Loan Contracting in the Presence of Usury Limits: Evidence from Auto Lending

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Disclaimer

The views expressed are those of the author and do not necessarily reflect those of the Consumer Financial Protection Bureau or the United States.
Overview

- Consumer credit markets are heavily regulated; rules:
  - Govern disclosure of loan terms
  - Ensure fair access to credit
  - Restrict allowable contracts

- We study the effects of interest rate limits in auto lending

- Loan contracting and organization of the lending market change to facilitate credit for risky borrowers
Why auto lending?

- Large credit market in which usury limits bind
  - The majority of states limit interest rates on vehicle loans
  - Strong demand for vehicle loans among subprime borrowers
    - $70.7 billion, or 31%, of auto loans in first half of 2014 to borrowers with credit scores below 640 (Equifax, 2014)

- Flexibility in contracting
  - Purchase financing provides opportunity to contract around binding usury limits
  - Note: applies to financing in other markets, for example “rent-to-own” market for furniture, electronics, appliances ($8 billion)
Contracting with dealer finance

• Simple insight on pricing loans:
  • If product seller provides financing, there is an opportunity to price discriminate along two dimensions, price of product and price of credit
  • When prevented from pricing credit risk through the interest rate, seller can adjust sales price of vehicle instead
  • Holding fixed collateral and down payment, this amounts to raising the loan amount, $L$, to increase the required payment rather than the interest rate, $r$
Sales and loan contracting

Constraints:

1) Sales contract – equal value exchanged: $P = D + L$
2) Usury limit: $r \leq r_{usury}$
3) Lender zero profit: $L \leq PV(\text{Pymt}, C)$
Sales and loan contracting

Integrated Dealer-Lender

Vehicle (Price P)

Down Payment (D)

Monthly Payment (Pymt) + Collateral in default (C)

Automobile Buyer

Interest Rate $r = f(L, Pymt)$

Contractual Constraints:

1) Sales contract – equal value exchanged: $P = D + L$
2) Usury limit: $r = f(L, Pymt) < r_{usury}$
Sales process - subprime market

• Sales process reinforces pricing strategy
  • Loan underwriting -> down payment and max monthly payment -> view eligible vehicles -> agree on vehicle, down payment and loan terms
  • Dealers avoid stating cash price of vehicle
    • Do not separately agree on price of vehicle and price of financing
    • On vehicles in lot, price either is not listed or is set at very high level to facilitate mark up without making it evident that mark up is really compensation for credit risk
Example of dealer lot
Buy here, pay here
Poor credit, no problem

EVERYBODY GETS APPROVED!

- Bad Credit
- Slow Payments
- Collections
- No Credit
- Repossessions
- Judgements
- Write-offs
- Bankruptcy
- Divorce
Loan comparison

- Fix value, risk, payment: PV $9000, same default risk, same payment of $382/mth
- Unconstrained: $L = $9000, $r = 30\%$
- Constrained: $L = $10,280, $r = 20\%$

- Constrained loan amortizes more slowly

<table>
<thead>
<tr>
<th>Period</th>
<th>Loan 1: $9000, 30%$ APR, 36 months</th>
<th>Loan 2: $10,280, 20%$ APR, 36 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Monthly Payment  $382</td>
<td>Monthly Payment  $382</td>
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<tr>
<td></td>
<td>Principal  $157</td>
<td>Principal  $211</td>
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<tr>
<td></td>
<td>Interest  $225</td>
<td>Interest  $171</td>
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<td>End-of-period Principal Balance  $10,070</td>
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<tr>
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<td>Monthly Payment  $382</td>
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<td>Principal  $206</td>
<td>Principal  $253</td>
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<tr>
<td></td>
<td>Interest  $176</td>
<td>Interest  $129</td>
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<td>End-of-period Principal Balance  $6,833</td>
<td>End-of-period Principal Balance  $7,507</td>
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<td>24</td>
<td>Monthly Payment  $382</td>
<td>Monthly Payment  $382</td>
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<tr>
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<td>Principal  $277</td>
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<td>Interest  $105</td>
<td>Interest  $74</td>
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<td>End-of-period Principal Balance  $3,919</td>
<td>End-of-period Principal Balance  $4,124</td>
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<td>36</td>
<td>Monthly Payment  $382</td>
<td>Monthly Payment  $382</td>
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<tr>
<td></td>
<td>Principal  $373</td>
<td>Principal  $376</td>
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<tr>
<td></td>
<td>Interest  $9</td>
<td>Interest  $6</td>
</tr>
<tr>
<td></td>
<td>End-of-period Principal Balance  $0</td>
<td>End-of-period Principal Balance  $0</td>
</tr>
</tbody>
</table>
Predictions

1) No rationing – same distribution of loans by credit score regardless of usury restriction

2) Dealers provide greater proportion of financing where usury rates are more likely to bind

3) Where usury rates bind, loan contracting changes: lower interest rate, higher sales price (and loan amount) relative to collateral value; loan payment is unchanged
Contribution to literature

- **Usury limits**
  - Economic growth and welfare (Benmelech and Moskowitz 2010; Glaeser and Scheinkman 1998)
  - Access to credit (Goudzwaard 1968; Jaffe and Modigliani 1969)

- **Seller financing**
  - Price discrimination (Brennan et al. 1988)
  - Asymmetric information (Stroebel 2013; Ivashina and Iverson 2015) and moral hazard (Murfin and Pratt 2014)
  - Monitoring and recovery value (Mian and Smith 1992)
  - Important source of auto loans in aggregate (Benmelech et al. 2014)

- **Subprime borrowing**
  - Collateral value and credit supply (Benmelech et al. 2013)
Outline

1. Background on usury limits

2. Do usury limits cause credit rationing?

3. Do usury limits promote dealer financing?

4. Do usury limits change loan contracting?
Usury limits

• Data compiled from state laws, cross-checked with National Consumer Law Center’s *The Cost of Credit* (2009)

• 29 states impose a maximum interest rate on auto loans

• Structure of law falls into one of three categories
  • Uniform limit applicable to all loans
  • Limit varies with age of vehicle (increasing with age)
  • Limit varies with loan amount (decreasing with size)

• Minimum ceiling ranges from 17% to 31%

• Average limit: 21.5% at minimum ceiling; 25.5% at maximum ceiling
Geographic variation in usury limits
1. Background on usury limits

2. Do usury limits cause credit rationing?

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Data

- **Experian AutoCount database**
  - Administrative data collected/compiled by credit bureau

- **Vehicle purchases - Departments of Motor Vehicles**
  - Date of purchase
  - Vehicle make, model and model year (and Kelley Blue Book value)
  - Dealer name and location
  - Lienholder name (and indication of whether dealer = lender)

- **Credit records**
  - Loan information – loan amount, duration, monthly payment, interest rate
  - Credit score
Data sample

- All financed purchases between January 2011 to August 2013 in states with available DMV data (4 states missing)
  - 28 million financed purchases

- Although underlying records are at transaction level, Experian only releases aggregated statistics
  - Our observations are at the level of dealer-lender-month-credit score bin (20 point intervals)
Analysis

1) Evaluate whether usury limits seem to bind for risky borrowers
2) Examine distribution of credit in states with and without usury limits

➢ Are risky borrowers rationed from the market when interest rates are restricted?
Figure – dist’n rates uncapped

*Sample includes loans made by dealers
Figure – dist’n of loans by score
Figure – dist’n of pop by score
Outline

1. Background on usury limits

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4. Do usury limits change loan contracting?
Outline of analysis

• If dealers pursue strategy of contracting around usury limits, then we should observe shift in provision of loans where usury limits bind

• Examine frequency of dealer financing in states with and without usury limits; regression model:

\[ ShareDealerFinancing_{icst} = \alpha + \beta Cap_s + \gamma_c + \eta_t + \varepsilon_{icst} \]
## Share of dealer financing and usury limit

<table>
<thead>
<tr>
<th>Cap X Score</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cap</td>
<td>0.03</td>
<td>-0.03***</td>
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<tr>
<td></td>
<td>-0.02</td>
<td>(0.01)</td>
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<tr>
<td>Cap X Score 300-420</td>
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<td>(0.11)</td>
<td>(0.10)</td>
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<tr>
<td>Cap X Score 420-480</td>
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<td>(0.06)</td>
<td>(0.06)</td>
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<tr>
<td>Cap X Score 480-540</td>
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<td>0.19*</td>
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<td></td>
<td>(0.11)</td>
<td>(0.10)</td>
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<tr>
<td>Cap X Score 540-600</td>
<td>0.18**</td>
<td>0.16**</td>
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<tr>
<td></td>
<td>(0.07)</td>
<td>(0.06)</td>
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<tr>
<td>Cap X Score 600-660</td>
<td>0.12***</td>
<td>0.10***</td>
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<td>(0.04)</td>
<td>(0.03)</td>
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<tr>
<td>Cap X Score 660-760</td>
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<td></td>
<td>(0.01)</td>
<td>(0.02)</td>
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<tr>
<td>Cap X Score 760+ (Excluded)</td>
<td></td>
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</table>

### R^2

- 0.51
- 0.51
- 0.53

### Obs

- 840,287
- 840,287
- 840,287
Outline

1. Background on usury limits

2. Do usury limits cause credit rationing?

3. Do usury limits promote dealer financing?

4. Do usury limits change loan contracting?
Outline of analysis

- Examine loan contracting among dealer-financed loans
  - Terms of loan only available if lender reports to credit bureau
  - Oversample larger dealer networks in this segment of market - small dealers generally do not report to bureaus
- Our sample includes loans with complete information
  - 40,000 transactions (collapsed to 28,000 observations)
## Summary statistics

<table>
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<th>Statistic</th>
<th>Mean</th>
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<tr>
<td>Credit Score</td>
<td>577</td>
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<tr>
<td>Interest Rate</td>
<td>0.19</td>
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<tr>
<td>Monthly Payment</td>
<td>$403</td>
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<tr>
<td>Term</td>
<td>42</td>
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<tr>
<td>Amt. Fin.</td>
<td>$12,340</td>
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<tr>
<td>LTV</td>
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<tr>
<td>Vehicle Value (KBB)</td>
<td>$8,267</td>
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<tr>
<td>Observations</td>
<td>28,152</td>
</tr>
</tbody>
</table>
CA vs. AR – interest rate

![Graph showing interest rate comparison between AR and CA (No Cap)]
CA vs. AR – LTV

[Graph showing the relationship between Scorex Score and LTV, with lines for AR, CA (No Cap), and 95% CI, indicating a comparison of loan-to-value ratios in California (CA) versus Arkansas (AR).]
CA vs. AR – demeaned payment
Regression analysis

- Goal is to estimate impact of binding usury limit on contract terms - rate, LTV or payment – but indicator of binding constraint not exogenous
  - Bind is function of r and unobserved risk, so correlated with error term

\[ Y_{it} = \beta_0 + \beta_1 \text{Bind}_{it} + \Gamma' X_{it} + \epsilon_{it} \]
Regression analysis (cont’d)

- Use two-stage model:

\[ B_{Ind_{ist}} = \alpha + \lambda' U_{sury_{is}} + \Psi' X_{ist} + \nu_{ist} \]

\[ Y_{ist} = \alpha + \beta \widehat{B_{Ind_{ist}}} + \Gamma' X_{ist} + \varepsilon_{ist} \]

- Usury includes – indicator for cap, quadratic in level of cap, indicator for capXcredit score bin
## Interest rates and binding usury

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pr(Binding = 1)</td>
<td>-0.06**</td>
<td>-0.07**</td>
<td>-0.07**</td>
</tr>
<tr>
<td></td>
<td>(0.03)</td>
<td>(0.03)</td>
<td>(0.03)</td>
</tr>
<tr>
<td>Vehicle Value (KBB)</td>
<td></td>
<td>-0.003***</td>
<td>-0.003***</td>
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<tr>
<td></td>
<td></td>
<td>(0.000)</td>
<td>(0.001)</td>
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<tr>
<td>Amt. Financed ('000s)</td>
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<td>0.001</td>
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<tr>
<td></td>
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<tr>
<td>Term</td>
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<td>-0.0001</td>
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<td>(0.0002)</td>
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<td>Observations</td>
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<td>28,152</td>
<td>28,149</td>
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<tr>
<td>Partial R-sq.</td>
<td>0.11</td>
<td>0.10</td>
<td>0.11</td>
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</table>
# LTV and binding usury

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<tr>
<td>Pr(Binding = 1)</td>
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<td>0.44***</td>
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<td></td>
<td>(0.14)</td>
<td>(0.14)</td>
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<tr>
<td>Vehicle Value (KBB)</td>
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<tr>
<td></td>
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<td>-0.03***</td>
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<td>(0.002)</td>
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<tr>
<td>Term</td>
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<tr>
<td>Partial R-sq.</td>
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</table>
## Monthly payment and binding usury

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<tr>
<td><strong>Pr(Binding = 1)</strong></td>
<td>-56.8</td>
<td>48.8</td>
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<td></td>
<td>(133.3)</td>
<td>(91.70)</td>
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<td><strong>Vehicle Value (KBB)</strong></td>
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<td>20.7***</td>
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<td><strong>Term</strong></td>
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<td><strong>Observations</strong></td>
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<td><strong>Partial R-sq.</strong></td>
<td>0.11</td>
<td>0.10</td>
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</tbody>
</table>
Financial literacy and education

• Financial transactions are complex and difficult to understand
  • Multiple dimensions of price make it had to isolate true cost of credit
• Strategy of price discrimination through product mark-up is an important idea when evaluating credit sales
• Usury limits promote price differentiation on product sale (heterogeneous good) rather than on financing (homogenous service) – counter to spirit of truth-in-lending?
Conclusion

• How do usury limits affect loan markets?
  • Little evidence of credit rationing – similar distribution of auto loans in states with and without usury limits.
  • Instead, loan contracting and organization of lending market adjust - patterns in data suggest dealer financing helps facilitate credit to risky borrowers

• Highlights challenge of regulating terms of credit transactions

• Tension between truth-in-lending and usury laws, as latter forces pricing of credit risk through vehicle mark-up and interest rate does not provide clear indication of cost of credit