Can Credit Rating Affect Credit Risk?
Causal Evidence from an Online Lending Marketplace

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University of Michigan, Ross School of Business

October 5, 2023
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Research Question and Motivation

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- Theoretical literature of coordination, feedback, and regulatory effects of corporate credit reporting.
- There is variation in credit reporting among equivalently creditworthy borrowers.
  - 2012 FTC Consumer Credit Audit showed widespread reporting errors by credit bureaus.
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Question: How does credit reporting impact credit risk for household borrowers?

Research Motivations:

- Theoretical literature of coordination, feedback, and regulatory effects of corporate credit reporting

- There is variation in credit reporting among equivalently creditworthy borrowers
  - 2012 FTC Consumer Credit Audit showed widespread reporting errors by credit bureaus
  - Equifax recently sent incorrect household credit scores to lenders
Equifax Sent Lenders Inaccurate Credit Scores on Millions of Consumers

During a three-week period this year, Equifax sent faulty scores to lenders, resulting in higher interest rates and denied applications.

By Andrew Ackerman and AnnaMaria Andriotis

Aug. 2, 2022 3:11 pm ET
Identification of Credit Rating Variation

- Identifying exogenous variation in borrower credit reporting is challenging
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- Utilize CARES Act passage on March 25th, 2020 which retroactively mandated borrowers starting forbearance plans January 31st, 2020 or later be reported “current” to credit bureaus.
Preview of Findings

- Borrowers who entered forbearance immediately after January 31st experienced a 40% lower default rate compared to borrowers who entered forbearance before January 31st.
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- Negative credit report shock $\rightarrow$ Credit Score $\downarrow$ $\rightarrow$ Default $\uparrow$.
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- Negative credit report shock $\rightarrow$ Credit Score ↓ $\rightarrow$ Default ↑

- Effects concentrated in ex-ante relatively higher quality borrowers

- Suggestive evidence borrowers lost access to external financing
Research Setting

- Detailed personal loan data from the online lender LendingClub
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- Households request borrowed funds primarily for debt consolidation with three or five-year amortization schedules
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- Households request borrowed funds primarily for debt consolidation with three or five-year amortization schedules

- LendingClub offers “hardship” forbearance when borrowers face financial difficulties

- How do “hardship plans” work?
Visual Explanation of Identification
Visual Explanation of Identification

Number of Loans on Hardship Each Month

WHO Declares World Pandemic

<table>
<thead>
<tr>
<th>Date</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dec 19</td>
<td>0</td>
</tr>
<tr>
<td>Jan 20</td>
<td>0</td>
</tr>
<tr>
<td>Feb 20</td>
<td>0</td>
</tr>
<tr>
<td>Mar 20</td>
<td>0</td>
</tr>
<tr>
<td>Apr 20</td>
<td>5000</td>
</tr>
</tbody>
</table>
Treatment and Control Covariate Match
Treatment and Control Covariate Match

- **Loan Grade**
- **Origination FICO**
- **Home Ownership**
- **Income Verification**
- **Loan Term in Months**
- **Employed 10+ Years**

Charts show distributions across different categories.

- **Control** and **Treatment** categories are compared.

Data visualizations are provided for each category.
Cumulative Borrower Default within 10 Months of Hardship

% Defaulted

Control

Treatment

Months Since Hardship Start

0
1
2
3
4
5
6
7
8
9
10

% Defaulted

0
20
40
60
80
Credit Score Evolution
Credit Score Evolution

![Credit Score Evolution Graph]

The graph illustrates the evolution of credit scores over time since a hardship start. It compares two groups: Control and Treatment. The mean FICO scores decrease over time for both groups, with the Treatment group showing a more pronounced decrease than the Control group. The x-axis represents months since hardship start, ranging from -10 to 10, and the y-axis shows mean borrower FICO scores, ranging from 600 to 700.
Credit Score Channel, Two-Stage Least Squares of Cumulative Default
Credit Score Channel, Two-Stage Least Squares of Cumulative Default

\[
Default_{i,s} = \alpha + \beta_1 \mathbb{1}(Fico\_Change_i) + \beta_2 Borrower\_Traits_i + \\
\beta_3 Loan\_Features_i + \beta_4 Local\_Controls_s + \epsilon_{i,s}
\]

\(Default_{i,s}\) : Default within 10 Months of Entering Hardship,
\(i\) : borrower,
\(s\) : state,
\(Fico\_Change_i\) instrumented by \(\mathbb{1}(Treatment_i)\)
## Credit Score Channel, Two-Stage Least Squares of Cumulative Default

### Table:

<table>
<thead>
<tr>
<th>Dependent variable:</th>
<th>Treatment</th>
<th>Default IV</th>
<th>Default IV</th>
<th>Default IV</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
</tr>
<tr>
<td>log(FICO_{t+4}/FICO_{t-1})</td>
<td>0.303***</td>
<td>−0.767***</td>
<td>−0.566***</td>
<td>−0.681***</td>
</tr>
<tr>
<td></td>
<td>(0.077)</td>
<td>(0.186)</td>
<td>(0.187)</td>
<td>(0.167)</td>
</tr>
<tr>
<td>Constant</td>
<td>−0.077*</td>
<td>0.550***</td>
<td>2.468***</td>
<td>2.402***</td>
</tr>
<tr>
<td></td>
<td>(0.042)</td>
<td>(0.026)</td>
<td>(0.548)</td>
<td>(0.591)</td>
</tr>
</tbody>
</table>

Extensive Borrower Controls: ×
State Fixed Effects: ×
Observations: 777
F Statistic: 13.769*** (df = 1; 775)

*Note:*

* p<0.1; ** p<0.05; *** p<0.01
Borrower Loan Balance over Time
Borrower Loan Balance over Time

Mean Borrower Outstanding Loan Principal ($)

Control  Treatment

Months Since Hardship Start

-10  -9  -8  -7  -6  -5  -4  -3  -2  -1  0  1  2  3  4  5  6  7  8  9  10
Robustness Test
Robustness Test

Number of Loans on Hardship Each Month

Count

Dec 19
Jan 20
Feb 20
Mar 20
Apr 20
date

WHO Declares World Pandemic
CARES Act Passed
Hardship Borrowers not Reported Late After this Date
Control Borrowers
Treatment Borrowers

0
5,000
10,000
15,000
20,000
Robustness Test

Table: Cumulative Default with Non-Hardship Borrowers

<table>
<thead>
<tr>
<th></th>
<th>Default logistic</th>
<th>Default conditional logistic</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>Hardship Dummy</td>
<td>23.559***</td>
<td>28.239***</td>
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<tr>
<td></td>
<td>(0.192)</td>
<td>(0.203)</td>
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<tr>
<td>Post January Dummy</td>
<td>1.409</td>
<td>1.356</td>
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<tr>
<td></td>
<td>(0.306)</td>
<td>(0.312)</td>
</tr>
<tr>
<td>Hardship Dummy * Post January Dummy</td>
<td>0.275***</td>
<td>0.276***</td>
</tr>
<tr>
<td></td>
<td>(0.350)</td>
<td>(0.358)</td>
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<tr>
<td>Interest Rate</td>
<td>1.088***</td>
<td>1.081**</td>
</tr>
<tr>
<td></td>
<td>(0.033)</td>
<td>(0.034)</td>
</tr>
<tr>
<td>Loan Amount (000s)</td>
<td>1.021**</td>
<td>1.017**</td>
</tr>
<tr>
<td></td>
<td>(0.008)</td>
<td>(0.008)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.066***</td>
<td>0.011***</td>
</tr>
<tr>
<td></td>
<td>(0.172)</td>
<td>(0.778)</td>
</tr>
<tr>
<td>Conditional Logit by State</td>
<td>×</td>
<td></td>
</tr>
<tr>
<td>Extensive Borrower Controls</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>Observations</td>
<td>1,556</td>
<td>1,556</td>
</tr>
</tbody>
</table>

Note: *p<0.1; **p<0.05; ***p<0.01
Cross-Sectional Tests

- Default and credit score drop concentrated in ex-ante higher quality borrowers, suggesting external financing coordination frictions
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- Effects not stronger in sub-samples of borrowers who are renters, unemployed, or have high levels of ex-ante debt
Further Questions and Research

▶ Data limitations to outside credit and borrower balance sheets
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- Is there a spillover to credit score shocks into employment, housing, insurance, fees, or other expenses?
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- Is there a spillover to credit score shocks into employment, housing, insurance, fees, or other expenses?
- Alternative data implications?
Conclusion and Thanks