Adverse Selection on Maturity: Evidence from Online Consumer Credit

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This Paper

- **Context**: Asymmetric information means borrower screening in credit markets is hard!
  
  – Stiglitz-Rothschild-Weiss-Jaffee: can backfire

- **Proposition**: let borrowers choose maturity, they will self-select on private information

- **Evidence**: Lenders that choose short term when long-term available better than short-term borrowers w/o long-term option

- **Theory**: Maturity screening more efficient than loan-size screening
So what?

• Functioning credit markets important
• Many results require no credit constraints
• Big externalities from collapsed credit markets

1. Having maturity choice is common
2. Demand elasticity w.r.t. maturity >> rates
3. Maturity screening easier
4. Target of policy: Dodd-Frank, Canada
1. Having Maturity Choice Common

Fraction of Originated Mortgages with Term < 30 Years

Source: LPS data; author’s calculations
2. Demand Elasticity for Maturity High

- Evidence that demand elasticity greater for term length than interest rate.
  - (By the way, is this margin present here? When borrowers discover 5 year option, increase loan size? Maybe not because credit card debt amount is fixed at time of decision)
- Elasticity result is because it’s all about payment size!
- Example: $13K loan for 2.5 years at 15% APR
- Consider three scenarios:
  1. Baseline: $522
  2. 20% decrease in interest rate: $504
  3. 20% increase in term length: $450
3. Maturity Screening Easier

• Lending to risky type needs to be compensated

• Screen on FICO expensive, highly predictive (significant) but not huge $R^2$ because of private information

• Screening on loan size inefficient since has direct welfare consequences to not borrow amount optimal for smoothing, etc.
4. Maturity is Policy Target

- Regulators often declare a particular contract feature or type of product equal based on cross-sectional comparisons of default rates.
- Leads to Dodd-Frank (effectively) outlawing 40 year+ mortgages, mortgages with most prepayment penalties, mortgages with IO features, etc.
- Regulators assume that poor performance is causal effect of, e.g. longer maturity, prepayment penalties.
- This paper shows that this blame is misplaced!
- Maybe some causal effect of contract features on default, but clearly there is massive selection into these contracts.
- Maybe not the case that an identical borrower who is randomly assigned a long-maturity loan more likely to default.
- If the story is just one of selection (as in this paper) then regulators are misplacing the blame for those defaults on those features.
- Point holds more broadly to comparing outcomes across financial contracts.
Sample: Typical Borrower

• Earning $66K/year (very cool to know this)
• FICO 695, 61% utilization of non-mortg debt
• 56% mortgagor, likely underwater
  – (since not taking out a 6% APR HEL/HELOC)
• Average 33 years old (15 year credit history)
• 3- or 6-year LC loans, $5-20K face, 16.3% APR
• Unsecured loan to consolidate and pay down debt (esp. credit card)
• Average installment $380/month
• 9.2% will be 120+ days late
Identification

• Can’t compare 15-year and 30-year mortgages to learn about self-selection
  – Nowhere near comparable situations
• Want to hold payment + NPV fixed. How can you do that and vary term? Can’t.
• Here, vary availability of other option. Bingo.
Described Policy Change

Pre-change

3 year
No loan

Post-change

3 year
5 year
Likely Actual Policy Change

Pre-change
- 3 year
- 5 year non-LC

Post-change
- 3 year
- 5 year
Control group

• Key worry with control group:
• Bad types in short-term-only regime are really bad because they don’t have access to non-LC options for longer-term loans.
• Mitigated by the fact that borrowers didn’t know 5 year option existed before applying.
• But could show that (ST+LT) pooled performance for $12K loans same before and after to show aggregate composition hasn’t changed
Results

• 16% of borrowers select out of short, into long
  – (14.5 log points is ~16%, so results may be larger)
• Borrowers who actively select into short term (i.e. who could’ve selected longer term):
  – Default less
  – Decrease in FICO less
    • (cf. On average, borrower FICO decreasing)
• Clear that performance better among short-term borrowers. Next question: why?
• Could be lots different about ST/LT borrowers
Interpretation

• Authors: LT contract is insurance against future volatility
  – Those that need insurance (private info on future volatility) select out of short-term loans
  – Short-term has roll risk (also was issue with Repo, GSEs)

• Intuitive but empirical evidence on insurance shaky:
  – Defaults not right away => subtle information
    • Effect of remaining balance: distress with $2K left << distress with $8K
    • Figure 8 shows consistent downward trend, consistent with proportional hazards model
  – More likely to prepay, too => income volatility
    • Mechanically true that longer contract more opportunity (and motive) to prepay? Need hazard model to lock this down. Control directly for outstanding balance?
Proportional Hazard Model

- Posit literature-standard Hazard Model:
  \[ \lambda(X,LT,t) = \exp(X\beta + \alpha LT)\lambda_0(t) \]
  – where \( \lambda_0(t) \) is the baseline hazard
- @ time t, LT contracts default by a proportional factor \( e^\alpha \) more than ST
- In levels, differential default rate is
  \[ (e^\alpha - 1)e^{X\beta}\lambda_0(t) \]
- Growing in t so long as baseline hazard is, too
This figure shows the estimated coefficient and 90% confidence interval of the regression:

\[
\text{default (Dt)} = b_{\text{amount}} + d_{\text{FICO}, t} + g \times b_{\text{amount}_{1000}, t} + x_i, t + e_i,
\]

where the outcome is \(\text{default (Dt)}\), a dummy that equals one if a loan is not current by more than 30 days as of April 2015 and if the last payment on these loan occurred \(D_{\text{amount}_{1000}}, t\), a dummy that captures the staggered expansion of the 60-month loans for amounts above $12,000 and $10,000 on March and July 2013, respectively. Standard errors are clustered at the subgrade level. Sample includes loans issued between December 2012 and October 2013, for loan amounts between $5,000 and $20,000.
Figure 8 Comments

• How much of insurance evidence rests on Fig 8?
• Proportional hazard story not fixed by diff-in-diff
  – Seems it would be fixed by putting in a differential trend for LT borrowers that would capture this
• Seems to be a trend, not a late-resolving uncertainty story
• Precision an issue
• Can’t reject flat in the later period
Other Interpretations

• Could be demand for implicit insurance against privately observed future volatility
• Can’t be: ex-ante credit risk, income, vintage
  – (all controlled for)
• PTI? Same volatility but select into LT because PTI higher and want more disposable income?
  – Default more because of high PTI
• Impatience (discount rate) / taste for disposable income?
  – Default more because of less saving
Missing Literature

• Self-selection in consumer credit:
  – Mortgage points, prepayment penalties
  – Exactly this story.
  – Stanton and Wallace (2003)
  – Mayer, Piskorski, Tchistyi (2013)

• Payment size matters!
  – Maturity provides biggest changes in payments
  – Mortgage modification lit, e.g. Eberly & Krishnamurthy (2014)
  – Fuster & Willen (2015)
Little Stuff

• Control for loan size? Remaining balance? Control for payment-to-income explicitly?
• 9.2% default result controls for loan age/censoring?
• Could plot baseline hazard for ST vs. LT borrowers to see where diverge
• “the average future FICO score of the 14% of borrowers that self-select into the long maturity loans is 2.3/14% = 16.4 points higher” should be “lower” (page 14)
Conclusion

• Borrowers sort themselves on maturity ✓
• Predictive of future loan performance ✓
• Nice theory: private info on future income volatility makes LT attractive as insurance ✓
• Just OK empirical evidence for insurance story
• Implications for market pricing of maturity?
• Hold our hands on how this could change the way we think / run credit markets.