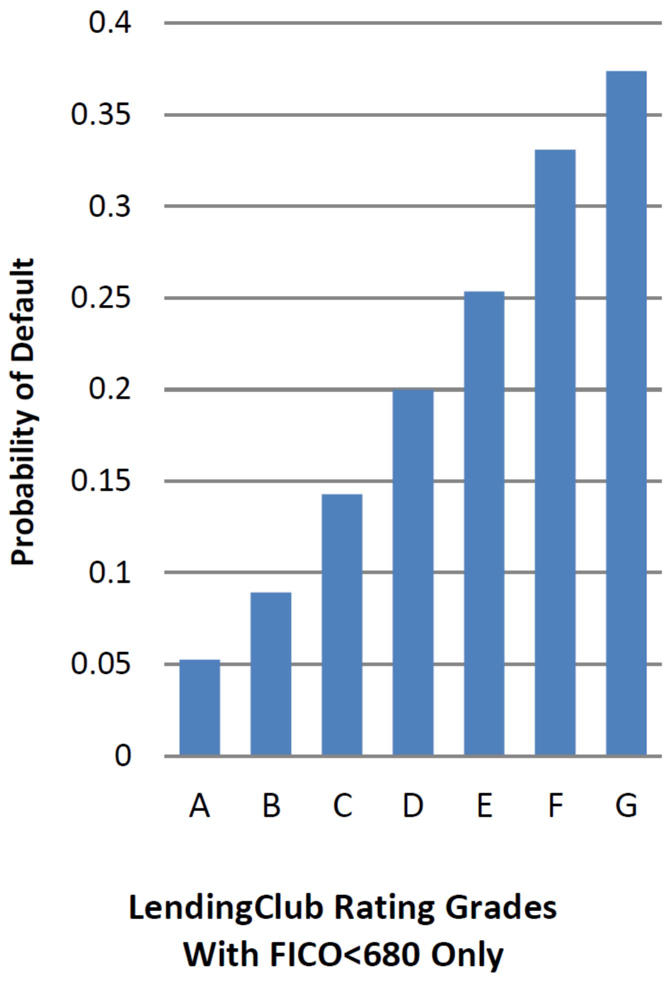
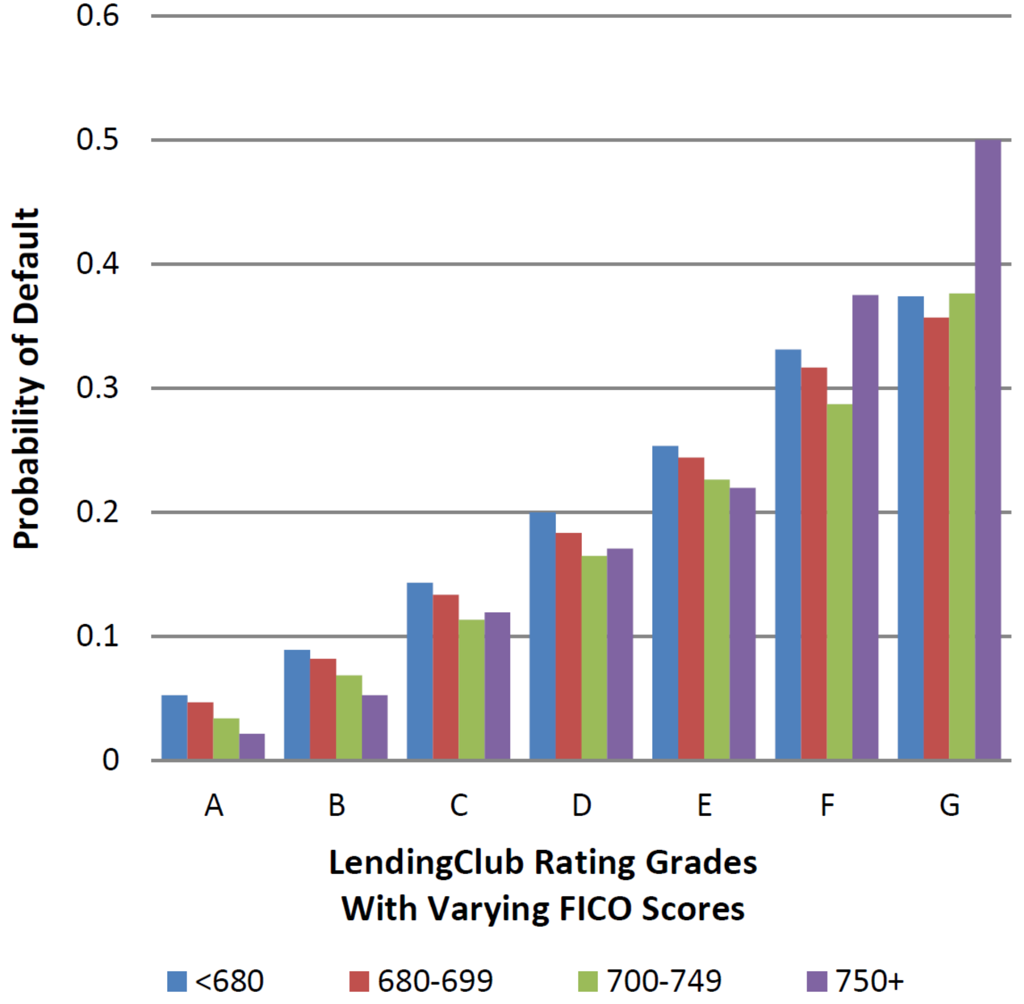


Figure 4B. Probability of being ≥60 DPD Within 24 Months After Origination — For Loans Originated in 2014–2015 — By Credit Scores and Rating Grades



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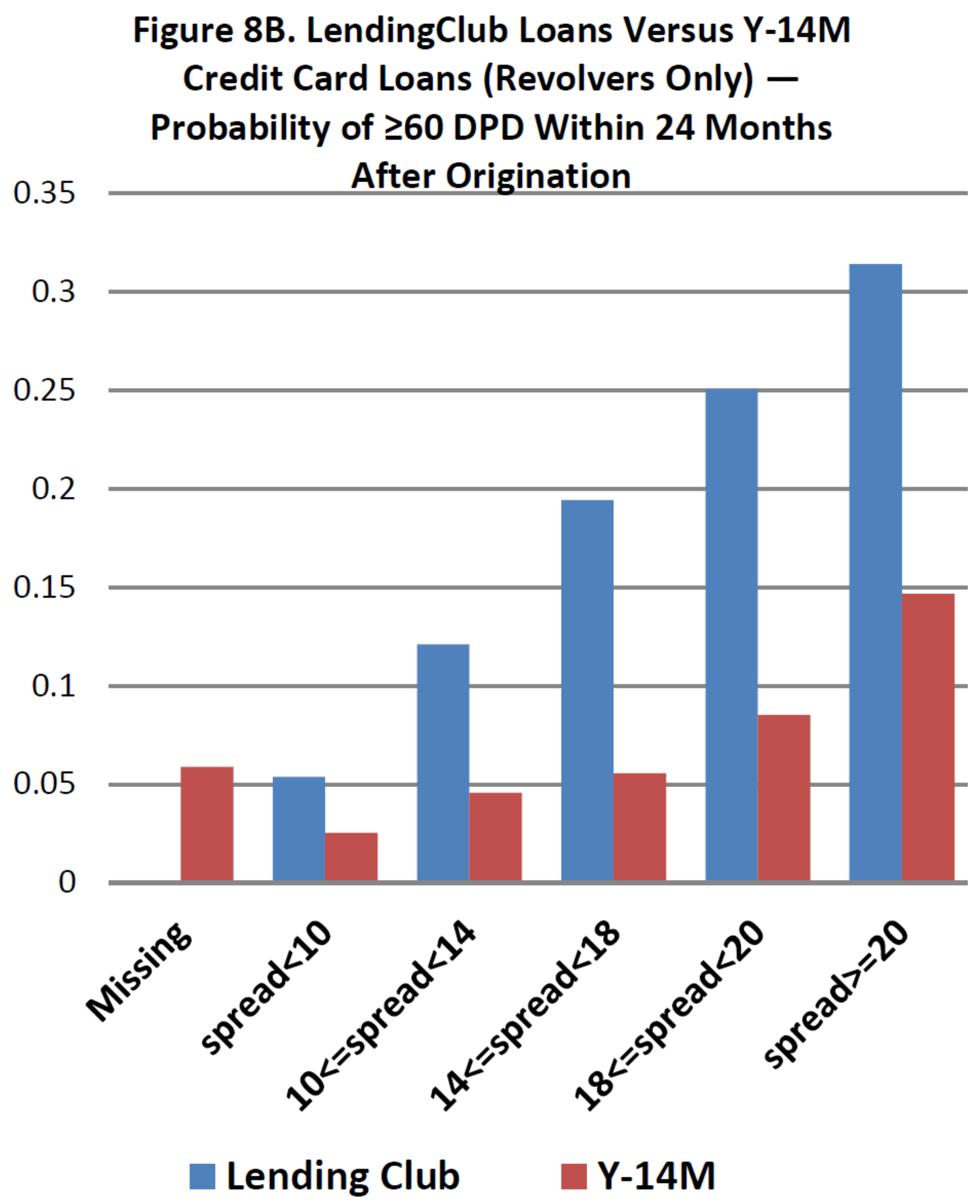
Pricing of Loans

- Authors interpretation:
  - Lending Club offers more attractive rates given default
- Alternative interpretation:
  - LendingClub underprices risk



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Taking on Excessive Risks?

- Late 2016: Moody's put bonds backed by **Prosper** originated loans on watch for a downgrade. The reviews for downgrade were prompted by a faster than expected buildup of delinquencies and charge-offs.

- Early 2017: Citigroup, that repackage roughly $1.5bn of **Prosper's** loans into securities, severed their partnership.

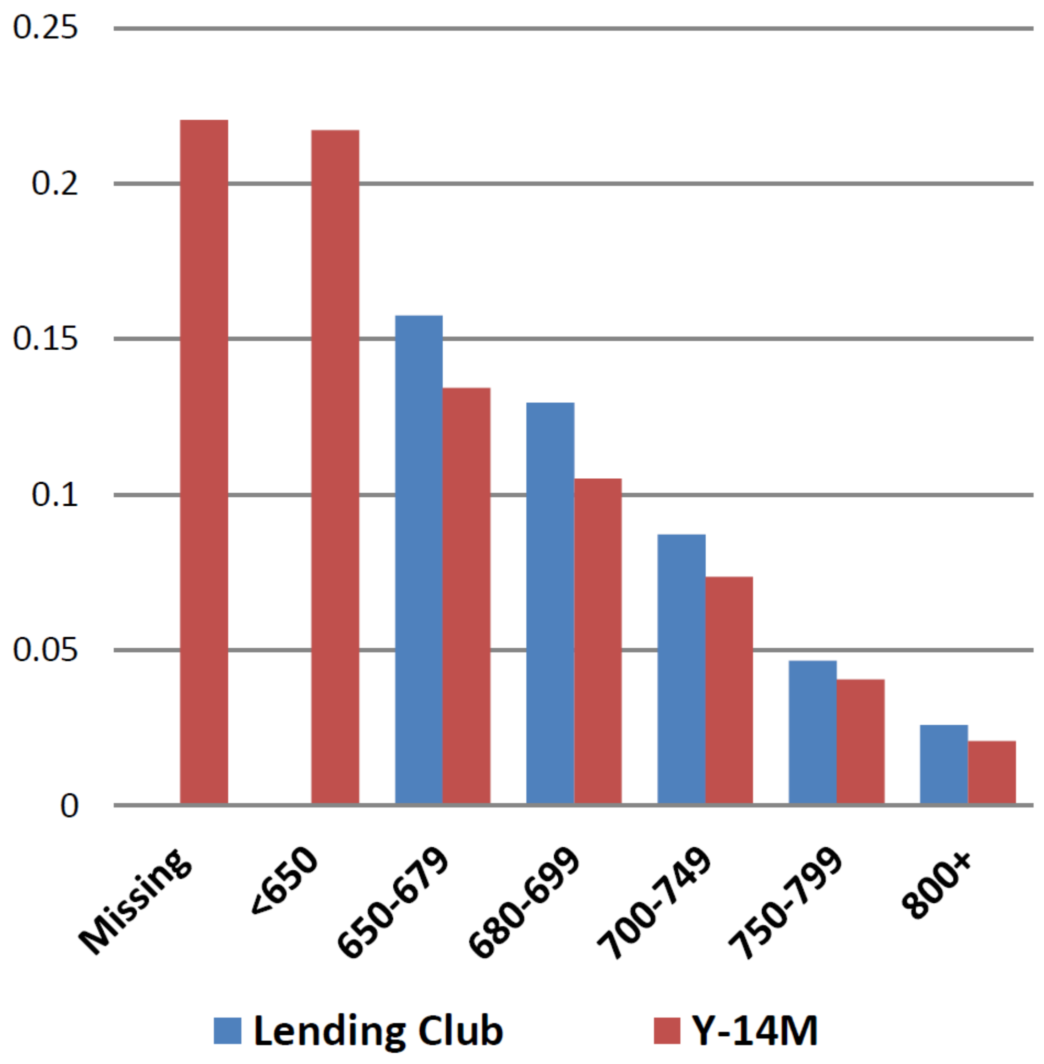
- November 2017: **LendingClub** announced that the delinquencies and charge-offs in their portfolio exceeds expectations and it would tighten their lending standards.

FICO vs LC Credit Rating

- LendingClub pitch: FICO misclassifies borrowers. We originate loans to customers that look much riskier in terms of FICO score than they really are.

- But…
  - LC loans exhibits higher defaults conditional on FICO score

Figure 10B. LendingClub Versus Y-14M Cards (Revolvers Only) — Probability of ≥60 DPD Within 24 Mos — by FICO Scores



LC Loans vs Credit Card Loans: Fair Comparison?

Lending Club Loans	Credit Card Loans
Term loans	Revolvers
Fixed amount upfront	Credit limit
Fixed repayment schedule	No repayment schedule
Easy to detect PD accounts	No repayment for 60 days <> 60 days PD if minimum payments are met

Evidence Taken in Totality

- Does alternative data offer incremental information to price/assess risk?
  - …
- Do LC credit rating grades reflect more accurate risk assessment?
  - …
- Can we run a horse race between FICOs and LC credit ratings?
  - Table 2

Is Risk Priced Properly: FICO vs LC Credit Rating?

	Credit Spread
D(Default within 24-Mo After Origination)	0.2197*** (0.0001)
D(2014-15)*D(Default within 24-Mo)	–0.0979*** (0.0001)
D(Rating Grade B)	3.2572*** (0.0001)
D(Rating Grade C)	6.3532*** (0.0001)
D(Rating Grade D)	9.4415*** (0.0001)
D(Rating Grade E)	12.1488*** (0.0001)
D(Rating Grade F)	15.8618*** (0.0001)
D(Rating Grade G)	18.1991*** (0.0001)
Adjusted R2	93.42%
Observation Number(N)	663,576

0.22< 1.35
Conclusion
LC grades better predictors of risk

	Credit Spread
D(Default within 24-Mo After Origination)	1.3499*** (0.0001)
D(2014-15)*D(Default within 24-Mo After Origination)	0.3387*** (0.0001)
D(650<FICO <680)	6.0992*** (0.0001)
D(680<FICO <700)	4.8362*** (0.0001)
D(700<FICO<750)	2.9388*** (0.0001)
D(750<FICO<800)	0.6505*** (0.0001)
Adjusted R2	34.25%
Observation Number(N)	663,576

Questions

- Fair game?
  - 4 buckets of FICO scores vs 8 LC credit ratings?
  - Why not use continuous FICO score and its polynomial?
- Predicting prices
  - At any point of time LC credit scored should predict LC loan prices completely
  - Are FICOs and LC credit ratings comparable over time?
- Proper LHS variable?
  - Should we put defaults on LHS?
  - Explore whether LC credit rating predict defaults better than FICOs?

Core Conclusions of This Paper

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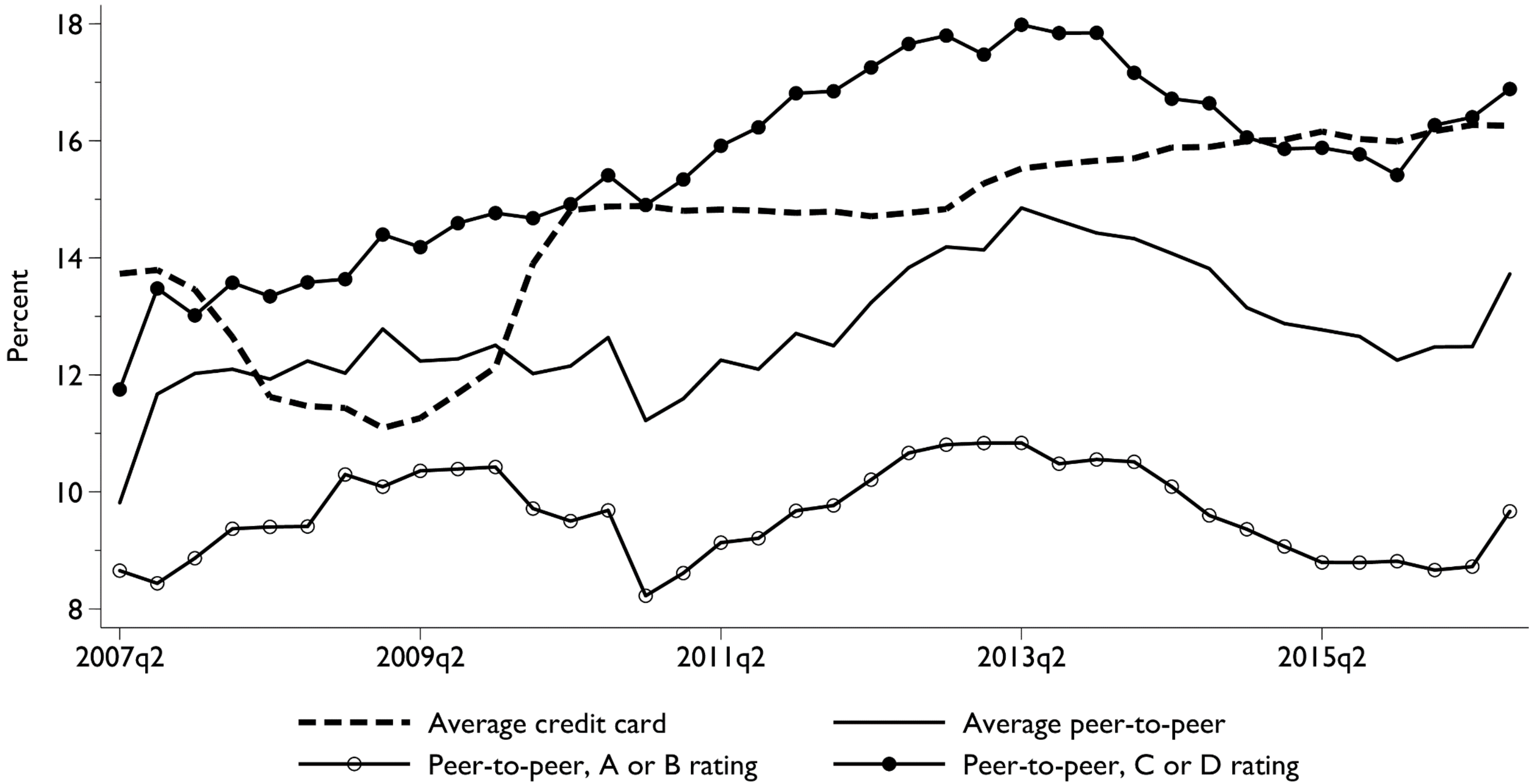
Conclusion

- Interesting area of research: we need more fundamental analysis here.
- Would love to see:
  - Discussion how LC credit ratings are related to loan prices
  - More intricate analysis of correlation between FICO and LC credit ratings
  - Are higher defaults indicative of better prices or excessive risk-taking by LC?
  - What predicts risk (defaults) better: horse race between LC credit ratings and FICO scores
    - 4 point FICO buckets vs 35 credit risk sub-categories

- Bigger question for follow up work: what is the effect on borrowers?

Cheap Refinancing



P2P vs Credit cards

Deai

Getting the money you need through Prosper couldn't be easier. You're already pre-approved for a personal loan, and it's easy, fast and free to apply. Here's how it works:

1. Choose the amount you need — from $2,000 up to $35,000

Your monthly payment stays the same[3] with **no surprises or hidden fees**. Your loan will be fully paid at the end of 3 or 5 years,[2] and you'll never be penalized for paying it off early.

2. Check your rate before you decide — it won't affect your credit score

Simply visit **SaveWithProsper.com** and enter your Confirmation Number to request your cash. Your low FIXED rate won't change over the life of your loan. That could **save you thousands in interest** compared with high-rate credit cards.

3. Get your money in as few as 3 days

You could have your cash within days, **deposited directly into your account**. There's no need to go to a bank and wait weeks for a decision — our investors are ready to help you meet your financial goals when you are.

That's it! You can use the money to pay off credit cards, make home improvements, or even start a business. Why wait? Request your money today — you'll be glad you did.

Sincerely,

Chris Lawson
Vice President, Borrower Services

You're pre-approved

- Save thousands in interest
- Lock in a low FIXED rate

University of Virginia
Darden School of Business

Cheap Refinancing?

- APR by Prosper Rating Range from **5.99% (AA) to 36.0% (HR)** for first-time borrowers…. Loan origination fees vary from **1%-5%** of loan amount…. Between April 1, 2016 and March 31, 207 the average three-year loan rate presented to other preapproved applicants <u>was **15.2% (18.7% APR).**</u>